CD-4046

SERVICE MANUAL

REVISION 0

Canon

MAY 1998

MY8-1390-000

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

Printed in Japan
Impreimé au Japon

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

PREFACE

This Service Manual describes necessary basic information for after-sales service and maintenance for maintaining the product quality and functions of the CD-4046.

Contents

Chapter 1: General Description
Features, specifications, names of parts, description of operation

Chapter 2: Basic Description
Outline of principle of image processing

Chapter 3: Functions & Operation
Description of principle of operation of electrical and mechanical systems

Chapter 4: Disassembly & Reassembly
Description of disassembly, reassembly, and adjustment

Chapter 5: Installation
Location and installation procedure

Chapter 6: Maintenance & Servicing
Parts to be replaced periodically, consumable parts

Chapter 7: Troubleshooting
Troubleshooting and service modes

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 the prolonged quality and function, and for investigating the cause of trouble during troubleshooting.

Quality Assurance Center
Canon Electronics Inc.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

CONTENTS

CHAPTER 1 GENERAL DESCRIPTION

CHAPTER 2 BASIC DESCRIPTION

CHAPTER 3 FUNCTIONS & OPERATION

CHAPTER 4 DISASSEMBLY & REASSEMBLY

CHAPTER 5 INSTALLATION

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

CHAPTER 6 MAINTENANCE & SERVICING

CHAPTER 7 TROUBLESHOOTING

APPENDIX

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

CHAPTER 1

GENERAL DESCRIPTION

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

I. FEATURES

1. Integrated functions

Scanner, recording and operation/display functions have been integrated.

2. Recording to CD-R disks

A packet writing system is used.
A single 650 MB CD-R disk holds about 20,000 pages.
(A4-size CCITT No.1 document, MMR compression at 200 dpi × 200 dpi)

3. Easy input

Color display LCD and touch panel are used.

4. High-speed scanning

About 37 sheets can be scanned in one minute.
(A4-size CCITT No.1 document, at 300 dpi × 150 dpi single-sided scanning)

5. Search and display on personal computer

Use of Windows®95 and compliance with CD-R related specifications allows images recorded on this machine to be searched and displayed on a personal computer.

Expected Product Life

Whichever of the following two items is reached first:

1) 5 years
2) Approx. 1,000,000 sheets fed

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

II. SPECIFICATIONS

Category	Item	Specifications
External Appearance & Installation	1. Model	Desktop
	2. Power supply	AC100V 50/60Hz AC120V 60Hz AC220-240V 50/60Hz
	3. Weight	Total weight: 19.4 kg Main body: 18.4 kg Display: 1 kg
	4. Temperature range	15 to 27.5°C (59 to 81.5°F)
	5. Humidity range	25 to 75%RH
	6. Max. power consumption or input current	100 V machines: 75 W 120 V machines: 1.0 A 220-240 V: 0.6 A
	7. Noise	During operation: 7.2 Bels (72 dB) Max. During standby: 5.5 Bels (55 dB) Max.
	8. Body dimensions	Tray opened: 365 (W) × 715 (D) × 287 (H) mm Tray closed: 365 (W) × 456 (D) × 244 (H) mm
	9. Touch panel dimensions	Leg opened: 192 (W) × 164 (D) × 79 (H) mm Leg closed: 192 (W) × 164 (D) × 57 (H) mm
Software	1. Operating system	Windows95 by Microsoft Corp.
	2. Application software	Made by Canon Electronics Inc.
	3. Scanner control module	Made by Canon Electronics Inc.
	4. CD-R control software	DirectCD by Adaptec, Inc.
	5. Display module	OCX by Wang Laboratories, Inc.
	6. Touch panel driver	TT-WIN95 by Gunze Limited
Document Scanning	1. Photo-sensitive element	BASIS: Image resolution 300 dpi, number of effective scanned pixels 3024 (256 mm)
	2. Scanning	Movement of document
	3. Light source	LED array (yellow green)
	4. Scan modes	Double-side & Single-side Text (w/out error diffusion processing) Photo (w/ error diffusion processing)
	5. Max. scanning range	256 mm (width) × 364 mm (length)
	6. Scanning resolution	1) 300 dpi × 300 dpi (horizontal × vertical) 2) 200 dpi × 200 dpi (horizontal × vertical) 3) 300 dpi × 150 dpi (horizontal × vertical)
	7. Function sheet	5 function sheets (packaged) supported

Table 1-1 (Continued)

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

Category	Item	Specifications
Document Feeding	1. Pick-up method	Automatic & Manual
	2. Document size	1) Automatic: Width 55 to 257 mm, Length 70 to 364 mm, Thickness 0.06 to 0.15 mm 2) Manual: Width 55 to 257 mm, Length 70 to 364 mm, Thickness 0.05 to 0.20 mm
	3. Paper storage	Stacked height 10 mm (approx. 100 sheets of 80 g/m^2)
	4. Document restrictions	1) Back carbon paper: Cannot be used 2) Pressure-sensitive paper: Cannot be used 3) Perforated paper for binding: Round perforations only 4) Curled paper: Curling 5 mm or less
	5. Feed speed	1) High speed: 241.9 mm/sec (300 dpi × 150 dpi) 2) Medium speed: 181.4 mm/sec (200 dpi × 200 dpi) 3) Low speed: 121.0 mm/sec (300 dpi × 300 dpi)
	6. Number of scanned documents	1) A4-size, single-sided: 37 sheets/min 2) A4-size, double-sided: 19 sheets/min 3) Letter-size, single-sided: 38 sheets/min 4) Letter-size, double-sided: 19 sheets/min Note: CCITT No.1 document, 300 dpi × 150 dpi, screen display
	7. Delivery method	Face down
	8. Paper tray storage	Approx. 100 sheets of 80 g/m^2
Image processing	1. Image processing	1) Shading compensation (BASIS compensation) 2) Gamma compensation (tone compensation) 3) Error diffusion 4) Edge emphasis 5) Binarization 6) Noise elimination
	2. Image compression method	MMR
Document recording	1. Recorder	CD-R drive CDU926S made by Sony Corporation
	2. Recording speed	2 × speed
	3. Playback speed	6 × speed
	4. Recording medium	650 MB CD-R disk
	5. Recording system	Packet writing
	6. Format when CD-R is ejected	1) DirectCD format 2) ISO9660 level 3 format (session close) Changeable
	7. Interface	SCSI-2
	8. Document recording capacity	Approx. 20,000 pages on 650 MB CD-R disk Note: A4-size CCITT No.1 document, 200 dpi × 200 dpi

Table 1-1 (Continued)

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

<table>
<tr><th>Category</th><th>Item</th><th>Specifications</th></tr>
<tr><td rowspan="6">Display & Operation</td><td>1. Display unit</td><td>STN type color LCD, K64488L-FF made by Citizen Watch Co., Ltd.</td></tr>
<tr><td>2. Display system</td><td>VGA (640 × 480 dots)</td></tr>
<tr><td>3. Viewing Area</td><td>123 × 92mm</td></tr>
<tr><td>4. Input unit</td><td>Touch panel
Attached to LCD surface</td></tr>
<tr><td>5. Image display functions</td><td>1) Enlarge & Reduce
2) Rotate
3) Scroll
4) Move page
5) Move file</td></tr>
<tr><td>6. Search items</td><td>1) Cabinet
2) Folder
3) Document
4) Key word
5) Date</td></tr>
<tr><td rowspan="4">Other</td><td>1. Power interruption countermeasures</td><td>Rechargeable sealed lead-acid battery built in as backup battery
Note: Backup battery is consumable.</td></tr>
<tr><td>2. External interface</td><td>1) VGA
2) Keyboard I/F
3) Mouse I/F
Note: For service use. Not to be used by the user.</td></tr>
<tr><td>3. Acquired specifications</td><td>
<table>
<tr><th>Country or Region</th><th>Safety Restrictions</th><th>Electromagnetic Wave Restrictions</th><th>Radiation Restrictions</th></tr>
<tr><td>Japan</td><td>--</td><td>VCCI Class A</td><td>---</td></tr>
<tr><td>USA</td><td>UL 1950</td><td>FCC Class A</td><td>CDRH</td></tr>
<tr><td>Canada</td><td>CSA 950</td><td>IC Class A</td><td>---</td></tr>
<tr><td>EC</td><td>EN60950</td><td>EN55022 Class B
EN61000-3-2
EN61000-3-3
EN50082-1</td><td>EN60825-1</td></tr>
<tr><td>Germany</td><td>EN60950</td><td>---</td><td>EN60825-1</td></tr>
<tr><td>Finland</td><td>EN60950</td><td>EN55022 Class B</td><td>EN60825-1</td></tr>
<tr><td>Australia</td><td>AS/NZ3260</td><td>EN55022 Class B</td><td>---</td></tr>
</table>
</td></tr>
<tr><td>4. Options</td><td>ED500 (endorser)</td></tr>
</table>

Table 1-1 (Continued)

These specifications are subject to change without notice for improvement of the machine.

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

III. PRECAUTIONS

This chapter 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.

A. Laser Beam Safety

A laser beam is emitted inside the CD-R drive of this machine. This laser beam will not be directed at the 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 disk drive. It is assumed that the CD-R disk drive will not be disassembled nor adjusted at the field.

The "CAUTION: LASER BEAM" label is affixed to the CD-R drive.

DANGER	INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM.
DANGER	RADIATIONS INVISIBLES DU LASER EN CAS D'OUVERTURE. EVITER TOUTE EXPOSITION DIRECTE AU FAISCEAU.
VORSICHT	UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSET ZEN.
ADVARSEL	USYNLIG LASERSTRÅLING VED ÅBNING. UNDGÅ UDS/ETTELSE FOR STRÅLING.
ADVARSEL	USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES. UNNGÅ EKSPONERING FOR STRÅLEN.
VARNING	OSYNLIG LASERSTRÅLING NÅR DENNA DEL AR ÖPPNAD. STRÅLEN ÄR FARLIG.
VARO!	NÄKYMÄTÖN AVATTAESSA OLET ALTTINA LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEN.

LASER BEAM label

B. Electrical Interference Countermeasures

This machine complies with the following electrical interference standards. However, the user might have to carry out separate countermeasures if the machine causes electrical interference.

Do not change nor modify this machine's specifications. If this has been carried out, its use may be forcibly discontinued on site. If this machine's specifications have been changed, or the machine has been disassembled and reassembled, follow the instructions described in this manual or in Service Information Bulletins.

The "CAUTION: ELECTRICAL INTERFERENCE" label is affixed on the rear of the machine.

Country or Region	Restriction
Japan	VCCI Class A
USA	FCC Class A
Canada	IC Class A
EC	EN55022 Class B, etc.
Australia, Finland, Germany	EN55022 Class B

This device complies with Part 15 of the FCC Rules Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interfernce received, inculuding interference that may cause undesired operation.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

ELECTRICAL INTERFERENCE label (120 V machines)

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

C. Backup Battery

This machine uses a rechargeable sealed lead-acid battery as a backup battery in the event of a power interruption.

Note: All references to "battery" in the User's Instructions refer to this backup battery.

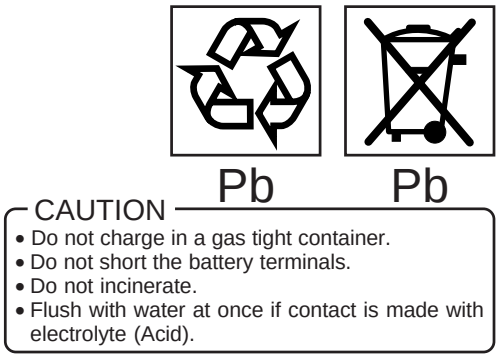
1. Cautions

1) Do not remove the transparent cover housing the rechargeable sealed lead-acid.
2) Do not short-circuit the terminals.
3) Do not damage nor deform the battery.
4) Do not bring the battery near to naked flames, nor splash it with water.
5) Do not block the holes on the transparent cover.
6) For details on how to replace the backup battery, see "Chapter 4. Disassembly and Assembly."
7) Store replacement backup batteries within the range –10°C to +30°C.
8) Use of the backup battery in an uncharged state (including storage) is limited to 15 months. Use of the backup battery is valid for two years from start of use.
9) Collect and dispose of unwanted backup batteries in a way that complies with local bylaws.

2. Cautionary Indications

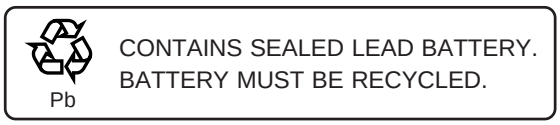
The following cautions are indicated on the backup battery and on the rear of the machine:

1) Backup battery



[120 V, 220-240 V machines]

2) Rear of machine



[120 V machines]

D. Recorded Data

Data can be written (recorded) to CD-R disks only once. Once data is written, it cannot be deleted nor overwritten. When writing data to CD-R disks, take care to prevent the CD-R disk from being subjected to vibration or impact. If a CD-R disk is scratched or damaged, the data on the CD-R disk may be destroyed. Once data is destroyed it cannot be recovered.

1. Cautions

1) Do not subject CD-R disks to vibration or impact during writing of data.
2) Do not scratch CD-R disks, nor allow dust to settle on them.
3) We recommend closing sessions.

Note: Once a CD-R disk is session-closed, data is less likely to be destroyed. However, about 14 MB of disk space is required for each session close operation.

4) We recommend selecting the backup mode. Read the "Read Me First" precautions included in the package.

Note: When the backup mode is selected, the same data as on the CD-R disk is also recorded to hard disk, so data can be copied more reliably than in the standard mode. However, when the CD-R disk is exchanged with a different CD-R disk, the data on hard disk must also be exchanged, so operations are extended by the time it takes to swap this data.

5) Backup the recorded data.
   Use the disk copy function to make copies of CD-R disks containing recorded data to ensure that data is available in the event that data on one of the CD-R disks is destroyed.
6) Use only authorized disks.
   Use CD-R disks having the COMPACT disc Recordable mark that indicates compliance with the Recordable Compact Disk System Part II (Orange Book) Standard. Do not use scratched or cracked CD-R disks.
7) Do not use CD-R disks formatted or recorded on the CD-4046 on other equipment.

E. CD-R disk

When the CD-R disk is damaged or dirty, data sometimes can no longer be read from the disk. Data cannot be recovered from damaged CD-R disks.

Note: "Disk" mentioned in this manual or in the User's Instructions refers to CD-R (Compact Disk Recordable) disks.

1. Cautions

1) Do not drop nor bend CD-R disks.
   Do not scratch the recording or label surfaces.
2) Do not leave fingerprints, dirt, dust or water drops on the recording surface of CD-R disks.
3) Do not leave CD-R disks in the direct sunlight or locations subject to high temperature or humidity.
4) Do not affix paper or tape to the recording surface or label surface.
5) When writing on the label surface, use a felt-tip pen or other soft-tipped pen.
6) After you have finished using a CD-R disk, put it away in its special case and store in a safe place. To use a CD-R disk, place it in the caddy and insert the caddy.
7) If the surface of the CD-R disk is marked with fingerprints or is dirty, wipe lightly with a soft, dry cloth or a commercially available CD cleaner outwards from the center of the disk.
8) Follow other cautions that come with the CD-R disk.

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

F. Turning Power OFF in an Emergency

This item describes how to turn the power OFF in an emergency.

1. Power Cord

The power switch on this machine is for turning the DC power ON and for starting up the software. This machine, however, does not have a switch for turning the AC power ON and OFF. Disconnect the power cord to turn the AC power OFF if the machine emits abnormal noise, smoke or foul odors.

Note: Normally, leave this power cord connected for charging the backup battery even if it is not used.

2. Reset switch

If a system error, for example, totally prevents the system from working, insert a piece of wire 1.0 to 1.5 mm in diameter into the hole on the reset switch and press the reset switch. This switch is located on the front of the machine. As soon as you release (turn OFF) the reset switch, the DC power is automatically turned OFF. Before turning the power ON again, wait at least 10 seconds before pressing the power switch.

Note: Do not press the reset switch except in an emergency. Do not press the reset switch with the HDD or CD-R drive operating. (The operator can judge whether or not the drives are operating by the sound of these drives operating or by the LED on the CD-R drive.) "ScanDisk" sometimes operates when the system is started up. This is normal, so do not press the reset switch while "ScanDisk" is operating.

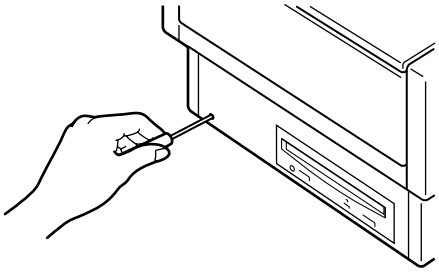


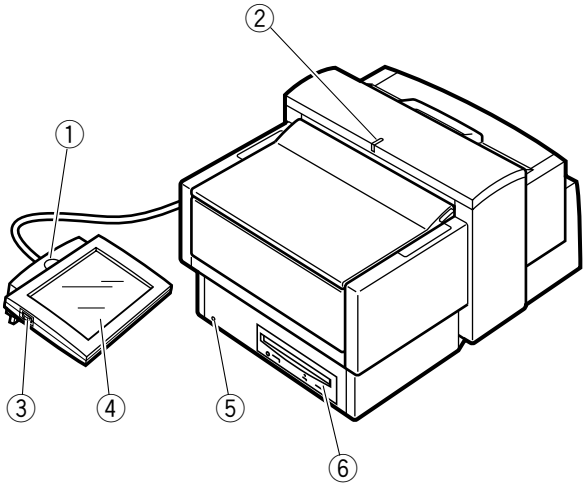
Fig. 1-1

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

IV. NAMES OF PARTS

1. Front View

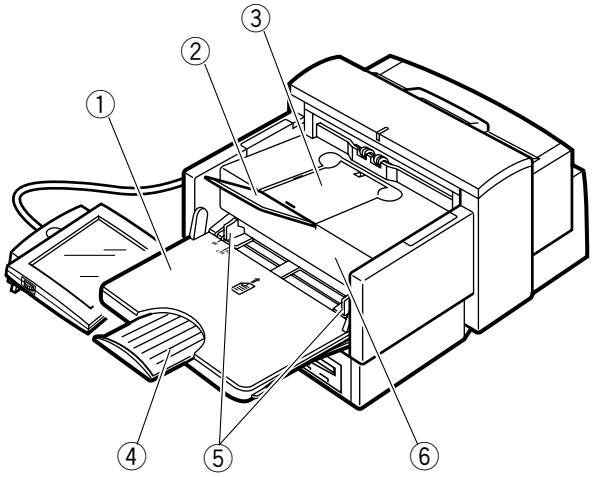
[With Pick-up Tray Closed]



① Power switch
② Power indicator
③ Contrast dial
④ Touch panel
⑤ Reset switch
⑥ CD-R drive

Fig. 1-2

[With Pick-up Tray Open]



① Pick-up tray
② Delivery tray guide
③ Delivery tray
④ Pick-up tray guide
⑤ Document guide
⑥ Feeder assembly

Fig. 1-3

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

V. DESCRIPTION OF OPERATION

A. Basic Operation

The following are the basic operations of this machine. For details, refer to the User's Instructions.

1. Turn the power ON by pressing the power switch.
2. The software automatically starts up and the [Startup screen] is displayed, followed by the [Main screen]. (It takes about two minutes 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's Instructions.
4. Quit operations in the [Main screen].
5. The software automatically shuts down, and the power is turned OFF. (It takes about 10 seconds for the power to turn OFF.)

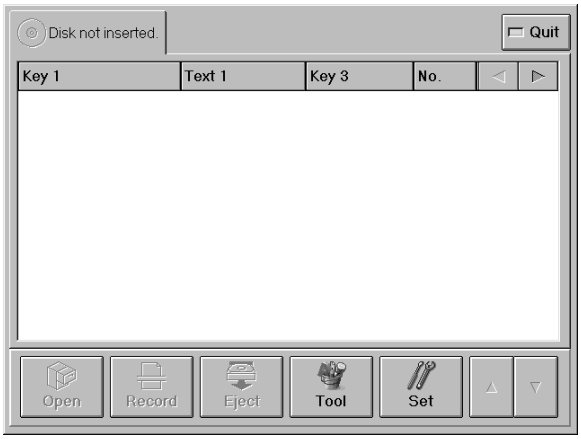
Note 1: Before turning the power back ON again, wait at least 10 seconds.

Note 2: Carry out operations on the touch panel with your fingertips. Using a hard, sharp-tipped 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 3: Carry out the following operation after the disk is displayed correctly on the [Main screen] when the CD-R is inserted.

Note 4: Make sure that the caddy cover is firmly closed. If the caddy cover is not completely closed, the caddy sometimes cannot be drawn out of the CD-R drive.

Note 5: Take care to prevent your necktie or long hair from becoming drawn inside the machine during operation. If it does, immediately disconnect the power cord.



[Main screen]

Fig. 1-4

If the CD-R disk is subjected to vibration or shock during recording, the data on the CD-R disk may be destroyed. Once data is destroyed it cannot be recovered. Make absolutely sure that the user is aware of this.

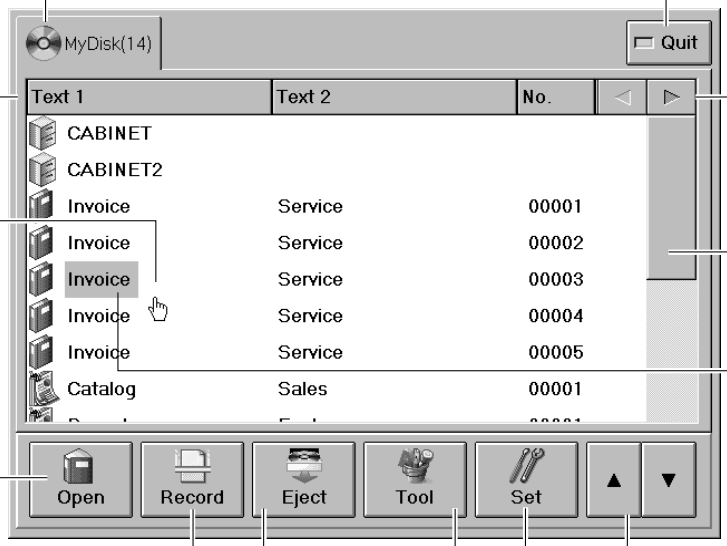
B. Operation Buttons

The following describes the operation buttons in the Main screen after a disk 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 disk, and the name of the currently open cabinet, folder and document. If there are two or more tabs, touch the desired tab to redisplay that screen.

Quit button
Touch this button to quit the software.



[Main Screen]

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

Scroll bar
This bar scrolls the field up and down.

Pointer
This is displayed when you place you finger on the touch panel.

Inverted display
The location specified by the finger is selected and displayed inverted.

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

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

Record button
Touch this button to record an image.

Eject button
Touch this button to eject the disk.

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

Tool button
Touch this button to create cabinets and folders, change cabinet or folder names, delete cabinets and folders, change document names, and copy disks.

Fig. 1-5

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

VI. REGULAR INSPECTION BY USERS

Fully explain to the user that the following locations must be cleaned about once every week, and that the power must be turned OFF and the power cord must be disconnected before the user starts cleaning.

1. Exterior

- Covers and touch panel
  Wipe with a cloth moistened with water or neutral detergent, and then wipe dry.

Note: When you clean the touch panel, be sure to firmly wring the cloth to prevent excess liquid from seeping inside the touch panel. Also, do not press down hard on the surface of the touch panel.

2. Optical Path

- Guide glass
  Wipe with a cloth moistened with water, and then wipe dry.

3. Pick-up Feed Assembly

Wipe the following rollers with a cloth moistened with water, and then wipe dry:

- Pick-up roller
- Feed roller
- Separation roller
- Registration drive roller
- Scanning follower roller (front)
- Scanning follower roller (rear)

Note: Clean each of the rollers rotating them in the feed direction.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

CHAPTER 2

BASIC DESCRIPTION

This chapter describes the basic knowledge required for this machine. For a more detailed description of operations and functions, see Chapter 3, Functions and Operation.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

I. OUTLINE

This section describes the series of operations from scanning through to recording of image data.

Refer to Fig. 2-1 for a structural diagram of the optical system, and Fig.2-2 for a schematic block diagram of the electrical circuit.

Firstly, both the surfaces of the document are irradiated by two LED arrays positioned above and below the document. The light reflected from the document surfaces is detected by the BASIS (Base Stored Image Sensor) and converted to electrical signals.

At this time, the image on the document is separated into individual pixels (picture elements) by the BASIS, and the electrical signals corresponding to the density of each of these pixels are processed in the image processor on the SH CPU PCB assembly. Next, data that is converted to TIFF by the function of the control CPU PCB assembly is sent to the CD-R drive and recorded on the disk.

Reference

- TIFF (Tagged Image File Format)
  This is an abbreviation for a commonly used image data file format.
  By this format, image data from the scanner assembly is appended with information called a “tag”.

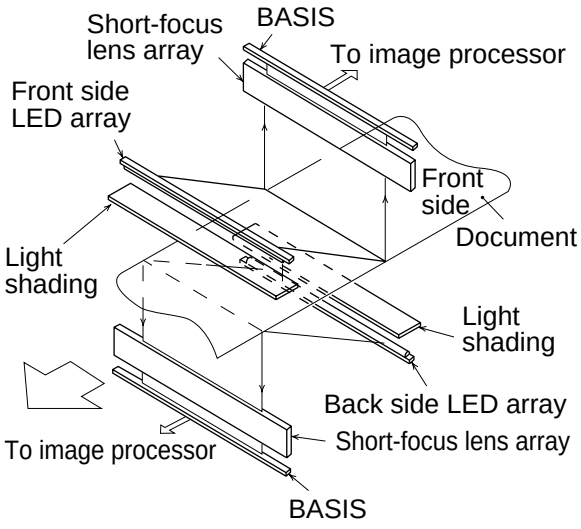


Fig. 2-1

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

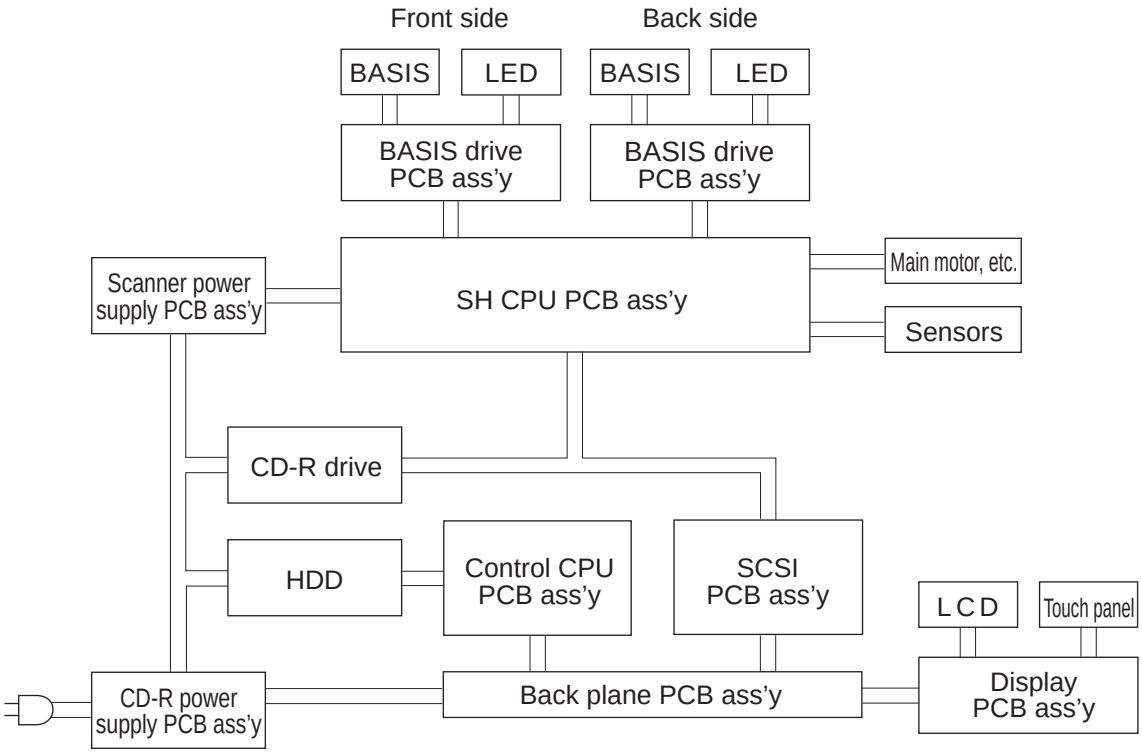


Fig. 2-2

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

II. IMAGE PROCESSING

1. Outline

Fig. 2-3 shows a block diagram of the main image processing functions from image scanning to image processing.

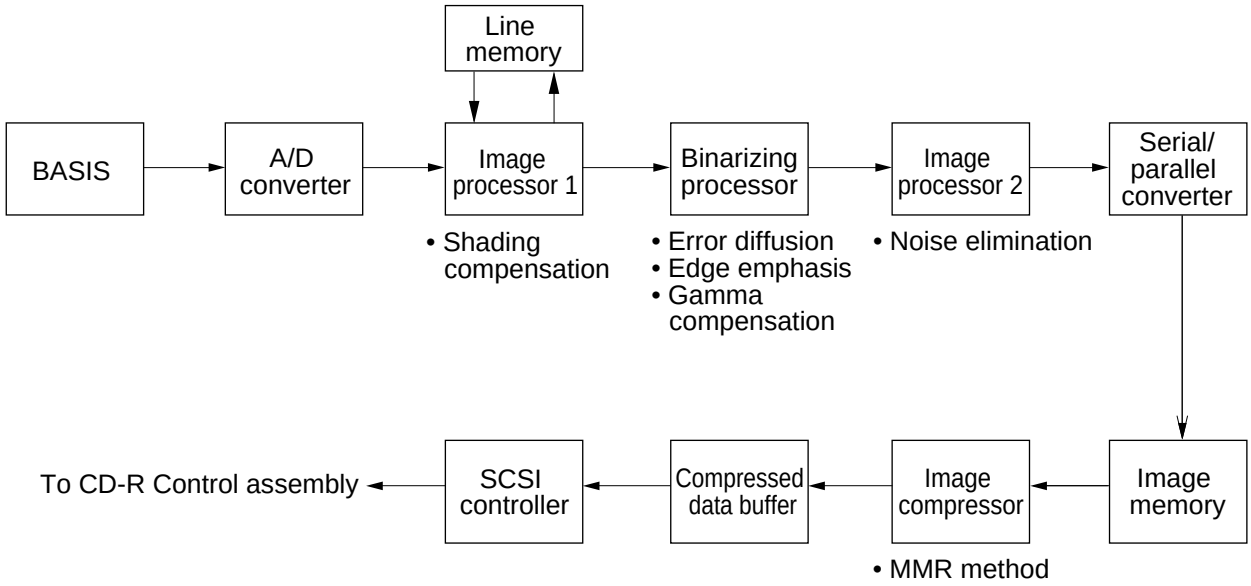


Fig. 2-3

Electrical signals (analog values) corresponding to the density of each pixel that are sent successively from the BASIS are converted by the A/D converter to digital signals (6-bit) corresponding to the pixel density. Then, these digital signals are processed for shading compensation at image processor 1.

- Shading compensation
  Compensation is made for dispersion in the light distribution of the LED array and also for dispersion in the sensitivity of each element of the BASIS.

After being processed by image processor 1, the digital signals are processed as follows and then binarized. The slice level setting (density adjustment) for binarizing can be varied.

- Error diffusion
  This process ensures the reproducibility of photographic and other half-tone documents.
- Edge emphasis
  Emphasizes the edge of the image, when converting image signals to binarized signals, in order to suppress the loss of the fine parts of the image.
- Gamma compensation (tone compensation)
  This compensates the tones in the scanned document.

Binarized image signals are sent to image processor 2 where they are processed for noise elimination and skipping.

- Noise elimination
  Unwanted fine black marks in the scanned document are eliminated to increase the compression ratio during image compression (encoding) that is carried out in the next stage.

After all of the above processes, the image signals are temporarily stored in image memory. These image signals are, then, compressed by the specified compression method (MMR method on this machine) by the image compressor.

Further, compressed image data is stored in compressed data buffer, and then sent to the CD-R control assembly via the SCSI controller.

2. Pixels

During actual scanning (reading of the image), a single scanning line is sub-divided into finer elements.

These elements constitute the building blocks of the image, and they are called “pixels”.

Each square shown in Fig. 2-4 is called a pixel.

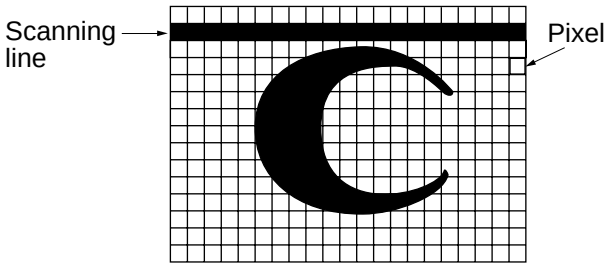
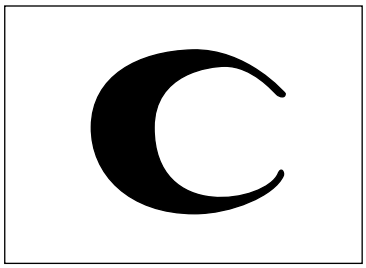


Fig. 2-4

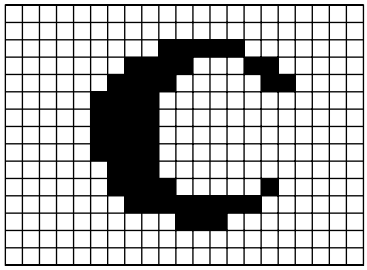
The smaller a pixel, the more faithful will be the reproduction of the original document. (See Figs. 2-5, 2-6 and 2-7.)



Original document

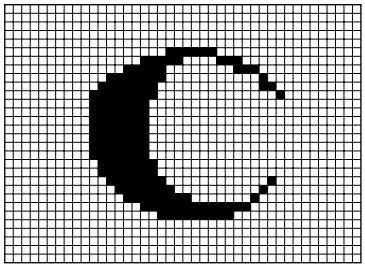
Fig. 2-5

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)



Larger pixels

Fig. 2-6



Smaller pixels

Fig. 2-7

As described above, it can be seen that the smaller the pixels are, the better the resolution is.

Resolution is expressed in scanning line density, and the unit of resolution is dpi "dots/25.4 mm". The unit "lpi" (raster lines/25.4 mm) is sometimes used as the unit for vertical scanning line density to distinguish it from the horizontal scanning line density. Fig. 2-8 shows an example of this.

- Horizontal scanning line density=4 dpi
- Vertical scanning line density=4 dpi

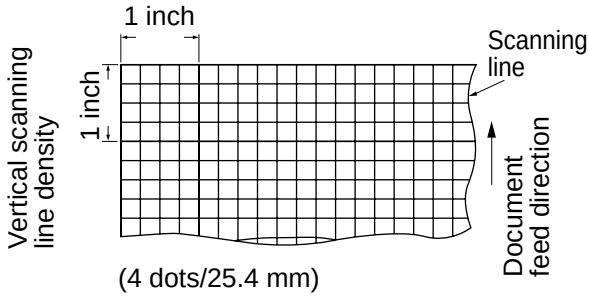


Fig. 2-8

Scanning line density

- Horizontal (= Main) scanning line density:
  This is the number of pixels per inch along a scanning line in the horizontal scanning direction.
  (unit: dpi)

- Vertical (= Sub) scanning line density:
  This is the number of pixels per inch along a scanning line in the vertical scanning direction.
  (unit: dpi or lpi)

Reference

- The maximum resolution of the BASIS on this machine is 300 dpi, and the number of effective scanned pixels in 256 mm is 3024.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

3. BASIS

The photo-electric conversion device used in this machine is a BASIS (Base Stored Image Sensor), while the CCD (Charge Coupled Device) is also commonly used in other machines.

BASIS is a single-chip photo-electronic conversion device with a scanning function, integrated with an array of several thousands of photosensitive elements, each of which measures only several tens of microns square in size.

Fig. 2-9 is the equivalent circuit of one photosensitive element (per pixel) of the BASIS.

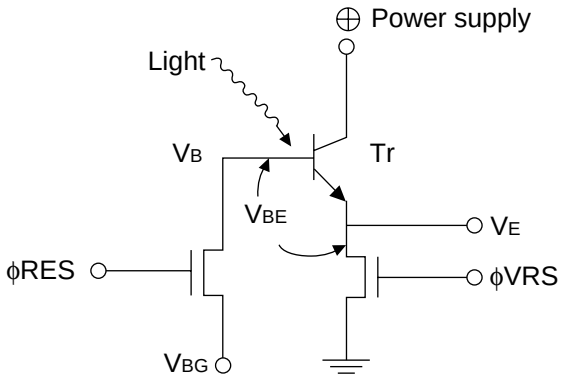


Fig. 2-9

Fig. 2-10 shows BASIS timing, and Fig. 2-11 shows BASIS internal operation.

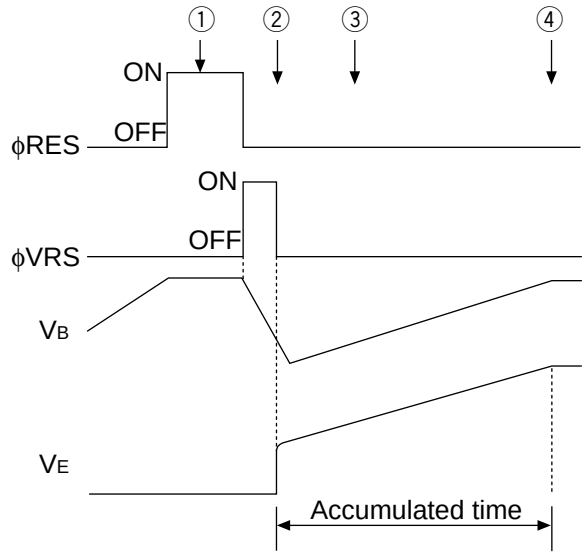


Fig. 2-10

Input the reset signal (H) to terminal φRES and set the V_B terminal at the same electrical potential as V_{BG}. ①

After terminal φRES goes low (L), terminal ø VRS goes high (H) and V_E is reset. After reset, if the "i" layer shown in Fig. 2-11 is irradiated with light, the "i" layer will transmit the light. Therefore, the "p" layer electrons are sent to the "n1" layer and flow to the ☞ power supply. The base voltage V_B gradually increases. ②

If the "n2" layer (emitter) electrons move toward the "p" layer, the emitter voltage V_E accumulates in the base capacity. ($V_E = V_B - V_{BE}$) ③

Emitter voltage V_E after the predetermined accumulated time has elapsed is output. The voltage for the amount of the light irradiation becomes $V_E = V_{EO}$. ④

As described above, the accumulated image information is read sequentially after being amplified for each individual bit.

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

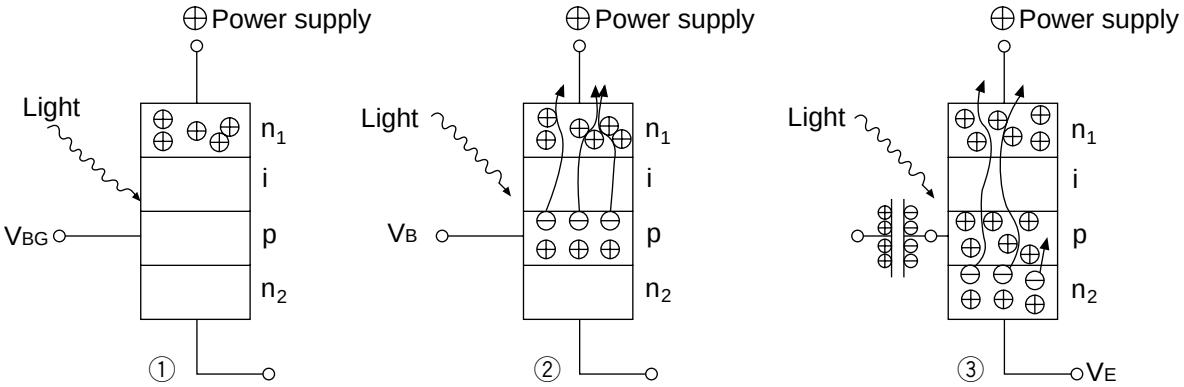


Fig. 2-11

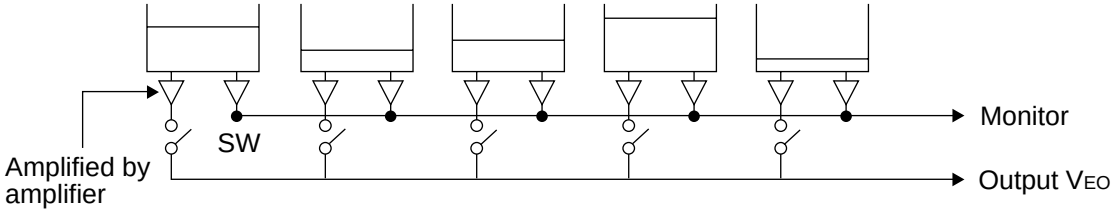


Fig. 2-12

The voltage of each bit is output by opening and closing the switches (SW) in Fig. 2-12 independently. The vertical scanning density is determined by the open-close-open synchronization of these switches.

Normally, the opening-closing synchronization of the switches (SW) is electrically controlled in such a way that the vertical scanning line density is the same as the horizontal scanning line density (determined by the size of the photosensitive elements).

In this way, the image of the document is broken up into pixels of several tens of microns square.

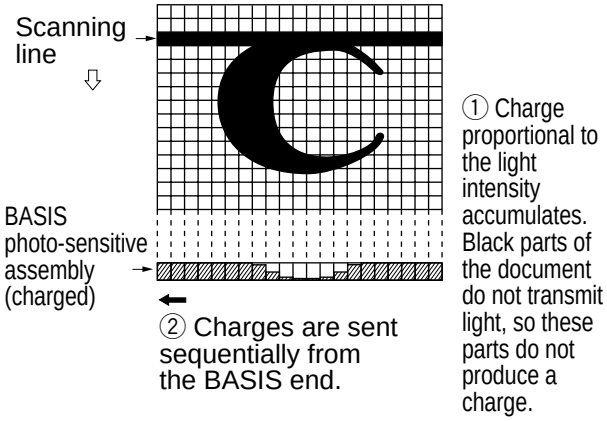


Fig. 2-13

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

4. A/D Conversion

As described above, the output sent from the BASIS is in analog signals, therefore these are converted into digital signals (to enable processing by a microprocessor).

Fig. 2-14 shows a case where the digital signals output after A/D conversion are two bit signals. (The input voltages differ from the actual values.)

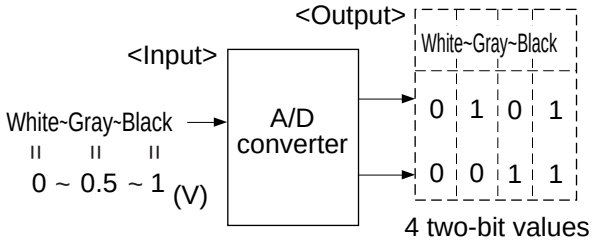


Fig. 2-14

If it were only necessary to judge whether the image density of the document was black or white, the output need only be one bit. In actual fact, however, it is necessary to reproduce halftones such as gray.

If the output is two bits, four values “00”, “01”, “10” and “11” can be output.

Consequently, the input signal (analog) which changes from 0[V] to 1[V] as the image of the document changes progressively through white, gray, and black, is converted to a digital signal of one of these four levels corresponding to the actual analog level.

If the output is four bits, sixteen values can be output.

In other words, as the number of output bits increases, the resulting digital signal represents the changes in density of the document more faithfully (good tonality).

This machine uses 6-bit signals to represent a total of 64 tones.

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

5. Shading Compensation

Even if the BASIS were to detect light reflected from the surface of uniform-density document along its entire scanning direction, the BASIS output from each of the pixels would not be the same value for the following reasons:

Reasons:

1. The light intensity of each of the LED arrays is different.
2. The sensitivity of each of the several thousand photosensitive devices in the BASIS are different.

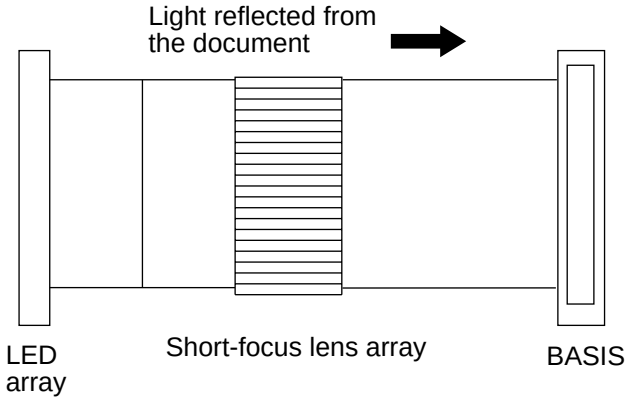


Fig. 2-15

Compensating for these dispersion in BASIS output is called “shading compensation”.

That is, when the BASIS detects light reflected from uniform-density document, the output of each of the pixels on the BASIS varies. So, each of the pixel output values from the BASIS is multiplied by a predetermined compensation index so that all outputs are equal.

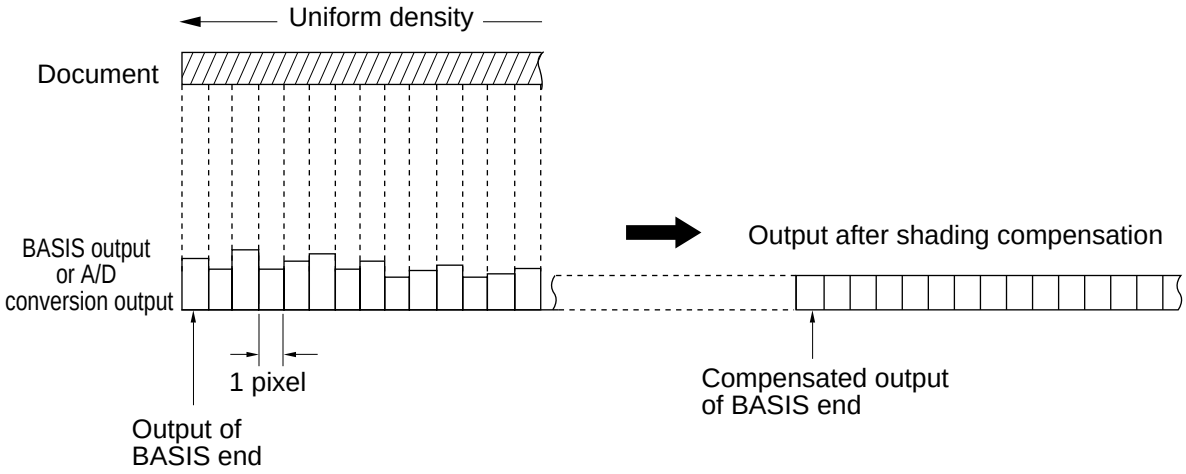


Fig. 2-16

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

Fig. 2-17 shows the output of BASIS Ⓐ when the image changes from white to black.

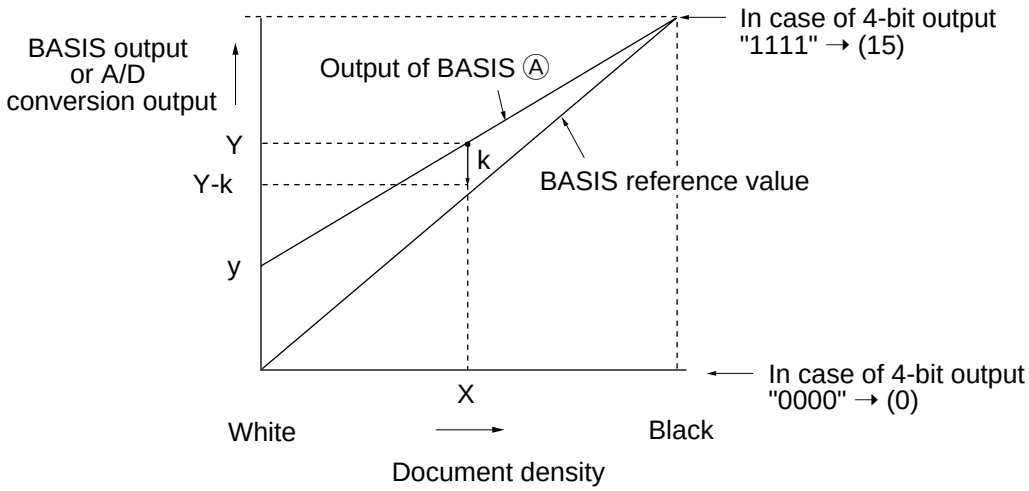


Fig. 2-17

The following describes the principle of shading compensation on the assumption that only the BASIS output for a single pixel Ⓐ is taken into account. (This description also assumes that the output after A/D conversion is 4-bit.)

Before this machine is shipped from the factory, a “white color paper” is scanned, and each of the BASIS output data are stored to memory.

Then, the compensation index for ensuring that each of the BASIS data levels are uniform is calculated.

The BASIS output value (y) is measured by reading the “white color paper” at pixel Ⓐ on the BASIS, and the compensation indices for all of the values from “y” through to “1111” (15) in accordance with this value are each calculated and stored in memory.

If the image density was “X” when the document is actually scanned, the output value after shading compensation (Y-k) can be obtained by multiplying the output Y (before compensation) by the compensation index.

Reference

1. Index table RAM
The RAM in which the compensation index for shading compensation is stored is called “index table RAM”.

2. Short-focus lens
The short-focus lens is fiber-shaped as shown in Fig. 2-18. A feature of this lens is that it has a short focal length.

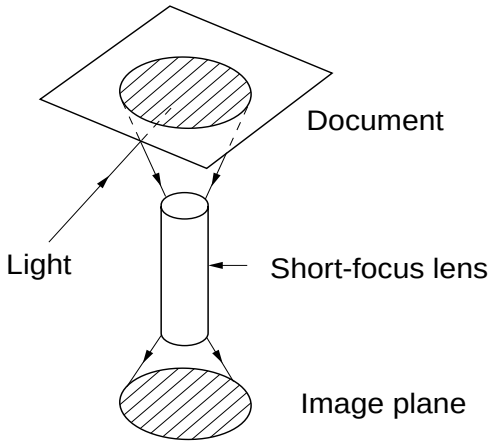


Fig. 2-18

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

The light beam that is incident to the lens is repeatedly reflected inside the lens as shown in Fig. 2-19. The interval of reflection of this light beam is proportional to the wavelength of the incident light.

For example, if the lens is shorter than the ratio with the light's wavelength like ① in Fig. 2-19, the emitted light beams condense. If the lens is longer, the emitted light scatters like ②. If the lens matches the ratio with the light's wavelength like ③, the light beams that are emitted from the lens become parallel light beams, and the image on the document is formed at the original size on the image plane.

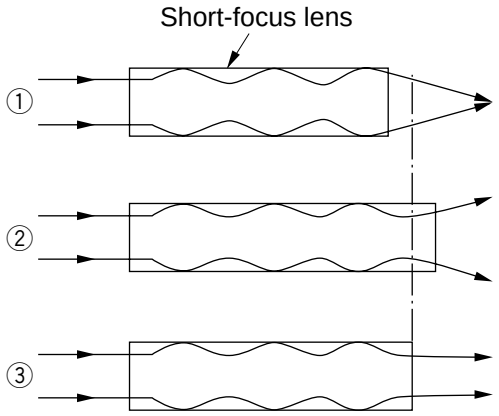


Fig. 2-19

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

6. Line Memory

Line memory is used to store one scanning line of data. The shading compensated data (signal) is temporarily store in this memory.

Data cannot be read from memory while it is being written. So, two line memories are provided, and "read" and "write" are executed alternately. Data is written in one line of memory while data is read from the other line.

These line memories are primarily used to compare the image density with the preceding line when edge emphasis processing is performed.

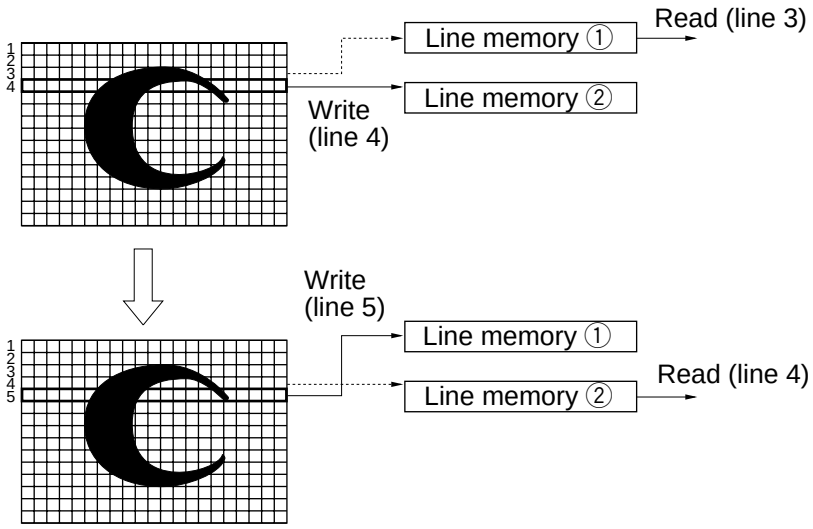


Fig. 2-20

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

7. Gamma Compensation (Tone Compensation)

Fig. 2-21 shows the relationship between document density and output level after shading compensation.

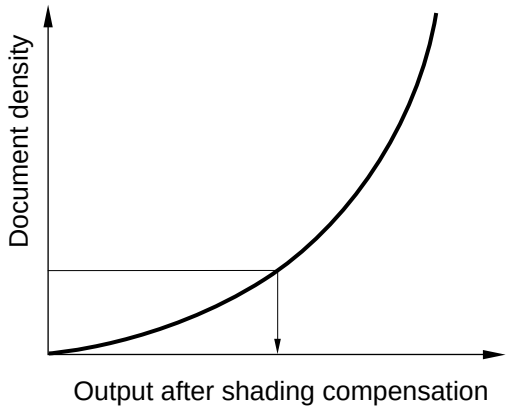
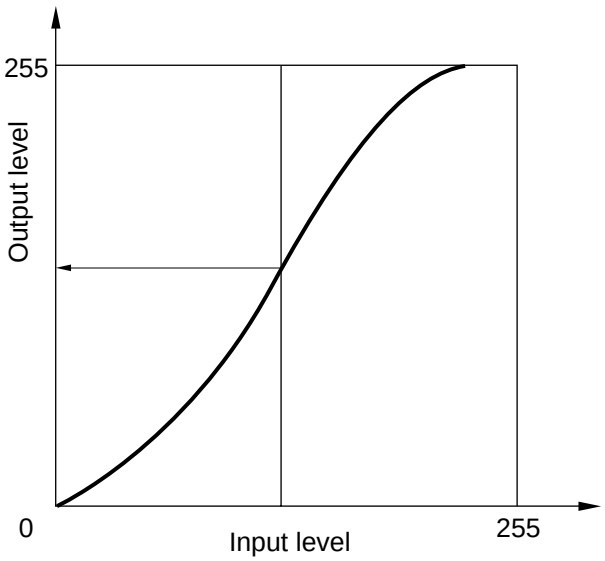


Fig. 2-21

The relationship between the document density and the output level after shading compensation (this output being the input level to the gamma compensation processor) is not linear. The input level to gamma compensation will produce a darker image when displayed without gamma compensation.

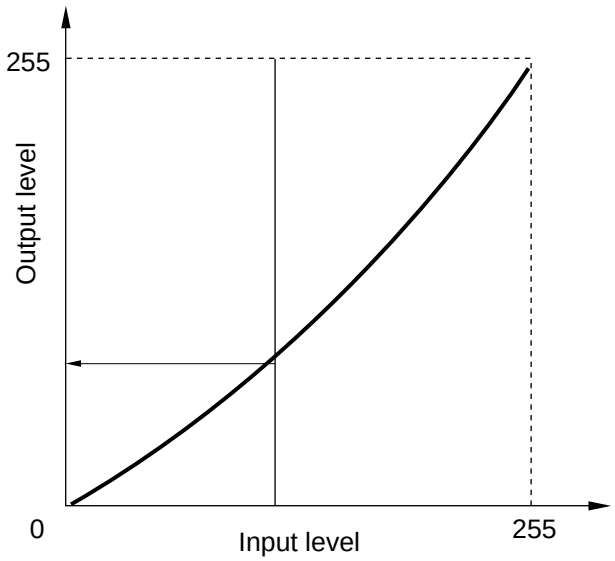
For this reason, the input level is converted to obtain the appropriate density.

1) Tone compensation in the text mode
   Fig.22 shows the relationship between input and output levels by tone compensation in the text mode.
   In the text mode, tone compensation is carried out so that the output level is slightly darker as each character is clearly recorded.



Gamma Compensation in Text Mode
Fig. 2-22

2) Tone compensation in the photo mode
   Tone compensation in the photo mode differs with that in the text mode in that tone is compensated so that light through to dark images are faithfully reproduced.



Gamma Compensation in Photo Mode
Fig. 2-23

8. Edge Emphasis

Edge emphasis is an electrical process that emphasizes difference between light and shade to make the image appear sharper.

Fig. 2-24 shows the waveform of the image signal obtained after edge emphasis.

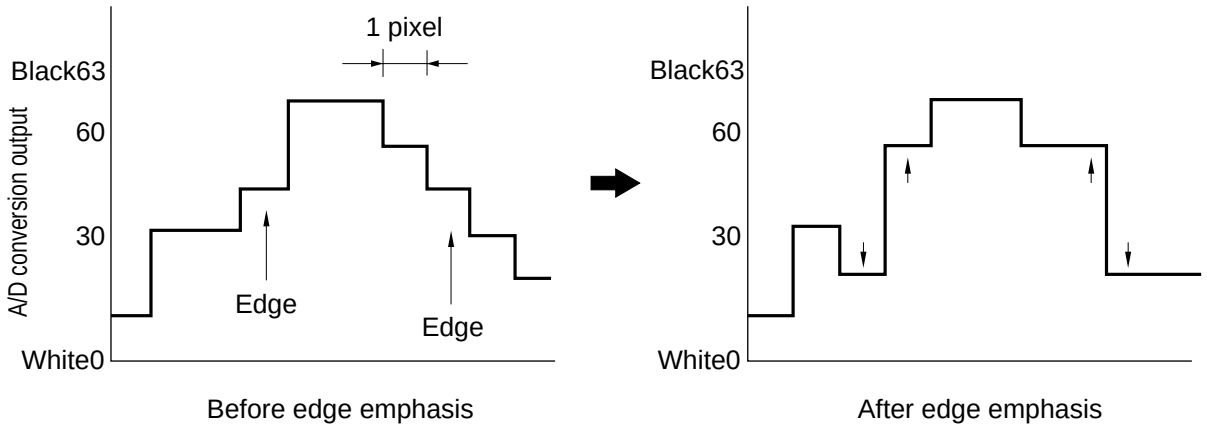


Fig. 2-24

Principle: In density processing, the data in the conversion table provided for edge emphasis is compared with the target pixel

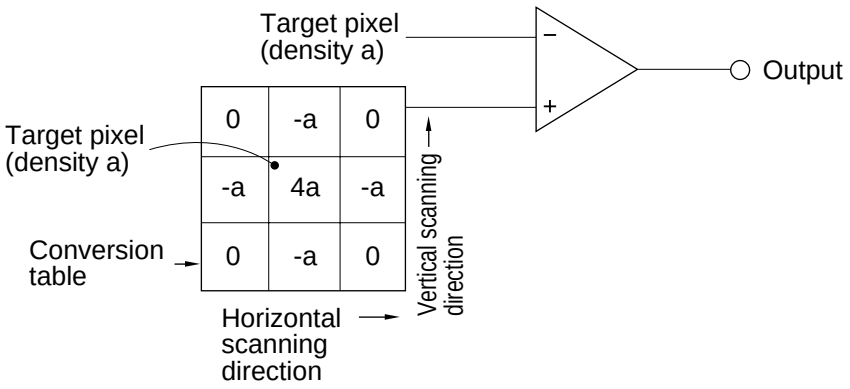


Fig. 2-25

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

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

Arithmetic processing in the horizontal scanning direction is carried out simultaneously with data reading. Arithmetic processing in the vertical scanning direction is carried out by using the line memory to convert data in the previous line.

Fig. 2-26 shows the principle of edge emphasis processing for an example where the A/D converted data consists of two bits.

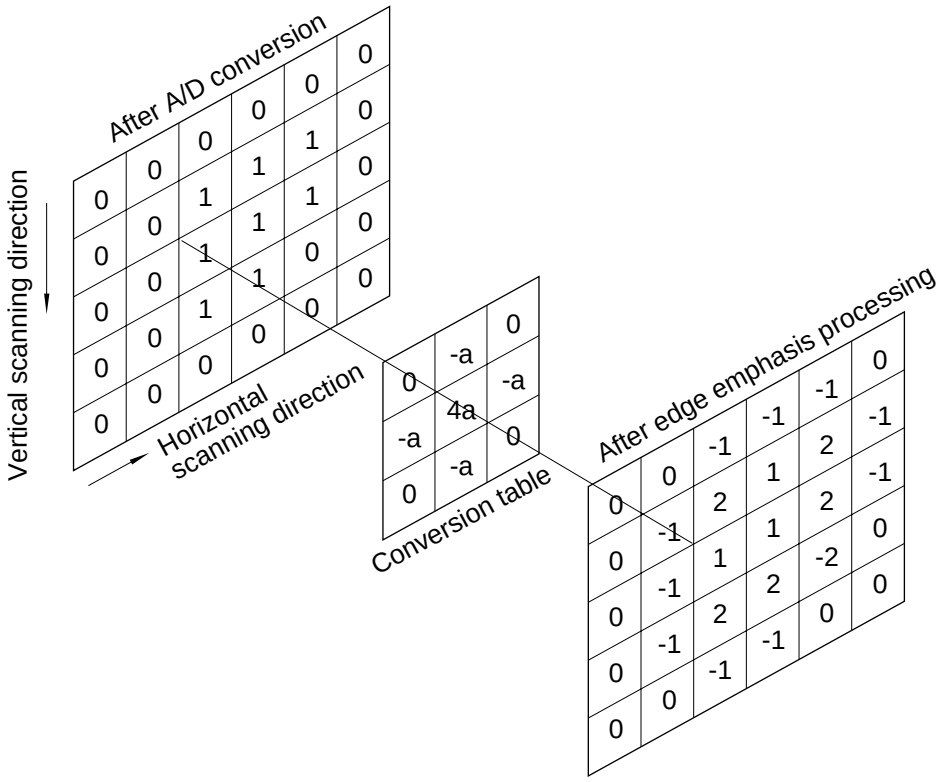


Fig. 2-26

9. Error Diffusion

Error diffusion processing is used for photographic documents.

With error diffusion processing, the value of one pixel in the input image data is compared to a value set for reference. When the comparison result is smaller than that value, “0” is output. If the result is larger, “15” is output (in the case of four bits).

The difference between the input pixel value and the output pixel value is added to the next input pixel value.

The sum of the pixel values is processed successively in the next process as an input pixel value.

As a result, the average density of the total image obtained from error diffusion processing becomes approximately the same as that obtained from simply input pixel binarizing processing. The value to be referred to when determining whether the output density is “0” or “15” is called the “slice level” (threshold value).

Figs. 2-27 to 2-29 show detailed examples.

Here, the density slice level is processed as “8”. When line 1/column 1 is processed, the output density becomes “0” since density “3” is smaller than slice level “8”, and the error value is “+3” (= 3 – 0). (See Fig. 2-27.)

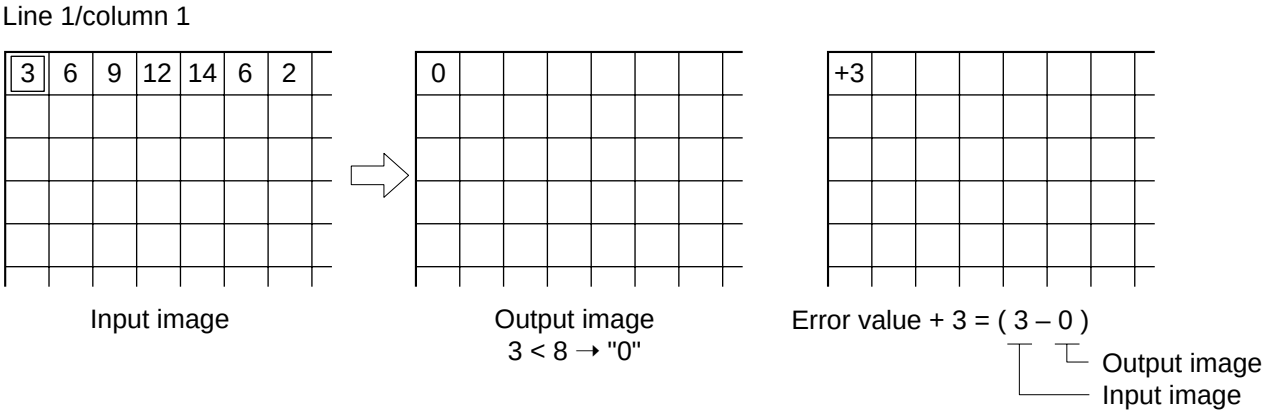


Fig. 2-27

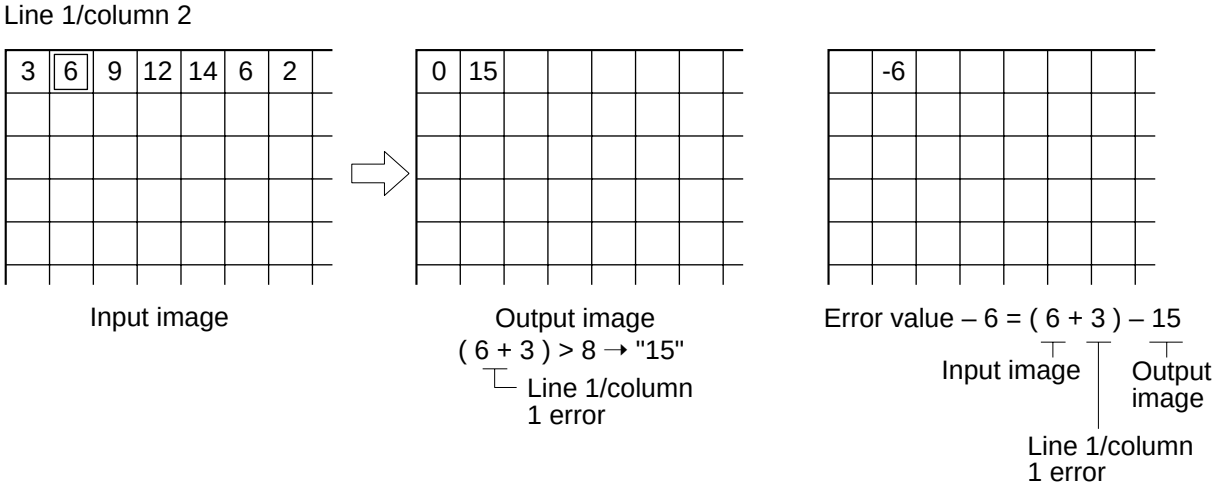


Fig. 2-28

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

When line 1/column 2 is processed, its pixel density becomes “9” (= 3+6) since the error value is carried on towards the right.

Since this value is larger than the slice level, the output density becomes “15” and the error value becomes “–6” {= (6+3) – 15}. (See Fig. 2-28.)

The pixel density of the line 1/column 3 is “3” (= 9–6). Since this is smaller than slice level “8”, the output density becomes “0” and the error value becomes “+3” {= (9–6) – 0}. (See Fig. 2-29.)

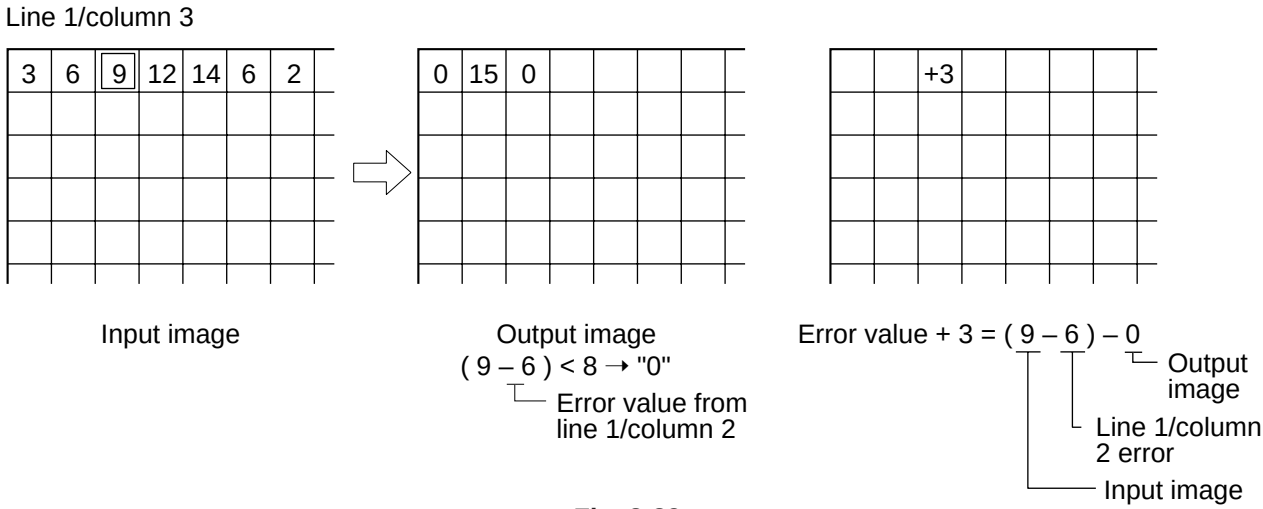


Fig. 2-29

When the following process is performed, the result shown in Fig. 2-30 is obtained.

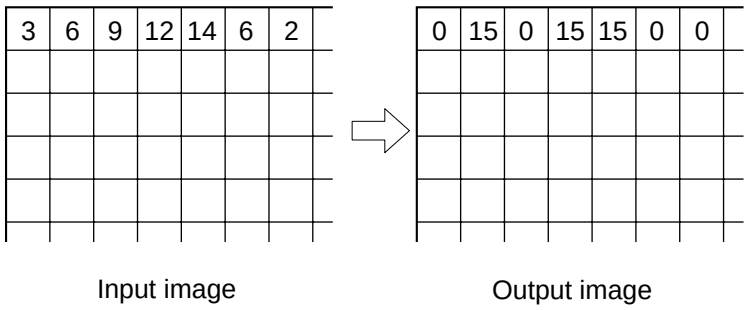


Fig. 2-30

For line 2, the density of line 2/column 1 is used as the reference value for processing. When the following process is performed, the result shown in Fig. 2-31 is obtained.

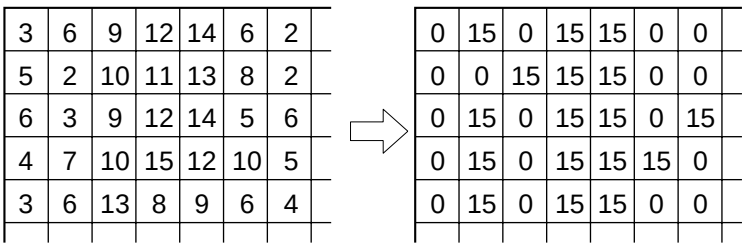


Fig. 2-31

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

10. Binarizing

As described above, when pixels are seen in units of each pixel, they can only be expressed as either “black” or “white”.

In order to designate one pixel as either black or white, a certain demarcation level must be set in the signals corresponding to the image density of the document so that signals higher than that level are judged as “black” and those lower, as “white”. (This process is called “binarizing.”)

The level at which pixels are designated as either black or white is called the “slice level” (threshold value).

For example, when the BASIS output is converted into 4-bit digital signals by the A/D converter, the slice level is set at one of the values between “0” to “15” and compared to the output after shading compensation (likewise a value from “0” = “0000” to “15” = “1111”).

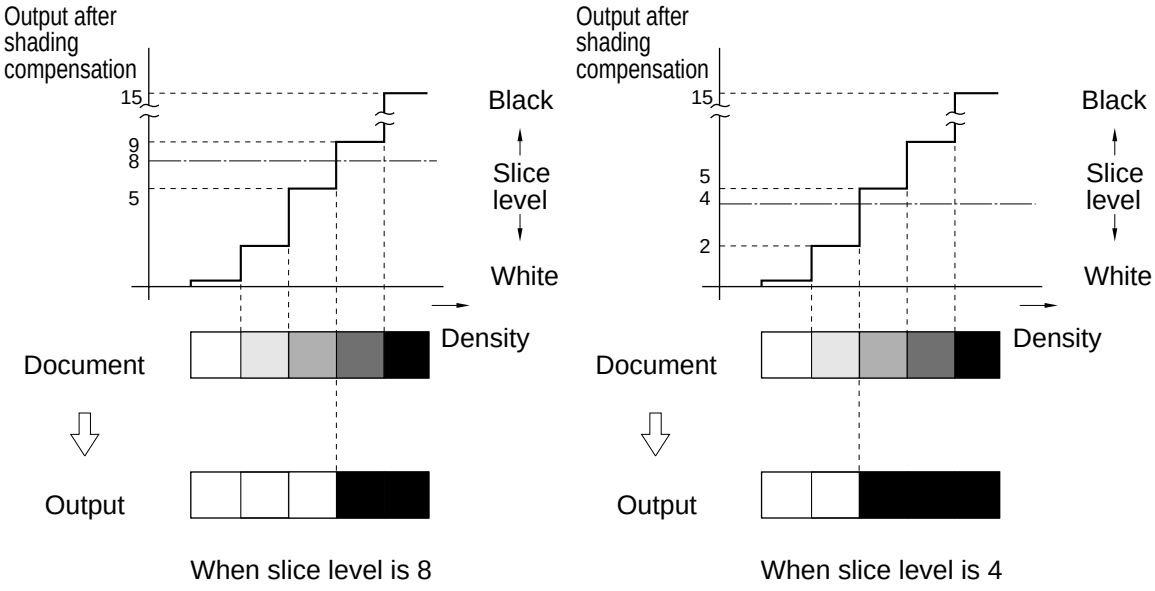


Fig. 2-32

Fig. 2-33 shows an example where the digital signal output after A/D conversion is four bits and the slice level is “8”. (This machine works with six bits.)

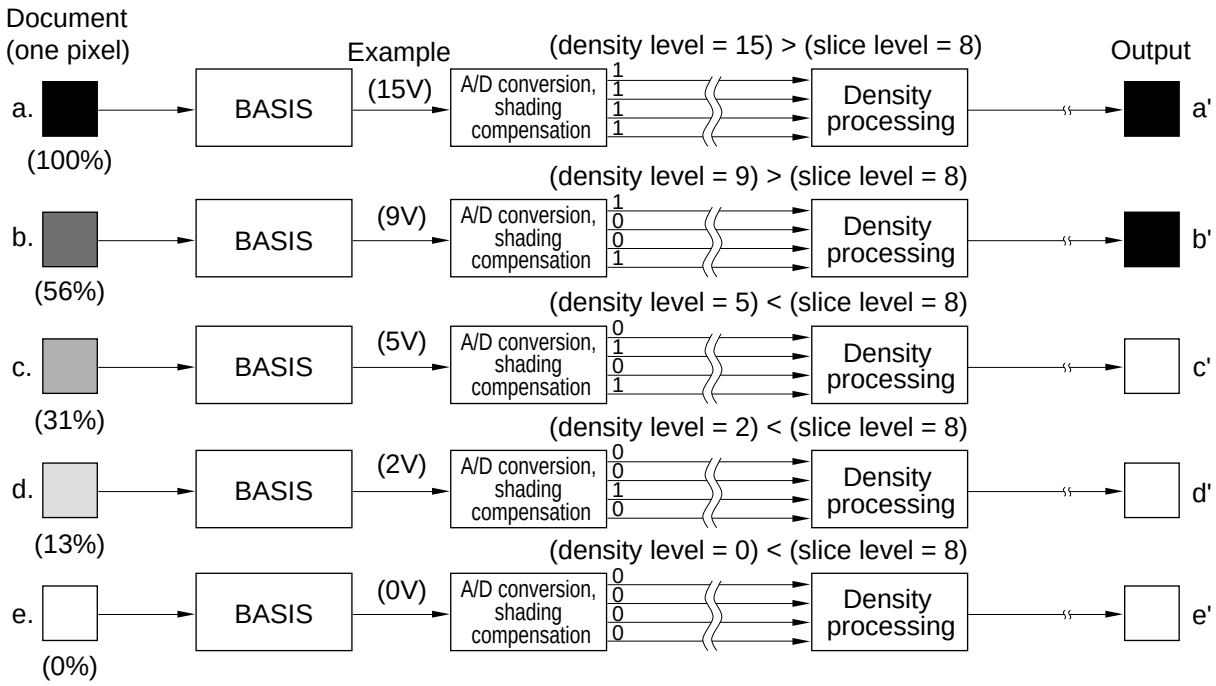


Fig. 2-33

Fig.2-34 compares the results of binarizing with and without error diffusion processing (this is referred to as “simple binarizing”).

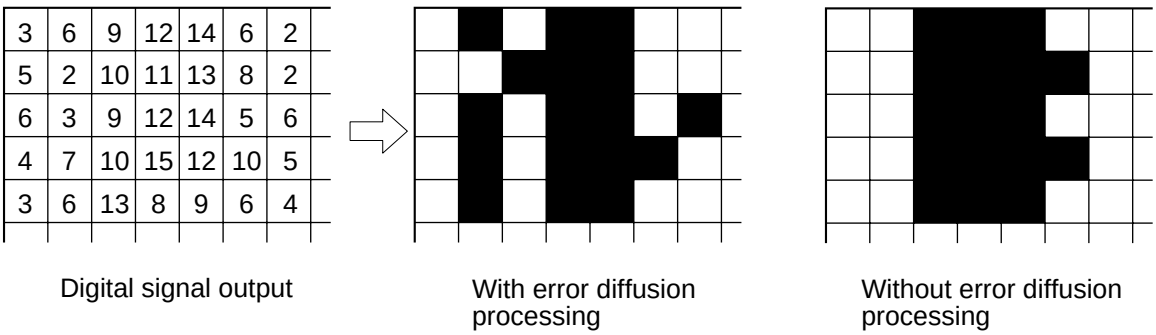


Fig. 2-34

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

11. Noise Elimination

Noise elimination is the electrical process of erasing unwanted small black marks that do not exist in the original document but may appear in scanned images.

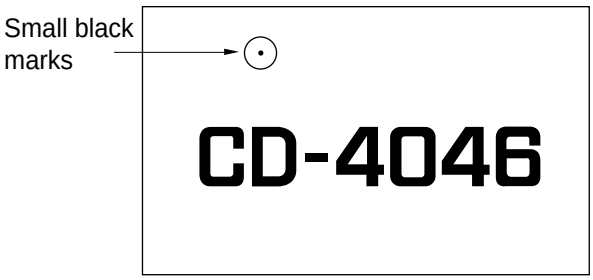


Fig. 2-35

When a document with a colored background or a dirty document is scanned, many small black marks like grains of sand may appear in the image as a result of edge emphasis processing. Noise elimination functions to prevent this phenomenon.

This function eliminates the noise component in images to make the image easier-to-view, and improves the compression ratio during image compression (encoding) so that image data can be recorded more efficiently on the disk.

Principle: The conversion used in noise elimination is shown below.

- Fig. 2-36 A
  If all of the eight dots immediately surrounding the target pixel are of a different color to that of the target pixel, the target pixel is judged to be “noise” and is eliminated.
- Fig. 2-36 B
  If all of the surrounding 16 dots two dots away from the target pixel are of a different color to that of the target pixel, the target pixel is judged to be “noise” and is eliminated.

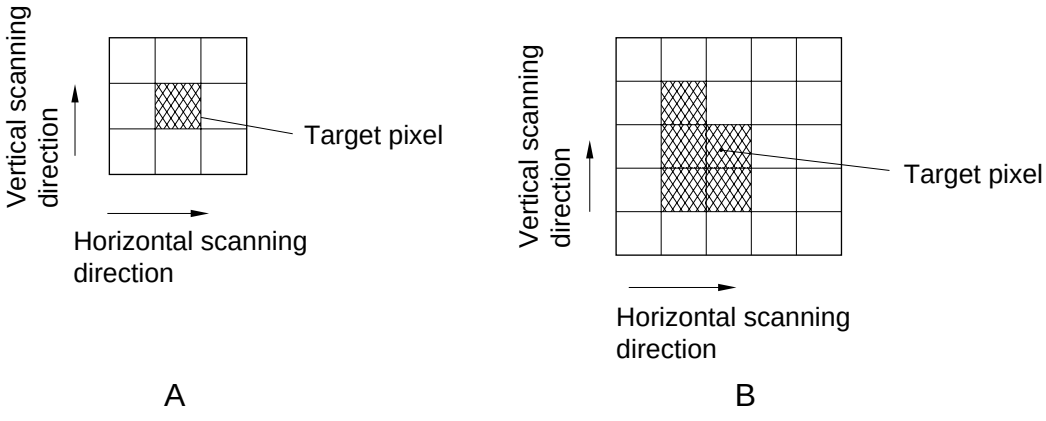


Fig. 2-36

12. Resolution Conversion

On this machine, 300 or 200 dpi can be selected as the resolution in the horizontal scanning direction, and 300, 200 or 150 dpi can be selected as the resolution in the vertical scanning direction.

On this machine, 300 × 300 dpi, 200 × 200 dpi and 300 × 150 dpi combinations are possible.

Principle:

- Vertical scanning direction
  The resolution in the vertical scanning direction is achieved by changing the document feed speed when document is scanned. When 200 dpi is set as the resolution, the feed speed is 1.5 times as much as that for 300 dpi. When 150 dpi is set, the feed speed is 2.0 times as much as that for 300 dpi. (See Fig. 2-37.)

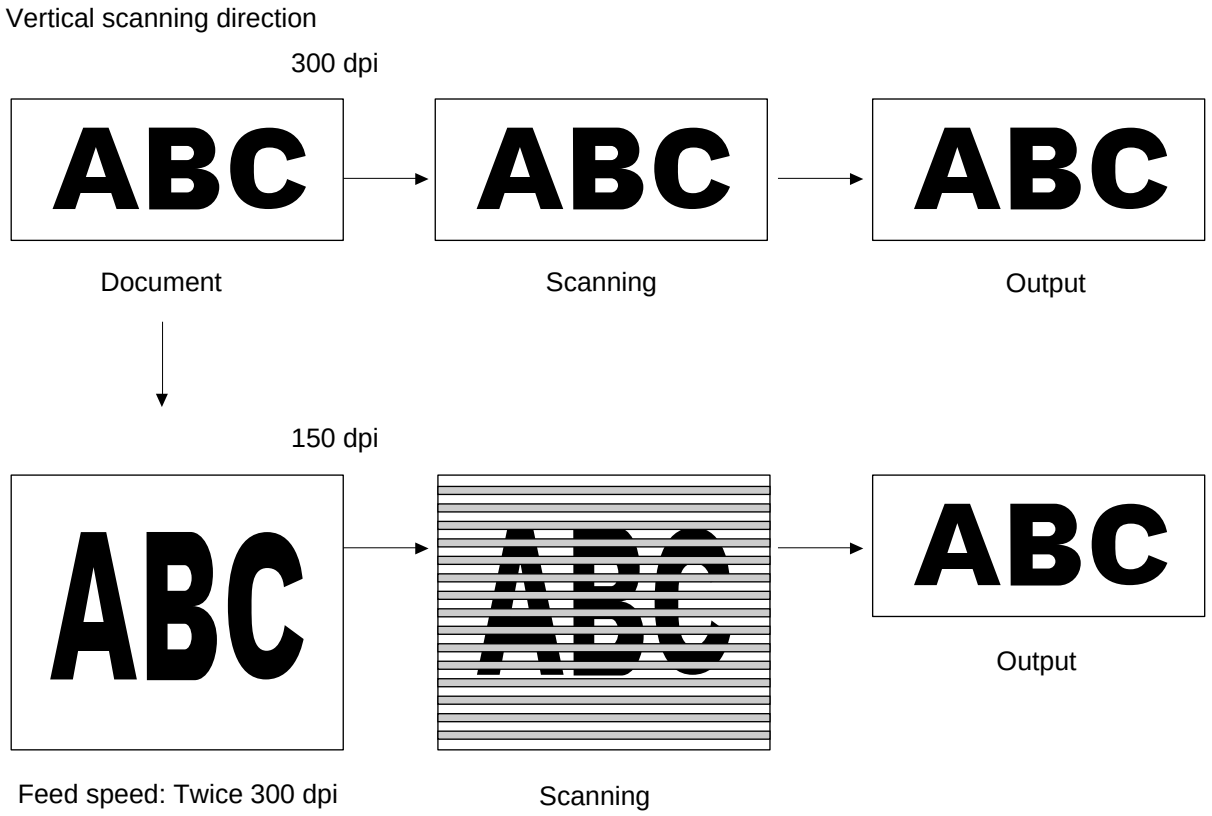


Fig. 2-37

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

- Horizontal scanning direction (skipping)
  The resolution in the horizontal scanning direction is achieved by temporarily storing image data in memory, and then selectively jumping pixels according to the desired resolution when this data is read from memory. This is called “skipping.” (See Fig. 2-38.)

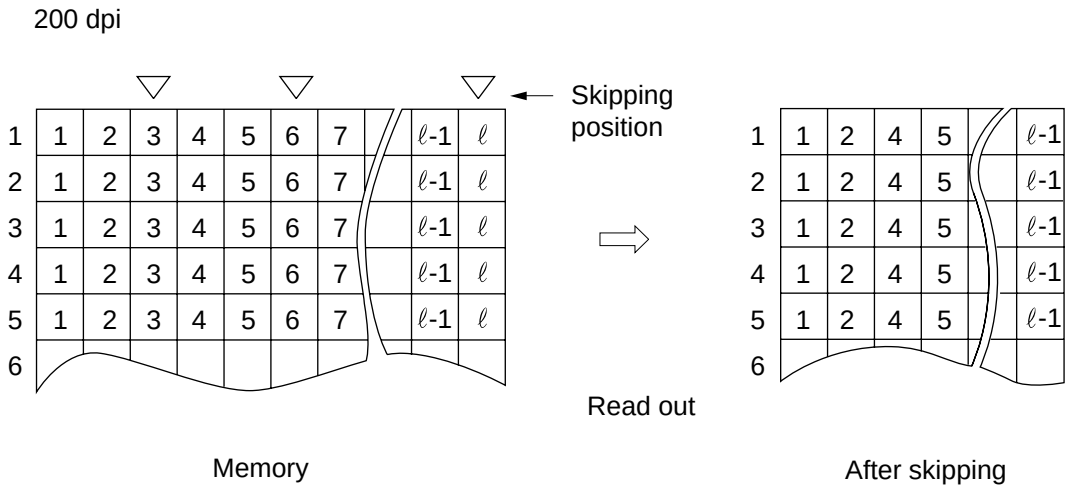


Fig. 2-38

13. Image Compression

a. Outline

When the image data is recorded onto recording media, the amount of data that can be recorded on a single recording media is limited due to the capacity of the recording media.

To overcome this, it is necessary to reduce the amount of data in the image of the document.

The reduction of the image data by encoding is called “compression”. The opposite process, i. e. restoring the encoded data to its original size, is called “expansion”.

The compression ratio is the ratio of the number of bits of data after compression to the number of bits before compression.

$$\text{Compression ratio} = \frac{\text{Number of bits of data after compression}}{\text{Number of bits of data before compression}}$$

There are three compression methods, MH, MR and MMR. (This machine compresses image data using the MMR method.)

b. One-dimensional encoding method (MH method)

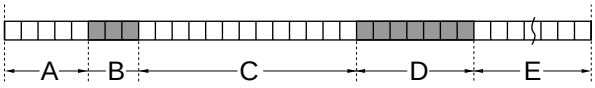


Fig. 2-39

One “read” scanning line can be divided alternately into white parts and black parts, as shown in Fig. 2-39. This corresponds to A to E in Fig. 2-39. The number of pixels in each of these sections is called the run length, or simply the run.

The method of encoding used for compressing the color (black or white) and run length of each of these sections is called run length encoding.

The code used is a modified Huffman code, therefore it is called Modified Huffman compression method. It is also abbreviated as “MH method.”

This method is called a one-dimensional encoding method because it allows encoding only in the horizontal scanning direction (i.e. in one dimension) of document which widens in one dimension.

c. Two-dimensional encoding (MR method)

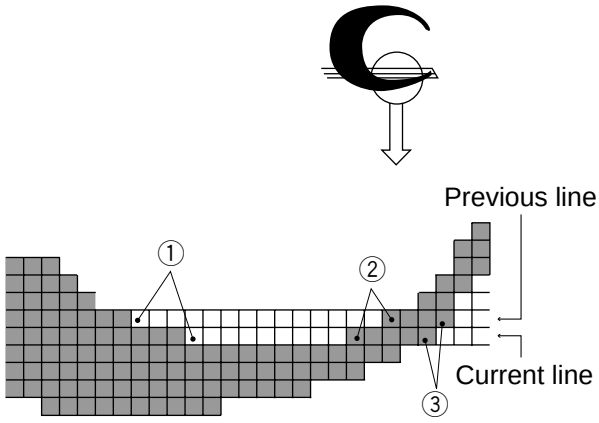


Fig. 2-40

By enlarging two continuous scanning lines such as those shown in Fig. 2-40, then comparing the positions of the black/white boundary pixels on the respective scanning lines, it can be seen that they are offset in the left-right direction. Specifically, this refers to parts ①, ②, and ③ in the figure.

The method of encoding, by which the positions of the black/white boundary pixels on one line are compared with the corresponding positions on the previous line, and the offset encoded, is called two-dimensional encoding.

The name “two-dimensional encoding” comes from the fact that the positions of the black/white boundary pixels in the horizontal (left-right) scanning direction in one line are compared with those of the previous line in the vertical scanning direction (i.e. in two directions).

This is called Modified Read compression. It is also abbreviated as “MR method.” The word “Read” is an acronym that stands for Relative Element Address Designative.

This method is useful for a document with squarish characters such as Chinese characters.

This encoding method has the disadvantage, that because encoding always proceeds while the data on one line is compared with that on the previous line, once an encoding error occurs it will affect the subsequent lines as well.

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

d. MMR method

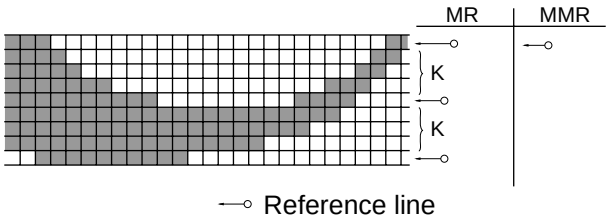


Fig. 2-41

By the MR method, one line in every K lines is encoded by one-dimensional encoding, and the remaining lines are encoded by two-dimensional encoding. By the MMR method (Modified Modified Read), all the lines will be encoded by two-dimensional encoding on the assumption that there is one imaginary white line in all before the first line.

This encoding method results in a higher image compression ratio than that of the MR method. (This machine compresses image data using the MMR method.)

III.IMAGE RECORDING

1. Outline

Fig. 2-42 is a block diagram showing the flow of image data from output by the scanner assembly through to recording.

① Image data is sent to the control CPU PCB assembly from the scanner assembly via the SCSI PCB assembly.

② Image data is appended with tag information and converted to TIFF.

③ The converted image data is sent to internal memory on the CD-R drive via the SCSI PCB assembly.
In actual fact, management information is also added to the converted image data.

④ The image data is written to the CD-R disk.

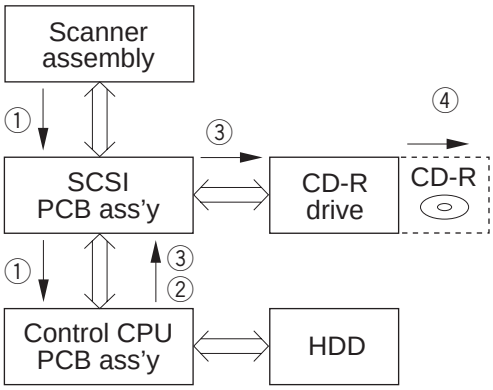


Fig. 2-42

2. CD-R

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

The sudden technological innovation that we have seen in personal computers and peripherals in recent years has also prompted the appearance of various digital media. In particular, CD-Rs demonstrate long-term data retention performance and low cost that is the same as or superior to that of microfilm. In addition to this, the fact that the CD-Rs can not be overwritten is gradually being accepted in courts as legal evidence.

Data can be written to CD-Rs only once, and written data cannot be erased or overwritten, while almost all recording media including MOD (magneto-optical disks) can be overwritten. However, by using recording systems called "track at-once" and "packet writing" for the CD-Rs, data can be recorded additionally to unwritten areas on the disk.

"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 Figs. 2-43 and 2-44.)

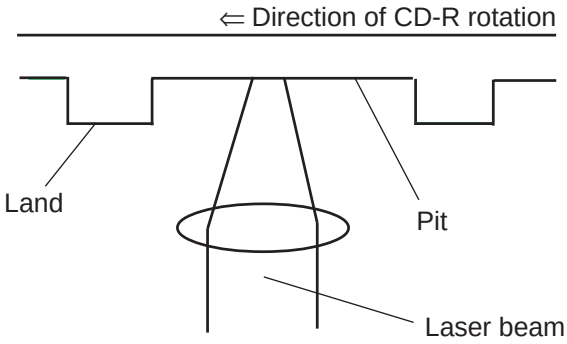
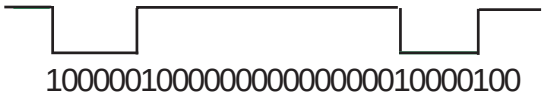


Fig. 2-43



Digital signal

Fig. 2-44

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

Fig. 2-45 shows the structure of a CD-R. CD-Rs have a recording layer made of a pigment sandwiched between the gold (Au) reflective layer and the substrate. CD-Rs also have channels called “grooves”. When the laser beam for recording data is directed at the reflective layer along these grooves, the heat generated by the laser beam causes the pigment to dissolve and change shape to form pits.

Handling of the CD-Rs during recording requires extra care because vibration or impact to the recording assembly may cause irrecoverable damage to the data, and/or, the disk.

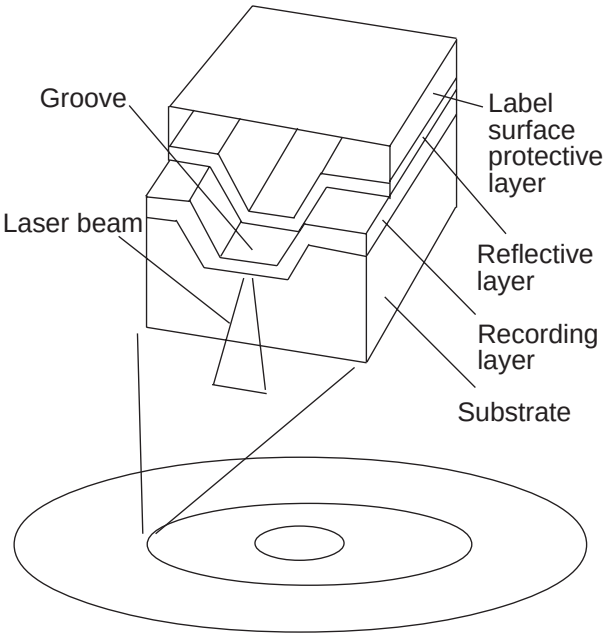


Fig. 2-45

3. CD-R Drive and Software

A CD-R drive and software for writing the data are needed to write data to CD-Rs. The type of the software varies according to the data writing method, and the CD-R drive matched to the software is used.

a. CD-R writing method

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.

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.

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. Also, the data area allocated for management can also be reduced, which increases overall efficiency. This machine uses this writing method.
   It is important to note that reading is not possible on some CD-ROM drives.

b. Packet writing software

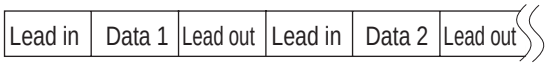
Currently, “CD-R FS” by Sony Corporation, and DirectCD by Adaptec, Inc. are typical for writing software. This machine uses DirectCD. DirectCD conforms to the UDF (Universal Disk Format) laid down by OSTA (Optical Storage Technology Association) of the USA Details of these software are omitted here.

c. Session

The string of image data prefixed by a “lead in” and appended with a “lead out” management information is called a “session.”

- Single session (disk at-once)
  Once-only writing

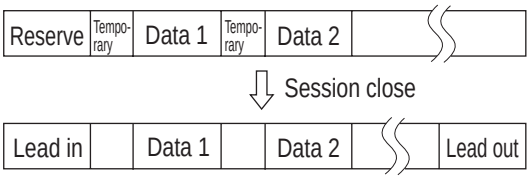
- Multi session (track at-once)
  Multiple writing



• Packet writing (DirectCD)

The “lead in” area preceding the image data is only secured as “reserve” area, and written data is appended with “temporary management information.” Subsequently written data is also appended with “temporary management information.” When additional writes need no longer be made, the session is closed for the first time. (This is called “session close.”)

Before a session close, recorded image data can be read only on CD-R drives that support DirectCD. After a session close, recorded image data can be read on most commercially available CD-ROM drives.



Note: Drives From Which Data Cannot be Read

Image data recorded on this machine sometimes may not be read on other CD-ROM drives and CD-R drives other than the CD-R drive built into this machine. Since no explicit indications nor explanations are available on some personal computers and/or CD-R/CD-ROM drives, readability of the image data from this machine must be tested in each case.

The ISO9660 standard stipulates the sector formats of CD-ROMs, and is sub-divided with three further levels, levels 1, 2 and 3.

Reading image data on a CD-R recorded on this machine before a session close requires a CD-R drive conforming to ISO9660 Level 3 and DirectCD. After a session close, it requires only a CD-ROM or CD-R drive conforming to ISO9660 Level 3. Naturally, the personal computer must be pre-installed with software capable of reading TIFF images. (See Fig. 2-46.)

For details on how to read data on a personal computer, refer to the User’s Instructions packaged with this machine.

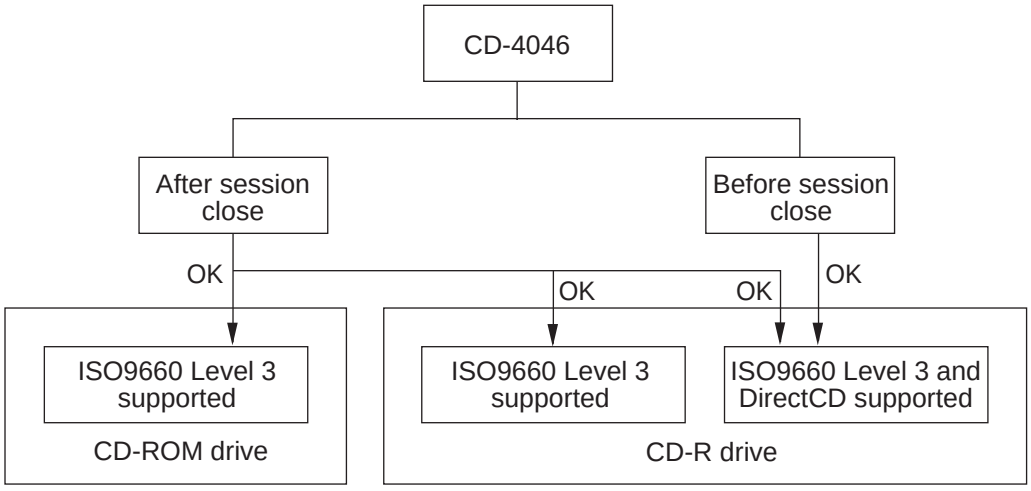


Fig. 2-46

CHAPTER 3

FUNCTIONS & OPERATION

1. This chapter describes the role of each function and operation of electrical and mechanical systems, and briefly describes the timing of operations in each system according to function. The symbol ▭▬▬▭ indicates the path of mechanical drive. If a signal is indicated together with the ⟶ symbol, this indicates the flow of electrical signals.
2. In descriptions of digital circuits on this machine, high voltage level signals are indicated by “H” and low voltage level signals are indicated by “L”. Note that voltage values differ according to circuit.
   A CPU is used on this machine. However, a description of CPU operation has been omitted as it is practically impossible to check internal operation of the CPU.
   It is assumed that the user will not carry out circuit board repairs. So, descriptions of circuits on printed circuit boards are limited to a brief description using block diagrams. Accordingly, two block diagrams are provided: one showing operations from the sensor up to the inputs of main circuit boards, and the other showing operations from the output of these main circuit boards up to the loads.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

I. OUTLINE

A. Basic Configuration

The basic configuration is as follows.

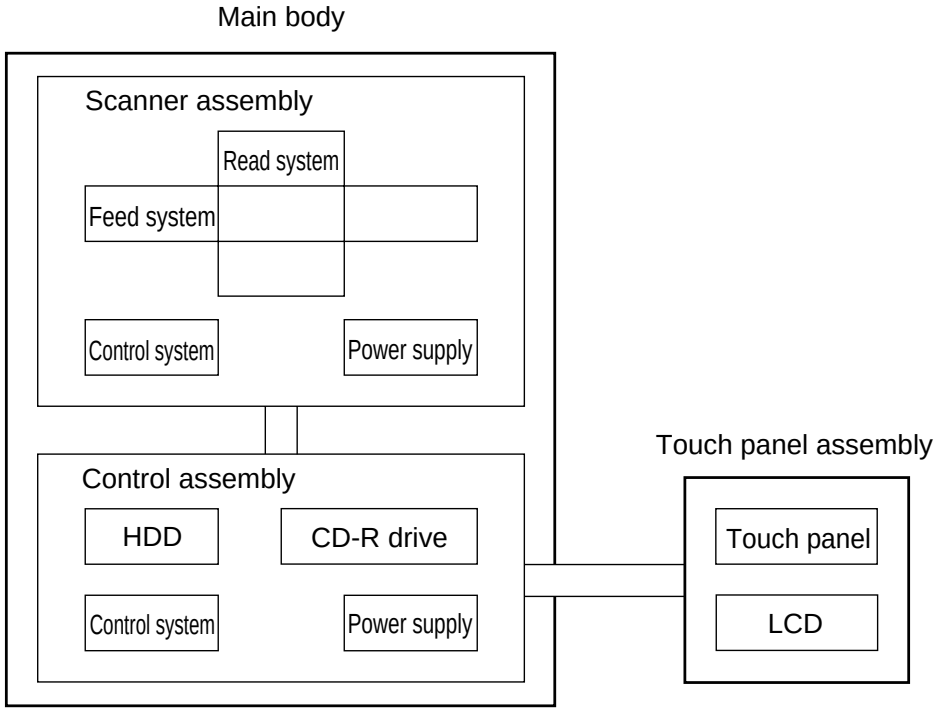


Fig. 3-1

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

1. Scanner Assembly

The scanner assembly consists of a feed system for feeding documents from the pick-up through to the delivery, BASIS and a control system for controlling these components. BASIS is the assembly where light emitted from the LED array onto the document is reflected onto the sensor to read the contents of the document. This scanner assembly is almost the same as the DR-3020.

2. Control Assembly

The control assembly consists of a HDD in which software is installed, CD-R drive for recording and reading image data, and a control system for controlling these components.

This control assembly also controls other scanner components 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 main body by a cable.

4. Power Supplies

Power supplies are provided externally for each of the scanner and the controller assemblies. AC power is input to the power supply for the controller assembly, and is then supplied to the scanner assembly via the controller power supply. This machine also has rechargeable sealed lead-acid battery in the event of a power interruption.

5. Software

This machine uses the following software:

- Operating system
  Windows 95 by Microsoft Corp.
- Application software
  Canon Electronics Inc. proprietary software
- Scanner control module
  Canon Electronics Inc. proprietary software
- CD-R control software
  DirectCD by Adaptec, Inc.
- Display module
  OCX by Wang Laboratories Inc.
- Touch Panel driver
  TT-WIN95 by Gunze Limited

6. Displaying Images on External Equipment

Image data that is recorded on this machine on CD-R can be displayed on an external personal computer and other peripheral equipment. However, the equipment on which image data can be displayed is limited.

For details, refer to the User's Instructions.

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

B. Main Drive

The scanner assembly on this machine has two motors, main motor (M1) for document feed and document board motor (M2) for raising and lowering the document board.

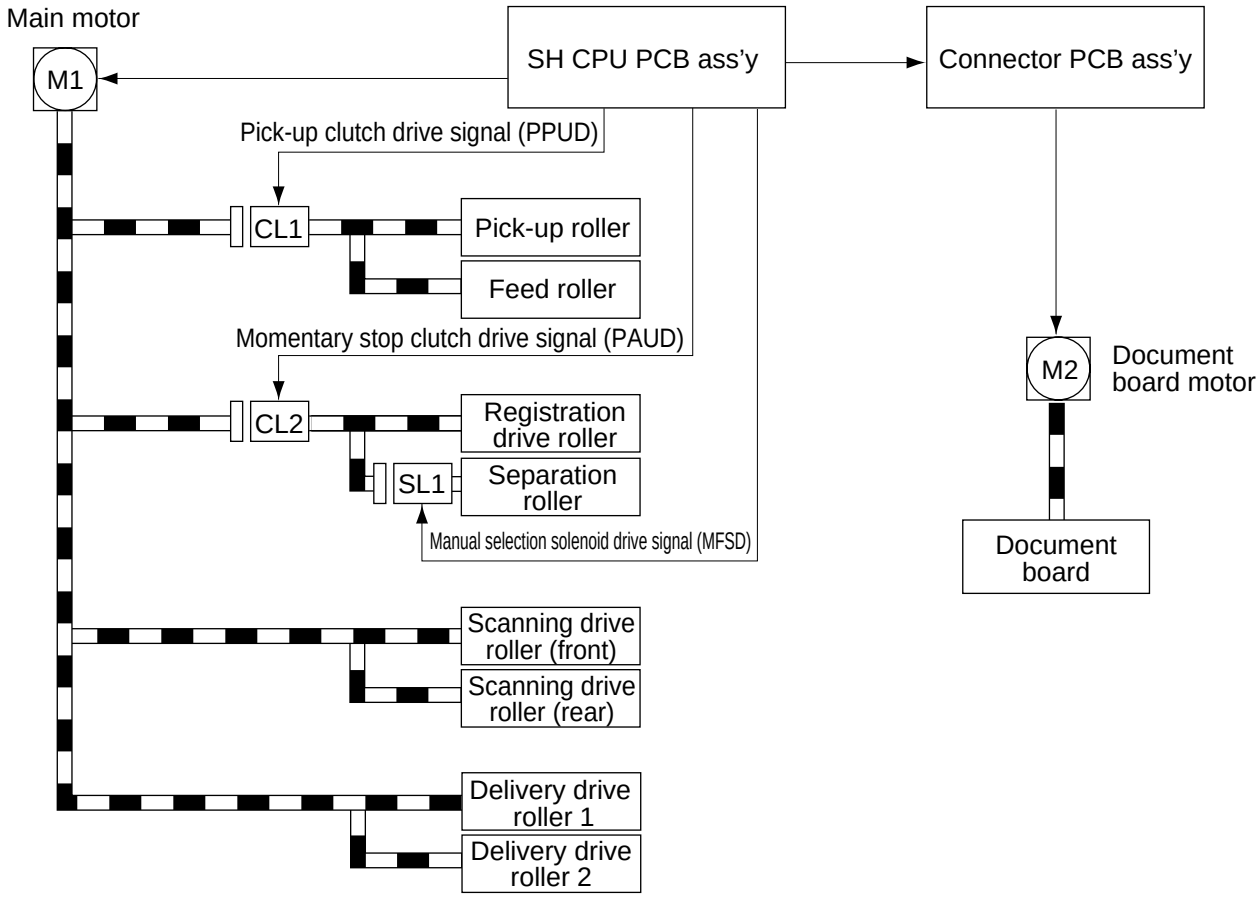


Fig. 3-2

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

C. Outline of Electrical Circuits

1. Control and Touch Panel Assemblies

Fig.3-3 shows a block diagram of the electrical circuits, and Fig.3-4 shows a block diagram of the circuit logic.

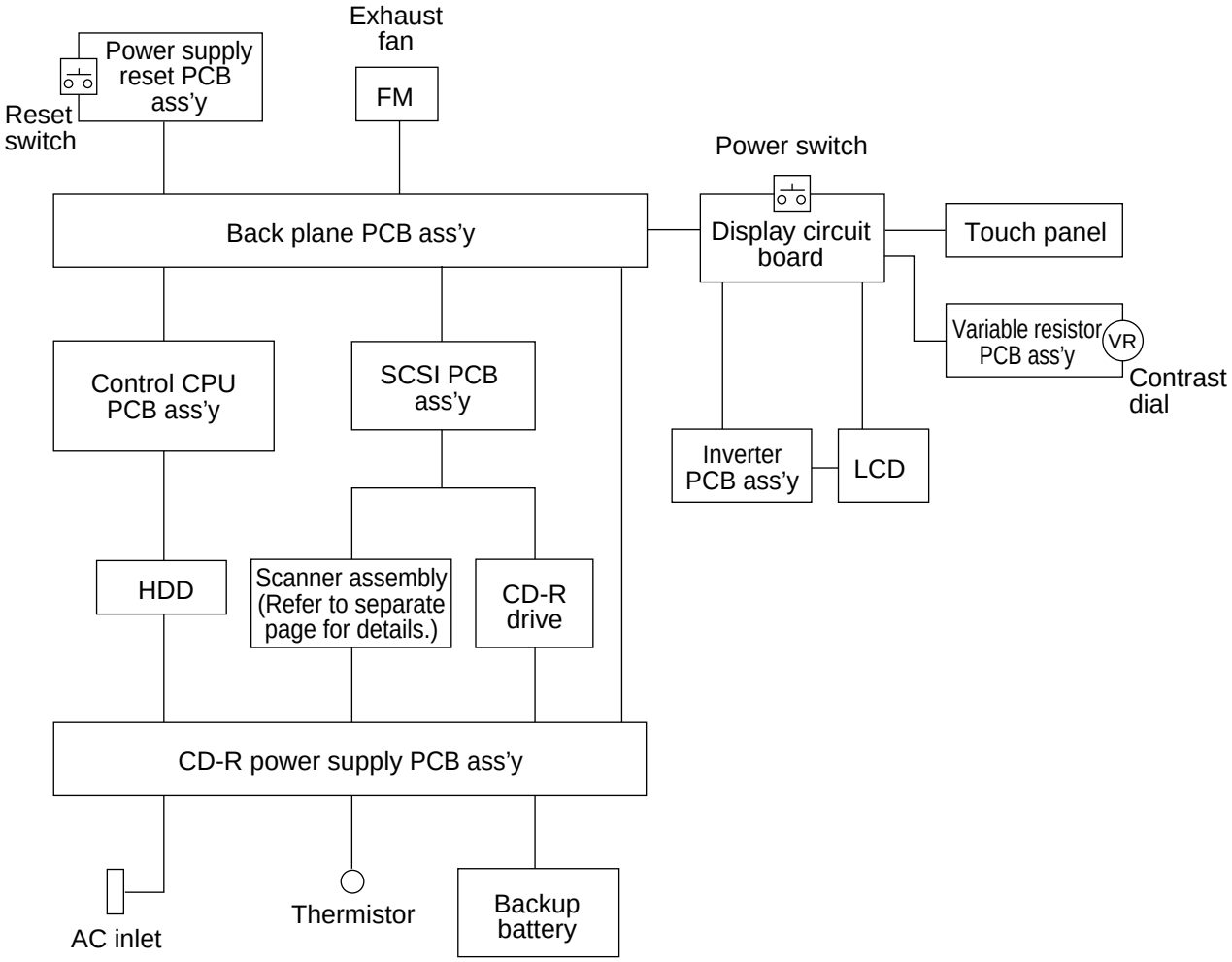


Fig. 3-3

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

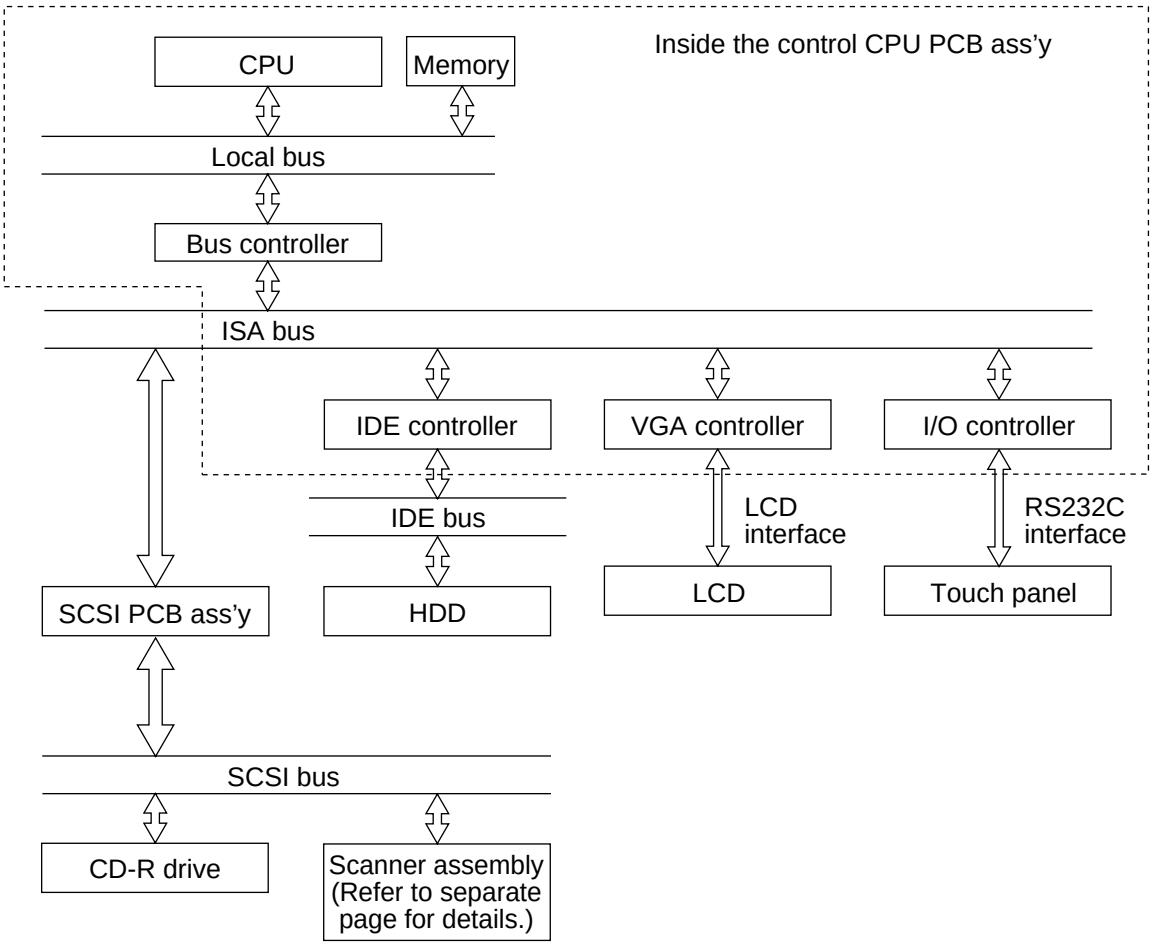


Fig. 3-4

Electrical control of the control and touch panel assemblies is carried out by the CPU on the control CPU PCB assembly. An 80486 DX4 chip is used as the CPU.

- Main CPU functions
  1) CD-R drive control
  2) LCD control
  3) HDD control
  4) Touch panel control
  5) Communications with scanner assembly

The control CPU PCB assembly, CD-R drive, LCD, HDD and other components are designed in an integrated external unit. This manual assumes that this unit is not disassembled nor repaired in the field, so a description of its internal electrical circuits is omitted here.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

2. Scanner Assembly

As described above, a scanner assembly almost identical to the DR-3020 is used. So, electrical circuits also are the same.

The difference between these two scanner assemblies is that a SCSI connector circuit bard has been added to the scanner assembly on this machine. Also, the power switch has been removed from the SH CPU PCB assembly.

Fig.3-5 shows a block diagram of the electrical circuits.

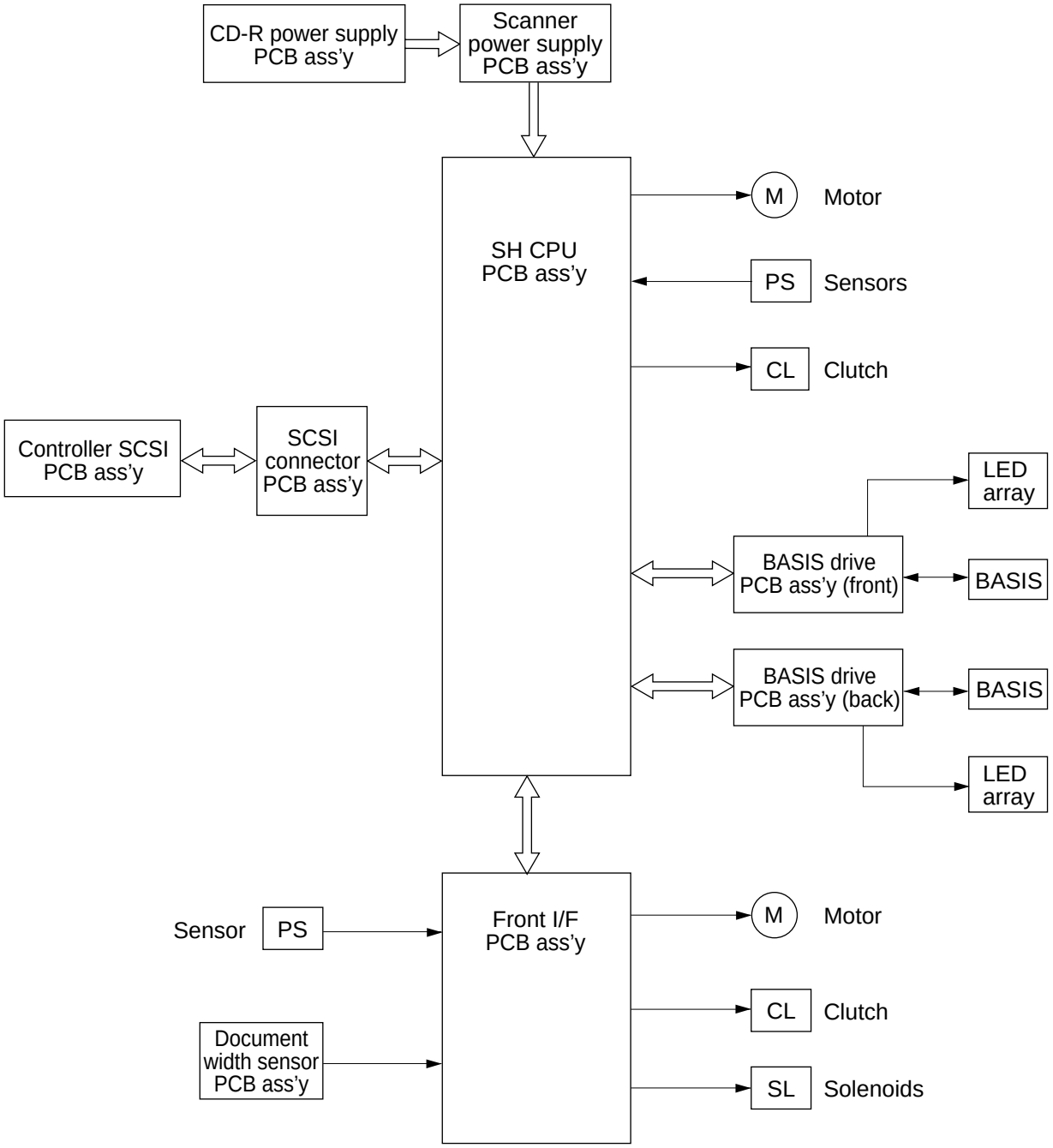


Fig. 3-5

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

Electrical control of the scanner assembly is carried out by the CPU on the SH CPU PCB assembly.

- Main CPU function
  1) Document feed control
  2) Image data control
  3) Communications with the controller assembly

This CPU, in accordance with a pre-stored program, outputs the necessary signals to motors, solenoids and other loads, and other PCB assemblies, in compliance with commands from sensors and the controller.

A flash ROM is connected to the CPU. The sequence programs for communication between the controller and scanner assemblies are stored to this flash ROM.

For details of the CPU circuits, see “V. Scanner Assembly Electrical Circuits” described lates.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

D. Inputs and Outputs for Main PCB Assemblies

Figs. 3-6 and 3-7 show the main inputs to and outputs from the main PCB assemblies in the scanner assembly.

Note: Signals appended with an asterisk ("*") (e.g. PDP1*) are Low-active signals.

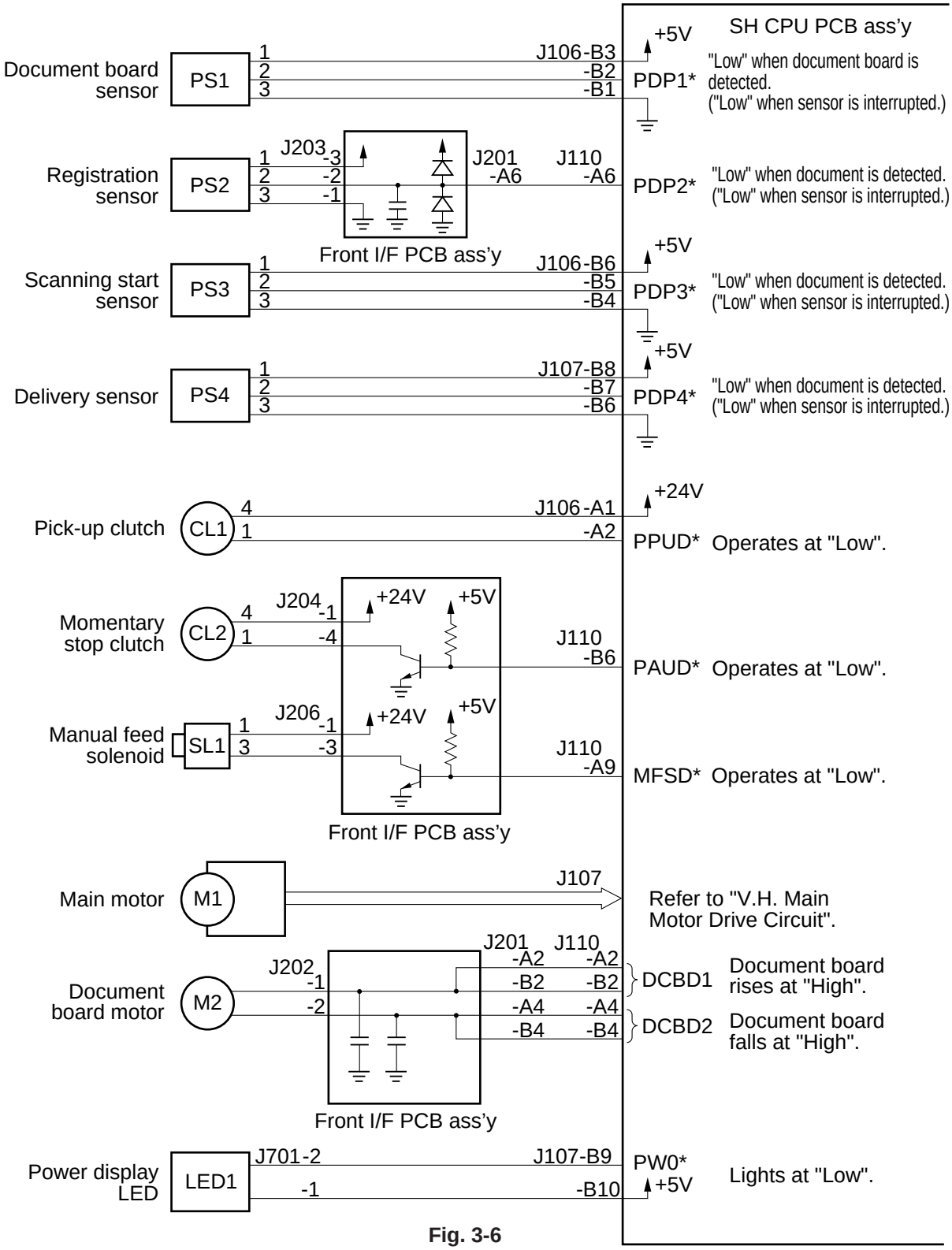


Fig. 3-6

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

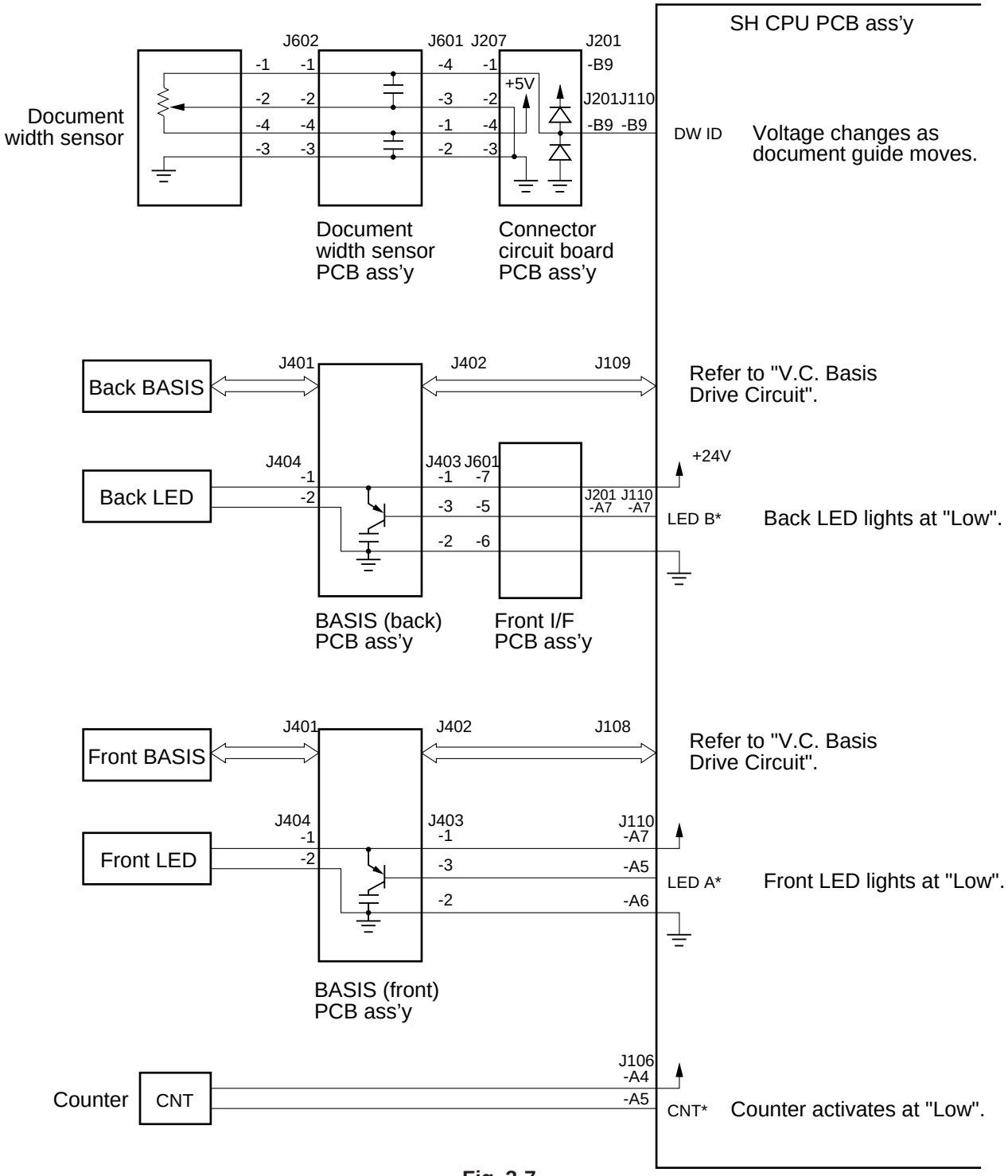


Fig. 3-7

E. Operation Timing

1. Power ON Sequence

The following describes the power ON sequence from turning the power switch ON through to startup completion (standby start).

Fig.3-8 shows the power ON sequence for the control assembly, and Fig.3-9 shows the power ON sequence for the scanner assembly.

On the control assembly, it takes about two minutes for the power ON sequence to end if the previous shutdown was normal. It takes longer if the previous shutdown was abnormal. On the scanner assembly, it takes several seconds for the power ON sequence to end.

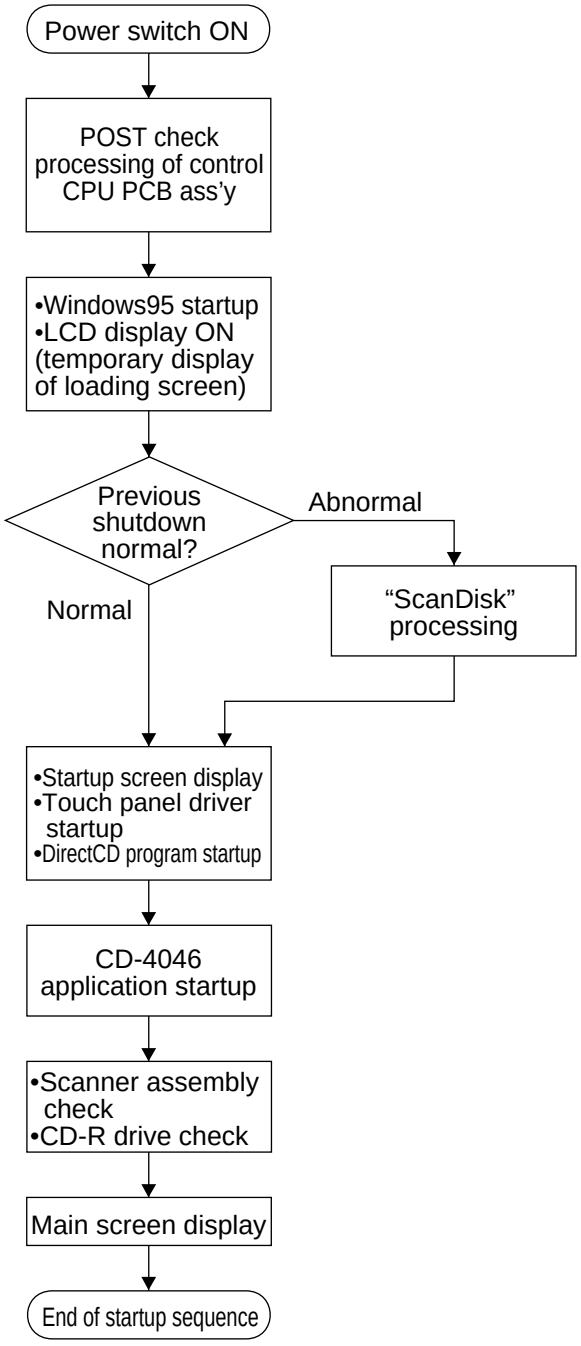


Fig. 3-8

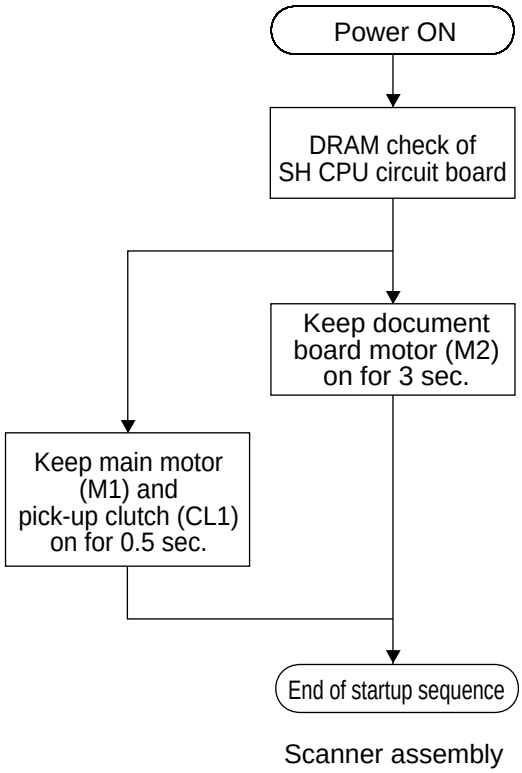


Fig. 3-9

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

2. Timing Chart during Document Feed

Fig.3-10 shows the timing chart for when two document sheets are fed in the automatic pick-up mode.

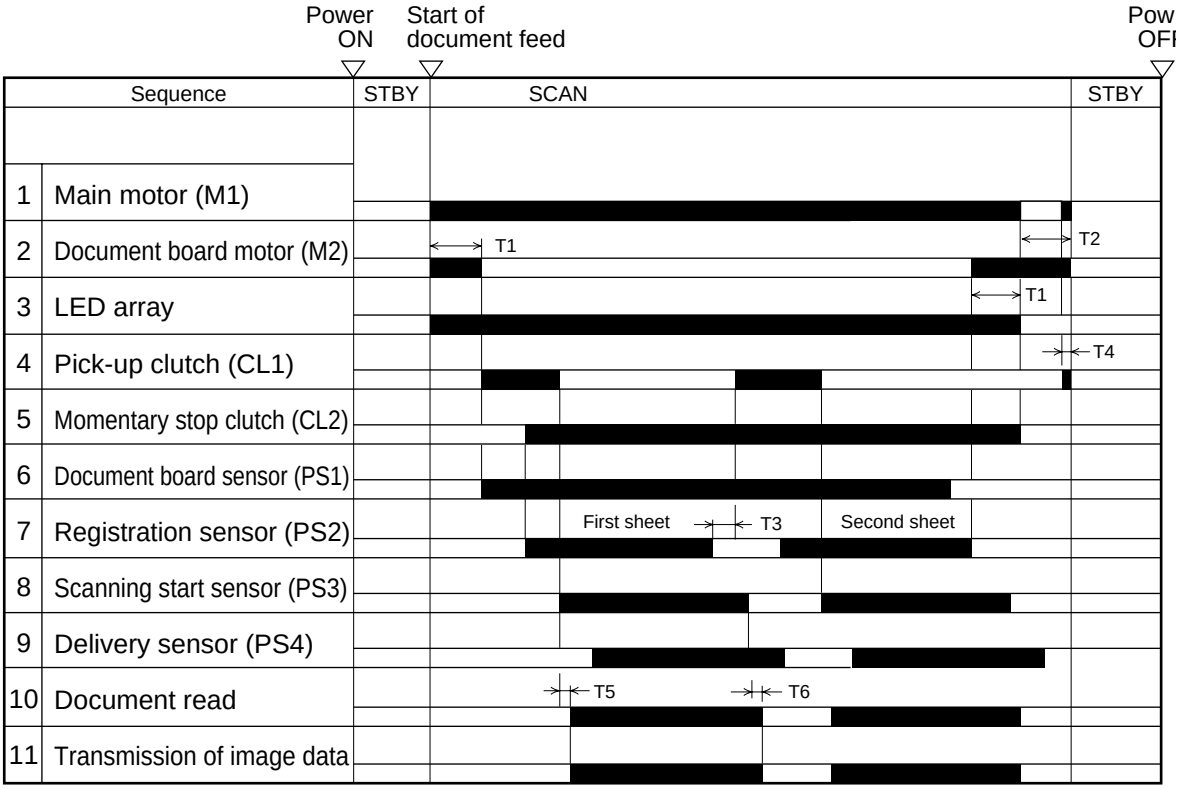


Fig. 3-10

(unit: ms)

Category	Description	Vertical scanning resolution			Remarks
		300dpi	200dpi	150dpi	
T1	Document board rise interval (max.)	3000	3000	3000	
T2	Document board fall interval	3000	3000	3000	
T3	Pick-up clutch ON timing	180	120	90	
T4	Interval in which feed roller is returned to initial state	500	500	500	Only from 2nd document onwards
T5	Document read start timing	284	189	142	
T6	Document read end timing	284	189	142	

Table 3-1

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

II. EXPOSURE SYSTEM

Fig. 3-11 shows the exposure system used in this machine.

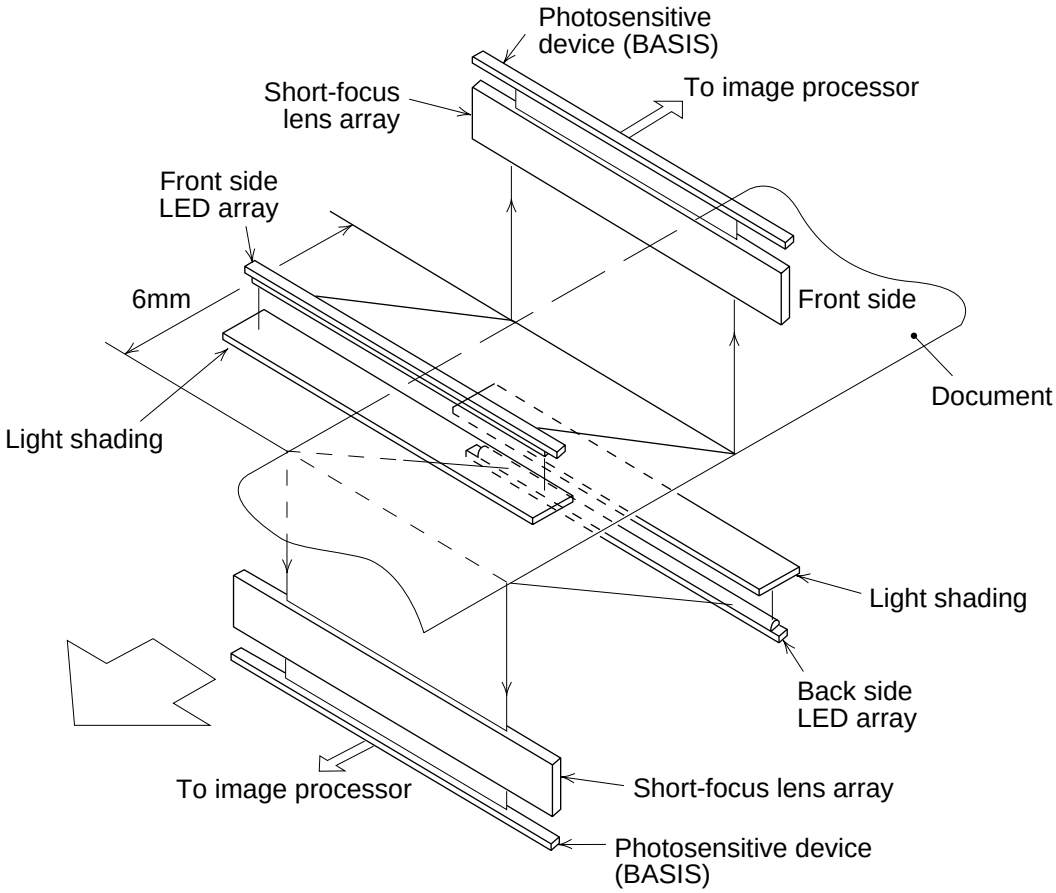


Fig. 3-11

Both surfaces of the document are irradiated at the image readout area by two LED arrays while being fed at high speed (241.9 mm/sec), medium speed (181.4 mm/sec) or low speed (121.0 mm/sec).

The light reflected from the document converges, via the short-focus lens array (fiber optic lens array), on to the BASIS to form an image of equal size.

The front and back sides of the document are read at points that are offset by 6 mm in order to prevent the image on one side of the document from being read on the other side.

The light reflected off the document is photoelectrically converted by the BASIS, and the resulting signals are processed in various ways by the image processor.

While the image is being scanned, light from the LED arrays is diffused by the light shading so that the background area of the document is made "black".

Conventionally, on the DR-3020, the document background was made "white." However, on this machine the background is made "black" as part of the standard specification to improve performance. This machine uses a new standard type scanner that produces a "black" background. Note that the background is sometimes cut and is not produced "black" when the document is recorded at an automatically preset paper size. This, however, is not a defect.

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

III. DOCUMENT FEED SYSTEM

A. Document Feed Assembly

Fig.3-12 shows a cross-section of the document feed assembly.

The drive rollers take the main motor as their drive source, and are rotated by drive power transmitted from the gears and timing belt.

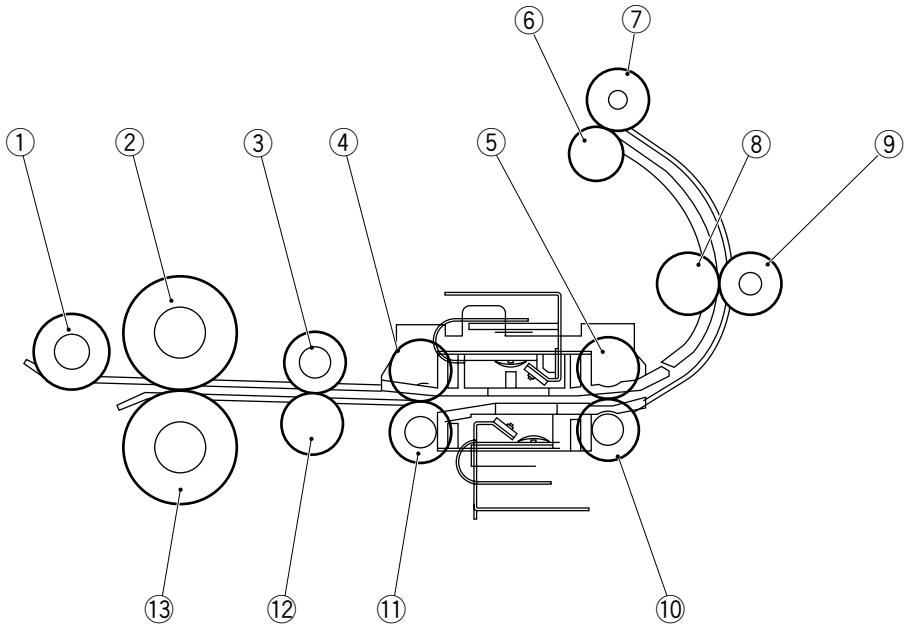


Fig. 3-12

① Pick-up roller
② Feed roller
③ Resist drive roller
④ Scanner guide roller (front)
⑤ Scanner guide roller (rear)
⑥ Delivery follower roller 2
⑦ Delivery drive roller 2
⑧ Delivery follower roller 1
⑨ Delivery drive roller 1
⑩ Reader drive roller (rear)
⑪ Reader drive roller (front)
⑫ Resist follower roller
⑬ Separation roller

B. Document Pick-up Assembly

Fig. 3-13 shows an overview of the document pick-up assembly. This assembly consists of the following mechanisms.

The document pick-up assembly consists of a pick-up roller, feed roller, torque limiter registration roller, planetary gear device, and other components.

- Document board drive mechanism
  During automatic pick-up, this mechanism pushes up the document board automatically, and when pick-up is finished, returns it to its original position.
- Manual feed switchover mechanism
  This mechanism is designed to switch over from document paper pick-up to manual feed.
  This also stops the drive of the separation roller to cancel the separation adjustment function.
- Automatic separation adjustment mechanism
  This mechanism automatically changes the space between the pick-up roller and separation roller in accordance with the thickness of the document, and separates/feeds the document one sheet at a time without any jamming and double feeding.

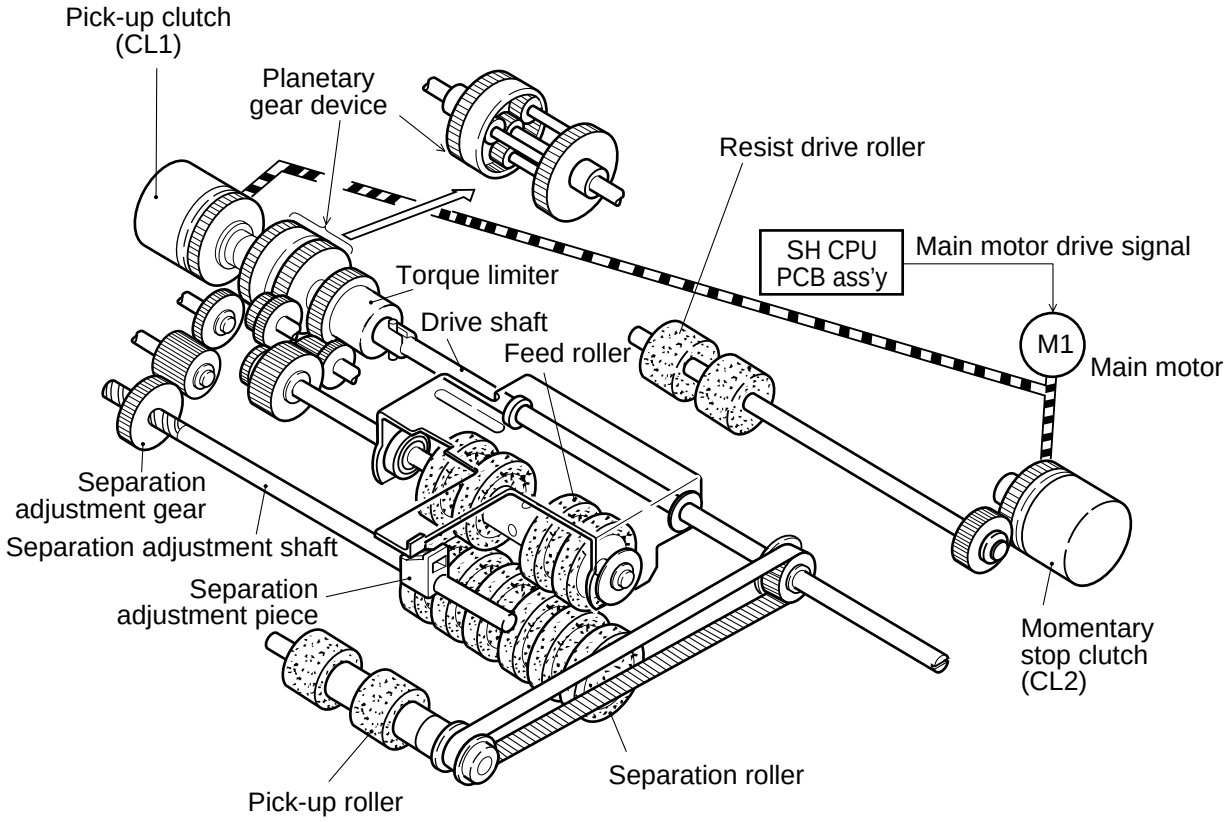


Fig. 3-13

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

C. Automatic Separation Adjustment Mechanism

1. Planetary Gear Device

Figs. 3-14 and 3-15 show an outline of the planetary gear device.

a. The planetary gear device consists of a sun gear that transmits the drive of the drive shaft, a carrier that transmits the drive from the feed roller, an internal gear that drives the separation adjustment piece, and three planetary gears that transmit the drive from the sun gear and carrier.

b. The carrier and internal gear of the planetary gear device have been installed to rotate freely on the drive shaft. The planetary gears also have been installed to rotate freely relative to the planetary shaft of the carrier.

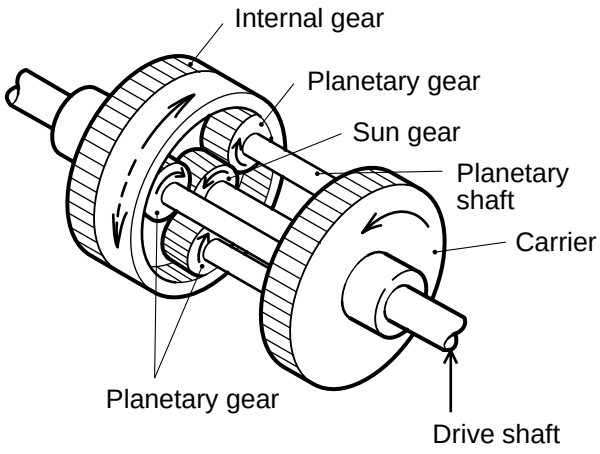


Fig. 3-14

c. The sun gear is directly connected to the drive shaft.

d. The internal gear of the planetary gear device is driven by the carrier and the sun gear.

e. The carrier rotates the three planetary gears attached to the planetary shafts on the carrier.

f. On the other hand, the sun gear drives the planetary gears.

g. The rotation of the internal gear is as follows:
- b>a → counterclockwise direction
- b<a → clockwise direction
- b=a → stop

a: Rotating speed of sun gear (planetary gears)
b: Rotating speed of carrier

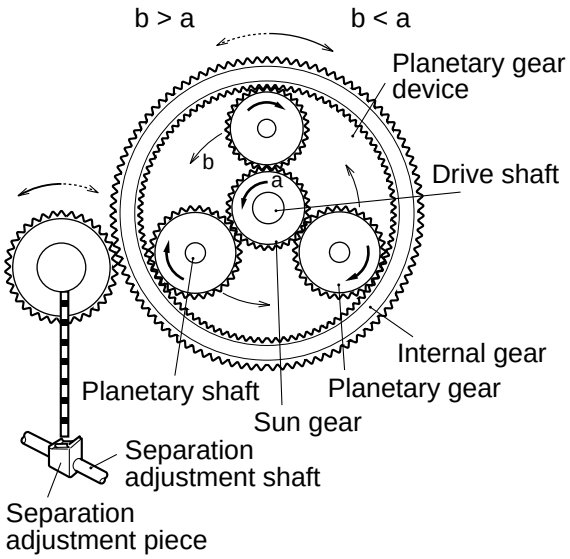


Fig. 3-15

2. At Start of Pick-up (Refer to Fig. 3-16)

a. At start of pick-up, the pick-up clutch (CL1) turns ON. ①

b. At start of pick-up, the document has not been fed to the feed roller section. For this reason, there is no load acting on the feed roller, and so the drive power from the main motor is transmitted to the feed roller so that it rotates. ② → ③ → ④

c. The drive transmitted to the feed roller is transmitted to the carrier, and turns the planetary gears of the planetary gear device. ④ → ⑤ → ⑥ → ⑦

d. On the other hand, the rotation of the sun gear of the planetary gear device is transmitted to the planetary gears to turn the internal gear. ⓐ → ⓑ

e. However, since there is no load acting on the feed roller, the rotating speed of the feed roller through to the carrier, that is transmitted to the internal gear of the planetary gear device, is faster than the rotating speed from the planetary gears. For this reason, the internal gear turns counterclockwise. ⑦

f. The rotation of the planetary gear device is transmitted to the separation adjustment gear, moving the separation adjustment shaft to the right. ⑧ → ⑨ → ⑩ → ⑪

g. As a result of this, the separation adjustment piece moves to the right so that the feed roller falls to the lower limit. ⑫

h. By lowering the feed roller to the lower limit, the space between the feed roller and the separation roller becomes minimum.

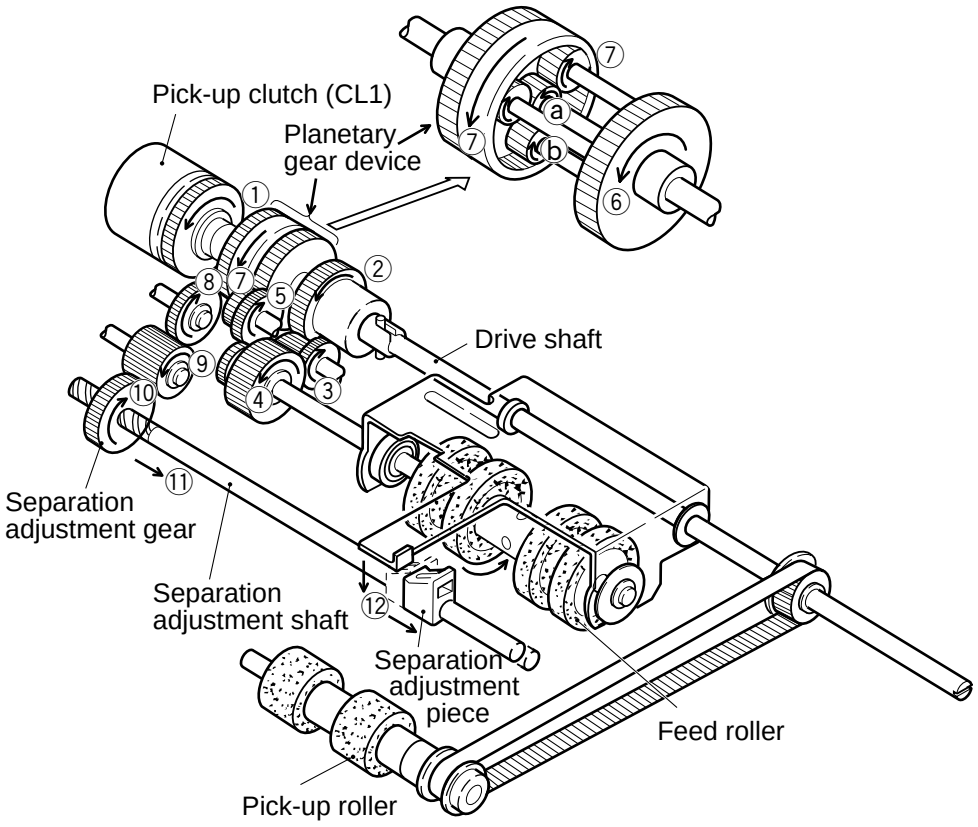


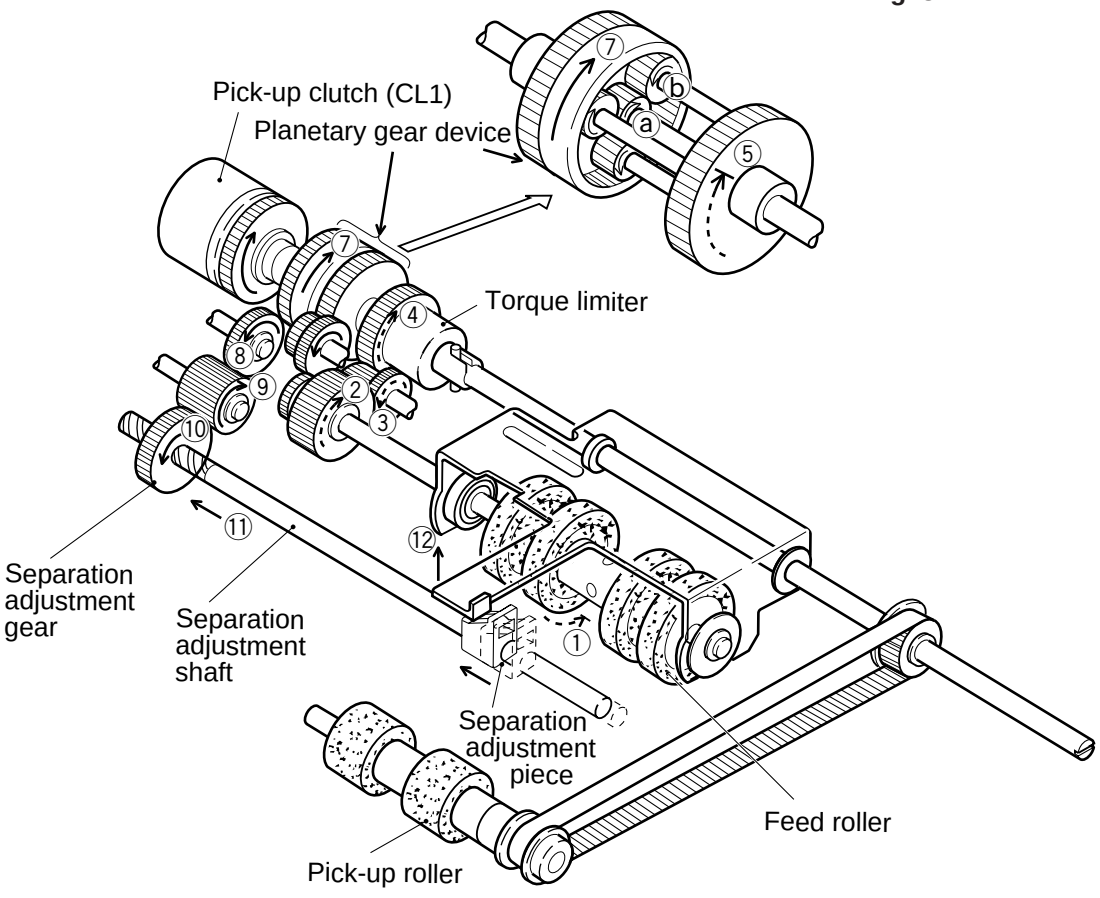
Fig. 3-16

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

3. At Document Pick-up (Refer to Fig. 3-17)

a. When rotation of the pick-up roller feeds the document to the feed roller section, it is not fed any further as the space between the feed roller and the separation roller is at its minimum.
b. Although the feed roller is rotating, a load is placed on the feed roller due to the thrust of the document. ①
c. The feed roller stops when its load becomes greater than the value set on the torque limiter. ② → ③ → ④
d. Because the rotation of the feed roller stops, the rotating drive to the carrier of the planetary gear device stops. ⑤
e. Accordingly, the drive to the planetary gears itself also stops.
f. On the other hand, since the drive of the sun gear is always in rotation, the planetary gears rotate. ⓐ → ⓑ
g. As the drive transmitted to the internal gear of the planetary gear device rotates only from the sun gear through to the planetary gears, the internal gear begins to rotate in the clockwise direction. ⑦
h. Reverse rotation is transmitted to the separation adjustment gear, and the separation adjustment shaft moves to the left. ⑧ → ⑨ → ⑩ → ⑪
i. As a result, the separation adjustment piece now moves to the left, and the feed roller starts to rise. ⑫
j. The space between the feed roller and separation roller begins to widen. When the space becomes equal to the thickness of the document, the document is fed.
k. When the thickness of the second and subsequent documents is the same as the first document, the rotation of the internal gear of the planetary is stopped as the load placed on the feed roller is uniform.
l. Accordingly, the separation adjustment shaft does not rotate, the adjustment piece also stops, and the documents are fed at all times.

Fig. 3-17



4. Pick-up Action Due to Change in Document Thickness

- When a thinner document is fed.
  a. The load placed on the feed roller becomes smaller, and the rotation of the feed roller becomes faster.
  b. The rotation of the carrier of the planetary gear device becomes faster, and the internal gear turns counterclockwise.
  c. 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 feed roller begins to fall.
- When a thicker document is fed.
  a. Action in reverse to that when a thinner document is fed is taken.

D. Detection of Faulty Document Feed

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

Judgment as to whether or not a document is being properly is made by whether or not the document is present at the sensor section at the check timing that is output by the CPU.

No.	Name of Sensor	Name of Signal
PS1	Document board sensor	PDP1
PS2	Registration sensor	PDP2
PS3	Scanning start sensor	PDP3
PS4	Delivery sensor	PDP4

Table 3-2

1. Pick-up Assembly Jams

a. Pick-up assembly delay jam

When the document, after passing the document board sensor (PS1), does not reach the registration sensor (PS2) within the specified time (T1).

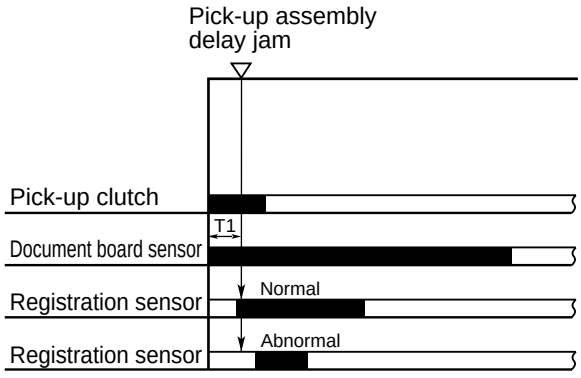


Fig. 3-18

	Vertical Scanning Resolution		
	300dpi	200dpi	150dpi
T1	12000	8000	6000

Unit: ms

Table 3-3

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

2. Feeder Assembly Jams

a. Feeder assembly delay jam

When the document, after passing the registration sensor (PS2), does not reach the scanning start sensor (PS3) within the specified time (T2).

b. Feeder assembly residual jam

When the document, after passing the scanning start sensor (PS3), does not pass the scanning start sensor (PS3) within the specified time (T3).

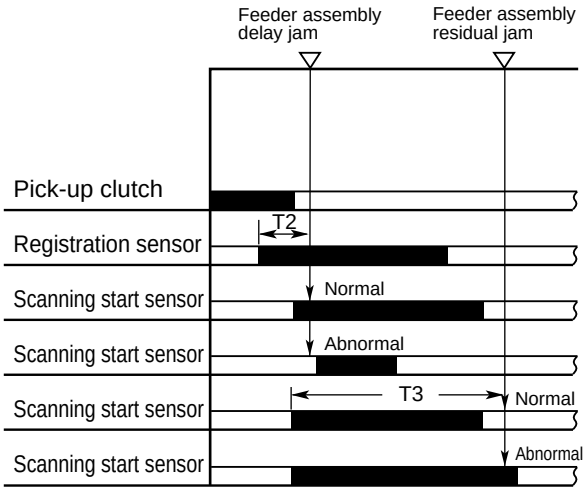


Fig. 3-19

	Vertical Scanning Resolution		
	300dpi	200dpi	150dpi
T2	3000	2000	1500
T3	3423	2282	1712

Unit: ms

Table 3-4

3. Delivery Assembly Jams

a. Delivery assembly delay jam

When the document, after passing the scanning start sensor (PS3), does not reach the delivery sensor (PS4) within the specified time (T4).

b. Delivery assembly residual jam

When the document, after passing the delivery sensor (PS4), does not pass the delivery sensor (PS4) within the specified time (T5).

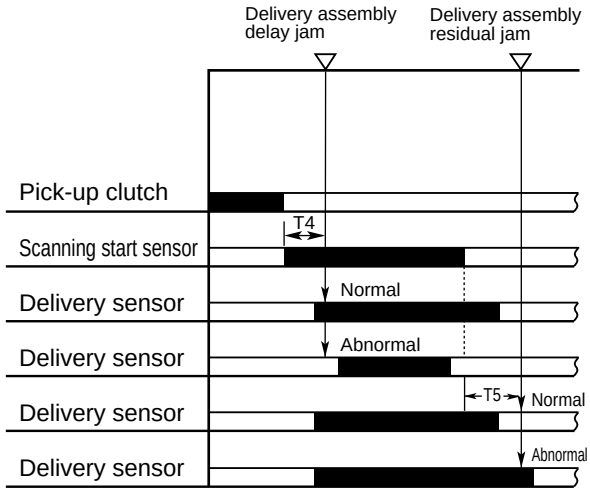


Fig. 3-20

	Vertical Scanning Resolution		
	300dpi	200dpi	150dpi
T4	1710	1140	855
T5	1710	1140	855

Unit: ms

Table 3-5

IV. FLOW OF IMAGE DATA

A. Scanner Assembly

Fig. 3-21 is a block diagram showing the flow of image data in the scanner assembly.

Signals from the BASIS are output after being divided into former half and latter half.

Electrical signals (analog) corresponding to the density of each pixel are transmitted serially from the BASIS. These signals are first converted by the A/D converter to digital signals of a level proportional to the density.

Then, the data transmission speed is converted from 2.5 Mbit/second to 10 Mbit/second in the data transmission speed conversion memory.

Next, the front/back and the former half and latter half data of each BASIS are made composite in the serial multi-circuit.

The composite 6-bit digital signals are processed for shading compensation in the multi-value image processing circuit.

These signals are further processed for edge emphasis, gamma compensation, and error diffusion in the image binarizing circuit to be converted to binary signals.

The resulting binarized image data is processed for noise elimination in the binarized image processing circuit.

When the scan resolution is other than 300 dpi, skipping is carried out according to the resolution.

After the various image processing, every 16 bits of binarized data is converted to parallel signals by the serial/parallel converter, and stored at whenever necessary in image memory by DMA transfer.

When the image data is compressed, it is processed for encoding in the image data encoding circuit, stored in the image data buffer memory, and transferred again to the SCSI bus via the SCSI control circuit by DMA transfer.

Then, the image data is sent to the control assembly via the SCSI bus, and is recorded on CD-R disk.

Reference

- DMA (Direct Memory Access)
  DMA refers to the operation whereby data is transmitted directly between the memory and devices without passing through the CPU. DMA is controlled by the DMA controller.

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

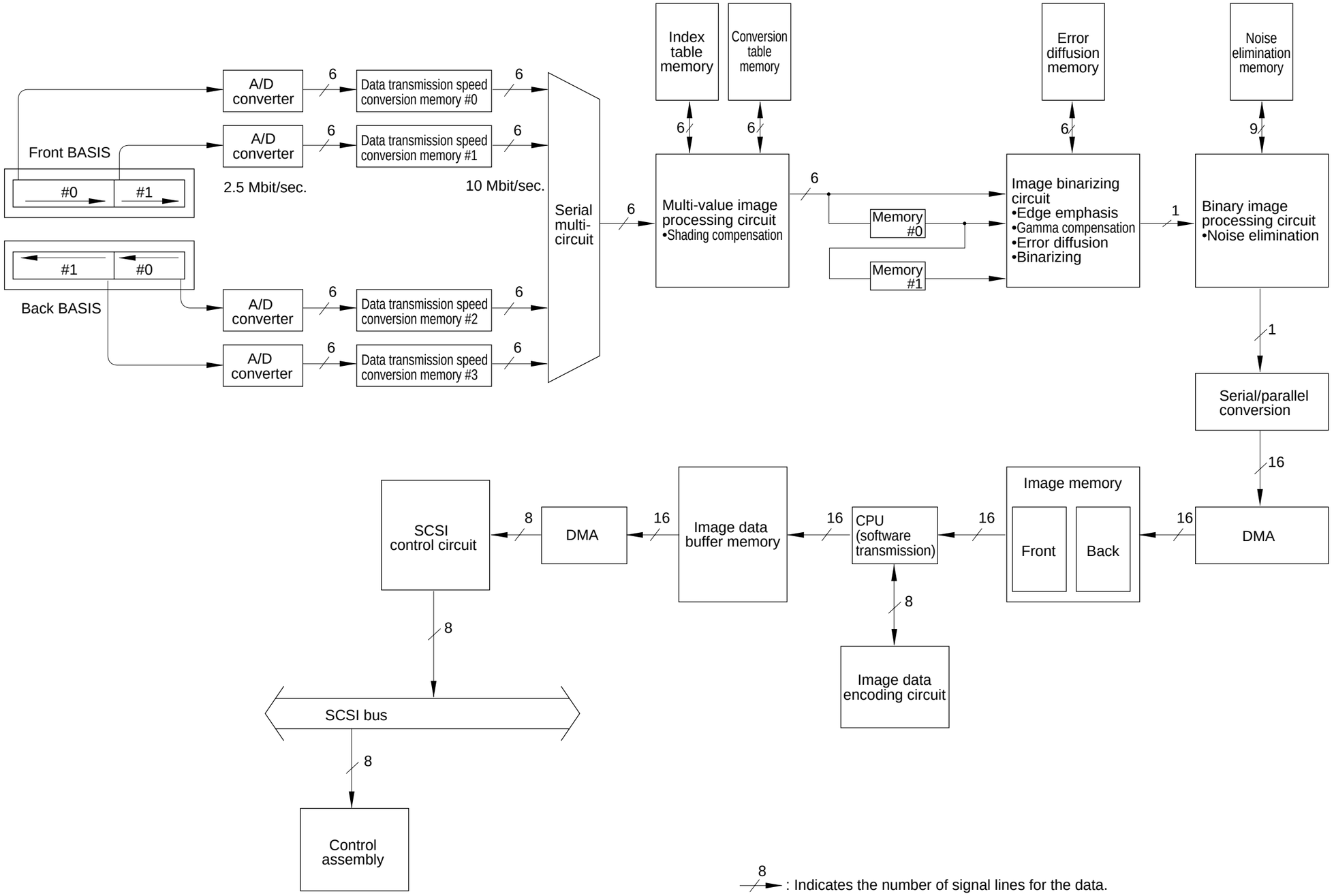


Fig. 3-21

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

B. Control Assembly

1. Recording

Table 3-6 shows the basic communications sequence between the control assembly and the scanner assembly.

Signals between the control assembly and the scanner assembly are handled on the SCSI bus.

1) The recording start command is sent from the control assembly to the scanner assembly to start document feed.
2) The data presence and feed status inquiry commands are sent from the control assembly, and the status signal is returned from the scanner assembly.
3) The data read command is sent from the control assembly, and the data is output from the scanner assembly.
4) The image data from the scanner assembly is processed by the control assembly.

No.	Control assembly	Communications direction	Scanner assembly
1	Recording start command	→→	
2			Start of document feed
3	Data presence and document feed status inquiry commands	→→	
4		←←	Presence of data and document feed status
5	1) Return to No.3 if there is no data during document feed. 2) Proceed to No.9 if there is no data during document feed stop. 3) Proceed to No.6 if there is data.		
6	Data read command	→→	
7		←←	Data output
8	1) Return to No.6 until there is no longer one document page of data. 2) Return to No.3 when one document page of data runs out.		
9	End		

Table 3-6

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

Fig. 3-22 is a block diagram showing control assembly logic. The following describes the flow of image data in the control assembly.

1) The image data from the scanner assembly is stored to memory on the control CPU PCB assembly via the SCSI bus.
2) When one document page's worth of image data has accumulated, the image data is appended with tag information and converted to TIFF. In actual fact, the image data is also appended with other management information.
3) This data is saved to CD-R drive memory via the SCSI bus.
4) When the data has reached a certain amount (one packet: max. 0.5MB), it is written to CD-R disk.
5) If you have selected "Display Image", the TIFF-converted image data is displayed successively on the LCD via the ISA bus.
6) If you have selected "Preview", one document page's worth of image data is displayed on the LCD via the ISA bus.

2. Searching and Displaying

The following describes how to display image data recorded to the CD-R on the LCD. (Refer to Fig. 3-22.)

1) The image data selected from the CD-R disk is recorded to memory on the control CPU PCB assembly via the SCSI bus.
2) The image data in the above memory is displayed on the LCD via the ISA bus.

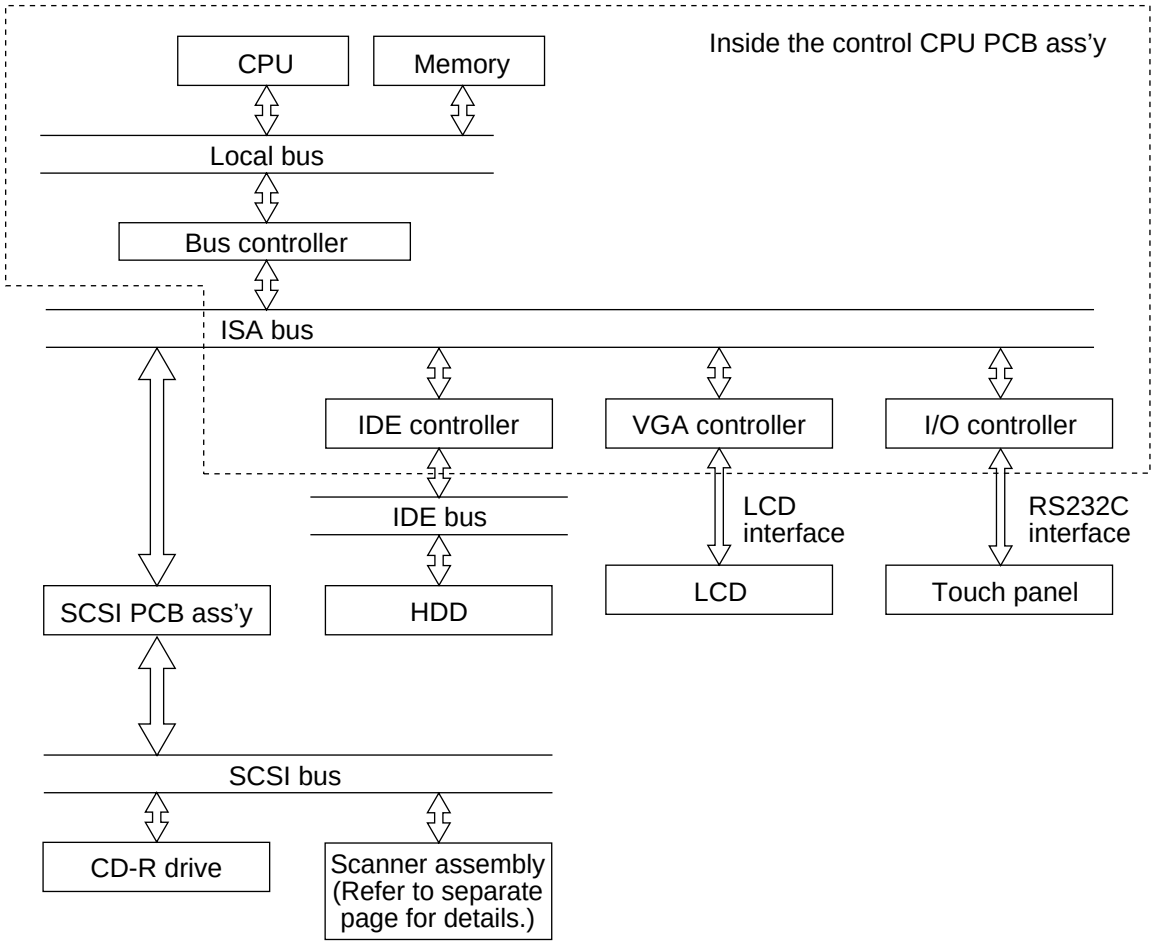


Fig. 3-22

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

C. Backup Mode

There are two CD-R disk modes, the “backup mode” and “standard mode.” When the CD-R mode is set to the backup mode, the same data that is recorded on CD-R disk is recorded to hard disk. If data on CD-R disk is destroyed, data can be restored to a separate CD-R disk.

This section describes the flow of image data in the backup mode, and the backup function.

1. Flow of image data during recording

The flow of image data is basically the same as described above. However, when data is sent to the memory of the CD-R drive, the same data is sent to HDD and is stored to the backup mode area on the hard disk. (See Fig. 3-23.)

Image data is not only recorded, all data including changes made to cabinet name, for example, are also recorded to hard disk.

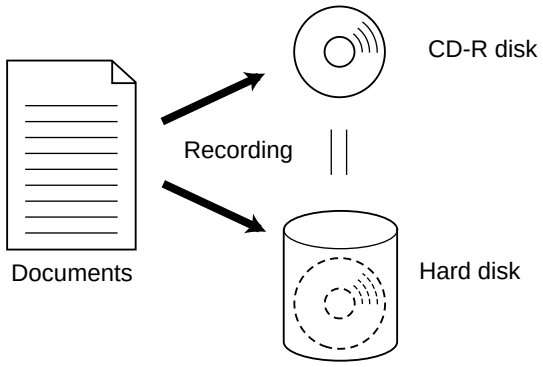


Fig. 3-23

2. Backup function

After data has been recorded, the data on CD-R and the data on hard disk are compared. If the data is found to be different, the data on hard disk is written to CD-R.

If the data of a different CD-R is recorded to hard disk when a CD-R is inserted and recording is carried out for the first time, the data is deleted, and all data on the currently inserted CD-R is written.

If an error occurs during use and the data on the CD-R is destroyed, the data can be restored to a new CD-R. However, note that only one CD-R worth of data can be backed up to hard disk. It also takes time (about one hour in the case of a large amount of data) to swap data on hard disk.

3. Standard mode

In the standard mode, image data is recorded to standard mode area on hard disk and to the CD-R at the same time during recording of image data. Data is rewritten when data on CD-R is compared with data on hard disk and the data is found to be different. If a different CD-R is inserted, the previous data is deleted from hard disk. For this reason, data can be restored less sufficiently than in the backup mode.

V. SCANNER ASSEMBLY ELECTRICAL CIRCUITS

A. Outline

As described earlier, the scanner assembly of this machine is almost identical to that used on the DR-3020. So, the electrical circuits also are almost the same.

Fig. 3-24 shows a block diagram based upon the flow of image data in the CPU circuit.

This figure shows the series of the analog signals output from the BASIS and output to the control assembly via the image processor.

The block diagram indicates the main functions of the machine in units of devices. The ☐ in the frame indicates the name of the device used in each gate array.

1. Explanation of Operation

The electrical signals that are input serially from the BASIS are first amplified, A/D-converted by the A/D converter, and then input to the multi-value image processing controller (BASIS-CHIP) as 6-bit digital signals. The four digital signals are made composite in the multi-value image processing controller via the composite RAM.

On the other hand, white pixel data is arithmetically processed in the multi-value image processing controller, and then stored in the index table RAM to carry out shading compensation. The conversion table RAM contains the compensation table that is used to compensate to the level of each BASIS. So, during image scanning, the BASIS signal is compensated and then output to convert the resolution in the horizontal scanning direction.

The shading-compensated 6-bit image signals output from the multi-value image processing controller are input to the image binarizing controller (NOAH-CHIP).

These image signals are processed for edge emphasis and error diffusion in the vertical scanning direction using two line memories, and then, they are binarized.

The image signals binarized in the image binarizing controller are input to the binary image controller (IF III-CHIP).

In the binary image controller, noise elimination is carried out.

The image signals output from the binary image controller are encoded in the image data encoding controller (ENC-CHIP).

The 8-bit image data output from the image data encoding controller (ENC-CHIP) is transmitted to the control assembly via the SCSI controller (SPC-CHIP) by the encoded image data transmission controller (SORAMAME-CHIP).

The encoded image data transmission controller carries out DMA transmission via buffer memory.

Reference

- DMA (Direct Memory Access)
  DMA refers to the operation whereby data is transmitted directly between the memory and devices without passing through the CPU. DMA is controlled by the DMA controller.

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

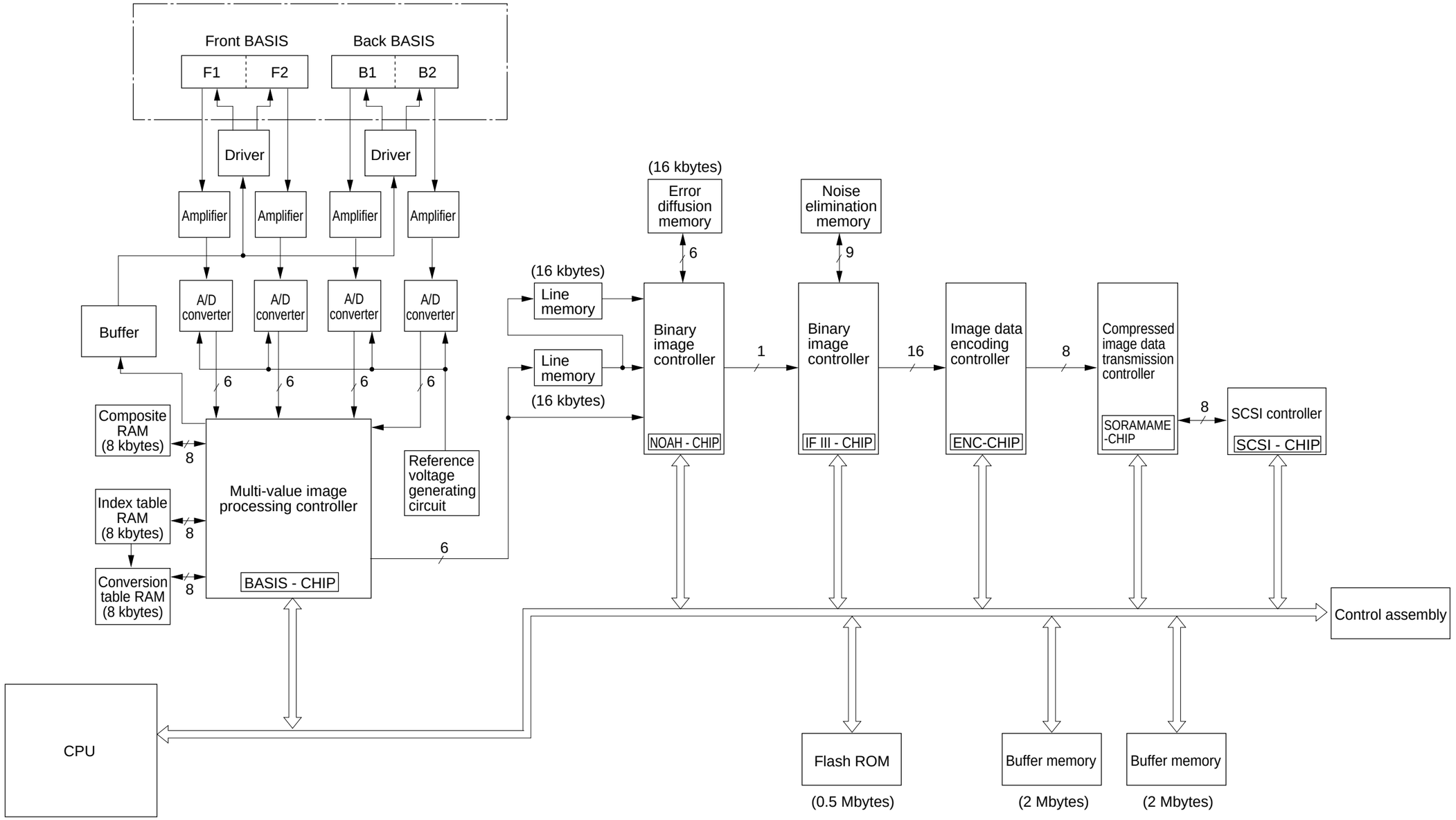


Fig. 3-24

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

B. CPU Circuit

Fig. 3-25 shows a block diagram of the CPU circuit.

Control of the scanner assembly is carried out by IC115 single chip 32-bit CPU.

The main functions of the IC are as follows.

IC No.	Function
IC101 (SPC-CHIP)	Control gate array for SCSI interface
IC102 (SORAMAME-CHIP)	Control gate array for interfacing IC107 (ENC-CHIP) and IC101 (SPC-CHIP)
IC103	Memory for making composites from image data from front BASIS and image data from back BASIS (8 kbytes)
IC104 (BASIS-CHIP)	Gate array for driving BASIS, and shading compensation
IC105	Index table memory during shading compensation (8 kbytes)
IC107 (ENC-CHIP)	Image data compression gate array
IC108	Conversion table memory during shading compensation (8 kbytes)
IC109	Buffer memory for image data transmission (2 Mbytes)
IC111 (NOAH-CHIP)	Gate array for edge emphasis, error diffusion and gamma compensation
IC112	Flash ROM for working and for writing various data on the scanner assembly (0.5 Mbytes)
IC113	Buffer memory for image data transmission (2 Mbytes)
IC114	Memory for error diffusion processing (16 kbytes)
IC115 (CPU)	Microcomputer for controlling scanner assembly
IC116	Line memory for edge emphasis processing (16 kbytes)
IC117 (IF-III-CHIP)	Gate array for noise elimination processing
IC118	Line memory for edge emphasis processing. Partially used for noise elimination processing (16 kbytes)

Table 3-7

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

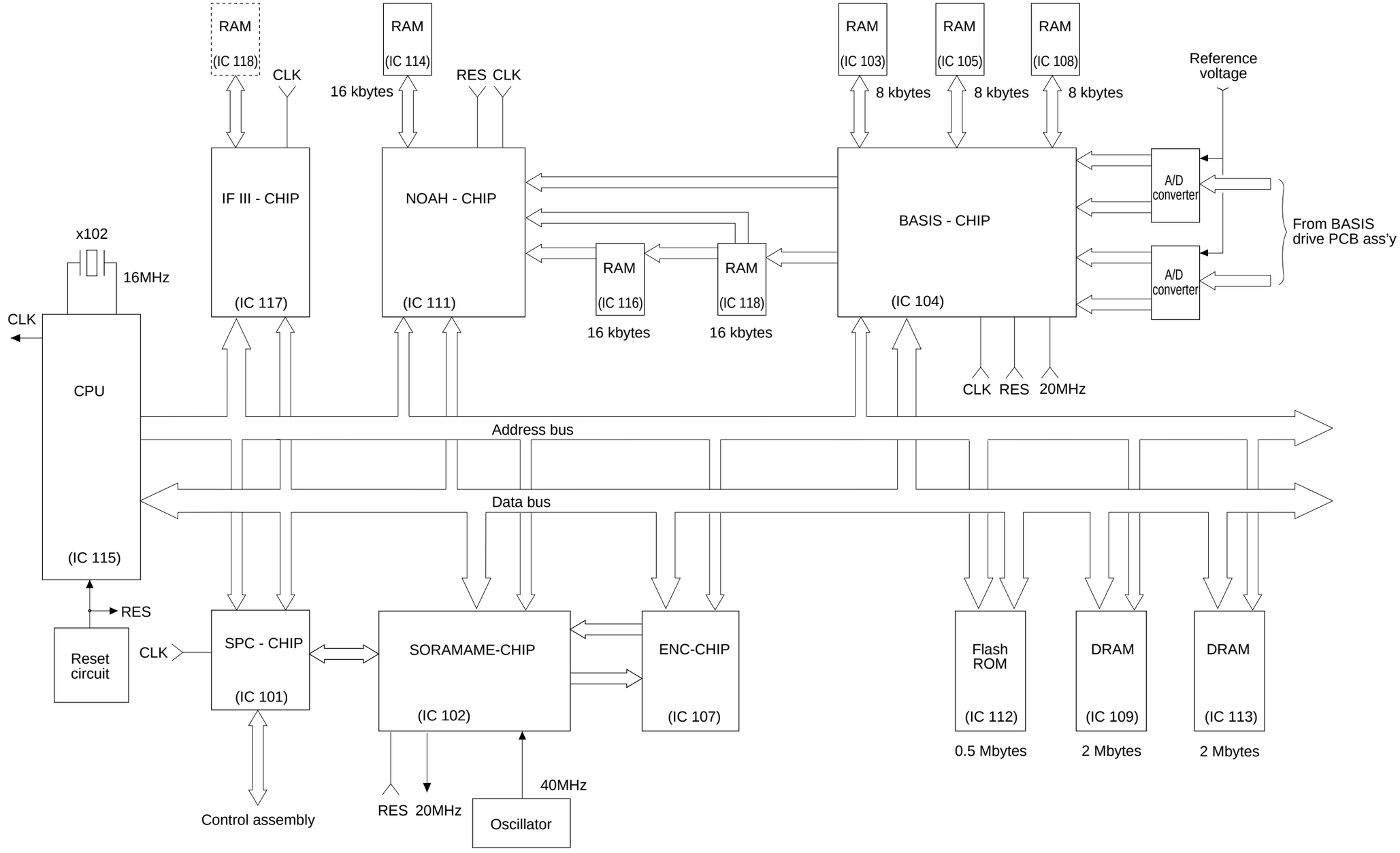


Fig. 3-25

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

C. BASIS Drive Circuit

1. Outline

This circuit amplifies the voltage (analog) corresponding to each pixel output from the BASIS, makes the front image signal composite with the back image signal, and converts the resulting signal into a 6-bit digital signal.

2. BASIS Structure

Figs. 3-26 and 3-27 show the structure of the BASIS (Base Stored Image Sensor).

The BASIS used in this machine has 3042 pixel bits, and consists of a photosensitive assembly, transmitter assembly, and output assembly.

The BASIS is constructed so that it is divided into two blocks, the former and latter blocks, to a ratio of 7 : 6.

The BASIS consists of 13 chips. Each chip has 234 sensors (photo-transistors) arranged in it.

The first nine bits of left end chip 1 and the last nine bits of right end chip 13 of the BASIS are dummy bits, and are not used.

The total number of sensors in the BASIS is:

13 (number of chips) × 234 (number of bits per chip) – 18 (unused sensors) = 3024 (number of sensors)

Resolution is:

3024 ÷ 256 (width: mm) = 11.8 (number of sensors) = 300 dpi

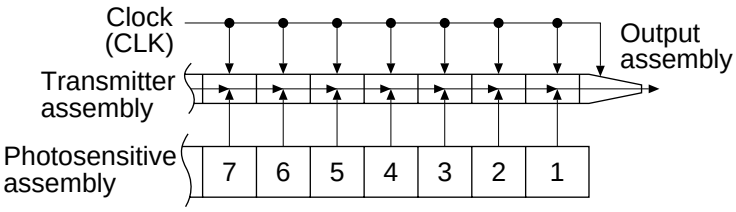


Fig. 3-26

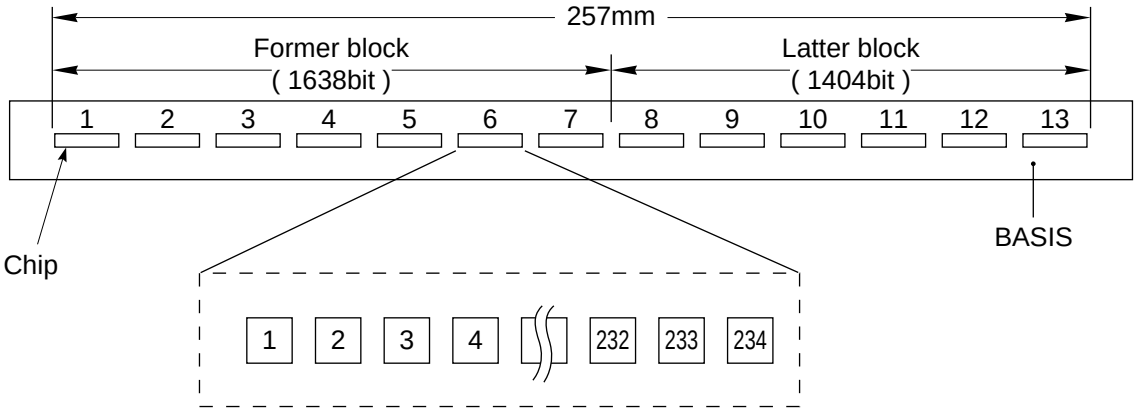


Fig. 3-27

3. Explanation of Operation

Fig. 3-28 shows the block diagram of the BASIS drive circuit.

Two BASIS's are used, one for reading the front side of the document and the other for reading the back side.

To read documents at high speed, the BASIS's read the former and latter blocks simultaneously.

The analog voltage of the former block (10 to 1638 bits) and the analog voltage of the latter block (1639 to 3033 bits) are output as Vout1 and Vout2, respectively, to the CPU circuit.

Clock signals (FSP and BSP) are input to the BASIS.

The analog signals output from the BASIS are amplified by amplifiers, and are converted to 6-bit digital signals by a 6-bit A/D converter.

After that, shading compensation is carried out on these signals by the multi-value image processor assembly.

- BASIS transmitter assembly (Refer to Fig. 3-29.) When the SP signals are ON, the previously held potential is synchronized with CLK, and is transmitted successively to the output assembly.

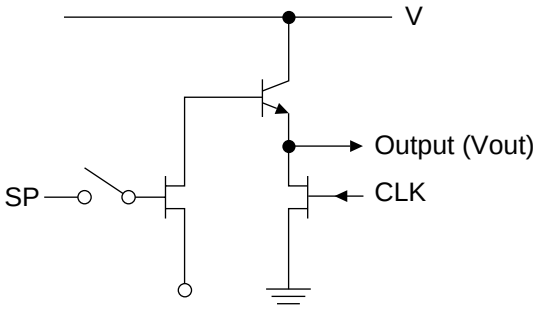
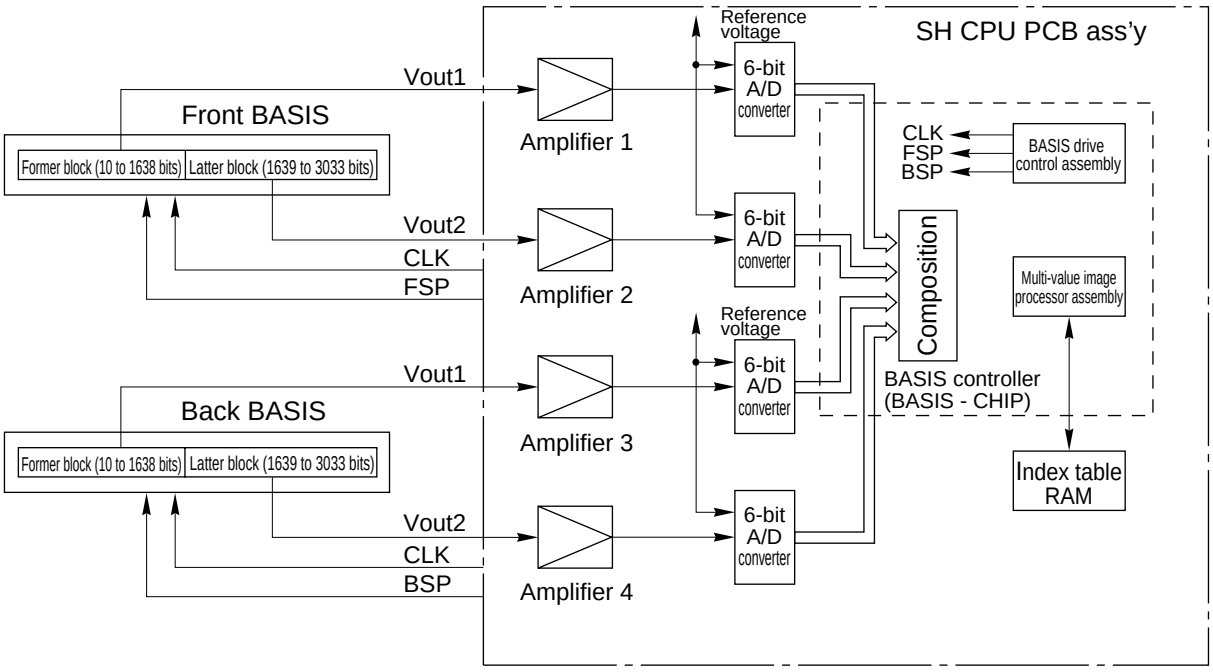


Fig. 3-29



(Analog shift register)

Fig. 3-28

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

Fig. 3-30 shows the timing chart of the BASIS operation.

SP is the line interval signal indicating a one line interval.

CLK is the BASIS drive clock and operates at 1.25MHz.

Vout1 indicates the output of the former block and Vout2, the output of the latter block of BASIS.

The intervals between CLK signal pulses 1 to 26 of the Vout1 output are the clamp intervals (52 bits). The intervals between pluses 27 to 31 are the dummy bits (9 bits), and are invalid bits (1 to 9 bits) of BASIS.

The intervals between CLK signal pulses 31 to 851 are the valid bits of BASIS and the 10th bit to the 1629th bit are output as image signals (S1 to S1629).

Likewise, the intervals between CLK signal pulses 1 to 26 of the Vout2 output are the clamp intervals (52 bits).

The intervals between pulses 27 to 671 are the valid bits of the latter block of BASIS and the 1639th bit to 3024th bit are output as image signals (S1630 to S3024).

The intervals between CLK signal pulses 671 to 676 are the invalid bits of the trailing end of BASIS.

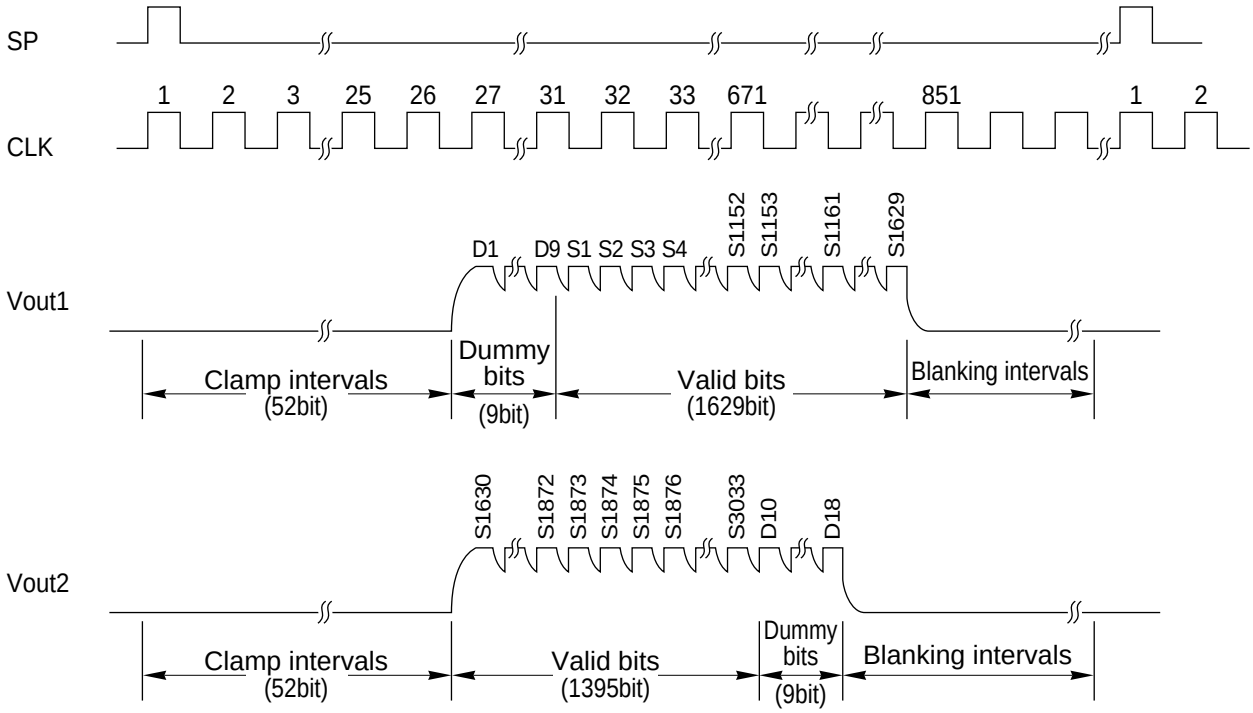


Fig. 3-30

D. Multi-value Image Processing Control (BASIS-CHIP) Circuit

1. Outline

This circuit has the following functions:

- It generates the drive timing signals for the two BASIS's which read the front and back sides of the document.
- It controls access to the index table RAM and the conversion table RAM from the BASIS side and the CPU side during shading compensation.

2. Explanation of Operation

Fig. 3-31 shows a block diagram of the multi-value image processing controller (BASIS-CHIP).

Fig. 3-32 shows the timing chart of image data read by BASIS.

The former and latter blocks of the front & back side BASIS's are read simultaneously.

The read timing of the back side starts a half line after the reading of the front side.

After being converted by A/D converters into digital signals, the data read from the front and back sides are made composite at the data speed conversion assembly & composition assembly.

Also, data input at a transmission speed of 2.5 Mbit/sec. are converted to 10M bit/sec.

After that, shading compensation is done by the shading compensation assembly, and the data is output to the image binarizing controller.

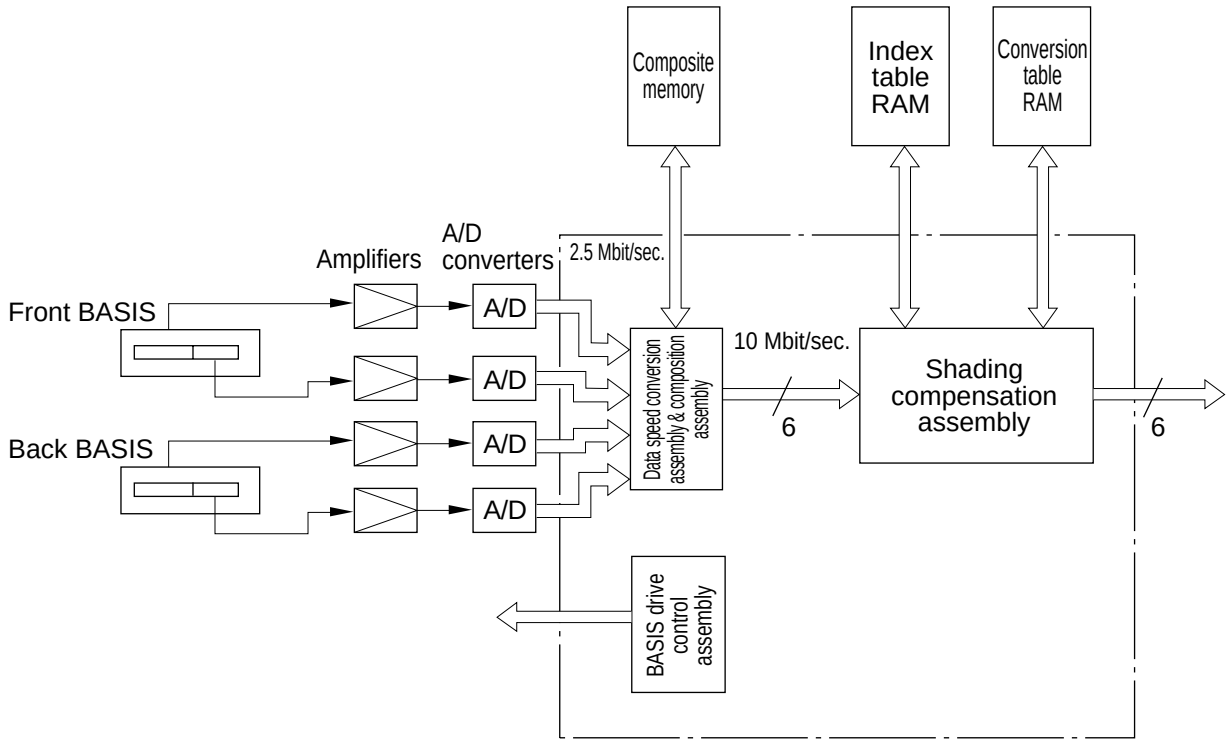


Fig. 3-31

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

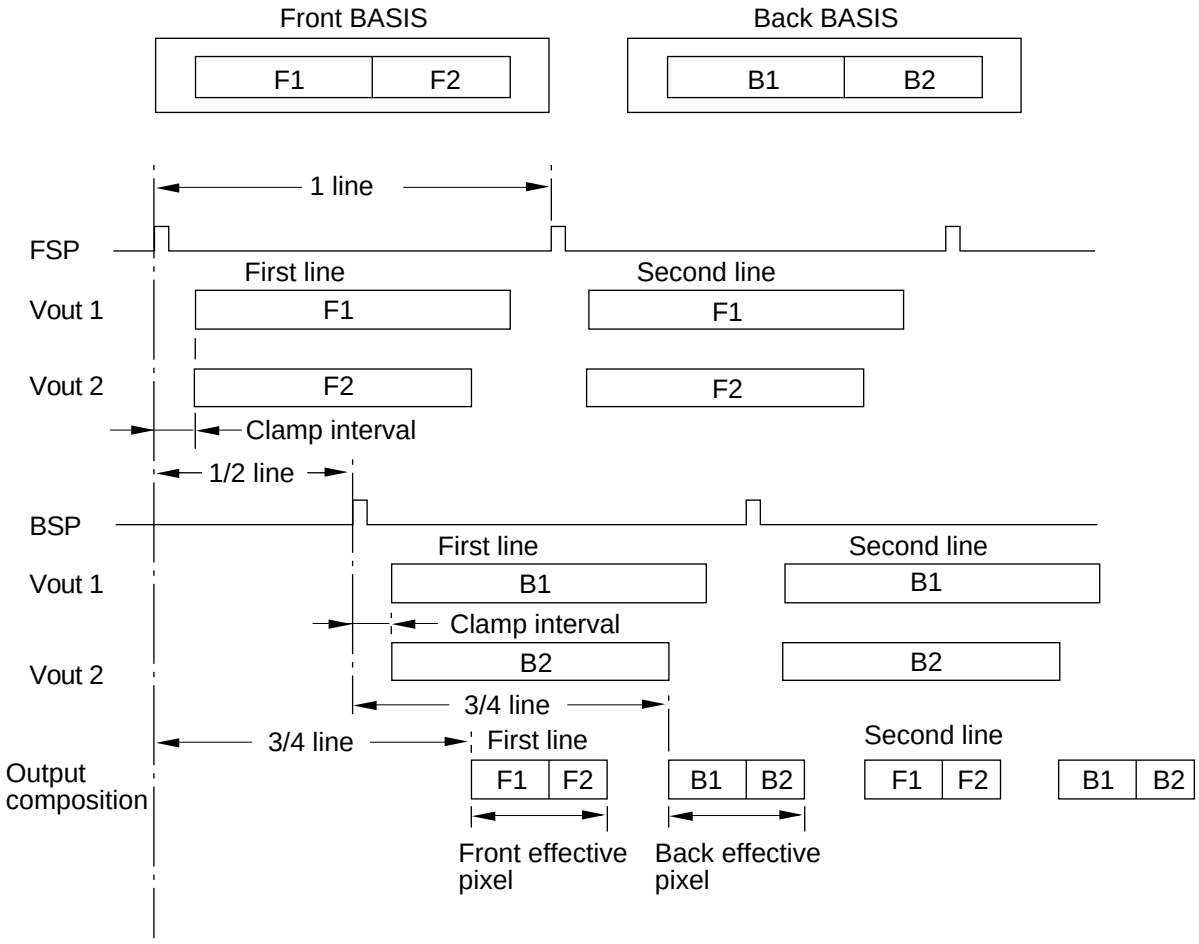


Fig. 3-32

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

E. Image Binarizing Controller (NOAH-CHIP) Circuit

1. Outline

This circuit binarizes the 6-bit image data output from the multi-value image processing controller by carrying out the following image processing.

- Edge emphasizing processing
  This process emphasizes the changes in light and dark areas to reproduce a distinct image.
- Error diffusion processing
  This process reproduces the halftones of photographs, etc.

2. Explanation of Circuit

Fig. 3-33 shows an outline of the image binarizing controller circuit.

The 6-bit image output from the multi-value image processing controller is input to the image binarizing controller via two line memories.

Edge emphasizing is carried out with this signal.

Memory #2 is used for error diffusion processing.

The data is image-processed, and then binarized and output.

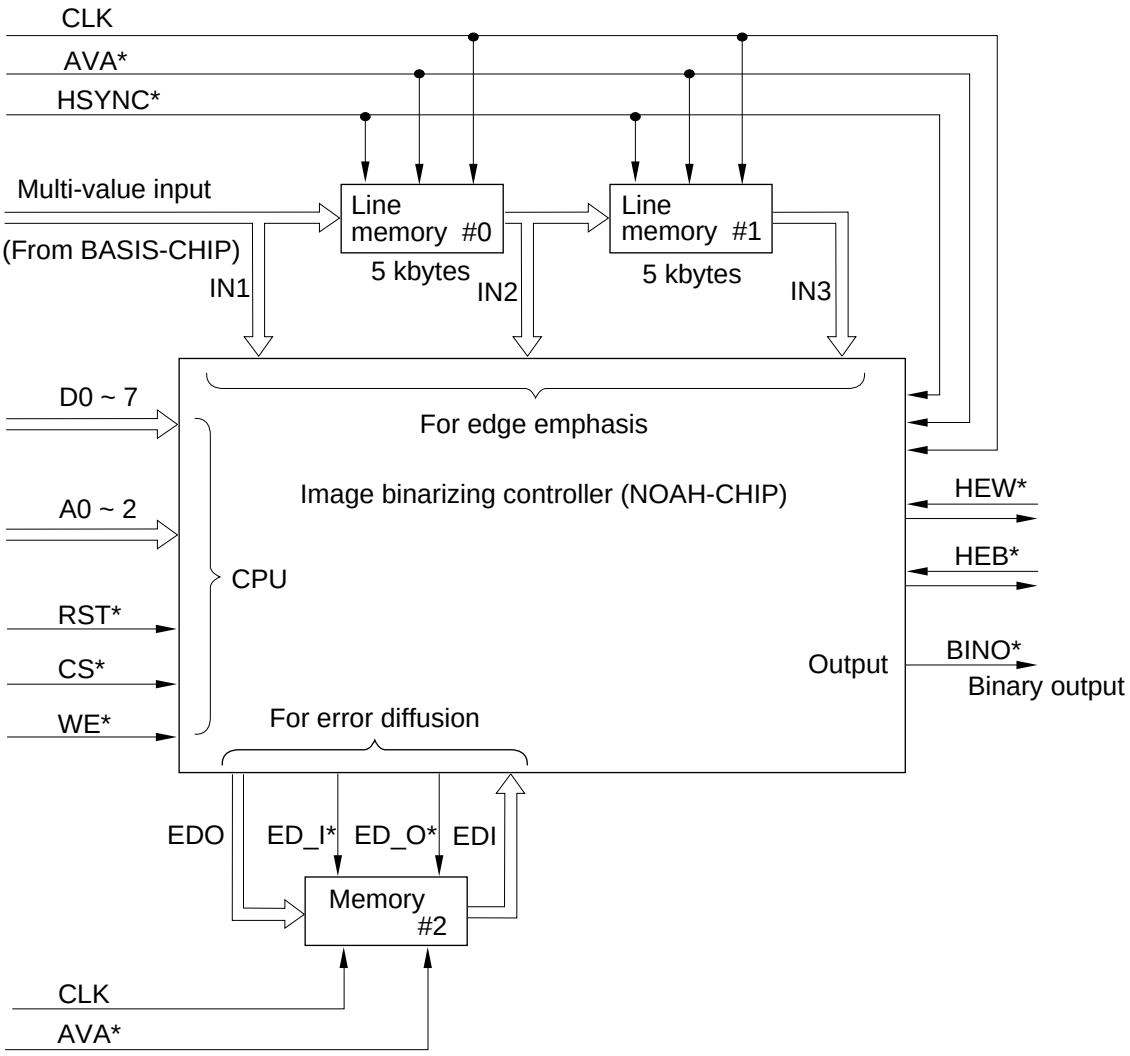


Fig. 3-33

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

The following gives the names of signals and their meanings:

CLK:	Reference clock
HYSNC*:	Horizontal synchronizing signal
AVA*:	IC operation control signal
HEW*:	Indicates the effective interval of the input image.
HEB*:	Indicates the effective interval of the input image.
INx:	Image input bus of 6-bits x 3 lines. Line in which IN1 is first processed
BINO*:	Binary image output data
EDI:	Error data input from error diffusion memory
EDO:	Error data output to error diffusion memory
ED_O*:	Read reset of error diffusion memory
ED_I*:	Write reset of error diffusion memory
Ax:	Internal register selection address
Dx:	CPU data bus
CS*:	Chip select signal
WE*:	Write enable signal
RST*:	Reset signal
Tx:	IC text signal

Note: Signals marked with an asterisk "*" mark are "Low" active signals.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

F. Binary Image Processing Controller (IF III-CHIP) Circuit

1. Outline

The binary image processing controller carries out the following processing on image data binarized by the image binarizing controller.

- Noise elimination processing
- Serial/parallel conversion processing

2. Processing Details

- Noise elimination
  This process treats independent and isolated pixel data in the image input data as image noise, and forcibly converts this data into “background” pixels.
  The main purpose of this function is to make it easier to see a binarized image of a soiled document or background as many fine dots, and also to reduce the lowering of the image data compression ratio.
- Serial/parallel conversion
  This process converts image-processed binary data to 16-bit parallel signals so that they are transmitted at high speed to the image buffer memory.

3. Explanation of Circuit

Fig. 3-34 shows a block diagram of the binary image processing controller.

Although the input selector is shown as a circuit that selects one signal system from four. This machine supports only one system.

The auxiliary signal generating circuit generates the following signals:

- PAG*: Page interval signal
  Level signal indicating the effective interval (length of one page) of the document
- HYSNC*: Horizontal synchronizing signal
  Pulse signal indicating the leading position of one scanning line of the image
- AVA*: Valid image interval signal
  Level signal indicating the interval of valid pixel data in one scanning line
- LN F*/B: Front & back side designation signal
  Level signal indicating the front/back interval of a double-sided document when the document is handled by combining the data as one scanning line. For a single sided document, the front is fixed at “0” and the back at “1”.

Note: Signals marked with an asterisk “*” markqre “Low” active signals.

Noise is eliminated from image data in the image processing circuit, and is output as 16-bit parallel signals via the output selector.

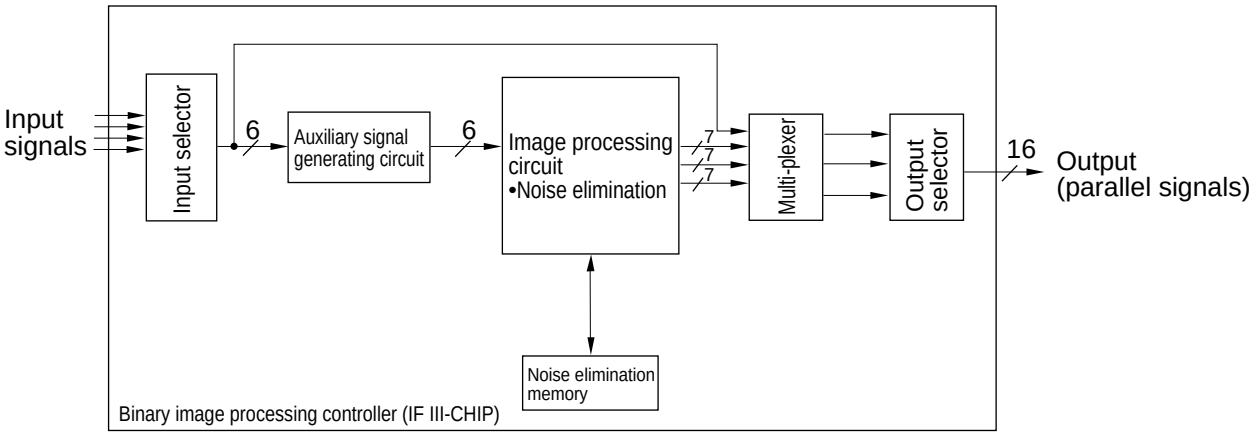


Fig. 3-34

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

G. Encoded Image Data Transmission Controller (SORAMAME-CHIP)

1. Outline

Fig. 3-35 show the block diagram of the encoded image data transmission controller and the functions of the peripheral devices.

The encoded image data transmission controller has the following functions:

- It interfaces the CPU and the image encoding controller in order to speed up encoding of image data.
- It interfaces the CPU and the SCSI protocol controller in order to exchange image data over the SCSI bus.

2. Explanation of Operation

The following is the flow of operation.

Note that the numbers in the figure correspond to those in this explanation.

① The CPU reads the image data from memory 1 and writes that data in the input memory register in the encoded image data transmission controller. Memory capacity is 14 bytes.

② The data written in the input memory is transmitted to the image data encoding controller via a dedicated 16-bit bus.

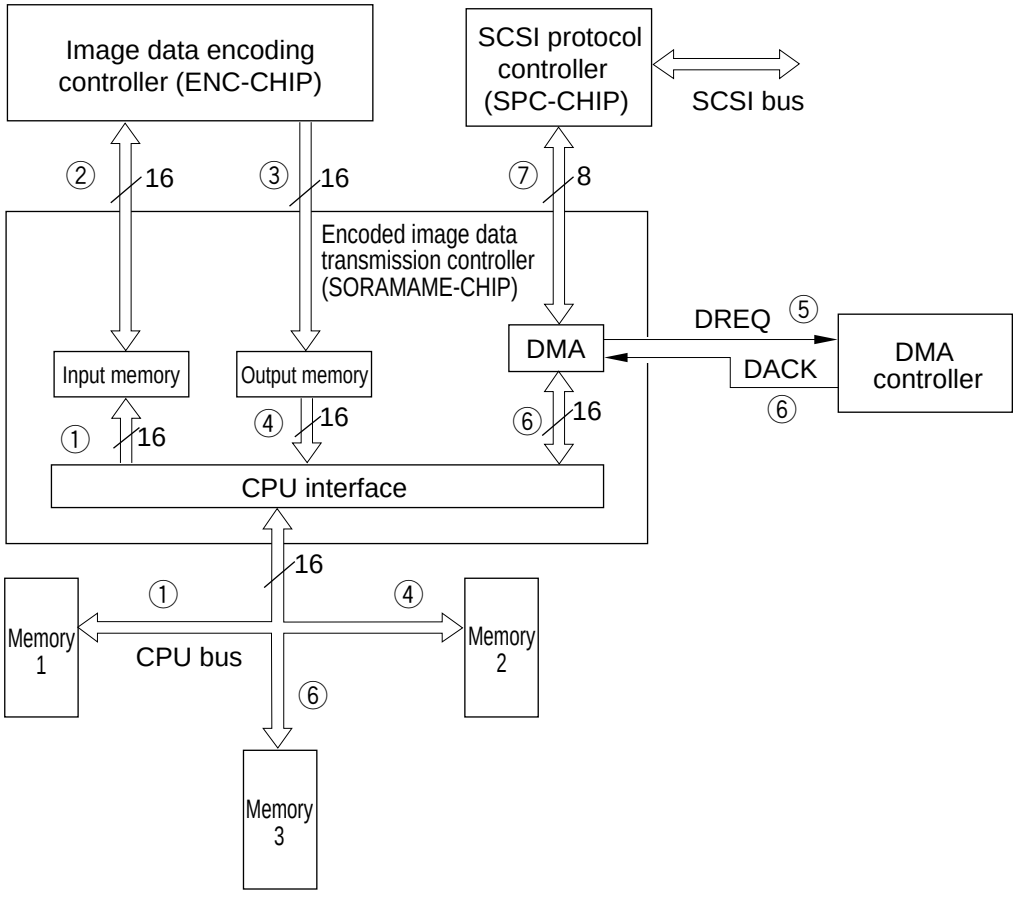


Fig. 3-35

③ The image data encoded by the image data encoding controller is transmitted to the output memory in the encoded image data transmission controller via a dedicated 16-bit bus. Memory capacity is 14 bytes. When the memory becomes full, the encoded data transmission controller stops transmitting.

④ The CPU reads the encoded data from the output memory register and writes that data in memory 2.

① to ④ above constitute the interface function between the CPU and the image data encoding controller.

⑤ When on DMA transfer, first DREQ (DMA transfer request) signals are sent from the encoded image data transmission controller to the DMA controller.

⑥ DACK (DMA request acknowledgment) signals are returned from the DMA, and image data is then transmitted by the DMA controller from memory 3, via the CPU bus, to the encoded image data transmission controller.

⑦ Image data is transmitted from the encoded image data transmission controller to the SCSI protocol controller via a dedicated 8-bit bus.

⑤ to ⑦ above constitute the interface function between the CPU and the SCSI protocol controller.

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

H. Main Motor Driver Circuit

1. Outline

Fig. 3-36 shows an outline of the main motor driver circuit.

A DC motor is used as the main motor.

The main motor is rotated at three different speeds, high, medium and low. These speeds are selected by combining two signals, SPEED A and SPEED B.

If an abnormality stops motor rotation, the M.LOCK signal becomes “H”, transmitting the error signal to the CPU to automatically stop the motor.

Rotation	SPEED A	SPEED B	Rotating speed	Feed speed
Low speed	H	H	144rpm	121.0mm/sec.
Medium speed	L	L	216rpm	181.4mm/sec.
High speed	H	L	288rpm	241.9mm/sec.

Table 3-8

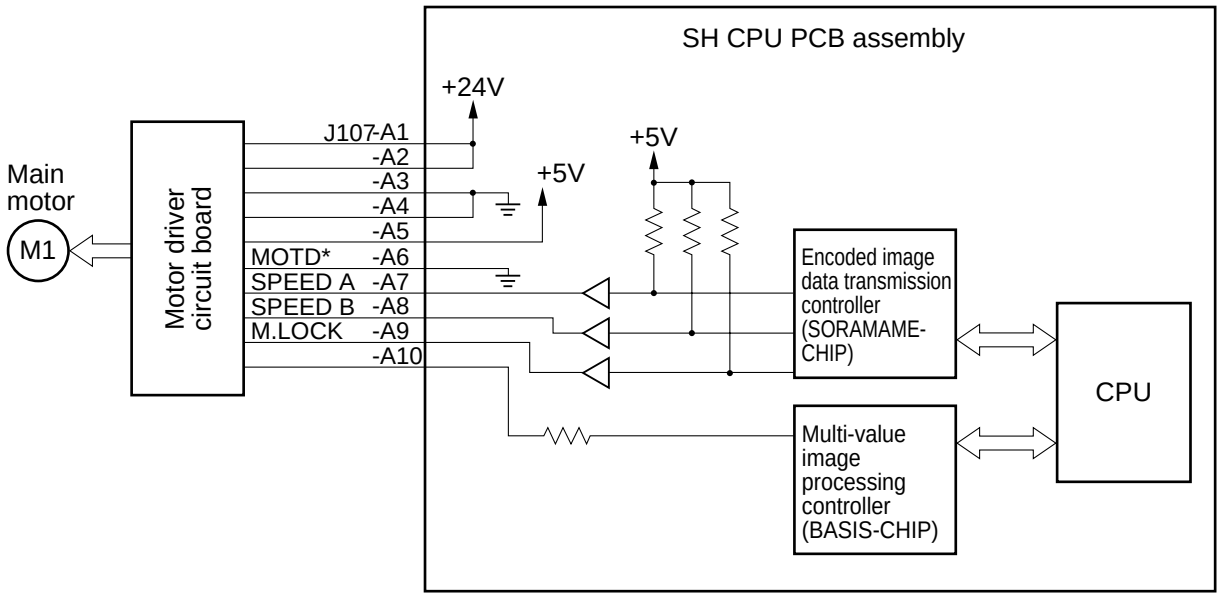


Fig. 3-36

VI. INTERFACES

1. Outline

When data is transmitted from the scanner assembly on this machine to the control assembly, it passes through an interface. This machine uses the SCSI (Small Computer System Interface) interface.

SCSI is a parallel interface. Though it is not suitable for data transfer over long distances, it is capable of high-speed data transfer, has many functions, and is a standard interface for connecting computers and peripheral devices. The bus that data is transferred over on the SCSI interface is called the “SCSI bus”.

2. SCSI Interface

Fig. 3-37 and Table 3-9 shows the data inputs and outputs, and the names of signals assigned to pins that are available on the SCSI interface.

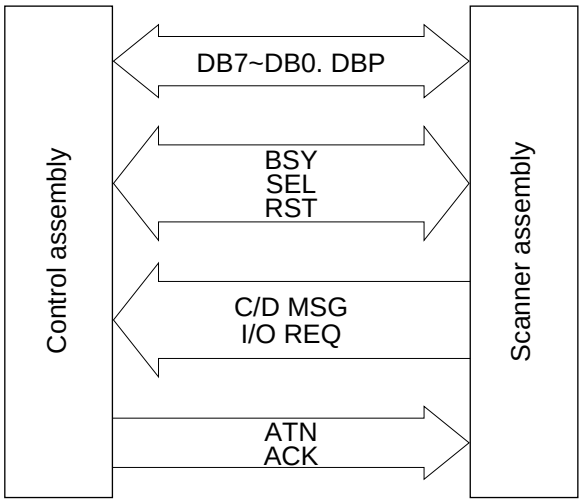


Fig. 3-37

Pin No.	Signal Name	Description
1-12	GND	(Ground)
13	Open	(Non-connection)
14-25	GND	(Ground)
26	DB0*	(Data Bit 0)
27	DB1*	(Data Bit 1)
28	DB2*	(Data Bit 2)
29	DB3*	(Data Bit 3)
30	DB4*	(Data Bit 4)
31	DB5*	(Data Bit 5)
32	DB6*	(Data Bit 6)
33	DB7*	(Data Bit 7)
34	DBP*	(Odd Parity Data Bit)
35-37	GND	(Ground)
38	TERMPWR	(Termination Power)
39-40	GND	(Ground)
41	ATN*	(Attention)
42	GND	(Ground)
43	BSY*	(Busy)
44	ACK*	(Acknowredge)
45	RST*	(Reset)
46	MSG*	(Message)
47	SEL*	(Select)
48	C/D*	(Control/Data)
49	REQ*	(Request)
50	I/O*	(Input/Output)

Note: Signals marked with an asterisk “*” mark are “Low” active signals.

Table 3-9

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

VII.CONTROL ASSEMBLY ELECTRICAL CIRCUITS

1. Outline

The control assembly reads in image data from the scanner assembly via the SCSI circuit board, and transmits this data to the CD-R drive. The circuit assembly also controls data I/O with the touch panel. These controls are carried out by the control CPU PCB assembly and by control software stored on HDD.

Some components have been purchased from outside manufacturers as the main PCB assemblies including the control CPU PCB assembly and other units. The following pages only show the main features, specifications and block diagrams of electrical circuits. A detailed description of functions and operations is omitted here.

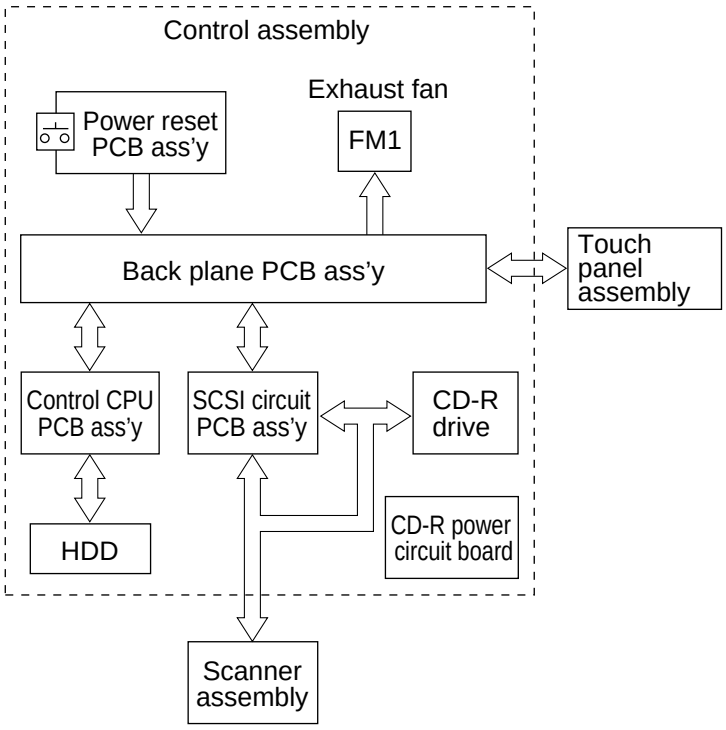


Fig. 3-38

2. Control CPU PCB assembly

A IBM PC/AT compatible board-type computer HF486ALL-2 made by Dux Inc. is used for this PCB assembly.

The following shows its main specifications, and a block diagram.

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

1) CPU: 80486 SX/DX/DX2/DX4 (AMD)
2) Core chip: PT86C386 (Pico Power)
3) Main memory: 16 Mbytes
4) BIOS ROM: FLASH ROM 128 kbytes
5) BIOS: Phoenix (AT compatible)
6) VGA: 65540/65545 (Chips & Tech.)
7) Max. rated voltage: 5V ±5%
8) Built-in battery: 3.6V Lithium battery

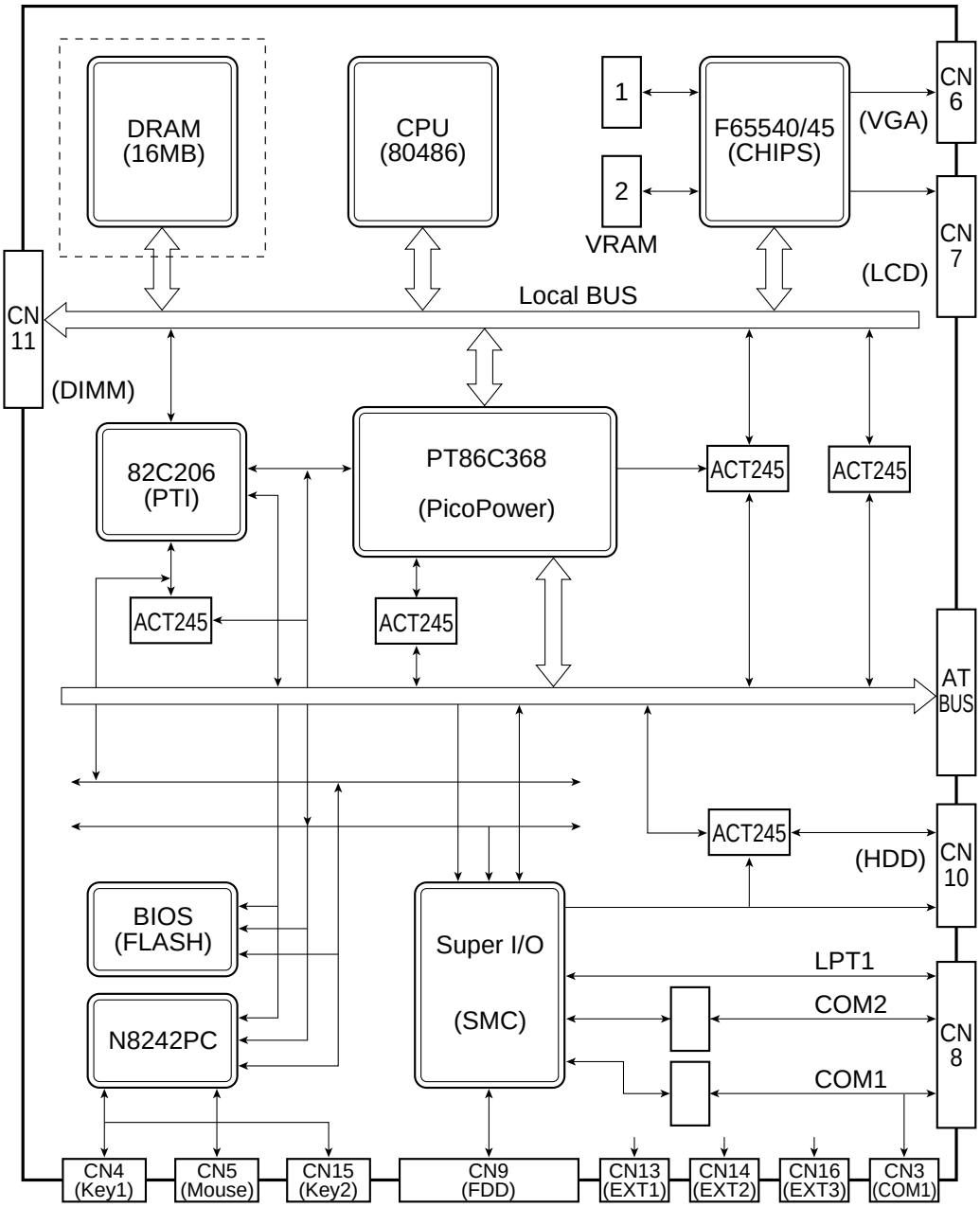


Fig. 3-39

3. SCSI PCB assembly

An IBM AT compatible SCSI host adapter AHA-1540CP made by Adaptec, Inc. is used for this PCB assembly.

The following shows its main features, and its component layout diagram.

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

1) ISA and EISA bus supported
2) SCSI-2 (FAST SCSI) supported
3) Max. transmission speed: 10 Mbytes/sec.

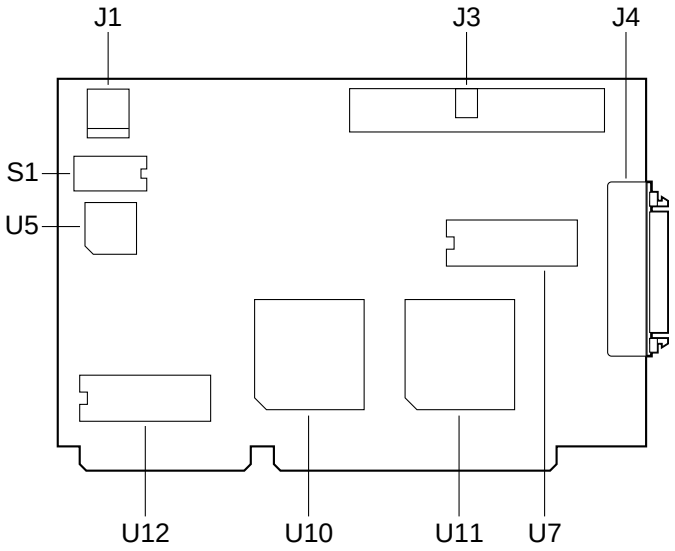


Fig. 3-40

Symbol	Name	Symbol	Name
J1	External LED connector	U7	Host adapter BIOS EPROM
J3	Internal connection SCSI connector	U10	AIC-3370 Plug & Play interface
J4	External connection SCSI connector	U11	AIC-7970 SCSI controller
S1	DIP switch	U12	Bus master firmware
U5	Bus master microprocessor		

Note 1: The J4 external connection SCSI connector is not used on this machine.
Note 2: The S1 DIP switch settings refer to “X. B. SCSI PCB Assembly”.

Table 3-10

4. CD-R Drive

A Sony Corporation CDU926S is used for this drive.

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	SCSI-2
2	Writing & Reading	2x speed writing 6x speed reading
3	Data transmission rate	2x: 300 kbytes/sec, 6x: 900 kbytes/sec
4	SCSI buffer member	512 kbytes
5	Recording mode	Four modes are supported. This machine uses packet writing (variable) as the writing method, and DirectCD by Adaptec, Inc. is used as the software.
6	Laser tye	Semiconductor GaAlAs (output at writing: 35 mW)
7	Recording disk	Use CD-R disks having the COMPACT disc Recordable mark that indicates compliance with the Recordable Compact Disk System Part II (Orange Book) Standard. One recommended product is packaged with the machine.
8	Max. recording capacity	650 Mbytes/sec.
9	Loading system	Caddy (one provided per machine)
10	Input voltage	+5VDC, +12VDC
11	External dimensions	148.5 (W) x 208 (D) x 42.5 (H) mm

Table 3-11

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

Note 2: Never subject CD-R drives to vibration or impact during writing. Doing so might damage the data on the CD-R. Data cannot be recovered from damaged disks.

Note 3: CD-R drives are mechanical and electrical precision units. So, use the packing materials in which replacement parts were originally packaged to protect the CD-R drive after it has been removed for transportation. Also, do not remove the caddy.

Note 4: Pay particular care of how you handle and store CD-Rs. Observe the precautions that accompany CD-Rs.

Note 5: Also refer to the precautions described in “Chapter 1, III. PRECAUTIONS.”

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

5. HDD (Hard Disk Drive)

A 3.5" MPA3017AT with built-in ATA interface compatible controller made by Fujitsu Limited is used as the hard disk drive.

The following shows the main specifications.

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

1) Total recording capacity: 1750 Mbytes
2) Number of logical cylinders: 3390
3) Number of heads: 16
4) Number of sectors: 63
5) Number of bytes: 512 bytes/sector
6) Recording method: PRML
7) Rotating speed: 5400 rpm
8) Average rotation wait time: 5.56 ms
9) Interface: ATA (IDE)

Note 1: Hard disk drives are mechanical and electrical precision units. So, use the packing materials in which replacement parts were originally packaged to protect the hard disk drive after it has been removed for transportation.

Note 2: Never disassemble this product on site.

Note 3: The interface name ATA and IDE are the same interface.

Note 4: The recording device on this machine is divided into “drive C:” and “drive D:” Recording is set so that software and other files are recorded to drive C: and the standard mode and backup mode data are recorded to drive D:.

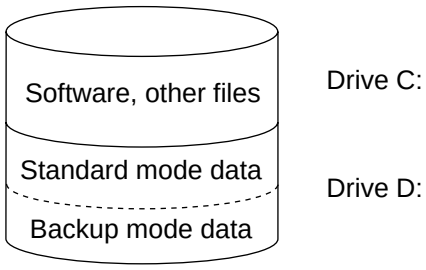


Fig. 3-41

6. Back Plane PCB Assembly

This PCB assembly carries out relaying with other circuit boards, and converts the signal voltage by the on-board buffer IC.

- Electromagnetic-wave countermeasure
  The signal voltage of the controller and touch panel is +5V. However, this voltage drops to 3.3V during transmission.

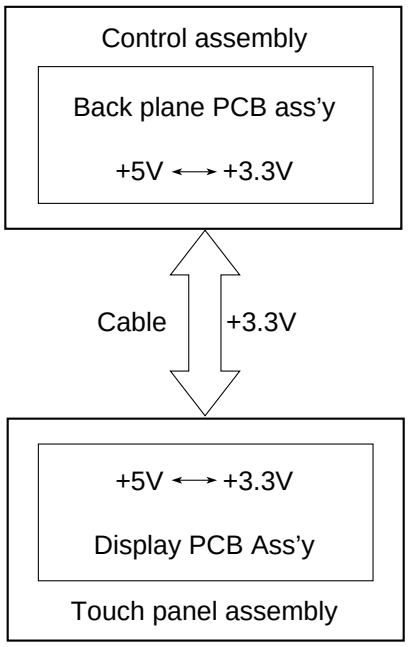


Fig. 3-42

This voltage drop is provided as an electromagnetic wave countermeasure. The smaller the voltage, the smaller the current becomes. So, radiation of electromagnetic waves is reduced.

- Power confirmation LED
  +5V and +12V LED’s are mounted on the back plane circuit board. These LED’s light when the respective DC power is supplied.

- Prevention of non-insertion of connectors
  This circuit is designed to display the exhaust fan error if you have forgotten to insert the power reset connector.

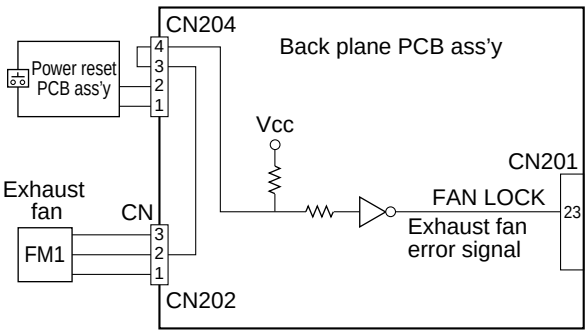


Fig. 3-43

VIII. POWER SUPPLY

A. Outline

Fig. 3-44 shows a block diagram of the power supplies and related circuits.

By connecting the power cord, AC power is supplied to the CD-R power supply PCB assembly. Power is supplied to the scanner power supply PCB assembly via the CD-R power supply PCB assembly. This machine is not provided with a switch for turning the AC power ON and OFF to prevent the power from being turned OFF by mistake during recording.

To turn the AC power supply OFF, disconnect the power cable.

When the power switch of the touch panel is opened, the following DC power supplies are supplied.

+12V DC and +5V DC are output from the CD-R power supply circuit board, and +24V DC, ±12V DC and +5V DC are output from the scanner power supply circuit board.

However, the signal voltage between the control assembly and touch panel is converted to +3.3V DC as described earlier.

Take sufficient precautions as the voltage output from the LCD backlight of the inverter circuit board is high.

If an unrecoverable error occurs while the machine is being used, press the reset switch on the front of the machine to stop DC power supply.

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

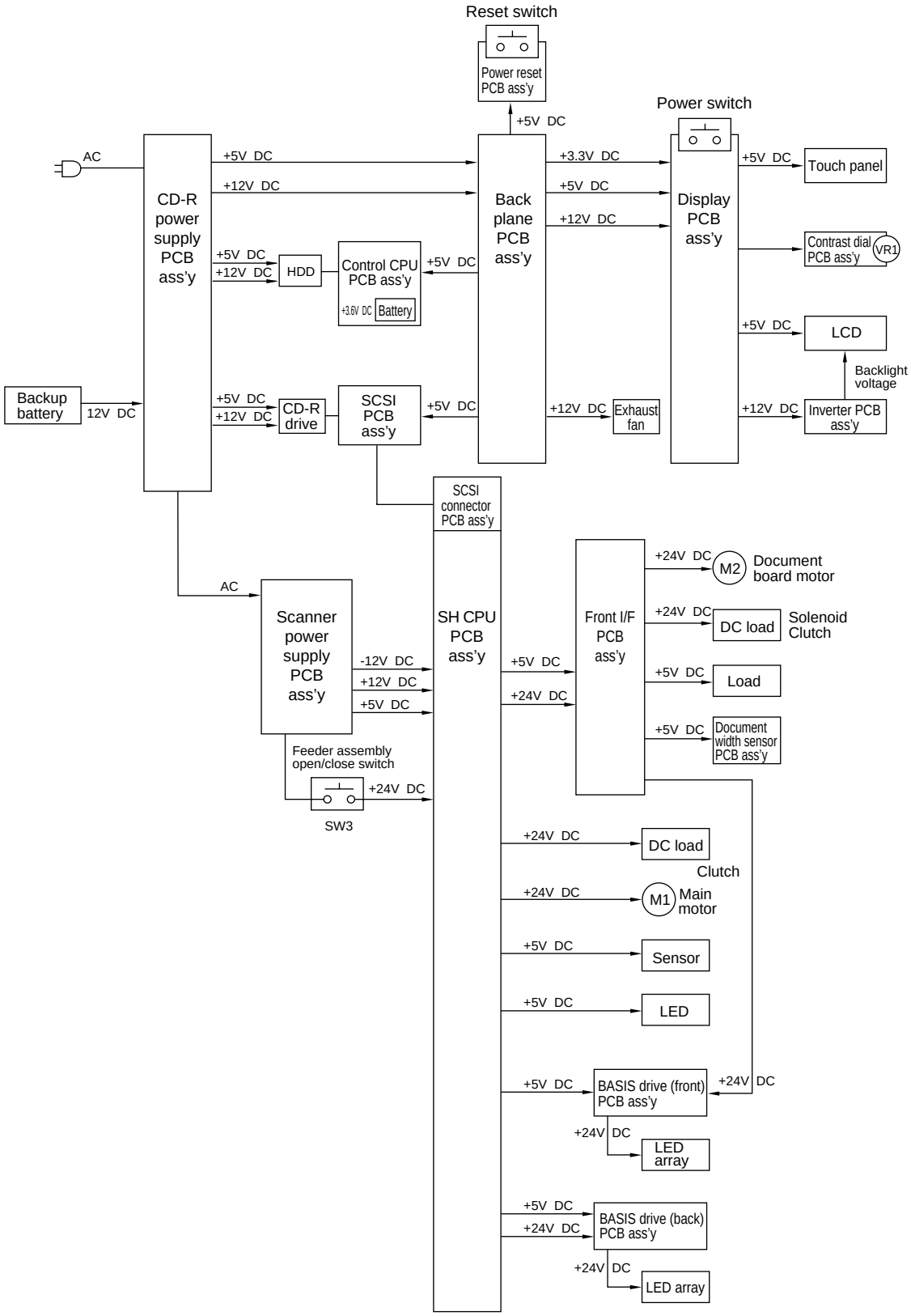

Reset switch
Power reset PCB ass'y
+5V DC
Power switch
AC
+5V DC
+12V DC
CD-R power supply PCB ass'y
Back plane PCB ass'y
+3.3V DC
+5V DC
+12V DC
Display PCB ass'y
+5V DC
Touch panel
Contrast dial PCB ass'y
VR1
+5V DC
+12V DC
HDD
Control CPU PCB ass'y
+5V DC
+3.6V DC
Battery
+5V DC
LCD
Backlight voltage
Backup battery
12V DC
+5V DC
+12V DC
CD-R drive
SCSI PCB ass'y
+5V DC
+12V DC
Exhaust fan
+12V DC
Inverter PCB ass'y
SCSI connector PCB ass'y
AC
Scanner power supply PCB ass'y
SH CPU PCB ass'y
Front I/F PCB ass'y
+24V DC
M2
Document board motor
+24V DC
DC load
Solenoid Clutch
-12V DC
+12V DC
+5V DC
+5V DC
+24V DC
+5V DC
Load
+5V DC
Document width sensor PCB ass'y
Feeder assembly open/close switch
+24V DC
SW3
+24V DC
DC load
Clutch
+24V DC
M1
Main motor
+5V DC
Sensor
+5V DC
LED
+5V DC
BASIS drive (front) PCB ass'y
+24V DC
+24V DC
LED array
+5V DC
+24V DC
BASIS drive (back) PCB ass'y
+24V DC
LED array

Fig. 3-44

B. Power Supply Circuit Protection Function

1. Power supply PCB assembly

A switching regulator is used for the scanner power supply PCB assembly and the CD-R power supply PCB assembly. If the load is short-circuited because of an abnormality, resulting in an overcurrent, the protection function will operate to stop output. When the output stops, disconnect the power cable, remove the cause of the short circuit, and allow the capacitor to discharge for about 10 minutes. The power supply will be automatically reset when the AC power supply is supplied.

2. Feeder assembly open/close switch

When the feeder assembly is opened due to a document jam, for example, the feeder assembly open/close switch turns OFF to stop the document drive system.

The main motor, other DC loads and +24V DC output to the BASIS are stopped. When the feeder assembly is closed, +24V DC output is resumed.

3. Backup battery

DC power is momentarily supplied to allow processing to end if the AC power supply interrupted while this machine is being used. This is to prevent damage to recording data.

Note: For details on how to handle this backup battery, refer to “Chapter 1, III. PRECAUTIONS.”

4. Lithium Battery

The following lithium battery is mounted on the control CPU PCB assembly for memory backup.

Manufacturer:	TOSHIBA BATTERY Co., LTD.
Model:	ER4VLY (Indication: ER4V/3.6V)
Voltage:	+3.6 VDC
Capacity:	1200 mAh

When the lithium battery is replaced, make sure that it is replaced with the same or equivalent battery.

When disposing of used batteries or PCB assemblies on which the lithium battery is mounted, follow the manufacturer’s instructions or local by-laws.

⚠ CAUTION: Replace the lithium battery with TOSHIBA ER4VLY or Equivalent 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 used battery promptly.

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

IX. LAYOUT OF ELECTRICAL COMPONENTS

A. Sensors

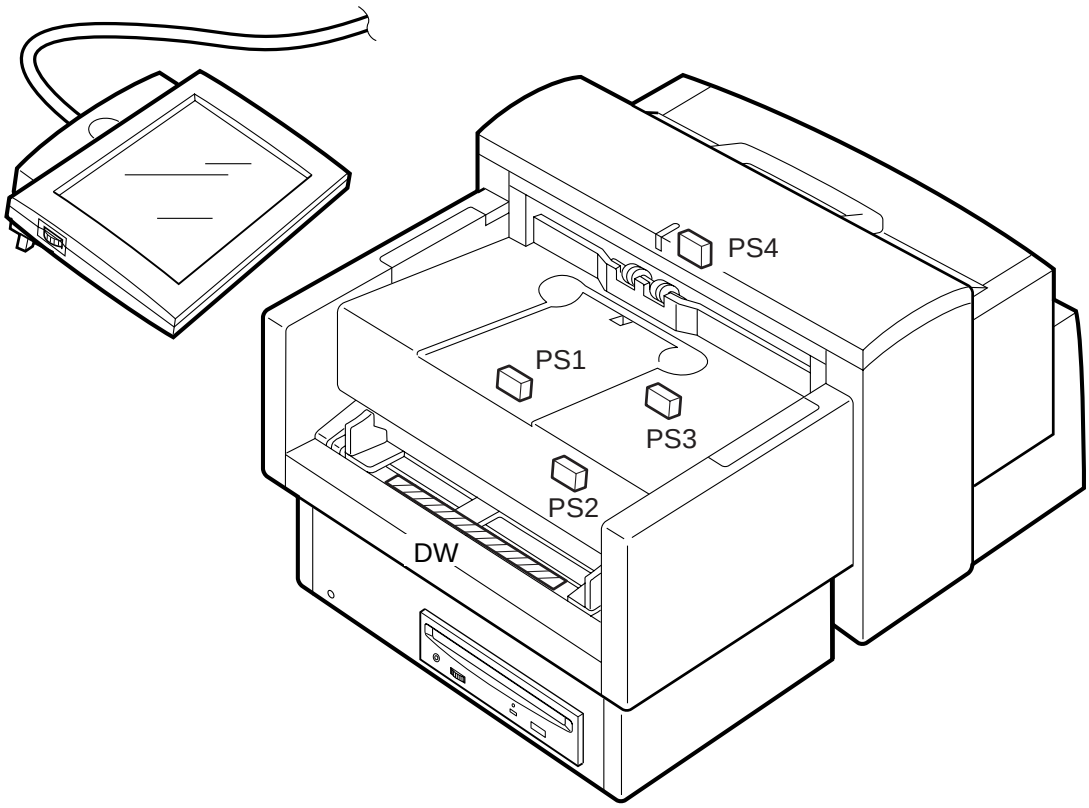


Fig. 3-45

Symbol	Name	Code	Function
PS	Photo interrupter	PS1 SP2 PS3 PS4	Detection of document on document board Detection of document at registration Detection of document in machine (for starting scanning) Detection of document in the delivery assembly
	Slide resistance sensor	DW	Document width detection

Table 3-12

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

B. Switches and LEDs

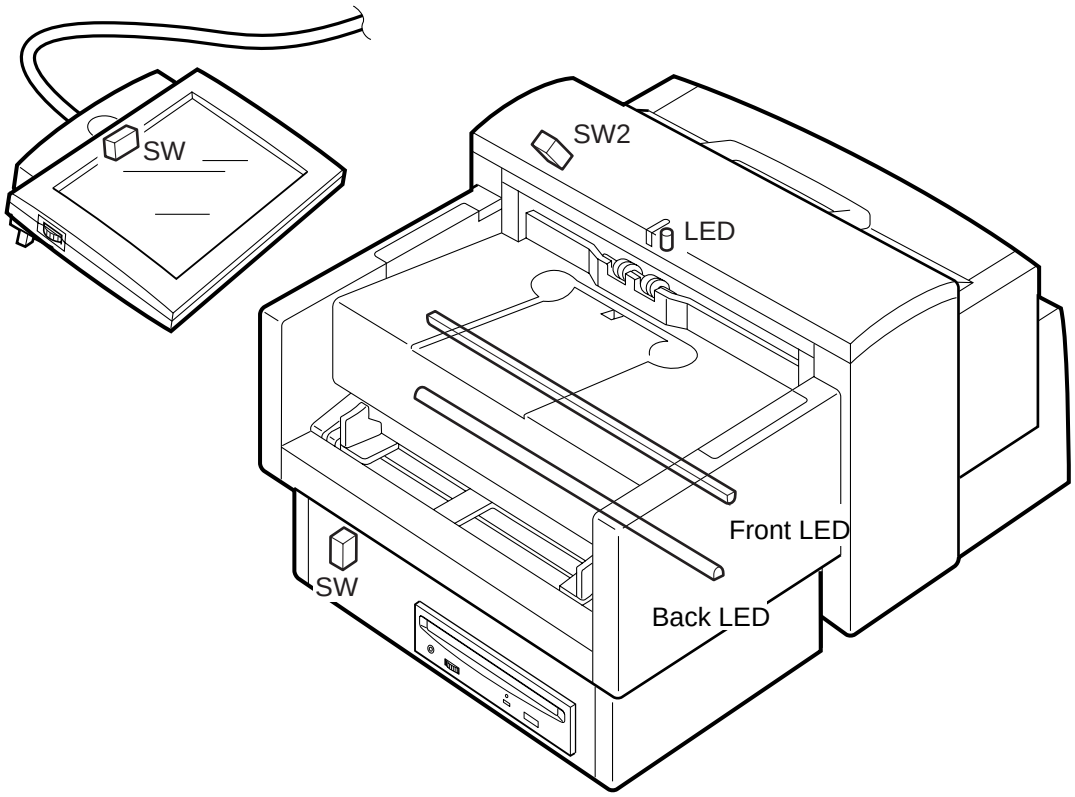


Fig. 3-46

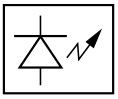
Symbol	Name	Code	Function
	Micro-switch	SW1 SW2 SW3	For turning power ON For interrupting 24 V power when the feeder assembly is open For turning power OFF (at error)
	LED	LED1 (Front LED) (Back LED)	For DC power supply display For illuminating document (front) For illuminating document (back)

Table 3-13

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

C. Clutches, Solenoids and Motors

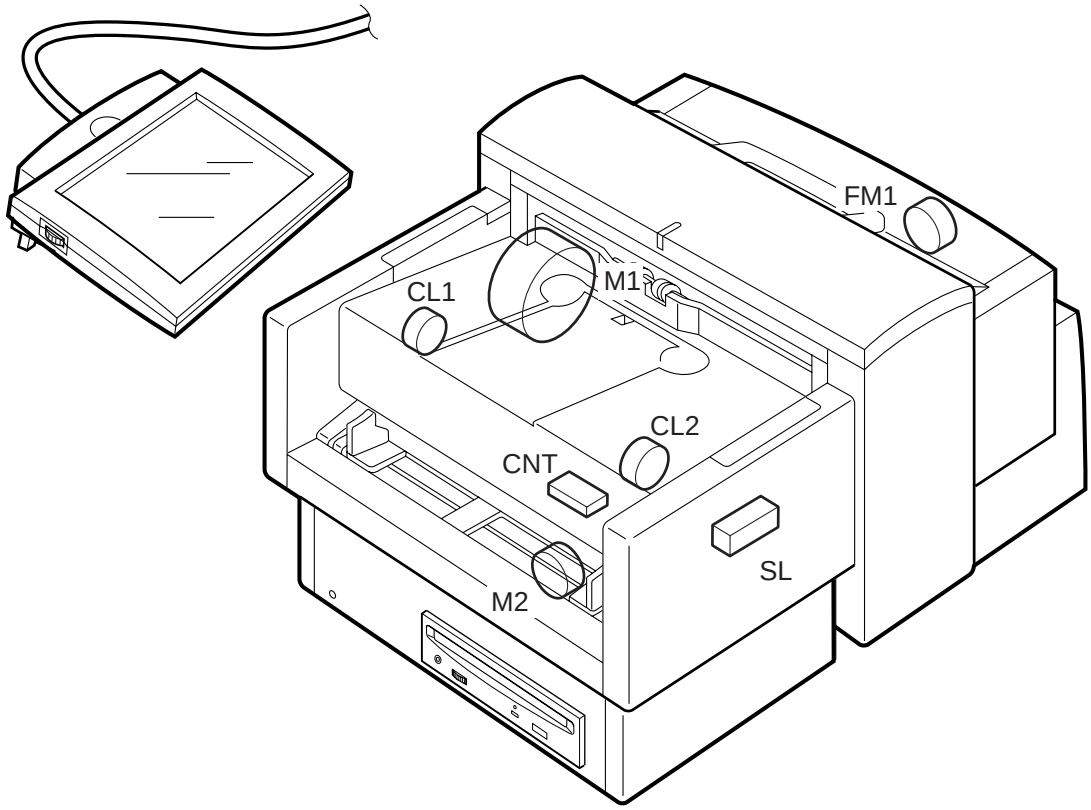


Fig. 3-47

Symbol	Name	Code	Function
CL	Clutch	CL1 CL2	For document pick-up For document momentary stop
SL	Solenoid	SL1	For selecting manual feed
M	Motor	M1 M2	For document feed (main motor) For document board up/down
FM	Fan motor	FM1	For cooling inside machine
CNT	Counter	CNT	Picked up paper counter

Table 3-14

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

D. PCB Assemblies and Units

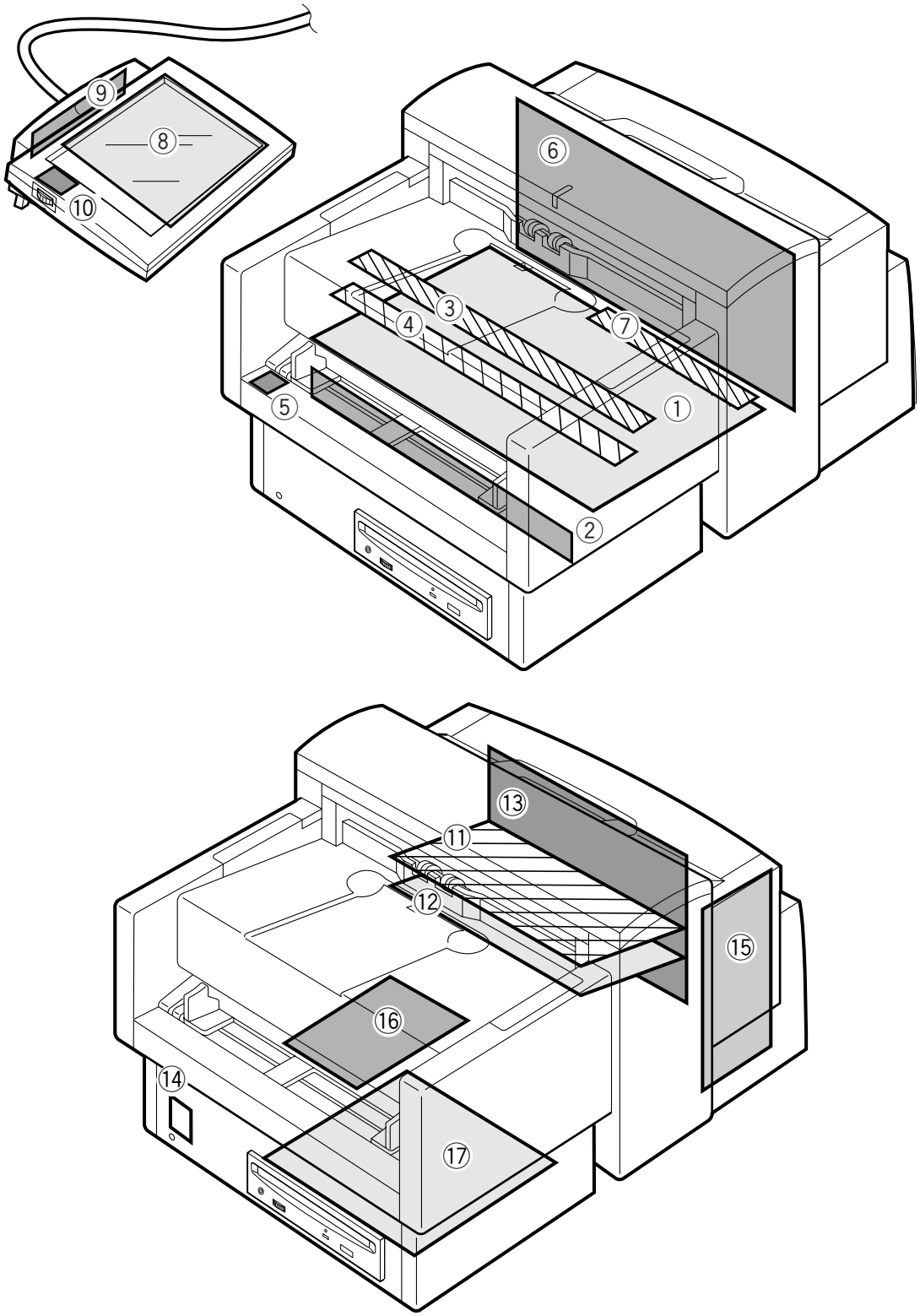


Fig. 3-48

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

Symbol	Name	Role
①	SH CPU PCB assembly	Scanner assembly control and communications with control assembly
②	Front I/F PCB assembly	Interface between SH CPU PCB assembly and DC load or sensors
③	Front BASIS driver PCB assembly	BASIS (front) drive
④	Rear BASIS driver PCB assembly	BASIS (rear) drive
⑤	Paper width detection PCB assembly	Interface between I/F PCB assembly and paper width sensor
⑥	Scanner power supply PCB assembly	DC power supply to scanner assembly
⑦	SCSI connector PCB assembly	SCSI connection between scanner assembly and control assembly
⑧	Display PCB assembly	LCD and touch panel drive, communications with control assembly
⑨	Inverter PCB assembly	Lighting of LCD backlight
⑩	Contrast dial PCB assembly	Adjustment of LCD contrast
⑪	Control CPU PCB assembly	Control of entire CD-4046
⑫	SCSI PCB assembly	SCSI interface control
⑬	Back plane PCB assembly	Relay of signals on various PCB assemblies and conversion of siganl voltages
⑭	Power reset PCB assembly	DC power OFF when trouble occurs
⑮	CD-R power supply PCB assembly	DC power supply to control assembly
⑯	HDD	Software save, data read and write
⑰	CD-R drive	Write and read of CD-R disk

Table 3-15

X. LIST OF VARIABLE RESISTORS, SWITCHES & LEDS FOR EACH CIRCUIT BOARD/UNIT

Only the VRs (variable resistors), SWs (switches) and LEDs mounted on the PCB assemblies and units that are necessary for servicing the machine at the field are described below.

VRs, SWs and LEDs not listed in the tables are for factory adjustment only. Special tools and measuring instruments are required to perform adjustments and checks using these VRs, SWs and LEDs. Often a high degree of accuracy is demanded. For this reason, do not touch these VRs, SWs and LEDs at the field.

Note: VRs that may be adjusted in the field .... ⊘
VRs that must not be adjusted in the field .. ⊘

A. SH CPU PCB Assembly

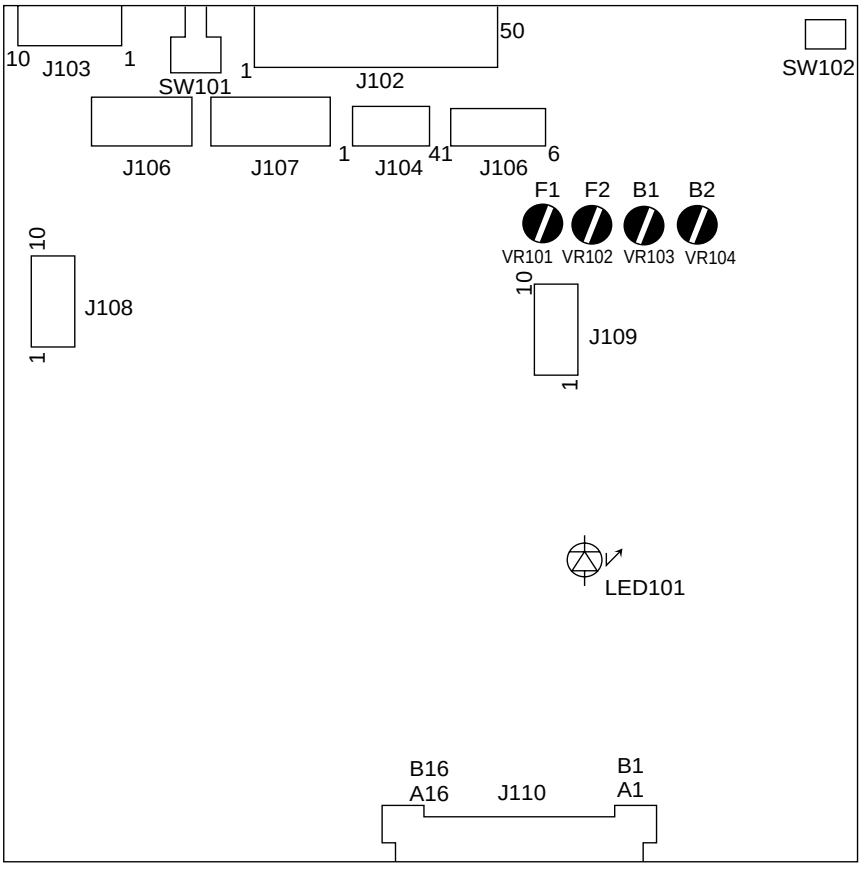


Fig. 3-49

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

LED No.	Display
LED101	• DRAM error at power ON → Lights • Address error → Lights

Table 3-16

Switch No.	Setting
SW101	SCSI ID setting (factory setting: No.2)
SW102	Setting of feed test mode

Note: The SW101 setting must not be changed at the field.

Table 3-17

Variable Resistor	Adjustment
	BASIS output adjustment
VR101	For former half BASIS (front)
VR102	For latter half BASIS (front)
VR103	For former half BASIS (back)
VR104	For latter half BASIS (back)
	Refer to “Chapter 7 V. Service Modes” for adjustment methods.

Table 3-18

- Setting of feed test mode
  With the SCSI cable disconnected, set the SCSI ID to “7”. Turn the power ON and press SW102. The machine enters the feed test mode.
  Changing the SCSI ID to “6”, “5”, “4” and “3” in this mode, enables continuous feed at low speed, continuous feed at high speed, manual feed at low speed, and manual feed at high speed, respectively.

B. SCSI PCB Assembly

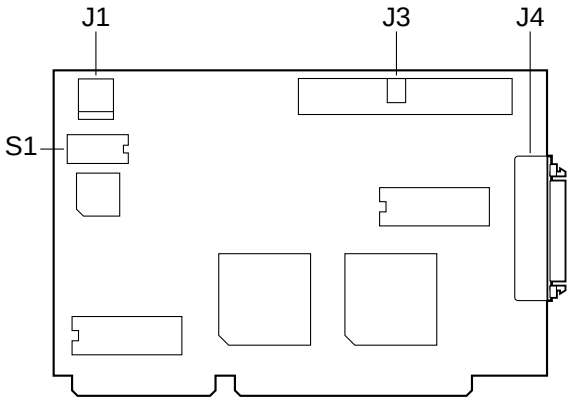


Fig. 3-50

S1 No.	Setting
SW1	ON : Plug & Play (disabled)
SW2	OFF: I/O port address
SW3	OFF: I/O port address
SW4	OFF: I/O port address
SW5	OFF: Floppy disk controller
SW6	OFF: BIOS address
SW7	OFF: BIOS address
SW8	OFF: BIOS address

Note: Do not change the above settings in the field.

Table 3-19

C. Back Plane PCB Assembly

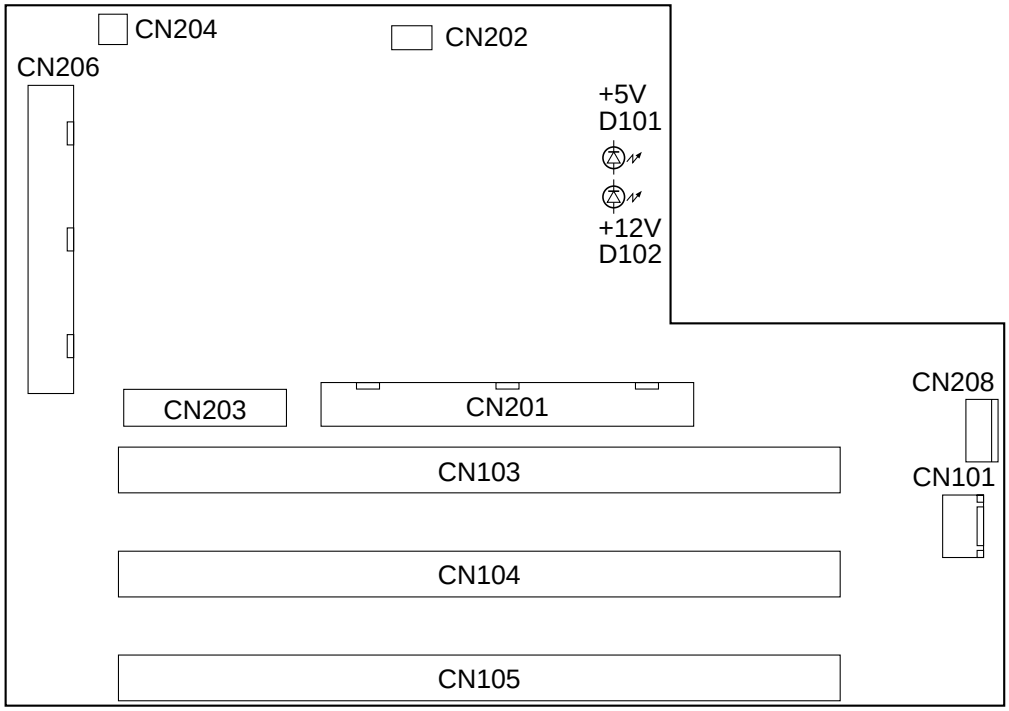


Fig. 3-51

LED No.	Display
D101	• Lights when +5V DC is supplied.
D102	• Lights when +12V DC is supplied.

Table 3-20

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

D. CD-R Power Supply PCB Assembly

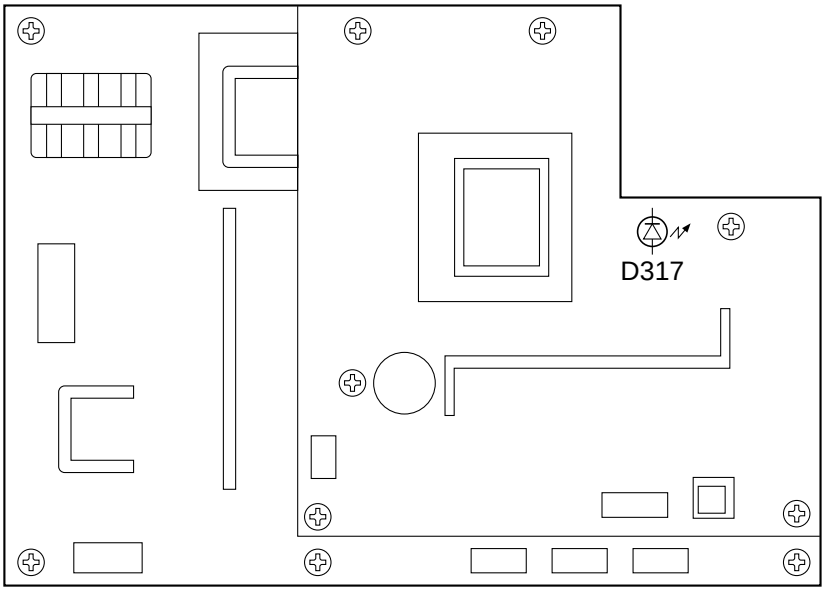


Fig. 3-52

LED No.	Display
D317	Lights when AC power is supplied

Table 3-21

E. Scanning Start Sensor (PCB assembly)

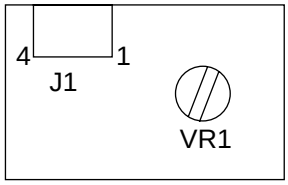


Fig. 3-53

VR No.	Adjustment
VR1	Document detection sensitivity adjustment Rotating VR clockwise increases the sensitivity

Note: Do not change at the field.

Table 3-22

F. Power Supply Display LED (PCB Assembly)

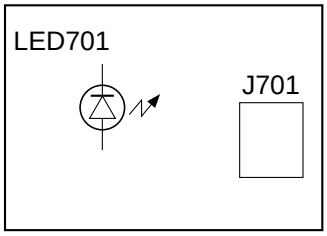


Fig. 3-54
Table 3-23

LED No.	Display
LED701	Lights when +5V DC power is supplied into the scanner assembly

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

G. CD-R Drive

Front Panel Side

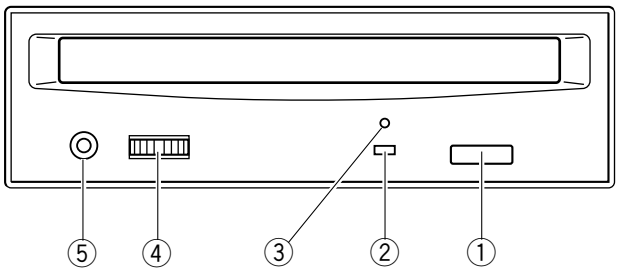


Fig. 3-55

No.	Name	Description
①	Eject button	Press this button to eject the caddy from the drive.
②	LED	Indicates the drive status. When this LED is lit “orange”: The drive is operating. (If the drive operates for a short time, this LED looks as if it is flashing). When this LED is lit “yellow”: The drive is standing by.
③	Emergency eject hole	This is used to eject the caddy in an emergency (only when the drive is malfunctioning). First, turn the power OFF. Then, insert a piece of wire 1.2 mm in diameter into this hole, and push in hard.

Note: ④ and ⑤ are not used on the CD-4046.

Table 3-24

Rear Panel Side (for connections)

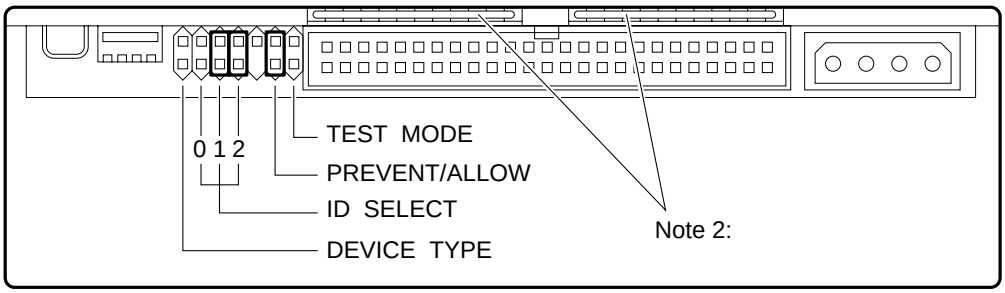


Fig. 3-56

Jumper	Setting
DEVICE TYPE	Open: SCSI device setting
ID SELECT	0: Open 1: Shorted 2: Shorted Default SCSI ID: No.6
PREVENT/ ALLOW	Shorted: Caddy ejection setting
TEST MODE	Open: Test mode

Note 1: Do not change the above settings in the field.

Note 2: The two terminators must remain inserted.

Table 3-25

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

H. HDD (Hard Disk Drive)

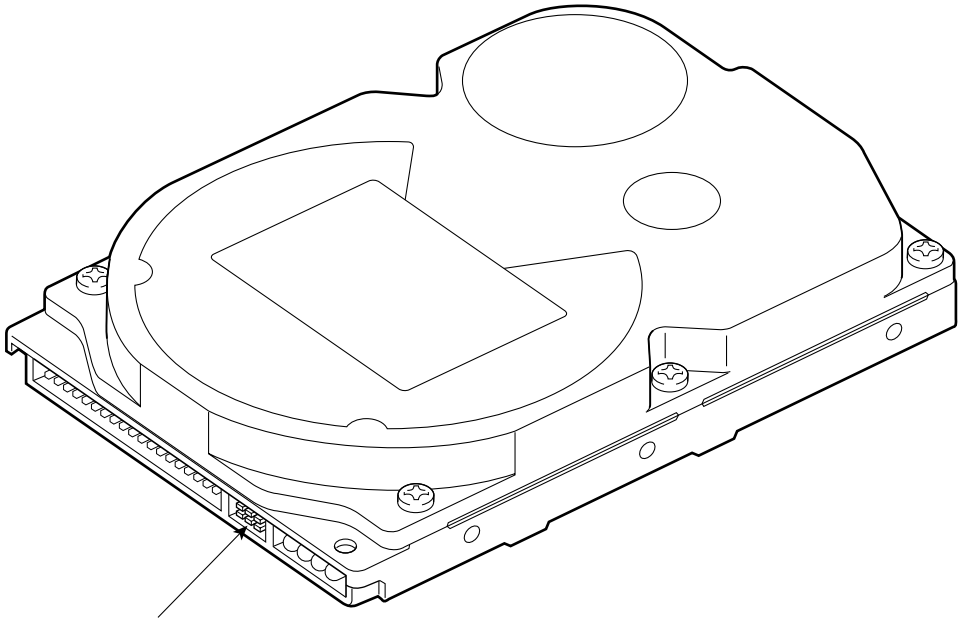
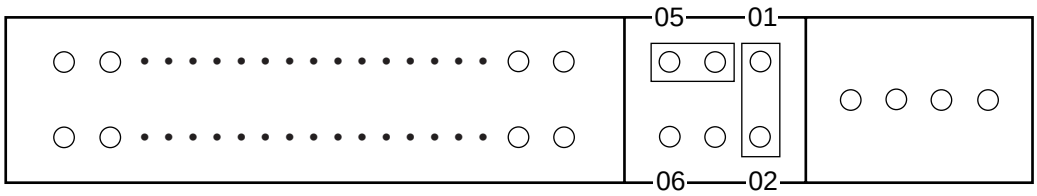


Fig. 3-57



Mode setting pin

Fig. 3-58

Jumper No.	Setting
05 03 01 ○ ○ ○ ○ ○ ○ 06 04 02	Master or slave setting Master setting 01-02: Short-circuited 03-05: Short-circuited Factory setting: Master drive setting

Note: Normally, do not change the factory settings. These settings, however, may be changed only when you install software. For details, refer to “Chapter 7 VI. Re-installing the Software”.

Table 3-26

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

CHAPTER 4

DISASSEMBLY & REASSEMBLY

This chapter describes the disassembly and reassembly procedure.
When disassembling and reassembling the machine, observe the following.

1. Before starting the disassembly and reassembly operations be sure to disconnect the power to the machine for safety sake.
2. Reassembly can be performed in the opposite way to disassembly unless otherwise mentioned.
3. In reassembly, do not confuse the type of screws (length and diameter) and their location.
4. To ensure positive continuity of electricity, a toothed washer is used as a ground retaining screw. Be sure to use this washer when reassembling the machine.
5. As a rule, do not operate the machine with any part removed.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

I. EXTERNAL CONTROL

A. Outside Cover

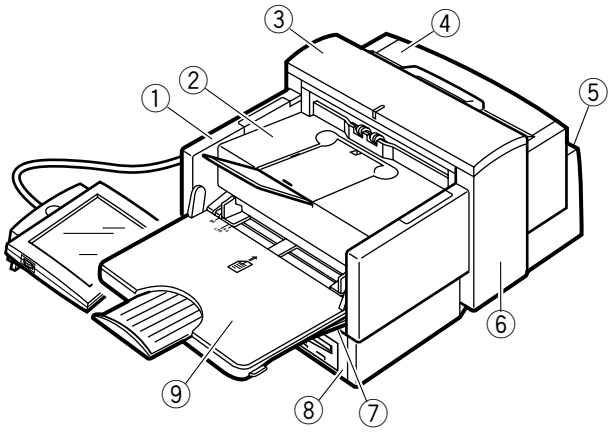


Fig. 4-101

	Screw	Hook
① Left cover	(1)	[3]
② Delivery tray cover	(2)	[0]
③ Top cover	(0)	[4]
④ Top rear cover	(0)	[0]
⑤ Rear cover	(4)	[0]
⑥ Right cover	(1)	[3]
⑦ Front cover	(0)	[0]
⑧ Lower front cover	(2)	[0]
⑨ Pick-up tray	(0)	[2]

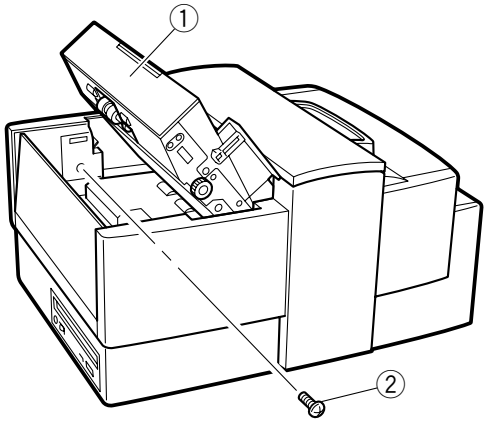
Note: The figures in ( ) and [ ] mean the numbers of fixing screws and mounting hooks, respectively.

When attempting to clean, check and repair the inside of the machine, remove the pertinent covers in the following procedure.

Procedures for removing covers that can be removed simply and individually only by removing the mounting screws are omitted.

1. Left Cover

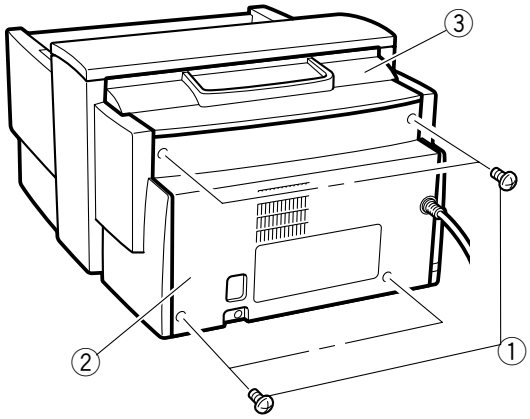
1) Remove the pick-up tray.
2) Open feeder assembly ①, and remove screw ②.



① Feeder assembly ② Screw

Fig. 4-102

3) Remove four screws (M4 x 8) ①, and then remove rear cover ② and top rear cover ③.

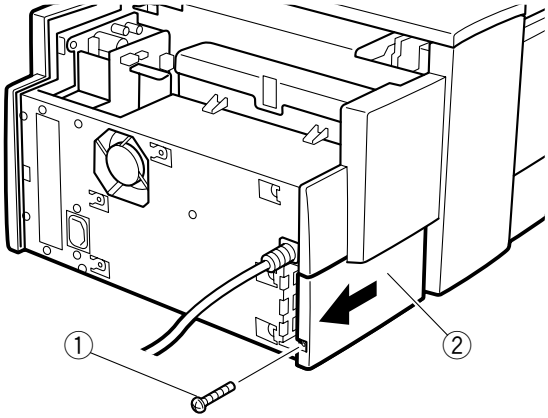


① Screw ② Rear cover
③ Top rear cover

Fig. 4-103

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

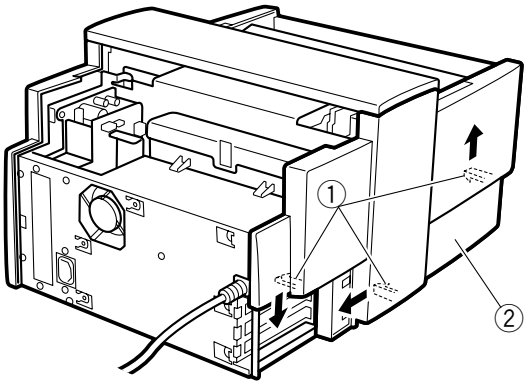
4) Remove screw (M3 x 6) ①, and draw out external I/F cover ② to the rear to remove.



① Screw ② External I/F cover

Fig. 4-104

5) Remove three hooks ①, and then remove left cover ②.

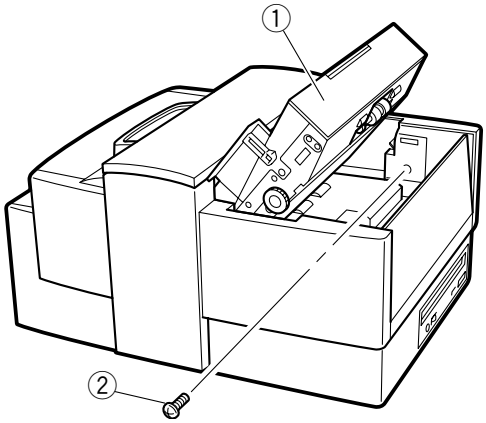


① Hooks ② Left cover

Fig. 4-105

2. Right Cover

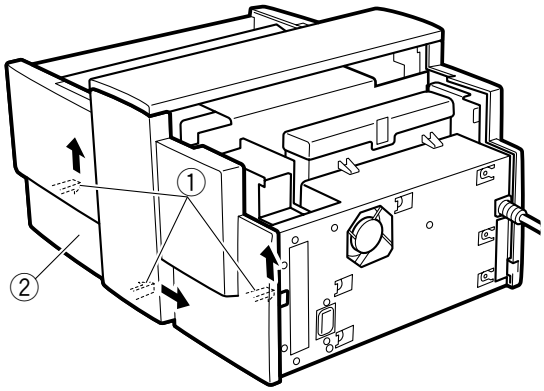
1) Remove the pick-up tray.
2) Open feeder assembly ①, and remove screw ②.



① Feeder assembly ② Screw

Fig. 4-106

3) Remove the rear cover and the top rear cover. (4 screws)
4) Remove three hooks ①, and then remove right cover ②.



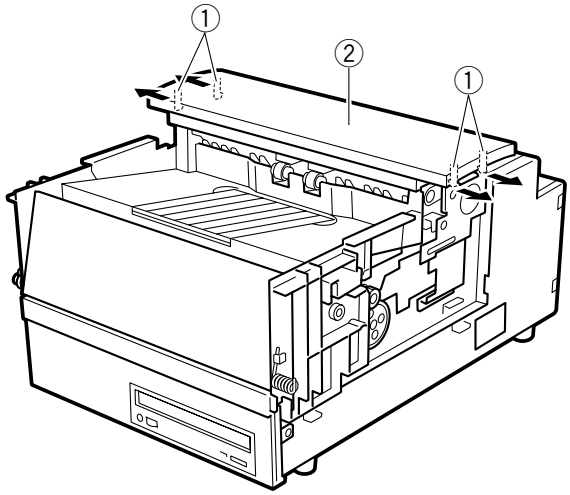
① Hooks ② Right cover

Fig. 4-107

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

3. Top Cover

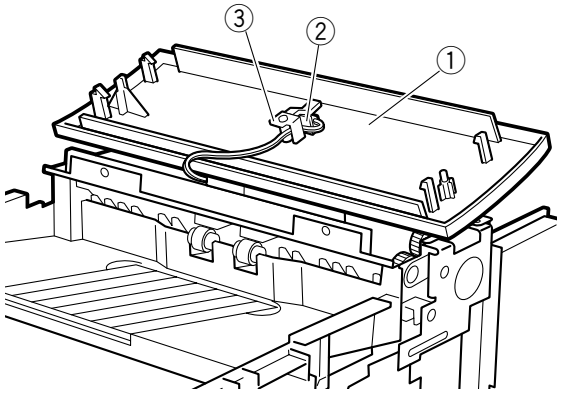
1) Remove the pick-up tray.
2) Remove the rear cover and the top rear cover. (4 screws)
3) Remove the left cover and external I/F cover. (2 screws)
4) Remove the right cover (1 screw)
5) Remove four hooks ① (two each on left and right sides), and slightly lift up top cover ②.



① Hooks ② Top cover

Fig. 4-108

6) Draw out connector ② on the rear of top cover ①, and then remove the top cover assembly.



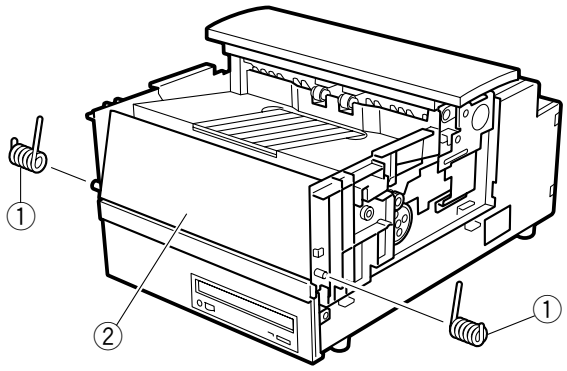
① Top cover ② Connector
③ LED mount

Fig. 4-109

Note: When mounting the top cover, be sure to hook the cable removed in step 6 to the rib of LED mount ③. If the cable is not fixed by the rib, it may be caught by the delivery roller and be broken.

4. Front Cover

1) Remove the pick-up roller.
2) Remove the rear cover and the top rear cover. (4 screws)
3) Remove the left cover and external I/F cover. (2 screws)
4) Remove the right cover. (1 screw)
5) Remove two springs ①, and then remove front cover ②.



① Springs (left, right) ② Front cover

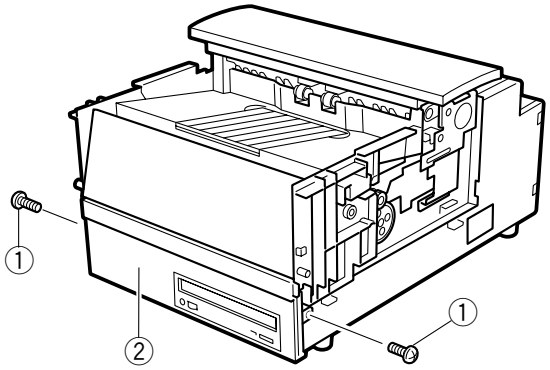
Fig. 4-110

Note: When mounting the front cover, be careful not to confuse the springs removed in step 5. The shape of the springs on the left and right is different.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

5. Lower Front Cover

1) Remove the pick-up tray.
2) Remove the rear cover and the top rear cover. (4 screws)
3) Remove the left cover and external I/F cover. (2 screws)
4) Remove the right cover. (1 screw)
5) Remove two screws ① (one each on left and right), and then remove lower front cover ②.

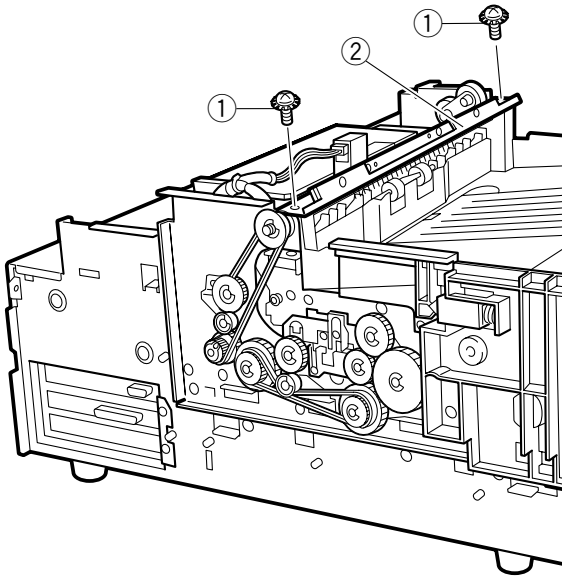


① Screws ② Lower front cover

Fig. 4-111

6. Delivery Tray Cover

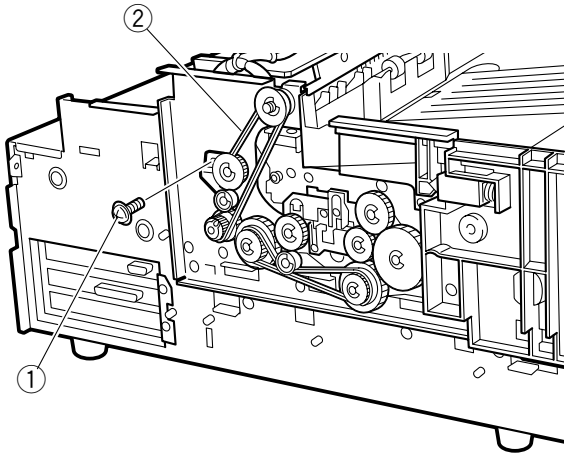
1) Remove the pick-up tray.
2) Remove the rear cover and the top rear cover. (4 screws)
3) Remove the left cover and external I/F cover. (2 screws)
4) Remove the right cover. (1 screw)
5) Remove the top cover.
6) Remove two screws ① (with toothed washer) and then remove static eliminator brush plate ②.



① Screw
② Static eliminator brush plate

Fig. 4-112

7) Loosen screw ①, release the tension of belt ②, and remove the belt.



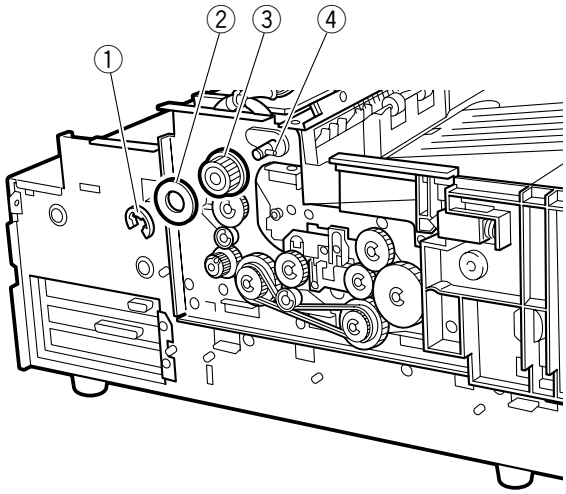
① Screw ② Belt

Fig. 4-113

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

8) Remove E-ring ①, and then remove collar ②, Pulley ③ and pin ④.

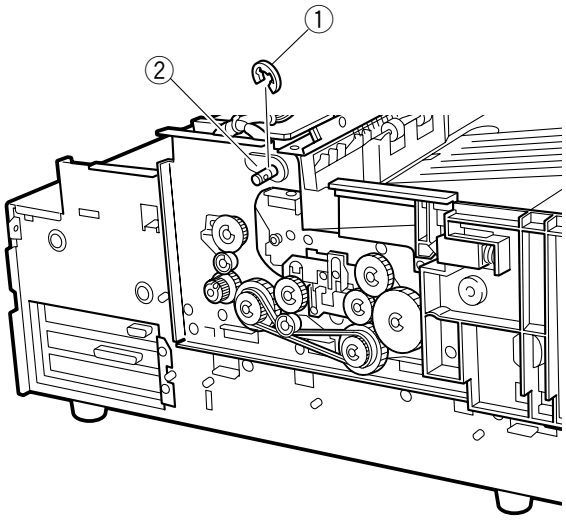
Note: Be careful not to lose the pin.



① E-ring ② Collar
③ Pulley ④ Pin

Fig. 4-114

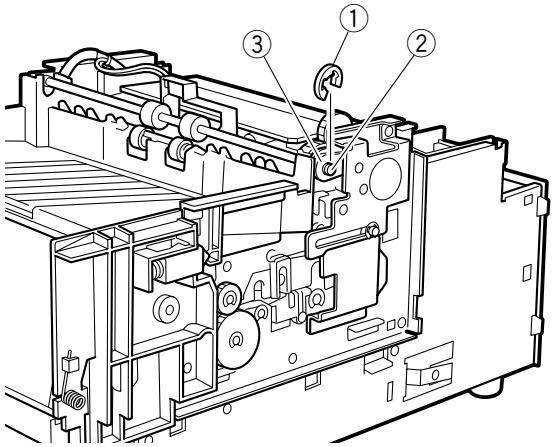
9) Remove E-ring ①, and then remove bushing ②.



① E-ring ② Bushing

Fig. 4-115

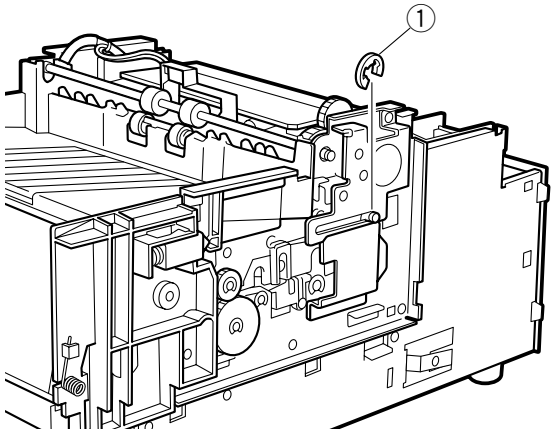
10) Remove E-ring ① on the opposite side, and slightly shift delivery roller shaft ②, and remove bushing ③.



① E-ring ② Delivery roller shaft
③ Bushing

Fig. 4-116

11) Remove E-ring ①.

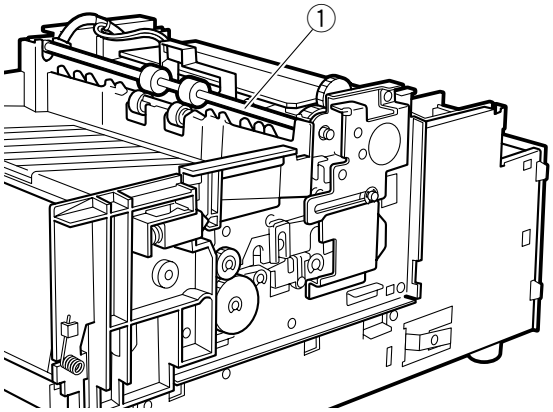


① E-ring

Fig. 4-117

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

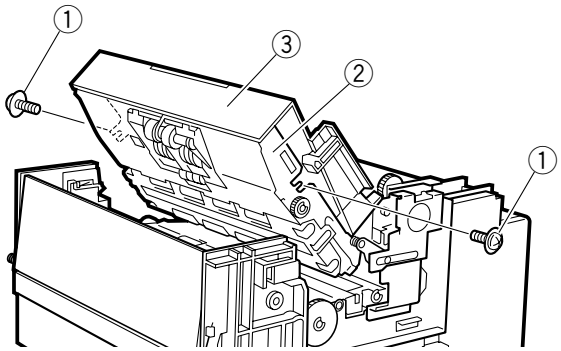
12) Remove delivery roller shaft ①.



① Delivery roller shaft

Fig. 4-118

13) Remove two screws ①, and then remove and delivery tray cover ③ while holding feeder assembly ② paying attention to the cable and other components.



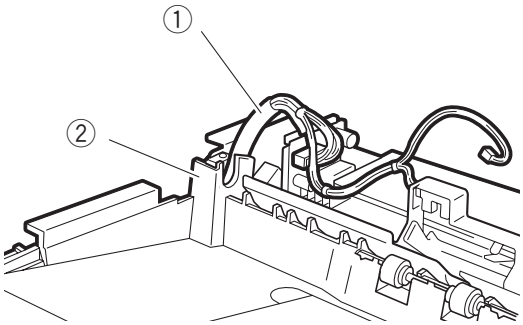
① Screws ② Feeder assembly
③ Delivery tray cover

Fig. 4-119

7. Mounting the Delivery Tray Cover

Pay attention to the following points, when mounting the delivery tray cover.

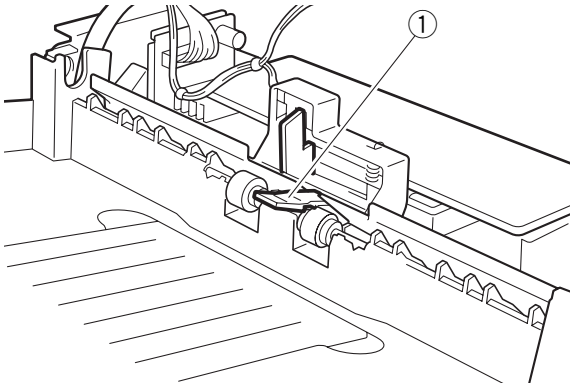
1) Cable ① of the front scanner unit should run through the inside of delivery tray cover ②.



① Cable ② Delivery tray cover

Fig. 4-120

2) When mounting the delivery tray unit, be careful not to damage delivery paper sensing lever ①.

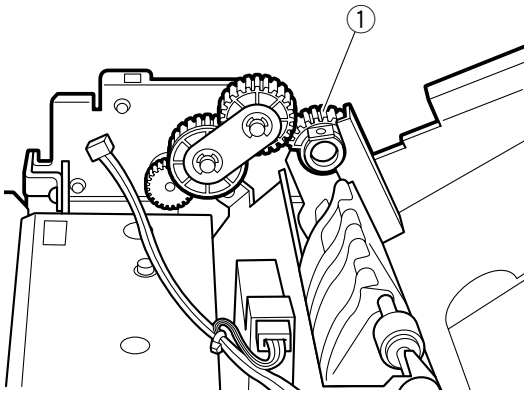


① Delivery paper sensing lever

Fig. 4-121

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

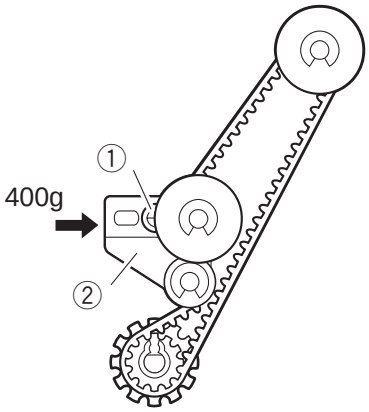
3) Pay attention to the direction in which you install open/close damper gear ①.



① Open/close damper gear

Fig. 4-122

4) Adjusting the belt tension
While pressing tension plate ② with a force of 400g in the direction of the arrow, tighten screw ①.



① Screw ② Tension plate

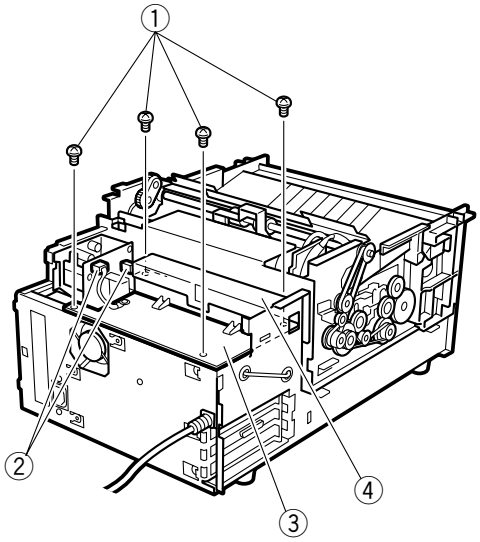
Fig. 4-123

B. Interlock Switches

1. Feeder Assembly Open/Close Switch

1) Remove the pick-up tray.
2) Remove the rear cover and the top rear cover. (4 screws)
3) Remove the left cover and external I/F cover. (2 screws)
4) Remove the right cover. (1 screw)
5) Remove the top cover.
6) Remove the front cover.
7) Remove the lower front cover. (2 screws)
8) Remove two screws ①, disconnect two connectors ②, and remove battery mounting plate ③.

Note: Do not remove backup battery ④ covers. Do not short-circuit the terminals.

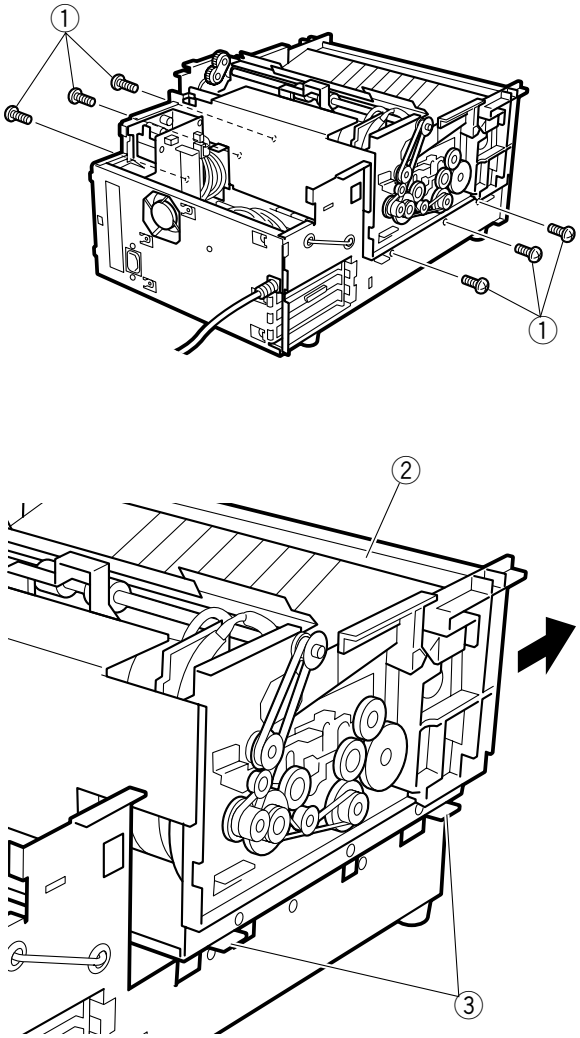


① Screws ② Connector
③ Battery mounting plate
④ Backup battery

Fig. 4-124

9) Remove six screws ① (3 each on left and right), and lift up and slightly shift scanner assembly ② towards the front.

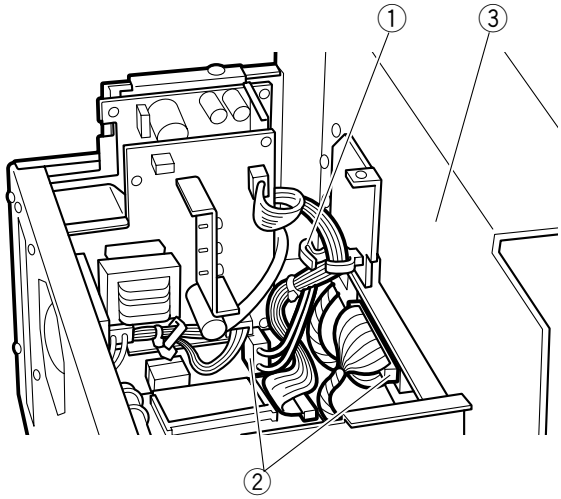
Note: Place the guides ③ (two each on the left and right) on the bottom left and right of the scanner assembly firmly on top of the side panels. Prevent the scanner assembly from falling down. If you shift the scanner assembly too far, the connectors may become deformed.



① Screws ② Scanner assembly
③ Guides

Fig. 4-125

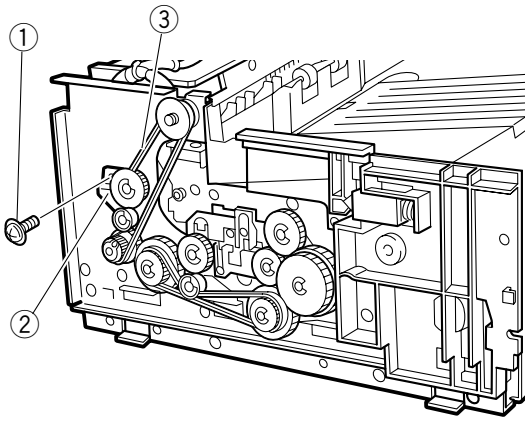
10) Open cable clamp ①, disconnect two connectors ②, and remove scanner assembly ③.



① Cable clamp ② Connector
③ Scanner assembly

Fig. 4-126

11) Remove screw ①, and then remove tension plate ② and belt ③.

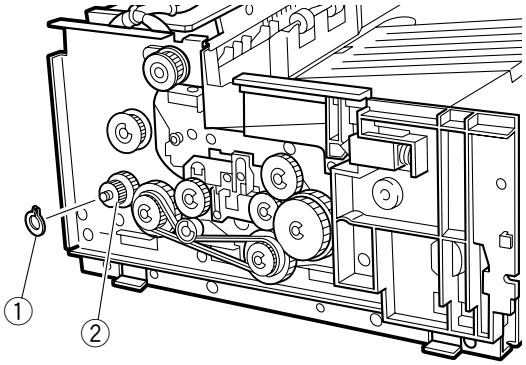


① Screw ② Tension plate
③ Belt

Fig. 4-127

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

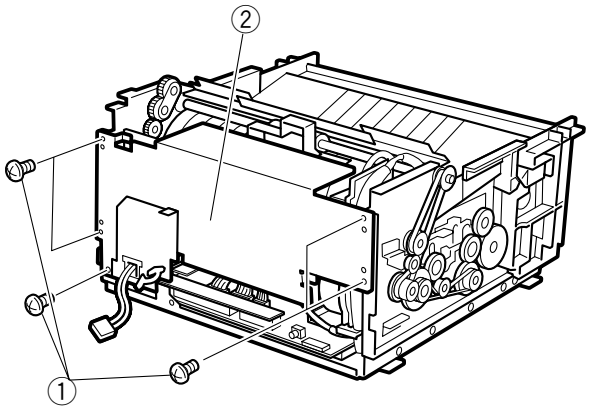
12) Remove G-ring ①, and then remove gear ②.



① G-ring ② Gear

Fig. 4-128

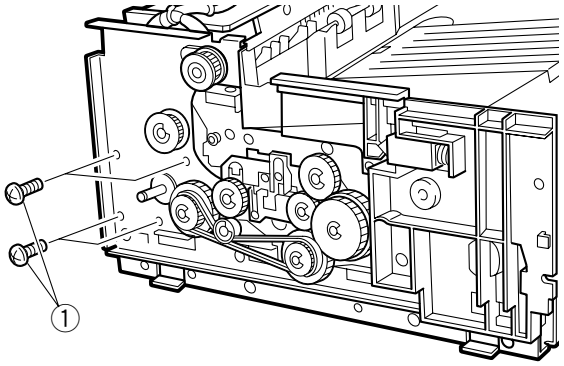
13) Remove five screws ①, and draw out scanner power circuit board ②.



① Screws ② Scanner power circuit board

Fig. 4-129

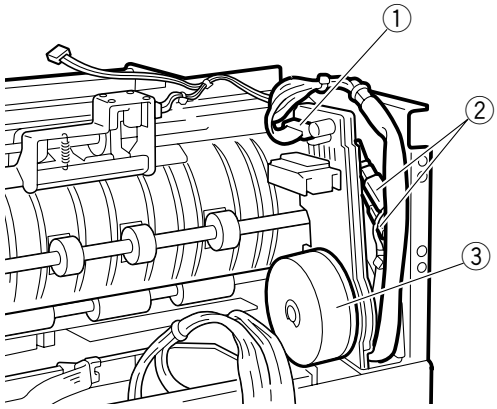
14) Remove four screws ①.



① Screws

Fig. 4-130

15) Draw out two faston terminals ② and connector ①, and remove main motor ③.

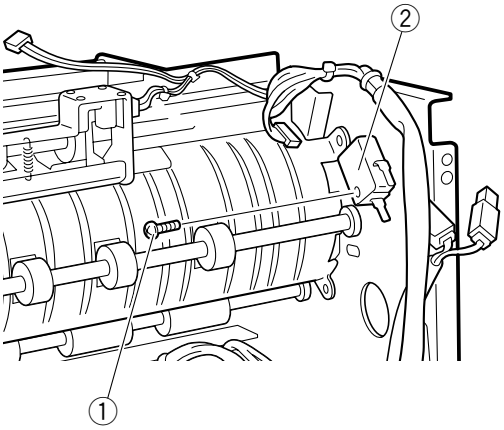


① Connector ② Faston terminals
③ Main motor

Fig. 4-131

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

16) Remove screw ①, and then remove feeder assembly open/close switch ②.



① Screw
② Feeder assembly open/close switch

Fig. 4-132

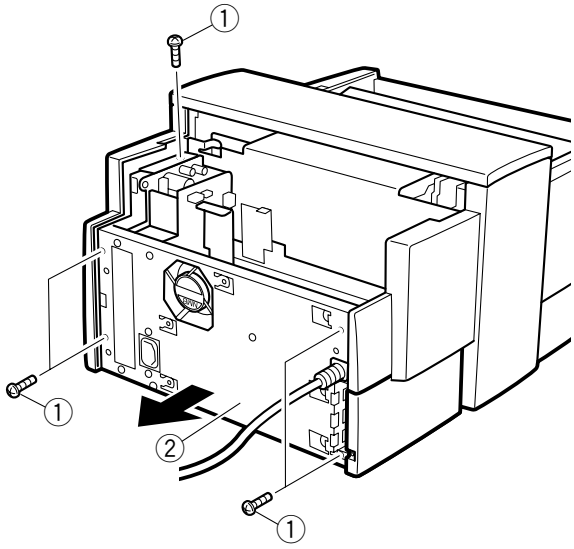
C. Fan

1. Exhaust Fan

1) Remove the rear cover and the top rear cover. (4 screws)
2) Remove the battery mounting plate. (4 screws)

Note: Refer to step 8 of item "1 Feeder Assembly Open/Close Switch".

3) Remove five screws ①, and slightly shift control assembly ②.



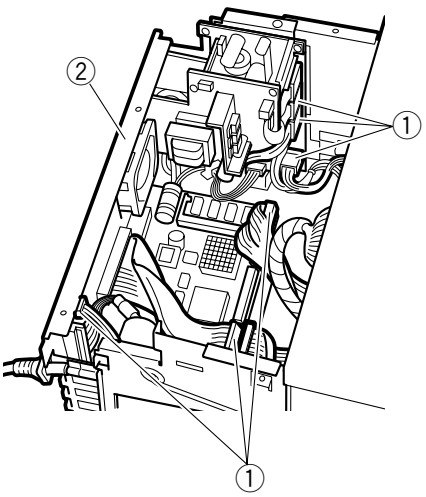
① Screws ② Control assembly

Fig. 4-133

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

4) Disconnect six connectors ①, and remove control assembly ②.

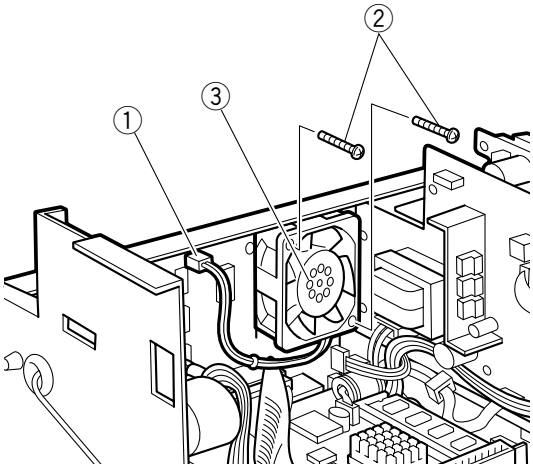
Note: The touch panel assembly is connected to the control assembly.



① Connector ② Control assembly

Fig. 4-134

5) Disconnect connector ①, remove screw ②, and then remove exhaust fan ③.



① Connector ② Screw
③ Exhaust fan

Fig. 4-135

Note: When mounting the exhaust fan, pay attention to the direction that it is installed. Install the exhaust fan so that air is drawn to the outside.

2. Mounting the Control Assembly

1) Make sure that the connectors are connected.
2) The electrical circuit is the same whichever side two connectors Ⓐ are inserted.
3) When inserting connectors Ⓑ, take care to prevent deformation or looseness on the PCB assembly.
4) Lead cables out in such a way that they are not nipped.

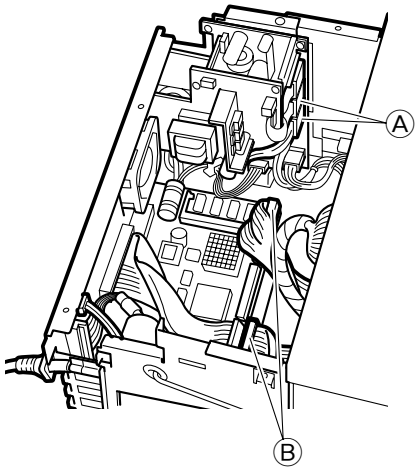


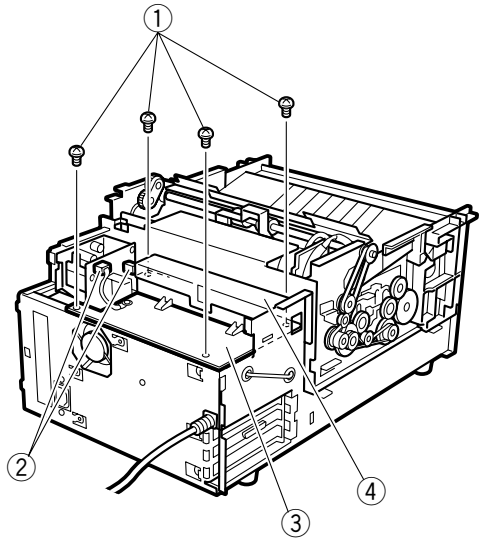
Fig. 4-136

II. DRIVE

1. Main Motor

1) Remove the pick-up tray.
2) Remove the rear cover and the top rear cover. (4 screws)
3) Remove the left cover and external I/F cover. (2 screws)
4) Remove the right cover. (1 screw)
5) Remove the top cover.
6) Remove the front cover.
7) Remove the lower front cover. (2 screws)
8) Remove four screws ①, disconnect two connectors ②, and remove battery mounting plate ③.

Note: Do not remove backup battery ④ covers. Do not short-circuit the terminals.

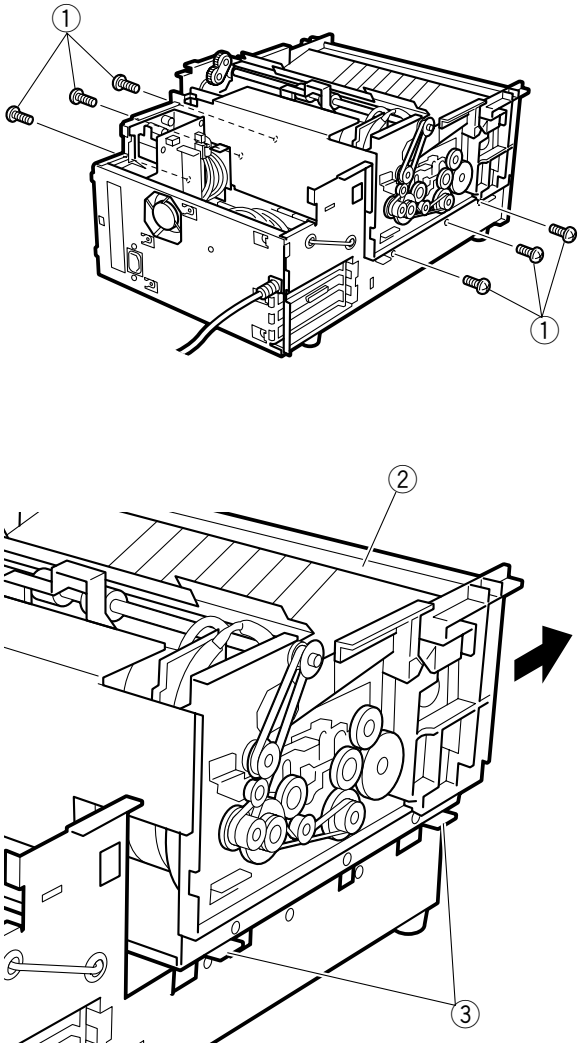


① Screws ② Connector
③ Battery mounting plate
④ Backup battery

Fig. 4-201

9) Remove six screws ① (3 each on left and right), and lift up and slightly shift scanner assembly ②.

Note: Place the guides ③ (two each on the left and right) on the bottom left and right of the scanner assembly firmly on top of the side panels. Prevent the scanner assembly from falling down. If you shift the scanner assembly too far, the connectors may become deformed.

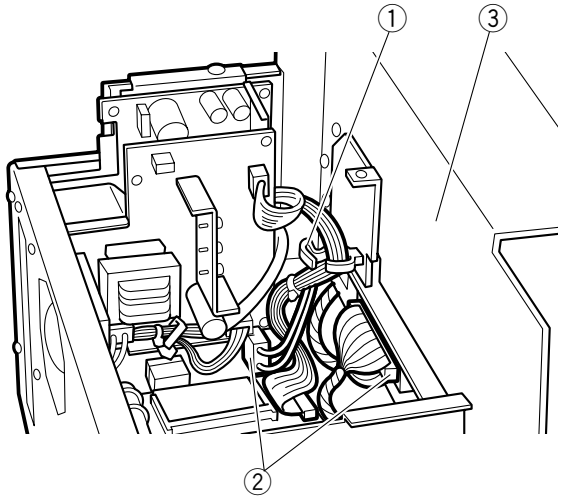


① Screws ② Scanner assembly
③ Guides

Fig. 4-202

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

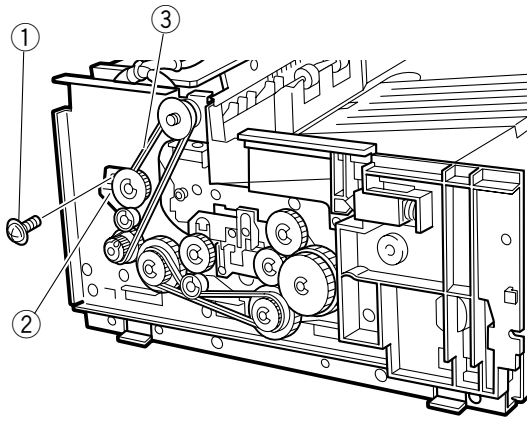
10) Open cable clamp ①, disconnect two connectors ②, and remove scanner assembly ③.



① Cable clamp ② Connector
③ Scanner assembly

Fig. 4-203

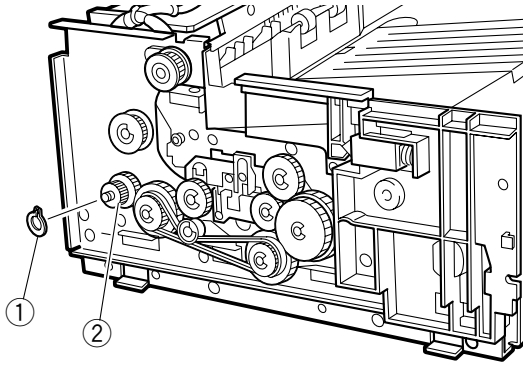
11) Remove screw ①, and then remove tension plate ② and belt ③.



① Screw ② Tension plate
③ Belt

Fig. 4-204

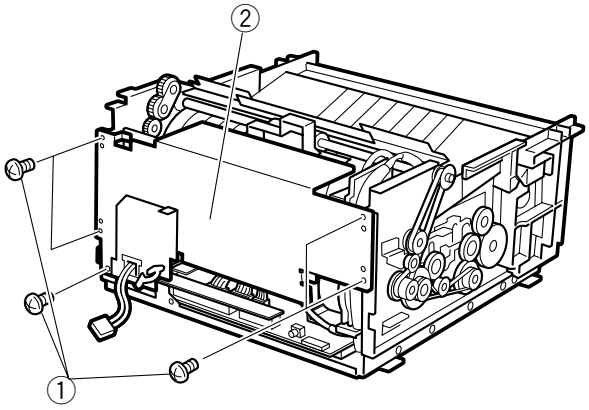
12) Remove G-ring ①, and then remove gear ②.



① G-ring ② Gear

Fig. 4-205

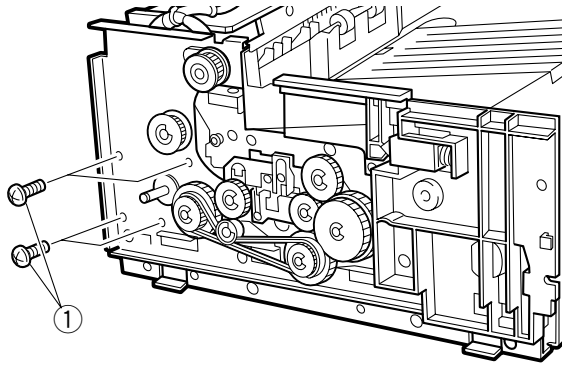
13) Remove five screws ①, and then remove scanner power PCB assembly ②.



① Screws
② Scanner power PCB assembly

Fig. 4-206

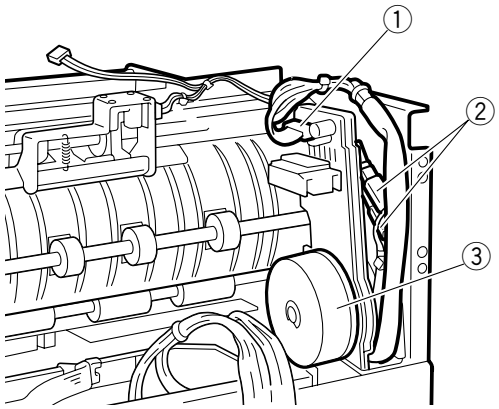
14) Remove four screws ①.



① Screws

Fig. 4-207

15) Pull out two faston terminals ② and connector ①, and remove main motor ③.



① Connector ② Faston terminals
③ Main motor

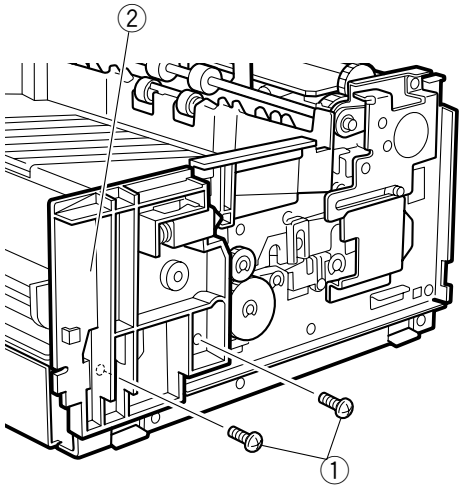
Fig. 4-208

2. Document Board Drive Motor

1) Remove the pick-up tray.
2) Remove the rear cover and the top rear cover. (4 screws)
3) Remove the left cover and external I/F cover. (2 screws)
4) Remove the right cover. (1 screw)
5) Remove the front cover.
6) Remove the lower front cover. (2 screws)
7) Remove the battery mounting plate (4 screws) and scanner assembly (6 screws).

Note: Refer to steps 8 to 10 of the item "1. Main Motor" procedure. The top cover need not be removed.

8) Remove two screws ①, and then remove right side plate ②.

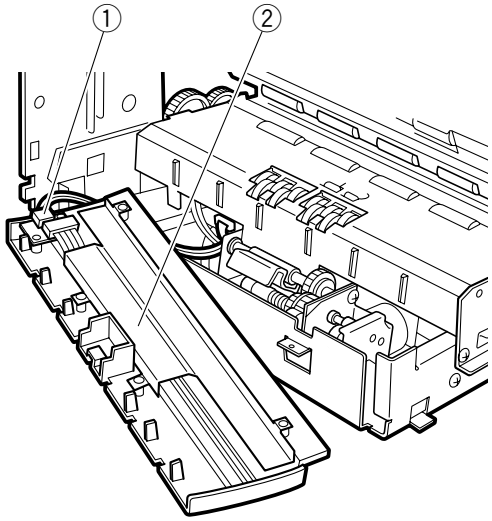


① Screws ② Right side plate

Fig. 4-209

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

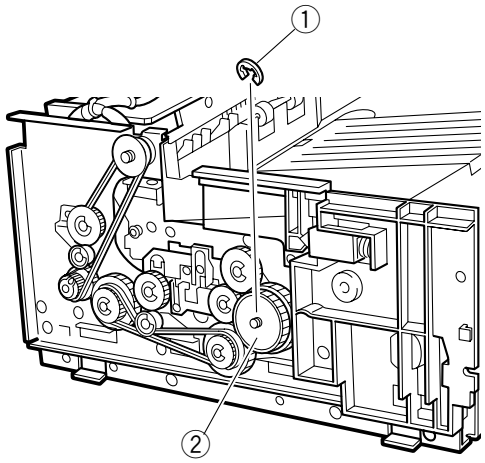
9) Disconnect connector ①, and remove pick-up guide ②.



① Connector ② Pick-up guide

Fig. 4-210

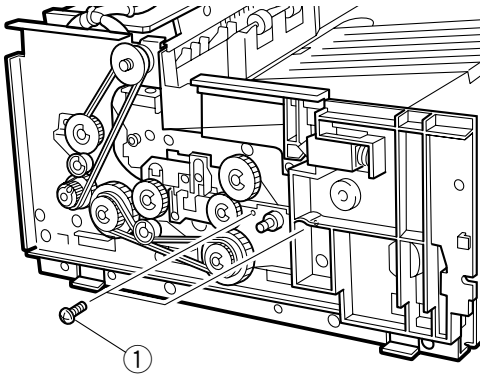
10) Remove E-ring ①, and then remove gear ②.



① E-ring ② Gear

Fig. 4-211

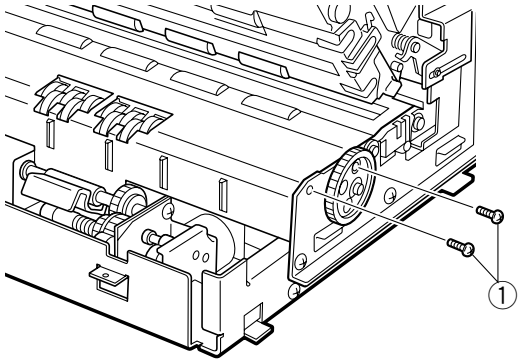
11) Remove two screws ①.



① Screws

Fig. 4-212

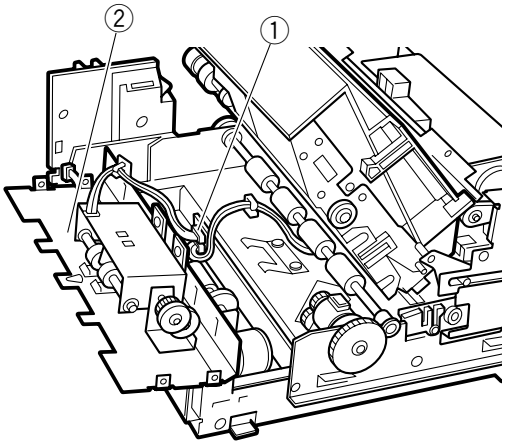
12) Remove two screws ① on the opposite side.



① Screws

Fig. 4-213

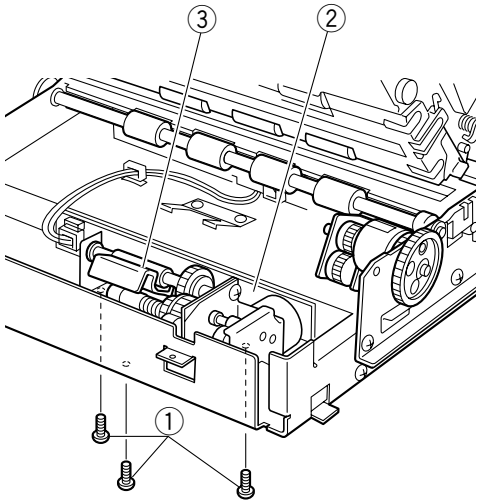
13) Disconnect connector ①, and then remove separation guide unit ②.



① Connector ② Separation guide unit

Fig. 4-214

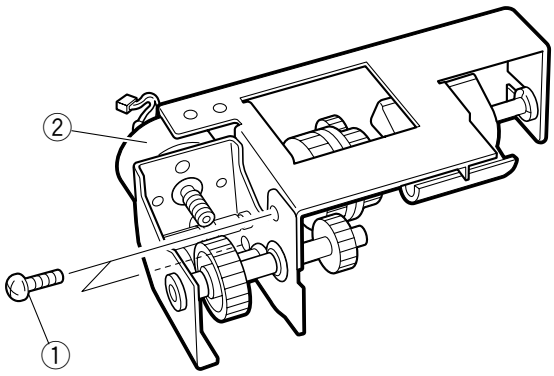
14) Remove three screws ①, disconnect connector J202 ②, and remove document board drive motor unit ③.



① Screws ② Connector
③ Document board drive motor unit

Fig. 4-215

15) Remove two screws ①, and then remove document board drive motor ②.



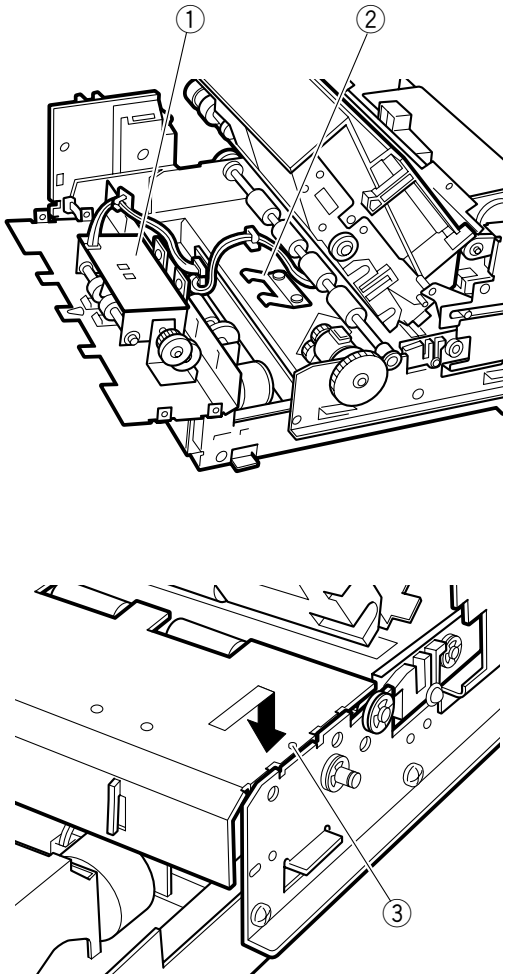
① Screws ② Document board drive motor

Fig. 4-216

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

3. Mounting the Separation Guide Unit

Place bottom plate ① of the separation guide unit on spring ②, press projection ③ on the separation guide plate down and to the rear, and tighten the screw to fasten.

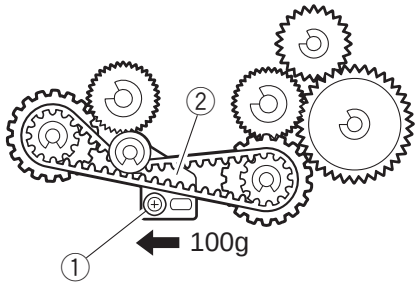


① Bottom plate ② Spring
③ Projection

Fig. 4-217

4. Adjusting the Belt Tension

While pressing tension plate ② with a force of 100g in the direction of the arrow, tighten screw ①.



① Screw ② Tension plate

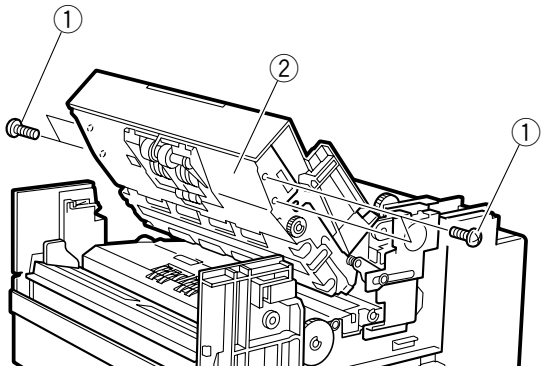
Fig. 4-218

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

III. DELIVERY

1. Feeder Roller

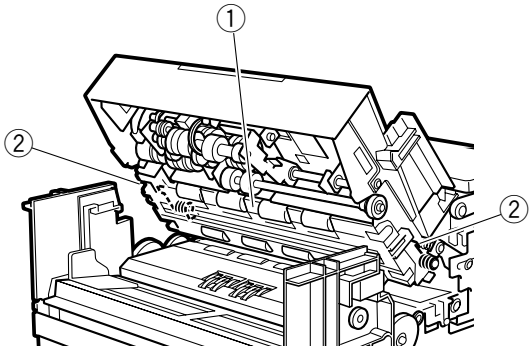
1) Remove the pick-up tray.
2) Remove the rear cover and the top rear cover. (4 screws)
3) Remove the left cover and external I/F cover. (2 screws)
4) Remove the right cover. (1 screw)
5) Remove the front cover.
6) Remove four screws ①, and then remove pick-up guide plate ②.



① Screws ② Pick-up guide plate

Fig. 4-301

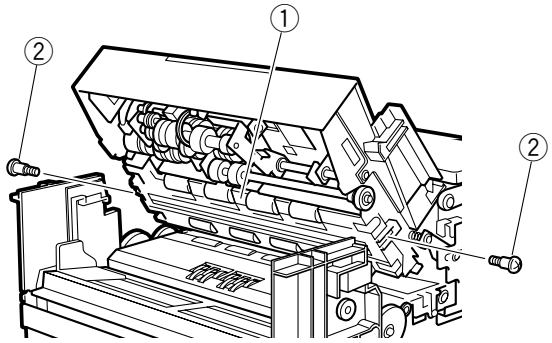
7) Release two springs ② of front scanner unit ①.



① Front scanner unit ② Springs

Fig. 4-302

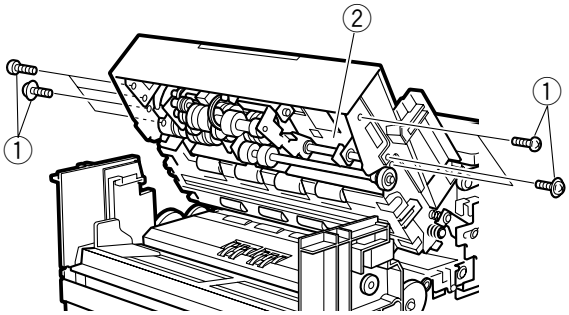
8) While holding the front scanner unit by hand, remove two screws ②, and pull front scanner unit ① down.



① Front scanner unit ② Screws

Fig. 4-303

9) Remove seven screws ① (two of which are black TP screws), and pull pick-up control assembly ② down.

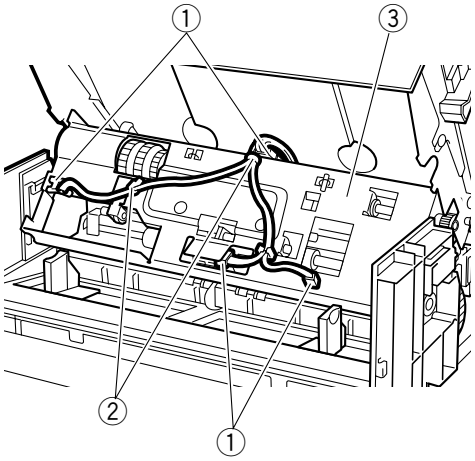


① Screws ② Pick-up control assembly

Fig. 4-304

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

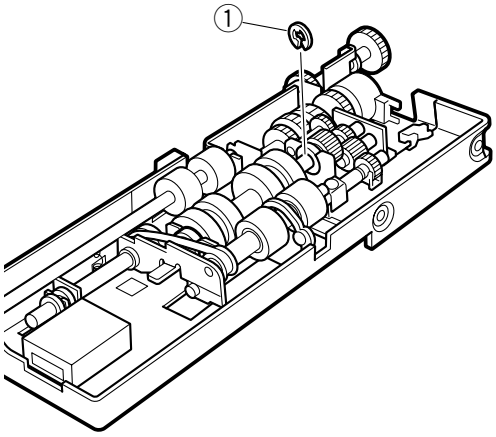
10) Disconnect four connectors ① and two cable clamps ②, and remove pick-up control assembly ③.



① Connectors ② Cable clamps
③ Pick-up control assembly

Fig. 4-305

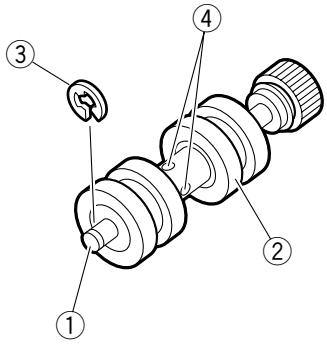
11) Remove E-ring ①.



① E-ring

Fig. 4-306

12) Put a mark showing the position of feeder roller ② on feeder roller shaft ① with a black felt-tip pen or a similar pen, remove E-ring ③, loosen two hex screws ④, and remove feeder roller.

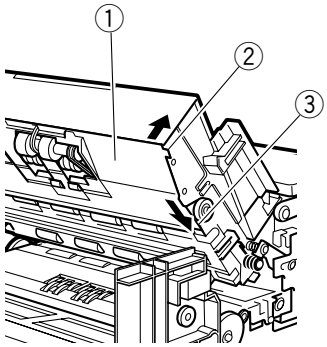


① Feeder roller shaft ② Feeder roller
③ E-ring ④ Hex screws

Fig. 4-307

2. Mounting the Pick-up Guide Plate

Fix pick-up guide plate ① with screws, pressing projection ② upward and projection ③ backward.



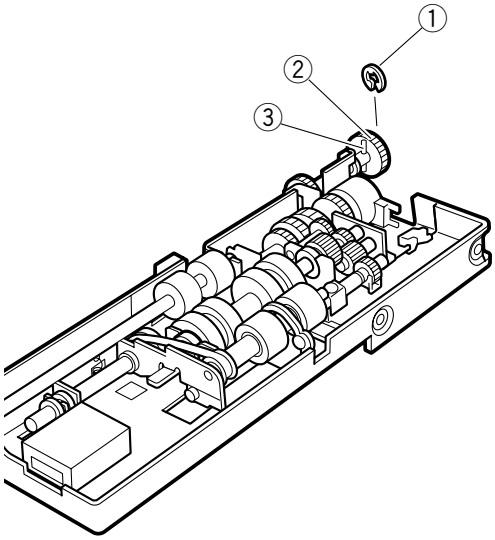
① Pick-up guide plate ② Projection
③ Projection

Fig. 4-308

3. Pick-up Clutch

1) Remove the pick-up control assembly referring to steps 1 to 10 of procedure “1. Feeder Roller”.
2) Remove E-ring ①, and then remove gear ② and pin ③.

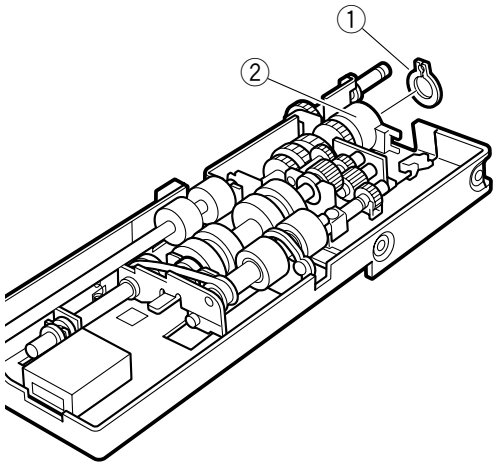
Note: Be careful not to lose the pin.



① E-ring ② Gear
③ Pin

Fig. 4-309

3) Remove G-ring ①, and then remove pick-up clutch ②.

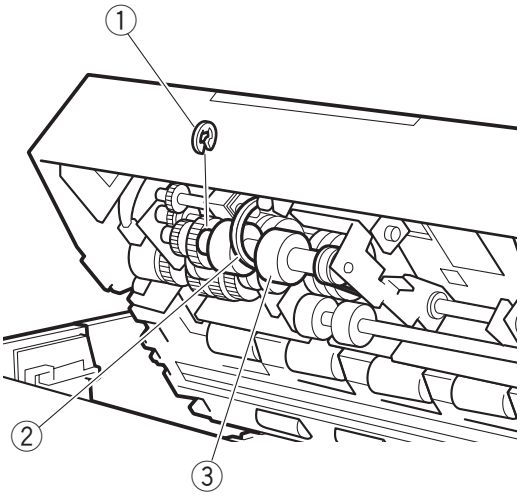


① G-ring ② Pick-up clutch

Fig. 4-310

4. Pick-up Roller

1) Remove the pick-up tray.
2) Open the feeder assembly.
3) Remove the pick-up guide plate. (4 screws)
4) Remove E-ring ①, and then remove pick-up roller ③ paying attention to sensor lever ②.



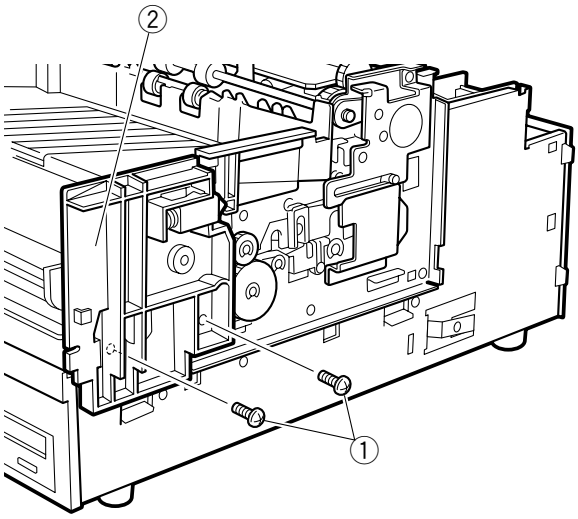
① E-ring ② Sensor lever
③ Pick-up roller

Fig. 4-311

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

5. Separation Roller

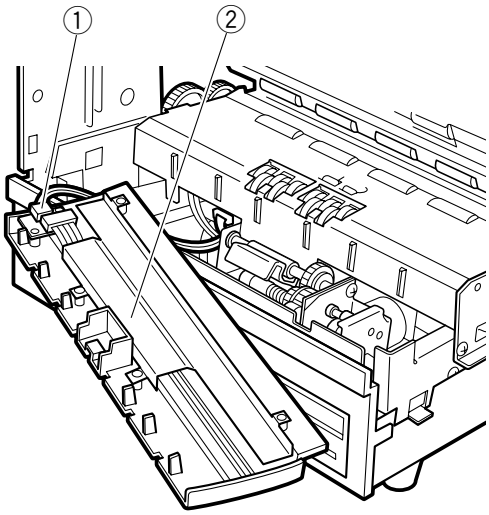
1) Remove the pick-up tray.
2) Remove the rear cover and the top rear cover. (4 screws)
3) Remove the left cover and external I/F cover. (2 screws)
4) Remove the right cover. (1 screw)
5) Remove the front cover.
6) Remove two screws ①, and then remove right side plate ②.



① Screws ② Right side plate

Fig. 4-312

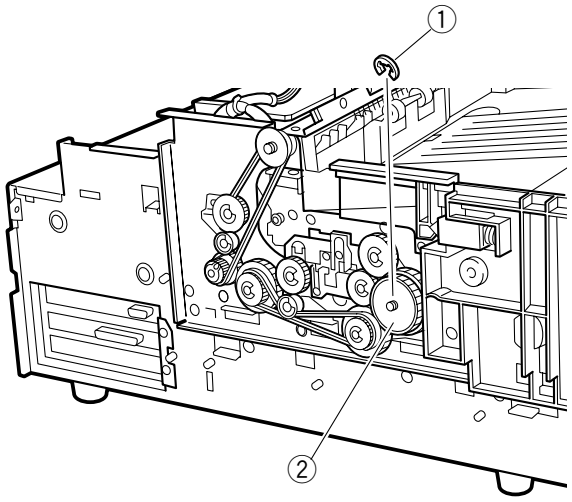
7) Disconnect connector ①, and then remove pick-up guide ②.



① Connector ② Pick-up guide

Fig. 4-313

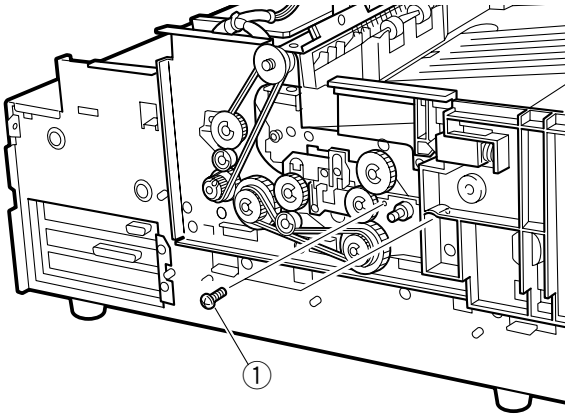
8) Remove E-ring ①, and then remove gear ②.



① E-ring ② Gear

Fig. 4-314

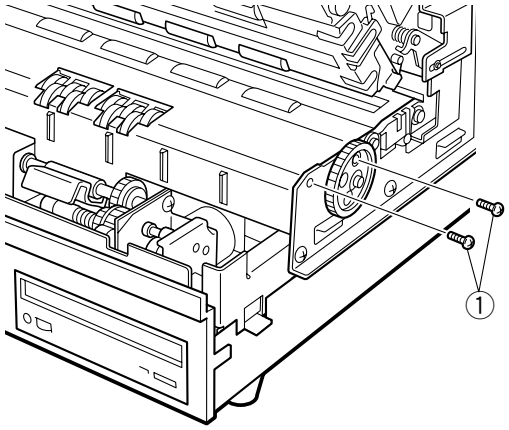
9) Remove two screws ①.



① Screws

Fig. 4-315

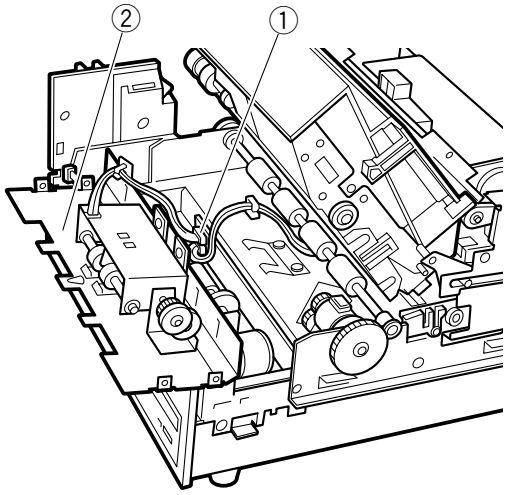
10) Remove two screws ① on the opposite side.



① Screws

Fig. 4-316

11) Disconnect connector ①, and remove separation guide unit ②.

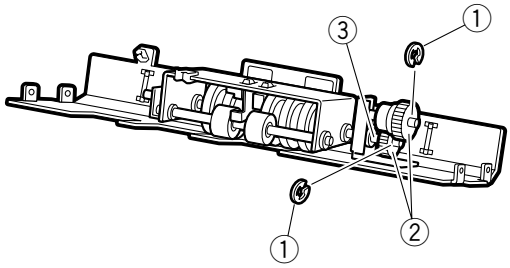


① Connector ② Separation guide unit

Fig. 4-317

12) Remove two E-rings ①, and then remove two gears ② and pin ③.

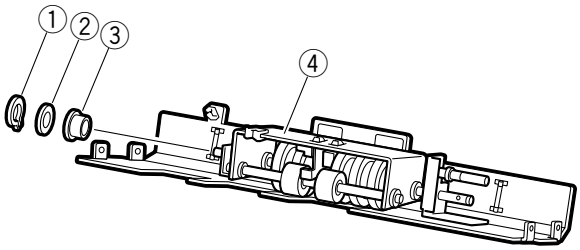
Note: Be careful not to lose the pin.



① E-rings ② Gears
③ Pin

Fig. 4-318

13) Remove G-ring ①, and then remove washer ②, bushing ③, and separation roller unit ④.

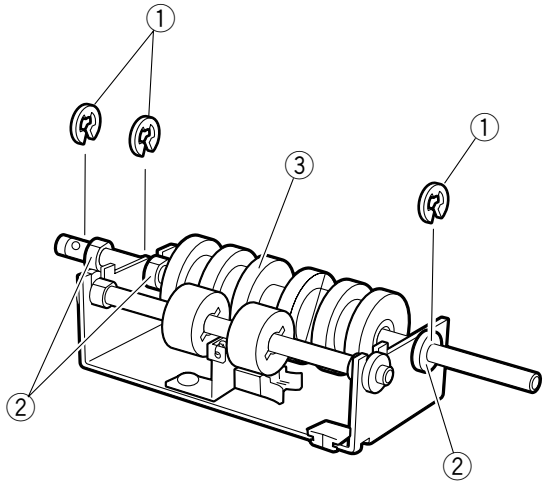


① G-ring ② Washer
③ Bushing ④ Separation guide unit

Fig. 4-319

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

14) Remove three E-rings ①, and then remove three bushings ②, and separation roller ③.



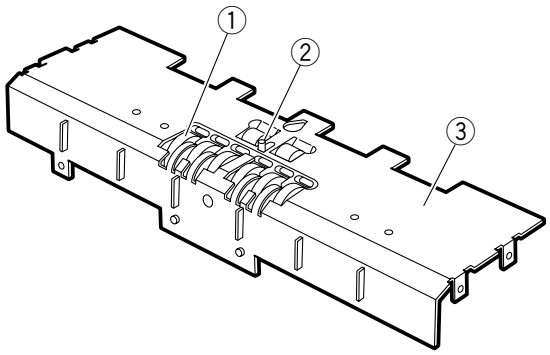
① E-rings ② Bushings
③ Separation roller

Fig. 4-320

6. Mounting the Separation Roller

1) Separation roller ① and sensor level ② must protrude from the hole on separate guide plate ③.

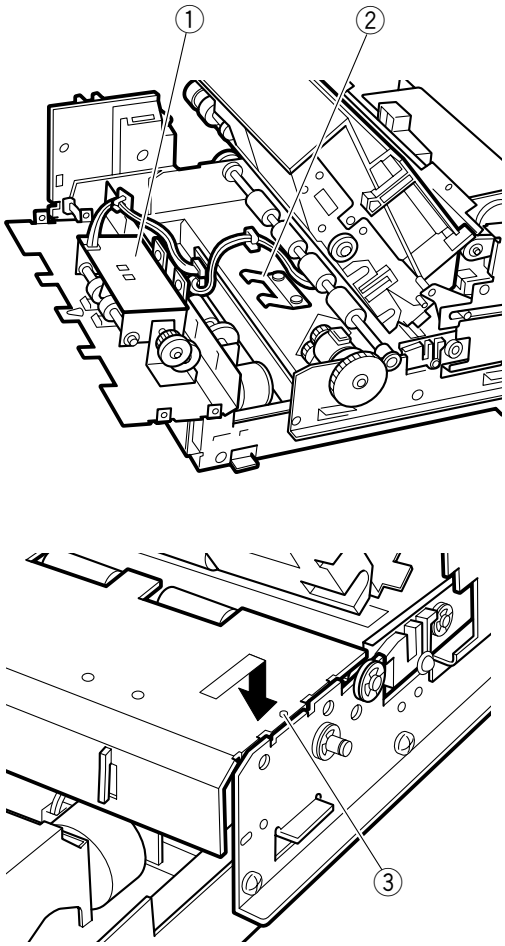
Note: Do not break the sensor cover. Also, make sure that it is moved smoothly.



① Separation roller ② Sensor lever
③ Separation guide plate

Fig. 4-321

2) Place bottom plate ① of the separation guide unit on spring ②, press projection ③ on the separation guide plate down and to the rear, and tighten the screw to fasten.



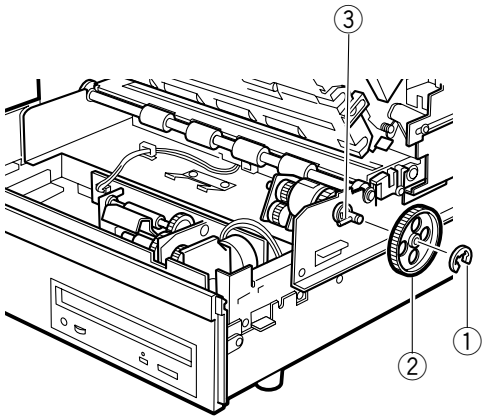
① Bottom plate ② Spring
③ Projection

Fig. 4-322

7. Momentary Stop Clutch

1) Remove the separation guide unit referring to steps 1 to 13 of procedure “5. Separation Roller”.
2) Remove E-ring ①, and then remove gear ② and pin ③.

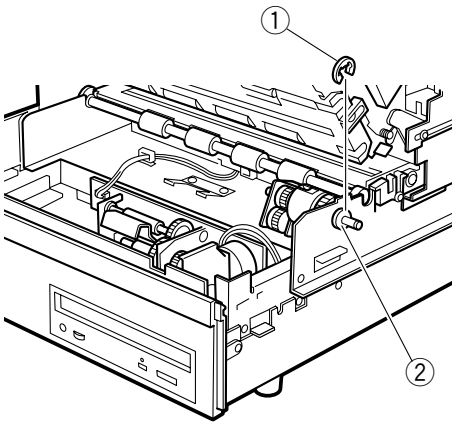
Note: Be careful not to lose the pin.



① E-ring ② Gear
③ Pin

Fig. 4-323

3) Remove E-ring ①, and then remove bushing ②.

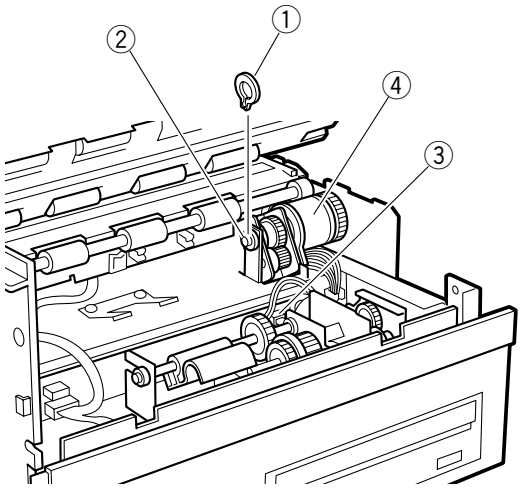


① E-ring ② Bushing

Fig. 4-324

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

4) Remove G-ring ①, pull out shaft ②, disconnect connector J204 ③, and remove momentary stop clutch ④.



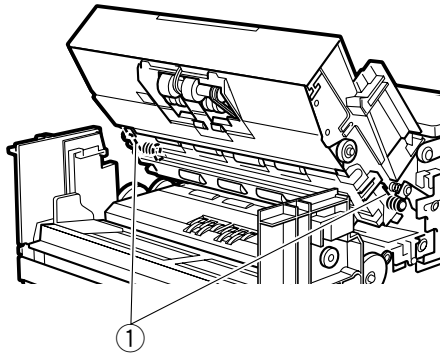
① G-ring ② Shaft
③ Connector ④ Momentary stop clutch

Fig. 4-325

IV. EXPOSURE

1. Front Scanner Unit

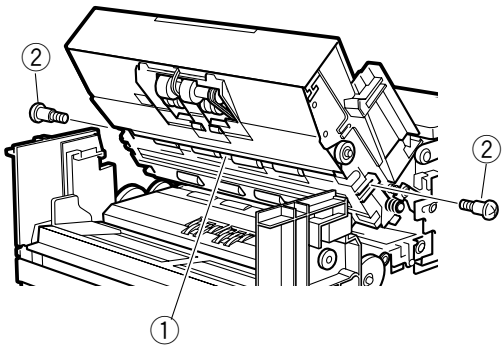
1) Remove the pick-up tray.
2) Remove the rear cover and the top rear cover. (4 screws)
3) Remove the left cover and external I/F cover. (2 screws)
4) Remove the right cover. (1 screw)
5) Remove the front cover.
6) Release two springs ①.



① Springs

Fig. 4-401

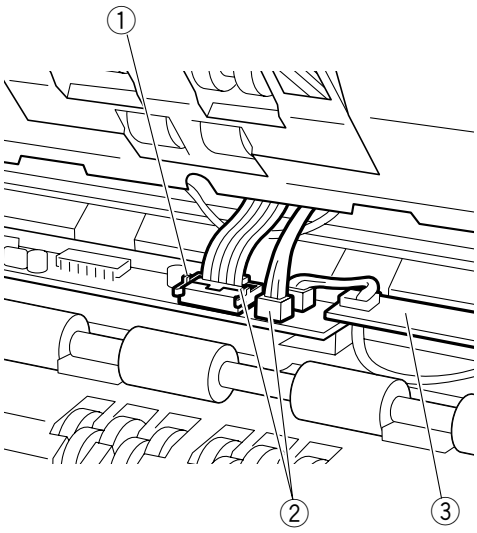
7) Remove two screws ② while holding front scanner unit ① by hand, and then pull front scanner unit down.



① Front scanner unit ② Screws

Fig. 4-402

8) Disconnect connector lock ① and two connectors ②, and remove front scanner unit ③.



① Connector lock ② Connectors
③ Front scanner unit

Fig. 4-403

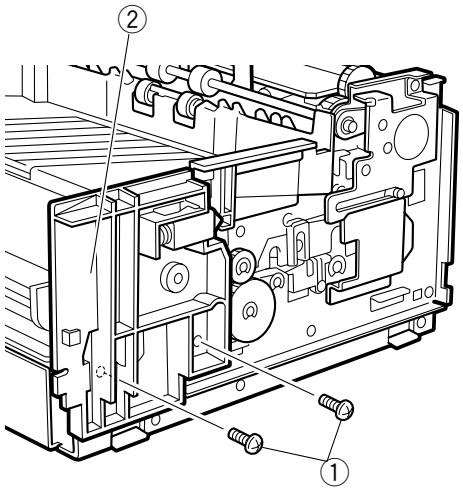
  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

2. Back Scanner Unit

1) Remove the pick-up tray.
2) Remove the rear cover and the top rear cover. (4 screws)
3) Remove the left cover and external I/F cover. (2 screws)
4) Remove the right cover. (1 screw)
5) Remove the front cover.
6) Remove the lower front cover.
7) Remove the battery mounting plate (4 screws) and scanner assembly (6 screws).

Note: Refer to steps 8 to 10 of the procedure "II. 1. Main Motor". The top cover need not be removed.

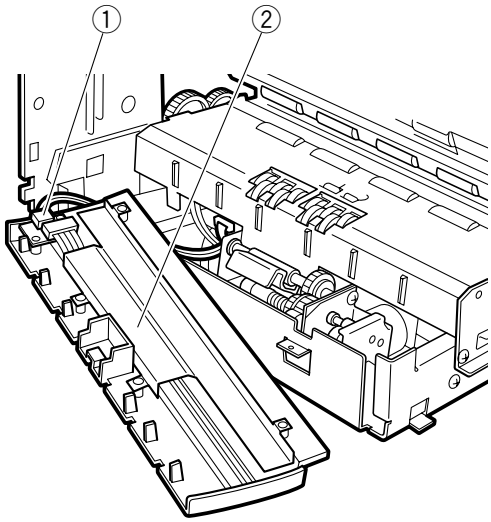
8) Remove two screws ①, and then remove right side plate ②.



① Screws ② Right side plate

Fig. 4-404

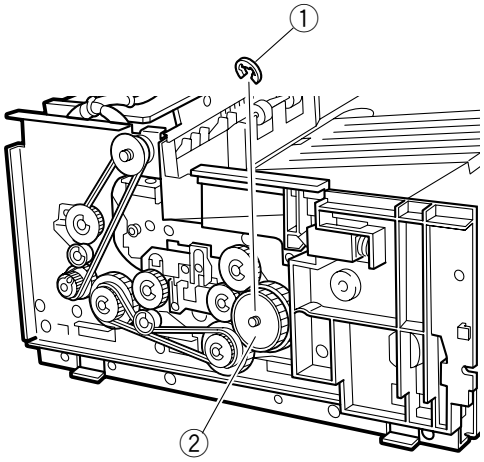
9) Disconnect connector ①, and remove pick-up guide ②,



① Connector ② Pick-up guide

Fig. 4-405

10) Remove E-ring ①, and then remove gear ②.

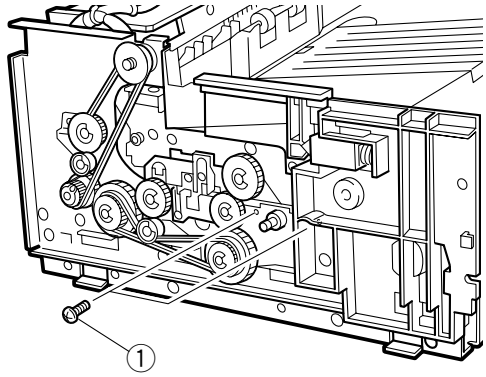


① E-ring ② Gear

Fig. 4-406

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

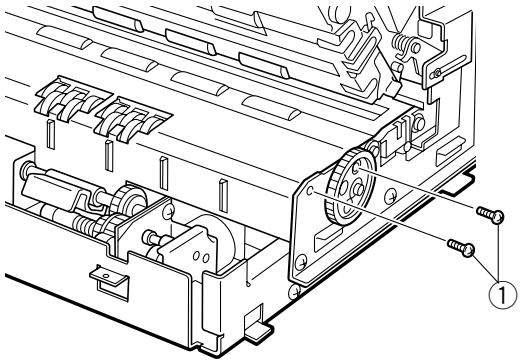
11) Remove two screws ①.



① Screws

Fig. 4-407

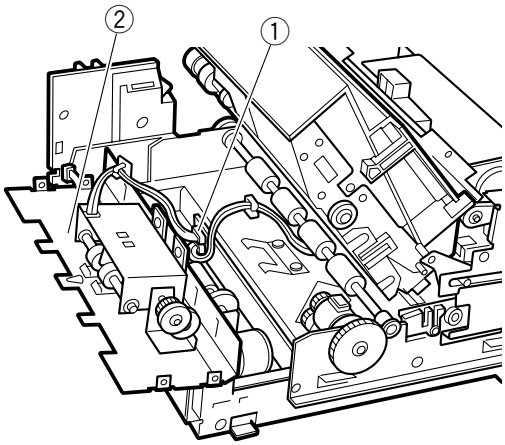
12) Remove two screws ① on the opposite side.



① Screws

Fig. 4-408

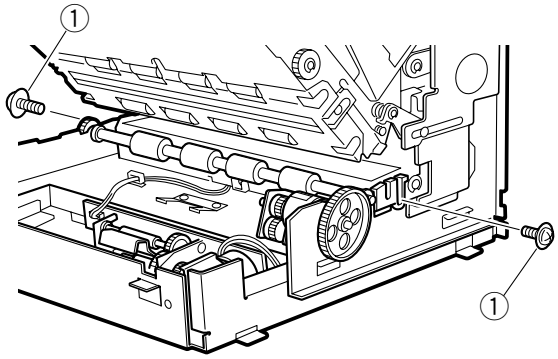
13) Disconnect connector ①, and remove separation guide unit ②.



① Connector ② Separation guide unit

Fig. 4-409

14) Remove two screws ① with washers.

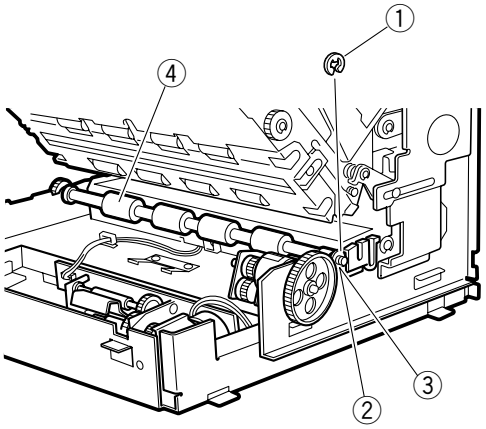


① Screws

Fig. 4-410

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

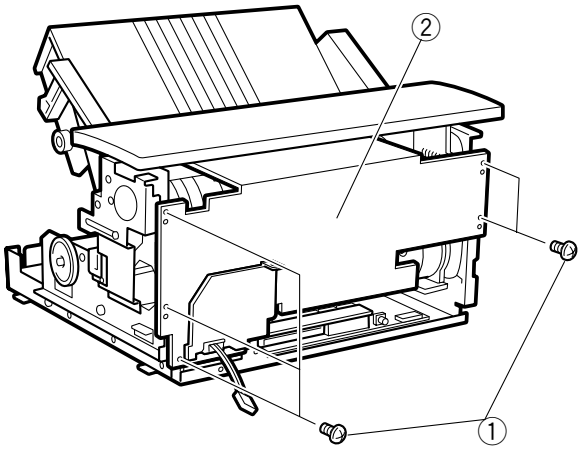
15) Remove the E-ring ①, washer ②, and bearing ③, and then remove roller shaft ④.



① E-ring ② Washer
③ Bearing ④ Roller shaft

Fig. 4-411

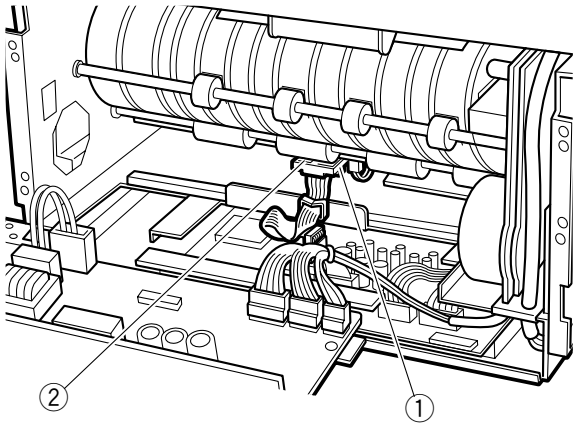
16) Remove five screws ①, and pull DC power supply unit ② down towards you.



① Screws ② DC power supply unit

Fig. 4-412

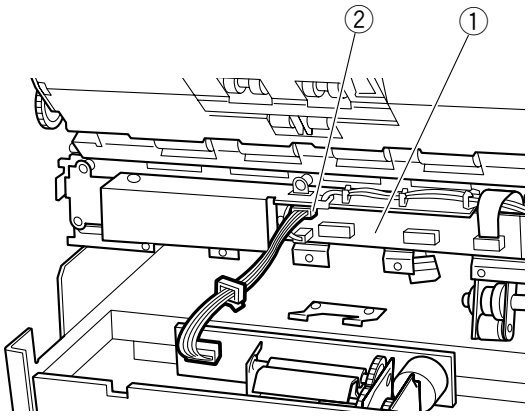
17) Disconnect connector lock ① and connector ②.



① Connector lock ② Connector

Fig. 4-413

18) Slightly draw out rear scanner unit ① from the front side, disconnect connector ②, and remove the rear scanner unit.



① Back scanner unit ② Connector

Fig. 4-414

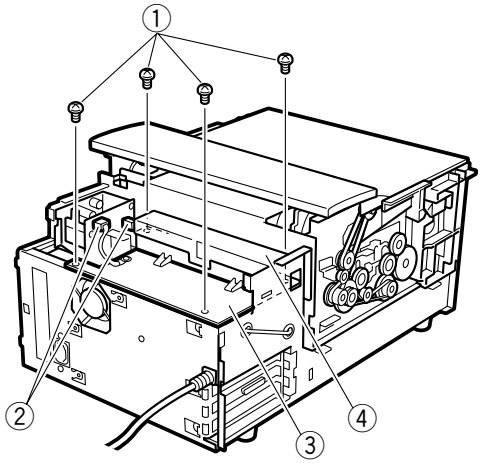
V. ELECTRICAL

A. Scanner Assembly

1. Scanner Power PCB Assembly

1) Remove the pick-up tray.
2) Remove the rear cover and the top rear cover. (4 screws)
3) Remove the left cover and external I/F cover. (2 screws)
4) Remove the right cover. (1 screw)
5) Remove the lower front cover. (2 screws)
6) Remove four screws ①, disconnect two connectors ②, and remove battery mounting plate ③.

Note: Do not remove backup battery ④ covers. Do not short-circuit the terminals.

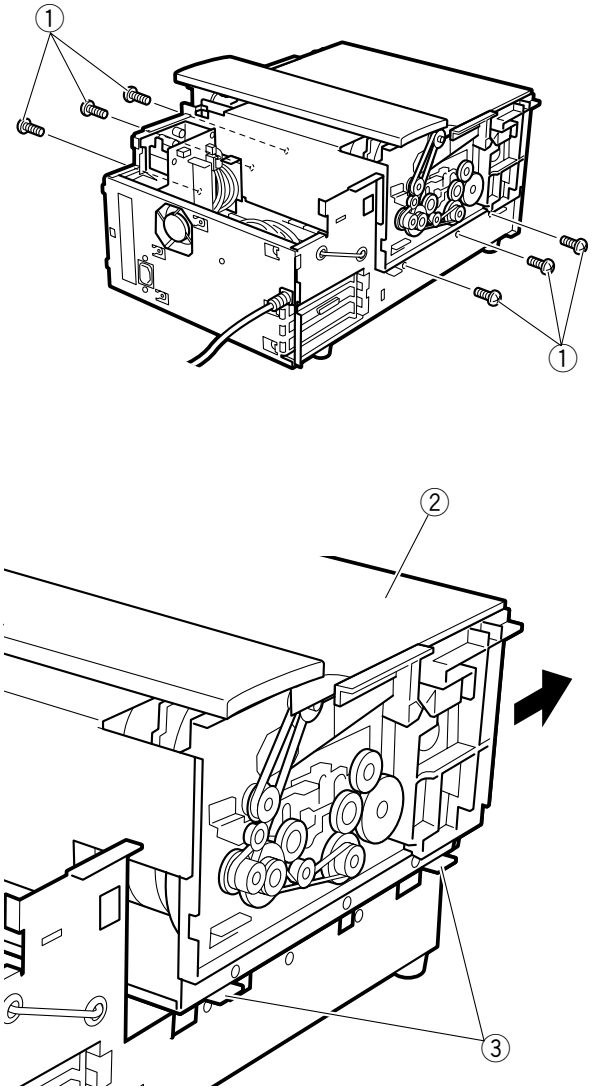


① Screws ② Connector
③ Battery mounting plate
④ Backup battery

Fig. 4-501

7) Remove six screws ① (3 each on left and right), and lift up and slightly shift scanner assembly ②.

Note: Place the guides ③ (two each on the left and right) on the bottom left and right of the scanner assembly firmly on top of the side panels. Prevent the scanner assembly from falling down. If you shift the scanner assembly too far, the connectors may become deformed.

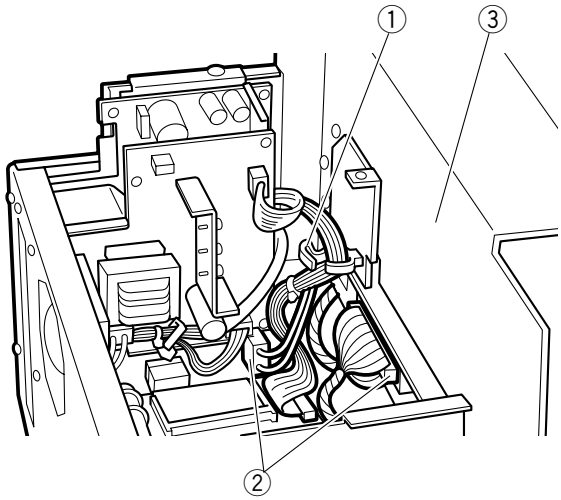


① Screws ② Scanner assembly
③ Guides

Fig. 4-502

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

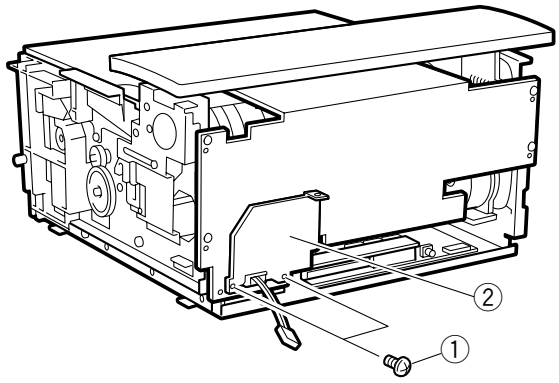
8) Open cable clamp ①, disconnect two connectors ②, and remove scanner assembly ③.



① Cable clamp ② Connectors
③ Scanner assembly

Fig. 4-503

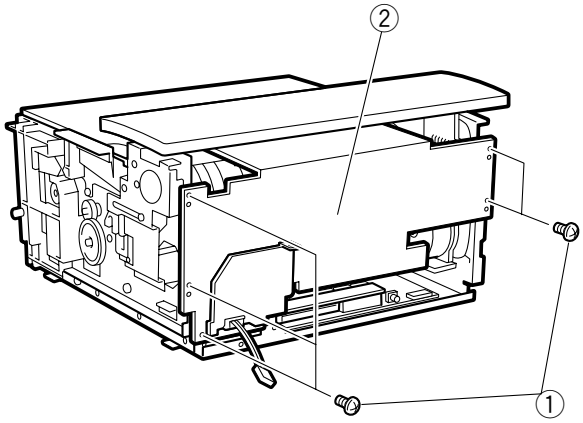
9) Remove two screws ①, and then remove auxiliary plate ②.



① Screws ② Auxiliary plate

Fig. 4-504

10) Remove five screws ①, and pull scanner power PCB assembly ② towards you.

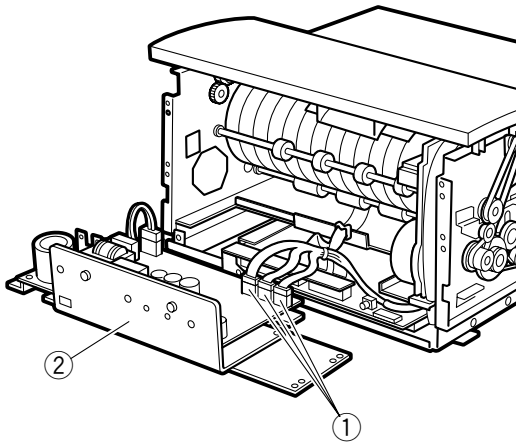


① Screws ② Scanner power PCB assembly

Fig. 4-505

11) Disconnect three connectors ①, and remove scanner power PCB assembly ②.

Note: For 220-240V model, remove the reactor also. Refer to “VI. 220-240V model”.



① Connectors ② Scanner power PCB assembly

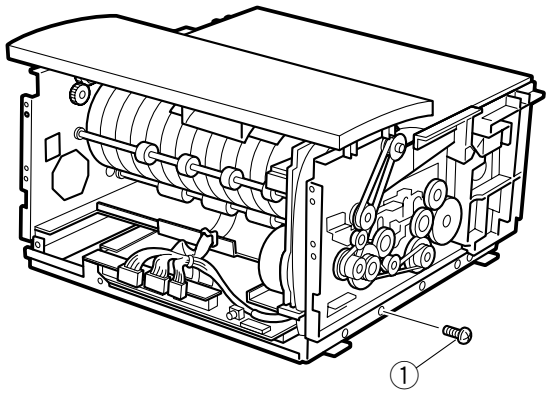
Fig. 4-506

2. SH CPU PCB Assembly

1) Remove the scanner power supply PCB assembly

Note: Refer to steps 1 to 11 of procedure "1. Scanner power supply PCB assembly". Step9 (auxiliary plate) is not required.

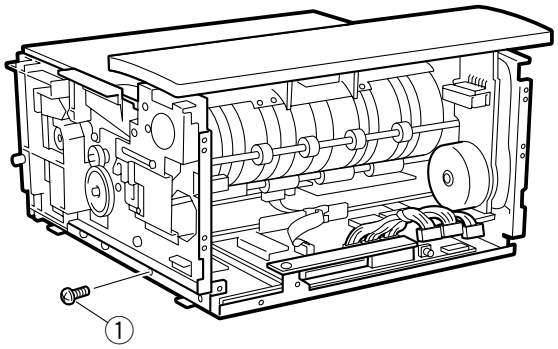
2) Remove screw ①.



① Screw

Fig. 4-507

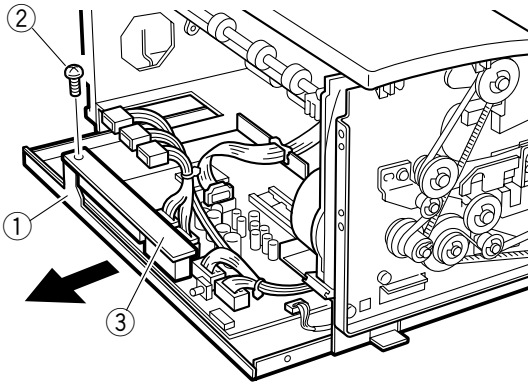
3) Remove screw ① on the opposite side.



① Screw

Fig. 4-508

4) Slightly draw out PCB assembly unit ①, and remove screw ② and the SCSI connector PCB assembly ③.

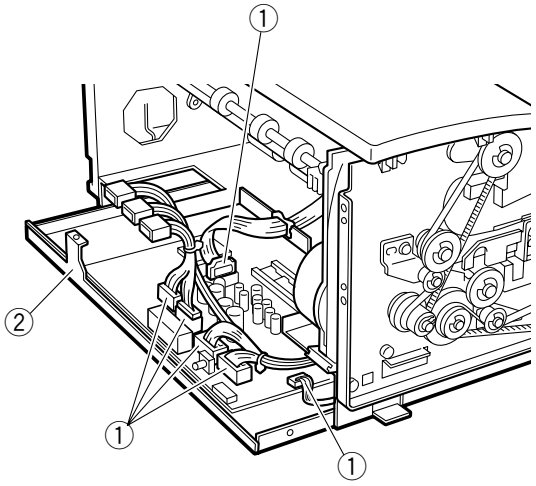


① PCB assembly unit ② Screw
③ SCSI connector PCB assembly

Fig. 4-509

5) Disconnect six connectors ①, and remove PCB assembly unit ②.

Note: Pay attention to the cables, when removing the PCB assembly unit.

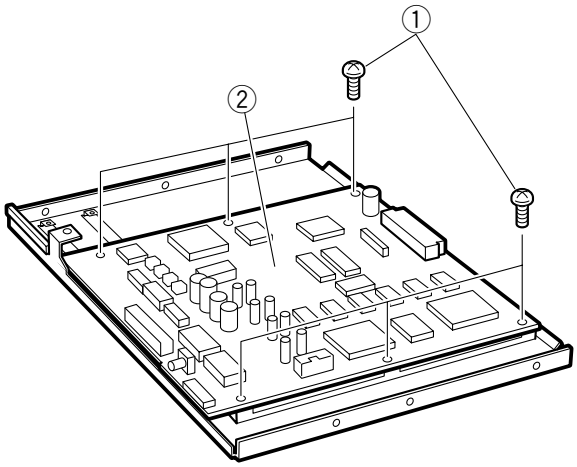


① Connectors ② PCB assembly unit

Fig. 4-510

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

6) Remove six screws ① and SH CPU PCB assembly ②.



① Screws
② SH CPU PCB assembly

Fig. 4-511

Note: When mounting the PCB assembly unit, make sure that the unit is firmly connected to the connector on the front I/F PCB assembly at the innermost side.

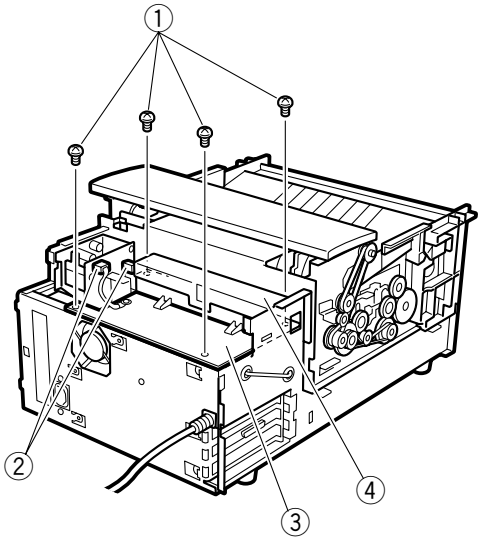
3. Front I/F PCB Assembly

1) Remove the separation guide unit referring to steps 1 to 11 of the procedure "III. 5. Separation Roller".

Note: When installing the front I/F PCB assembly refer to step 2 of the "III. 6. Mounting the Separation Roller" procedure.

2) Remove the lower front cover. (2 screws)
3) Remove two screws ①, disconnect two connectors ②, and remove battery mounting plate ③.

Note: Do not remove backup battery ④ covers. Do not short-circuit the terminals.

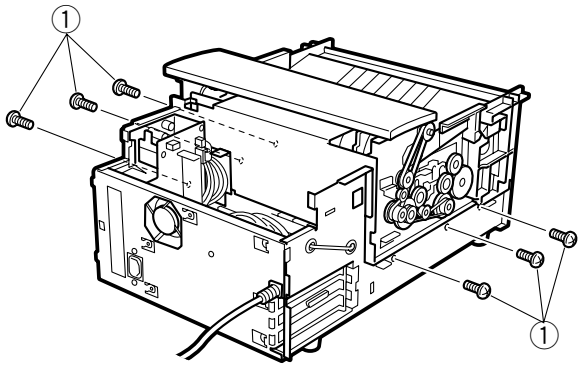


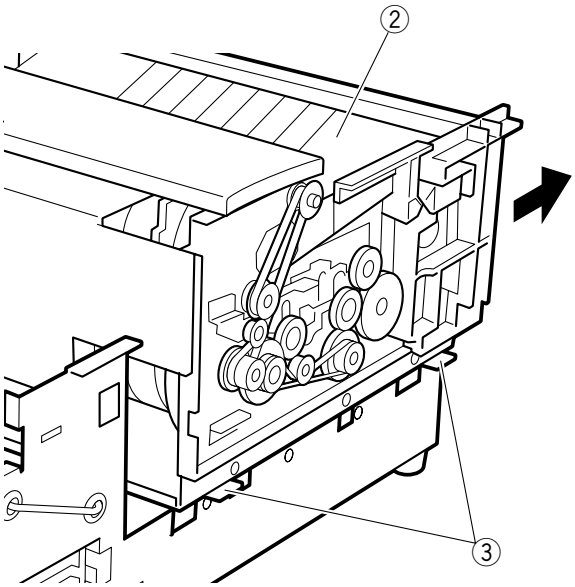
① Screws ② Connectors
③ Battery mounting plate
④ Backup battery

Fig. 4-512

4) Remove six screws ① (3 each on left and right), and lift up and slightly shift scanner assembly ②.

Note: Place the guides ③ (two each on the left and right) on the bottom left and right of the scanner assembly firmly on top of the side panels. Prevent the scanner assembly from falling down. If you shift the scanner assembly too far, the connectors may become deformed.

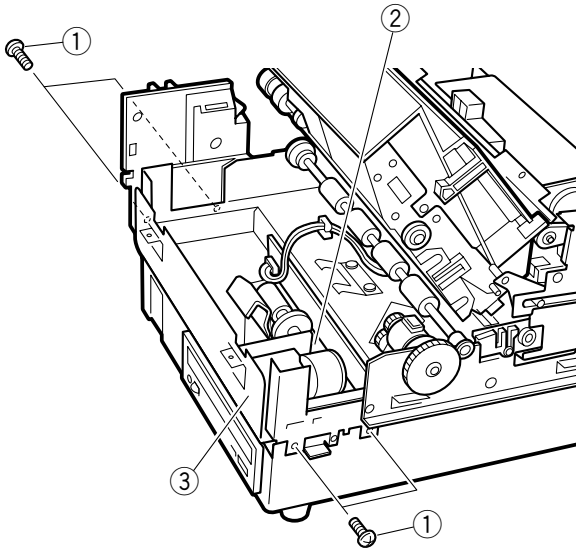




① Screws ② Scanner assembly
③ Guides

Fig. 4-513

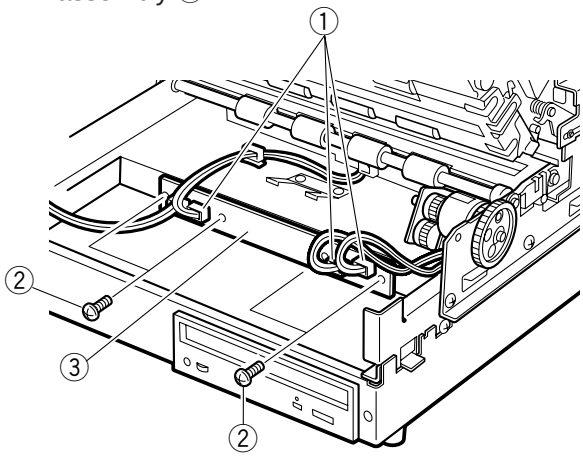
5) Remove four screws ① (two each on left and right), disconnect connector J202 ②, and draw out motor mounting plate ③ towards you to remove.



① Screws ② Connector
③ Motor mounting plate

Fig. 4-514

6) Disconnect three connectors ①, and remove four screws ②, and then remove front I/F PCB assembly ③.



① Connectors ② Screws
③ Front I/F PCB assembly

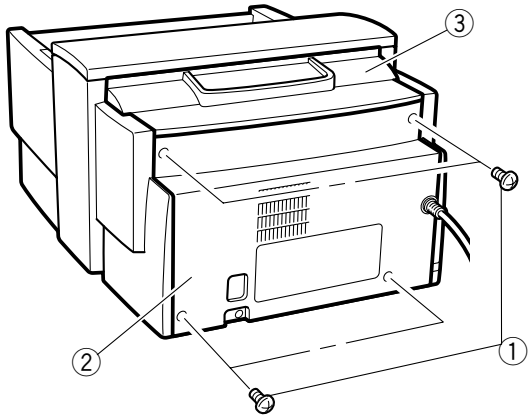
Fig. 4-515

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

B. Control Assembly

1. Backup Battery

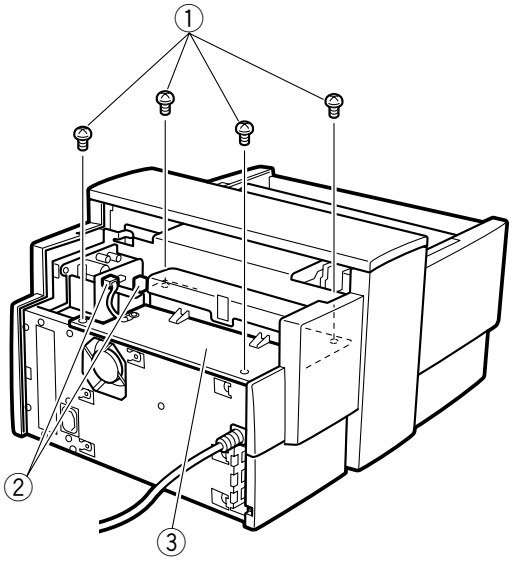
1) Remove four screws ①, and then remove rear cover ② and top rear cover ③.



① Screws ② Rear cover
③ Top rear cover

Fig. 4-516

2) Remove four screws ①, disconnect two connectors ②, and remove battery mounting plate ③.

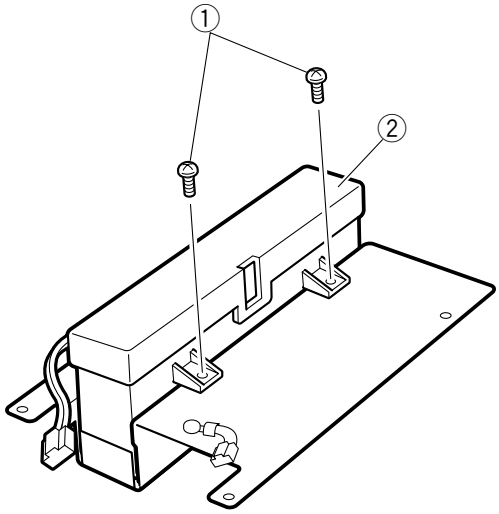


① Screws ② Connectors
③ Battery mounting plate ④ Backup battery

Fig. 4-517

3) Remove two screws ①, and then remove backup battery ②.

Note: The backup battery is a sealed lead-acid battery. Do not remove its transparent cover. Also, do not short-circuit the terminals. Otherwise, refer to "Chapter 1, III. PRECAUTIONS, C. Backup Battery" (page 1-7).



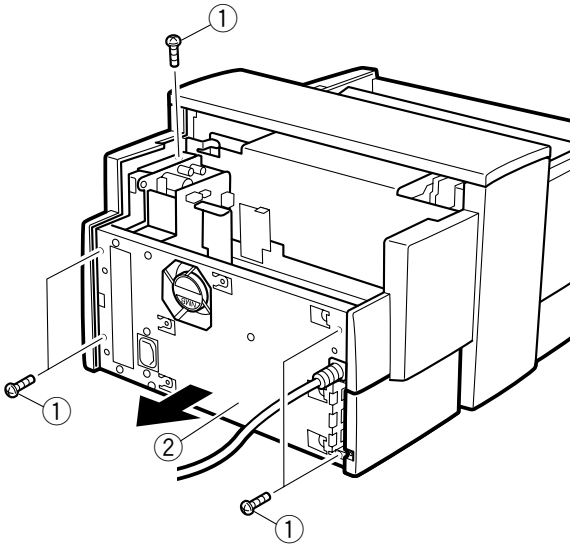
① Screws
② Backup battery

Fig. 4-518

Note: When you have replaced the backup battery, refer to "Chapter 7, VII. After Replacing Electrical Parts".

2. CD-R Power Supply PCB Assembly

1) Remove the rear cover and top rear cover. (4 screws)
2) Remove the battery mounting plate. (4 screws)
3) Remove five screws ①, and slightly shift PCB assembly unit ② to the rear.

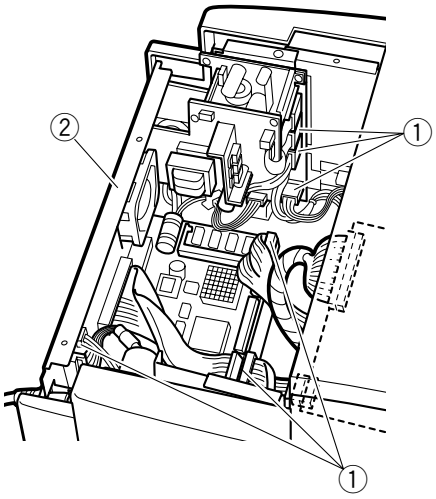


① Screws ② PCB assembly unit

Fig. 4-519

4) Disconnect six connectors ①, and remove PCB assembly unit ②.

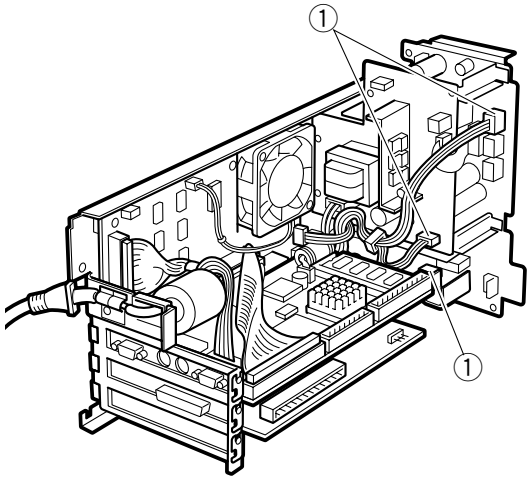
Note: The touch panel is connected to the control assembly.



① Connectors ② PCB assembly unit

Fig. 4-520

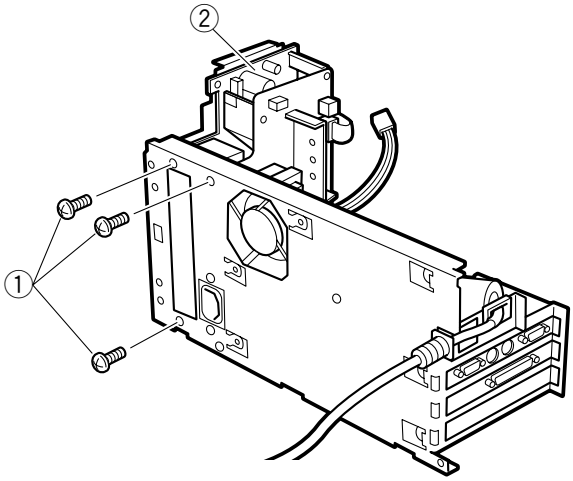
5) Disconnect three connectors ①.



① Connectors

Fig. 4-521

6) Remove three screws ①, and remove CD-R power PCB assembly ②.



① Screws ② CD-R power PCB assembly

Fig. 4-522

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

3. Mounting the PCB Assembly Unit

1) Make sure that the connectors are connected.
2) The electrical circuit is the same whichever side two connectors Ⓐ are inserted.
3) When inserting connectors Ⓑ, take care to prevent deformation or looseness on the PCB assembly.
4) Lead cables out in such a way that they are not nipped.

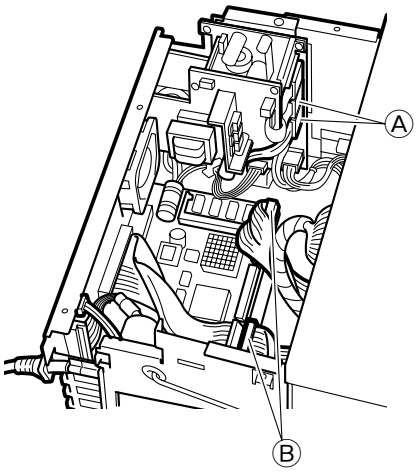
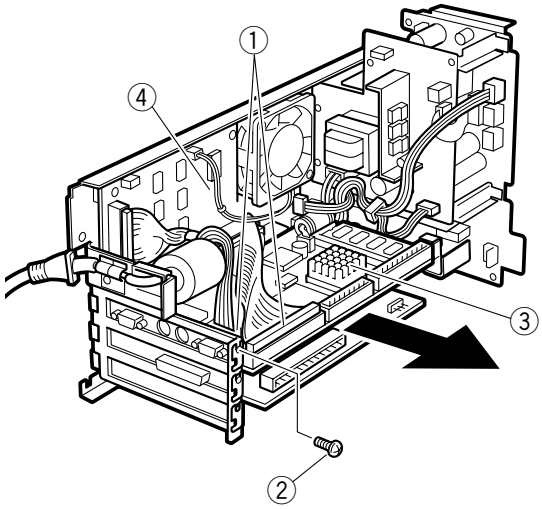


Fig. 4-523

4. Control CPU PCB Assembly

1) Remove the PCB assembly unit referring to steps 1 to 4 of procedure “2. CD-R Power Supply PCB Assembly”.
2) Disconnect two connectors ①, remove screw ② and draw out control CPU PCB assembly ③ towards you.

Note: The fitting of the connectors on back plane PCB assembly ④. Pay attention to the terminal pints as they protrude towards the rear side of the control CPU PCB assembly.



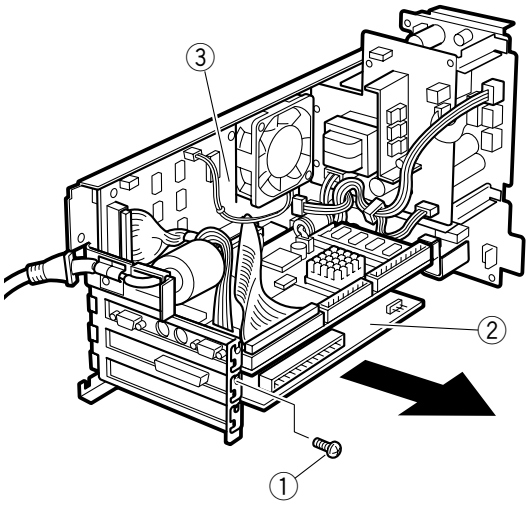
① Connectors ② Screw
③ Control CPU PCB assembly
④ Back plane PCB assembly

Fig. 4-524

5. SCSI PCB Assembly

1) Remove the PCB assembly unit referring to steps 1 to 4 of procedure “2. CD-R Power Supply PCB Assembly”.
2) Remove screw ①, and draw out SCSI PCB assembly ② towards you.

Note: The fitting of the connectors on back plane circuit board ④. Pay attention to the terminal pints as they protrude towards the rear side of the control CPU PCB assembly.



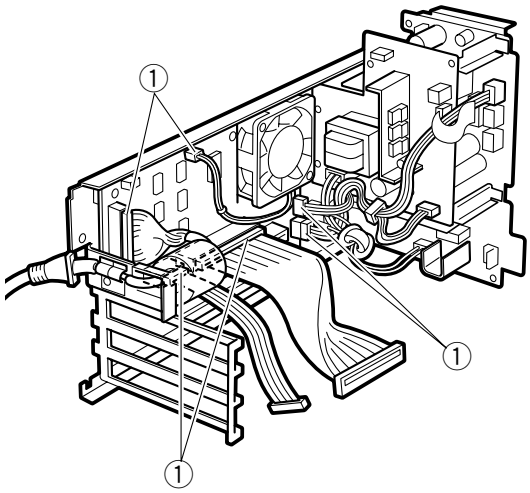
① Screw ② SCSI PCB assembly
③ Back plane PCB assembly

Fig. 4-525

Note: When replacing the SCSI PCB assembly, check the DIP switch settings. For details, see “Chapter 3, X. B. SCSI PCB Assembly”.

6. Back Plane PCB Assembly

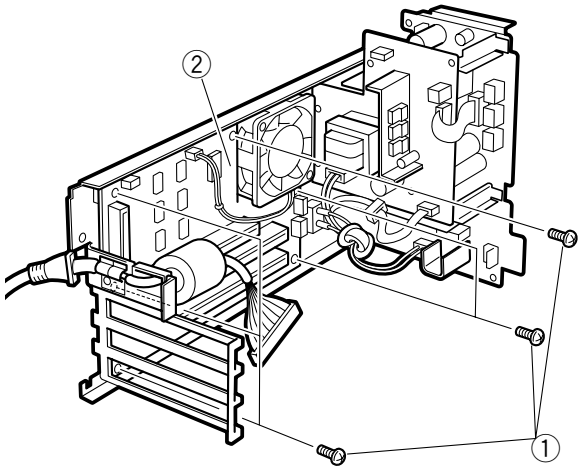
1) Remove the PCB assembly unit referring to steps 1 to 4 of procedure “2. CD-R Power Supply PCB Assembly”.
2) Remove the control CPU PCB assembly. (1 screw)
3) Remove the SCSI PCB assembly. (1 screw)
4) Disconnect six connectors ①.



① Connectors

Fig. 4-526

5) Remove six screws ①, and then remove back plane PCB assembly ②.



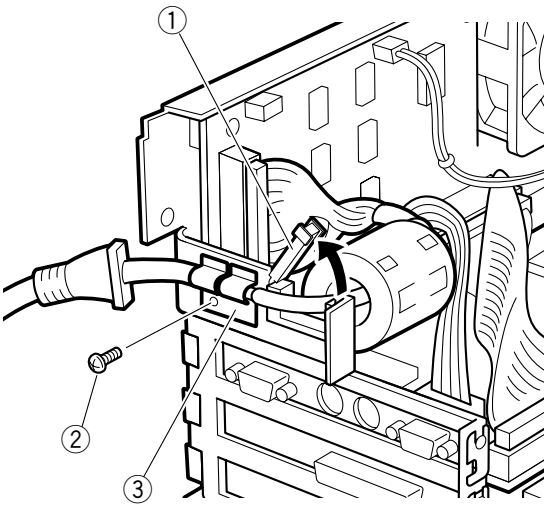
① Screws ② Back plane PCB assembly

Fig. 4-527

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

7. Connector Cable

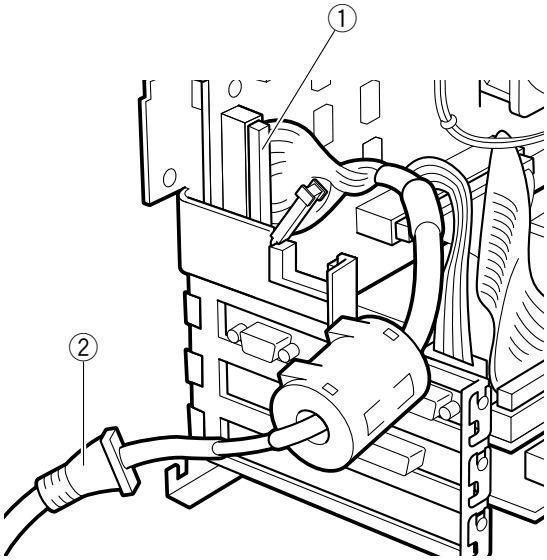
1) Remove the PCB assembly unit referring to steps 1 to 4 of procedure “2. CD-R Power Supply PCB Assembly”.
2) Open cable clamp ①, remove screw ②, and remove earth plate ③.



① Cable clamp ② Screw
③ Earth plate

Fig. 4-528

3) Disconnect connector ①, and disconnect connector cable ②.



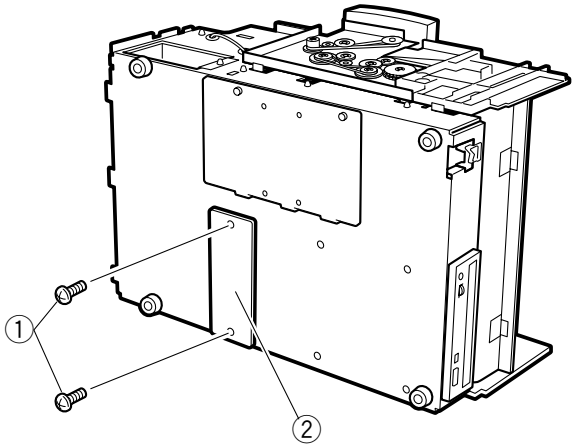
① Connector ② Connector cable

Fig. 4-529

8. CD-R Drive

1) Remove the pick-up tray.
2) Remove the rear cover and the top rear cover. (4 screws)
3) Remove the left cover and external I/F cover. (2 screws)
4) Remove the right cover. (1 screw)
5) Remove the front cover.
6) Remove the lower front cover. (2 screws)
7) Set the body onto its side, and remove two screws ① and blind plate ②.

Note: When setting the body on it side, place it on the flat surface. Also, take care not to scratch the gears, or damage parts.

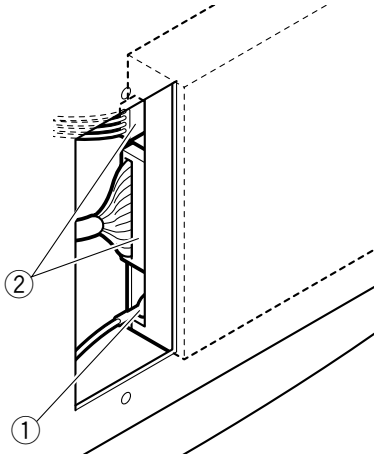


① Screws ② Blind plate

Fig. 4-530

8) Remove faston terminal ①, and disconnect two connectors ②.

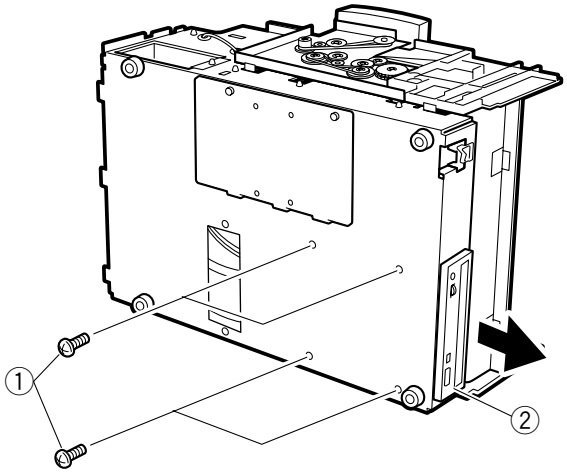
Note: During this operation, take case not to injure your hands on the metal panels.



① Faston terminal ② Connector

Fig. 4-531

9) Remove four screws ①, and draw out CD-R drive ② towards you to remove.



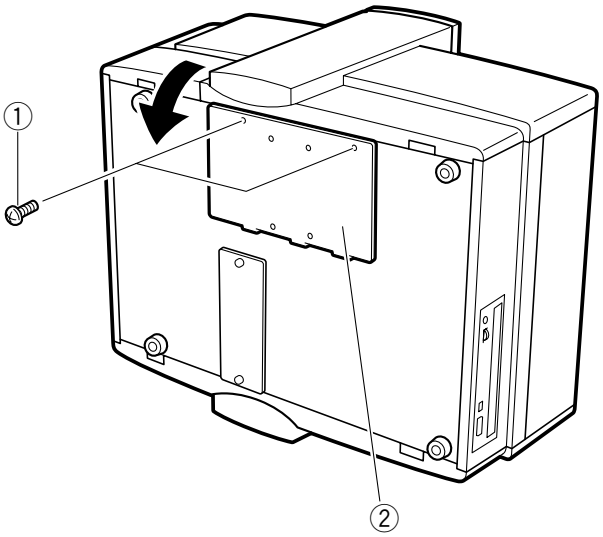
① Screws ② CD-R drive

Fig. 4-532

Note: When transporting the CD-R drive after it has been removed, be sure to put it into the special packing case that contained the replacement service parts. The CD-R drive is a precision instrument, and should be handled with care. The service parts are provided with a caddy. Replace the caddy, and pack the old caddy removed from the CD-R drive.

9. HDD (Hard Disk Drive)

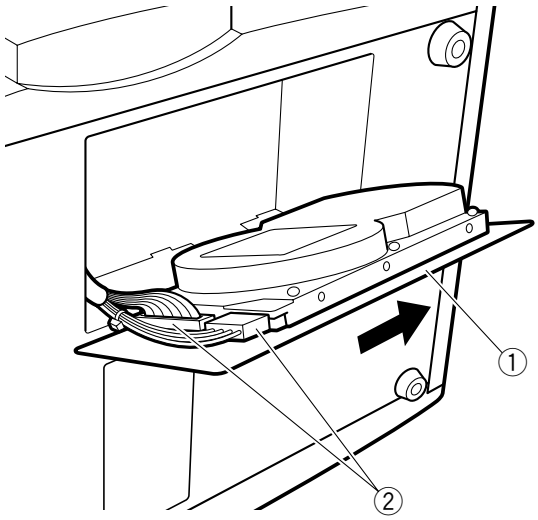
1) Set the body onto its side, remove two screws ①, and pull down the body towards you while holding HDD mounting plate ②.



① Screws ② HDD mounting plate

Fig. 4-533

2) Disconnect two connectors ② while holding HDD mounting plate ①, and move HDD mounting plate to the side to remove.



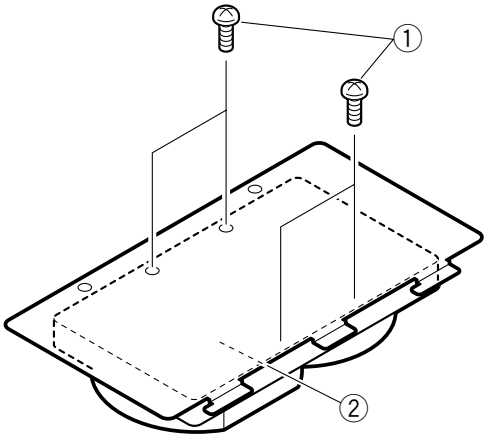
① HDD mounting plate ② Connectors

Fig. 4-534

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

3) Remove four screws (6-32 UNC), and then remove HDD ②.

Note: Special screws are used.



① Screws ② HDD

Fig. 4-535

Note 1: When transporting the CD-R drive after it has been removed, be sure to put it into the special packing case that contained the replacement service parts. The CD-R is a precision instrument, and should be handled with care.

Note 2: Software is not installed on the HDD (MH6-3028) that is set as a service part. HDDs on which software is installed are set as service tools for each language.

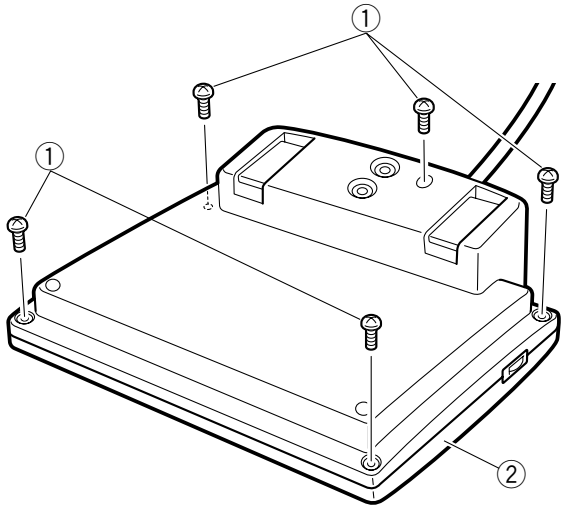
Note 3: When the HDD has been replaced, refer to "Chapter 7, VII. After Replacing Electrical Parts".

C. Touch Panel Assembly

1. Touch Panel

Note: When the touch panel has been disassembled, make sure that it is calibrated after it is reassembled. For details on how to calibrate the touch panel, see "Chapter 7, VII. After Replacing Electrical Parts".

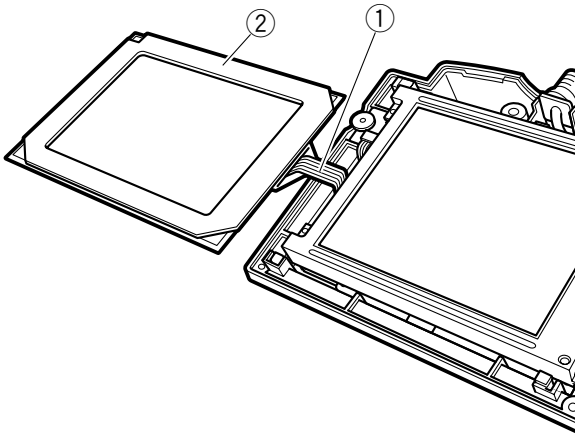
1) Remove five screws ① from the rear side, and remove touch panel cover ②.



① Screws ② Touch panel cover

Fig. 4-536

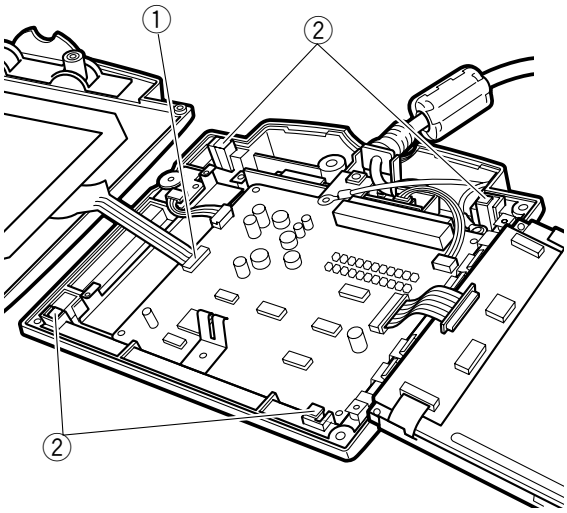
2) Disconnect flexible cable ①, and remove touch panel ②.



① Flexible cable ② Touch panel

Fig. 4-537

Note: When mounting the touch panel, carry out step 3 of the procedure "2. LCD" described later and insert the flexible cable into connector ① on the display PCB assembly. The position of the touch panel must be aligned with the inside of four guides ②.

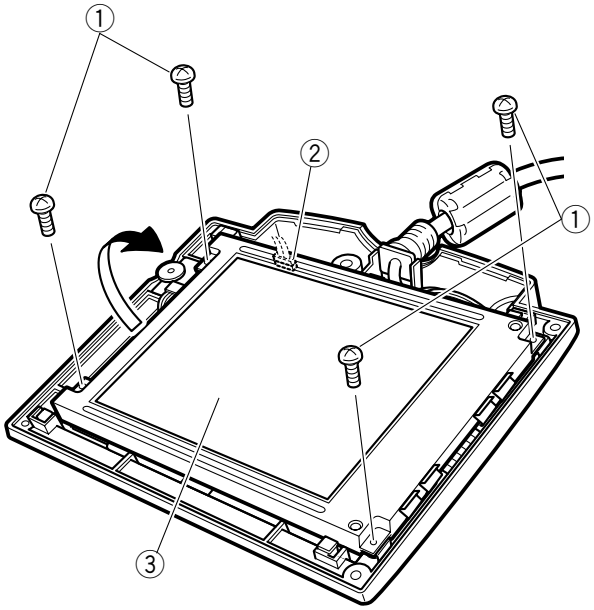


① Connector ② Guides

Fig. 4-538

2. LCD (Liquid Crystal Display)

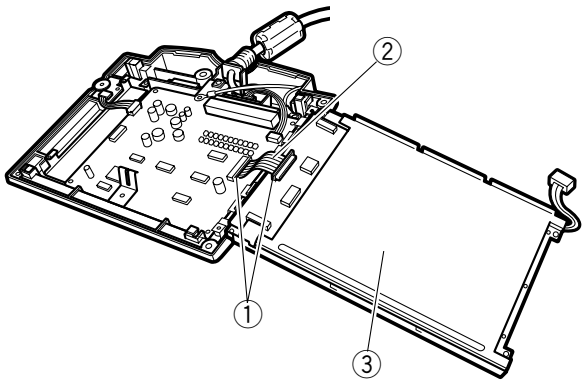
1) Remove the touch panel cover. (5 screws)
2) Remove the touch panel.
3) Remove four screws ①, disconnect connector ②, and open LCD ③.



① Screws ② Connector
③ LCD

Fig. 4-539

4) Disconnect two connector stoppers ①, draw out flex cable ②, and remove LCD ③.

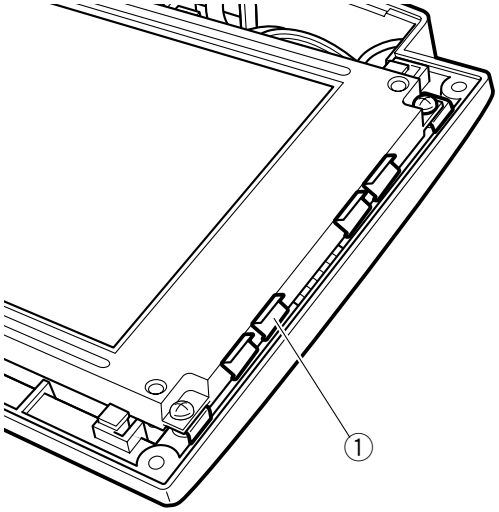


① Stopper ② Flexible cable
③ LCD

Fig. 4-540

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

Note: When mounting the LCD, make sure that earth plate ① contacts the side of the LCD.

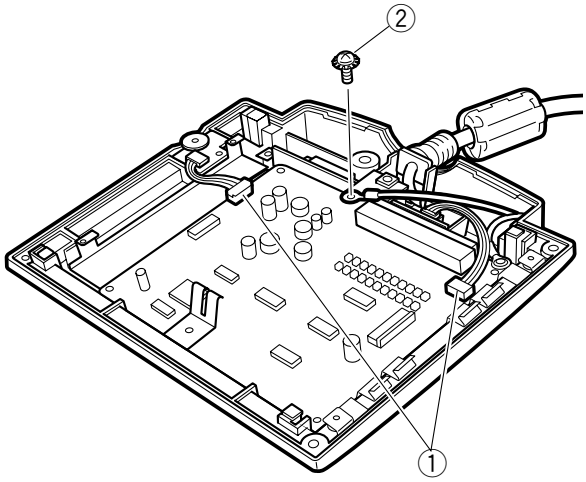


① Earth plate

Fig. 4-541

3. Display PCB Assembly

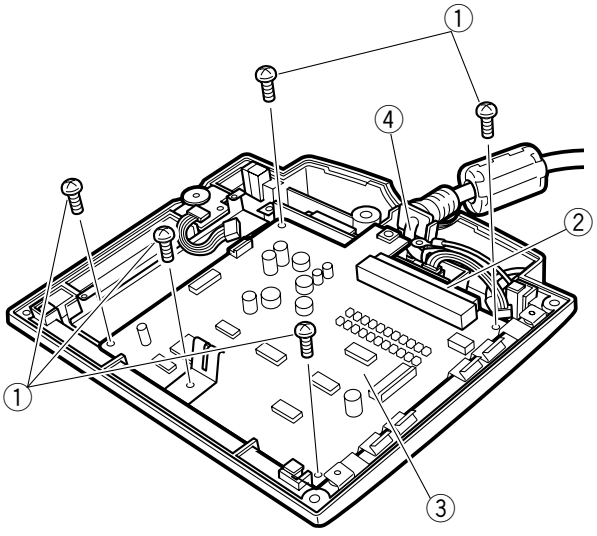
1) Remove the touch panel cover. (5 screws)
2) Remove the touch panel.
3) Remove the LCD. (4 screws)
4) Disconnect two connectors ①, and remove screw ② (with toothed washer).



① Connectors ② Screw

Fig. 4-542

5) Remove five screws ①, disconnect connector ②, and then remove display PCB assembly ③.



① Screws ② Connector
③ Display PCB assembly ④ Connector cable

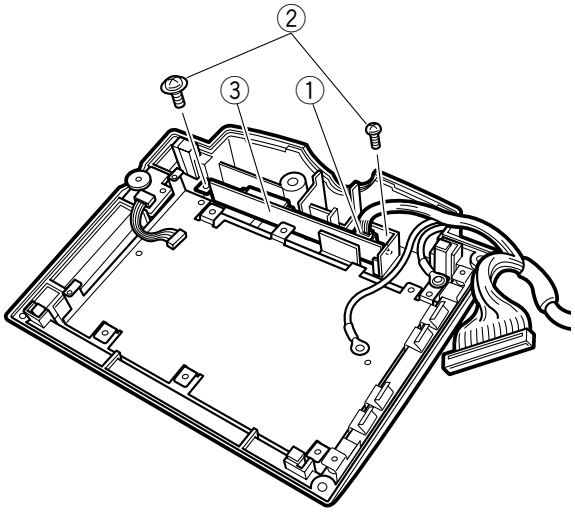
Fig. 4-543

Note: When mounting the display PCB assembly, fit the connector cable between the ribs so that connector cable ④ does not ride on the display PCB assembly.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

4. Inverter PCB Assembly

1) Remove the touch panel cover. (5 screws)
2) Remove the touch panel.
3) Remove the LCD. (4 screws)
4) Remove the display PCB assembly. (6 screws)
5) Disconnect connector ①, and remove two screws ②, and then remove inverter PCB assembly ③.

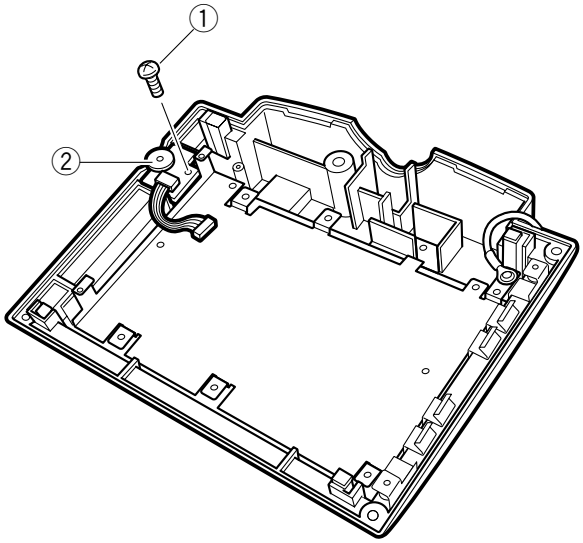


① Connector ② Screws
③ Inverter PCB assembly

Fig. 4-544

5. PCB Mounting Plate

1) Remove the touch panel cover. (5 screws)
2) Remove the touch panel.
3) Remove the LCD. (4 screws)
4) Remove the display PCB assembly. (6 screws)
5) Remove the inverter PCB assembly. (2 screws)
6) Remove screw ① and contrast dial PCB assembly ②.

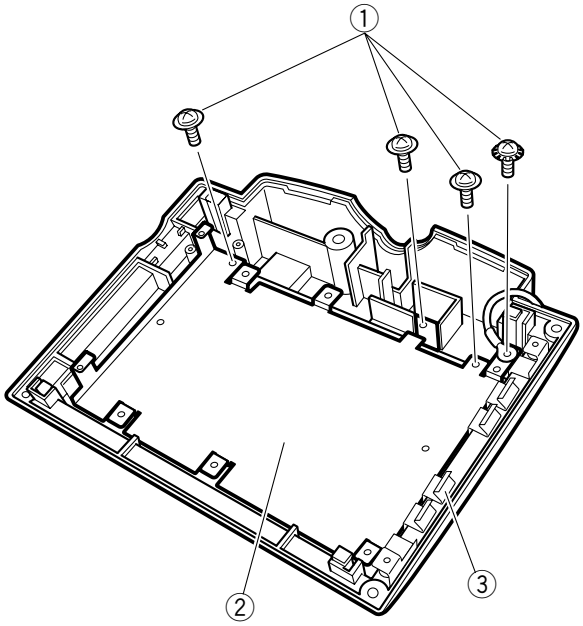


① Screw ② Contrast dial PCB assembly

Fig. 4-545

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

7) Remove four screws ①, and PCB mounting plate ②.



① Screws ② PCB mounting plate
③ Earth plate

Fig. 4-546

Note: When mounting the PCB mounting plate, do not forget to insert the earth plate ③ under the mounting plate.

VI. 220-240V MODEL

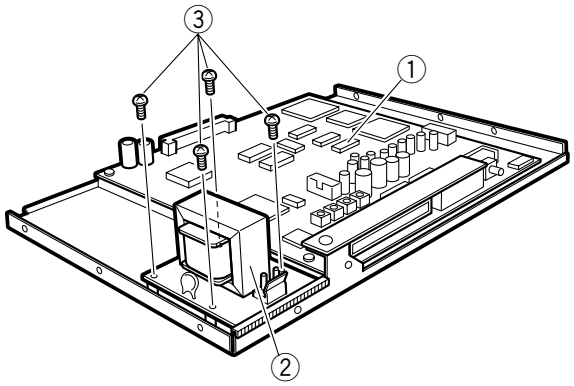
Electromagnetic and harmonic countermeasures are not provided on other voltage models installed on 220-240V model.

The following describes these parts.

1. Scanner Power PCB Assembly

Reactor ② is mounted to the side of SH CPU PCB assembly ① as part of scanner power PCB assembly.

Remove four screws ③ to remove the reactor.



① SH CPU circuit board ② Reactor
③ Screws

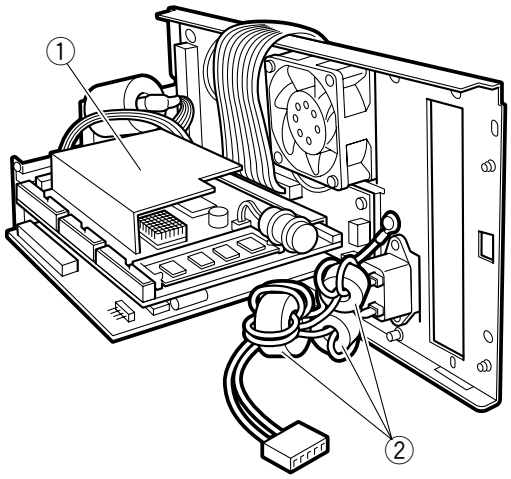
Fig. 4-601

2. Control CPU PCB Assembly

A shielded plate ① is provided as part of this PCB assembly. (Refer to Fig. 4-602.)

3. AC Inlet

A total of three noise filters ② are provided as part of the AC inlet. (Other voltage models are provided with only one.)



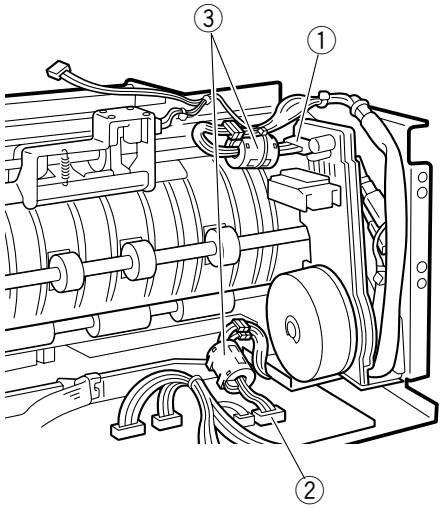
① Shielded plate ② Noise filter

Fig. 4-602

4. Cable w/ Noise Filter

Cable w/ noise filter ③ is connected to main motor connector A ① and SH CPU PCB assembly connector B ② (J106).

Disconnect the connectors, and remove the cable w/ noise filter.



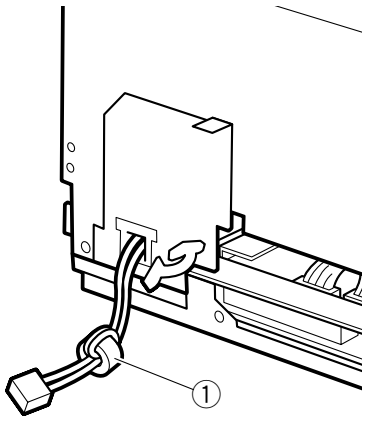
① Connector A ② Connector B
③ Cable w/ noise filter

Fig. 4-603

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

5. AC line Cable

Noise filter ① is provided for the AC line cable to which the power PCB assemblies of the scanner assembly and the control assembly are connected.



① Noise filter

Fig. 4-604

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

CHAPTER 5

INSTALLATION

This product undergoes exhaustive adjustment and testing before it is shipped from the factory.

Installation after unpacking at the field is important for demonstrating the machine's performance to be the same as when it passed factory inspections.

The service engineer must fully understand the machine's performance before installing and inspecting the machine at a suitable environment according to the described procedure.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

I. SELECTION OF LOCATION

It is recommended that the customer engineer personally inspects the customer's premises before installing any machine. The location should meet the following requirements.

■ The power supply should be connected to an outlet capable of supplying the voltage shown on the rating plate plus or minus 10%. A grounding plug must be used.

Grounding Items
1) Power outlet grounding terminal
2) Earth lead that has been grounded for office equipment

■ The temperature should be between 15 to 27.5°C (59 to 81.5°F), and relative humidity between 25 and 75% RH. In particular, do not install the machine near water faucets, humidifiers, hot water heaters, and refrigerators.

■ The machine 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 the machine.
- In applications where installation of the machine in the direct sunlight is unavoidable, a heavy curtain should be installed on the windows to protect the machine.

■ Maintain sufficient space around the machine during operation and maintenance, and to allow ventilation.
- The exhaust fan and power cord are located at the rear of the machine. So, do not push the machine against the wall.
- Allow sufficient space on both sides of the machine so that you can insert your hands to lift it up when the machine is to be moved.

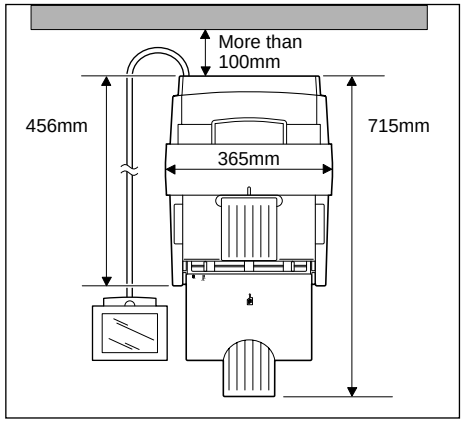
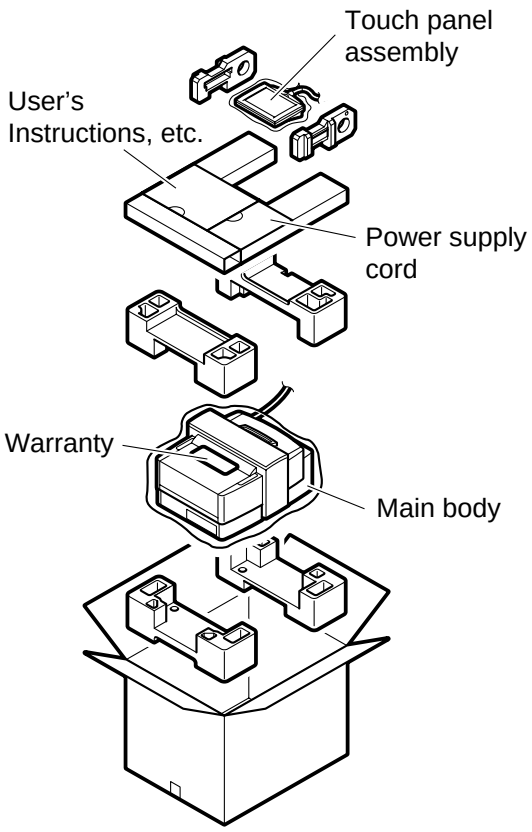


Fig. 5-1

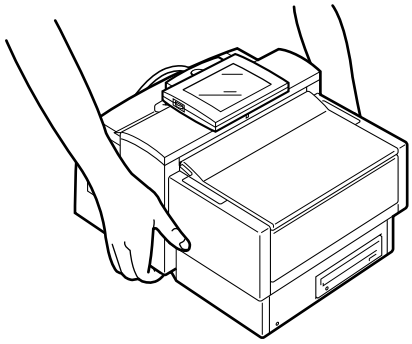
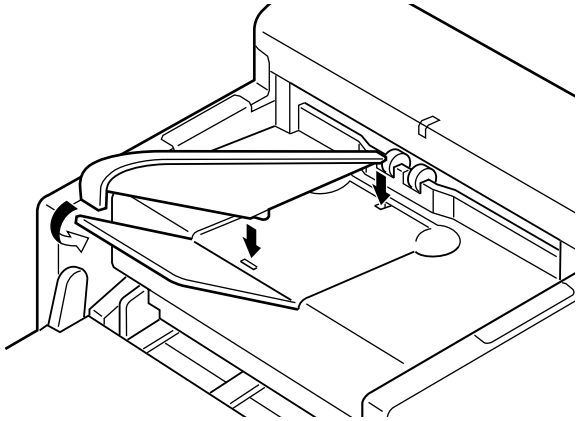
 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

II. UNPACKING & INSTALLATION

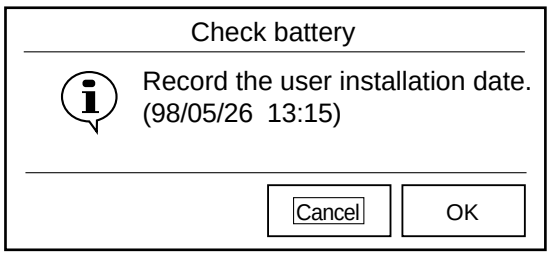
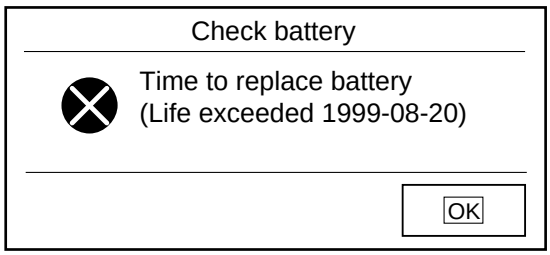
If the machine (in its shipping container) has been stored in a cold location, it should not be unpacked in a warm room until it has had time to warm up. Otherwise, moisture may condense on the metal and glass parts, resulting in trouble. At least one hour should be allowed for the machine to warm up to room temperature before the shipping container is opened.

No.	Procedure	Inspection and Remarks
1	Open the shipping container. **Note:** The container weighs about 25 kg. Its external dimensions are approx. 630 (W) x 510 (D) x 440 (H) mm. The touch panel assembly is connected to the main body by a connector cable.	
2	Take out the parts and other materials in the shipping container.	Check that the shipping container contains the following parts: • Machine (main body and touch panel assembly) • Power supply cord • Grounding wire (on 100 V machines only) • Delivery auxiliary guide • CD-R disk • Caddy • Read Me First • User's Instructions (2 volumes) • Function sheets • Warranty card (on 100, 120 V machines only) • User registration card (on 100 V machines only) • Customer service center list (on 100 V machines only)

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

No.	Procedure	Inspection and Remarks
3	Move the machine to where it is to be installed. **Note:** Place the touch panel on the main body of the machine as shown in the figure on the right, and hold the bottom center of the left and right covers with your hands. The machine weighs about 19 kg.	
4	Peel off all the filament tape securing the various parts.	Check all the covers for possible damage incurred during transportation.
5	Open the feeder assembly, and remove the protective sheet from the scanning glass assembly. **Note:** Store the protective sheet that you removed for when you move the machine by truck at a later date.	
6	Connect the power cord. **Note:** Also connect the grounding wire on 100 V models.	
7	Install the delivery auxiliary guide if necessary. The delivery auxiliary guide is effective when feeding thin, long documents.	

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

No.	Procedure	Inspection and Remarks
8	Press the POWER switch. When the "Check battery screen" is displayed, Touch on-screen [OK] button. **Note:** When the installation date has exceeded 15 months since the machine was shipped from the factory, the message "Replacement Period" is displayed. Press the [OK] button, and replace the backup battery. For details on how to replace the backup battery, refer to the backup battery item in "Chapter 4 Disassembly & Reassembly". The backup battery is consumable (Sales goods). It is not supplied as a service part.	 <Check battery screen>  <Screen displayed when 15 months has been exceeded>
9	Record a document and conduct a document search, and make sure that the machine is operating normally. **Note :** For details on operation methods, refer to this manual and the User's Instructions. If necessary, change the time and its display format in the User setup screen and the "Disk mode" setting in the service mode. Notify the user if the setup has been changed.	
10	When you have checked that operation is normal, turn the power OFF. Even if the software has crashed, follow the procedure below to make a note of the installation date in order to know when to replace the backup battery. 1) Remove the rear and top rear covers. 2) Write the installation date on the "DATE label" that is affixed to the top surface of the backup battery. 3) Reassemble parts to their original locations.	

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

III. TRANSPORTING THE MACHINE

When the machine is moved by truck to another installation site after it has been installed, carry out the following.

No.	Procedure	Inspection and Remarks
1	Remove the CD-R disk.	
2	Turn the power OFF, and remove all cords connected to the machine.	
3	Remove the delivery auxiliary guide if attached.	
4	Open the feeder assembly, and cover the scanning glass assembly with protective sheet.	
5	Close the pick-up tray.	
6	Cover the main body and touch panel assembly with protective sheet.	
7	Put the machine into the shipping container.	

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

CHAPTER 6

MAINTENANCE & SERVICING

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

I. PARTS TO BE REPLACED PERIODICALLY

Parts must be replaced periodically to maintain the machine's functions to a constant standard. The following table shows parts that must be replaced periodically (parts that greatly influence machine operation when they are no longer functional but are not externally deformed or damaged).

Preferably these parts should be replaced when periodic servicing is carried out closest to the recommended replacement cycle.

As of April 1, 1998

No.	Parts Name	Parts No.	Q'ty	Replacement Cycle (number of copies)	Remarks
1	Pick-up roller	MA2-4321	1	500,000	
2	Regist drive roller	MA2-4335	1	500,000	
3	Feed roller	MA2-4342	1	500,000	
4	Separation roller	MA2-4399	1	500,000	
5	Reader drive roller (front)	MA2-4424	1	500,000	
6	Reader drive roller (rear)	MA2-4425	1	500,000	

Table 6-1

Note: The above figures are for reference only. So, they may vary according to conditions of use.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

II. CONSUMABLE PARTS

This machine has not consumable parts.

The following table shows the backup battery that is set as a consumable (sales goods). This is replaced by the service technician.

As of April 1, 1998

No.	Parts Name	Destination	Catalog No.	Remarks
1	Backup battery	Japan	MG1-2829	Replace every two years. The replacement period is displayed on the touch panel.
2	Backup battery	Overseas	MG1-2836	

Table 6-2

Note 1: Used backup batteries must be collected and disposed of according to local bylaws. Otherwise, refer to “Chapter 1, III. PRECAUTIONS, C. Backup Battery” (page 1-7).

Note 2: For details on how to replace the backup battery, refer to the backup battery item in “Chapter 4, Disassembly & Reassembly”.

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

III. BASIC PERIODIC SERVICING PROCEDURE

Note: Before you visit the user site for periodic servicing, check the Service Ledger, and take any parts that you expect need to be replaced.

No.	Procedure	Inspection	Remarks
1	Pay your respects to the supervisor.	Check current status (including log information).	
2	Place the CD-R disk that you took with you, and record a document and conduct a document search.	• Document feed • Results of document record & search • Abnormal noise	Make sure that you take a CD-R disk for use in servicing with you to the user site.
3	Replace parts (only when necessary).		
4	Clean the document feed assembly and optical assembly.		
5	Re-check the results, and record a document and conduct a document search again.		
6	Clean around the machine.		
7	Make any required entries into the Service Sheet, and report to the supervisor.		

Table 6-3

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

IV. PERIODIC SERVICING LIST

Note: Use only the specified solvents and oils. Do not use other solvents and oils.

[△: Cleaning ●: Replacement ☆: Oiling □: Adjustment ◎: Inspection]

Unit Name	Location	Maintenance Cycle			Remarks
		At Installation	Whenever Required	Every 250,000 Sheets	
Document Feed Assembly	Pick-up roller			△	Wipe with a cloth moistened with water, and then wipe dry.
	Regist drive roller			△	
	Feed roller			△	
	Separation roller			△	
	Scanner guide roller (front)			△	
	Scanner guide roller (rear)			△	
Optical assembly	Scanning glass			△	

Table 6-4

Note 1: Be sure to clean the rollers while turning them into the direction of document feed.
Note 2: If the rollers are very dirty, instruct the user to perform “Daily User Inspection” again.

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

CHAPTER 7

TROUBLESHOOTING

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

I. ERROR DISPLAYS & COUNTERMEASURES

A. Outline

Messages are displayed on the touch panel if an error occurs on this machine. Table 7-1 shows a list of error messages. This list includes errors that are countermeasured by the user and displays for confirming of operations also.

Errors that can be countermeasured by the user (e.g. operator errors) are countermeasured by the user.

Errors that cannot be countermeasured by the user must be countermeasured by the service technician referring to this manual.

Errors that occur can be recorded and displayed in the service mode. For details, refer to "V. Service Mode".

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

1. Basic Countermeasure

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

1) Check the display, and touch the OK button. The error display disappears.
2) Make sure that operation was not wrong or that an unauthorized disk 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, touch 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, jump to step 9.
7) If the system starts up normally by carrying out the same operation, shut down the system 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.

9) If the system cannot be shut down in the normal way, press the reset switch to shut down the system. However, the service engineer can disconnect the power cord instead of pressing the reset switch. If the software is normal, the system can be shut down with the backup battery running. If the screen does not disappear after two minutes, press the reset switch.
10) Press the power switch to restart the system.
11) If the system starts up normally by carrying out the same operation, continue to use the system as it is and see what happens.
12) If the same error is still displayed by carrying out the same operation, press the reset switch to shut down the system.

From here on, the service technician should carry out the procedure.

2. "Disk Fault"

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

1) When the disk is subjected to vibration or shock during recording of data (This destroys the data.)
2) When a disk that was created (e.g. formatted, data recorded) on another unit such as a personal computer is used
3) When a scratched or dirty disk is used

Note: Disks whose data is damaged due to scratches on the disk cannot be repaired.

3. "Disk Cleaning"

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

4. "Re-installing the Software"

Software must be re-installed if the software crashes. For details, see "VI. Re-installing the Software".

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

5. “Data Playback”

“Data Playback” refers to the disk data save function that is automatically executed when an error occurs. Actual “Data Playback” function is the same as disk copy. However, in the case of a disk that is set to the standard mode, all data can not be played back. For details, see the User’s Manual.

For details, see “Chapter 3. IV C. Backup Mode” or the User’s Instructions.

6. Replacing Parts and Checking Connections

For details on replacing parts and disassembling to check connections, refer to “Chapter 4, Disassembly and Reassembly”.

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

B. LIST OF ERROR MESSAGES

No.	Messages	Description and Countermeasures
0	Unexpected error occurred.	Normally, this error does not occur, for example, when the CD-R drive does not support packet writing. If this error is not remedied by “Basic Countermeasure,” the software may be restored by “Re-installing the software”. However, how to remedy such an error at the field is basically unknown.
1	Invalid compression type.	The image could not be displayed as the image data compression method is different. A probable cause is “Disk fault”. Touch the [OK] button, and eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning” it.
4	File of same name already exists.	An attempt was made to change the name of a cabinet, for example, however it could be changed since the same name exists. Touch the [OK] button, and set a different name.
6	Cannot find file.	An attempt was made to open or delete a cabinet. However, this was not possible the cabinet does not exist on the disk. A probable cause is “Disk fault”. Touch the [OK] button, and eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”.
10	CD-R drive not found. System will shut down.	The CD-R drive could not be identified. If you touch the [OK] button, the power automatically turns OFF. Turn the power ON again. If the same error re-occurs, turn the power OFF, and check the CD-R drive connection. Also, check the disk for any abnormalities. If you cannot find any abnormalities, replace the CD-R drive.
11	Could not make directory.	An attempt was made to create a new cabinet. However, this was not possible. A probable cause is “Disk fault”. Touch the [OK] button, and eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”.
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. A probable cause is a faulty disk. Touch the [OK] button, and eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”. If special characters in the preset language were used when that name was created, and the currently preset language is different, change the name to one that can be read by the current language setting.
16	Cannot read specified file.	The image data could not be read as the recording format is different. A probable cause is “Disk fault”. Touch the [OK] button, and eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”.
18	Illegal volume label.	An attempt was made to use illegal characters (e.g. “+”, “=”, etc) in the disk name. Or, a 2-byte character was entered from the 8th to the 9th byte. Touch the [OK] button and enter the name correctly.
19	No paper on pick-up tray.	There was no paper on the pick-up tray when recording was started in the automatic pick-up mode. Touch the [OK] button, and start recording after placing a document on the pick-up tray.

Table 7-1 (continued)

No.	Messages	Description and Countermeasures
20	Open feeder and remove paper.	A paper jam occurred. Touch the [OK] key, open the feeder assembly and remove the document.
21	Close feeder.	The feeder assembly was open when the machine was started up or recording was started. Touch the [OK] button, and close the feeder assembly. When the feeder assembly is open, the DC power of the scanner assembly is cut and the machine cannot be operated.
22	Scanner not connected, or power not ON. Quit operation.	Communications with the scanner are not possible. When you touch the [OK] button, the power is automatically turned OFF. Check the scanner internal cable connections, and the signal and power supply cable connections between the scanner assembly and cntrol assembly. If there is nothing wrong with the connections, see “III. Operation Trouble” described later on. This error sometimes occurs when a momentary power interruption occurs.
23	File access failed.	Normally, this error does not occur, for example, when a folder at the continuous recording destination is already in use when recording is carried out. If this error is not remedied by “Basic Remedy,” a probable cause is a faulty disk. Touch the [OK] button, and eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”. If the same error re-occurs even though no abnormality was found on the disk, re-install the software, and carry out “Re-installing the software”.
28	Fields’ length are too long. Please shorten for xx characters.	The characters (64 including extenders) in a preset field exceed the specified number by xx characters. Touch the [OK] button, and reduce the number of characters of the field to be set or the already set field.
30	Not enough free space on disk. Prepare for the new disk.	The remaining amount of disk space has fallen below 60 MB. Touch the [OK] button, and prepare a new disk. Data can be recorded until the remaining amount of disk space has fallen to 40 MB.
33	Possible disk errow. Replace with new disk.	A disk that cannot be used on the CD-4046, for example, a disk created on a personal computer was inserted. Or, reading from such a disk was not possible. When you touch the [OK] button, the disk is automatically ejected. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”.
38	Could not copy.	An attempt was made to copy a disk. However, writing to disk was not possible. A probable cause is “Disk fault.” Touch the [OK] button, and eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”. Sometimes an illegal file name is used in the copy operation.
40	Copying canceled.	Copying was canceled by the user midway. Touch the [OK] button.
43	Invalid path or file name.	An attempt was made to use illegal characters in a name when creating a cabinet. Touch the [OK] button, and use the correct characters. This error will not occur if the characters displayed on the CD-4046 keyboard screen are used.
50	Fan or RESET switch may not be functioning properly. Now starting shutdown.	The exhaust fan or reset switch is in error. If the exhaust fan is rotating normally, a probable cause is a faulty reset switch connection. The power automatically is turned OFF several seconds after this error is displayed. Check the exhaust fan or reset switch connections. If no abnormalities are found, replace each of these parts.

Table 7-1 (continued)

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

No.	Messages	Description and Countermeasures
54	Cannot write to this disk.	An attempt was made to copy a disk. However, data could not be written to the copy destination disk. A probable cause is “Disk fault”. Touch the [OK] button, and eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”.
55	Not enough free disk space. Copy to new disk again.	The copy destination disk ran out of space during disk copying. When you touch the [OK] button, a dialog box appears to ask if you if you want to copy to another disk. Touch the [OK] button again, and insert a new disk. This error will not occur if you use a disk having the same amount of free space, and management on the original and the copied disk is correct.
57	Time to replace battery.	The life of the backup battery (2 years) has been exceeded. Though you can continue operations if you touch the [OK] button, this error will be displayed each time that the power is turned ON. Quickly replace the battery (preferably within one week).
62	Could not read recording mode information from this image.	The recording mode information could not be read from this image data. A probable cause is “Disk fault”. Touch the [OK] button to eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning.”
63	Not enough free disk space. Further recording is not possible. Please close the session.	The remaining amount of disk space has fallen below 40 MB. Further recording is no longer possible. Touch the [OK] button, close the session and eject the disk. Replace with a new disk.
71	Recording possible only if multiple/job document is selected in Search Results Screen.	Either a document is not selected in Search Results Screen, or an attempt has been made to record a cabinet, folder or single/job document. In the Search Results Screen, continuous recording is possible only on multiple/job documents. Touch the [OK] button, and carry out the correct operation.
73	Cannot delete cabinet as it is not empty.	The cabinet that you are trying to delete could not be deleted as it contains folders or documents. Touch the [OK] button, and carry out the correct operation.
74	Cannot delete folder as it is not empty.	The folder that you are trying to delete could not be deleted as it contains documents. Touch the [OK] button, and carry out the correct operation.
75	The settings of CD-R Drive are in error.	The CD-R drive setting differs from the actually mounted CD-R drive. Touch the [OK] button. If the same error occurs, turn the power OFF, and check the CD-R drive. Also, check the disk for any abnormalities.
76	Disk I/O Error.	Something on the CD-R drive side prevented recording to or reading from the CD-R drive from being executed. Touch the [OK] button. If the same error occurs, turn the power OFF, and check the CD-R drive. If no abnormalities are found, replace the CD-R drive.
78	Failed to eject disk. Press button of CD-R drive.	An attempt was made to eject the disk. However, this was not possible. A probable cause is “Disk fault”. Touch the [OK] button, and press the eject button on the CD-R drive to eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”.

Table 7-1 (continued)

No.	Messages	Description and Countermeasures
83	Not enough free disk space. Cannot close session.	The session could not be closed as there was not enough free disk space. Touch the [OK] button, and eject the disk without closing the session. This error does not occur as long as the disk was created only on the CD-4046.
86	File with illegal file name exists. Session close was canceled.	An attempt was made to close the session. However, this was not possible as an illegal name existed on the disk. Touch the [OK] button, and eject the disk without closing the session. This error does not occur as long as the disk was created only on the CD-4046. If special characters in the preset language were used when that name was created, and the currently preset language is different, change the name to one that can be read by the current language setting.
94	Corrected backup information.	If the user cancels or interrupts the power supply while data is in the process of being backed up, data is sometimes saved in an incomplete state to hard disk. When the system is next started up, delete this incomplete data. This error is only recorded to a log, and is not displayed on the user screen.
95	Could not write document successfully to disk.	A mismatch was found in the data as a result of comparing backup data recorded to hard disk after end of recording. If you touch the [Retry] button, the backup data is written to disk. If you touch the [Cancel] button, writing of that document is canceled, and processing advances to comparison with the next document. If you touch the [Cancel all] button, comparison of all documents is canceled. A probable cause is “Disk fault”. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”. If the disk is scratched or damaged, copy the data to a new disk.
97	Could not lock CD-R drive button.	A disk is inserted. So, an attempt was made to lock disk ejection by the CD-R drive eject button. However, this was not possible. Touch the [OK] button, eject the disk and insert the disk again. If the same error occurs, a probable cause is “Disk fault”. Touch the [OK] button, and eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”. Also, check the caddy. If no abnormalities are found, replace the CD-R drive.
98	Could not unlock CD-R drive button.	An attempt was made to eject the disk. However, this was not possible. As the CD-R drive eject button is ineffective, the disk cannot be ejected by pressing this eject button. Though the software is normal, regular shutdown is not possible. Touch the [OK] button, and then disconnect the power cord to turn the power OFF in the same way as for a power interruption. If you press the power switch again, the disk will be ejected automatically. Even if this does not eject the disk, eject the disk manually with the power turned OFF. For details, see “Chapter 3. Functions and Operations, IX. Layout of Electrical Parts.”
99	Cannot copy Retry?	A disk read or write error occurred while a disk copy or backup was in progress. If you touch the [Retry] button, the copy is executed again. If you touch the [Cancel] button, copying of only the file where the error occurred is canceled, and processing advances to copying of the next files. If you touch the [Cancel all] button, copying of all files is canceled. A probable cause is “Disk fault”. Touch the [OK] button, and eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”. **Note:** This is recorded as a “file copy error” in the log.

Table 7-1 (continued)

No.	Messages	Description and Countermeasures
104	Cannot read field setting.	An attempt was made to read from the field setup file currently recorded on the disk. However, this was not possible. A probable cause is “Disk fault”. Touch the [OK] button, and eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”.
105	Cannot write field setting.	An attempt was made to write to the field setup file currently recorded on the disk. However, this was not possible. A probable cause is “Disk fault”. Touch the [OK] button, and eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”.
106	Bad disk.	A disk is inserted. So, an attempt was made to read the data on the disk. However, this was not possible. A probable cause is “Disk fault”. Touch the [OK] button, and eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”. If the same error re-occurs even with the disk inserted again, the disk data may be destroyed. If the data is saved to hard disk, copy the data to a new disk.
107	Could not start session.	An attempt was made to start the session. However, this was not possible as the disk has been subjected to impact, and is scratched. If you touch the [OK] button, disk copy is started. So, insert a blank disk. Use the copied disk as the original.
108	Failed to write data.	An attempt was made to write data to disk from memory on the control CPU PCB assembly. However, this was not possible as the disk has been subjected to impact, and is scratched. If you touch the [OK] button, “Data playback” sometimes is started. In this case, insert a blank disk, and use the played back disk as the original. If “Data playback” is not started, eject the disk, and make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”.
109	Could not close session. Starting to restore data.	An attempt was made to close the session. However, this was not possible as the disk has been subjected to impact, and is scratched. If you touch the [OK] button, “Data playback” is started. So, insert a blank disk. Use the played back disk as the original.
111	Could not make backup.	An attempt was made to back up data from the disk. However, this was not possible because of an illegal file name at the backup source, not enough disk space at the backup destination or a disk error. A probable cause is a “Disk fault”. Touch the [OK] button, and eject the disk. Make sure that the disk is suitable. If the disk is dirty, carry out “Disk cleaning”. If special characters in the preset language were used when that name was created, and the currently preset language is different, change the name to one that can be read by the current language setting.
112	Power OFF detected on scanner. Quit operation.	The scanner assembly power was momentarily cut and supplied again. When you touch the [OK] button, the same shutdown processing as for a power interruption is automatically carried out. If the power interruption lasted for about one second or more, the display that appears when the power supply has been cut is displayed. If the disk was inserted, the disk will be automatically ejected when the power is turned ON again. If the same error occurs, check the scanner assembly connections.

Table 7-1 (continued)

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

No.	Messages	Description and Countermeasures
113	Could not write document successfully to disk. Not enough free disk space.	A mismatch was found in the data as a result of comparing backup data recorded to hard disk after end of recording. Also, data could not be written to disk as there was not enough free space. Touch the [OK] button, close the disk session and eject the disk. Record the document to another disk.
114	Could not make backup.	This error is displayed when the [Cancel] button is touched as an error occurs even if the [Retry] button is touched to copy the document again after error No.99 is displayed when you recording continuously in the standard mode. A probable cause is “Disk fault” or HDD fault. The software is probably normal.
117	Cannot continue to use this disk. Make copy.	A fatal error occurred during writing of data to disk. A probable cause is “Disk fault.” When you touch the [OK] button, “Data playback” starts. So, insert a blank disk. Use the played back disk as the original.
124	Power supply cut. Now starting shut down.	The AC power was shut off due to a power interruption, for example. Shutdown processing is automatically carried out. If a power interruption occurred, wait for the power to be restored. If the cause is not a power interruption, implement “III. Operation trouble 1. AC Power Does Not Turn On”.

Table 7-1 (continued)

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

C. Other Error Displays

The following describes screens displayed on the touch panel that allow you to judge the details of the error in addition to those described in "B. Error Message List".

Note: Check Reproducibility
Before you carry out the countermeasure described in this section, follow the procedure below unless specified otherwise to check that the error can be reproduced. Carrying out this procedure sometimes automatically repair the error.

1) Disconnect the power cord, and turn the power OFF.
2) The backup battery starts working, and shutdown processing is automatically carried out.

Note: If shutdown processing is not carried out, Push the reset switch to turn the power OFF.

3) After shutdown processing has ended, wait about 10 seconds.
4) Turn the power ON again, and see if the same state occurs.
5) If normal operation is returned to, continue use as it is and see what happens.

1. "Black Screen"

- Description
  The screen remains black even a few minutes after the power is turned ON.
- Cause
  Probable causes are a faulty power supply, LCD or software bug.
- Remedy

1) Push the reset switch to turn the power OFF.

Note: Don't push the reset switch, while the HDD or CD-R drive is operating.

2) Carry out "III. Opration trouble, 3. Software does not run".

2. "Frozen Screen"

- Description
  The screen is not switched even if an operation is carried out. Or, operations cannot be carried out.
- Cause
  Probable causes are a faulty touch panel or software bug.
- Remedy

1) Disconnect the power cord, and turn the power OFF.
2) Carry out step 4 onwards in procedure "III. Operation trouble, 3. Software does not run" and "4. Touch panel does not work".

3. "Safe Mode Screen"

- Description
  The letters "Safe mode" are displayed in the four corners of the screen. (See Fig. 7-1)
- Cause
  The software could not be started up.
- Remedy

1) Wait a few minutes before disconnecting the power cord and turning the power OFF.
2) Carry out step 4) onwards in procedure "III. Operation trouble, 3. Software does not run".

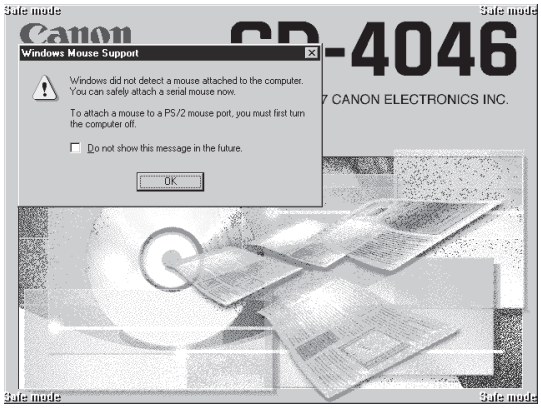


Fig. 7-1

4. “Blue Screen”

- Description
  The entire screen is blue. Text indicating status or an instruction is sometimes displayed.
- Cause
  A probable cause is a Windows95-related bug,
- Remedy

1) Follow the on-screen instruction. To carry out key operations, first connect a keyboard to the CD-4046.

Note 1: For details on how to connect the keyboard, see “V. G. Calibrating the Touch Panel” described later.

Note 2: If an instruction is not displayed or operations are not possible:
Disconnect the power cord, and turn the power OFF.

Note 3: Carry out step 4 onwards in procedure “III. Operation trouble, 3. Software does not run”.

5. “ScanDisk Screen”

- Description
  The [ScanDisk screen] is displayed, and you can hear the sound of the HDD operating. (See Fig. 7-2)
- Cause
  A probable cause is that the system could not be shut down correctly.
- Remedy
  The [Main screen] will automatically be displayed (after a few minutes). Do not turn the power OFF. Wait with the ScanDisk screen still displayed.

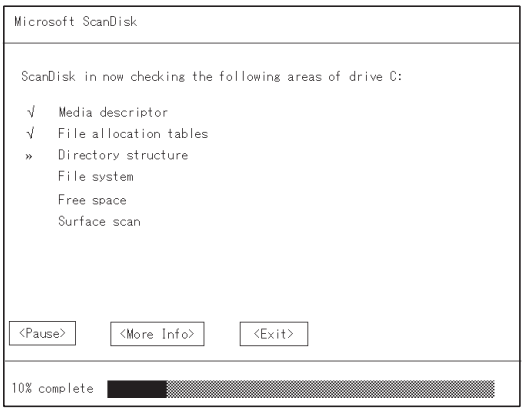


Fig. 7-2

6. “Error Dialog Box”

- Description
  The Error dialog box is displayed. (See Fig. 7-3)
- Cause
  Probable causes are that an illegal operation was carried out or a software fault.
- Remedy

1) Touch the [Close] button.
2) Wait a few minutes before disconnecting the power cord and turning the power OFF.
3) Carry out step 4 onwards in procedure “III. Operation trouble, 3. Software does not run”.

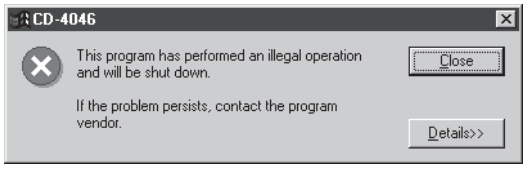


Fig. 7-3

7. “Power Interruption Screen”

- Description
  The [power interruption screen] is displayed. (See Fig. 7-4)
- Cause
  The AC power was shut off due to a power interruption, for example.
- Remedy

1) Shutdown processing is automatically carried out.
2) If a power interruption occurred, wait for the power to be restored.
3) If the cause is not a power interruption, implement “III. Operation trouble 1. AC Power does not turn ON”.

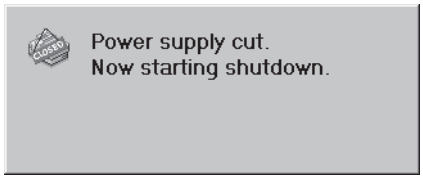


Fig.7-4

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

8. "Phoenix SETUP screen"

- Description
  The [Phoenix SETUP screen] is displayed. See Fig. 7-5.)
- Cause
  Probable causes are that an illegal operation was carried out or a software fault.
  This occurs when the software BIOS setup is reset.

Memo: BIOS stands for Basic Input Output System.

- Remedy

1) Connect the keyboard to the CD-4046.

Note: For details on how to connect the keyboard, see "V. G. Calibrating the Touch Panel" described later.

2) Set the items as indicated in Figs. 7-5, 7-6 and 7-7 by the keyboard.
   Items whose setting is as shown on the displays need not be changed.
   Set the time to the present time. Other key operations should follow the on-screen instructions.
   To move between items, use the [↑] or [↓] keys. To change items, use the [+] or [–] keys. To scroll the screen, use the [Page Down] or [Page Up] keys.

3) When you have finished setting the items, press the [Esc] key to display the Exiting SETUP screen.
4) Press the [F4] key to automatically start startup.
5) If other setup screens are displayed before the Main screen is displayed, implement step 11 onwards in procedure "VI. 3. Re-installation Procedure".

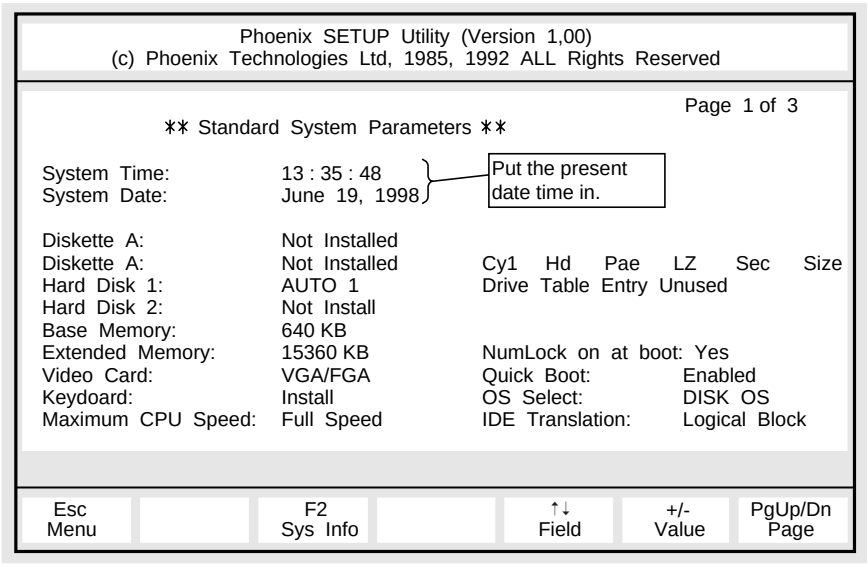


Fig. 7-5

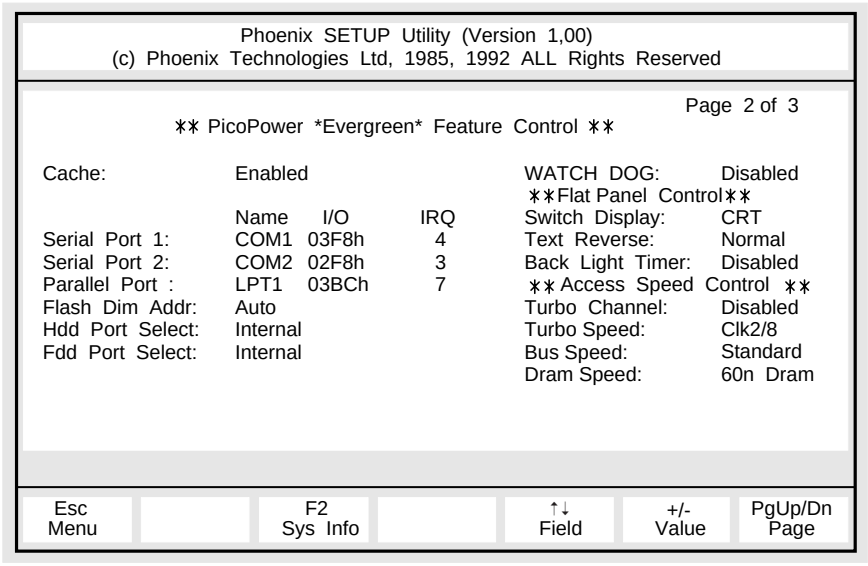


Fig. 7-6

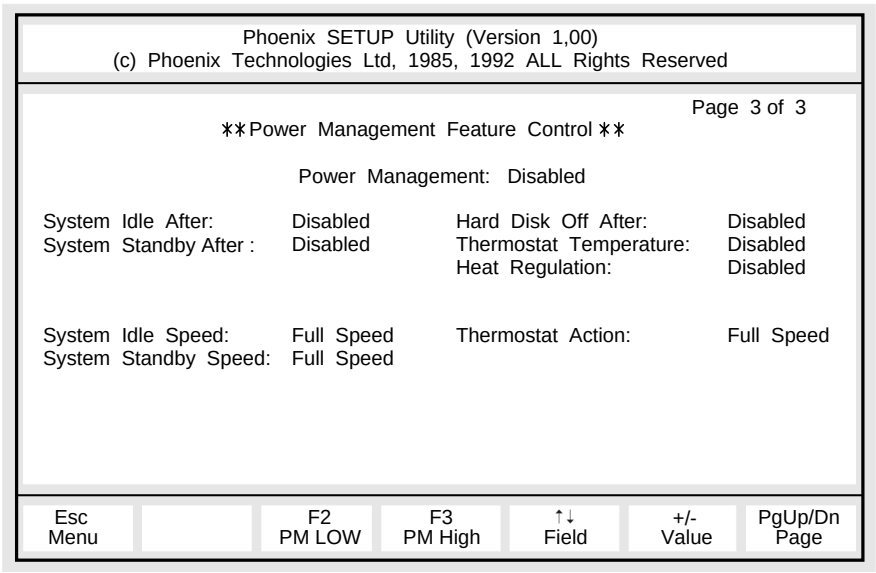


Fig. 7-7

D. Clearing Document Jams

1) Remove the document from the delivery tray. Remove the delivery auxiliary guide if it is attached and close the delivery tray guide.

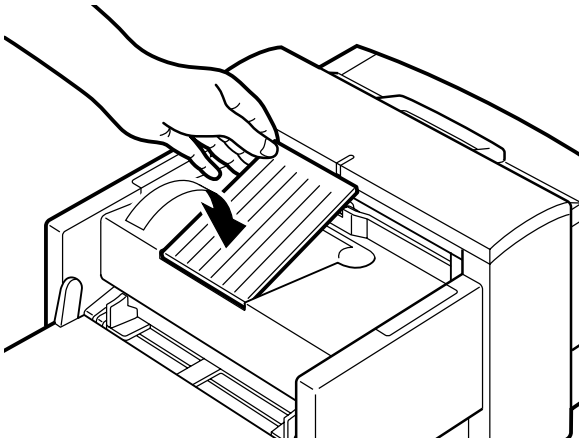


Fig. 7-8

2) Gently open the feeder assembly taking care not to apply shock to the body.

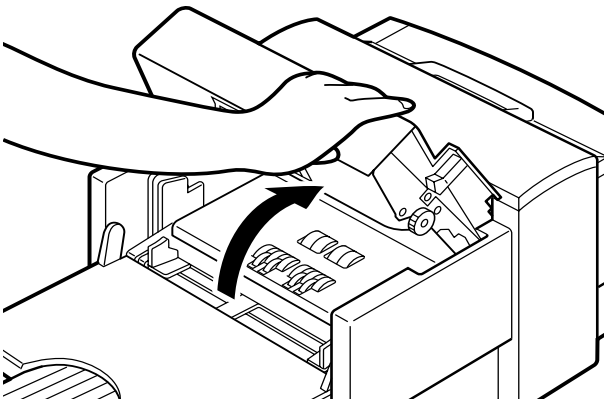


Fig. 7-9

3) Remove the jammed document taking care not to rip it.

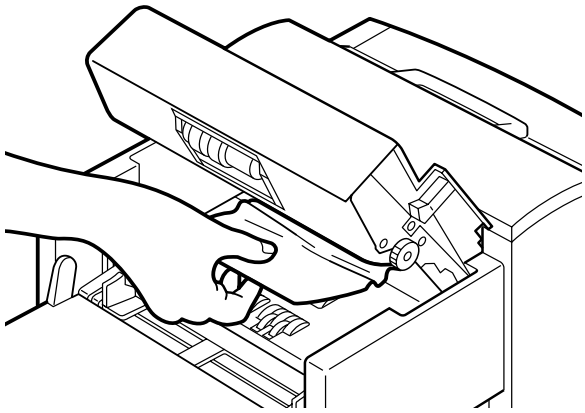


Fig. 7-10

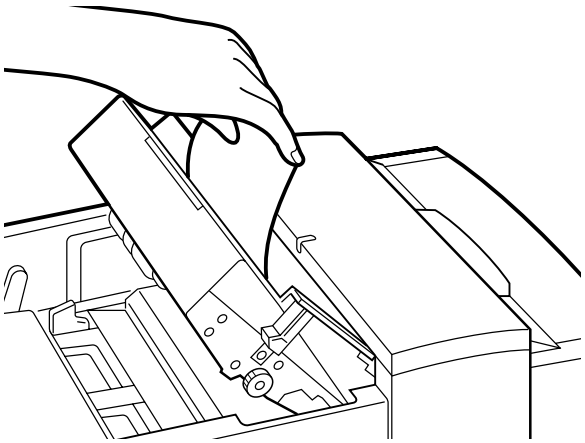


Fig. 7-11

4) Gently close the feeder assembly taking care not to apply shock to the body.

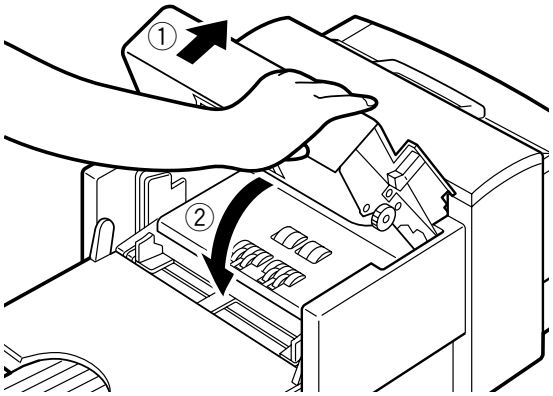


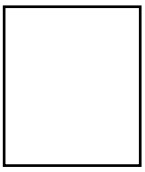
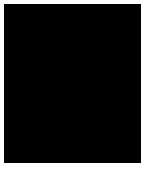
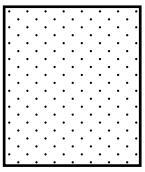
Fig. 7-12

Note: Check the recorded document.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

II. IMAGE TROUBLE

1	Images are not output (white blank, black blank, spotted)

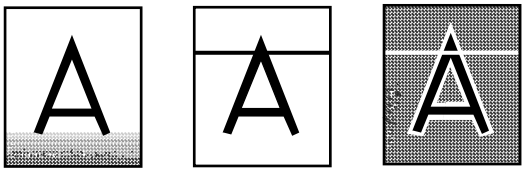




Cause/Location	Step	Check Item	Result	Countermeasure
Recording setup item "brightness"	1	Is the "brightness" setting correct?	NO	Change the setting.
Guide glass	2	Is the guide glass dirty?	NO	Clean the glass. Also clean the rollers if necessary.
BASIS cable	3	Is the cable connected to connector J402 on the BASIS drive PCB assembly on the trouble side?	NO	Firmly connect.
LED for illuminating document	4	Does the LED on the trouble side light?	NO	Carry out the checks in "LED does not light."
Scanner unit	5	Will replacing the scanner unit on the trouble side remedy the trouble?	YES	End.
Control assembly connections	6	Is the connector on the control assembly firmly connected?	NO	Firmly connect.
SH CPU PCB assembly	7	Will replacing the SH CPU PCB assembly remedy the trouble?	YES	End.
CD-R drive			NO	Replace the CD-R drive.

Note: If images are not output due to damage on the disk, the data cannot be recovered.

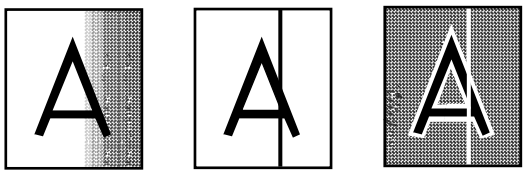
CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

2 Uneven image density, lines (horizontal direction)



Cause/Location	Step	Check Item	Result	Countermeasure
Guide glass	1	Is the guide glass of the scanner unit dirty?	YES	Clean the glass. Also clean the rollers if necessary.
Connectors	2	Are connectors J108 and J109 on the SH CPU PCB assembly firmly connected?	NO	Firmly connect.
SH CPU PCB assembly			YES	Replace the SH CPU PCB assembly.

3 Uneven image density, lines (vertical direction)



Cause/Location	Step	Check Item	Result	Countermeasure
Is the guide glass dirty?	1	Is the guide glass of the scanner unit dirty?	YES	Clean the glass. Also clean the rollers if necessary.
Shading compensation	2	Will retrying shading compensation remedy the trouble?	YES	End
SH CPU PCB assembly	3	Will replacing the SH CPU PCB assembly remedy the trouble?	YES	End
Scanner unit			NO	Replace the scanner unit on the trouble side.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

III. OPERATION TROUBLE

1	AC power does not turn ON

Cause/Location	Step	Check Item	Result	Countermeasure
Power plug	1	Is the power plug inserted in the outlet?	NO	Insert the power plug.
Power voltage	2	Is the rated power voltage being supplied to the power outlet?	NO	Explain to the user that this is not machine trouble.
Power cord	3	Is electricity passing through the power cord properly?	NO	Replace the power cord.
AC inlet	4	Is the rated voltage being supplied to connector CN1 on the CD-R power supply PCB assembly?	NO	Check the wiring from the AC inlet to connector CN1 on the CD-R power supply PCB assembly. If there is no problem, replace the AC inlet.

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

2	DC power does not turn ON

Cause/Location	Step	Check Item	Result	Countermeasure
AC power supply	1	Does LED (D317) on the CD-R power supply PCB assembly light?	NO	Carry out the check items of "AC power does not turn ON."
Wiring & connections	2	Does the power indicator LED (LED1) on the top cover light?	NO	Check the wiring from connector CN2 on the CD-R power supply PCB assembly to the power indicator LED (LED1) via the scanner power supply PCB assembly.
			YES	As +5V is being supplied to the SH CPU circuit board, check other power supply lines according to the procedure below.
CD-R power supply PCB assembly	3	Do the LEDs (D101: +5V, D102: +12V) on the back plane PCB assembly light?	NO	Check the wiring from connector CN101 on the back plane PCB assembly to connector CN6 on the CD-R power supply PCB assembly. If there is no problem, replace the CD-R power supply PCB assembly.
			YES	As +5V and +12V are being supplied to the back plane PCB assembly, check other power supply lines according to the procedure below.
Feeder assembly	4	Is the feeder assembly properly closed?	NO	Close the feeder assembly.
Feeder assembly open/close switch (SW2)	5	Does the multimeter read approximately 24V when the ⊕ and the ⊖ probes of the multimeter set at the 50 VDC range are connected respectively to connectors CN4-3 and CN4-1 on the scanner power supply circuit board and the power is turned ON with the feeder assembly open?	YES	Check the wiring or switches from connector CN4 on the scanner power supply PCB assembly up to the feeder assebmly open/close switch (SW2). If there is a problem, repair the wiring or replace the parts.

<table>
<tr><th>Cause/Location</th><th>Step</th><th>Check Item</th><th>Result</th><th>Countermeasure</th></tr>
<tr><td>SH CPU PCB assembly</td><td rowspan="2">6</td><td rowspan="2">Connect the multimeter probes to the connectors on the scanner power supply PCB assembly shown below with the multimeter set at the 50 VDC range. Are the specified voltages output?
<table><tr><th>Connector</th><th>Terminal</th><th>Voltage</th></tr><tr><td rowspan="2">CN3</td><td>2 ⊕
1 ⊖</td><td>+24V</td></tr><tr><td>4 ⊕
3 ⊖</td><td>+5V</td></tr><tr><td rowspan="2">CN2</td><td>1 ⊕
2 ⊖</td><td>+12V</td></tr><tr><td>3 ⊕
4 ⊖</td><td>–12V</td></tr></table></td><td>YES</td><td>Check the wiring from the scanner power supply PCB assembly up to the SH CPU PCB assembly. If there is no problem, replace the SH CPU PCB assembly.</td></tr>
<tr><td>Scanner power supply PCB assembly</td><td>NO</td><td>Replace the scanner power supply PCB assembly.</td></tr>
<tr><td>CD-R power supply PCB assembly</td><td rowspan="2">7</td><td rowspan="2">Connect the multimeter probes to the connectors on the CD-R power supply PCB assembly shown below with the multimeter set at the 30 VDC range. Are the specified voltages output?
<table><tr><th>Connector</th><th>Terminal</th><th>Voltage</th></tr><tr><td rowspan="2">CN7</td><td>1 ⊕
2 ⊖</td><td>+12V</td></tr><tr><td>4 ⊕
3 ⊖</td><td>+5V</td></tr><tr><td rowspan="2">CN8</td><td>1 ⊕
2 ⊖</td><td>+12V</td></tr><tr><td>4 ⊕
3 ⊖</td><td>+5V</td></tr></table></td><td>YES</td><td>Check the wiring from the CD-R power supply PCB assembly up to the HDD and CD-R drives. If there is a problem, repair the wiring.</td></tr>
<tr><td>Wiring & connections</td><td>NO</td><td>Replace the CD-R power supply PCB assembly.</td></tr>
</table>

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

3	Software does not run

<table>
<tr><th>Cause/Location</th><th>Step</th><th>Check Item</th><th>Result</th><th>Countermeasure</th></tr>
<tr><td>AC power supply</td><td>1</td><td>Does LED (D317) on the CD-R power supply PCB assembly light?</td><td>NO</td><td>Carry out the check items of “AC power does not turn ON.”</td></tr>
<tr><td rowspan="4">DC power supply</td><td rowspan="2">2</td><td rowspan="2">Do the LEDs (D101: +5V, D102: +12V) on the back plane PCB assembly light?</td><td>YES</td><td>DC power is supplied to the back plane PCB assembly. Carry out the procedure from step 4 onwards.</td></tr>
<tr><td>NO</td><td>Check the wiring from connector CN101 on the back plane PCB assembly up to connector CN6 on the CD-R power supply PCB assembly. If there is a problem, repair the wiring.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Connect the multimeter probes to the connectors on the CD-R power supply PCB assembly shown below with the multimeter set at the 30 VDC range. Are the specified voltages output?
<table><tr><th>Connector</th><th>Terminal</th><th>Voltage</th></tr><tr><td rowspan="2">CN6</td><td>1 ⊕
3 ⊖</td><td>+12V</td></tr><tr><td>2 ⊕
3 ⊖</td><td>+5V</td></tr><tr><td rowspan="2">CN7</td><td>1 ⊕
2 ⊖</td><td>+12V</td></tr><tr><td>4 ⊕
3 ⊖</td><td>+5V</td></tr></table></td><td>YES</td><td>Replace the back plane PCB assembly.</td></tr>
<tr><td>NO</td><td>Replace the CD-R power PCB assembly.</td></tr>
<tr><td>Wiring & connections (HDD related)</td><td>4</td><td>Is the wiring from the back plane PCB assembly up to the control CPU PCB assembly and HDD faulty?</td><td>YES</td><td>Repair faulty location.</td></tr>
<tr><td>HDD (including software)</td><td>5</td><td>Is the HDD emitting normal operating sounds?
Or, can you hear the buzzer on the control CPU PCB assembly sound once?
Note: If you hear the buzzer sounding continuously twice or more, a probable cause is a faulty HDD.</td><td>NO</td><td>Check the wiring from connector CN7 on the CD-R power supply PCB assembly up to the HDD. If there is no problem, carry out “Re-installing the software” or replace the HDD.
For details, see “VI. Re-installing the Software”.</td></tr>
</table>

Cause/Location	Step	Check Item	Result	Countermeasure
Wiring & connections (LCD related)	6	Is the wiring from the back plane PCB assembly up to the display PCB assembly, inverter PCB assembly and LCD faulty? **Note:** A high voltage flows to connector CN2 on the inverter PCB assembly. Do not touch this connector when the power is turned ON.	YES	Repair faulty location.
Inverter PCB assembly	7	Does the backlight light? **Note:** When the backlight is lit, the screen is a dark blue. When the backlight is out, the screen is black.	NO	Replace the inverter PCB assembly.
Display PCB assembly	8	Will replacing the LCD remedy the trouble?	NO	Replace the display PCB assembly.
LCD				
Control CPU PCB assembly	9	Will replacing the control CPU PCB assembly remedy the trouble?	YES	End.
Software			NO	“Re-install the software”.

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

4 Touch panel does not work

Cause/Location	Step	Check Item	Result	Countermeasure
Wiring & connections	1	Is the wiring from the touch panel up to the display PCB assembly faulty?	YES	If the connections are faulty, firmly connect the connectors. If the cable is faulty, replace the touch panel.
Position calibration	2	Does the touch panel work if you touch about 5 mm away from the center of the operation button?	YES	Touch a position about 5 mm away from the center of the operation button to enter the service mode. Execute Touch Panel in the service mode. For details, refer to "V. Service Mode".
			NO	Connect the keyboard, and execute "Position calibration". For details, refer to "V. Service Mode".
Touch panel	3	Will replacing the touch panel remedy the trouble?	YES	End.

5 Pick-up clutch (CL1) does not work

Cause/Location	Step	Check Item	Result	Countermeasure
Pick-up clutch (CL1)	1	Does the multimeter read approximately 24V when the ⊕ and the ⊖ probes of the multimeter set at the 50 VDC range are connected respectively to connectors J106-A1 and J106-A2 on the SH CPU PCB assembly, and the document board motor (M2) turns OFF?	YES	Check the wiring from the SH CPU PCB assembly to the pick-up clutch (CL1). If there is no problem, replace the clutch.
SH CPU PCB assembly			NO	Replace the SH CPU PCB assembly.

6 Main motor (M1) does not rotate

Cause/Location	Step	Check Item	Result	Countermeasure
Faulty DC power supply	1	Does the multimeter read approximately 24V at the start of scanning when the ⊕ and the ⊖ probes of the multimeter set at the 50 VDC range are connected respectively to connectors J107-A1 and J107-A3 on the SH CPU PCB assembly?	NO	Carry out the check items of "DC power does not turn ON."
Main motor (M1)	2	Does the multimeter read approximately 5V at the start of scanning when the ⊕ and the ⊖ probes of the multimeter set at the 50 VDC range are connected respectively to connectors J107-A5 and J107-A7 on the SH CPU PCB assembly and scanning is started?	YES	Check the wiring from the SH CPU PCB assembly to the main motor (M1). If there is no problem, replace the main motor.
SH CPU PCB assembly			NO	Replace the SH CPU PCB assembly.

7 Document board motor (M2) does not rotate

Cause/Location	Step	Check Item	Result	Countermeasure
Document board load	1	Is there any load in the drive system from the document board motor (M2) to the document board?	YES	Remove the load.
Document board motor (M2)	2	Does the multimeter read approximately 24V at the start of scanning when the ⊕ and the ⊖ probes of the multimeter set at the 50 VDC range are connected respectively to connectors J202-1 and J202-2 on the front I/F PCB assembly and scanning is started?	YES	Check the wiring from the front I/F PCB assembly to the document board motor (M2). If there is no problem, replace the document board motor.
Front I/F PCB assembly	3	Does the multimeter read approximately 24V at the start of scanning when the ⊕ and the ⊖ probes of the multimeter set at the 50 VDC range are connected respectively to connectors J110-A2 and J110-A4 on the SH CPU PCB assembly and scanning is started?	YES	Check the wiring from the SH CPU PCB assembly to the front I/F PCB assembly. If there is no problem, replace the front I/F PCB assembly.
SH CPU PCB assembly			NO	Replace the SH CPU PCB assembly.

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

8 Manual selector solenoid (SL1) does not work

Cause/Location	Step	Check Item	Result	Countermeasure
Manual selector solenoid (SL1)	1	Does the multimeter read approximately 24V when the ⊕ and the ⊖ probes of the multimeter set at the 50 VDC range are connected respectively to connectors J206-1 and J206-3 on the front I/F PCB assembly, and the document is picked up manually?	NO	Check the wiring from the front I/F PCB assembly to the manual selector solenoid (SL1). If there is no problem, replace the solenoid.
Front I/F PCB assembly	2	Does the multimeter read approximately 24V when the ⊕ and the ⊖ probes of the multimeter set at the 50 VDC range are connected respectively to connectors J110-A11 and J110-A9 on the SH CPU PCB assembly, and the document is picked up manually?	YES	Check the wiring from the SH CPU PCB assembly to the front I/F PCB assembly. If there is no problem, replace the front I/F PCB assembly.
SH CPU PCB assembly			NO	Replace the SH CPU circuit board.

9 Front LED does not light

Cause/Location	Step	Check Item	Result	Countermeasure
Front LED	1	Does the multimeter read approximately 24V when the ⊕ and the ⊖ probes of the multimeter set at the 50 VDC range are connected respectively to connectors J404-1 and J404-2 on the front BASIS driver PCB assembly, and the document is scanned?	YES	Check the wiring from the front BASIS driver PCB assembly to the front LED. If there is no problem, replace the front scanner unit.
Front scanner unit	2	Does the multimeter read approximately 24V when the ⊕ and the ⊖ probes of the multimeter set at the 50 VDC range are connected respectively to connectors J106-A7 and J106-A5 on the SH CPU PCB assembly, and the document is scanned?	YES	Check the wiring from the SH CPU PCB assembly to the front BASIS driver PCB assembly. If there is no problem, replace the front scanner unit.
SH CPU PCB assembly			NO	Replace the SH CPU PCB assembly.

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

10 Back LED does not light

Cause/Location	Step	Check Item	Result	Countermeasure
Back LED	1	Does the multimeter read approximately 24V when the ⊕ and the ⊖ probes of the multimeter set at the 50 VDC range are connected respectively to connectors J404-1 and J404-2 on the back BASIS driver PCB assembly, and the document is scanned?	YES	Check the wiring from the back BASIS driver PCB assembly to the back LED. If there is no problem, replace the back scanner unit.
Back scanner unit	2	Does the multimeter read approximately 24V when the ⊕ and the ⊖ probes of the multimeter set at the 50 VDC range are connected respectively to connectors J207-7 and J207-5 on front I/F PCB assembly, and the document is scanned?	YES	Check the wiring from the front I/F PCB assembly to the back BASIS driver PCB assembly. If there is no problem, replace the back scanner unit.
Front I/F PCB assembly	3	Does the multimeter read approximately 24V when the ⊕ and the ⊖ probes of the multimeter set at the 50 VDC range are connected respectively to connectors J110-A11 and J110-A7 on the SH CPU PCB assembly, and the document is scanned?	YES	Check the wiring from the SH CPU circuit board to the front I/F PCB assembly. If there is no problem, replace the front I/F PCB assembly.
SH CPU PCB assembly			NO	Replace the SH CPU PCB assembly.

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

IV. FEEDING TROUBLE

1	Jams, double-feed, wrinkles

Cause/Location	Step	Check Item	Result	Countermeasure
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?	NO	Clean the rollers. Also clean the guide glass if necessary.
Drive power transmission	3	Can you hear abnormal sounds during document feed? Are the power transmission gears broken or the belts loose?	YES	Replace the parts at the faulty locations, or adjust the belt tension.

V. SERVICE MODE

A. Service Mode Items List

Table 7-2 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
About	Version	Displays CD-4046 version information.
	Windows	Start up [Explorer] on Windows95. This is used, for example, when re-installing the software.
	Locale	Start up [Regional Settings Properties] on Windows95. This is for multi-language versions, and should not be used in Japanese-language and English-language versions.
	Used files	Displays a list of files used by CD-4046.
	Default all	Return all settings excluding the battery and regional settings to their defaults.
	Log file	Select whether or not to record the log to hard disk. Normally, set to record at the field.
	Log list	Display the log file list.
	Disk mode	Select how to set the disk mode.
Battery	History	The date that the battery was set is displayed at all times.
	Remove history	Delete the date that the battery was set. This is used when the date was set by mistake.
	Exchange battery	Set the battery exchange date. This is used when the battery is exchanged.
Tools	Scanner	Start up the scanner assembly service software. This is used for adjusting the scanner assembly.
	Touch panel	Start up the software for calibrating the positions on the touch panel. This is used for calibrating the touch panel.

Table 7-2

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

B. How to Enter the Service Mode

1. Turn the power ON to display [Main screen]. If another screen is already displayed, [Main screen] is redisplayed.
2. If the user disk is inserted, touch the [Eject] button to eject the disk. The eject setting is as set by the user.
3. Touch the [Quit] button to display [Quit screen].
4. Touch the left side of [Quit screen] twice, followed by the right side once and then the left side once.

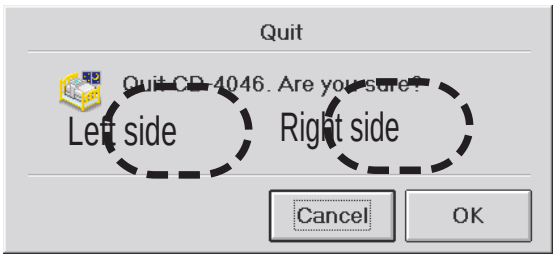


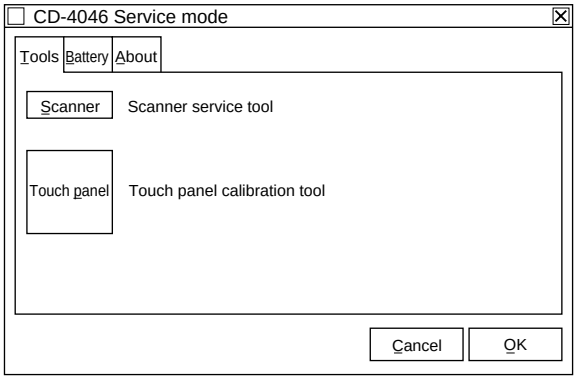
Fig. 7-13

Note: The left and right sides of the screen must be touched a total of four times within about two seconds. If these sides are not touched properly and the service mode is not entered, you must start all over again.

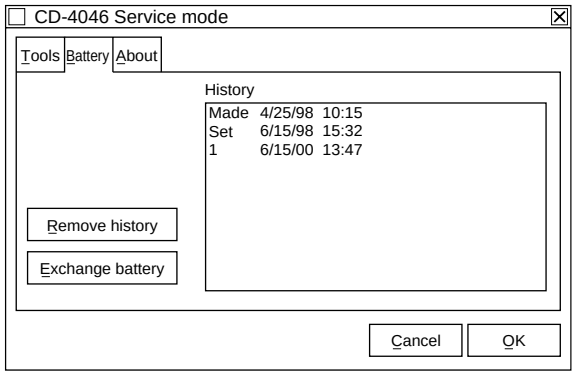
5. The Service mode screen is displayed. It takes about 10 seconds for the screen to be displayed.

Note: In the service mode, shutdown processing in the event of a power interruption is not executed. If the PC power supply is cut off during operation, DC power is supplied from the backup battery. So, quickly exit the service mode.

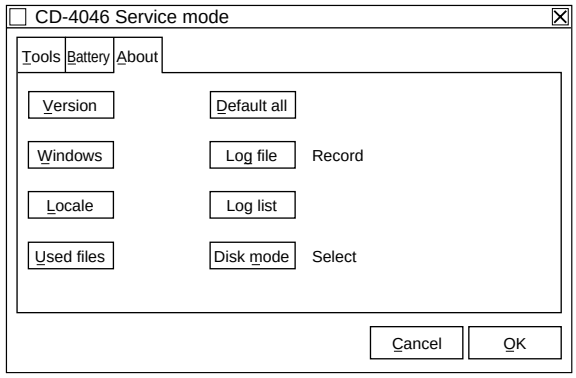
6. Touch the tabs arranged at the top left to display the screen containing items for carrying out that operation. Three tabs are provided: “About”, “Battery” and “Tools”. The screen for when “Tools” is selected is first displayed.



[Tools selection screen]



[Battery selection screen]



[About selection screen]

Fig. 7-14

C. How to Exit the Service Mode

1. Finish each of the items.
2. Touch the [OK] button at the bottom of the [Service mode screen]. When the settings have been changed, touch the [Cancel] button. The [setting disable confirmation screen] is displayed. To disable the changes, touch the [OK] button.
3. When the settings have been changed, the [setting change confirmation screen] is displayed. Touch the [OK] button. If you touch the [Cancel] button, the [Service mode screen] is re-displayed.
4. The [quit confirmation screen] is displayed. Touch the [OK] button.If you touch the [Cancel] botton, the [Service mode screen] is re-displayed.
5. The [Main menu screen] is automatically re-displayed.
6. Touch 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.

Note: A special method for exiting the service mode is used when “Windows” or “Locale” is selected. For details, refer to the relevant item.

D. How to Operate Each of the Items

Note: Basically, you either following the on-screen instructions, or you touch the button indicating the operation that you want to carry out.

1. Version

1) Touch the [Version] button.
2) The [Version Information screen] is displayed. This screen displays the following individual versions in addition to the CD-4046 version:

- DR3020 scan/save driver
- CD-4046 Service mode
- ASPI for Win32 (95/NT) DLL
- Microsoft Windows95 ID
- CD-UDF File System Driver
- Windows 95 Touchscreen Driver

3) Touch the [SCSI] button to display the SCSI connection information.

- ID: 2 CANON DR-3020
- ID: 6 SONY CD-R CDU926S

4) Check the version information, and touch the [OK] button.

2. Windows

Note 1: Carry out this operation correctly. A mistake made in this operation may result in serious trouble. The following description also assumes that the operator understands how to use Windows 95.

Note 2: Connect the keyboard before you carry out this operation. For details on how to connect the keyboard, see “V. G. Calibrating the Touch Panel” described later.

1) Touch the [Windows] button.
2) The selection confirmation screen is displayed.
3) Touch the [OK] button. The service mode is exited, and Explorer on Windows95 starts up. If you touch the [Cancel] button, the [Service mode screen] is re-displayed.
4) The [Explorer screen] is displayed.
5) For details on operations, follow the separate instructions.
6) Quit the procedure as follows.
   Touch the ☒ at the right side of the title bar. The [Explorer screen] closes.
7) Press the [Esc] key with the [Ctrl] key on the keyboard held down to display the Windows95 [Start screen].

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

8) The [Windows shutdown screen] is displayed.
9) Make sure that the message “Shut down the computer?” is selected, then you touch the [Yes] key.
10) The system automatically shuts down, and the power is turned OFF.

Reference: Another way of quitting Windows95 is to redisplay the CD-4046 [Menu screen] without using the keyboard. Start up file “NM01.Exe” in folder “CD-4046” in folder “Program Files” in “Drive C:” from the [Explorer screen]. The [Menu screen] is automatically displayed. However, the [Explorer screen] is not closed, so close it later.

3. Locale

Note: This item is interlocked with Regional Settings Properties in Windows 95. This is for multi-language versions, and should not be used in Japanese-language and English-language versions.

1) Touch the [Locale] button.
2) The [Regional Settings Properties screen] is displayed.
3) Select the regional setting to be used by this machine.
4) After changing the setting, touch the [Apply] button.
   To cancel changing of settings, touch the [Cancel] button. Or, if you have not changed the settings, touch the [OK] button.
5) If you have touched the [Cancel] button or the [OK] button, the [Service Mode screen] is redisplayed.
6) If you have touched the [Update] button, the [setting change confirmation screen] is displayed. If you touch the [Yes] button, the system is immediately restarted and the [Main screen] is displayed.
7) If you touch the [No] button in the [Setting Change Confirmation screen], the [Regional Settings Properties screen] is redisplayed. Touch either the [Cancel] button or the [OK] button in this screen to redisplay the [Service mode screen]. After you have executed other service mode items, the settings are changed when you exit the service mode and the [Main screen] is redisplayed.

4. Used Files

1) Touch the [Used files] button.
2) The list of files used by CD-4046 excluding Windows 95-related files are displayed in the [List of files screen]. This screen is used to check whether or not files have been installed correctly. This screen is normally not used at the field. If you select a file in this list, file information is displayed below.
   Windows95-related files are not displayed.
3) If you touch the [OK] button, the [Service mode screen] is redisplayed.

5. Default All

Note: If this item is executed, all settings excluding the battery and regional settings are returned to their defaults (factory settings). Do not execute this item by mistake. If necessary, note down the settings before they are returned to their defaults.

1) Touch the [Default all] button.
2) The [Setting Change Confirmation screen] is displayed. Touch the [OK] button. To cancel changing of settings, touch the [Cancel] button.

6. Log File

1) Touching the [Log file] button changes the setting. “Record” or “Not Record” is displayed to the side of the [Log file] button.
2) When “Record” is displayed, the log is recorded to hard disk. Normally, display “Record” (default).
3) When “Not Record” is displayed, the log is not recorded.

Note: This must be set to “Record” at the field.

7. Log List

1) Touch the [Log list] button.
2) A list of files in which logs have been recorded is displayed in the [Log file screen]. Files "CD-4046(1)" through to "CD-4046(5)" are available. Initially, only "CD-4046(1)" is displayed, however, the number of files increases as the amount to record increases. Files are displayed from the latest recording date in descending order to the oldest recording date.

Note 1: Other files such as "Scan", "SCSI" and "Win" are displayed in addition to "CD-4046(1)" through to "CD-4046(5)". These files record information that is required for carrying out analysis at the design department. Do not use these files at the field.

Note 2: The maximum size of each of the files excluding "Win" is about 1 MB. Though the size of "Win" is unrestricted, normally, it never exceeds 1 MB.

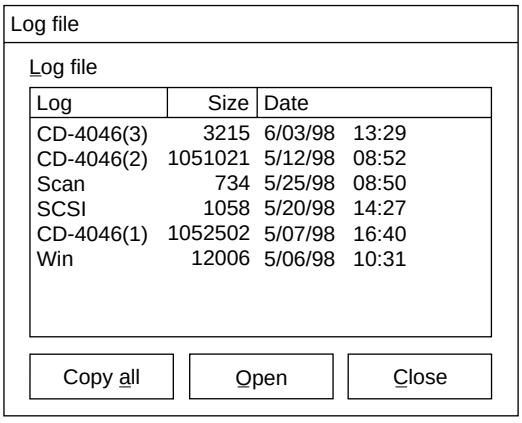


Fig. 7-15

3) Select a file name (touch the file name on the touch panel) and touch the [Open] button . The details of the selected file are displayed in the [Password screen].
   The CD-4046 error log and operation log are displayed. For details on error log No. and error messages, see Table 7-1 described above. The operation log contains a log of main operations, and is required when carrying out analysis in the development department. You need to pay attention to only the error log at the field.

- Error Log Display Format
  [date of occurrence] error No., (additional information), message

Note 1: Whether or not "(additional information)" is displayed depends on the type of error. The name of related files and error codes are displayed as additional information.

Note 2: Logs for which an error No. is not displayed are operation logs.

- Display Example

  [1998-05-12 16:28:55] Error 19, No paper in pick-up tray
  [1998-06-13 08:54:12] Open "E: \DOCSY\CABINET
  [1998-06-13 14:25:18] Error 6, (test 3), Cannot find file.

4) If you touch the [X] button on the right side of the title bar, the [Word Pad screen] disappears.
5) If you touch the [Close] button, the [Log file screen] closes.

Note: If you touch the [Copy all] button in the [Log file screen], each of the files are copied to CD-R disk. For details, refer to "E. Copying Logs". Do not touch the [Copy all] button when the user CD-R disk is inserted.

8. Disk Mode

1) Touching the [Disk mode] button changes the setting. "Select" or "Backup" is displayed to the side of the [Disk mode] button.
2) When "Select" is displayed, the user can select either the backup mode or the standard mode when blank disks are formatted.
3) When "Backup" is displayed, the backup mode is automatically selected.

Note: Default is "Select". If the user wants to limit the disk mode to the backup mode, select "Backup mode". Notify the user if the setup has been changed.

Reference: Explanation of Modes

- In the standard mode, data is recorded to the CD-R disk and the hard disk only when the document is being recorded. After recording ends, the data on the CD-R disk and hard disk are compared. If the data does not match, the data on hard disk is copied to CD-R disk and compared again. If another standard mode CD-R disk is inserted, data on the hard disk is deleted. This mode is best suited to when user are using two or more CD-R disks.

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

- In the backup mode, all data is recorded to CD-R disk and hard disk, for example, when the document is being recorded or the name of the folder is changed. After recording ends, the data on the CD-R disk and hard disk are compared just like in the standard mode. However, the data is not deleted from hard disk after comparison ends.
  Though this made is better than the standard mode in terms of data safety, it takes more time to exchange data on hard disk when you exchange the CD-R disk that is in the backup mode.
- Modes can be changed after they have been set. For details, refer to the User's Instructions.
- Other wise, refer to "Chapter 3, IV. C Backup Mode."

9. History

1) If you select the "Battery" tab, the battery setting date is displayed at all times on the [History screen].

• Description of Details
Mode: Date CD-4060 was produced (date when battery was first turned ON)
Set: Date when the CD-4046 was installed at the field (date when battery was first turned ON after CD-4060 was shipped from the factory)
1 to n: Date battery was exchanged

Note: If you replace the HDD after you have installed the CD-4046, the setting date data will be lost. Trouble will occur if the next battery exchange date is unknown. Carry out the following to countermeasure this.
When you first turn the power ON after you have replaced the HDD, the [Production Date Record screen] is displayed. Touch the [Other] button and enter the date written on the backup battery. The dates at "Mode" and "Set" are the battery exchange date that you entered here. For details, refer to "VII. PROCEDURE AFTER REPLACING ELECTRICAL PARTS A. HDD".

10. Remove History

1) Touch the [Remove history] button.
2) The [delete confirmation screen] is displayed. Touch the [OK] button.
To cancel deletion, touch the [Cancel] button.

11. Exchange Battery

1) Touch the [Exchang battery] button.
2) The [Date Setup screen] is displayed. Touch the [OK] button. If you touch the [Cancel] button, battery exchange is not set, and the [Service Mode screen] is redisplayed.

Note: For details on how to exchange the battery, refer to "Chapter 4 Disassembly and Reassembly". Also, refer to "Chapter 7, VII. After Replacing Electrical Parts".

12. Scanner

1) Touch the [Scanner] button.
2) The [Menu (3020 Tool) screen] is displayed. Select the required item and operate that item. For details, refer to "F. Scanner Service Mode".

Note: The DR-3020 is used as the scanner assembly, so this accounts for "3020" in the title screen.

3) When you have quit each of the items, touch the × button at the right side of the title bar.
4) The [Service Mode screen] is redisplayed.

13. Touch Panel

1) Touch the [Touch panel] button.
2) The [Calibration screen] is displayed. Touch the point of intersection of the × mark.
3) Another × mark is displayed. Touch its point of intersection in the same way.
4) The [End screen] is displayed. Touch the [OK] button.
5) The [Service Mode screen] is redisplayed.

Note 1: Accurately touch the point of intersection of the × mark. If you touch the wrong position, erroneous data will be entered and operations on the touch panel may no longer be possible. Once entered, the data cannot be changed in the [Calibration screen]. To calibrate the touch panel, repeat the procedure from the beginning.

Note 2: If you do not touch the point of intersection of × marks within 30 seconds, the [Time out screen] is displayed. If this screen is displayed, touch the [OK] button to redisplay the [Service Mode screen] and repeat the procedure from the beginning.

Note 3: If the calibrated position deviates greatly from the correct position, the operation cannot be carried out correctly on the touch panel. Also, the touch panel cannot be calibrated on the touch panel itself. So, connect a keyboard to the machine. Then the calibration is carried out using the keyboard. For details, refer to "G. Touch Panel Calibration".

E. Copying Logs

If the trouble cannot be corrected at the user site, the log information must be relayed to the supervisory department. The CD-4046 is not provided with a log printout function. So when there are few related logs, note down the details of displayed logs on paper, and send the paper attached to a Claim Card. If you cannot note down all of the displayed logs, follow the procedure below to copy the logs and send the required part of the log.

1) If the user disk is inserted, touch the [Eject] button to eject the disk. The eject setting is as set by the user.
2) Insert a CD-R disk for servicing on which logs may be recorded.

Note: Use only CD-R disk that have been formatted on the CD-4046. When you visit the user, take a CD-R disk on which logs can be recorded with you.

3) When the CD-R disk is session-closed, touch the [Tool] button and add "New session."
4) Enter the service mode and, touch the [Log list] button in "About". The [Log file screen] is displayed.

Note: Make sure that the CD-R disk has been identified before you enter the service mode.

5) If you touch the [Copy all] button, the [confirmation screen] is displayed. Touch the [OK] button. To cancel copying, touch the [Cancel] button.

Note: The log is copied to a folder "copied date" (e.g. 19980530) in folder "log" on the service CD-R disk. If you have copied a different log, the date will be appended with a number to the same day.

6) When copying ends, the [Log file screen] is redisplayed.
7) Exit the service mode.
8) Close the CD-R session in the [Main screen], eject the disk and turn the power OFF.
9) Insert the CD-R containing the copied logs into the personal computer for servicing, open the folder "Log" and copy the folder "copied date" in question to the hard disk, etc. of the personal computer.

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

10) Open the folder that you copied, and open the files containing the recorded logs. File type is LOG file, so you can open the file in the [WORD PAD] application etc..
11) Look at the displayed contents, and either print out the part relating to the trouble, or save the file to floppy disk and send it to the supervisory department.

Note 1: First of all, open the file "CD-4046(n)" having the latest recording date, and check locations where the related error may have occurred. Then send previous and subsequent logs. Files must contain a dotted line "----------" and at least one line "Power ON CD-4046 Version ..." under the dotted line. Next, open the "Win", "SCSI" or "Scan" files, and send a log of the same time as CD-4046 (n).

Note 2: A CD-R disk containing recorded images is sometimes required in addition to the logs for analyzing trouble. If so, send either the original CD-R disk or backup CD-R disk. To copy CD-R disk, touch the [Tool] button in the [Menu screen], and touch the [Copy disk] button in [Tool box screen]. For details, refer to the User's Instructions.

Reference: Log information is recorded to "C:\Program Files\Cd-4046" on the CD-4046 hard disk.

• Example of supplied log

```
[1998-06-03  13:59:59] ------------------------------------------------------------------------
[1998-06-03  14:00:00]        PowerON CD-4046 Version 1.04.34.0
[1998-06-03  14:01:33]        Insert 0A55D0EE, MEDIA_CLOSEDISO, Standard
[1998-06-03  14:01:44]        Format 0A55D0EE
[1998-06-03  14:01:57]        DeleteBackup D:\BACKTEMP\
[1998-06-03  14:43:18]        ScanNew E:\DOCS\TEST1_1998-06-03_00001.TIF
[1998-06-03  14:43:29]        ScanComplete 1 files
[1998-06-03  15:02:25] Error 107, (0x08030200),    Could not start session.
[1998-06-03  15:03:50]        Restore 0A55D0EE
[1998-06-03  15:04:27]        Eject 0A55D0EE
```


F. SCANNER SERVICE MODE

1. Outline

The following scanner service modes are available.

1) Shading compensation mode
   Displays the light intensity output data of BASIS. Also, carries out shading compensation and writes data.
2) Document detecting sensor position adjustment mode
   Adjusts the position of the document width detecting sensor and writes data.
3) Registration adjustment mode
   Adjusts registration and writes the data.
4) Port check mode
   Checks operation of each DC load.
5) Sensor check mode
   Displays the input states of each of the sensors.
6) Image display mode
   Feeds the document and displays the image on the touch panel.

For details on how to enter and exit the scanner service mode, refer to “D. 12. Scanner” above.

Fig. 7-16 shows the Menu (3020 Tool) screen.

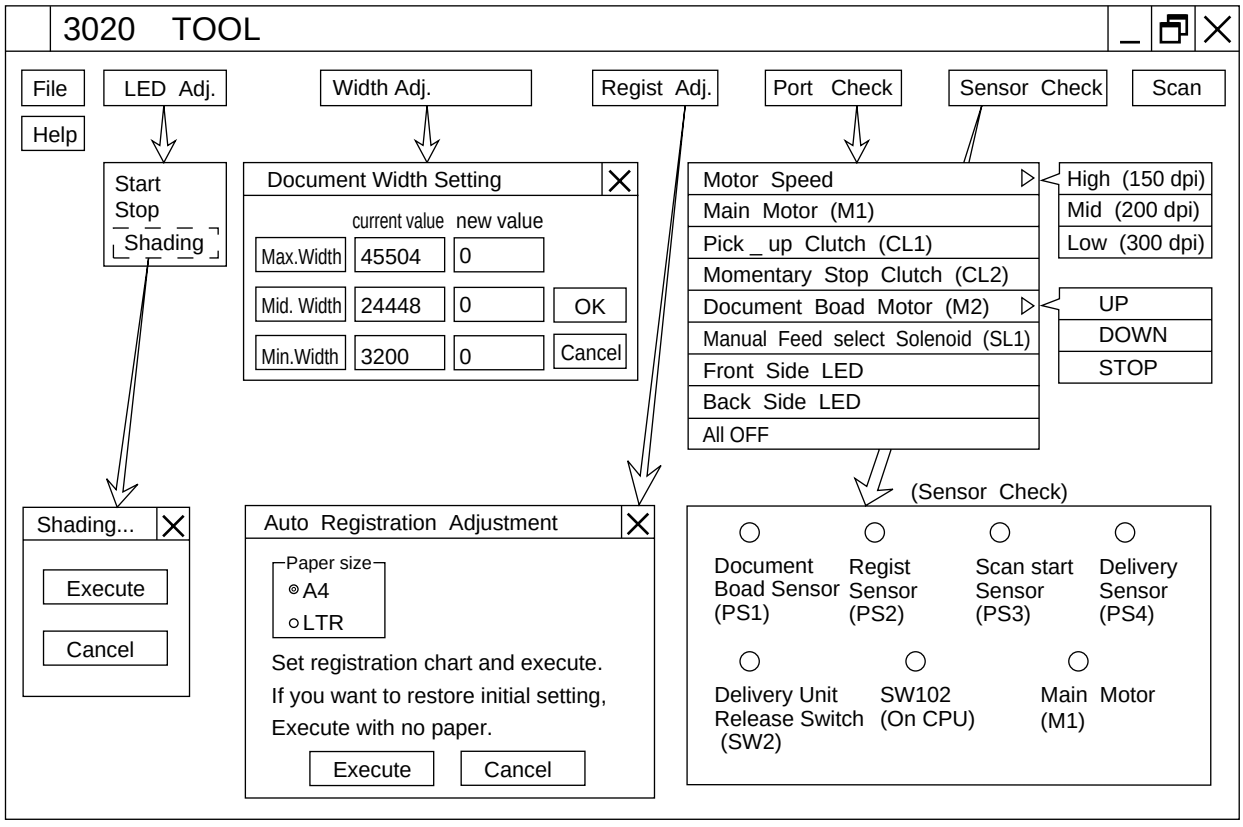


Fig. 7-16

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

2. Shading Compensation

To carry out shading compensation, you must first remove covers before entering the service mode and carry out other preparations. For details, see “Note: About Preparations” described later.

1) Cover the entire glass surface of the upper and lower scanner unit of the scanner assembly with one sheet of standard white paper (FY9-3004-020), and close the feeder assembly. Take care to prevent the white paper from becoming dirty or wrinkled.
2) Touch the [Start] from [LED Adj.] on the Menu screen.
3) Scanning starts, and the density of the standard white paper is displayed on the touch panel as a waveform. (See Fig. 7-17)
4) Turn VR101 through VR104 on the SH CPU PCB assembly to adjust so that the waveform coincides with the reference line. Do not excessively shift the waveform upwards. This will cause the waveform to saturate.
   VR101 (F1): For adjusting the front half of the front side.
   VR102 (F2): For adjusting the back half of the front side.
   VR103 (B1): For adjusting the front half of the back side.
   VR104 (B2): For adjusting the back half of the back side.
5) Touch the [Shading] from [LED Adj.] on the Menu screen.
6) To execute shading compensation, touch the Execute button.
7) Shading compensation is carried out for about one minute, and the shading compensation data is written into the memory on the SH CPU PCB assembly. When shading compensation ends, the waveform falls down.
8) To delete display of the density waveform, touch the [Stop] from [LED Adj.].

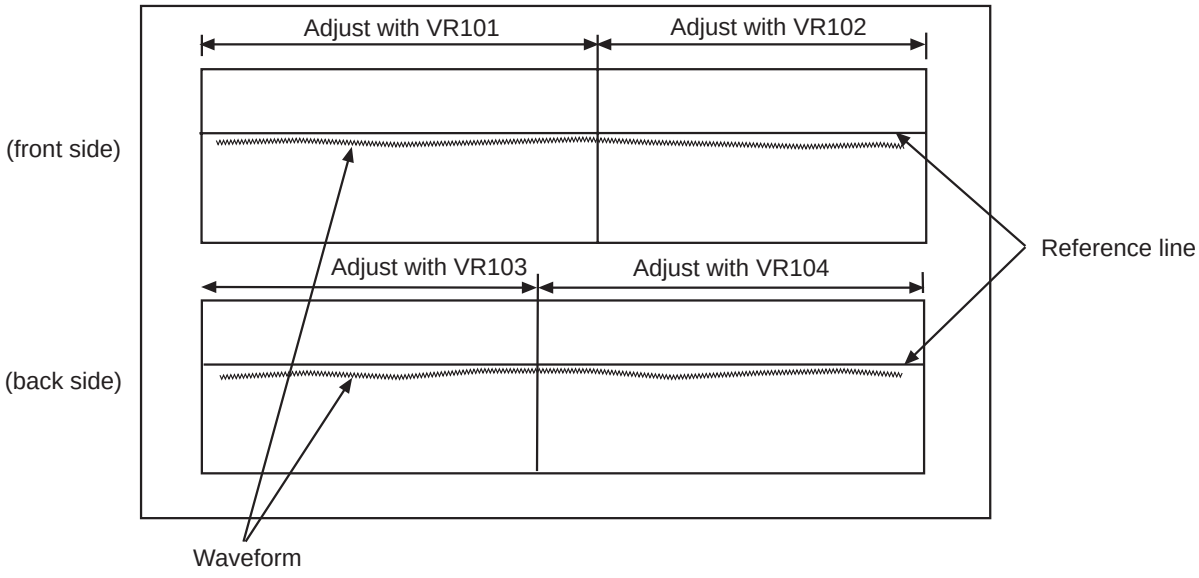
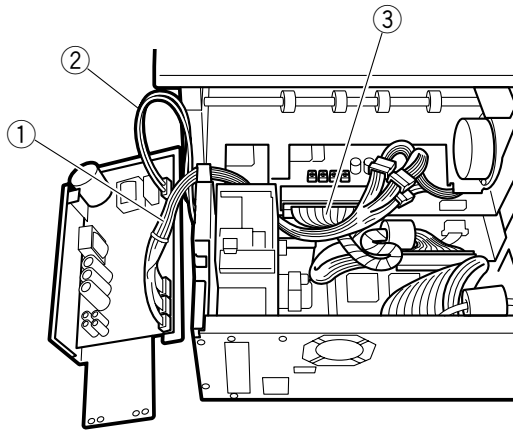


Fig. 7-17

Note: About Preparations

The VR101 through VR104 on the SH CPU PCB assembly are hidden and cannot be adjusted. For this reason, the scanner power supply PCB assembly must be removed before you carry out shading compensation.

1) Remove the scanner power supply PCB assembly. For details, refer to "Chapter 4, Disassembly and Reassembly, V. A. 1. Scanner Power Supply PCB Assembly". The auxiliary plate in step 9 need not be removed.
2) Place the scanner assembly on the side panel of the control assembly.
3) Place the scanner power supply PCB assembly to the side of the body, and connect the extension service tool scanner DC able ① (TKM-0281) and scanner AC cable ② (TKM-0288).
4) Connect the SCSI cable to the SCSI connector PCB assembly.



① Scanner DC cable ② Scanner AC cable
③ SCSI cable

Fig. 7-18

3. Document Width Sensor Adjustment

When carrying out this adjustment, prepare a sheet of thick paper 160 mm wide.

1) Touch the [Width Adj.] on the Menu screen. The following operation screen is displayed.

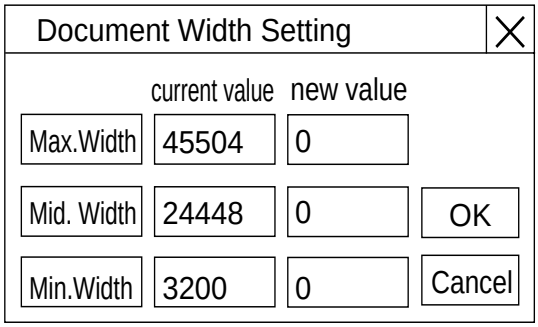


Fig. 7-19

2) Widen the document guide plate as far as possible, and touch the [Max.Width] button. The new value is displayed on the right.
3) Place the 160 mm wide thick paper on the document board, align the document guide plate with it, and touch the [Mid.Width] button. The new value is displayed on the right.
4) Narrow the document guide plate as far as possible, and touch the [Min.Width] button. The new value is displayed on the right.
5) If OK, touch the [OK] button. The value of the sensed document width is written into the memory on the SH CPU PCB assembly. This takes about 30 seconds. When writing to memory ends, the operation screen disappears.

Reference

- The figures indicated to the side of [Max. Width], [Mid. Width] and [Min. Width] are values output from the resistance sensor of the document guide plate.
  These values must be [Max. Width] > [Mid. Width] > [Min. Width], and moreover the value of [Min. Width] must be about midway between the values of [Max. Width] and [Min. Width]. If these figures do not meet these conditions, then it is possible that there is something wrong with the resistance sensor.

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

4. Registration Adjustment

1) Prepare three sheets of white A4 or letter size copy paper.
2) Draw the lines shown in Fig. 7-20 on all three sheets of copy paper prepared in a. above using a pencil or similar object.

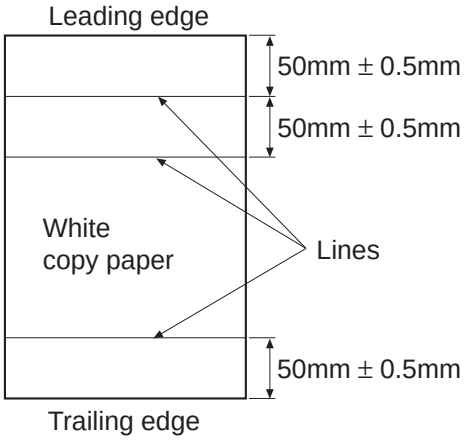


Fig. 7-20

3) Place the three sheets with the lines drawn on them on the document board face up.
4) Touch the [Register Adj.] on the Menu screen. The following operation screen is displayed.

Note: Defaults can be returned to by touching [Execute] button without any paper placed on the document board, and touching [OK] button with the confirmation screen displayed.

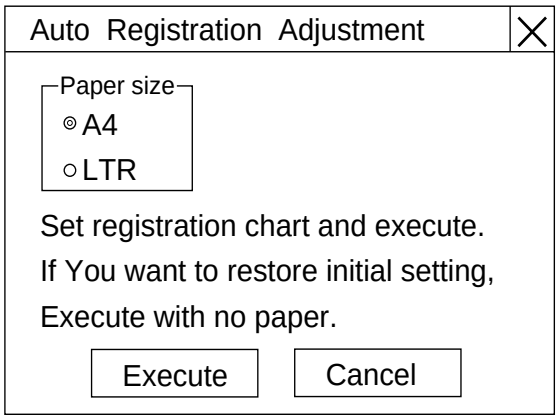


Fig. 7-21

5) Touch [A4] when A4 paper documents are used, or [LTR] when letter size documents are used.
6) Touch the [Execute] button. The copy paper is fed, and the Average screen is displayed. If the value (xxx) is within 295 ±12, touch the [OK] button.

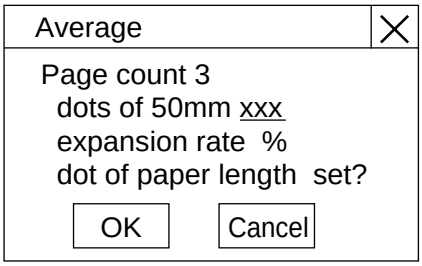


Fig. 7-22

7) The registration adjustment values are written into the memory on the SH CPU PCB assembly. This takes several seconds. When writing to memory ends, the Average screen disappears.
8) Actually feed a document, and make sure that the leading edge registration value is ±2mm.

5. Port Check

1) Touch [Port Check] on the Menu screen. The operation screen is displayed.

2) The following DC loads can be checked by touching the respective item. Ticked "✓" items excluding [Pick-up Clutch (CL1)] and [All OFF] are either selected or ON.

- [Motor Speed]
  The speed of the motor can be switched in three stages:
  High speed: [High (150 dpi)]
  Medium speed: [Mid (200 dpi)]
  Low speed: [Low (300 dpi)]
- [Main Motor (M1)]
  ON/OFF of main motor (M1)
- [Pick_up Clutch (CL1)]
  ON of pick-up clutch (CL1)
  This automatically turns OFF when document board sensor (PS1) turns OFF.
- [Momentary Stop Clutch (CL2)]
  ON/OFF of momentary stop clutch (CL2)
- [Document Board Motor (M2)]
  Drives the document board motor (M2) and moves the document board up and down.
  Rise: [UP]
  Fall: [DOWN]
  Stop: [STOP]

- [Manual Feed Select Solenoid (SL1)]
  Turns the manual feed select solenoid ON/OFF.
- [Front Side LED]
  Turns the front side LED for illuminating the document ON/OFF.
- [Back Side LED]
  Turns the back side LED for illuminating the document ON/OFF.
- [All OFF]
  Turns OFF all DC loads.

3) After you have finished checking all ports, touch [All OFF].

6. Sensor Check

1) Touch [Sensor Check] on the Menu screen. The Sensor Check screen is displayed.

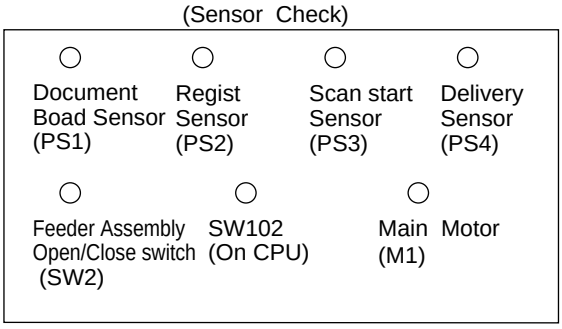


Fig. 7-23

2) You can check the ON/OFF state of each sensor and switch. An "○" displayed in red on screen indicates that the sensor or switch is ON.

- [Document Board Sensor (PS1)]
  Document board sensor
- [Registration sensor (PS2)]
  Registration sensor
- [Scan Start Sensor (PS3)]
  Scan start sensor
- [Delivery Sensor (PS4)]
  Delivery sensor
- [Feeder Assembly Open/Close Switch (SW2)]
  Feeder assembly open/close switch
- [SW102 (On CPU)]
  Push switch SW102 on SH CPU PCB assembly
- [Main Motor (M1)]
  Main motor

3) After you have finished checking all sensors, touch [Sensor Check] again. The Sensor Check screen disappears.

Note: The sensors can be checked together with "5. Port Check".

7. Image Display

1) Place the document on the document board.
2) Touch [Scan] on the Menu screen.
3) The document is fed at slow speed, and the screen image is displayed on the touch panel.
4) To delete the displayed image, either touch [Stop] from [LED Adj.], or touch [×] on the right side of the title bar to exit the scanner service mode.

8. 3020 Tool Version Display

1) Touch [Version] from [Help] on the Menu screen.
2) The Version screen is displayed.
3) If you touch [OK] button, the Version screen disappears.

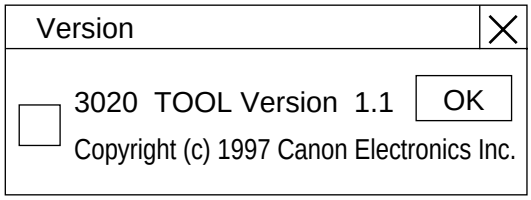


Fig. 7-24

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

G. Touch Panel Calibration

The following describes how to calibrate the position data when the touch panel is touched.

1. Calibration in the Service Mode

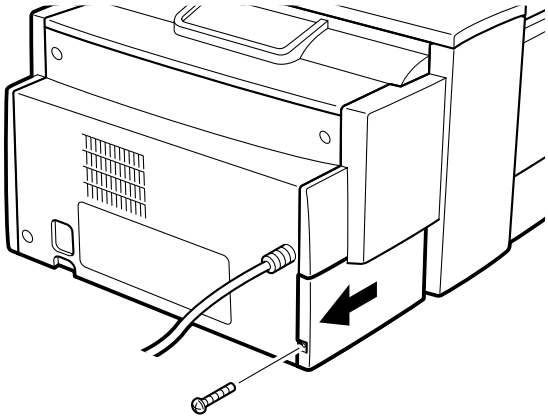
If the display point deviates from the touch point by about several millimeters, and you can enter the service mode by touching a point several mm from the display point, calibrate the touch panel in the service mode.

For details, see “D. 13. Touch Panel” above.

2. Calibration Using the Keyboard

If the calibrated position deviates greatly from the correct position, and the service mode cannot be entered, connect a keyboard to the CD-4046 to calibrate the touch panel. Follow the procedure below to calibrate the touch panel.

1) Remove the screw, and pull the external I/F cover to the rear to remove.



Fi. 7-25

2) Connect the keyboard connector to the round connector on the left of the top row.

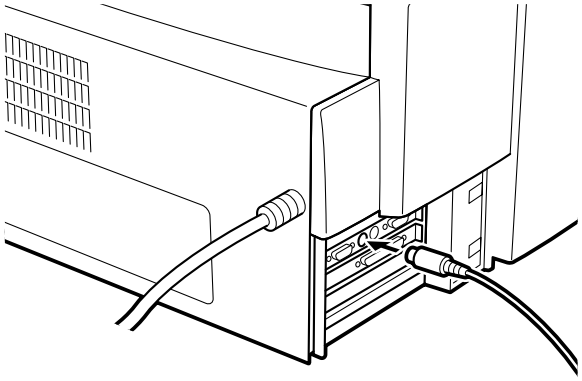
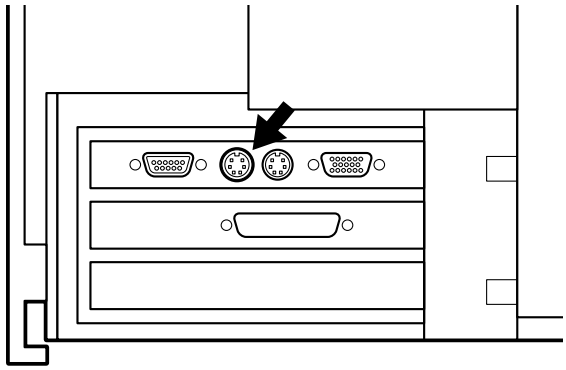


Fig. 7-26



Fi. 7-27

3) Turn the power ON to display the [Menu screen].
4) Press the Esc key with the Ctrl key on the keyboard held down to display the Windows95 [Start screen].
5) Press the P key to display the [Program List screen].
6) Press the T key to display the [Touch Panel File List screen].
7) Press the ↓ key once and then the Enter key to display the [Touch Screen Control screen].
8) If you press the C key with the Alt key held down, [Calibration screen] (same as screen displayed in service mode) is displayed.
9) Touch the point of intersection of the × mark. The × mark is displayed again. Touch the point of intersection.

10) The [End screen] is displayed. Press the Enter key to redisplay the [Touch Screen Control screen].
11) When you touch the ☒ button on the right side of the title bar, [Main screen] is redisplayed.

Note: How to touch the point of intersection of the × mark in step 9 is the same as described in the [Service Mode]. Also, refer to “D. 13. Touch Panel”.

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

VI. RE-INSTALLING THE SOFTWARE

1. Outline

The software must be re-installed if the CD-4046 cannot be operated due to software crash. The following describes the re-installation procedure and basic precautions. For a detailed description, “3. Software Re-installation Procedure”.

1) Connect a good HDD, faulty HDD and keyboard to the CD-4046.
2) Start up the CD-4046 from the good HDD.
3) Re-install (write) the contents of the recovery CD onto the faulty HDD.
4) Mount the re-installed HDD on the CD-4046.
5) Start up the CD-4046 and initialize settings.

Note 1: The CD-4046 cannot be started up from the recovery CD.

Note 2: Do not make any mistakes in the operation procedure. If you mistake, both of the HDDs may become faulty. If the operation cannot be corrected, or operation is not accepted (operation is not possible or the system freezes), press the reset switch on the CD-4046 and repeat the operation. However, note that the system may not be restarted correctly.

Note 3: Before you start operations, make sure that the power is OFF and that the power cord is disconnected.

Note 4: If the CD-R disk is still inserted, it must be ejected in advance. Turn the power ON, and press the eject button on the CD-R drive after waiting a few seconds. Then, the CD-R disk is ejected. Even of the software is defective, the CD-R disk can be ejected if power is being supplied to the CD-R drive.
If Windows95 and eject software are normal, the CD-R disk is automatically ejected (about one minute after turning the power ON) after the software is started up.

Note 5: When starting up the system using a re-installed HDD, the touch panel must be calibrated again and other settings must be set again.

Note 6: Software can be written to faulty HDD or unformatted HDD (unformatted HDD set as a service part). However, software can not be written to HDD formatted on other personal computers and hardware faulty HDD.

Note 7: Agreements with software companies sometimes restrict the handling of software. When re-installing software, observe the instructions in this manual. If the agreement is violated, you may be punished.
Basic Restriction: The software ID No. is a unique number, and no other product has the same ID No. You must also use the ID No. indicated on the HDD or CD-4046.
Use this software to CD-4046 only.

Note 8: If the software must be restored in a short time, refer to “4. Recovering the System by Replacing the HDD”.

Note 9: It is often the case that part of the software is damaged. However, which software is damaged cannot be specified at the field. So, re-install all software.

2. Required Units and Service Tools

The following units and service tools are required for re-installing the software and recovering the system by replacing the HDD.

1) CD-4046
2) HDD IDE cable (service tool TKM-0282)
3) HDD DC cable (service tool TKM-0287)
4) Recovery CD (service tool TKM-0283: English version)
5) HDD with ID No. (service tool TKM-0284: English version)
6) Keyboard with PS/2 mini DIN6 pin connector for Windows95 (commercially available)

Note: 1), 5) and 6) are required for “recovering the system by replacing the HDD”.

3. Software Re-installation Procedure

The following procedure is for when a service tool HDD with ID No. used for the first time has been connected. In the case of service tool HDDs that have been used in the past, part of this procedure is omitted. For details, see "5. Precautions When Re-using HDDs" described later.

1) Set the CD-4046 on its side, and remove the faulty HDD. For details on how to remove the HDD, refer to "Chapter 4, Disassembly and Reassembly".
2) Connect the service tool HDD IDE cable (TKM-0282) and HDD DC cable (TKM-0287) to the IDE cable and DC cable that were connected to the faulty HDD.
3) Return the CD-4046 to its original position, and connect the faulty HDD and service tool HDD with ID No. (TKM-0284: English version) to each of the cables.
4) Change the positions of the jumper on each of the HDDs to set the HDDs. Set the faulty HDD as the SLAVE and the service tool HDD as the MASTER. For details on how to set the jumper, refer to the indications on each HDD.

Note: Normally, either of the HDDs can be set as the master HDD. So, remove the jumper inserted into No.1 and No.2 on the faulty HDD to set this as the slave HDD.

5) Place each of the HDDs on a flat, stable location.

Note: Do not subject the HDDs and CD-4046 to vibration or impact during installation of software.

6) Remove the external I/F cover attached to the left cover of the CD-4046, and connect the keyboard. For details on how to remove the cover and how to connect the keyboard, see "V. Service Mode, G. Touch Panel Calibration".

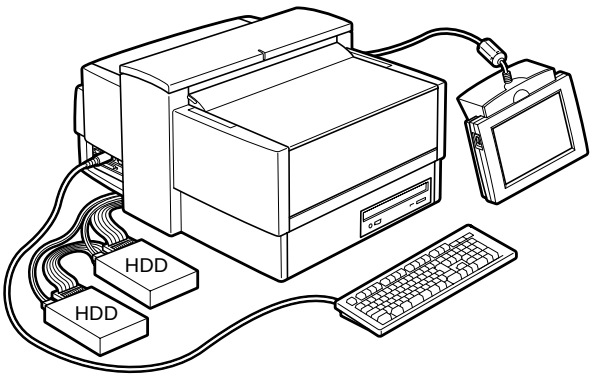


Fig. 7-28

7) Turn the CD-4046 ON, and after about 20 seconds hold down the Ctrl, Alt and S keys on the keyboard simultaneously immediately after the buzzer has sounded.
8) The [Phoenix SETUP screen] is displayed on the touch panel.
9) Set "Hard Disk1" to "AUTO1" and "Hard Disk2" to "AUTO2". Move between items using the ↑ or ↓ keys on the keyboard, and change the settings using the + or – keys.

Note: Normally, "Hard Disk2" is set to "Not Installed." So, press the – key several times to change it to "AUTO2."

10) Press the Esc key to display the [Exiting SETUP screen]. Press the F4 key.
11) Startup is automatically started, and the [CD-4046 Startup screen] is displayed. Immediately afterwards, the [New Hardware] and [Insert Disk screen] are displayed.

Note: If the [Main screen] is displayed, jump to step 16.

12) Press the Enter key on the keyboard.

Note: Do not operate the touch panel until the CD-4046 application software has finished starting up and the [Main screen] is displayed.

13) When the [Insert Disk screen] has changed, press the Enter key.
14) After the [Device Driver Wizard screen] is displayed, press the Enter key.
15) When the Device Driver Wizard screen has changed, press the Enter key.
16) Startup automatically continues, and the [Main screen] is displayed. Immediately afterwards the [Error screen] (not enough space) is displayed.

Note: Some of the following operations can be carried out on the touch panel. The touch panel is calibrated using the keyboard. For details, see "V. G. Calibrating the Touch Panel" described earlier.
Those familiar with Windows95 operations may carry out subsequent operations on the keyboard. Press the keys so that the operation result is the same.

17) Touch the [OK] button. The [Battery Check (production date)] screen is displayed.
18) If you touch the [Cancel] button on the touch panel in the [Battery Check (production date) screen], [CD-R drive screen] is displayed. Touch [OK] button, the [Windows ID screen] is displayed.
19) When the [Windows ID screen] is displayed, enter the [Product ID No.] affixed on the service tool HDD.

Note: If you make a mistake in the entry, touch the incorrectly entered numbers and enter the correct number again.

20) Touch the [OK] button. The [Confirmation screen] is displayed.
21) Touch the [Yes] button. The [Main screen] redisplayed.
22) Select "Windows" in the service mode to display the [Explorer screen]. For details on operations, see "V. Service Mode".
23) Place the service tool recovery CD (TKM-0283: English version) in the caddy, and insert the caddy into the CD-R drive.
24) Touch the folder "Makehdd" in drive [C:] on the [Explorer screen] twice consecutively. Touch the file "MakeHDD.exe" in the folder [Makehdd] twice consecutively. This starts up file "MakeHDD.exe".

Note 1: Some folders or files have similar names. Do not select these folders or files by mistake.

Note 2: When carrying out this operation on the keyboard, press the [↑] or [↓] keys to select the folder or file, and execute the operation by pressing the [Enter] key. If drive [C:] is not selected, press the [Tab] key to select the drive.

25) The [Explorer screen] automatically disappears, and the system is restarted.
26) The contents of the recovery CD are automatically written to the faulty HDD.
During this operation, the [Now Copying screen] is displayed. Writing is divided into two stages.

Note: Data can be written to faulty HDDs or unformatted HDD (unformatted HDD set as a service part). However, data cannot be written to HDD formatted on other personal computers and hardware faulty HDD. If data cannot be written, follow the instructions displayed on screen to cancel the operation.

27) The first operation is the creation of partitions. This takes about two minutes to complete. When this operation is completed, the [CD-4046 Startup Screen] is displayed, and the recovery CD is automatically ejected. Insert it again.

Note: If the area setting is not damaged, this procedure is automatically omitted, and the procedure starts from step 28.

28) The next operation is formatting and writing (copying). This takes about 13 minutes to complete. When this operation is completed, the system is automatically restarted, and the recovery CD is ejected.
29) Startup continues, and the [Main screen] is displayed. Immediately afterwards the [Error screen] (not enough space) is displayed.
30) Touch the [OK] button. The [Battery Check (production date)] screen is displayed.
31) Touch the [Cancel] button in the [Battery Check (production date)] screen. If the [CD-R Drive screen] is displayed, touch the [OK] button.
32) Touch the [Quit] button to turn the power OFF.
33) Disconnect the power cord, remove the cables connected to each of the HDDs, and be sure to set the jumper on the re-installed HDD to the master setting.

Note: If the procedure so far up to this step is carried out in the workshop, the time spent at the user installation site can be shortened.

34) Assemble the re-installed HDD into the CD-4046.
35) Remove the rear and top rear covers of the CD-4046 so that the product ID No. affixed to the side of the exhaust fan and the date affixed on the top cover of the backup battery can be seen.
36) In the same way as in step 7, turn the CD-4046 ON, and after about 20 seconds hold down the [Ctrl], [Alt] and [S] keys on the keyboard simultaneously immediately after the buzzer has sounded.
37) The [Phoenix SETUP screen] is displayed on the touch panel.
38) Change the "Hard Disk2" setting to "Not Installed" on the keyboard.

39) Press the [Esc] key to display the Exiting SETUP screen. Press the [F4] key.
40) Startup is automatically started, and the [Main screen] is displayed. Immediately afterwards, the [Battery Check (production date) screen] is displayed.

Note: If the [New Hardware screen] and [Insert Disk screen] are displayed before the [Main screen] is displayed, carry out steps 11 to 15.

41) Be sure to calibrate the touch panel using the keyboard. For details, see "V. G. Touch Panel Calibration" described earlier. Subsequent operations are carried out on the touch panel.
42) If you touch the [Other] button in the [Battery Check (production date) screen], the [Enter Date screen] is displayed. It takes about 20 seconds for the screen to be displayed.

43) Enter the date affixed to the top cover of the backup battery.

Note: Though the date that you entered differs from the actual production date, preference is given to the next time that the backup battery exchange date is displayed correctly. So, enter the installation data or the backup battery replacement date. The installation date is automatically set to the same date.

44) If you touch the [OK] button, the [Battery Check (exchange date) screen] is displayed.
45) If you touch the [OK] button, the [Windows ID screen] is displayed.
46) Enter the product ID No. affixed to the side of the exhaust fan.

Note: If you make a mistake in the entry, touch the incorrectly entered numbers and enter the correct number again.

47) If you touch the [OK] button, the [Confirmation screen] is displayed.
48) Touch the [Yes] button to redisplay the [Main screen].
49) The service mode settings and the basic setup, field, and template in the setup screen operated by the user have returned to their defaults. If necessary, change or add to these s

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

4. Recovering the System by Replacing the HDD

If software must be restored in a short time, replace the faulty HDD with the service tool HDD to restore the system. The following describes the procedure to do this and precautions.

1) Replace the faulty HDD with the service tool HDD with ID No. (TKM-0284: English version). For details on how to replace the HDD, refer to "Chapter 4, Disassembly and Reassembly".
2) Remove the rear and top rear covers of the CD-4046 so that the product ID No. affixed to the side of the exhaust fan and the date affixed on the top cover of the backup battery can be seen.
3) Remove the external I/F cover attached to the left cover of the CD-4046, and connect the keyboard. For details, refer to "V. Service Mode, G. Touch Panel Calibration."
4) Press the power switch. The [CD-4046 Startup screen] is displayed after about one minute.
5) Immediately afterwards, the [New Hardware screen] and [Insert Disk screen] are displayed.

Note: If the [Main screen] is displayed, jump to step 10.

6) Press the Enter key on the keyboard.

Note: Do not operate the touch panel until the CD-4046 application software has finished being started up and the [Main screen] is displayed.

7) When the [Insert Disk screen] has changed, press the Enter key.
8) After the [Device Driver Wizard screen] is displayed, press the Enter key.
9) When the [Device Driver Wizard screen] has changed, press the Enter key.
10) Startup automatically continues, and [Main screen] is displayed. The [Battery Check (production date) screen] is displayed immediately after.
11) Be sure to calibrate the touch panel using the keyboard. For details, see "V. G. Touch Panel Calibration" described earlier. Subsequent operations are carried out on the touch panel.
12) If you touch the Other button in the [Battery Check (production date) screen], the [Enter Date screen] is displayed. It takes about 20 seconds for the screen to be displayed.
13) Enter the date affixed to the top cover of the backup battery.

Note: Though the date that you entered differs from the actual production date, preference is given to the next time that the backup battery exchange date is displayed correctly. So, enter the installation data or the backup battery replacement date. The installation date is automatically set to the same date.

14) If you touch the OK button, the [Battery Check (exchange date) screen] is displayed.

Note: If the [CD-R Drive screen] is displayed, touch the OK button.

15) If you touch the OK button, the [Windows ID screen] is displayed.
16) To permanently use the service tool HDD that you mounted on the CD-4046, Enter the product ID No. affixed to the side of the exhaust fan. To use it temporarily, enter the product ID No. affixed to the service tool HDD.

Note 1: If you make a mistake in the entry, touch the incorrectly entered numbers and enter the correct number again.

Note 2: If you use the service tool HDD permanently, the product ID No. unique to the service tool HDD cannot be used in the future. Also, the faulty HDD that you removed no longer has a unique product ID No., and can be used after re-installation only as a substitute HDD having an ID No.

Note 3: When the service tool HDD is used temporarily, the HDD that you removed must be re-installed and replaced as soon as possible. The product ID No., production date and other data have already been input for the service tool HDD. So, when the service tool HDD is next used, use it for temporary replacement use, or as the startup HDD at re-installation; do not use it for permanent replacement. Also, when the service tool HDD is next used, the operation procedure differs partially, so see "5. Precautions when Re-using HDDs" described later.

17) If you touch the OK button, the [Confirmation screen] is displayed.
18) Touch the Yes button to redisplay the [Main screen].

19) The service mode settings and the basic setup, field, and template in the setup screen operated by the user have returned to their defaults. If necessary, change or add to these setups. For Instruction details, refer to “V. Service Mode” and the User’s Instructions. The log recorded files are deleted.
20) Touch the Quit in [Main screen] to turn the power OFF.
21) Remove the keyboard, and return the external I/F cover, rear cover and top rear cover to their original positions.
22) Turn the power ON.
23) Make sure that the [Main screen] is displayed in the regular manner, and that the settings are correct before handing th

5. Precautions when Re-using HDDs

When the service tool HDD is used once, the product ID No. and production date of the service tool HDD will be already entered. So, the procedure differs partially for when you use the service tool HDD for temporary replacement or as the re-installation startup HDD.

1) Operations steps 11 to 21 in “3. Re-installing the Software Procedures” above are not required as the [New Hardware], [Insert Disk], [Device Driver Wizard], [Battery Check] and [Windows ID Screens] are not displayed. The [Main screen] is displayed after step 10 is carried out. Carry out step 16, and then execute the procedure from step 22 onwards.
2) Operations steps 5 to 18 in “VI. Recovering the system by Replacing the HDD” above are not required as the [New Hardware], [Insert Disk], [Device Driver Wizard], [Battery Check] and [Windows ID screens] are not displayed. The [Main screen] is displayed after step 4 is carried out. Carry out step 11, and then execute the procedure from step 19 onwards.
3) When the installation date relating to the backup battery replacement date is set to an old date two years ago or earlier, the [Battery Check (exchange) screen] is displayed. If you leave this date setting as it is, this screen will also be displayed when the user is using the CD-4046. So, change the installation date. Enter the service mode, select [Remove history] and delete the installation date. Next, select “Exchange battery” and set the new date. For details, refer to “V. Service Mode” described above.
4) When the HDD is used for temporary replacement, replace the HDD as soon as possible.

  CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

VII. AFTER REPLACING ELECTRICAL PARTS

Some of the electrical parts that are used on this machine must be remedied (e. g. adjusted and reset) after they are replaced. This applies to the following parts and units.

1) HDD
2) Backup battery
3) Touch panel assembly
4) SH CPU PCB assembly
5) Scanner unit
6) Document width sensor

Note 1: The HDD must be remedied also after the software has been re-installed.

Note 2: The touch panel assembly must be calibrated when the positional relationship between the touch panel and the LCD has changed. This is necessary not only after replacement of parts but also after disassembly.

1. HDD

1) When the HDD is replaced with a service part (blank HDD without software installed), carry out the procedure in "VI. 3. Re-installation Procedure" described above. However, note that the blank HDD service part is to be connected instead of the faulty HDD.
2) When the HDD is replaced with the service tool (HDD with ID No.), carry out the procedure in "VI. 4 Recovering the system by replacing the HDD".
3) When the software has been re-installed, carry out the procedure in "VI. 3. Re-installation Procedure" described above.

Note: When you send a removed HDD, pack it in the box that contained the service part or service tool HDD.

2. Backup Battery

1) Write the replacement date on the "DATE" label that is affixed to the top surface of the backup battery.
2) Execute "Exchange battery" in the Service mode. For details on operations., refer to "V. Service Mode" described above.
3) Dispose of used backup batteries in accordance with local bylaws and regulations. Otherwise, refer to "Chapter 1, III. C. Backup Battery".

3. Touch Panel Assembly

The touch panel must be calibrated if the positions of the touch panel and the LCD have deviated. This is necessary not only after replacement of parts but also after disassembly.

4. SH CPU PCB Assembly

Carry out the following referring to "V. F. Scanner Service Mode".

1) Shading compensation
2) Document width sensor adjustment
3) Resistration adjustment

5. Scanner Unit

Carry out shading compensation referring to "V. F. Scanner Service Mode".

6. Document Width Sensor

Adjust the document width sensor referring to "V. F. Scanner Service Mode".

APPENDIX

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

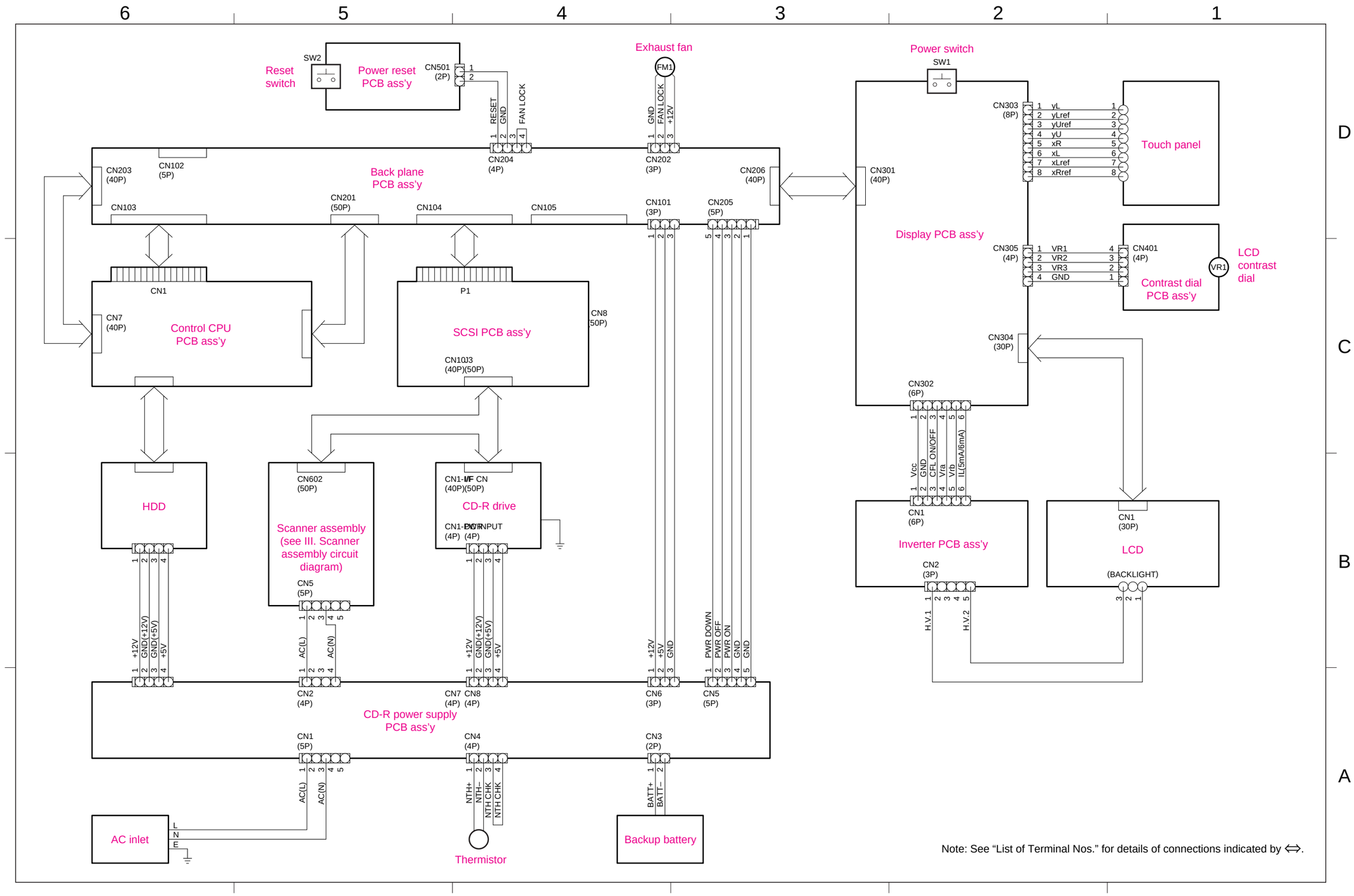
I. LIST OF SIGNALS

This section lists the abbreviations of drive and detection signals used in this manual and circuit diagrams, and explains their meanings.

CLK	CLocK
DCBD1	DoCument Board Drive motor command 1
DCBD2	DoCument Board Drive motor command 2
DWID	Document WIDth detection signal
LED_A	front side LED drive command
LED_B	back side LED drive command
M_LOCK	Motor LOCK signal
MFSD	Manual Feed Solenoid Drive command
MOTD	MOTor Drive command
PAUD	Paper pAUse Drive command
PDP1	Paper Detection signal 1
PDP2	Paper Detection signal 2
PDP3	Paper Detection signal 3
PDP4	Paper Detection signal 4
PPUD	Paper Pick-Up Drive command
SP	Sift Pulse signal
SPEED-A	SPEED select signal A
SPEED-B	SPEED select signal B
Vout1	BASIS analog Voltage out put signal 1
Vout2	BASIS analog Voltage out put signal 2
Vref	BASIS drive reference Voltage

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

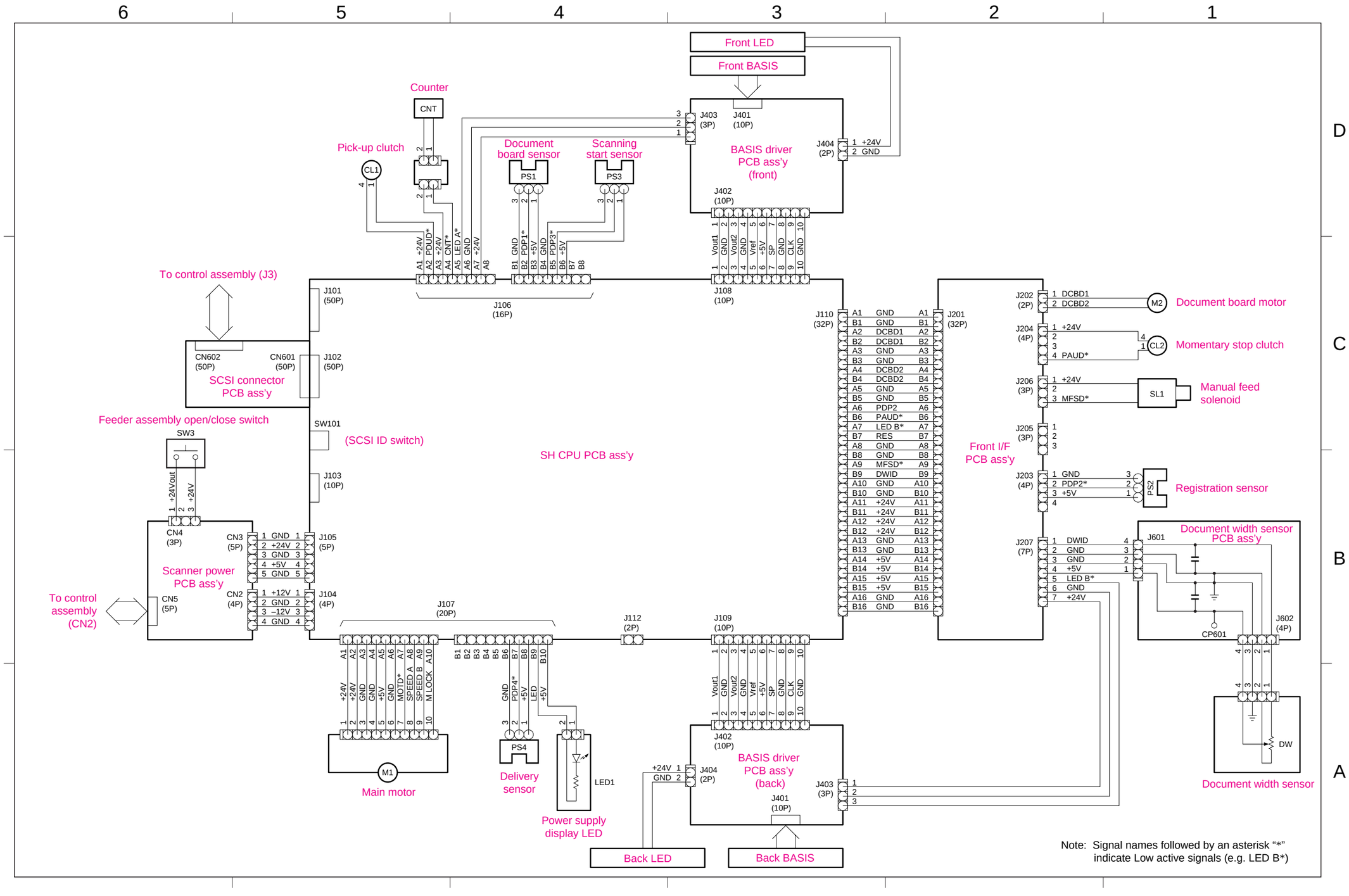
II. GENERAL CIRCUIT DIAGRAM



Note: See “List of Terminal Nos.” for details of connections indicated by ⇔.

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

III. SCANNER ASSEMBLY CIRCUIT DIAGRAM



 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

IV. LIST OF TERMINAL NUMBERS

1. Control CPU PCB Assembly to Back Plane PCB Assembly
(CN7 to CN203)

Terminal No.	Signal Name	Terminal No.	Signal Name
1	NC	21	GND
2	NC	22	UD3
3	GND	23	UD2
4	GND	24	UD1
5	VDD	25	UD0
6	VAA	26	LD3
7	DISP OFF	27	LD2
8	CP	28	LD1
9	NC	29	LD0
10	LOAD	30	GND
11	FRAME	31	GND
12	NC	32	NC
13	UD7	33	NC
14	UD6	34	NC
15	UD5	35	NC
16	UD4	36	NC
17	LD7	37	NC
18	LD6	38	NC
19	LD5	39	NC
20	LD4	40	GND

Table A-1

(CN8 to CN201)

Terminal No.	Signal Name	Terminal No.	Signal Name
1	NC	26	NC
2	NC	27	NC
3	NC	28	NC
4	PWR DOWN	29	NC
5	NC	30	NC
6	PWR OFF	31	NC
7	NC	32	NC
8	TOUCH CTRL	33	NC
9	NC	34	NC
10	GND	35	NC
11	NC	36	NC
12	GND	37	GND
13	NC	38	NC
14	GND	39	NC
15	NC	40	NC
16	GND	41	NC
17	NC	42	NC
18	GND	43	TxD
19	NC	44	NC
20	GND	45	RxD
21	NC	46	RTS
22	GND	47	NC
23	FAN LOCK	48	CTS
24	GND	49	GND
25	PWR SW	50	NC

Table A-2

(CN1 to CN103)

Terminal No.	Signal Name	Terminal No.	Signal Name
A1	IO CH CK*	B1	GND
A2	SD7	B2	RESET DRV
A3	SD6	B3	+5V
A4	SD5	B4	IRQ9
A5	SD4	B5	–5V
A6	SD3	B6	DRQ2
A7	SD2	B7	–12V
A8	SD1	B8	OWS*
A9	SD0	B9	+12V
A10	IO CH RDY	B10	GND
A11	AEN	B11	SMEMW*
A12	SA19	B12	SMEMR*
A13	SA18	B13	IOW*
A14	SA17	B14	IOR*
A15	SA16	B15	DACK3*
A16	SA15	B16	DRQ3
A17	SA14	B17	DACK1*
A18	SA13	B18	DRQ1
A19	SA12	B19	REFRESH*
A20	SA11	B20	CLK
A21	SA10	B21	IRQ7
A22	SA9	B22	IRQ6
A23	SA8	B23	IRQ5
A24	SA7	B24	IRQ4
A25	SA6	B25	IRQ3
A26	SA5	B26	DACK2*
A27	SA4	B27	TC
A28	SA3	B28	BALE
A29	SA2	B29	+5V
A30	SA1	B30	OSC
A31	SA0	B31	GND
C1	SBHE*	D1	MEMCS16*
C2	LA23	D2	IOCS16*
C3	LA22	D3	IRQ10
C4	LA21	D4	IRQ11
C5	LA20	D5	IRQ12
C6	LA19	D6	IRQ15
C7	LA18	D7	IRQ14
C8	LA17	D8	DACK0*
C9	MEMR*	D9	DRQ0
C10	MEMW*	D10	DACK5*
C11	SD8	D11	DRQ5
C12	SD9	D12	DACK6*
C13	SD10	D13	DRQ6
C14	SD11	D14	DACK7*
C15	SD12	D15	DRQ7
C16	SD13	D16	+5V
C17	SD14	D17	MASTER*
C18	SD15	D18	GND

Table A-3

2. Control CPU PCB Assembly to HDD (CN10 to CN1-I/F)

Terminal No.	Signal Name	Terminal No.	Signal Name
1	RESET*	21	DMARQ
2	GND	22	GND
3	DATA7	23	IOW*
4	DATA8	24	GND
5	DATA6	25	IOR*
6	DATA9	26	GND
7	DATA5	27	IORDY
8	DATA10	28	CSEL
9	DATA4	29	DMACK*
10	DATA11	30	GND
11	DATA3	31	INTRQ
12	DATA12	32	IOCS16*
13	DATA2	33	DA1
14	DATA13	34	PDIAG*
15	DATA1	35	DA0
16	DATA14	36	DA2
17	DATA0	37	CS0*
18	DATA15	38	CS1*
19	GND	39	DASP*
20	NC (KEY)	40	GND

Table A-4

3. SCSI PCB Assembly to SCSI Connector PCB Assembly and CD-R Drive
(J3 to CN602)
(J3 to I/F CN)

Terminal No.	Signal Name	Terminal No.	Signal Name
1	GND	26	+5V
2	DB0*	27	GND
3	GND	28	GND
4	DB1*	29	GND
5	GND	30	GND
6	DB2*	31	GND
7	GND	32	ATN*
8	DB3*	33	GND
9	GND	34	GND
10	DB4*	35	GND
11	GND	36	BSY*
12	DB5*	37	GND
13	GND	38	ACK*
14	DB6*	39	GND
15	GND	40	RST*
16	DB7*	41	GND
17	GND	42	MSG*
18	DB8*	43	GND
19	GND	44	SEL*
20	GND	45	GND
21	GND	46	C/D*
22	GND	47	GND
23	GND	48	REQ*
24	GND	49	GND
25	NC	50	I/O*

Table A-5

4. SCSI PCB Assembly to Back Plane PCB Assembly (PL to CN104)
This connection is the same as that in “1. Control CPU PCB Assembly to Back Plane PCB Assembly (CN1 to CN103)” described above.

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

5. Back Plane PCB Assembly to Display PCB Assembly
(CN206 to CN301)

Terminal No.	Signal Name	Terminal No.	Signal Name
1	GND	21	GND
2	PWR SW	22	UD3
3	+5V	23	UD2
4	+5V	24	UD1
5	+3.3V	25	UD0
6	+12V	26	GND
7	+12V	27	LD7
8	GND	28	LD6
9	TxD	29	LD5
10	RxD	30	LD4
11	RTS	31	GND
12	CTS	32	LD3
13	VDD	33	LD2
14	VAA	34	LD1
15	DISP OFF	35	LD0
16	GND	36	GND
17	UD7	37	FRAME
18	UD6	38	LOAD
19	UD5	39	CP
20	UD4	40	GND

Table A-6

6. Display PCB Assembly to LCD
(CN304 to CN1)

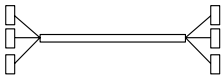
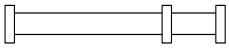
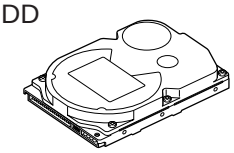
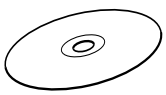
Terminal No.	Signal Name	Terminal No.	Signal Name
1	VSS	16	VSS
2	VD3	17	LD7
3	VAA	18	LD6
4	VDD	19	LD5
5	DISP OFF	20	LD4
6	NC	21	LD3
7	VSS	22	LD2
8	UD7	23	LD1
9	UD6	24	LD0
10	UD5	25	VSS
11	UD4	26	FRAME
12	UD3	27	LOAD
13	UD2	28	VSS
14	UD1	29	CP
15	UD0	30	VSS

Table A-7

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

V. LIST OF SPECIAL TOOLS

The following lists the special tools that are required for servicing this machine in addition to the standard tool set.

No.	Tool name	Tool No.	Shape	Rank	Purpose/Remarks
1	Test sheet set	TKM-0271	A4 copy size	A	• 10 sheets/set
2	Standard white paper	FY9-3004	A4 copy size	B	• For shading compensation • 20 sheets/set
3	Scanner DC cable	TKM-0281	Cable w/ connector (length 600 mm) 	B	• For shading compensation
4	Scanner AC cable	TKM-0288	Cable w/ connector (length 400 mm) 	B	• For shading compensation
5	HDD IDE cable	TKM-0282	Cable w/ connector (length 900 mm) 	B	• For re-installing software
6	HDD DC cable	TKM-0287	Cable w/ connector (length 600 mm) 	B	• For re-installing software
7	HDD with ID No.	TKM-0284 (English version) TKM-0290 (Japanese version)	HDD 	B	• For re-installing software • With authentication label and ID label
8	Recovery CD	TKM-0283 (English version) TKM-0289 (Japanese version)	CD 	B	• For re-installing software • With recovery indication and case

Note: Rank

A= Each service technician should carry one with him.

B= A group of about five service technicians should share one.

C= Each workshop should keep one.

CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

VI. LIST OF SOLVENTS & LUBRICANTS

No.	Name	Application	Composition	Remarks
1	Ethyl alcohol (Ethanol) Isopropyl alcohol (Isopropanol)	Cleaning: Glass, plastic, rubber, external covers	C_2H_5OH $(CH_3)_2$ CHOH	• Do not bring near fire. • Procure locally.
2	MEK	Cleaning: Metal parts, oil smudges, toner smudges	$CH_3 \cdot CO \cdot C_2H_5$ Methylethyl ketone	• Do not bring near fire. • Procure locally.
3	Heat-resistant grease	Lubricating the drive mechanism	Mineral oil-based lithium soap Molybdenum disulfide	• Vitasol MO-138S (manufactured by Hitachi Powder Mill) • Tool No. CK-0427 (500 g/can)
4	Lubricating oil (low viscosity)	Lubrication points: Scanner rail, etc.	Mineral oil (paraffin-based)	• Uniway 68 (CK-0451) • Substitutes: Suwaway S68 (manufactured by Maruzen Sekiyu) Mobil Vactra Oil No. 2 (manufactured by Mobil Oil)
5	Lubricating oil (high viscosity)	Lubrication point: One-way clutch in pick-up control unit, etc.	Mineral oil (paraffin-based)	• Uniway 220 (manufactured by Nihon Sekiyu) • Tool No. CK-0524 (100 cc) • Substitutes: Suwaway S180 (manufactured by Maruzen Sekiyu)

 CANON CD-4046 REV.0 MAY 1998 PRINTED IN JAPAN (IMPRIME AU JAPON)

Prepared by

Quality Assurance Center
Canon Electronics Inc.

Printed in Japan

FIRST EDITION (MAY 1998) [63999]

1248 Shimokagemori, Chichibu-shi
Saitama 369-1892, Japan

Canon

The publication is printed on
70% reprocessed paper.

PRINTED IN JAPAN (IMPRIME AU JAPON) 0598AB0.40-1