I. FEATURES

1. Compact size scanner with A3 capable

External dimensions (tray closed): 398 (W) ∆ 312 (D) ∆ 191 (H) mm

2. High-speed/high-quality scanning

Newly 3-line contact image sensor

Simplex: 50 ppm, duplex: 100 ipm (200 dpi, A4 size) with black & white, grayscale and color modes

3. Dual-path mechanism (U-turn/straight path)

Straight path is provided for thicker documents

4. No periodic maintenance

Periodic maintenance is not necessary by service technician.

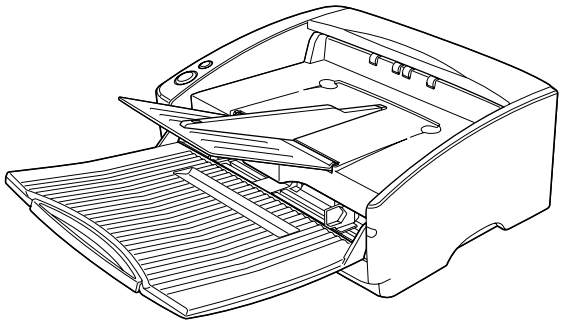

Figure 1-101

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Other company names and product names mentioned in this document are registered trademarks or trademarks of the respective companies.

II. SPECIFICATIONS

1. Appearance/Installation

No.	Item	Specifications
1	Type	Desktop type sheet fed scanner
2	Voltage models	1) 100 V model: 100 VAC, 50/60 Hz 2) 120 V model: 120 VAC, 60 Hz 3) 220-240 V model: 220-240 VAC, 50/60 Hz
3	Rating power consumption/current	1) 100 V model: 83 W 2) 120 V model: 1 A 3) 220-240 V model: 0.5 A *Energy Star conformity
4	Operating environment	10 to 32.5∀C (50 to 90.5∀F) 20 to 80%RH *No condensation allowed.
5	Noise	1) Sound power level In standby mode: 40 dB or less In operating mode: 71 dB or less 2) Sound pressure level: Bystanders (reference) In operating mode: 61 dB or less
6	Dimensions	Tray closed: 398 (W) ∆ 312 (D) ∆ 191 (H) mm Tray opened: 398 (W) ∆ 668 (D) ∆ 194 (H) mm at U-turn
7	Weight	Approx. 10 kg
8	Output interface	SCSI-3 (Ultra SCSI) USB2.0 (Hi-speed)
9	Expected product life (in-house information)	One of the following two items, whichever comes first. 1) 5 years 2) Sheets fed: 4,000,000 sheets (A4 size) There are parts needed to replace.
10	Estimated duty cycle	6,000 sheets/day (A4)
11	Installation	User
12	Bundle software	ISIS/TWAIN driver, CapturePerfect 3.0, Acrobat 7.0
13	Option	Barcode module *Imprinter will be released on 3rd Q, 2005
14	Consumable parts (commercial goods)	Exchange roller kit (Pickup, Feed, Retard rollers)

Table 1-201

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2. Documents Feed

No.	Item	Specifications			
1	Document size		U-turn path	Straight path	
		1) Width	53 to 300 mm		
		2) Length	70 to 432 mm		
2	Document weight (converted thickness)	1) Separation-feed	52 to 128 g/m^2 (0.06 to 0.15 mm)		
		2) Non-Separation	42 to 157 g/m^2 (0.05 to 0.20 mm)	42 to 546 g/m^2 (0.05 to 0.66 mm)	
3	ISO/JIS standard card	Available at straight path with non-separation feed only. Width: 53.9 mm, Length: 85.5 mm, Thickness: 0.84 mm or less *No embossment is permitted.			
4	Long-document mode	Available by service mode (Special users only) 1000 mm max. *Thickness: 0.2 mm or less, Image data size: 128 MB or less			
5	Document requirements	1) Pressure-sensitive paper: Can be fed with limitation of direction. 2) Carbon-backed paper: Cannot be fed. 3) Perforated paper for binder: Can be fed with limitation of holes. 4) Curled paper: Can be fed only if curl is 8 mm or less. 5) Creased paper: Can be fed, but crease must be straightened before being fed.			
6	Document storage		U-turn path	Straight path	
		1) Pickup	10 mm or less including curls (100 sheets or less with 80 g/m^2 document)		
		2) Eject	12 mm or less (including curls)	(Not warranted because the eject tray length is short.)	
		3) Ejected face direction	Face down	Face up (inverted ordering)	
7	Feeding speed	Resolution	Binary	Grayscale	Color
		100/200 dpi	300 mm/sec		
		300/400 dpi	240 mm/sec		
		600 dpi	120 mm/sec		90 mm/sec
		*At 600 dpi, the numbers above may differ depending on the setting conditions.			

Table 1-202

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3. Document Reading *using bundle software (CapturePerfect 3.0)

No.	Item	Specifications			
1	Type of sensor	3 Line Contact Image Sensor (CIS)			
2	Picture element	Density of element: 600dpi, Effective elements: 7328 Δ 3 line (310 mm)			
3	Light source	3-color (RGB) LEDs R: 620 nm, G: 530 nm, B: 467 nm			
4	Color dropout	Available: R/G/B/Custom-color, each side *Color emphasize modes are available also.			
5	Reading side	Simplex (Front)/Duplex (Both)/Blank skip *Reverse side selection is available.			
6	Reading size	1) Typical: A3/A4/A4-R/A5/A5-R/A6/A6-R, B4/B5/B5-R/B6/B6-R, LDR/LGL/LTR/LTR-R 2) Auto size detection 3) Maximum size (300 Δ 432mm) 4) Margin (∂10 mm) 5) User setting			
7	Output mode	1) Binary (Black&White/Error diffusion/ Hi-speed text enhancement/Advanced text enhance- ment) 2) Grayscale (8 bit) 3) Color (24 bit) *MultiStream function is available.			
8	Output resolution	100 Δ 100 dpi, 150 Δ 150 dpi, 200 Δ 200 dpi, 240 Δ 240 dpi, 300 Δ 300 dpi, 400 Δ 400 dpi, 600 Δ 600 dpi,			
9	Reading speed	A4 size documents			
		Mode	Resolution	Single	Double
		Black&White	200 dpi	50 ppm	100 ipm
			300 dpi	40 ppm	80 ipm
			600 dpi	18 ppm	18 ipm
		Grayscale	200 dpi	50 ppm	100 ipm
			300 dpi	40 ppm	70 ipm
			600 dpi	18 ppm	16 ipm
		Color	200 dpi	50 ppm	100 ipm
			300 dpi	40 ppm	70 ipm
			600 dpi	6 ppm	16 ipm
		*Settings of reading are default, and Grayscale/Color are JPEG. The numbers above may differ depending on the computer, the function settings and other conditions. Other detailed conditions are omitted.			

Table 1-203

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4. Image Processing/Other Functions *using bundle software (CapturePerfect 3.0)

No.	Item	Specifications
1	Brightness adjustment	255 steps, back side individual setting, AE for B&W mode
2	Contrast adjustment	7 steps, back side individual setting
3	Gamma correction	Gray/R/B/G individual color, each side setting
4	Edge emphasize	5 steps
5	JPEG composition	Performed in scanner
6	Shading correction	Performed at each batch (shading plates are provided in scanner)
7	Skew correction (deskew)	Performed by image processing
8	Skew detection	Performed by end sensors (to prevent from tearing document)
9	Double feed detection	Length detection sensor/Ultra-sonic sensor
10	Other image processing	Black border removal, Binder hole removal, Image rotation, Text orientation, Batch code, Dots erase, Notch erase
11	Counter	Total fed count/Replacement count (memorize in scanner)
12	Operational button	Start button/Stop button

Table 1-204

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

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III. PRECAUTIONS

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

1. Power OFF in Emergency

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

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

2. Prohibition of Modify

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

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

3. Electromagnetic Wave Interference Countermeasures

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

4. User Manual

Read the user manual thoroughly before using this machine.

5. Disposal

Following local regulations when disposing of the product and parts.

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IV. NAME OF PARTS

1. Front

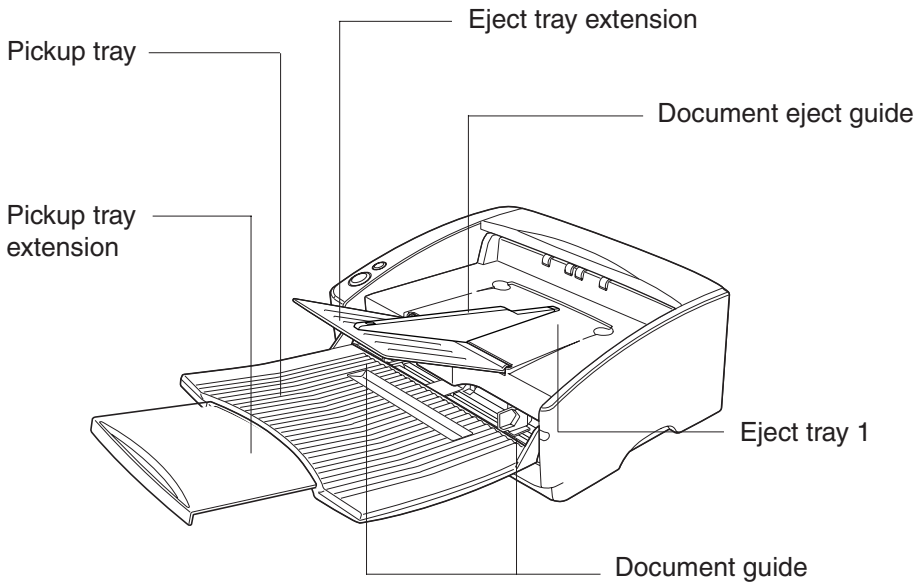

Figure 1-401

2. Operation Panel

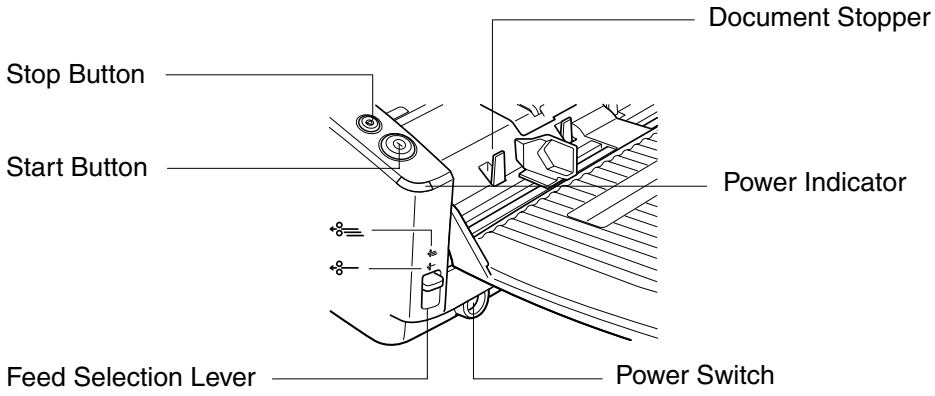

Figure 1-402

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3. Rear

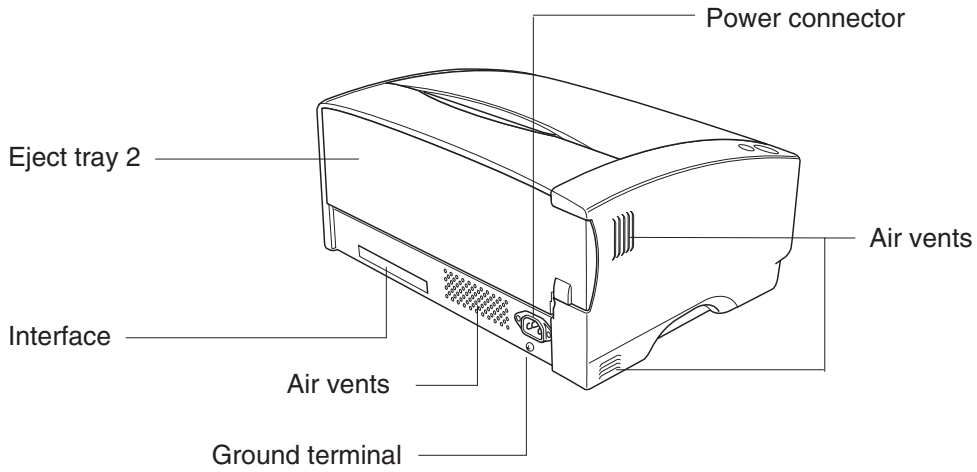

Figure 1-403

4. Interface

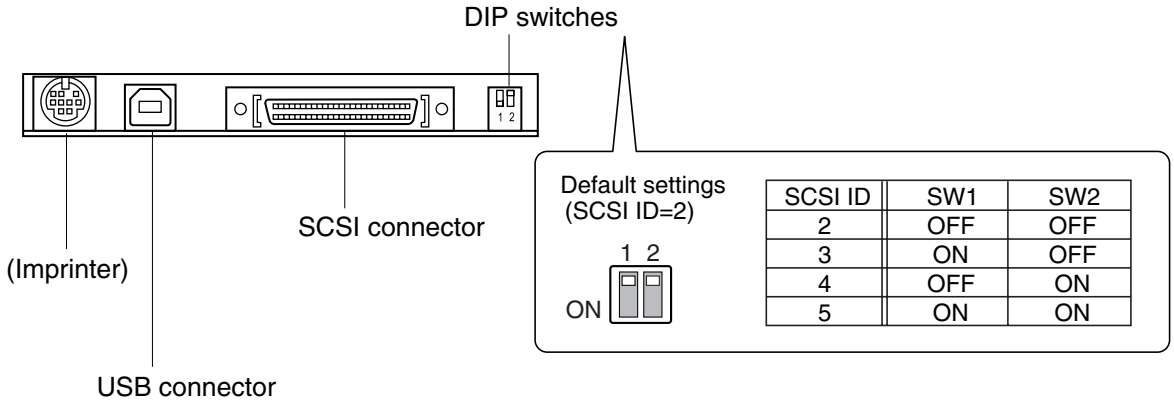

Figure 1-404

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V. USER OPERATION

Refer to the software user manual for this machine for details.

1. Installation

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

2. Operation Screen

Basic operation screens if CapturePerfect 3.0 is used are shown for reference. CapturePerfect 3.0 uses an ISIS driver.

1) Main screen

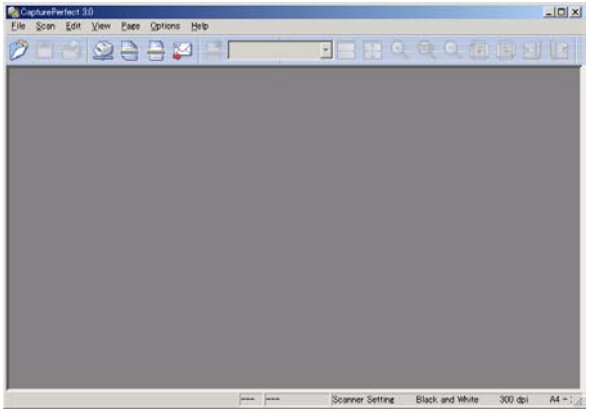

Figure 1-501

2) Basic settings

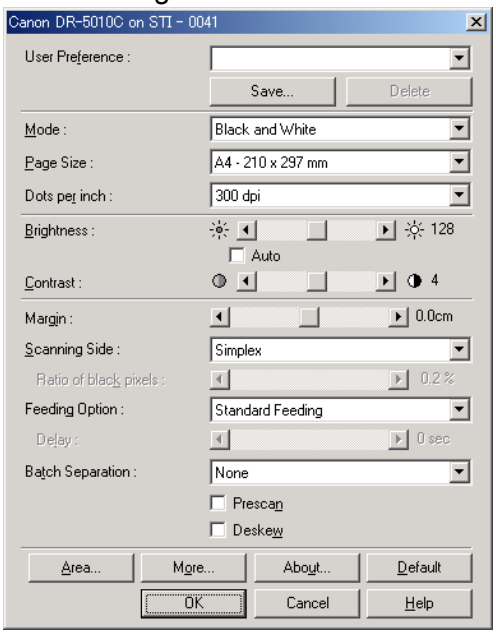

Figure 1-502

3) Detailed settings

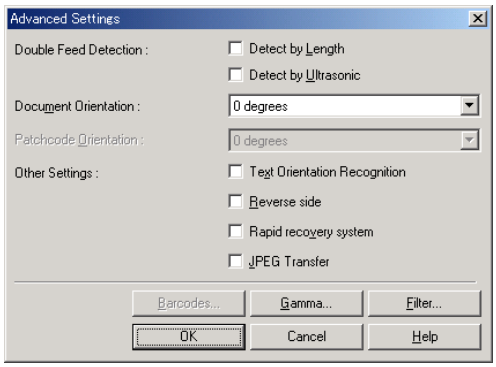

Figure 1-503

4) Filter

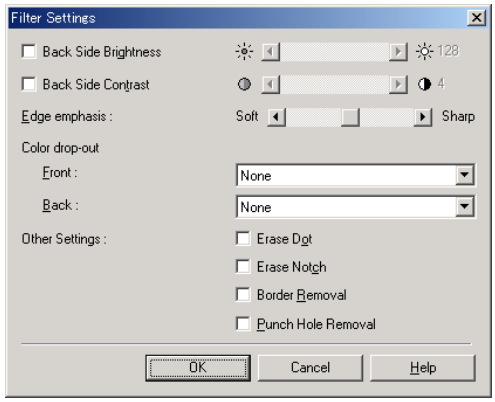

Figure 1-504

5) Gamma

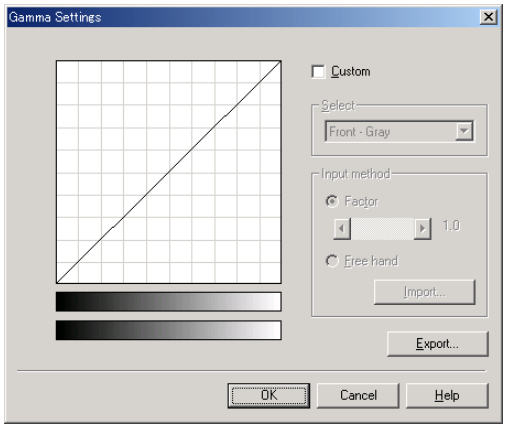

Figure 1-505

3. Clearing Jams

1) Remove documents left on the eject tray and then close the eject tray extension.

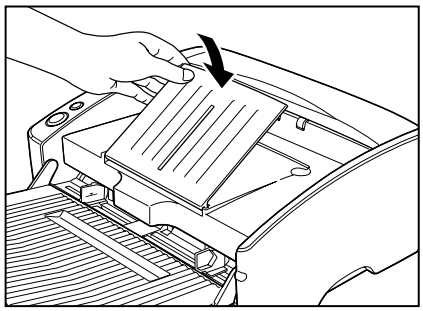

Figure 1-506

2) Open the upper unit slowly.

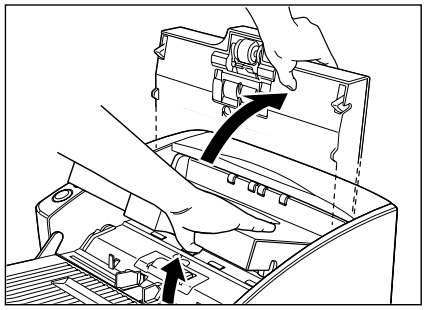

Figure 1-507

Note: Do not hold the pickup roller at the center when opening or closing the upper unit.

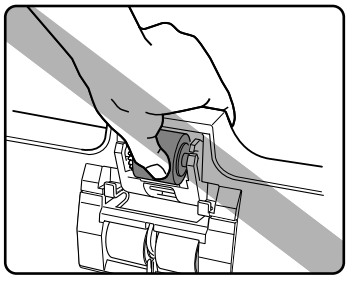

Figure 1-508

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3. Electrical Circuits

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

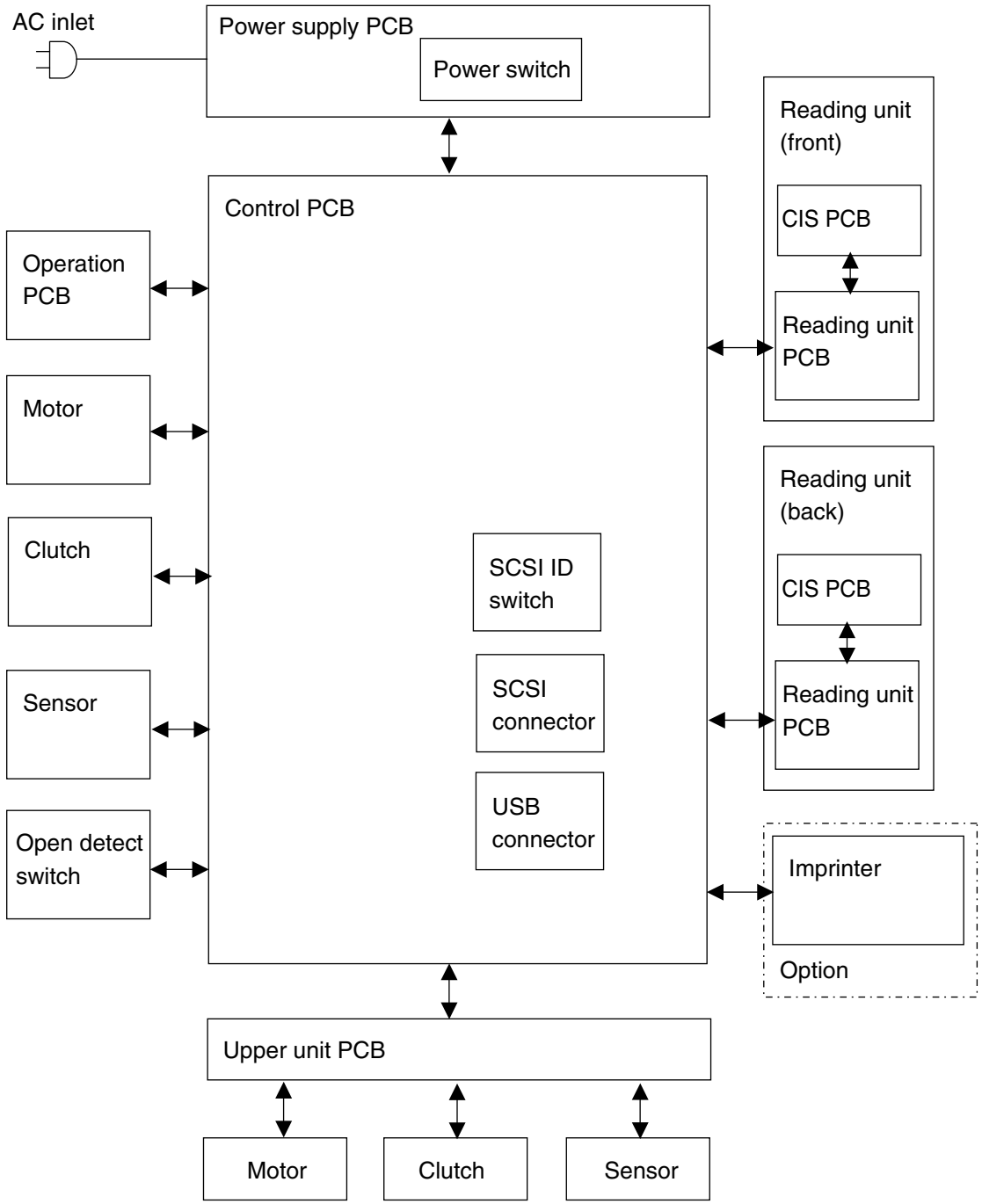

Figure 2-103

4. Timing Chart

Figure 2-104 describes the timing chart when you separately feed two sheets of document by using a U-turn path without temporarily suspending the machine.

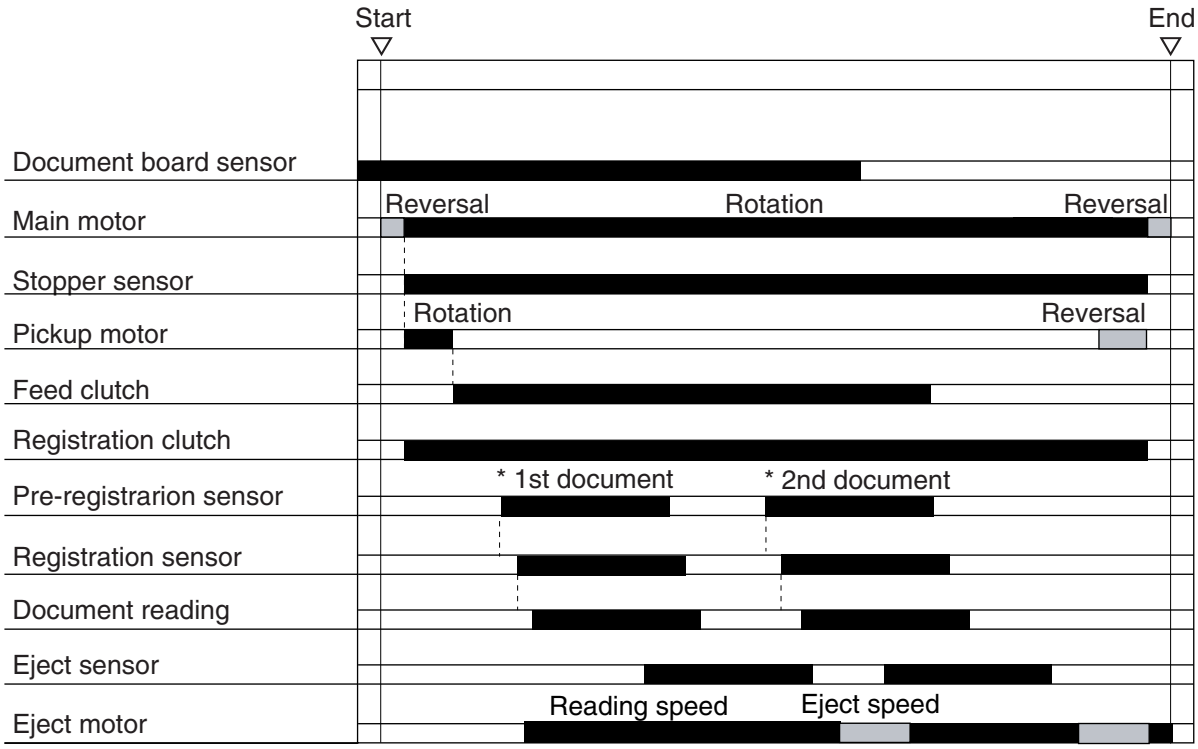

Figure 2-104

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The RGB analog signals output from the CIS unit are input to the reading unit PCB.

After those signals are converted into the digital signals in the reading unit PCB, the dedicated image processing IC (YUME-chip) rearranges the order of the data to compensate shading and align three lines. The image data used at this time consist of 10bit digital signals.

According to the scanner settings, an optical resolution between 600 dpi and 300 dpi can be selected. In case that the resolution is set at 400 dpi or less, 300dpi data are output. In case that the resolution is set at 600 dpi, 300 or 600dpi data are automatically selected depending on the volume of data.

The image data output from the reading unit PCB are input to the control PCB and processed by the dedicated image processing IC (DRADRA-chip).

Since the data are processed as 8 bits within the IC, they are converted from 10 bits to 8 bits at the image reading section. And, the image data is rearranged.

The image processing section 1 changes the resolution of the main-scanning direction, performs the grayscale conversion and the dropout color in accordance with the scanner settings in order to convert the data into basic image data.

This machine is provided with the "MultiStream" function. Thus, the data can be converted into image data which meet two types of settings, simultaneously. The basic image data are stored in the SDRAM through the SDRAM interface. SDRAM is 128 Megabytes in capacity.

And then, the 3-dimensional color space processing section performs the 3-dimensional gamma correction which is a newly developed processing in order to improve the quality of colors.

The image processing section 2 changes the resolution, performs the 1-dimensional gamma correction (adjustment of brightness and contrast, and custom gamma correction) and the grayscale conversion.

The image processing section 3 handles the edge emphasis, binarizing (simple binarizing, error diffusion), and binary AE processing (ABC, High-speed text enhancement).

In the JPEG module, the grayscale and color data can be compressed in JPEG format. When JPEG is selected, the image data size is reduced by compression within this machine so that it can be transferred to the computer in less time. As a result, more documents can be scanned in a given time.

Finally, processed image data are sent from the DMA I/F to the computer either through the SCSI or USB interface.

In case that the MultiStream is selected, the image data stored in the SDRAM are processed again in accordance with the secondary settings.

The following image processing are carried out inside the computer.

- ∉ Advanced text enhancement
- ∉ Automatic size detection
- ∉ Skew correction
- ∉ Black border removal
- ∉ Binder hole removal
- ∉ Blank skip
- ∉ Add-on
- ∉ Patch code detection
- ∉ Text orientation
- ∉ Image rotation
- ∉ Dots erasing
- ∉ Notch erasing

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V. IMAGE PROCESSING

Note: The principle of the processing described in this section is simplified to make it easily understandable. In actual cases, the procedure may be somewhat complicated.

1. Image Processing in Main Body

1) A/D Conversion

The image data output from the image sensor are analog signals. These signals are converted to digital signals in order to process them into each image. This is called A/D conversion.

Figure 2-501 shows the outputs of digital signals after A/D conversion when they are 4bit signals.

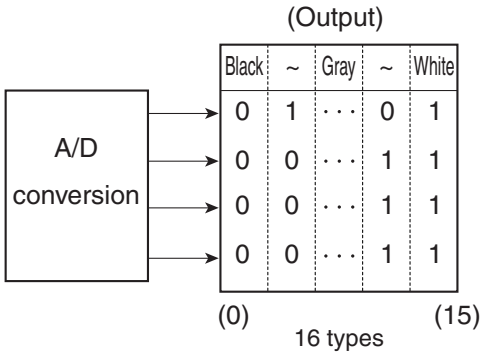

Figure 2-501

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

This machine outputs eight bits, so 256 levels can be obtained.

The offset and gain are adjusted for the analog signals to successfully convert those signals into digital signals.

In the offset adjustment, the minimum output value of perfect black is changed to the predefined value. In the gain adjustment, the maximum output value of perfect white is changed to the predefined value.

The offset and gain adjustments are sometimes called “black clamp” and “amplification” processing, respectively.

2) Shading Correction

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

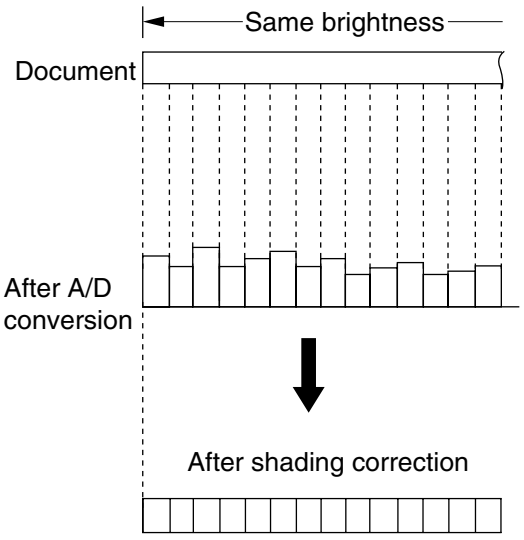

Figure 2-502

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The correction values of each element are calculated in advance and stored in a memory. This machine stores those values in the memory installed on the reading unit PCB.

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

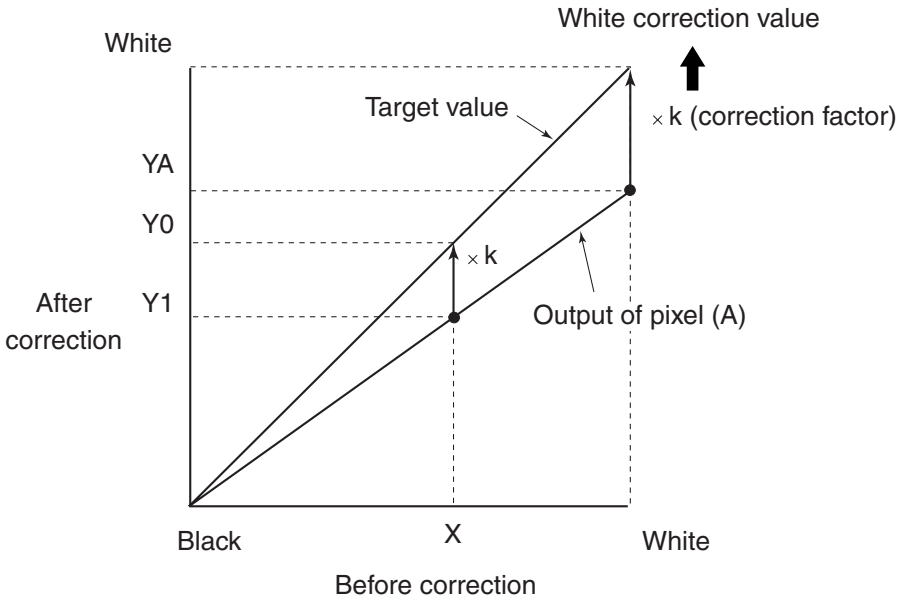


Figure 2-503

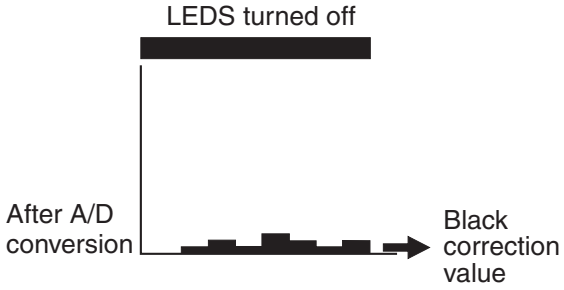


Figure 2-504

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

Some models use a standard white sheet, which is one of service tools, in the service mode in order to calculate correction values. However, this machine is equipped with the standard white sheet (called shading plate). Thus, correction values can be automatically calculated during normal operation.

3) Data Rearrangement

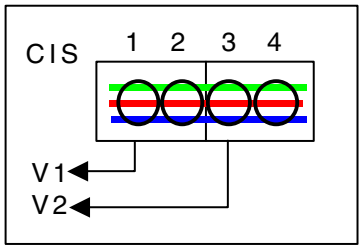
The data arrangement change is necessary to create appropriate image data.

The data rearrangement is performed after the A/D conversion.

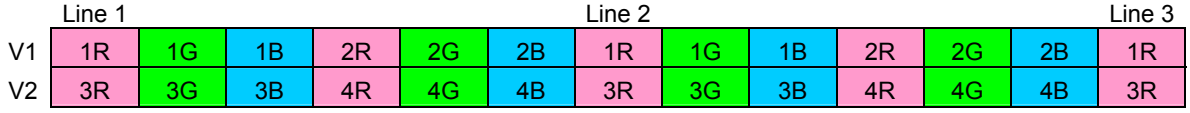
Each block parallel data of the CIS unit is rearranged as serial data in the reading unit PCB and those data are rearranged to correct the positions of three lines. And, the final, they are rearranged in output order of the final picture elements in the control PCB.

The following shows the data arrangement in case that the CIS unit configuration is set to simplex, four picture elements, and two blocks for easy understanding.

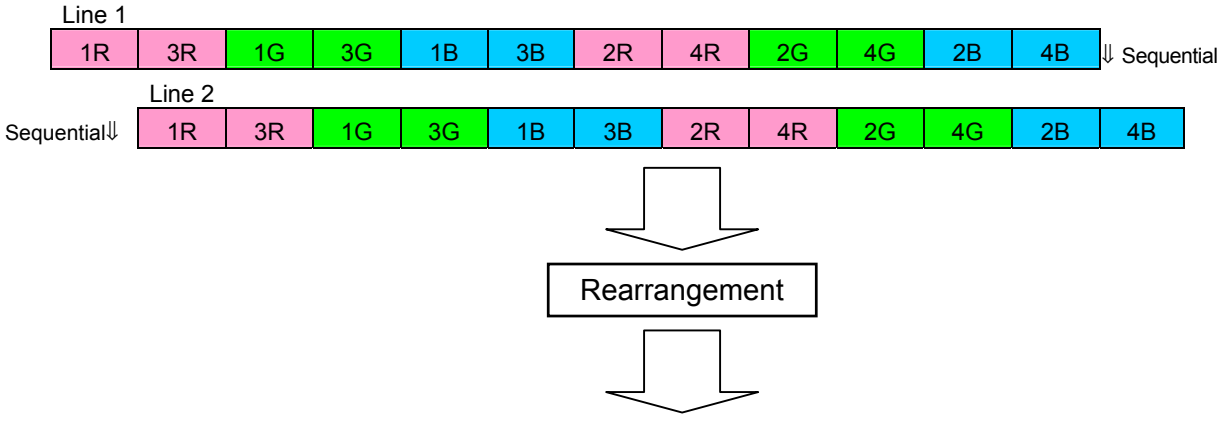
* CIS unit configuration



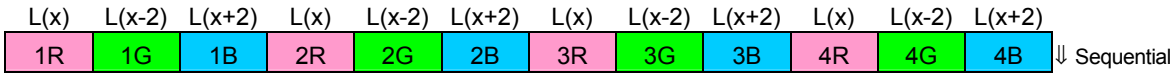
i) CIS unit output (each block output)



ii) Reading unit PCB (rearrangement)



iii) Control PCB (in order of final output)



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4) Image Resolution Conversion

a) Main-Scanning Direction

For the main-scanning direction, the image resolution conversion is executed by thinning out the standard clocks for image processing according to the resolution.

For example, when converting to 200 dpi from 300 dpi, the standard 300 dpi clock is used, with 1 clock pulse removed from every three pulses. (Figure 2-505)

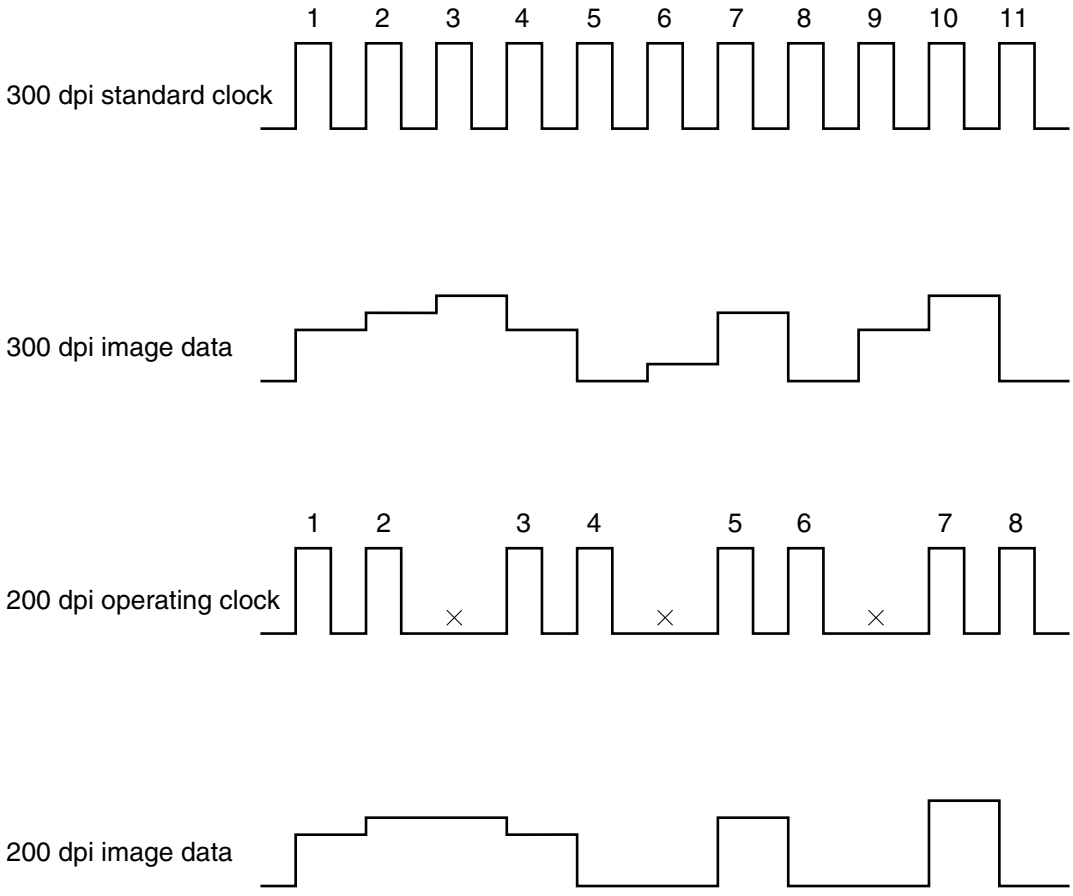

Figure 2-505

b) Sub-Scanning Direction

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

In the case of 200 dpi, feeding speed is 1.5 times as fast as 300 dpi. In the case of 150 dpi, it is twice the speed, and in the case of 100 dpi, three times the speed used for 300 dpi.

When the timing for reading the data from the image sensor is the same, the resolution in the sub-scanning direction can be converted by changing the feeding speed. (Figure 2-506)

However, the feeding speed is limited depending on the specifications of feed motor. If the feeding speed can not be raised, the read timing is thinned out. (Figure 2-507)

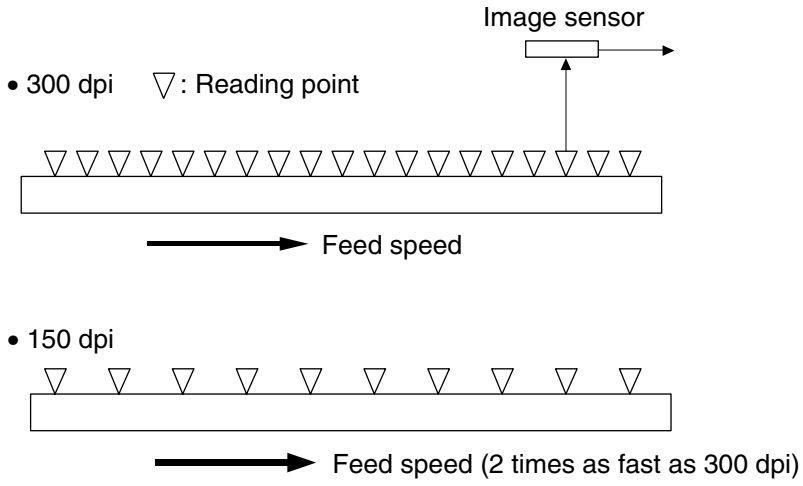

Figure 2-506

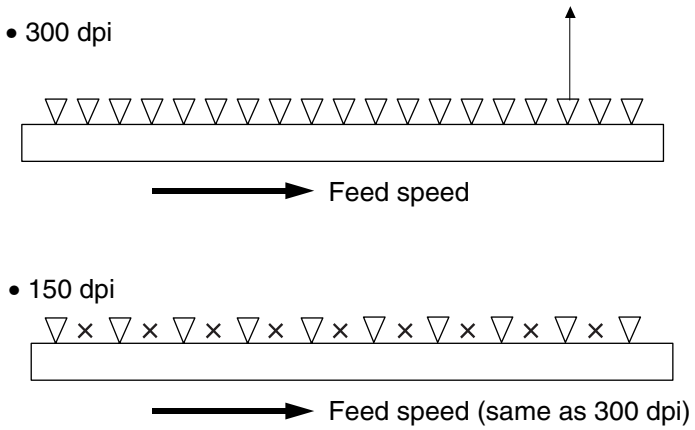

Figure 2-507

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d) Interpolation processing

This section describes how to convert a 300dpi image data into a higher-resolution one in case that the image data cannot be read at a high resolution depending on memory capacities or reading speed specifications.

The method of simply and repeatedly outputting an original image data to convert it into a high-resolution one is called simple interpolation processing, and the method of averaging the resolution of data to convert it into a high-resolution one is called averaging interpolation processing.

This machine has an SDRAM with the capacity of 128 MB. In case of an image data which cannot be stored in the SDRAM, for example, in case that it is processed in the 600dpi/color mode, average a 300dpi image data to convert it into a 600dpi data. In case of a 400dpi image data processed through 3-line CIS layout dimension, use averaged 600dpi data as original data to convert it into a 400dpi image data.

Table 2-510 includes original image data and picture element data after the averaging interpolation processing.

∉ Original data (300 dpi)

A	B	C	D
E	F	G	H
I	J	K	L

∉ Picture element data after the averaging interpolation processing (600 dpi)

A	$\frac{A+B}{2}$	B	$\frac{B+C}{2}$	C	$\frac{C+D}{2}$	D
$\frac{A+E}{2}$	$\frac{A+B+E+F}{4}$	$\frac{B+F}{2}$	$\frac{B+C+F+G}{4}$	$\frac{C+G}{2}$	$\frac{C+D+G+H}{4}$	$\frac{D+H}{2}$
E	$\frac{E+F}{2}$	F	$\frac{F+G}{2}$	G	$\frac{G+H}{2}$	H
$\frac{E+I}{2}$	$\frac{E+F+I+J}{4}$	$\frac{F+J}{2}$	$\frac{F+G+J+K}{4}$	$\frac{G+K}{2}$	$\frac{G+H+K+L}{4}$	$\frac{H+L}{2}$
I	$\frac{I+J}{2}$	J	$\frac{J+K}{2}$	K	$\frac{K+L}{2}$	L

Figure 2-510

5) Gray scale conversion

In case that the binary or gray scale mode is selected, three image data (R, G and B) which were input in the control PCB should be converted into a single brightness data.

Thus, an average of red, green and blue data is used as a single brightness data. Where a brightness data is "L," L = (R + G + B) / 3.

Suppose that R = 50, G = 200, B = 50. In this case, the green data should be converted into a gray data, which is calculated by L = (50 + 200 + 50) / 3 = 100.

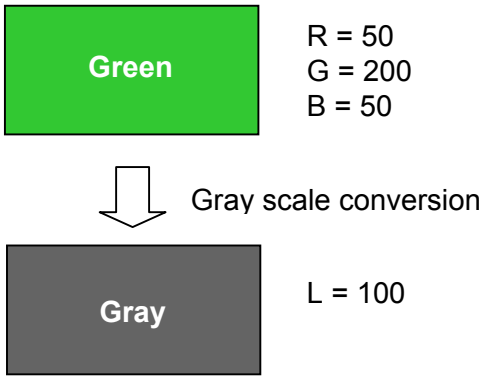

Figure 2-511

6) Color dropout (RGB)

In case that the color dropout mode only for R is selected, of three image data (R, G and B) which were input in the control PCB, only the red data is used as a brightness data.

Suppose that R = 220, G = 3 and B = 7. The red data should be converted into a near white data which is L = 220.

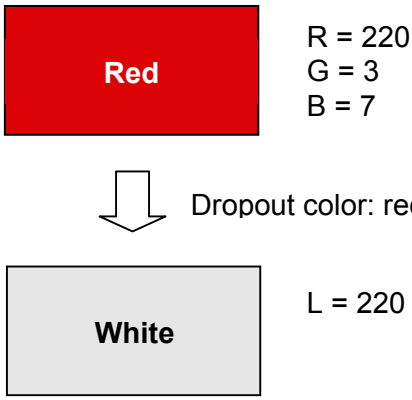

Figure 2-512

In case that the color emphasis mode only for R is selected, of three image data (R, G and B) which were input in the control PCB, the G and B data are converted into a single brightness data.

Thus, an average of G and B is used as a single brightness data. Where a brightness data is "L," L = (G + B) / 2.

Suppose that R = 220, G = 3 and B = 7. The red data should be converted into a near black data which is calculated by L = (3 + 7) / 2 = 5.

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The following paragraphs describe the overview of processing based on the block diagram.

The edges are detected through filters 1 and 2 and output to the binarizing processing section. Through filter 3, the threshold values of each picture element are calculated in accordance with the averaging method using 5x5 matrix data and output to the binarizing processing section.

The binarizing processing section breaks the picture elements of each edge image which was input down to “edge picture elements,” “inside picture element” and “background picture elements.” And then, it binarizes the edge picture elements according to the threshold values of each corresponding position. And it binarizes the inside picture elements according to the average of the threshold values calculated by binarizing the edge picture elements, and outputs all the background picture elements as white. Those picture element data is restored to images to create binary AE images.

10) 3-dimensional Gamma Correction

A conventional machine compensates R, G and B individually. Thus, the 1-dimensional gamma correction is applied (Figure 2-257).

On the other hand, the 3-dimensional gamma correction applies to this machine to improve the quality of color images (Figure 2-528).

The 3-dimensional gamma correction means that how (R, G, B) data should be output is determined based on the original (R, G, B) 3-dimensional data. The colors, R, G and B correlate with each other. Thus, if R is changed, the other colors should be changed. This improves the color repeatability. This processing is not performed in case of grayscale data.

* 1-dimensional gamma correction

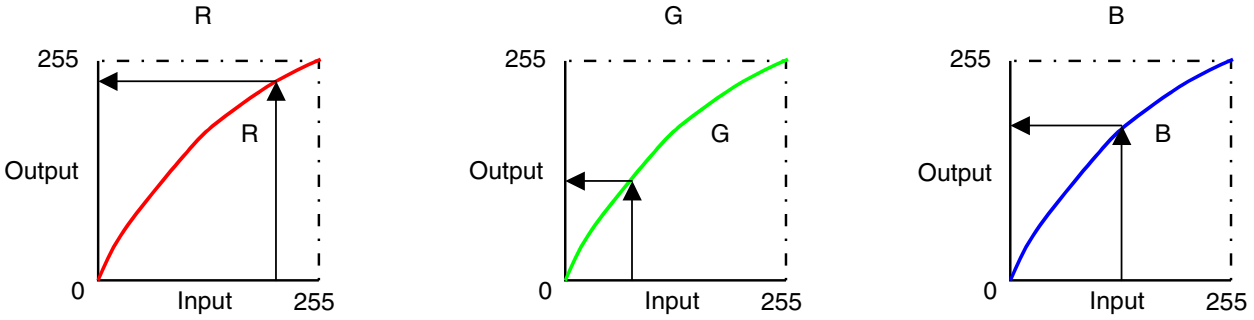

Figure 2-527

* 3-dimensional gamma correction

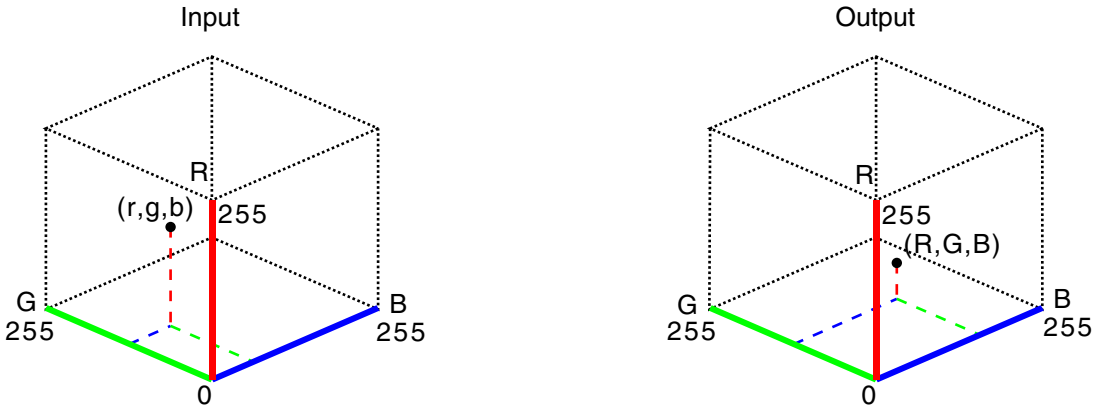

Figure 2-528

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12) MultiStream

MultiStream is a function that outputs data in two different modes at a single scan.

Figure 2-532 shows a screen where 600dpi resolution for grayscale and 100dpi resolution for black & white have been set on the front side of the document, and the resulting outputs.

In this case, the SDRAM in this machine stores 600dpi gray scale data, outputs this data primarily and then, outputs 100dpi black & white data converted from the stored 600dpi data secondarily.

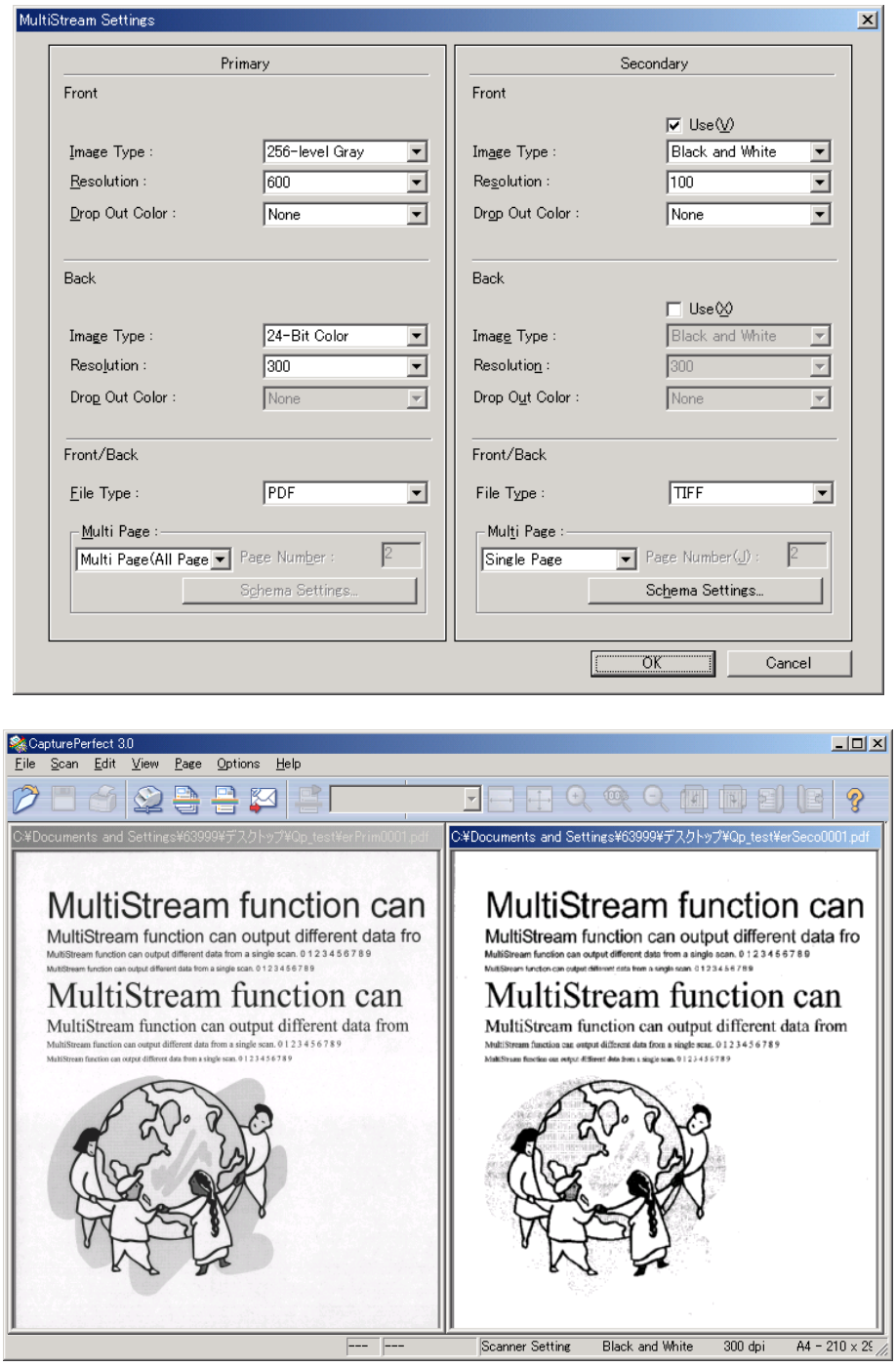

Figure 2-532

2. Image Processing in the Computer

1) Advanced Text Enhancement

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

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

For example, as shown in the image in Figure 2-533, a histogram for each block is calculated, and the optimum slice level is determined to binarize the picture elements.

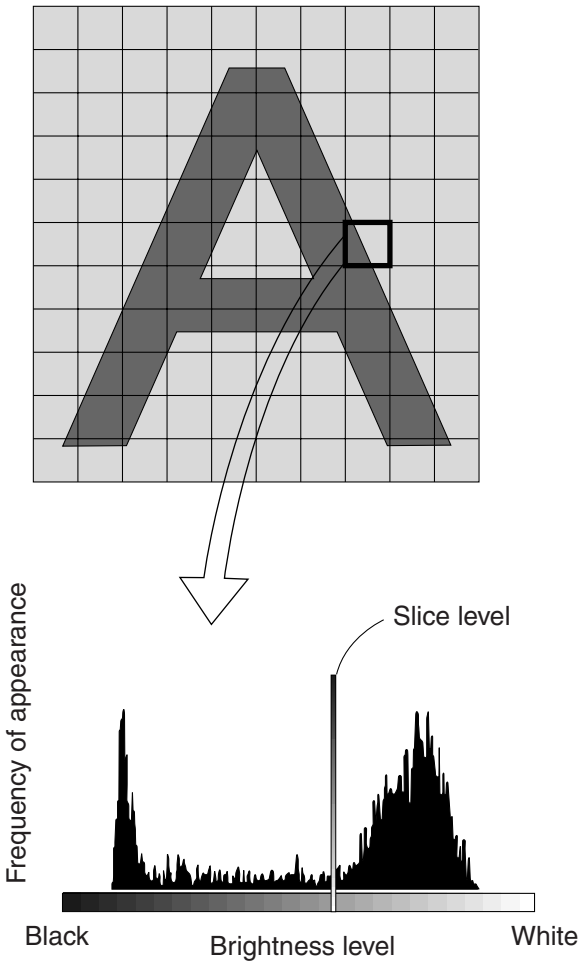

Figure 2-533

2) Automatic Size Detection

In case that the automatic size detection mode is selected, an image data with the maximum width and the length detected by the registration sensor in the feed direction is read.

However, this machine has an A4 width sensor so that it should not read unnecessary data. In case that the width of document guides is the same as or more than that of A4-size paper, an image data with the maximum width of 310 mm is read. And in case that the width of image data is less than that of A4-size paper, an image data with the width of 220 mm is read.

The maximum outside frame is detected from the image data which has been read. The inside of the data is defined as the paper size and the margins are removed.

Moreover, in case that the mode which makes the volume of data increase is selected to enhance the processing speed, the machine converts the data into a black and white/100dpi data and outputs it to a computer. The maximum outside frame is computed based on this converted data. And an original data which is equal to such frame in size is output to a computer.

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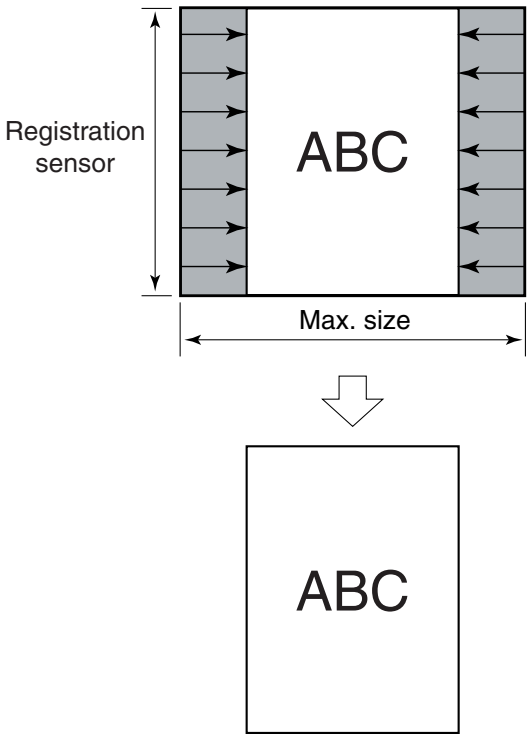

Figure 2-534

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

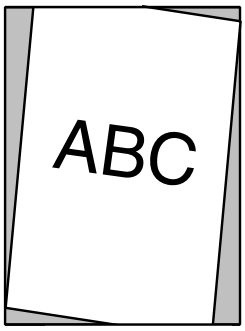

Figure 2-535

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

3) Skew Correction (Deskew)

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

The image data is then restored to the user-specified image size. (Figure 2-538)

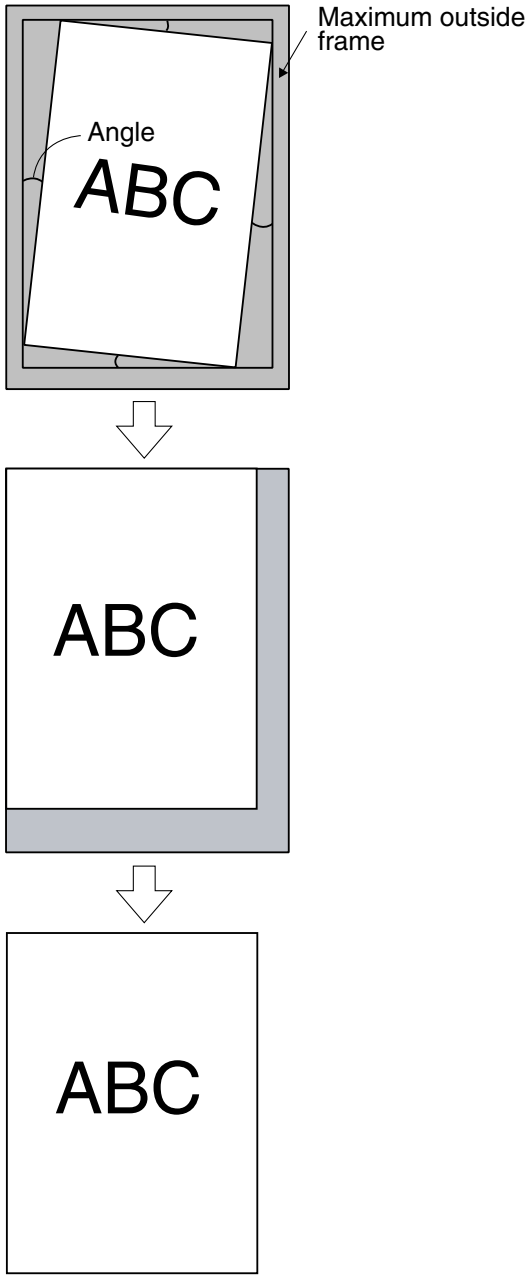

Figure 2-536

4) Black Border Removal

When the black border removal is selected, the image data is read with the specified read size.

The frame of document is detected based on this image data and the outside of the frame is converted into the white data. (Figure 2-537)

The conventional black border removal may vanish the letters if there are some letters on the edge of document and the document is skewed too much. This machine extracts the outer shape of document without the hollow. Thus, no letters vanish. (Figure 2-538)

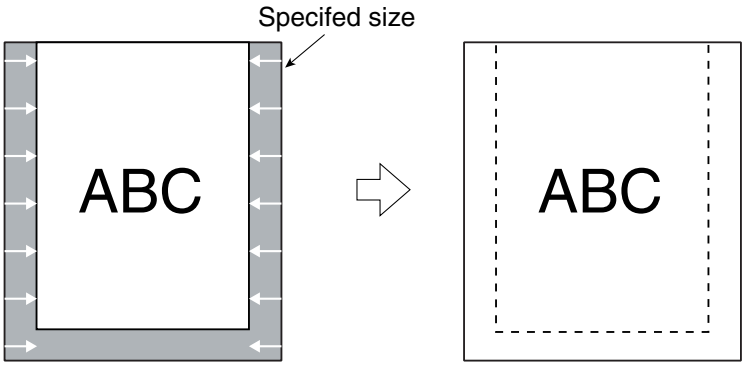

Figure 2-537

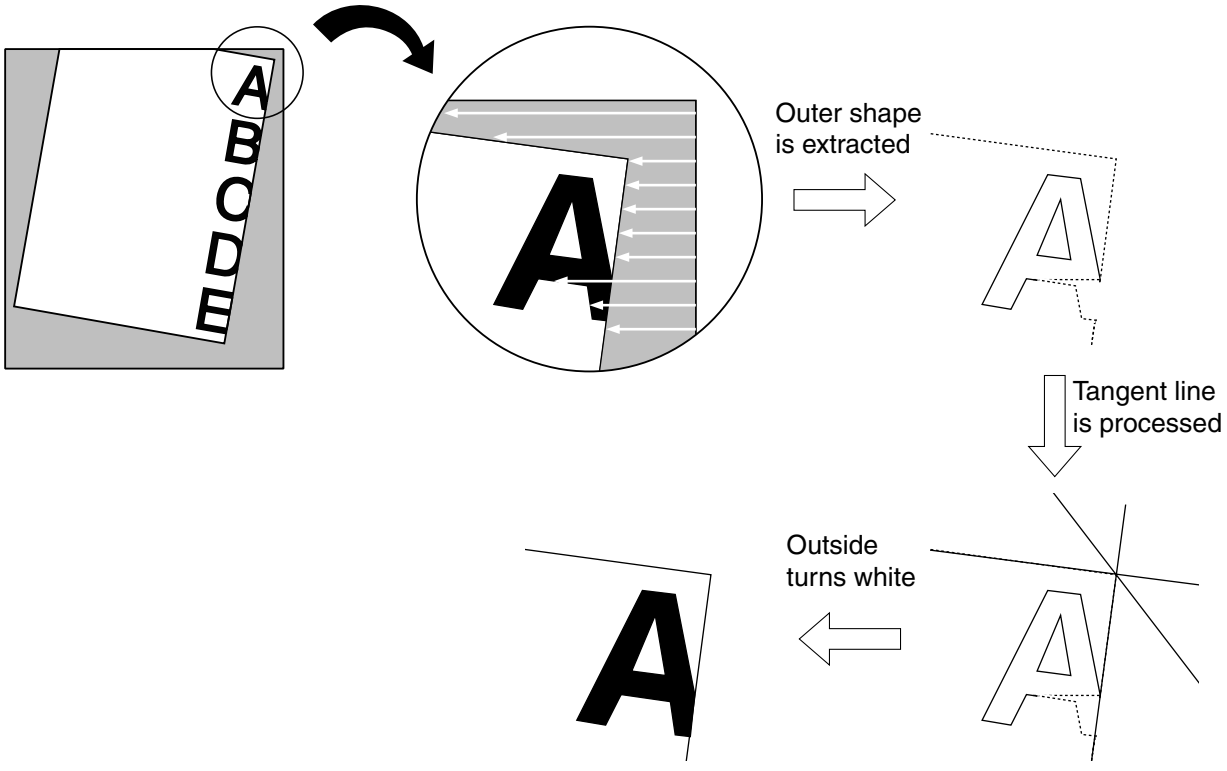

Figure 2-538

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7) Dot Erasing
Dot erasing is the process of erasing any unnecessary small black dots in the binary data in the document.
This is called black dot erasing.

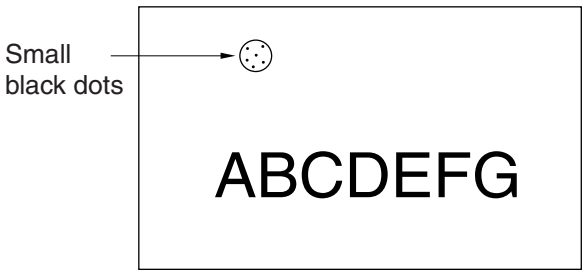

Figure 2-545

For dot erasing, the conversion table shown in Figure 2-546 is used.
When all the colors of the 8 dots around the target picture element differ from that of the target picture element, the target picture element is judged an “isolated dot” and erased.

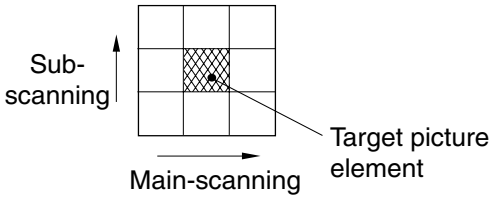

Figure 2-546

The white dots in a document with a black background can be erased using the same method. This is called white dot erasing.

8) Notch Erasing
Notch erasing is the process of compensating for any unevenness in binary output when horizontal and vertical straight lines are scanned. (Figure 2-547)

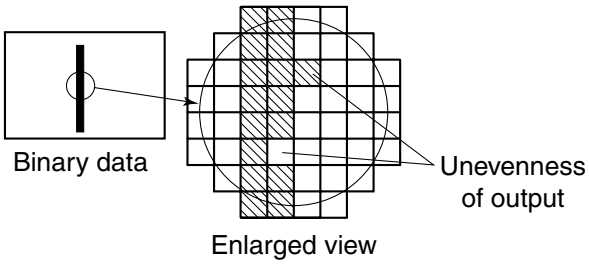

Figure 2-547

When the sequential three dots next to a target picture element among the eight dots are the same color as the target picture element and other five dots are different color, the target picture element is judged to be a notch and its output is reversed. (Figure 2-548)

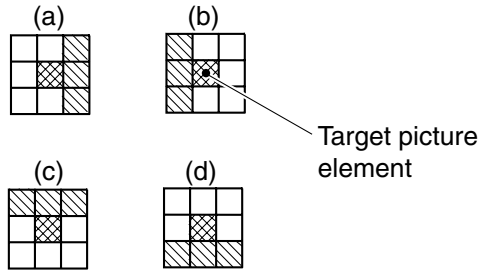

Figure 2-548

VI. POWER SUPPLY

1. Power Supply

The power supply PCBs of this machine use the dedicated parts for the 100V and 200V units. Figure 2-601 shows a block diagram of the power supply PCB.

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

The supplied AC power is converted by a rectifying bridge to unsmoothed 100 to 240 VUN and converted to 24 VDC.

24 VDC is output from the power supply PCB to the control PCB. The necessary voltage are generated in the control PCB. Each PCB receives DC voltage from the control PCB.

Note: A suffix, "U," which is attached to voltage figures, means that those power supplies are turned OFF when the machine is placed in the sleep mode.

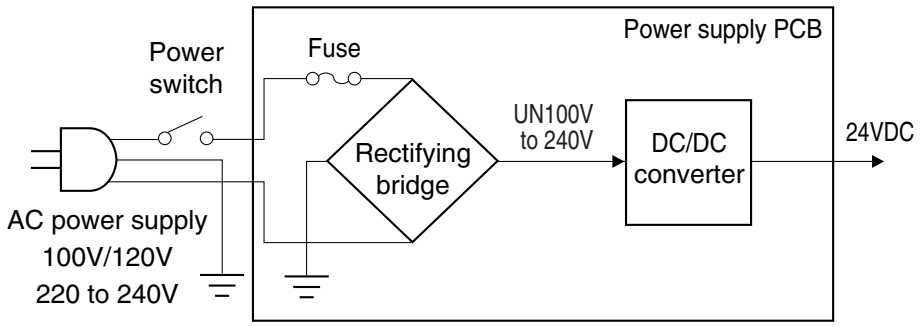

Figure 2-601

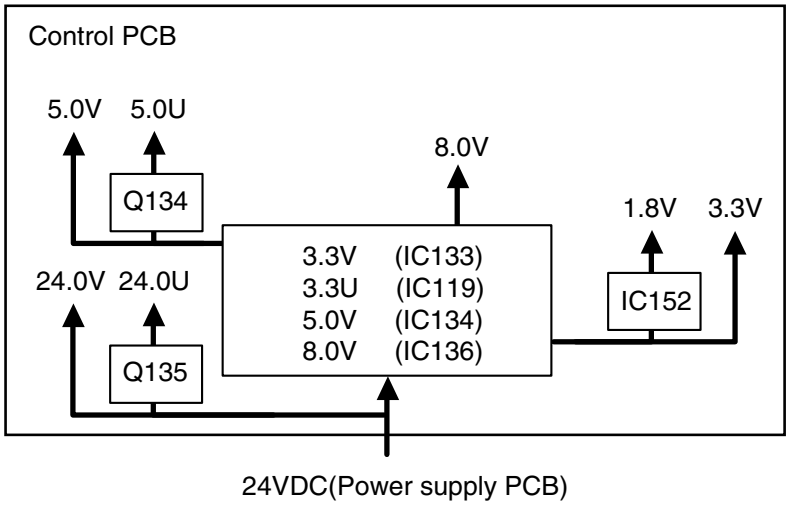

Figure 2-602

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Connector		Description
J108	3P	Open detect switch
J109	16P	Lower unit sensor (PS3/4/5/8/9)
J118	14P	Reading unit (front)
J119	14P	Reading unit (back)
J122	3P	DC power supply standby
J125	4P	DC power supply (+24V)
J129	5P	Reading unit (front) DC power
J131	6P	Reading unit (back) DC power
J132	8P	Reading unit (front)
J134	9P	Reading unit (back)
J136	32P	Upper unit PCB
J140	4P	Eject motor
J141	4P	Ultrasonic sensor PCB (drv)
J143	5P	Shading motor (lower)
J144	8P	Operation PCB, Registration clutch
J146	6P	Lower unit sensor (PS1/2)
J147	11P	Main motor

Table 2-801

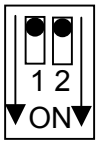
Switch	Description
SW101	SCSI ID settings 1 2 ID2 OFF OFF ID3 ON OFF ID4 OFF ON ID5 ON ON Setting at shipping: ID2 

Table 2-802

LED	Description
LED101	CPU normal operation: Flashing
LED106	+24VDC supply: Lit

Table 2-803

2. Power Supply PCB

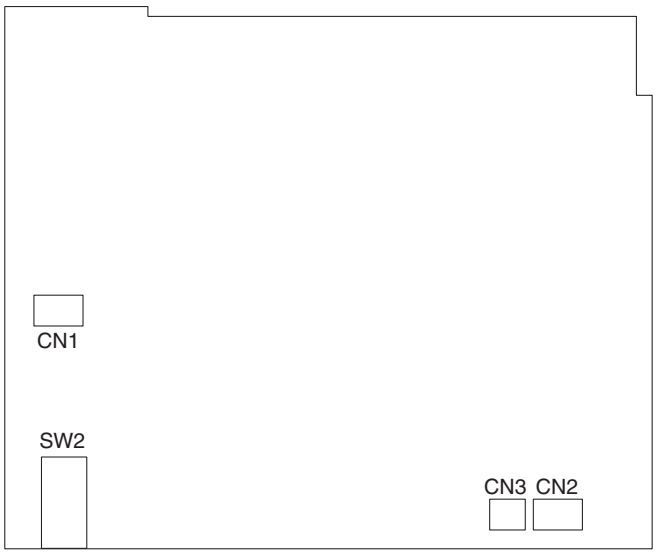


Figure 2-802

Connector		Description
CN1	2P	AC power supply input
CN2	4P	DC24V power supply output
CN3	3P	DC power supply standby signal

Table 2-802

Switch	Description
SW2	Power supply ON/OFF

Table 2-803

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*** Notes on disassembling and assembling**

1) When the self-tapping screws are installed, fit them into the screw thread as before the disassembly in order not to damage the threads on the parts.
2) Many parts of this machine are secured by fittings. The parts must not be damaged by deforming excessively during work. They must be assembled so that they are not shifted or lifted.
3) When the parts are installed, be careful for the cables not to be pinched in a gap.

I. EXTERNAL COVERS

1. Pickup Tray

1) Bend the arm ①, unhook the fitting part. And remove the pickup tray ②.

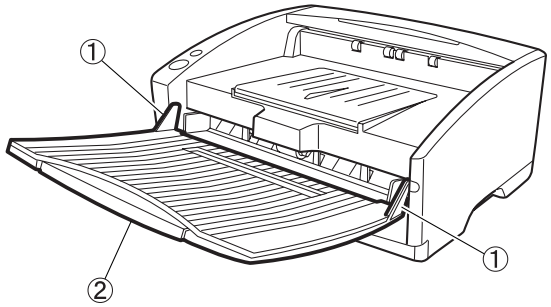

Figure 3-101

2. Top Cover

1) Remove the 2 screws ① (M3 self-tapping type). And then, turn the top cover ② and unhook the left and right fitting parts. And then, remove top cover.

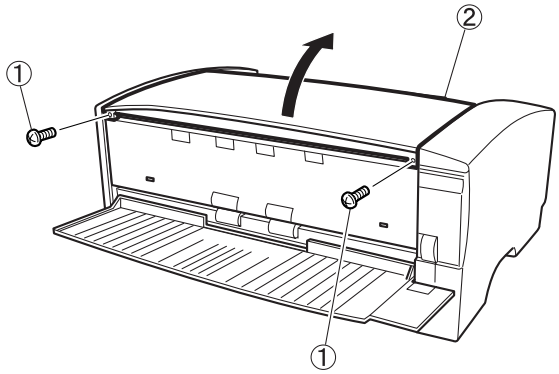

Figure 3-102

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3. Eject Cover

1) Remove the top cover.
2) Push the right and left fitting parts ① downward, turn the eject cover ② and pull it out to remove it.

Note: In this state of things, the eject tray 2 can be removed as well.

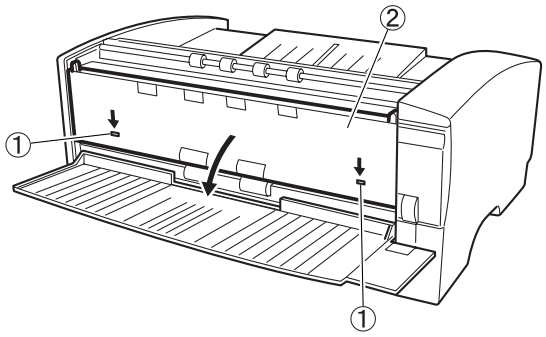

Figure 3-103

4. Eject Tray 2

1) Remove the top cover.
2) Remove the eject cover.
3) Pull out the eject tray 2 ① toward to remove it.

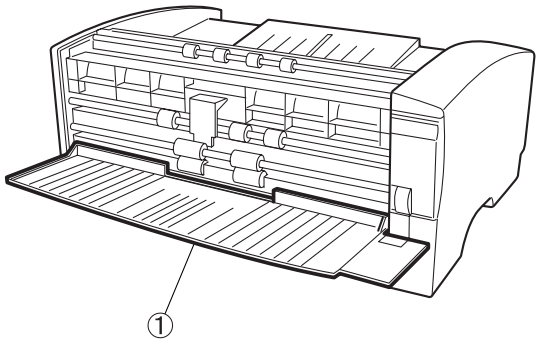

Figure 3-104

5. Left Cover

1) Remove the top cover and eject cover.
2) Slide the gear cover ①, unhook the side fitting part, unhook the upper and lower fitting parts and remove the gear cover.

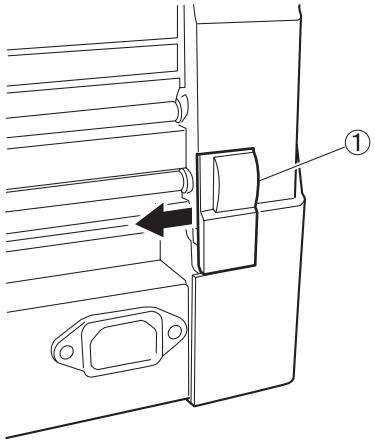

Figure 3-105

3) Remove the screws ① (M3 self-tapping type) which are put one each on the inside of the front and backside.

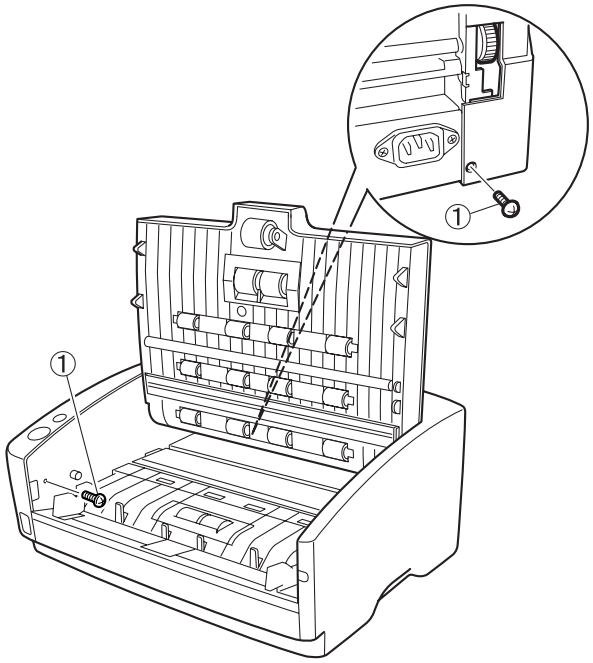

Figure 3-106

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7. Eject Tray 1

1) Remove the screws ① (M4 self-tapping type) which are put one each on the right and left sides. And then, pull out the eject tray 1 ② about 10 mm. After unhooking the inside fitting part, lift the front side of the eject tray 1 to remove it.

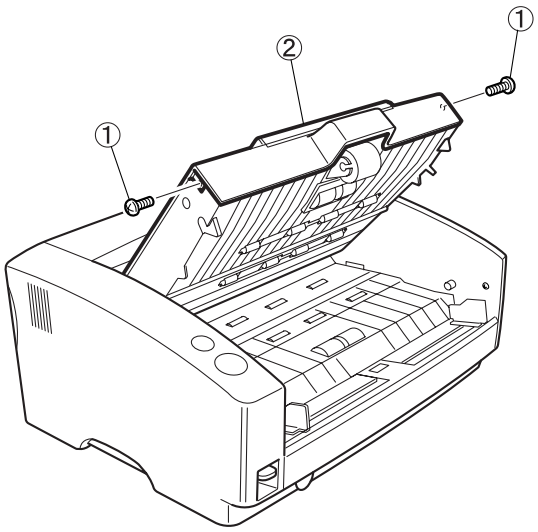

Figure 3-113

Note: Because the eject tray extension and eject roller U (follower) are included in the eject tray 1 removed, remove such parts if necessary.

*** Notes on replacing parts**

The eject tray 1 ① as a service part does not have a charge eliminating brush ②. If the eject tray 1 is replaced, prepare for a charge eliminating brush and attach it to the eject tray 1. Align the end of the silver sheet of the charge eliminating brush with the end of the eject tray and attach it straightly.

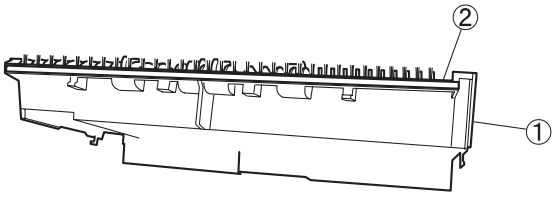

Figure 3-114

8. Lower Front Cover

1) Remove the left and right covers.
2) Unhook the left and right fitting parts ① And then, remove lower front cover ②.

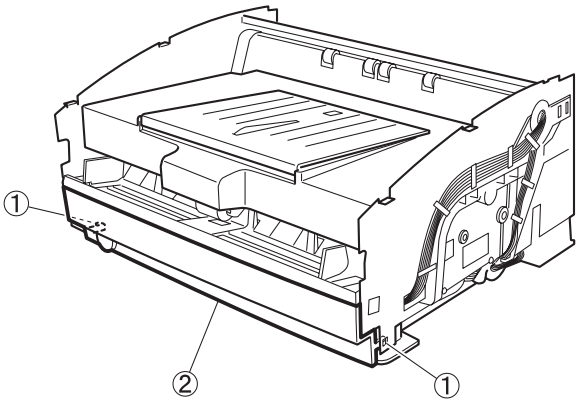

Figure 3-115

9. Entrance Guide Assembly

Note: In case that the document stopper is lowered, start from Step 3 because the left cover does not need to be removed.

1) Remove the left cover.
2) In case that the document stopper ① is raised, turn the rotor of the main motor ② counterclockwise to lower it.

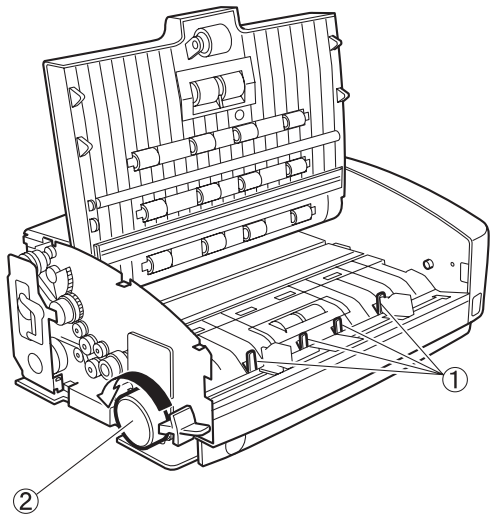

Figure 3-116

3) Remove the retard roller.
4) Remove the screws ② and shoulder ones① two each. And then, lift the back-side of the entrance guide assembly ③ to unhook the inside fitting part. After that, displace the document stopper slightly and pull out the entrance guide assembly toward to remove it.

Note: Because the cables are connected to the backside of the entrance guide assembly, do not pull it too hard.

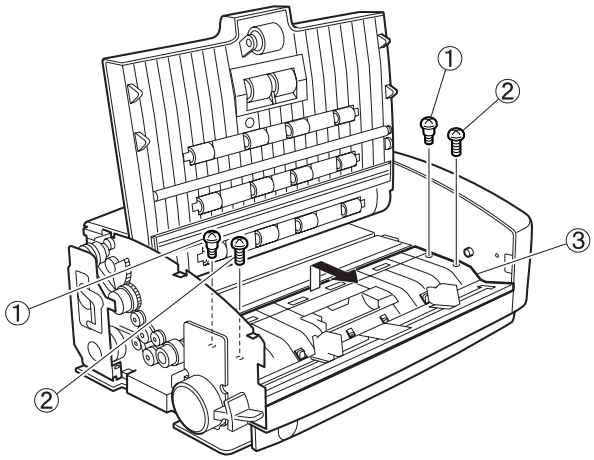

Figure 3-117

*** Notes on assembling**

Assemble the entrance guide assembly by passing it under the shaft projecting from the right and left side plates.

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II. UPPER UNIT

A. Common Procedures

1. Upper Unit

1) Remove the left and right covers.
2) Remove the eject tray 1.
3) Disconnect the 3 connectors ① on the control PCB and remove the cable fastener. And then, put the cables ② in the upper unit. Disconnect the 2 connectors ③ on the upper unit PCB and remove the cable fastener. And then, put the cables ④ out of the upper unit.

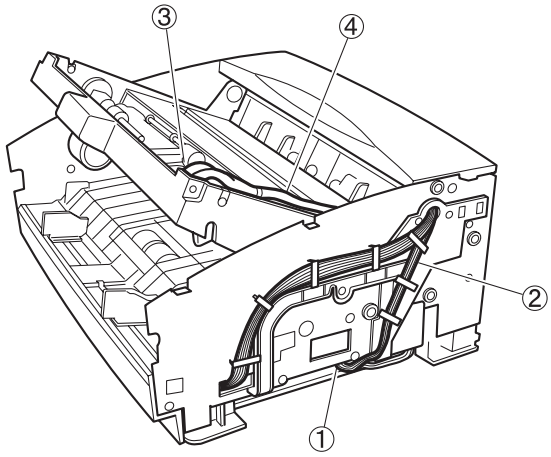

Figure 3-201

4) Remove the 4 screws ① (3 of 4 are M4 self-tapping type). And then, remove the eject drive assembly ②.

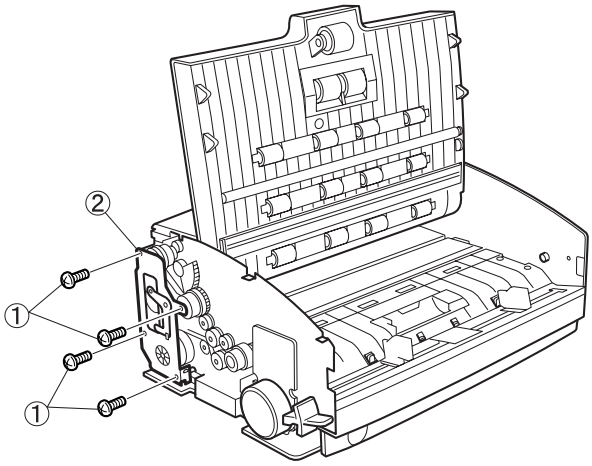

Figure 3-202

5) Remove the E ring ①. And then, remove the one way hinge ② and hinge gear ③. After that, unhook the inside fitting part to remove the upper unit gear ④.

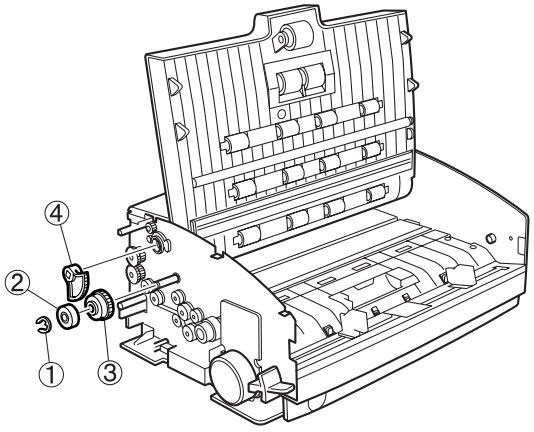

Figure 3-203

6) Remove the 2 screws ① (M3 x 3, with flange). And also, remove the hinge guide ② from the side plate to remove the upper unit ③.

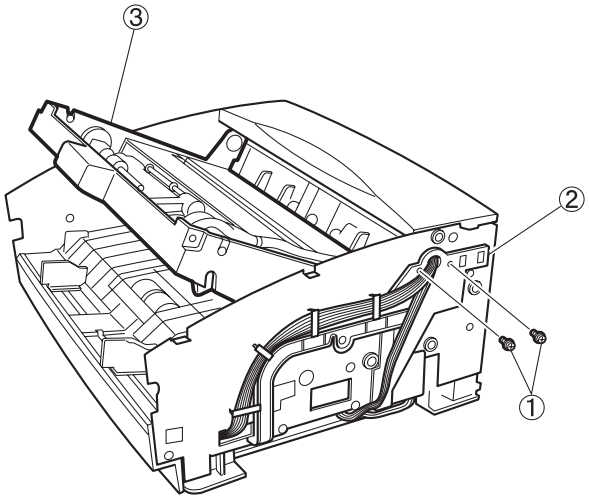

Figure 3-204

2. Shading Cover Assembly (Upper)

1) Remove the eject tray 1.
2) Disconnect the cable connected to the shading cover assembly.
3) Remove the 4 screws ① (M4 self-tapping type). And then, remove the 2 grounding plate ② and shading cover assembly ③.

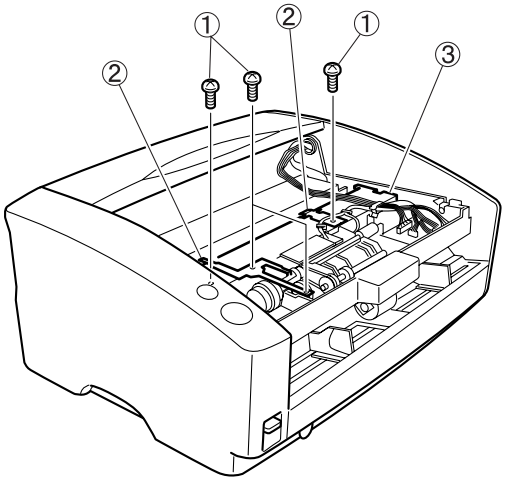

Figure 3-205

*** Notes on assembling**

Insert each protrusion of the cover into the left and right coil springs ① mounted on the platen roller unit. Do not forget reinstalling the grounding plate removed when the cover assembly is removed. And be careful for the cables not to be pinched in a gap.

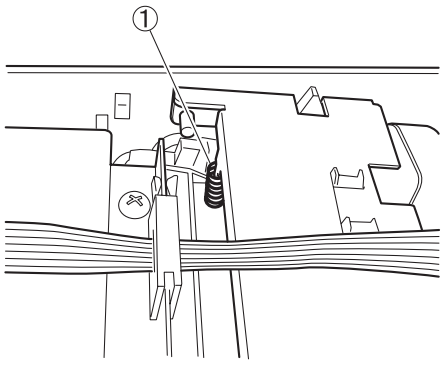

Figure 3-206

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D. READING SYSTEM

1. Reading Unit (Front)

1) Remove the eject tray 1.
2) Disconnect the 2 connections ①. Remove the 3 screws ② (M4 self-tapping type). And then, remove the cover ③.

Note: Remove them so that they are not damaged because the end of the grounding plate ④ is inserted in the cover.

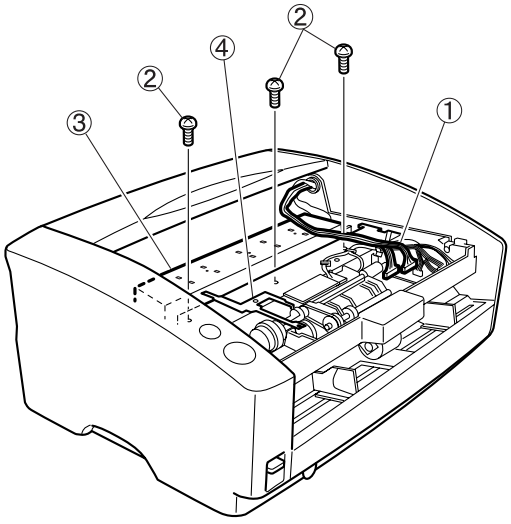

Figure 3-217

3) Disconnect the 3 connectors ①. And then, remove the reading unit (front).

Note: Because those connectors and pins of the cables for image signals are easily deformed, handle them with care.

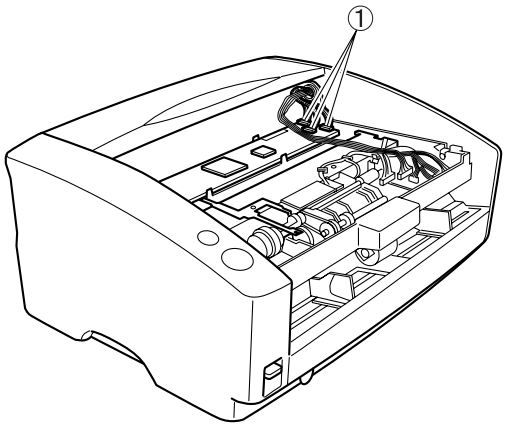

Figure 3-218

*** Notes on assembling**

To install the cover, place the rear projection ① under the torsion spring and insert the end of the grounding plate ② into the rectangular hole in the cover.

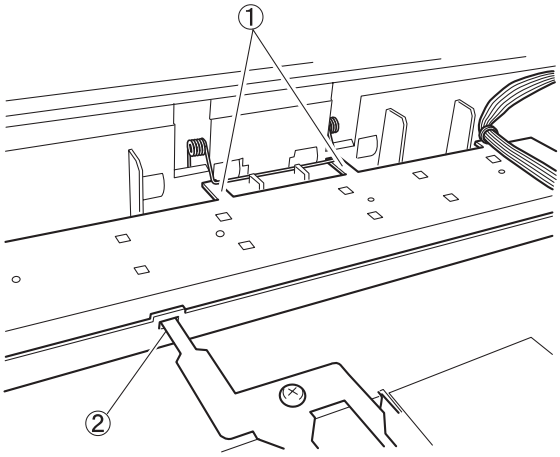

Figure 3-219

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2. Reading Unit PCB (Front)

1) Remove the reading unit (front).
2) Remove the 4 screws ① (flat head and self-tapping types). After unhooking the 2 fitting parts ②, disconnect the 2 FFC cables ③. And then, remove the reading unit PCB (front) ④.

Note: Do not remove the components of the CIS unit such as the CIS PCB and light guide except for the reading glass.

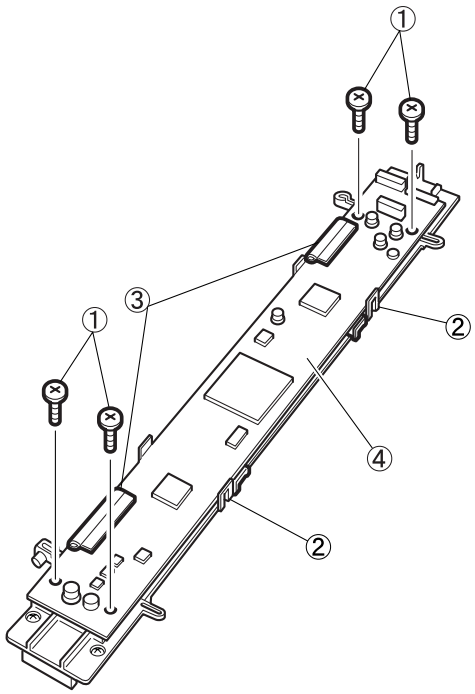

Figure 3-220

Note: The reading unit PCB for the front is totally the same as that for the back.

*** Notes on assembling**

Place the FFC cable between the CIS unit and the PCB so that it does not protrude to the outside.

3. CIS Unit (Front)

1) Remove the reading unit (front).
2) Remove the reading unit PCB.
3) After removing the 4 screws ① (self-tapping type, black), unhook the fitting part ②. And then, remove the holder ③.

Note: After removing the holder, the left and right grounding plates ④ installed between the CIS unit and holder drops off.

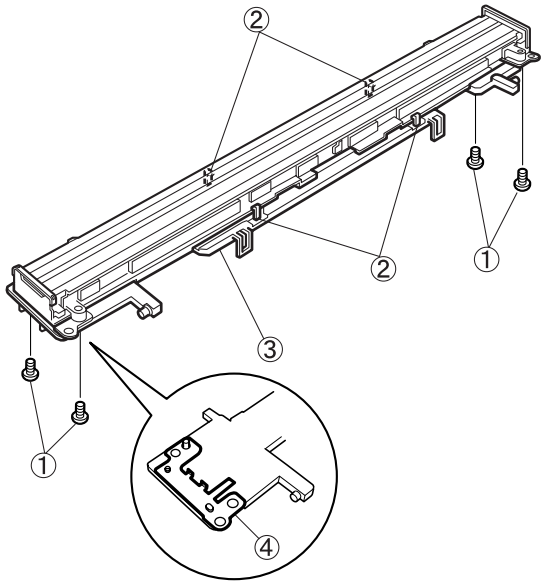

Figure 3-221

*** Notes on assembling**

When fixing the CIS unit on the holder, do not bend the CIS unit. If the reading glass is bent, the focal lengths will become inconsistent when a target is read.

Assemble the grounding plate by aligning it with the positioning.

Although both the CIS units for the front and back contain the same components, the directions of the glasses are different.

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5. Adjustment of Tension of Timing Belt

1) Loosen the screw ① and release the hook of the spring ②. After that, stretch the timing belt ③ over the pulley and idler as described in the following figure.

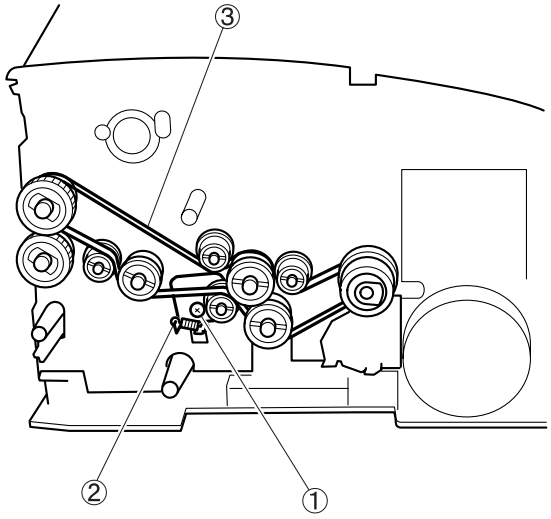

Figure 3-324

2) Put the hook of the spring back and tighten the screw. The tension of the timing belt is automatically adjusted in keeping with that of the spring.

D. READING SYSTEM

1. Reading Unit (Back)

1) Remove the right cover.
2) Remove the entrance guide assembly.
3) Remove the lower roller cover (front).
4) Remove the 3 connectors ① on the reading unit.

Note: Because those connectors and pins of the cables for image signals are easily deformed, handle them with care.

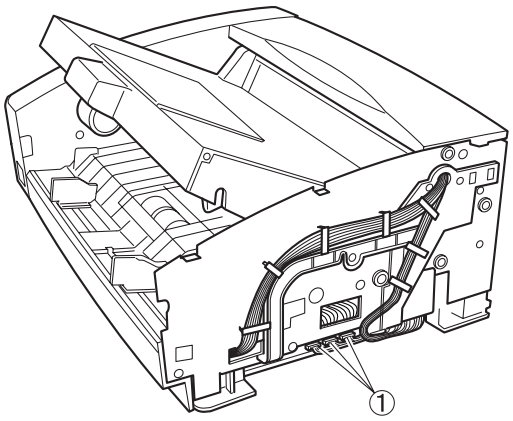

Figure 3-325

5) Remove the 2 screws ① (M3 x 8). And remove the reading unit (back) ②.

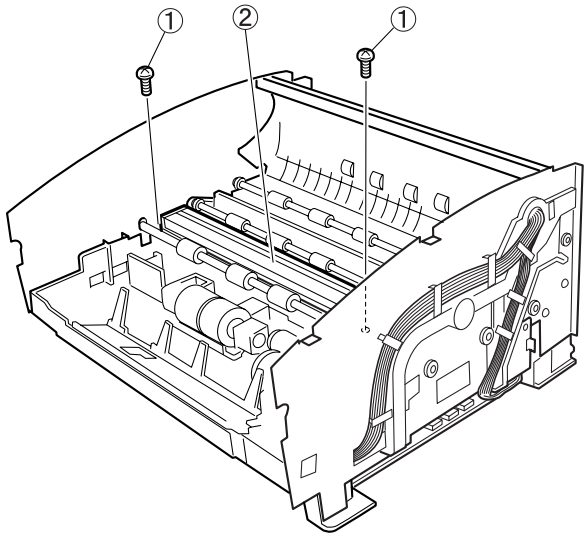

Figure 3-326

2. Reading Unit PCB (Back)

1) Remove the reading unit (back).
2) Remove the 4 screws ① (flat head and self-tapping type). And then, after unhooking the fitting parts ②, remove the 2 FFC cables ③. And remove the reading unit PCB (back) ④.

Note: Do not remove the components of the CIS unit such as the CIS PCB and light guide except for the reading glass.

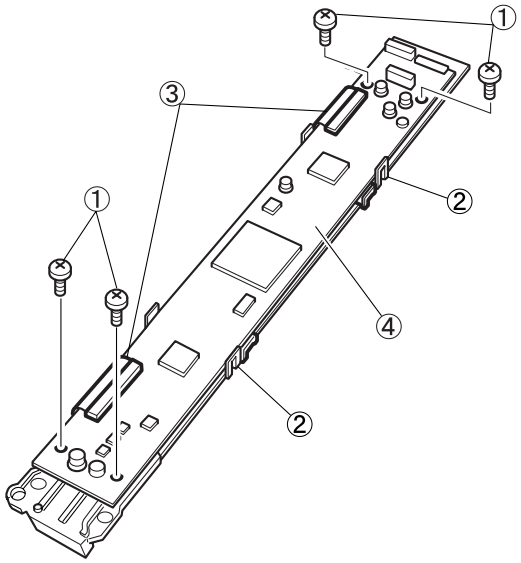

Figure 3-327

Note: The reading unit PCB for the front is totally the same as that for the back.

*** Notes on assembling**

Place the FFC cable between the CIS unit and the PCB so that it does not protrude to the outside.

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E. ELECTRICAL SYSTEM (PCB AND OTHERS)

1. Control PCB

1) Remove the bottom box.
2) Remove the 2 connectors ① and 11 screws ② (round-end). And remove the control PCB ③.

Note: The connector for the power supply is equipped with a stopper.

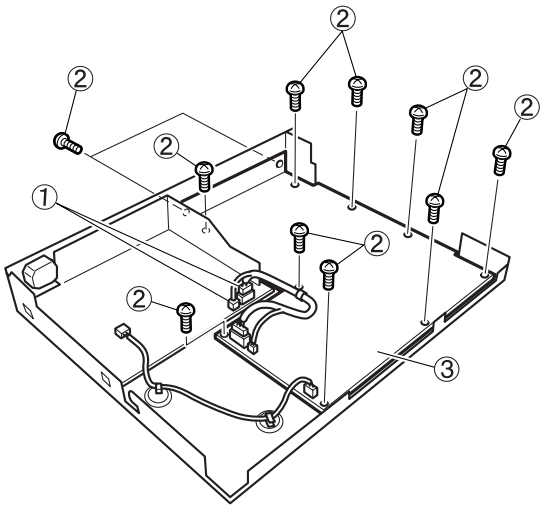

Figure 3-331

2. Power Supply PCB

1) Remove the bottom box.
2) Remove the 3 connectors ① and 6 screws ② (round-end). And remove the power supply PCB ③.

Note: The connector for the power supply is equipped with a stopper.

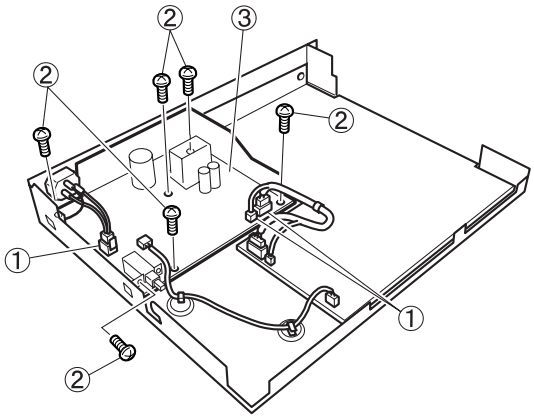

Figure 3-332

*** Notes on assembling**

Be aware that the power is turned off.

3. Document Board Sensor PCB

1) Remove the entrance guide assembly.
2) Unhook the fitting part ①. And remove the cover ②.

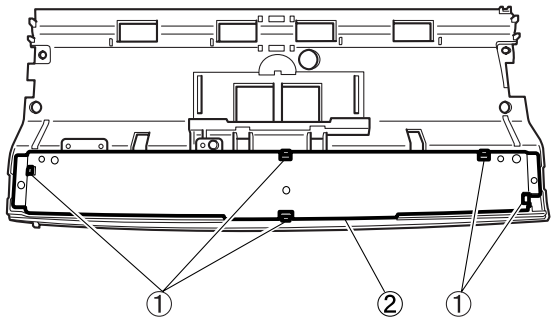

Figure 3-333

3) Remove the 2 screws ① (M3 self-tapping). And remove the document board sensor PCB ②.

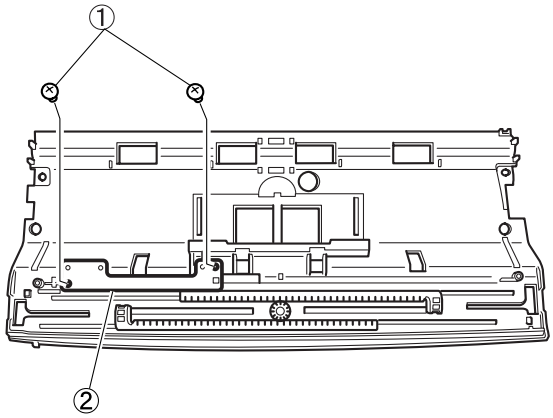

Figure 3-334

*** Notes on assembling**

Install the document guides so that the right document guide opens to the same level as the left one does.

4. Ultrasonic Sensor PCB (Drive)

1) Remove the entrance guide assembly.
2) Release the hook ① of the coil spring. And then unhook the left and right fitting parts ② and turn the bearing with stopper ③ to remove the axis. And remove the retard roller holder ④.

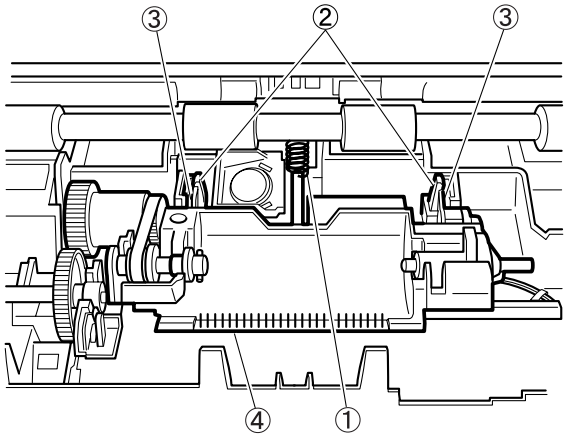

Figure 3-335

3) Push down the tops of the 3 fitting parts ① to remove the ultrasonic sensor ②. And unhook the fitting part ③. And then, remove the ultrasonic sensor PCB (drive) ④.

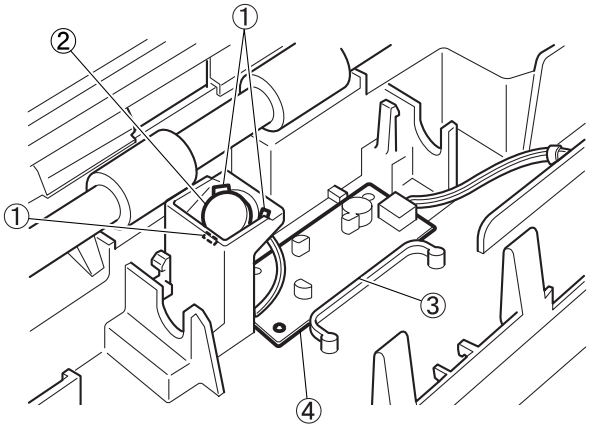

Figure 3-336

*** Notes on assembling**

Be sure to install the coil spring.

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I. INSTALLATION

This machine is installed by the user. The user should be advised to install the machine by reading the user manual thoroughly.

If the machine is installed by a service technician, it must be carried out according to the user manual. The following section provides an overview.

1. Selection of Location

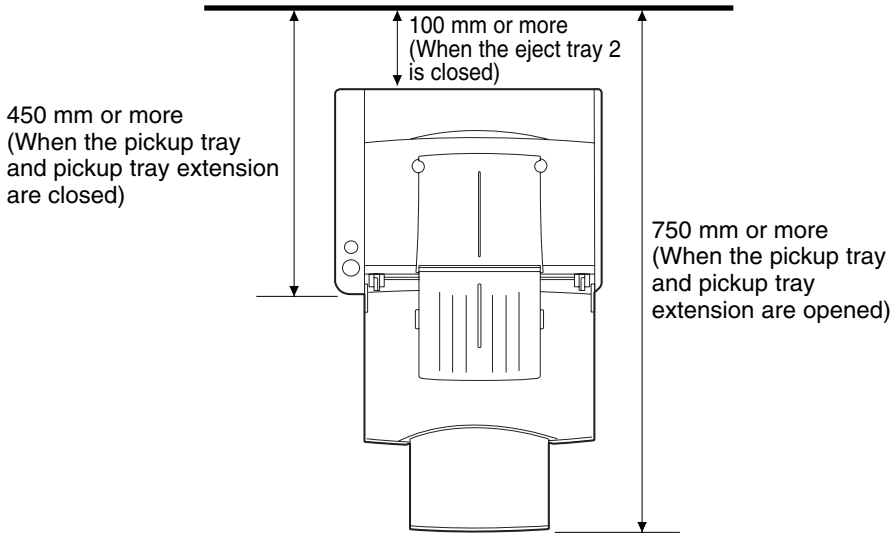

Figure 4-101

- Maintain sufficient spaces around the machine for operation and maintenance, and to allow ventilation.
- If read documents are ejected to the back of the machine (straight path), there must be a sufficient space for ejecting them behind it.

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2. Checking Items

Open the outer packaging box and take out the main body and other items packed with it. Check that there are no missing items. The unpacking procedure is indicated on the box.

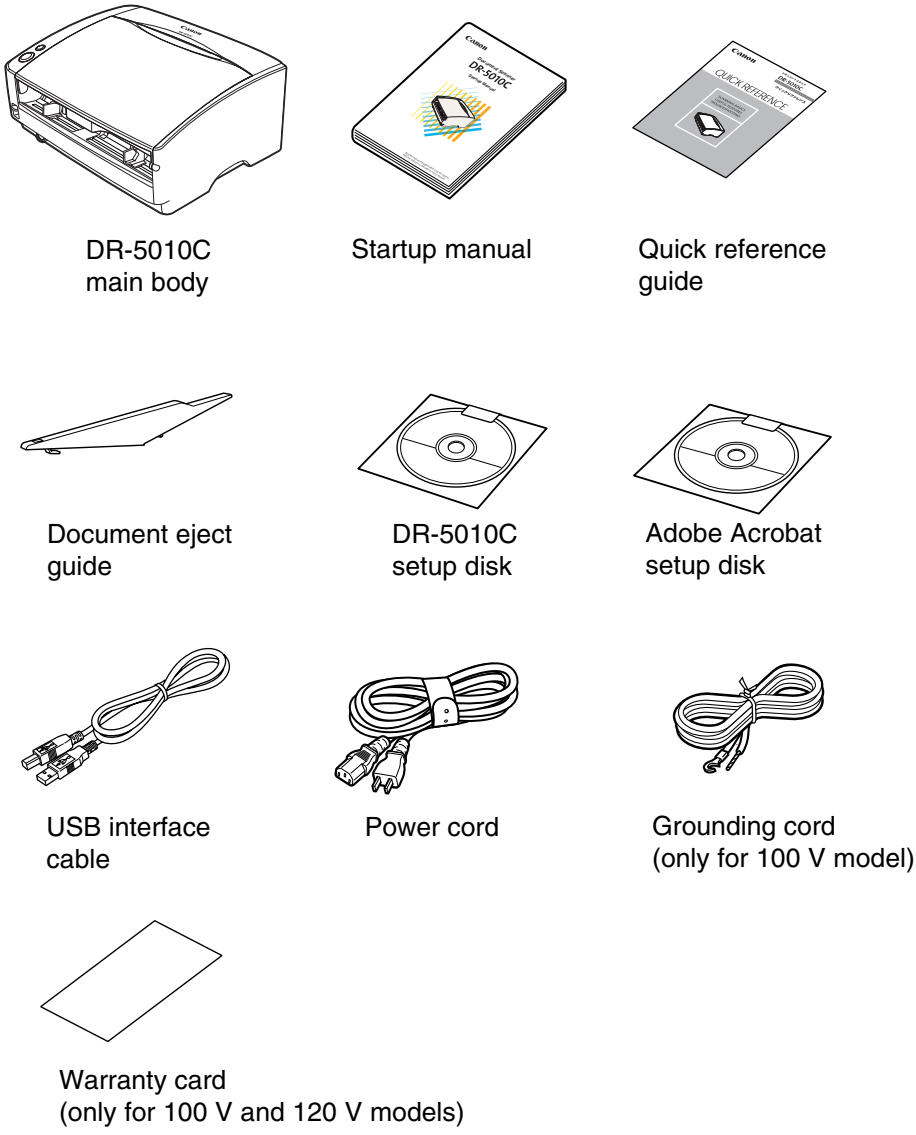

Figure 4-102

- The DR-5010C setup disk is inserted in the startup manual.
- Retain the outer packaging box and packing materials because they are required to store and transport this machine.

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I. ERROR DISPLAY

1. Power Lamp

The DR-5010C does not have an error display area, but some errors are indicated by the power indicator on the operation panel of the DR-5010C.

If the DR-5010C operates normally, the power indicator lights. The power indicator flashes if the DR-5010C can not scan the document in case that the upper unit opens or the document jam occurs, etc.

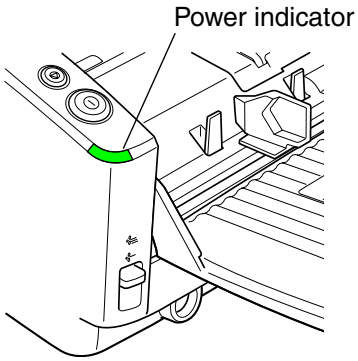


Figure 5-101

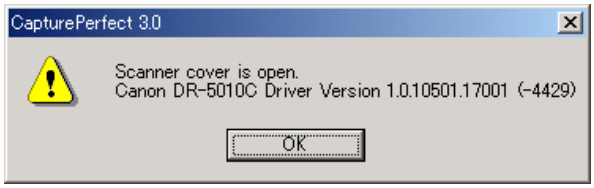
2. Error Messages

Error messages are displayed on the display connected to the computer.

The contents of the error message differ depending on the software that is used.

Most error messages are related to improper user operation and document jams. The user shall perform the remedy according to the error message. If the "motor abnormality," etc. occur, the matter must be referred to a service technician.

The followings show the main error messages displayed when the "CapturePerfect 3.0" is used.



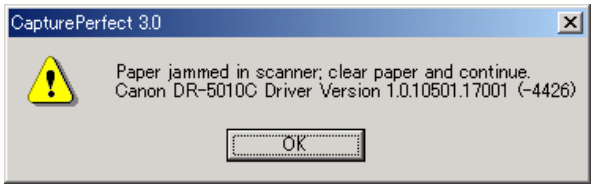


Figure 5-102

II. SERVICE MODE

1. Outline

The service mode of the DR-5010C can be executed by installing on the computer for servicing the service mode software located in the setup disk provided with the DR-5010C.

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

Figure 5-201 shows the service screen.

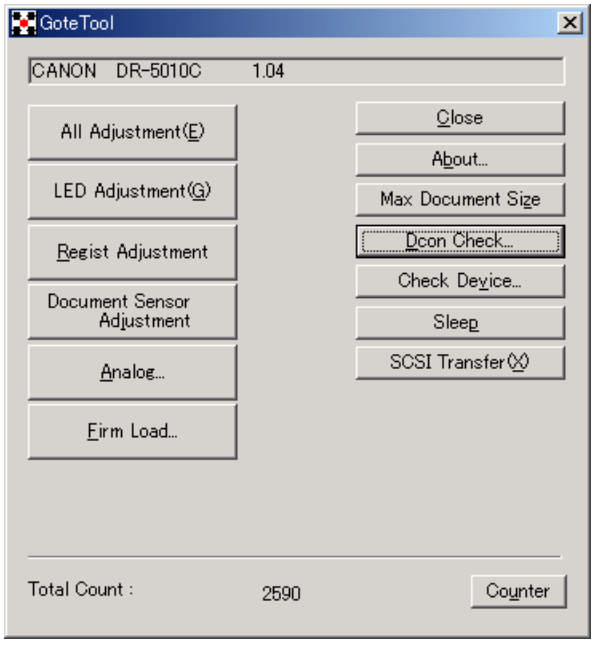


Figure 5-201

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

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

No.	Button name/Functions
1	All Adjustment Perform all adjustments related to image reading.
2	LED Adjustment Perform the CIS adjustments.
3	Regist Adjustment Perform the registration adjustments.
4	Document Sensor Adjustment Perform the document sensor adjustments.
5	Analog Display the analog value of each sensor.
6	Firm Load Change the firmware.
7	About Display this service mode version.
8	Max. Document Size Set the long document mode.
9	Dcon Check Check the operation of the hardware such as operation buttons, sensors, motors, etc.
10	Check Device Display the version of the internal devices of the DR-5010C.
11	Sleep Set the sleep mode.
12	SCSI Transfer Set the SCSI transfer speed.
13	Counter Display and change the total count (cumulative number of feed sheet) and the number of document jam.

Table 5-201

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2. Installation Procedure

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

1) Power ON the computer for servicing and start up the OS (Windows).
2) Set the setup disk supplied with the DR-5010C.
3) Copy the "\Driver\Tools" folder in the setup disk to one of the drives of the computer for servicing.

Note: For how to install the software provided with the DR-5010C, refer to the user manual.
However, for the specifications, such as the maximum number of documents that can be scanned at one time, see the computer system conditions described in the user manual.

3. Starting Up and Exiting Service Mode

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

1) Connect the computer for servicing with the DR-5010C using a SCSI interface cable or a USB interface cable.
2) After powering ON the DR-5010C, power ON the computer.
3) Open the installed "Tools" folder and start up the "GoteTool.exe" file. (See Figure 5-202.)
4) The password screen is displayed, so after inputting the six characters "market," select [OK]. (See Figure 5-203.)
5) The service screen is displayed.

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

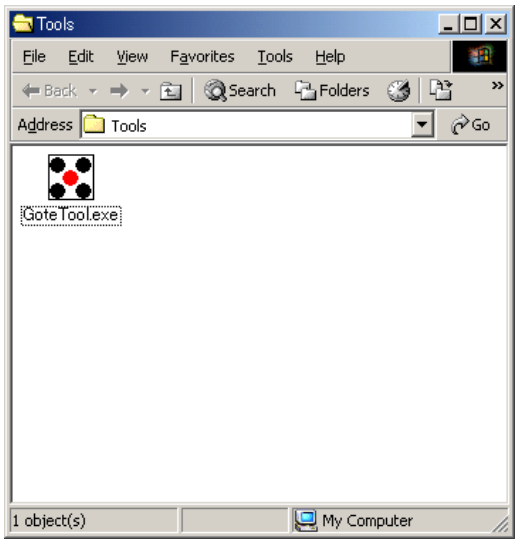

Figure 5-202

Figure 5-203

Note: After the DR-5010C is connected to the computer and the computer is powered ON for the first time, a screen requesting installation of “New Hardware” or a “Device Driver” is displayed. In this case, perform the “Scanner Recognition” according to the user manual.

Note: To execute the service mode with the user's computer, start up “GoteTool.exe” on the setup disk supplied with the DR-5010C. Do not copy this program to the user's computer. Do not let the user know the folder name and password to be used.

4. All Adjustment

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

This mode consists of three individual adjustment items: “LED Adjustment,” “Regist Adjustment” and “Document Sensor Adjustment.”

Operating Procedure

1) Clean the document board sensor window, the shading plate and the reading glass. Do not bend the shading plate.
2) Set a piece of regular white copy paper (A4/LTR). Set the document guide position to the paper. This paper is used to perform “Regist Adjustment.”
3) Select [All Adjustment] on the service screen.

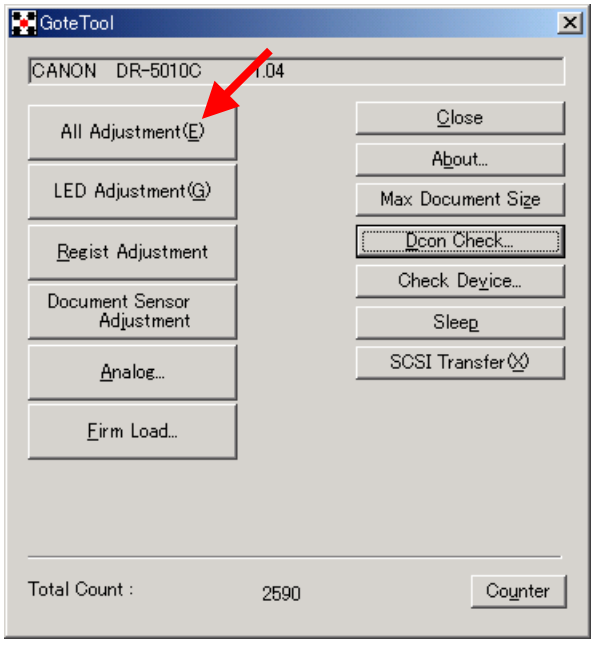

Figure 5-204

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c. Motor 1

This section describes the operation check of the main motor and the eject motor.

When a reading mode and a resolution are selected from the pulldown box corresponding to each motor, the motor turns at the speed that meets the condition.

The operation screen is shown below.

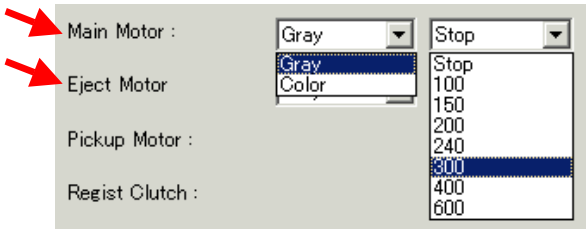

Figure 5-211

d. Motor 2, clutch

This section describes the operation check of other motor and clutch.

- Pickup Motor
- Regist Clutch (Registration cluch)
- Shading One time (Shading motor)
- Feed Clutch

The operation screen is shown below.

Figure 5-212

[Shading One time] can check the operation of both the upper and lower shading plates at the same time. The operation check of the shading plates can be performed by using the operation buttons for the user.

e. CIS unit LED

When the corresponding LED button is selected, the LED lights.

However, when the upper unit is opened to check lighting, the open detect switch turns OFF. Since the correct lighting operation is not performed in that state.

Therefore, after opening the upper unit, keep pressing the open detect switch with a sheet of thick paper, etc and then perform the operation.

≠# Operating Procedure

1) Fully open the upper unit.
2) Press and hold the open detect switch with a sheet of folded thick paper or the flat end of a bar. (When the open detect switch is ON, the pickup roller is raised.)

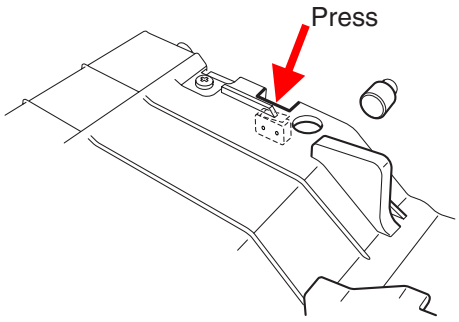

Figure 5-213

3) Select the corresponding LED button.

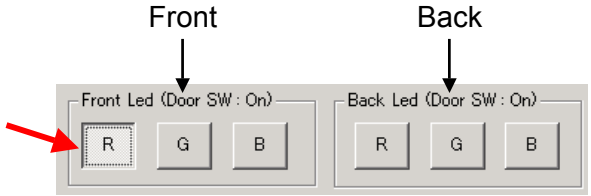

Figure 5-214

Note: If the open detect switch turns OFF when the LED lights, the machine may malfunction.

7. Analog

This mode is used to check analog data for sensors. However, the operation check of normal sensors is performed in the previous section “Dcon Check,” so this section describes the ultrasonic sensor and A4 width sensor.

a. Ultrasonic sensor

When [Analog] is selected on the service screen, [USS screen] is displayed.

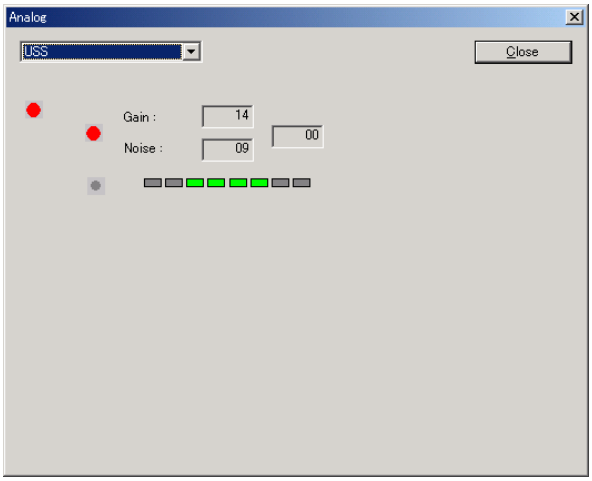

Figure 5-215

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When two sheets of paper are set on the ultrasonic sensor section, the “double feed judgment indicator” and “amplitude judgment indicator” light in red. The “phase judgment indicator” may light under some conditions. The screen displayed when a double feed is detected is shown below.

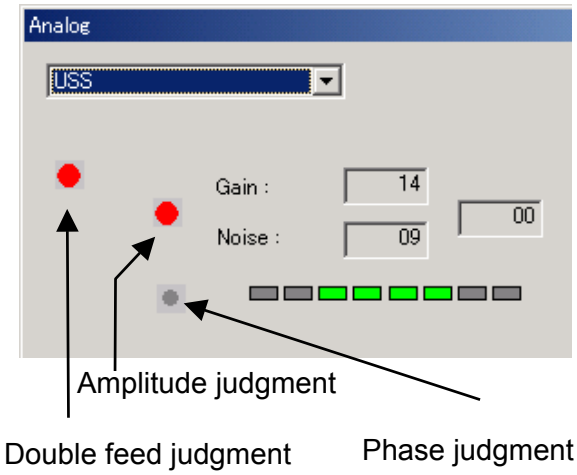

Figure 5-216

b. A4 width sensor

When [Feeder1] is selected on the [USS screen] pulldown box, [Feeder1 screen] is displayed.

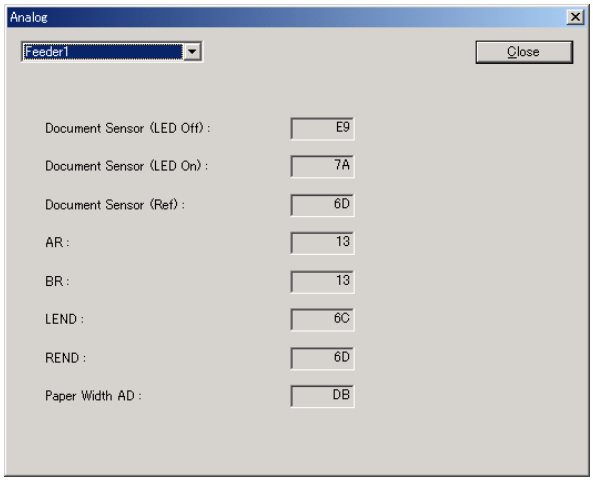

Figure 5-217

[Paper Width AD] at the bottom of the screen indicates the A4 width sensor. If the document guide is maximized, a large number, such as “DB,” is displayed. When the document guide is narrowed, the value decreases slightly before it becomes the A4 width, and when it reaches the A4 width position, the value becomes nearly zero, such as “0A,” and then the value does not change.

Figure 5-218

8. Max Document Size

This mode is used to set the long document mode. However, the long document mode is not standard specification, so it is used for special users only. Do not use it for general users.

When the long document mode is set, the document length is 1000 mm at the maximum, but there are restrictions shown below:

- Document size: “Automatic detection” only
- Document thickness: 0.2 mm or less
- Image size: 128 MB or less
- Feed: Feed a sheet of paper. Performance of paper pickup/eject is not guaranteed.

When [Max Document Size] is selected on the service screen, the setting screen is displayed. To set the long document mode, change the setting to [1000.0(mm)] and press the [OK] button.

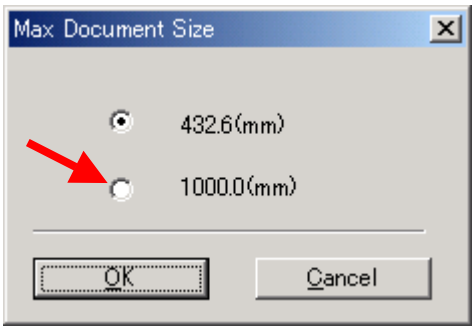

Figure 5-219

9. Sleep

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

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

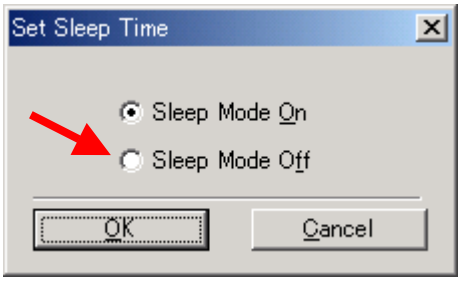

Figure 5-220

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DR-5010C

SERVICE MANUAL

FIRST EDITION

Canon

MAR. 2005 MY8-13A4-000

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

PREFACE

This Service Manual describes necessary basic information for field service and maintenance for maintaining the product quality and functions of the DR-5010C.

Contents

Chapter 1: General description
Features, specifications, name of parts, operation method

Chapter 2: Functions and operation
Description of operation of machine system and electrical system by function

Chapter 3: Disassembly and reassembly
Disassembly method, reassembly method

Chapter 4: Installation and maintenance
Installation method, maintenance method

Chapter 5: Troubleshooting
Service modes and troubleshooting

Appendix: General circuit diagrams, etc.

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

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

Quality Assurance Center
Canon Electronics Inc.

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CHAPTER 1

GENERAL DESCRIPTION

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I. FEATURES

1. Compact size scanner with A3 capable

External dimensions (tray closed): 398 (W) × 312 (D) × 191 (H) mm

2. High-speed/high-quality scanning

Newly 3-line contact image sensor

Simplex: 50 ppm, duplex: 100 ipm (200 dpi, A4 size) with black & white, grayscale and color modes

3. Dual-path mechanism (U-turn/straight path)

Straight path is provided for thicker documents

4. No periodic maintenance

Periodic maintenance is not necessary by service technician.

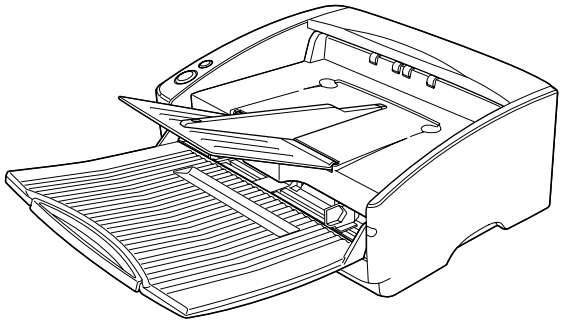

Figure 1-101

"Windows" is a trademark of Microsoft Corporation in the U.S. and other countries.

Other company names and product names mentioned in this document are registered trademarks or trademarks of the respective companies.

II. SPECIFICATIONS

1. Appearance/Installation

No.	Item	Specifications
1	Type	Desktop type sheet fed scanner
2	Voltage models	1) 100 V model: 100 VAC, 50/60 Hz 2) 120 V model: 120 VAC, 60 Hz 3) 220-240 V model: 220-240 VAC, 50/60 Hz
3	Rating power consumption/current	1) 100 V model: 83 W 2) 120 V model: 1 A 3) 220-240 V model: 0.5 A *Energy Star conformity
4	Operating environment	10 to 32.5°C (50 to 90.5°F) 20 to 80%RH *No condensation allowed.
5	Noise	1) Sound power level In standby mode: 40 dB or less In operating mode: 71 dB or less 2) Sound pressure level: Bystanders (reference) In operating mode: 61 dB or less
6	Dimensions	Tray closed: 398 (W) × 312 (D) × 191 (H) mm Tray opened: 398 (W) × 668 (D) × 194 (H) mm at U-turn
7	Weight	Approx. 10 kg
8	Output interface	SCSI-3 (Ultra SCSI) USB2.0 (Hi-speed)
9	Expected product life (in-house information)	One of the following two items, whichever comes first. 1) 5 years 2) Sheets fed: 4,000,000 sheets (A4 size) There are parts needed to replace.
10	Number of sheets fed	6,000 sheets/day (A4)
11	Installation	User
12	Bundle software	ISIS/TWAIN driver, CaptureParfect 3.0, Acrobat 7.0
13	Option	Barcode module *Imprinter will be released on 3rd Q, 2005
14	Consumable parts (commercial goods)	Exchange roller kit (Pickup, Feed, Retard rollers)

Table 1-201

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2. Documents Feed

<table>
<tr><th>No.</th><th>Item</th><th colspan="4">Specifications</th></tr>
<tr><td rowspan="3">1</td><td rowspan="3">Document size</td><td></td><td>U-turn path</td><td colspan="2">Straight path</td></tr>
<tr><td>1) Width</td><td colspan="3">53 to 300 mm</td></tr>
<tr><td>2) Length</td><td colspan="3">70 to 432 mm</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Document weight (converted thickness)</td><td>1) Separa-tion-feed</td><td colspan="3">52 to 128 g/m^2
(0.06 to 0.15 mm)</td></tr>
<tr><td>2) Non-Separation</td><td>42 to 157 g/m^2
(0.05 to 0.20 mm)</td><td colspan="2">42 to 546 g/m^2
(0.05 to 0.66 mm)</td></tr>
<tr><td>3</td><td>ISO/JIS standard card</td><td colspan="4">Available at straight path with non-separation feed only.
Width: 53.9 mm, Length: 85.5 mm, Thickness: 0.84 mm or less
*No embossment is permitted.</td></tr>
<tr><td>4</td><td>Long-document mode</td><td colspan="4">Available by service mode (Special users only)
1000 mm max.
*Thickness: 0.2 mm or less, Image data size: 128 MB or less</td></tr>
<tr><td>5</td><td>Document requirements</td><td colspan="4">1) Pressure-sensitive paper: Can be fed with limitation of direc-tion.
2) Carbon-backed paper: Cannot be fed.
3) Perforated paper for binder: Can be fed with limitation of holes.
4) Curled paper: Can be fed only if curl is 8 mm or less.
5) Creased paper: Can be fed, but crease must be straightened before being fed.</td></tr>
<tr><td rowspan="4">6</td><td rowspan="4">Document storage</td><td></td><td>U-turn path</td><td colspan="2">Straight path</td></tr>
<tr><td>1) Pickup</td><td colspan="3">10 mm or less including curls
(100 sheets or less with 80 g/m^2 document)</td></tr>
<tr><td>2) Eject</td><td>12 mm or less
(including curls)</td><td colspan="2">(Not warranted because the eject tray length is short.)</td></tr>
<tr><td>3) Ejected face direction</td><td>Face down</td><td colspan="2">Face up
(inverted ordering)</td></tr>
<tr><td rowspan="5">7</td><td rowspan="5">Feeding speed</td><td>Resolution</td><td>Binary</td><td>Grayscale</td><td>Color</td></tr>
<tr><td>100/200 dpi</td><td colspan="3">300 mm/sec</td></tr>
<tr><td>300/400 dpi</td><td colspan="3">240 mm/sec</td></tr>
<tr><td>600 dpi</td><td colspan="2">120 mm/sec</td><td>90 mm/sec</td></tr>
<tr><td colspan="4">*At 600 dpi, the numbers above may differ depending on the setting conditions.</td></tr>
</table>

Table 1-202

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3. Document Reading *using bundle software (CaptureParfect 3.0)

No.	Item	Specifications			
1	Type of sensor	3 Line Contact Image Sensor (CIS)			
2	Picture element	Density of element: 600dpi, Effective elements: 7328 × 3 line (310 mm)			
3	Light source	3-color (RGB) LEDs R: 620 nm, G: 530 nm, B: 467 nm			
4	Color dropout	Available: R/G/B/Custom-color, each side *Color emphasize modes are available also.			
5	Reading side	Simplex (Front)/Duplex (Both)/Blank skip *Reverse side selection is available.			
6	Reading size	1) Typical: A3/A4/A4-R/A5/A5-R/A6/A6-R, B4/B5/B5-R/B6/B6-R, LDR/LGL/LTR/LTR-R 2) Auto size detection 3) Maximum size (300 × 432mm) 4) Margin (±10 mm) 5) User setting			
7	Output mode	1) Binary (Black&White/Error diffusion/ Hi-speed text enhancement/Advanced text enhancement) 2) Grayscale (8 bit) 3) Color (24 bit) *MultiStream function is available.			
8	Output resolution	100 × 100 dpi, 150 × 150 dpi, 200 × 200 dpi, 240 × 240 dpi, 300 × 300 dpi, 400 × 400 dpi, 600 × 600 dpi,			
9	Reading speed	A4 size documents			
		Mode	Resolution	Single	Double
		Black&White	200 dpi	50 ppm	100 ipm
			300 dpi	40 ppm	80 ipm
			600 dpi	18 ppm	18 ipm
		Grayscale	200 dpi	50 ppm	100 ipm
			300 dpi	40 ppm	70 ipm
			600 dpi	18 ppm	16 ipm
		Color	200 dpi	50 ppm	100 ipm
			300 dpi	40 ppm	70 ipm
			600 dpi	6 ppm	16 ipm
		*Settings of reading are default, and Grayscale/Color are JPEG. The numbers above may differ depending on the computer, the function settings and other conditions. Other detailed conditions are omitted.			

Table 1-203

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4. Image Processing/Other Functions *using bundle software (CaptureParfect 3.0)

No.	Item	Specifications
1	Brightness adjustment	255 steps, back side individual setting, AE for B&W mode
2	Contrast adjustment	7 steps, back side individual setting
3	Gamma correction	Gray/R/B/G individual color, each side setting
4	Edge emphasize	5 steps
5	JPEG composition	Performed in scanner
6	Shading correction	Performed at each batch (shading plates are provided in scanner)
7	Skew correction (deskew)	Performed by image processing
8	Skew detection	Performed by end sensors (to prevent from tearing document)
9	Double feed detection	Length detection sensor/Ultra-sonic sensor
10	Other image processing	Black border removal, Binder hole removal, Image rotation, Text orientation, Batch code, Dots erase, Notch erase
11	Counter	Total fed count/Replacement count (memorize in scanner)
12	Operational button	Start button/Stop button

Table 1-204

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

III. PRECAUTIONS

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

1. Power OFF in Emergency

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

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

2. Prohibition of Modify

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

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

3. Electromagnetic Wave Interference Countermeasures

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

4. User Manual

Read the user manual thoroughly before using this machine.

5. Disposal

Following local regulations when disposing of the product and parts.

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IV. NAME OF PARTS

1. Front

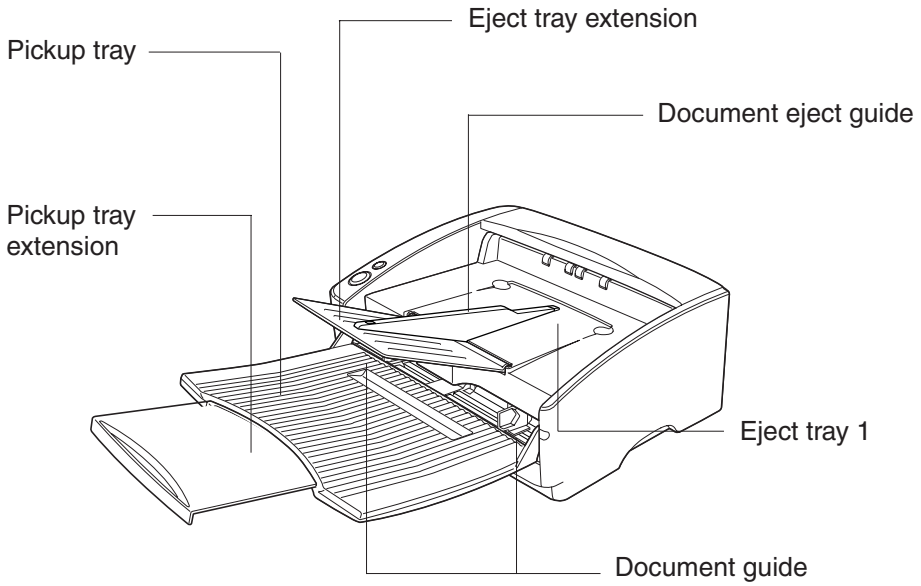

Figure 1-401

2. Operation Panel

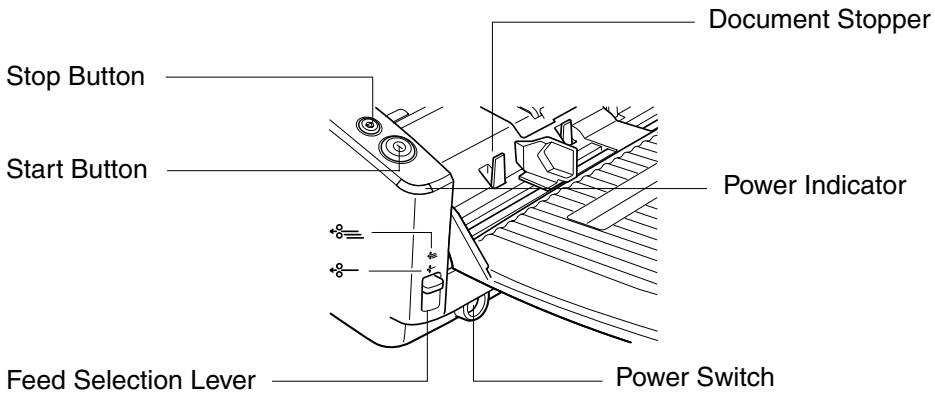

Figure 1-402

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3. Rear

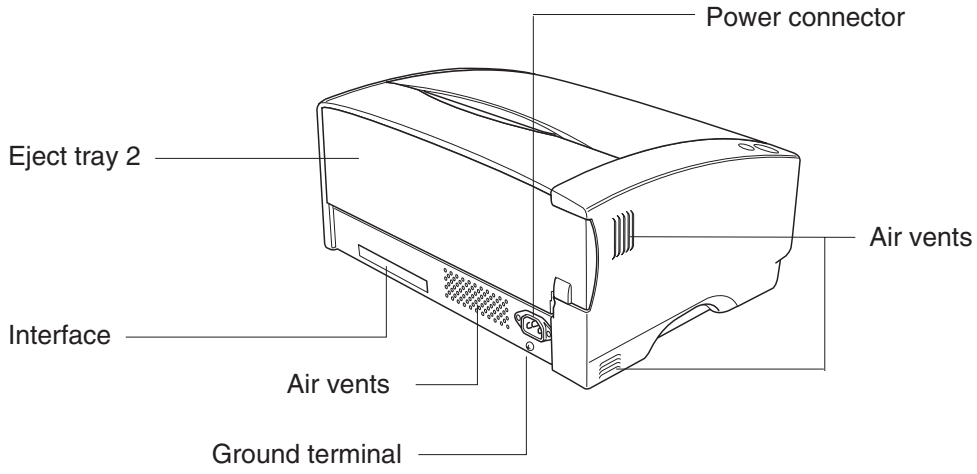
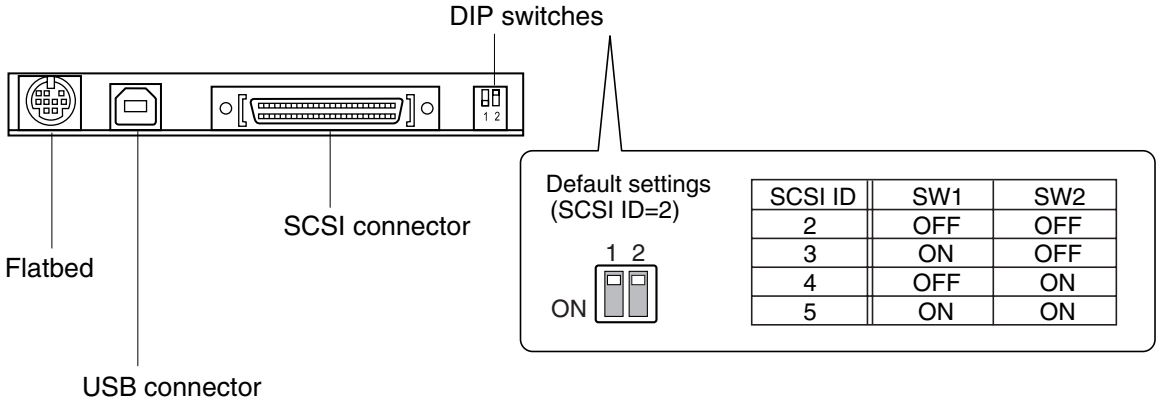


Figure 1-403

4. Interface



SCSI ID	SW1	SW2
2	OFF	OFF
3	ON	OFF
4	OFF	ON
5	ON	ON

Figure 1-404

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V. USER OPERATION

Refer to the software user manual for this machine for details.

1. Installation

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

2. Operation Screen

Basic operation screens if CapturePerfect 3.0 is used are shown for reference. CapturePerfect 3.0 uses an IS driver.

1) Main screen

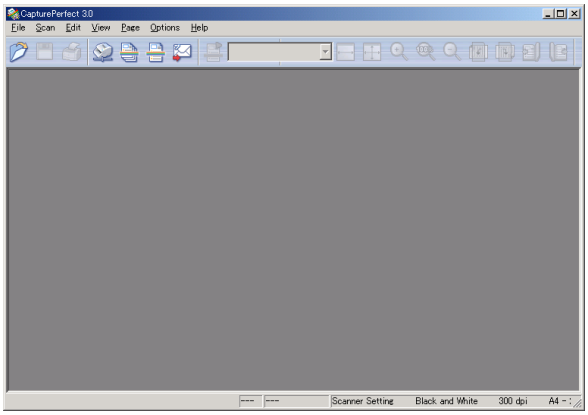

Figure 1-501

2) Basic settings

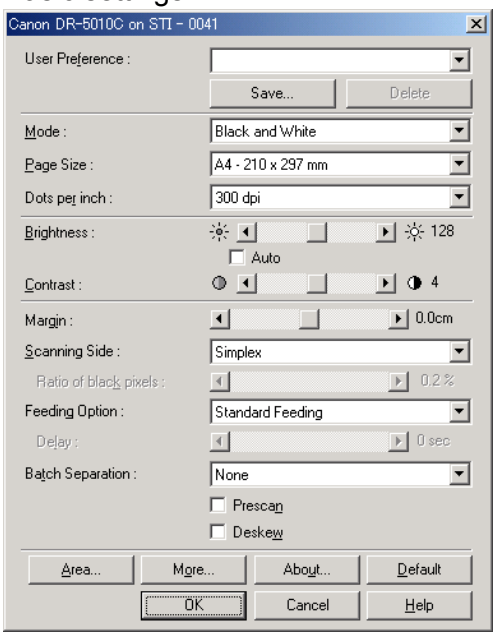

Figure 1-502

3) Detailed settings

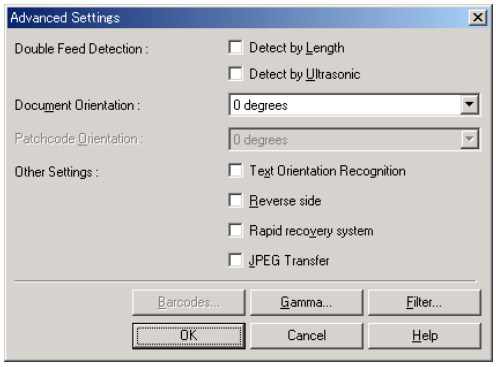

Figure 1-503

4) Filter

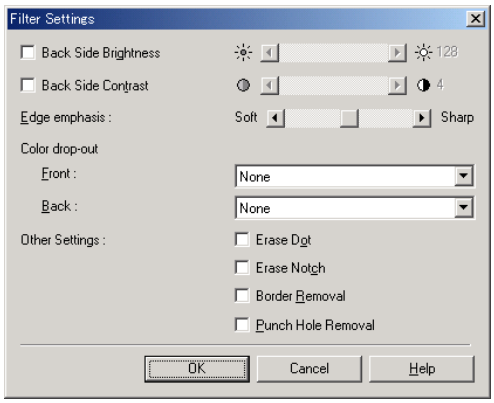

Figure 1-504

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5) Gamma

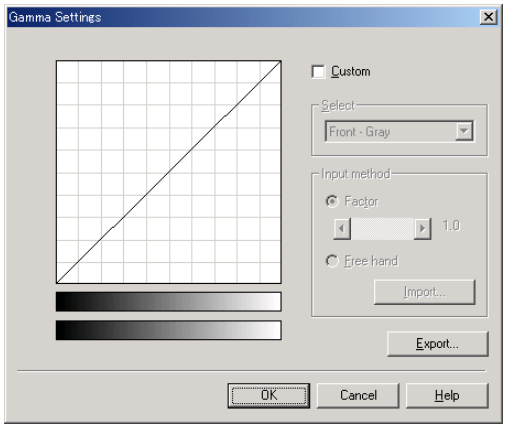

Figure 1-505

3. Clearing Jams

1) Remove documents left on the eject tray and then close the eject tray extension.

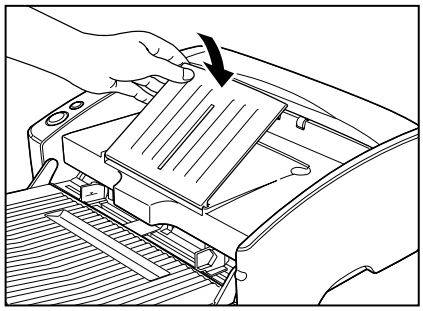

Figure 1-506

2) Open the upper unit slowly.

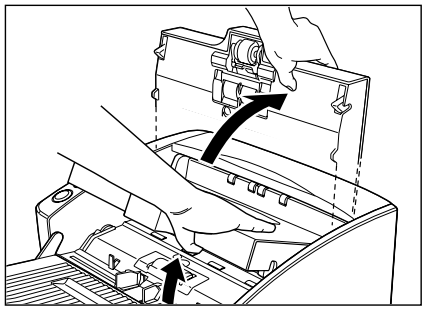

Figure 1-507

Note: Do not hold the pickup roller at the center when opening or closing the upper unit.

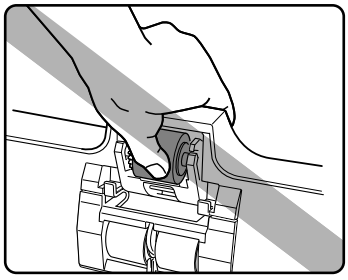

Figure 1-508

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3) Remove the jammed document carefully.

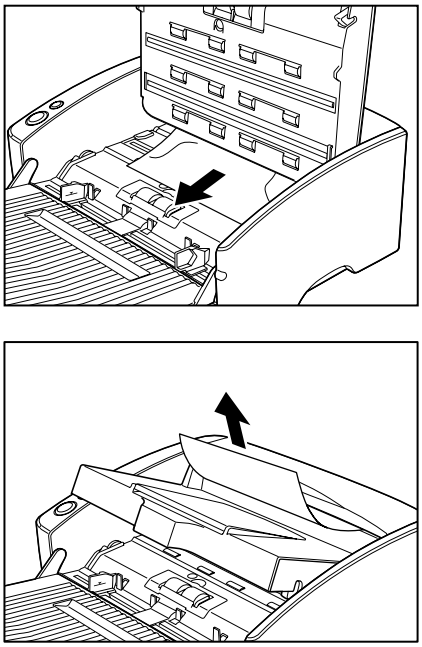

Figure 1-509

4) Close the upper unit slowly. Then push both ends with both hands to close it securely.

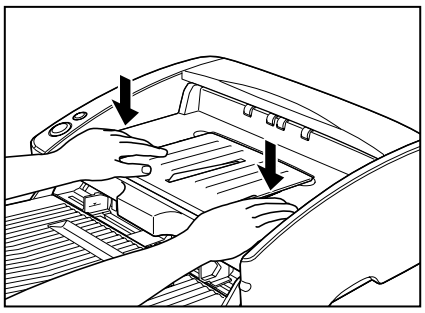

Figure 1-510

VI. USER MAINTENANCE

Refer to the user manual for this machine for details.

1. Cleaning

Daily cleaning items are shown below.

1) Main unit exterior
2) Main unit interior (feed path)
3) Rollers
4) Reading glass
5) Shading plates

2. Shading Plates

The procedure for cleaning the shading plates is shown below.

Note: Do not bend the shading plates during cleaning.

1) Turn the power ON.
2) Open the upper unit.
3) Hold the start button for approx. two seconds to raise the upper and lower shading plates.

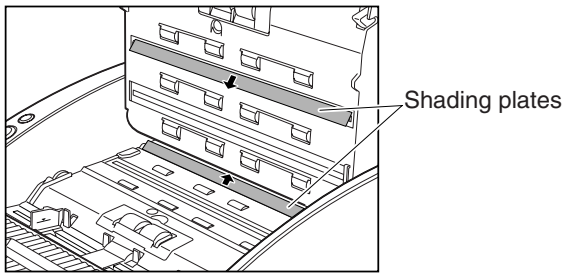

Figure 1-601

4) Clean the shading plates.
5) When the stop button is pressed, the shading plates are retracted. (They are also retracted when the upper unit is closed slightly.)
6) Close the upper unit.

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3. Roller Replacement

The pickup, feed and retard rollers are consumables. They should be replaced when 250,000 sheets are fed as a guide. The rollers are replaced by the user.

a. Replacement message

When the number of sheets fed exceeds 250,000, a "roller replacement message" is displayed on the display when the computer is started.

Note: The message is not displayed when the operating system is Windows NT.

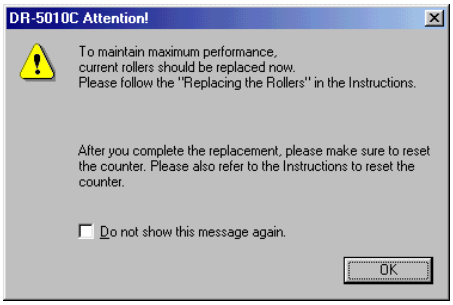

Figure 1-602

When a roller is replaced, the counter must be reset.

To reset the counter, select "Start -> Settings → Control Panel → Scanners and Cameras" to display the "Properties" screen for this machine, and click the "Reset" button for the counter.

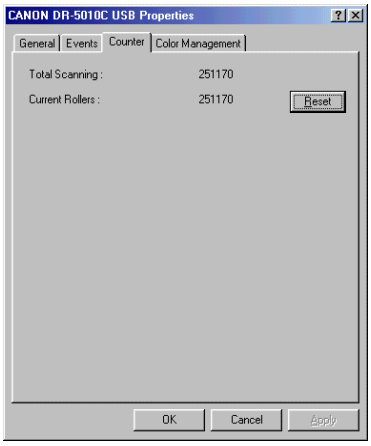

Figure 1-603

b. Pickup roller

• Removal

1) Turn the power ON.

Note: If the power is OFF, the pickup roller does not move forward and cannot be replaced.

2) Open the upper unit.

3) Push down the pickup roller, open the hooks and remove the roller.

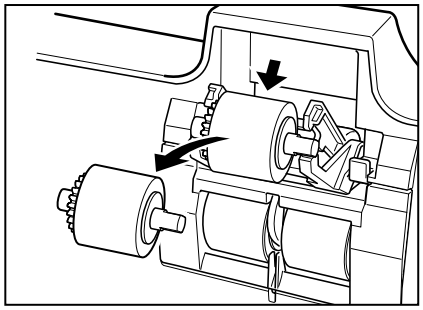

Figure 1-604

• Installation

1) Hold both ends of the pickup roller shaft and align it with the hooks.

Note: The gear on the pickup roller must be on the left.

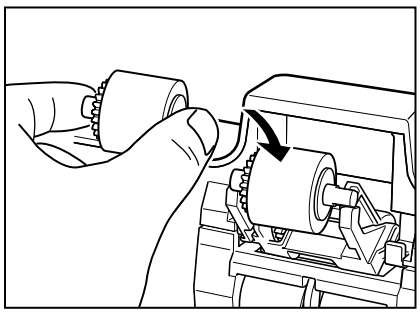

Figure 1-605

2) Push down the hooks with the pickup roller shaft to push down the roller.

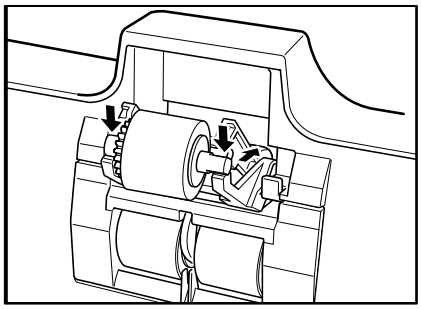

Figure 1-606

c. Feed roller

• Removal

1) Open the upper unit.

2) Lower the roller cover hooks and remove the cover.

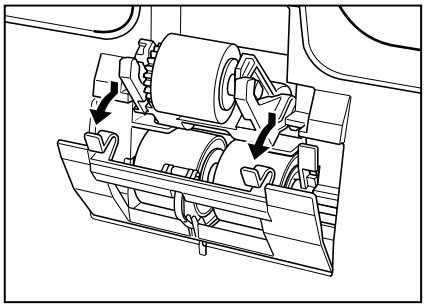

Figure 1-607

3) Move the roller fixing lever forward and slide it to the right.

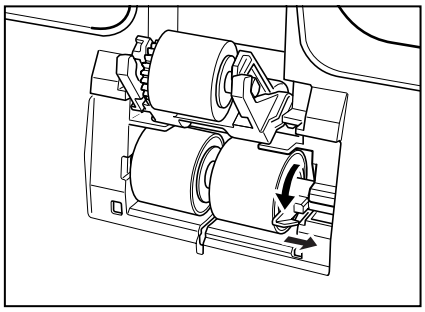

Figure 1-608

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4) Slide the feed roller to the right and remove it.

• Installation

1) Align the notch in the feed roller with the shaft on the main body and set the roller.

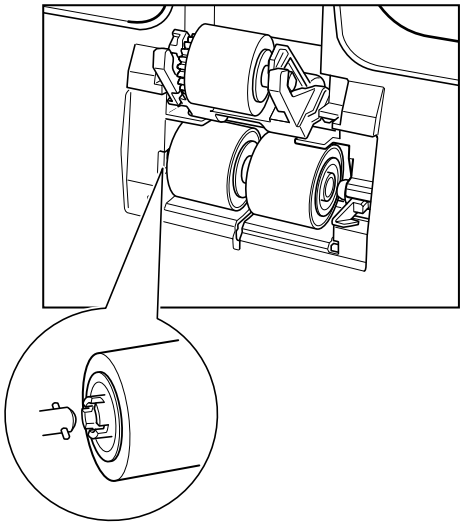

Figure 1-609

2) Slide the roller fixing lever to the left and fit it into the hole in the feed roller. Then raise the lever and secure the roller.
3) Reinstall the roller cover.

d. Retard roller

• Removal

1) Open the upper unit.
2) Insert a finger behind the roller cover and remove the cover.

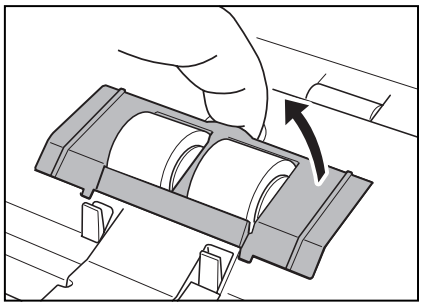

Figure 1-610

3) Raise the roller fixing lever and slide it to the right.

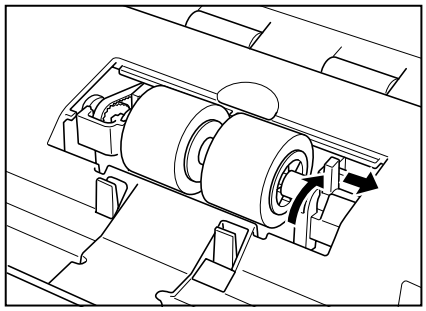

Figure 1-611

4) Slide the retard roller to the right and remove it.

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- Installation

1) Align the notch in the retard roller with the shaft on the main body and set the roller.

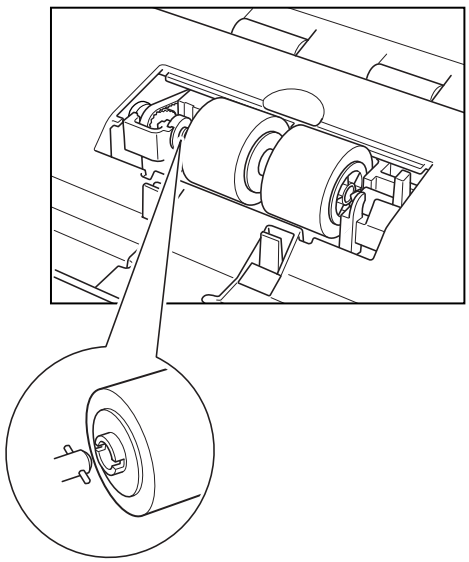

Figure 1-612

2) Slide the roller fixing lever to the left and fit it into the hole in the retard roller. Then move the lever forward and secure the roller.
3) Reinstall the roller cover.

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CHAPTER 2

FUNCTIONS & OPERATION

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I. OUTLINE

1. Basic Configuration

Figure 2-101 shows the configuration of this machine.

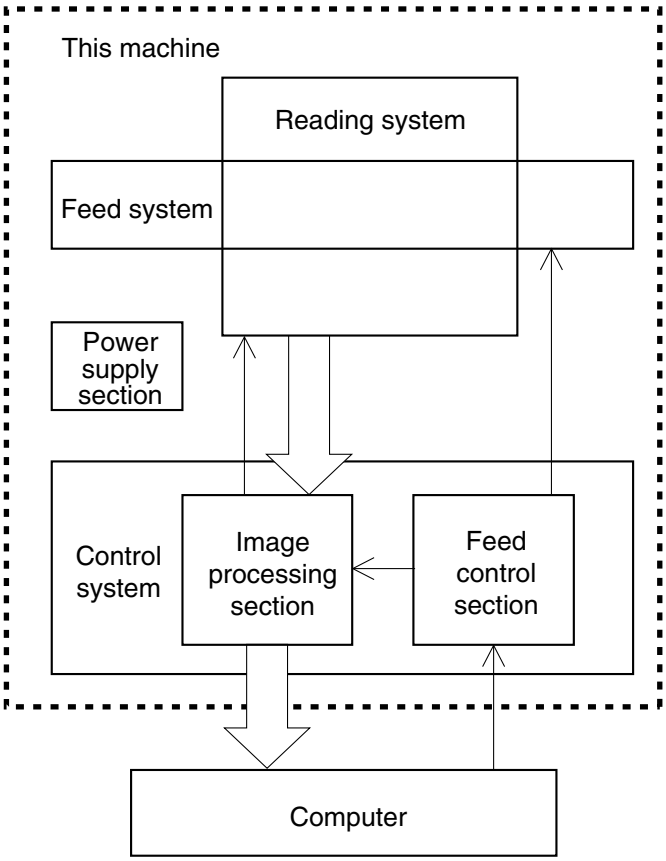

Figure 2-101

1) Reading System
This system reads image data from image sensors.

2) Feed System
This system performs from document pickup to document ejection.

3) Control System
This system is comprised of an image processing section and a feed control section.
The image processing section controls the reading system, processes the read image data, and outputs it to the computer. However, image data processing is also performed by the computer.
The feed control section controls the feed system.

4) Power Supply Section
This section converts the AC power supplied from external into the DC power and supplies it to the control PCB.

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2. Motor Drive

This machine has a main motor (M1) and an eject motor (M2) for feeding the document.

Additionally, it also has a pickup motor (M3) to move a pickup roller upwards and downwards and shading motors (M4 (upper) and M5 (lower)) to move a shading plate.

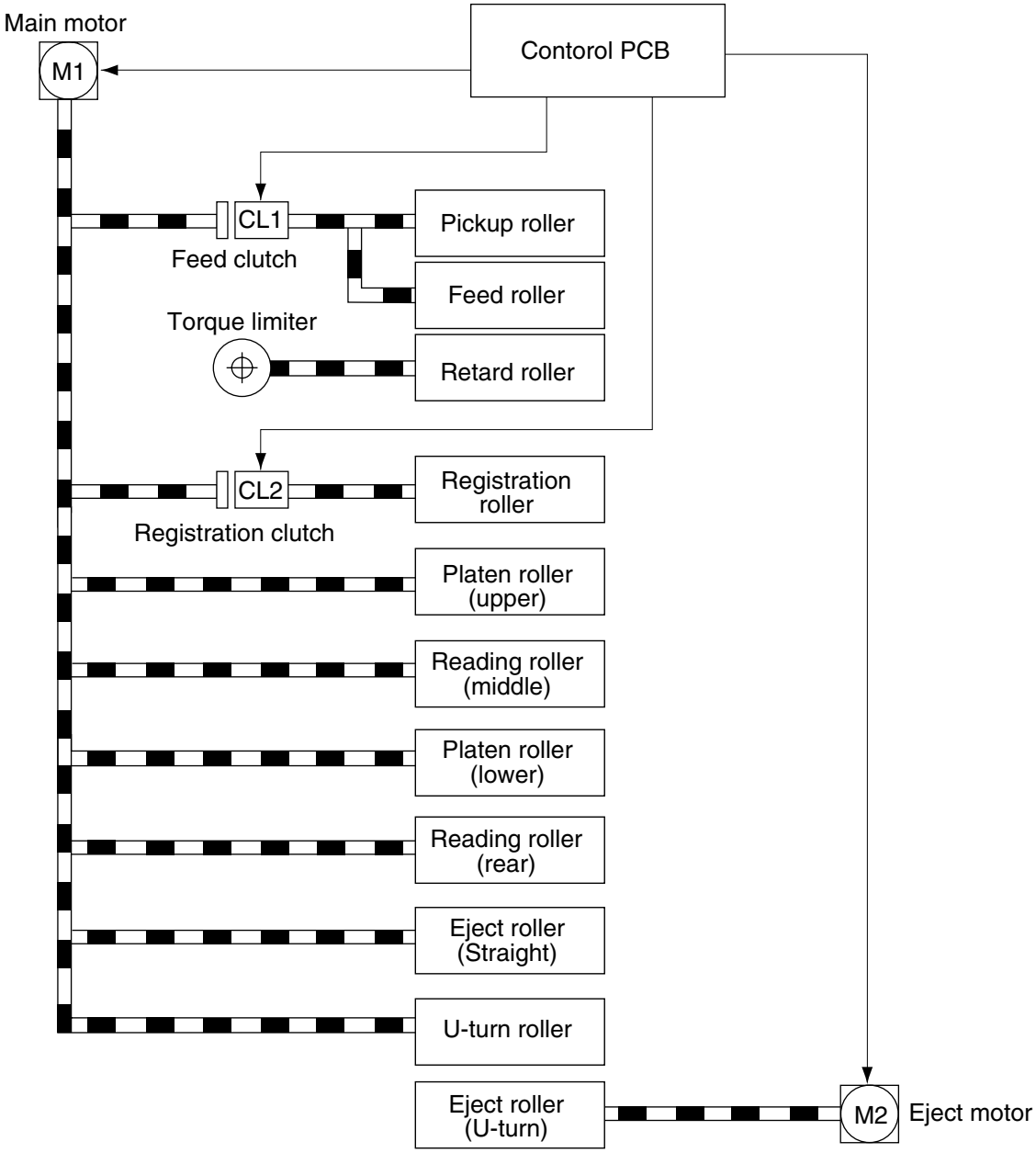

Figure 2-102

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3. Electrical Circuits

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

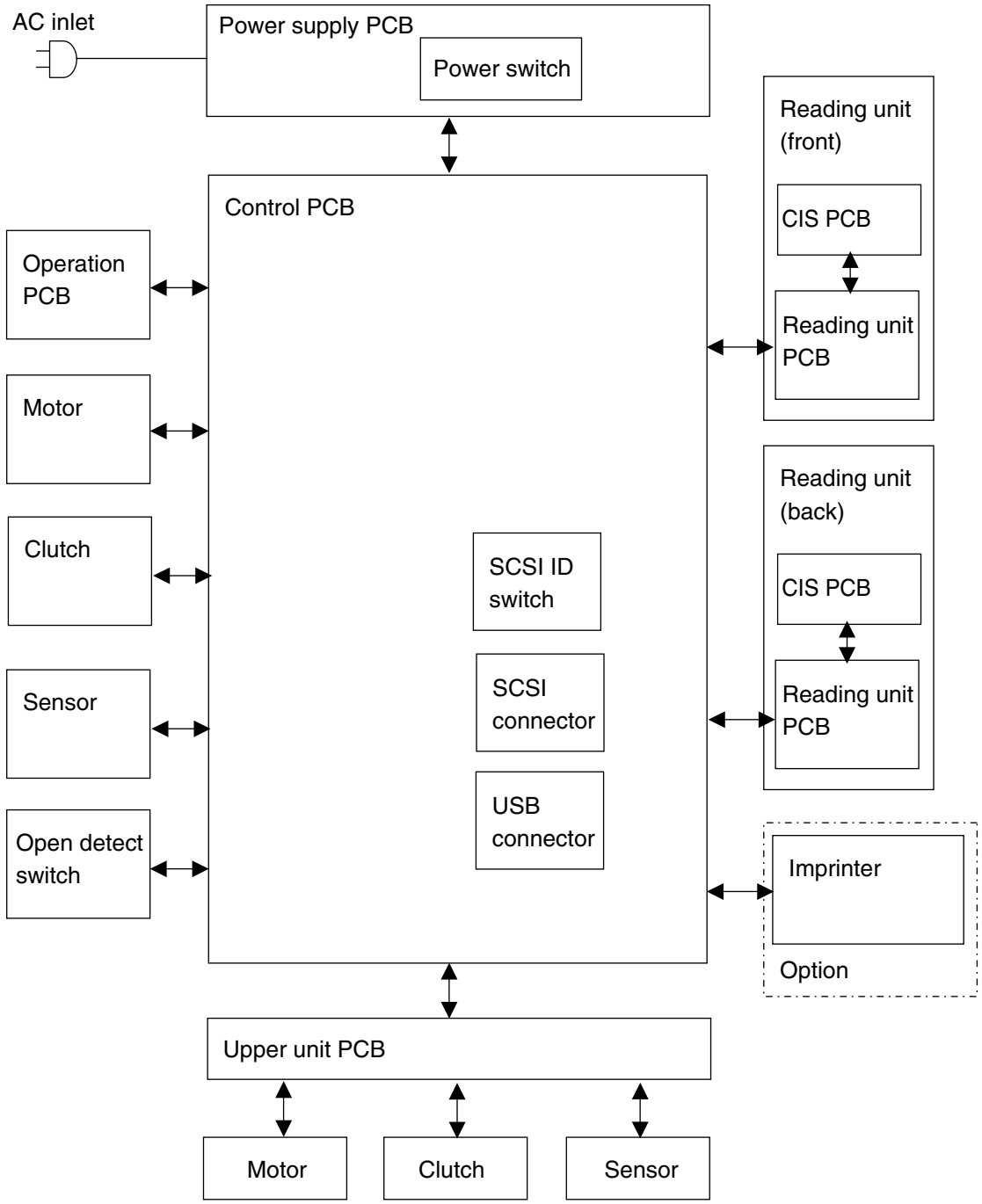

Figure 2-103

4. Timing Chart

Figure 2-104 describes the timing chart when you separately feed two sheets of document by using a U-turn path without temporarily suspending the machine.

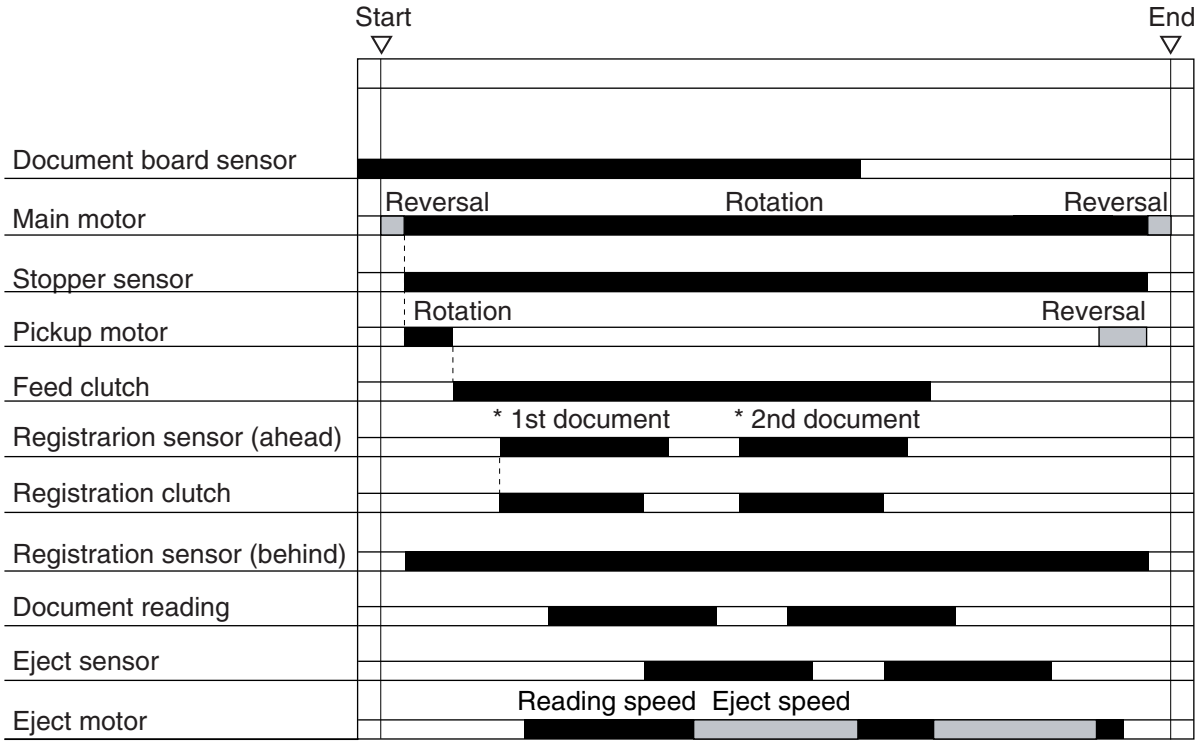

Figure 2-104

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II. READING SYSTEM

1. Outline

Figure 2-201 shows the configuration of the reading system.

The reading system consists of the CIS unit and platen rollers.

The CIS unit (front) reads the front side of the documents and the CIS unit (back) reads the back side of the documents.

This configuration enables the unit to read both the front and back sides of a document using a single scan.

The image data read are sent to the image processing section of the control PCB via the reading unit PCB.

The platen rollers hold the document tightly against the reading glass to keep it in focus.

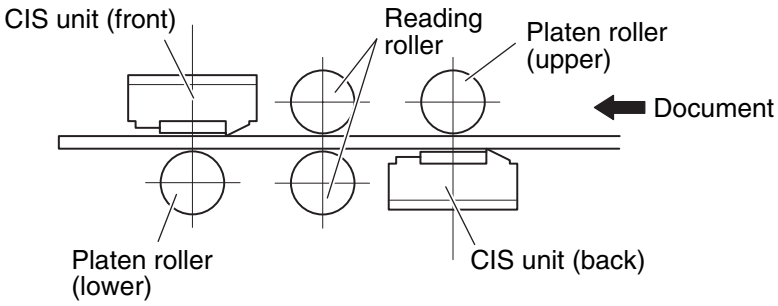

Figure 2-201

2. CIS Unit

Figure 2-202 is a sectional diagram of the CIS (Contact Image Sensor) unit.

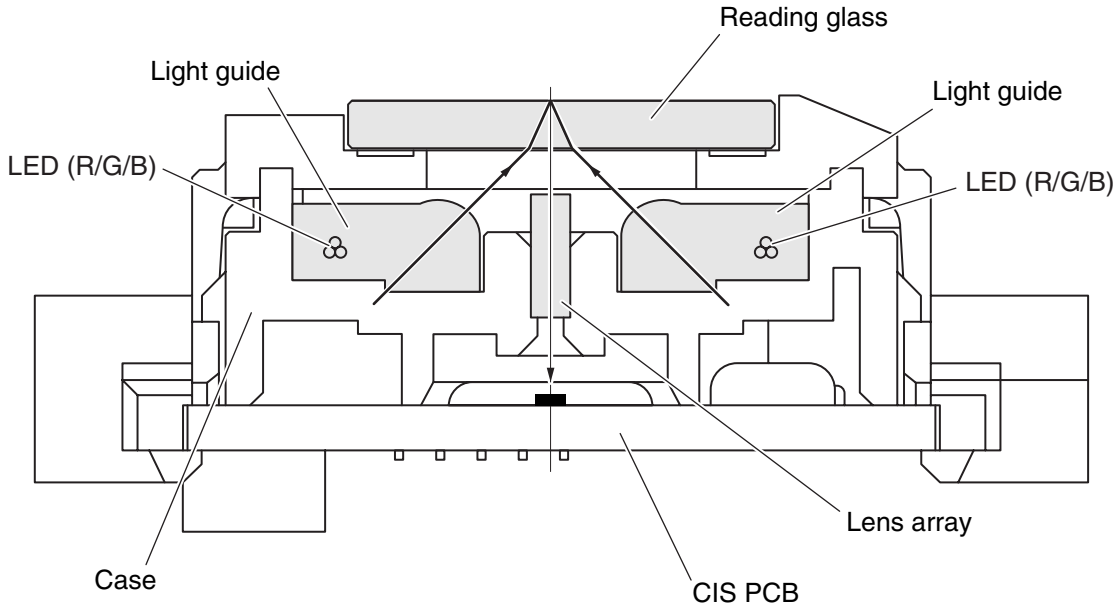

Figure 2-202

The CIS unit consists of a CIS PCB, a lens array, LEDs (R/G/B), light guides, a reading glass and a case.

The CIS PCB has 16 blocks of 3-line CMOS image sensors with color filters with an optical resolution of 600 dpi. The number of effective picture elements of each color is 7326 and its reading width is 310 mm. (Figure 2-203)

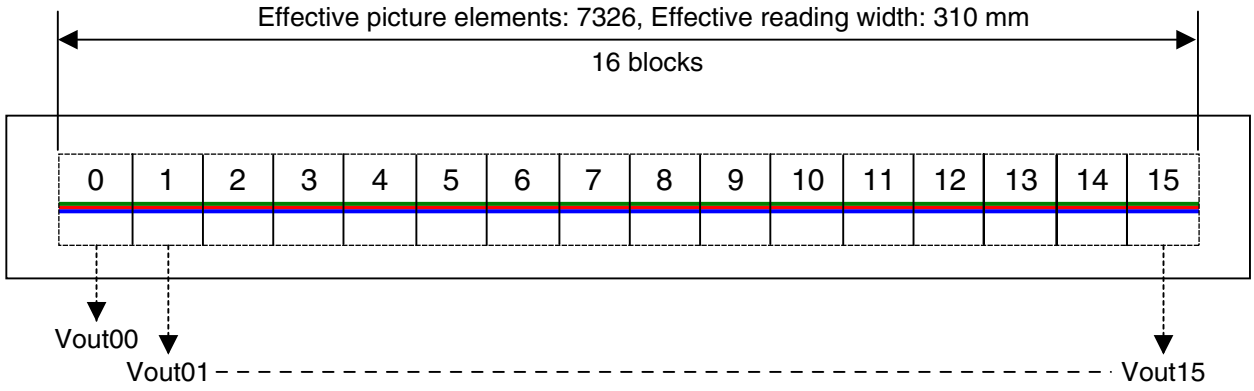

Figure 2-203

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This CIS unit is characterized by the fact that the CIS has three lines. Each line corresponds to each of RGB colors. In the conventional 1-line type color mode, LEDs are lighted in order of color and image data is read, but as it is changed to the 3-line type, the LEDs are lighted at the same time and color shift can be reduced. Since the two light guides are installed and light the reading spot from the right and left sides, the influence of the shadows of wrinkles of documents can be reduced.

LEDs light illuminates the document through the light guides, and the light reflected from the document enters the image sensors through the lens array. The image sensors convert the light to an analog signal. (Figure 2-204)

The analog signals are sent to the reading unit PCB, processed and transformed into digital signals. And then, they are sent to the control PCB.

The combination of CIS unit, reading unit PCB and mounting plates of those units is collectively called “reading unit.”

This machine lights all the LEDs to read image data even if it is put into the color dropout or color emphasis mode. The necessary image processing is done in the control PCB.

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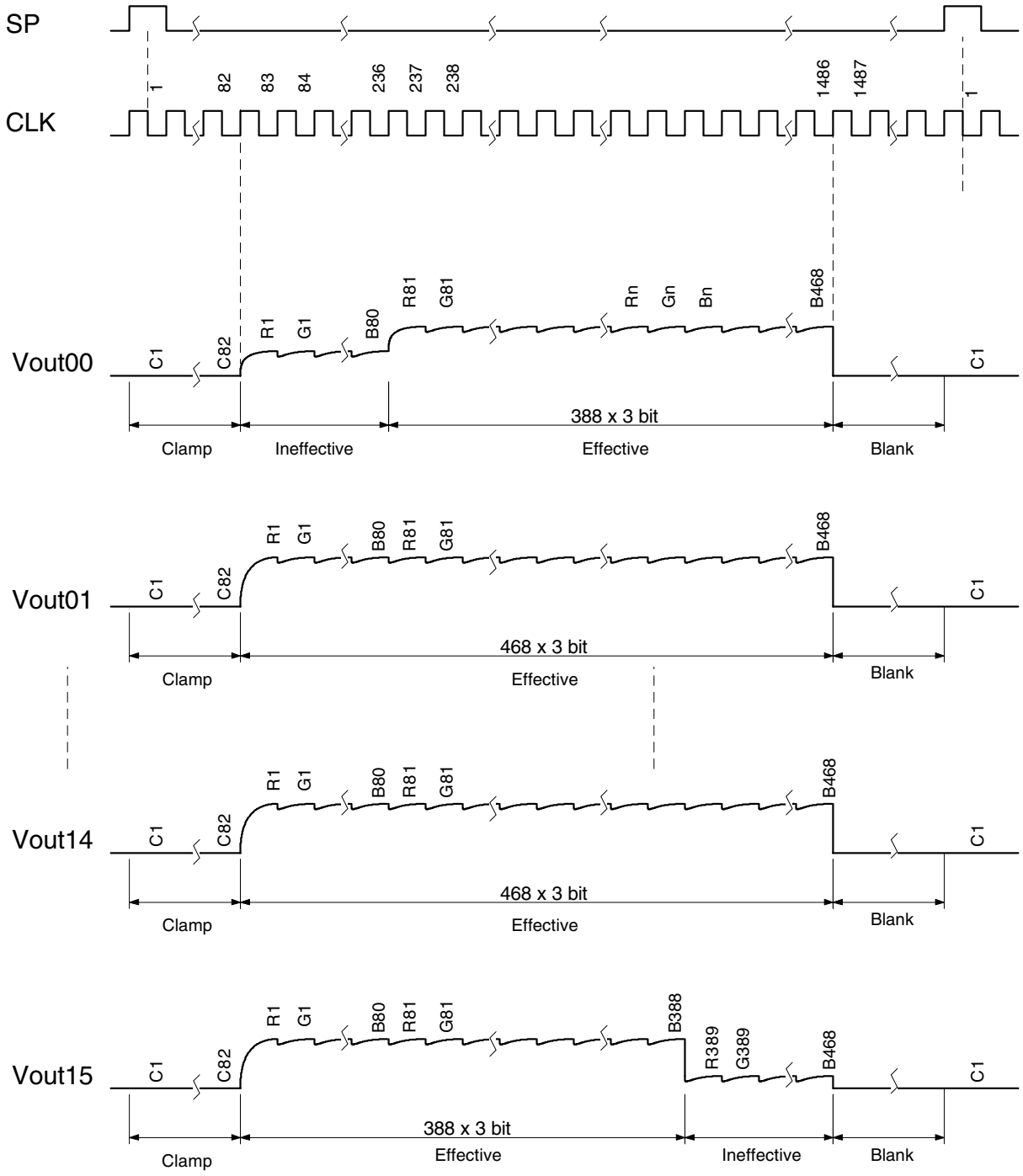

Figure 2-204

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3. CIS Position Correction

The 3-line CIS is basically arranged at a pitch of 600 dpi (0.0423 mm) around R. (Figure 2-205)

Thus, RGB color shift like the conventional machine can be prevented by correcting image data by considering the difference in the position of each line.

To correct position shift of 600 dpi pitch, R data, G data before two lines and B data after two lines are joined to make one picture element data if R is used as reference.

L(n) data = [R(n), G(n-2), B(n+2)]

This machine uses a reading unit PCB for rearrangement for this data.

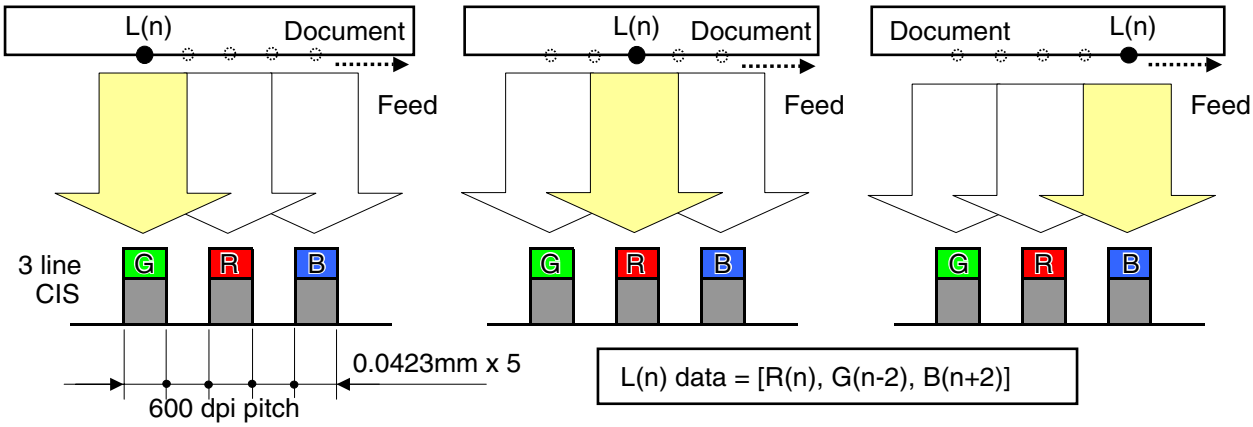


Figure 2-205

4. Shading Plate

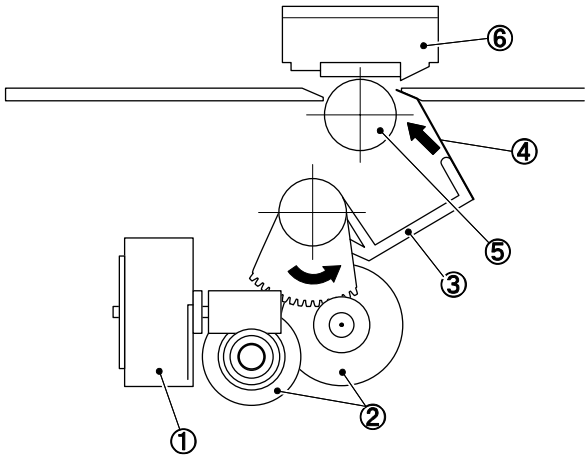
A shading plate is installed for the front and the back of the CIS unit each (a total of two shading plates) to calculate a shading correction value.

A layout drawing of the shading plate for the CIS unit is shown in Figure 2-206.

The shading plate is a white plastic sheet with a thickness of 0.1 mm.

The shading plate is stuck on an arm with gears. This arm with gears moves by tracing circular arcs by the drive of the shading motor. The shading plate is inserted into the clearance between the CIS unit and platen roller, and shading is performed at this time.

The calculated shading correction value is saved in the reading unit PCB. The shading is performed at the beginning of the batch that is scanned. Cleaning of the shading plate can be carried out by pressing the START/STOP buttons on the operation panel.



① Shading motor
② Gear
③ Arm with gears
④ Shading plate
⑤ Platen roller
⑥ CIS unit

Figure 2-206

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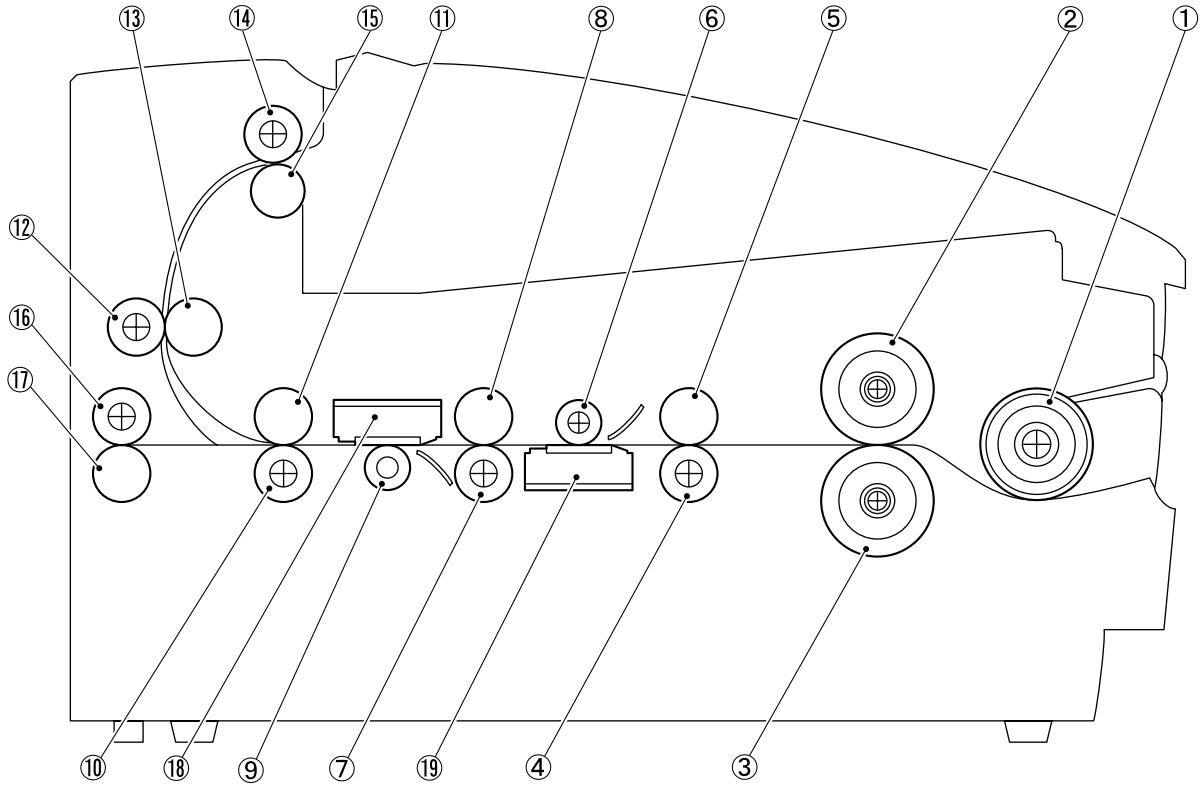
III. FEED SYSTEM

1. Outline

Figure 2-301 is a sectional diagram of the feed system.



① Pickup roller
② Feed roller
③ Retard roller
④ Registration roller (drive)
⑤ Registration roller (follower)
⑥ Platen roller (upper)
⑦ Reading roller middle (drive)
⑧ Reading roller middle (follower)
⑨ Platen roller (lower)
⑩ Reading roller rear (drive)
⑪ Reading roller rear (follower)
⑫ U-turn roller (drive)
⑬ U-turn roller (follower)
⑭ Eject roller U (drive)
⑮ Eject roller U (follower)
⑯ Eject roller S (drive)
⑰ Eject roller S (follower)
⑱ CIS unit (front)
⑲ CIS unit (back)

Note: The three follower rollers ⑤, ⑧, ⑪, are the same parts.

Figure 2-301

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2. Pickup System

The conventional machine lifts the document board, bring documents into contact with the pickup roller and feed them. This machine does not move the document board, lowers the pickup roller and feeds documents. It has a dedicated motor (M5) for lifting and lowering the pickup roller.

The surface from the document loading section to the separation section is a tilted plane, and documents are separated on the tilted surface before they reach the separation section to suppress double feed.

The pickup section has a document stopper. This stopper limits the leading edge position of the document when it is set, and the stopper begins to go down when a scan start instruction is given. The stopper is lowered by the reverse drive of the main motor (M1).

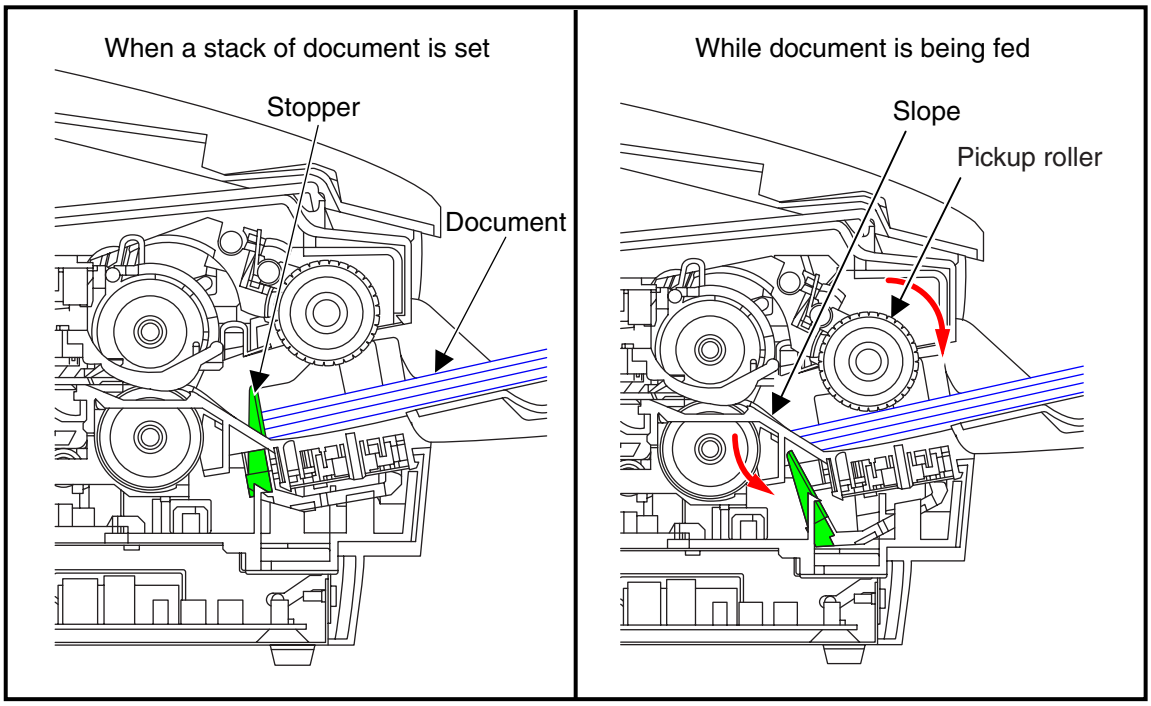

Figure 2-302

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3. Separation Mechanism

Separation of this machine is performed by the retard roller.

Figure 2-303 shows the configuration of the separation mechanism.

Since the torque limiter is built in the retard roller, when the outside pressure on the roller exceeds the specified value into the feed direction, the roller begins to rotate in the same direction.

As shown in Figure 2-303-a, when overlapped documents enter into the clearance between the feed roller and the retard roller, the document in contact with the feed roller is fed in the feed direction, and the retard roller does not rotate so that the document in contact with the retard roller is not pushed in.

As shown in Figure 2-303-b, once a single document remains, the retard roller rotates in conjunction with the feed roller and the document to feed the document.

If non-separation is selected, the retard roller rotation becomes free and the separation function becomes invalid.

Since the mounting base of the retard roller is supported by a constant spring force for this machine, the distance between the feed roller and retard roller and variations of rollers are absorbed and stable separation performance can be obtained.

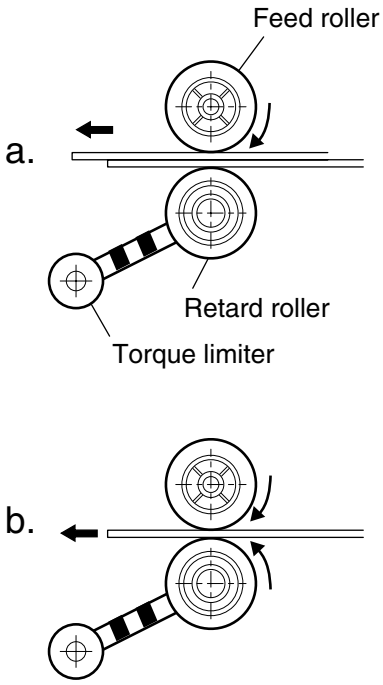

Figure 2-303

4. Straight Path

For the conventional machine, the document is fed in a U-shaped path and ejected to the document set side. This machine has a straight path to feed documents straightly and deliver them to the opposite side of the document set, in addition to the U-shaped feed path (U-turn path).

The straight path is very useful when the thicker documents or cards are scanned. Thus, this machine is able to scan an international standard compliant card (vertical length: 53.9 mm, width: 85.5 mm, thickness: 0.76 mm) except for embossed cards. If the eject cover is opened, the flapper moves to close the U-turn path and open the straight path.

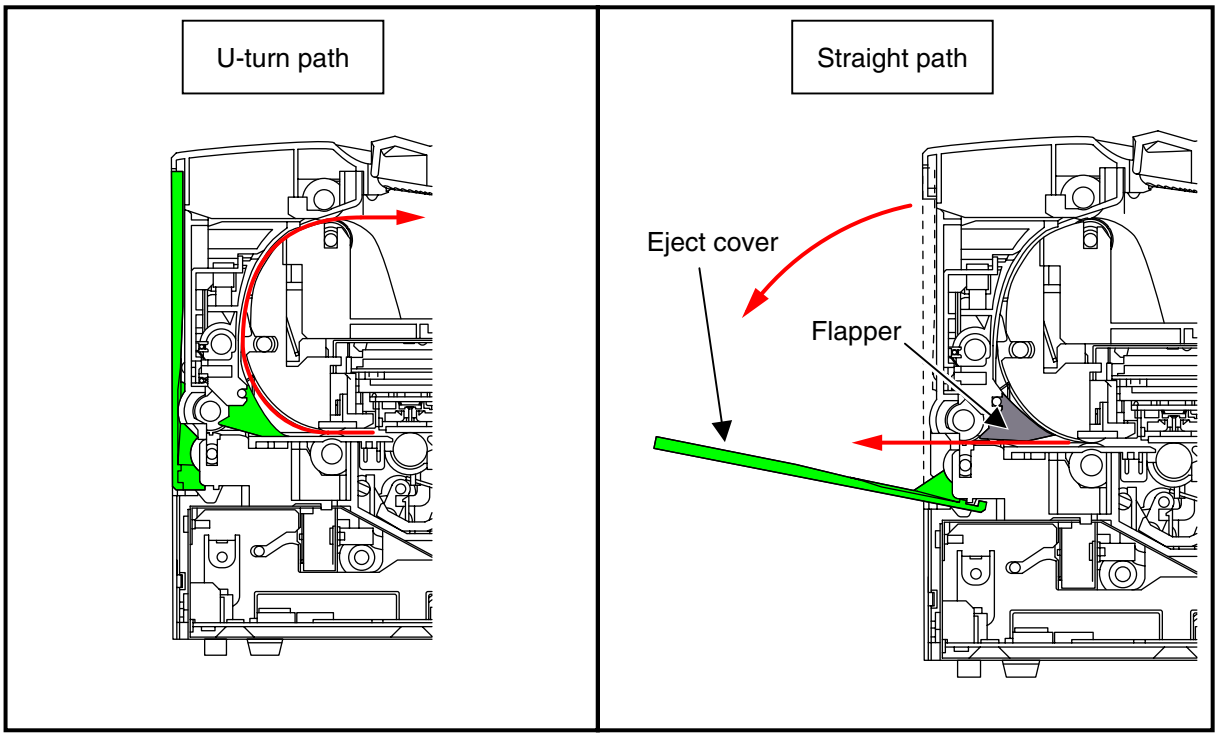

Figure 2-304

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5. Eject Speed Control

The eject speed of documents of the conventional machine is the same as the feeding speed. For this reason, documents may be pushed out when documents are fed at high speed, or may be caught at the eject port when they are fed at low speed. This machine has a dedicated motor (M2) for ejection. When documents are read, the eject speed is set to the same as the feeding speed, and set to the specified speed (150 mm/sec) after it passes through the eject sensor to prevent the above problems.

After the time for the document to pass through the eject roller elapses, the eject speed is returned to the feeding speed.

This function is effective only for the U-turn path eject.

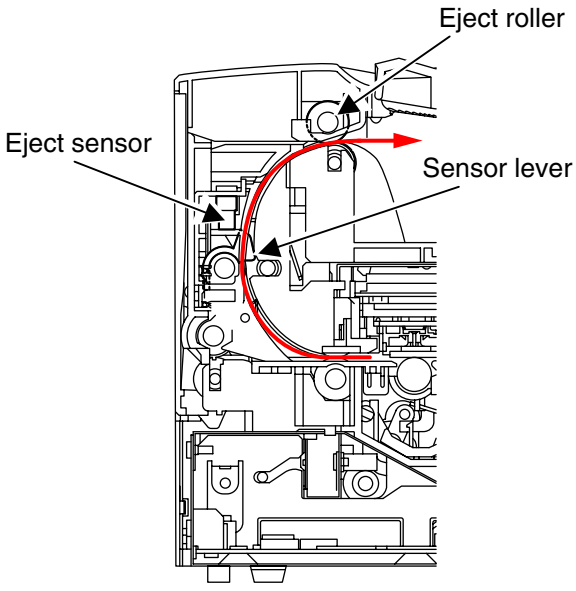

Figure 2-305

6. Feed Error Detection

1) Jam Detection

Document jams are detected by the registration sensors (front, back) and the eject sensor.

a) Early Reach Jam

The leading edge of the following document was detected after the trailing edge of the document was detected by the registration sensor before the document has been fed for a specific length.

b) Residual Jam

The trailing edge of the document was not detected even though the document has been fed for the maximum specific length after the leading edge of the document was detected by the registration sensor.

c) Fast Feed Jam

The trailing edge of the document was detected after the leading edge of the document was detected by the registration sensor before the document has been fed for the minimum specific length.

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d) Eject Jam

The document was not detected by the eject sensor even though the document has been fed for the maximum specific length after the document was detected by the registration sensor. (Delay)

The trailing edge of the document was not detected even through the document has been fed for the document length detected by the registration sensor after the leading edge of the document was detected by the eject sensor. (Residual)

When the machine starts reading a document with a document left in the machine, a non-removal jam occurs.

2) Double Feed Detection

There are two document detection methods in this machine: the document length detection by the registration sensor and the document overlapping detection by the ultrasonic sensor.

The double feed detection by ultrasonic uses the ultrasonic drive sensor and the ultrasonic receive sensor.

The ultrasonic drive sensor transmits the ultrasonic and the ultrasonic receive sensor receives the ultrasonic signal to gain a specific signal level. When overlapping documents are fed, the signal level is different from when properly feeding a single document. The unit interprets this difference as a double feed.

Note: When the length of the overlapping portion of the documents is less than 50 mm, the double feed may not be detected.

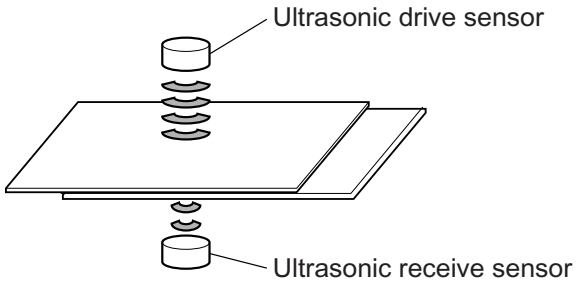

Figure 2-306

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3) Skew Detection

When a larger-sized document is skewed, the ends of the document may be torn. Therefore, the skew detection sensors are mounted on both sides of the feed section entrance. When skewing is detected by the right-end sensor or left-end sensor, the document feeding is stopped.

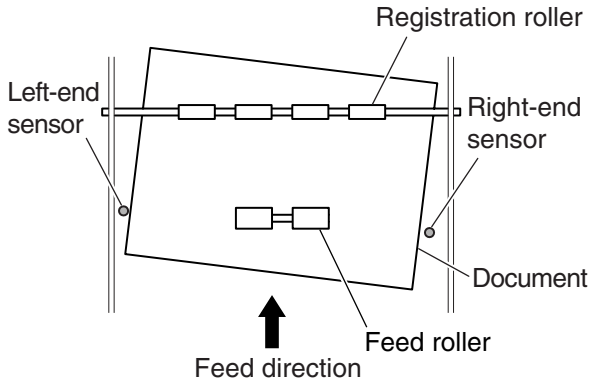

Figure 2-307

7. Mechanical Feed Mode

This machine also supports a mechanical feed mode to check the feed condition without using a computer.

This mode should not be available to the users.

The mechanical feed mode can be activated by pressing the buttons on the operation panel, as follows:

i) Turn ON the power switch with the start button pressed.
ii) Continue pressing the start button for about one second and press the stop button immediately after the power indicator blinks.
iii) Press off the both buttons. When it is in the mechanical feed mode, the power indicator keeps blinking.

If the start button is pressed while in the mechanical feed mode, with documents in the document board, the machine will feed the documents at a feeding speed determined by the SCSI ID set on the DIP switch located at the computer connection. Images are not scanned at this time.

To end the mechanical feed mode, turn the power OFF.

ID.	Feeding speed	1	2
ID2	Black & white/color 200 dpi	OFF	OFF
ID3	Black & white/color 300 dpi	ON	OFF
ID4	Black & white 600 dpi	OFF	ON
ID5	Color 600 dpi	ON	ON

Table 2-301

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IV. CONTROL SYSTEM

1. Control PCB

Control of the this machine is performed by the control PCB.

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

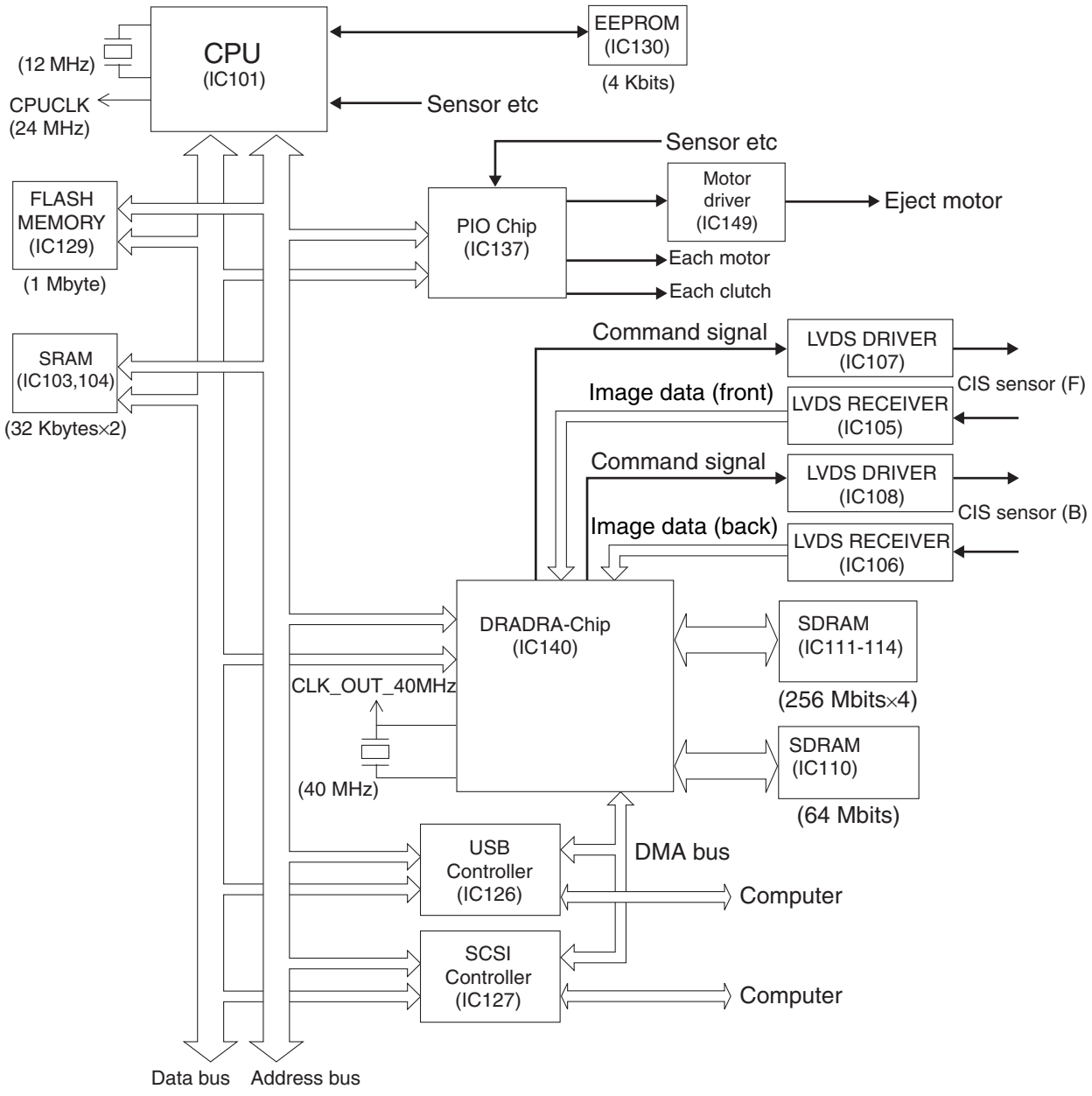

Figure 2-401

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IC No.	Name	Function
IC101	CPU	All controls
IC103, 104	SRAM (32 Kbytes) × 2	CPU work memory
IC105, 106	LVDS receiver × 2	Image data reception
IC107, 108	LVDS driver × 2	Image data transmission
IC110	SDRAM (64 Mbits)	JPEG module memory
IC111 to 114	SDRAM (256 Mbits) × 4	Image data storage (total 128 Mbytes)
IC126	USB controller	USB control
IC127	SCSI controller	SCSI control
IC129	Flash memory (1 Mbytes)	Firmware and each parameter storage
IC130	EEPROM (4 Kbits)	Each setting storage
IC137	PIO-chip	Input and output ports
IC140	DRADRA-chip	Image processing
IC149	Motor driver	Eject motor drive

Table 2-401

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2. Image Processing Control

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

The next section describes the principle of the image processing methods.

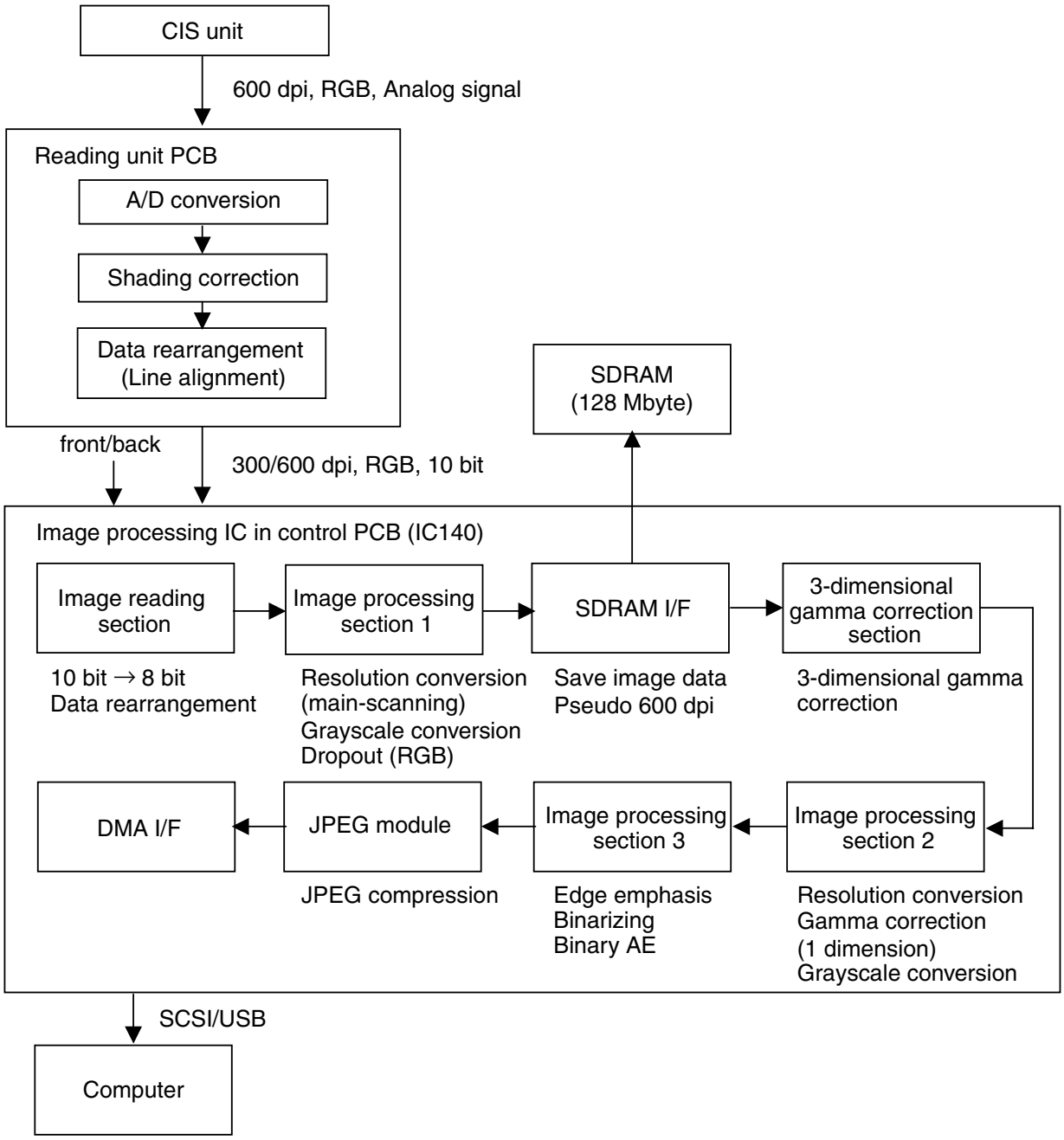

Figure 2-402

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The RGB analog signals output from the CIS unit are input to the reading unit PCB.

After those signals are converted into the digital signals in the reading unit PCB, the dedicated image processing IC (YUME-chip) rearranges the order of the data to compensate shading and align three lines. The image data used at this time consist of 10bit digital signals.

According to the scanner settings, an optical resolution between 600 dpi and 300 dpi can be selected. In case that the resolution is set at 300 dpi or less, 300dpi data are output. In case that the resolution is set at 600 or 400 dpi, 300 or 600dpi data are automatically selected depending on the volume of data.

The image data output from the reading unit PCB are input to the control PCB and processed by the dedicated image processing IC (DRADRA-chip).

Since the data are processed as 8 bits within the IC, they are converted from 10 bits to 8 bits at the image reading section. And, the image data is rearranged.

The image processing section 1 changes the resolution of the main-scanning direction, performs the grayscale conversion and the dropout color in accordance with the scanner settings in order to convert the data into basic image data.

This machine is provided with the “MultiStream” function. Thus, the data can be converted into image data which meet two types of settings, simultaneously. The basic image data are stored in the SDRAM through the SDRAM interface. SDRAM is 128 Megabytes in capacity.

And then, the 3-dimensional color space processing section performs the 3-dimensional gamma correction which is a newly developed processing in order to improve the quality of colors.

The image processing section 2 changes the resolution, performs the 1-dimensional gamma correction (adjustment of brightness and contrast, and custom gamma correction) and the grayscale conversion.

The image processing section 3 handles the edge emphasis, binarizing (simple binarizing, error diffusion), and binary AE processing (ABC, High-speed text enhancement).

In the JPEG module, the grayscale and color data can be compressed in JPEG format. When JPEG is selected, the image data size is reduced by compression within this machine so that it can be transferred to the computer in less time. As a result, more documents can be scanned in a given time.

Finally, processed image data are sent from the DMA I/F to the computer either through the SCSI or USB interface.

In case that the MultiStream is selected, the image data stored in the SDRAM are processed again in accordance with the secondary settings.

The following image processing are carried out inside the computer.

- Advanced text enhancement
- Automatic size detection
- Skew correction
- Black border removal
- Binder hole removal
- Blank skip
- Add-on
- Patch code detection
- Text orientation
- Image rotation
- Dots erasing
- Notch erasing

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V. IMAGE PROCESSING

Note: The principle of the processing described in this section is simplified to make it easily understandable. In actual cases, the procedure may be somewhat complicated.

1. Image Processing in Main Body

1) A/D Conversion

The image data output from the image sensor are analog signals. These signals are converted to digital signals in order to process them into each image. This is called A/D conversion.

Figure 2-501 shows the outputs of digital signals after A/D conversion when they are 4bit signals.

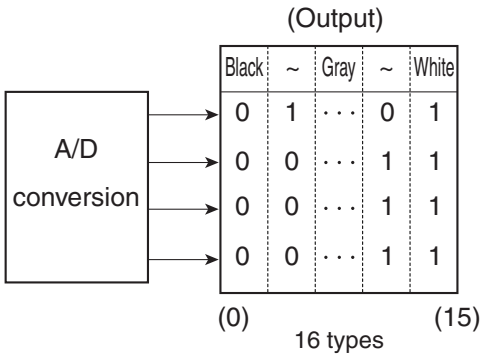

Figure 2-501

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

This machine outputs eight bits, so 256 levels can be obtained.

The offset and gain are adjusted for the analog signals to successfully convert those signals into digital signals.

In the offset adjustment, the minimum output value of perfect black is changed to the predefined value. In the gain adjustment, the maximum output value of perfect white is changed to the predefined value.

The offset and gain adjustments are sometimes called “black clamp” and “amplification” processing, respectively.

2) Shading Correction

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

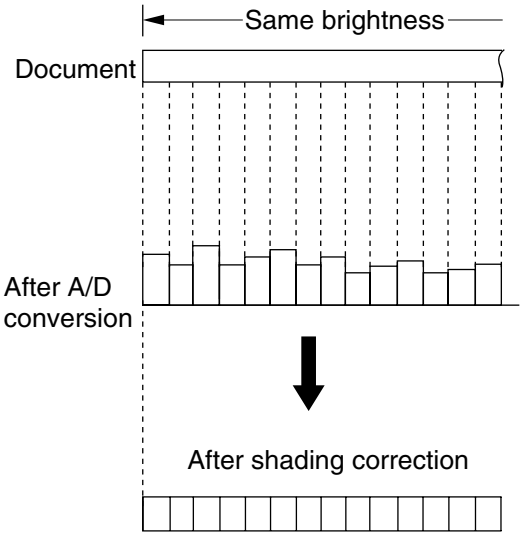

Figure 2-502

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The correction values of each element are calculated in advance and stored in a memory. This machine stores those values in the flash memory installed on the control PCB.
There are two types of correction values: black and white correction values. For black correction value, readout indicated when an LED does not illuminate, in other words, when a black image is read (intense black) is set as a target value. For white correction value, readout of standard white sheet is set as a target value (pure white).

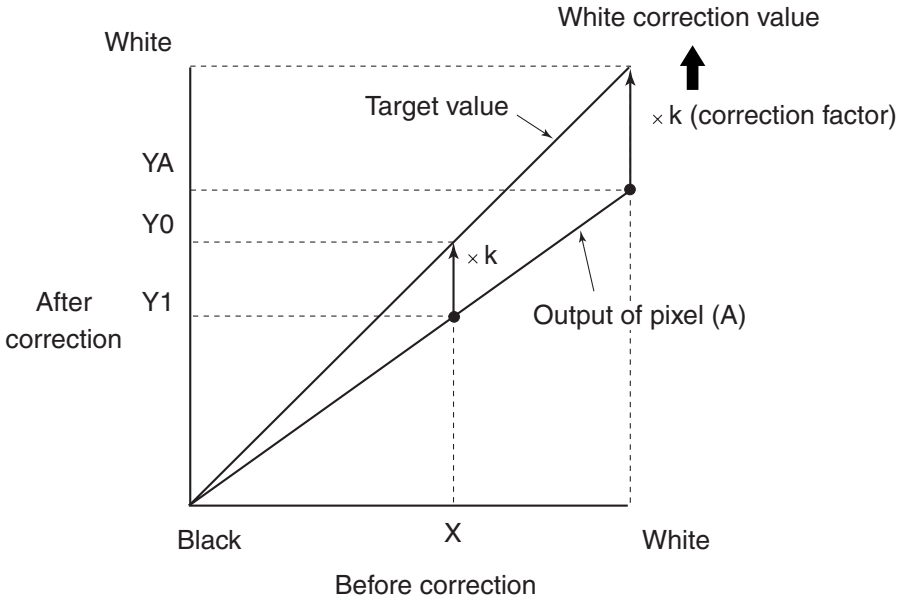

Figure 2-503

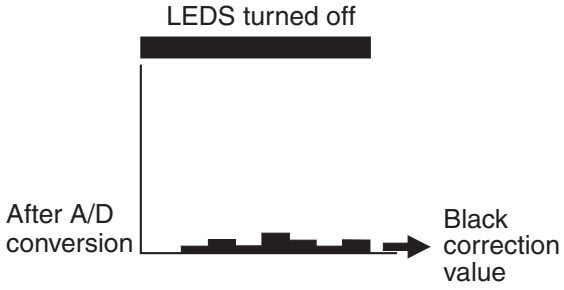

Figure 2-504

The data of each element which have been converted into digital signals are compensated in accordance with the corresponding values.
Some models use a standard white sheet, which is one of service tools, in the service mode in order to calculate correction values. However, this machine is equipped with the standard white sheet (called shading plate). Thus, correction values can be automatically calculated during normal operation.

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3) Data Rearrangement

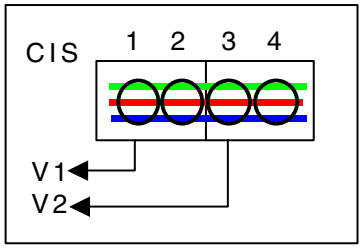
The data arrangement change is necessary to create appropriate image data.

The data rearrangement is performed after the A/D conversion.

Each block parallel data of the CIS unit is rearranged as serial data in the reading unit PCB and those data are rearranged to correct the positions of three lines. And, the final, they are rearranged in output order of the final picture elements in the control PCB.

The following shows the data arrangement in case that the CIS unit configuration is set to simplex, four picture elements, and two blocks for easy understanding.

* CIS unit configuration



i) CIS unit output (each block output)

	Line 1						Line 2						Line 3
V1	1R	1G	1B	2R	2G	2B	1R	1G	1B	2R	2G	2B	1R
V2	3R	3G	3B	4R	4G	4B	3R	3G	3B	4R	4G	4B	3R

ii) Reading unit PCB (rearrangement)

Line 1

1R	3R	1G	3G	1B	3B	2R	4R	2G	4G	2B	4B	→Sequential

Line 2

Sequential→	1R	3R	1G	3G	1B	3B	2R	4R	2G	4G	2B	4B

Rearrangement

iii) Control PCB (in order of final output)

L(x)	L(x-2)	L(x+2)	L(x)	L(x-2)	L(x+2)	L(x)	L(x-2)	L(x+2)	L(x)	L(x-2)	L(x+2)	
1R	1G	1B	2R	2G	2B	3R	3G	3B	4R	4G	4B	→Sequential

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4) Image Resolution Conversion

a) Main-Scanning Direction

For the main-scanning direction, the image resolution conversion is executed by thinning out the standard clocks for image processing according to the resolution.

For example, when converting to 200 dpi from 300 dpi, the standard 300 dpi clock is used, with 1 clock pulse removed from every three pulses. (Figure 2-505)

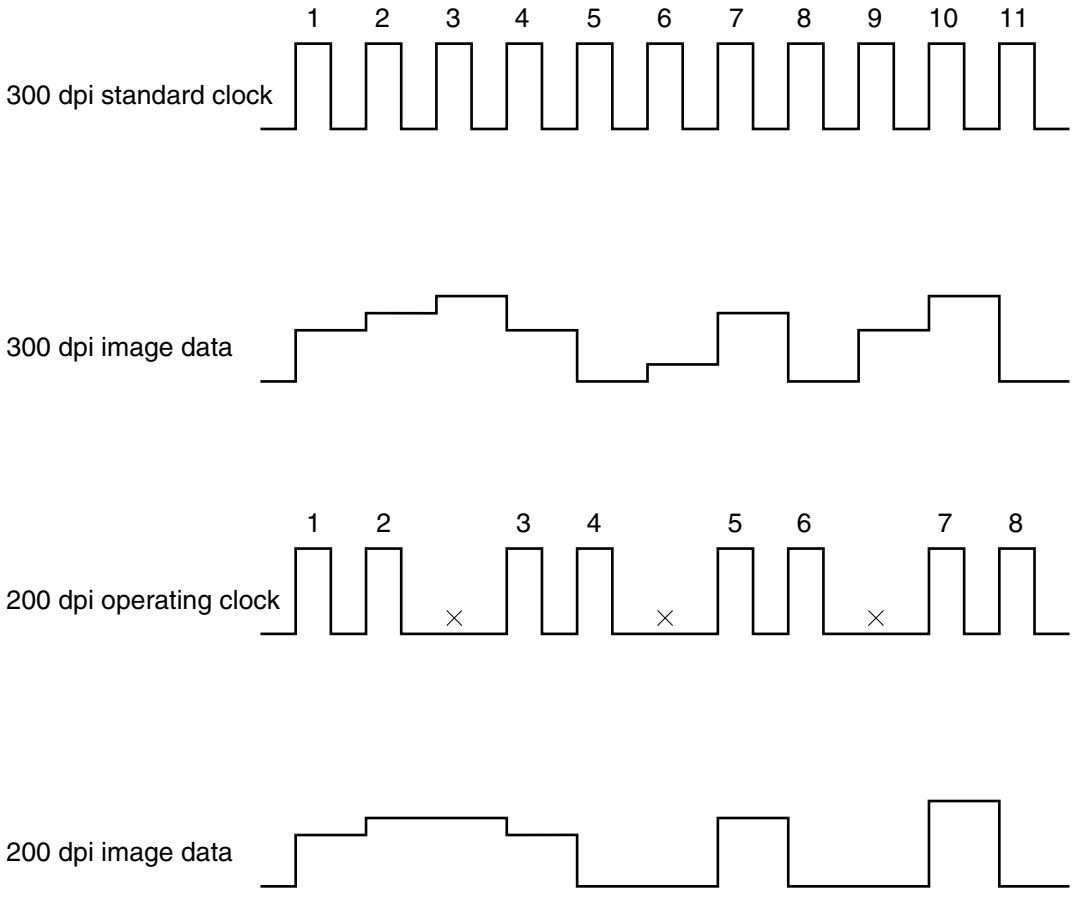

Figure 2-505

b) Sub-Scanning Direction

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

In the case of 200 dpi, feeding speed is 1.5 times as fast as 300 dpi. In the case of 150 dpi, it is twice the speed, and in the case of 100 dpi, three times the speed used for 300 dpi.

Since the timing for reading the data from the image sensor is the same, the resolution in the sub-scanning direction can be converted by changing the feeding speed. (Figure 2-506)

However, the feeding speed is limited depending on the specifications of feed motor. If the feeding speed can not be raised, the read timing is thinned out. (Figure 2-507)

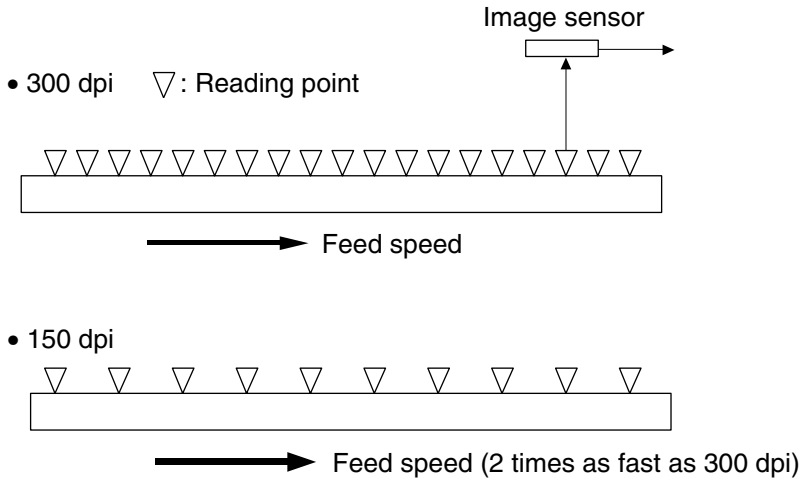

Figure 2-506

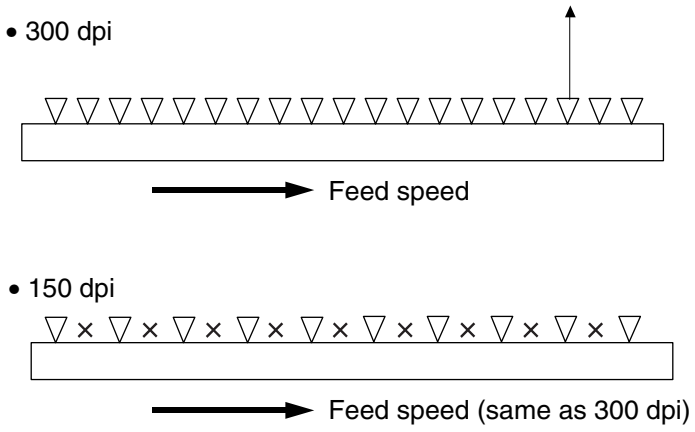

Figure 2-507

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c) Averaging Method

The image resolution conversion by averaging is sometimes called “smoothing.”

Averaging method conversion enables the data to be smoothly transformed much better than that by thinning-out method, resulting in reducing the occurrence of Moire patterns.

Averaging is especially useful for low-resolution photographs.

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

Figure 2-508 shows the aspects of 300dpi image data and the image data averaged to 150dpi data.

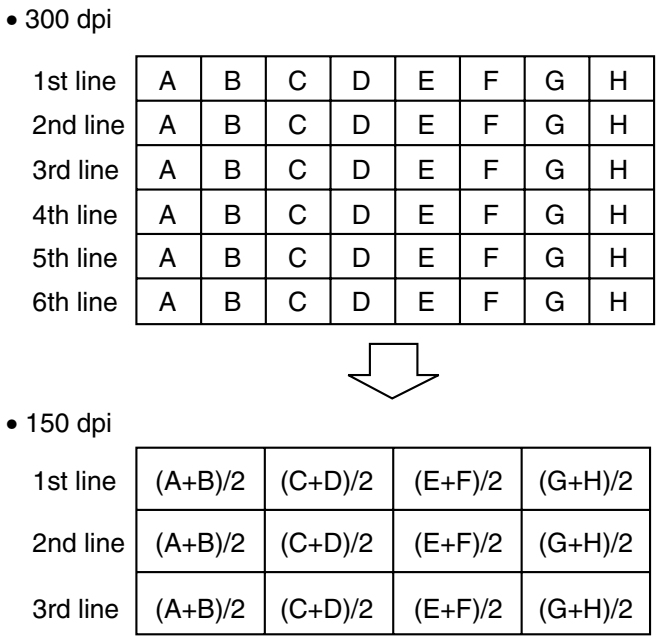

Figure 2-508

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However, this machine thins out the data after averaging the data. The following tables describe the case that the 300dpi data are converted into the 200dpi data.

- Input data [300 dpi]

A1	B1	C1	D1	E1	F1
A2	B2	C2	D2	E2	F2
A3	B3	C3	D3	E3	F3

- After averaging [300 dpi]

$\frac{A1+B1}{2}$	$\frac{B1+C1}{2}$	$\frac{C1+D1}{2}$	$\frac{D1+E1}{2}$	$\frac{E1+F1}{2}$	$\frac{F1+G1}{2}$
$\frac{A2+B2}{2}$	$\frac{B2+C2}{2}$	$\frac{C2+D2}{2}$	$\frac{D2+E2}{2}$	$\frac{E2+F2}{2}$	$\frac{F2+G2}{2}$
$\frac{A3+B3}{2}$	$\frac{B3+C3}{2}$	$\frac{C3+D3}{2}$	$\frac{D3+E3}{2}$	$\frac{E3+F3}{2}$	$\frac{F3+G3}{2}$

- After resolution conversion [200 dpi]

$\frac{A1+B1}{2}$	$\frac{B1+C1}{2}$	$\frac{D1+E1}{2}$	$\frac{E1+F1}{2}$
$\frac{A2+B2}{2}$	$\frac{B2+C2}{2}$	$\frac{D2+E2}{2}$	$\frac{E2+F2}{2}$
$\frac{A4+B4}{2}$	$\frac{B4+C4}{2}$	$\frac{D4+E4}{2}$	$\frac{E4+F4}{2}$

Figure 2-509

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d) Interpolation processing

This section describes how to convert a 300dpi image data into a higher-resolution one in case that the image data cannot be read at a high resolution depending on memory capacities or reading speed specifications.

The method of simply and repeatedly outputting an original image data to convert it into a high-resolution one is called simple interpolation processing, and the method of averaging the resolution of data to convert it into a high-resolution one is called averaging interpolation processing.

This machine has an SCRAM with the capacity of 128 MB. In case of an image data which cannot be stored in the SDRAM, for example, in case that it is processed in the 600dpi/color mode, average a 300dpi image data to convert it into a 600dpi data. In case of a 400dpi image data processed through 3-line CIS layout dimension, use averaged 600dpi data as original data to convert it into a 400dpi image data.

Table 2-510 includes original image data and picture element data after the averaging interpolation processing.

- Original data (300 dpi)

A	B	C	D
E	F	G	H
I	J	K	L

- Picture element data after the averaging interpolation processing (600 dpi)

A	$\frac{A+B}{2}$	B	$\frac{B+C}{2}$	C	$\frac{C+D}{2}$	D
$\frac{A+E}{2}$	$\frac{A+B+E+F}{4}$	$\frac{B+F}{2}$	$\frac{B+C+F+G}{4}$	$\frac{C+G}{2}$	$\frac{C+D+G+H}{4}$	$\frac{D+H}{2}$
E	$\frac{E+F}{2}$	F	$\frac{F+G}{2}$	G	$\frac{G+H}{2}$	H
$\frac{E+I}{2}$	$\frac{E+F+I+J}{4}$	$\frac{F+J}{2}$	$\frac{F+G+J+K}{4}$	$\frac{G+K}{2}$	$\frac{G+H+K+L}{4}$	$\frac{H+L}{2}$
I	$\frac{I+J}{2}$	J	$\frac{J+K}{2}$	K	$\frac{K+L}{2}$	L

Figure 2-510

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5) Gray scale conversion

In case that the binary or gray scale mode is selected, three image data (R, G and B) which were input in the control PCB should be converted into a single brightness data.

Thus, an average of red, green and blue data is used as a single brightness data. Where a brightness data is "L," L = (R + G + B) / 3.

Suppose that R = 50, G = 200, B = 50. In this case, the green data should be converted into a gray data, which is calculated by L = (50 + 200 + 50) / 3 = 100.

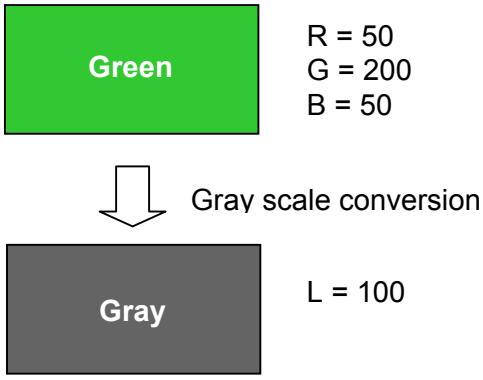

Figure 2-511

6) Color dropout (RGB)

In case that the color dropout mode only for RGB is selected, of three image data (R, G and B) which were input in the control PCB, only the red data is used as a brightness data.

Suppose that R = 220, G = 3 and B = 7. The red data should be converted into a near white data which is L = 220.

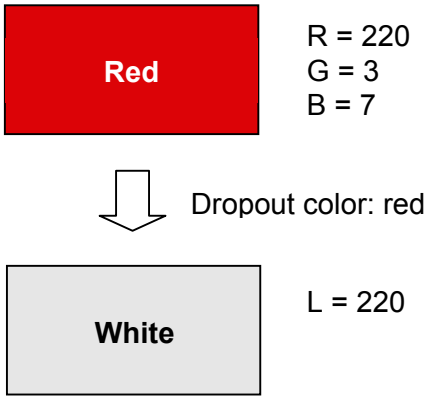

Figure 2-512

In case that the color emphasis mode only for RGB is selected, of three image data (R, G and B) which were input in the control PCB, the G and B data are converted into a single brightness data.

Thus, an average of G and B is used as a single brightness data. Where a brightness data is "L," L = (G + B) / 2.

Suppose that R = 220, G = 3 and B = 7. The red data should be converted into a near black data which is calculated by L = (3 + 7) / 2 = 5.

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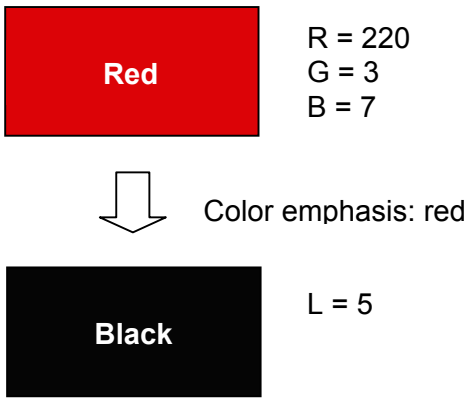

Figure 2-513

Note: For the custom dropout color, refer to the other section.

7) Gamma Correction (1-dimension)

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

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

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

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

Note: For the 3-dimensional gamma correction, refer to the other section.

a) Brightness Adjustment

This adjusts the overall brightness of the scanned image. The image brightness increases as the setting value becomes larger, and decreases as the value becomes smaller.

For brightness adjustment in black and white mode, refer to the “Binarizing” section.

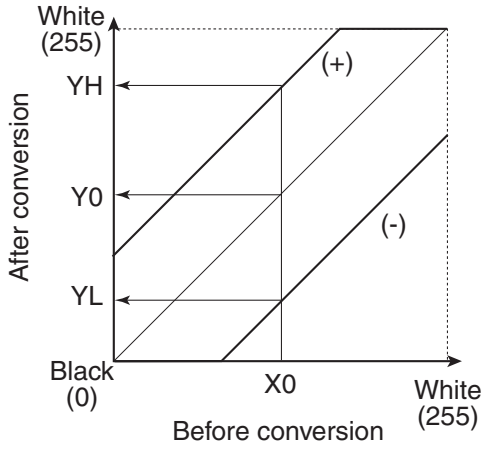

Figure 2-514

b) Contrast Adjustment

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

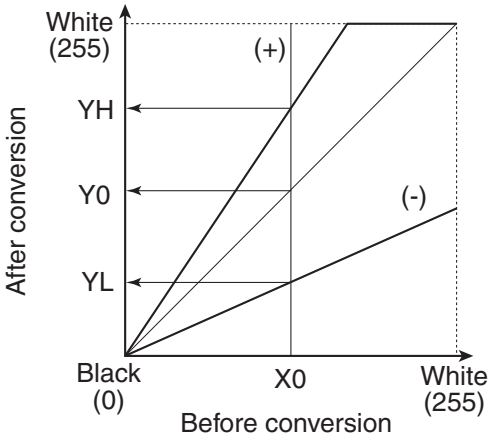

Figure 2-515

c) Custom Adjustment

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

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

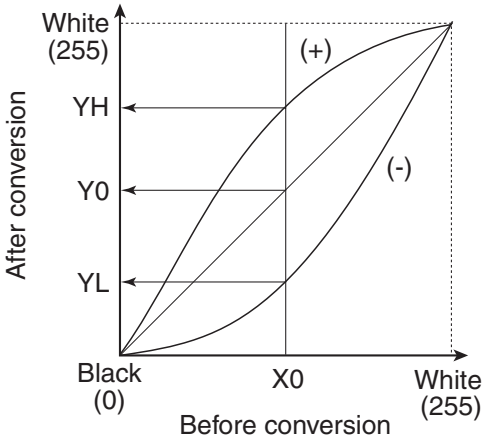

Figure 2-516

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8) Edge Emphasis

Edge emphasis is a kind of processing which emphasizes the brightness change in order to make the image appear sharp. (Figure 2-517)

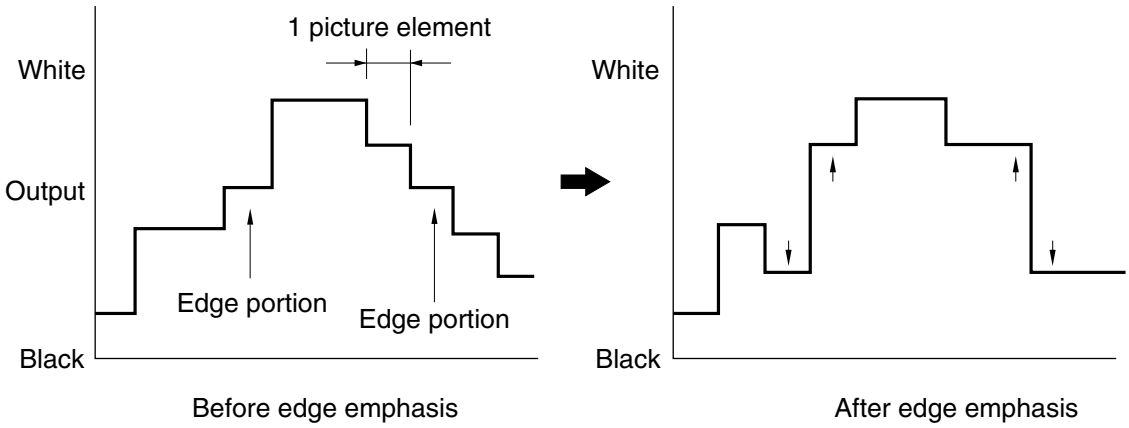

Figure 2-517

The processing is performed by comparing the data in the conversion table provided for performing edge emphasis, with the target picture element data (a). (Figure 2-518)

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

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

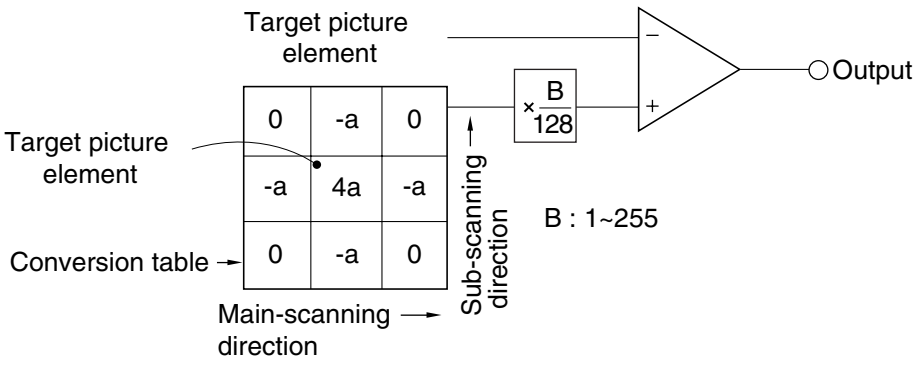

Figure 2-518

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9) Binarizing

a) Simple Binarizing

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

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

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

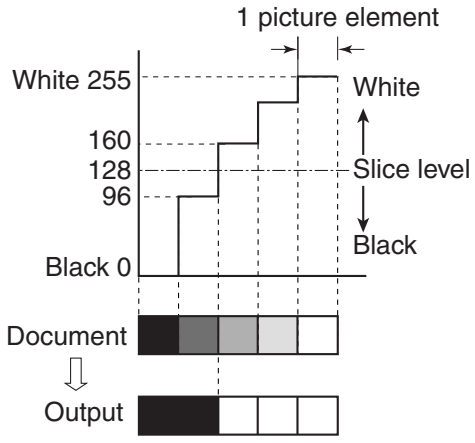

Figure 2-519

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b) Error Diffusion

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

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

The value of 1 picture element of input image data is compared with the slice level. When it is smaller than the slice level, it is output as “0” and when it is bigger then the slice level, it is output as “15.” The difference between the values of the input and output picture elements is then added to the next picture element to be processed.

First, when processing the first low of Line 1, since the data “12” is larger than the slice level “8,” the output data becomes “15,” and the resultant error becomes -3 (=12-15). (Figure 2-520)

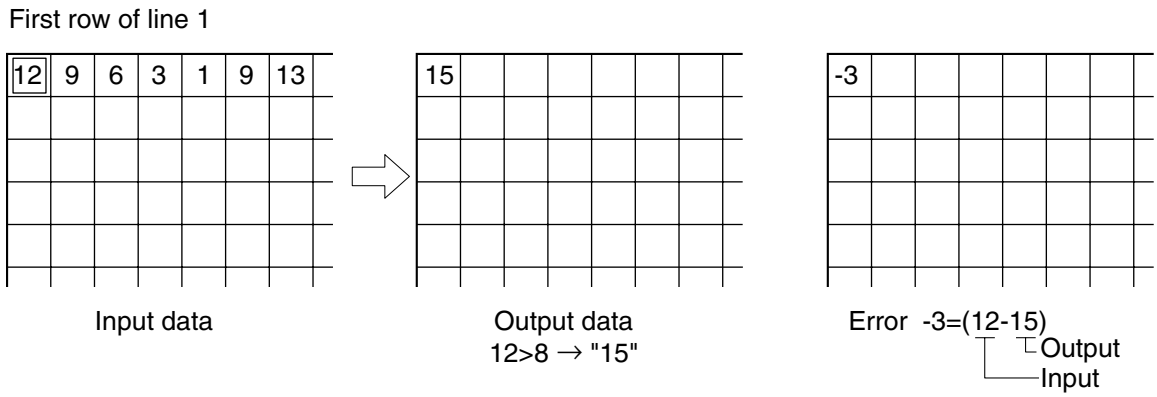

Figure 2-520

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

As this value is smaller than the slice level, the output data is “0” and the error becomes “+6” [=(9-3)-0]. (Figure 2-521)

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

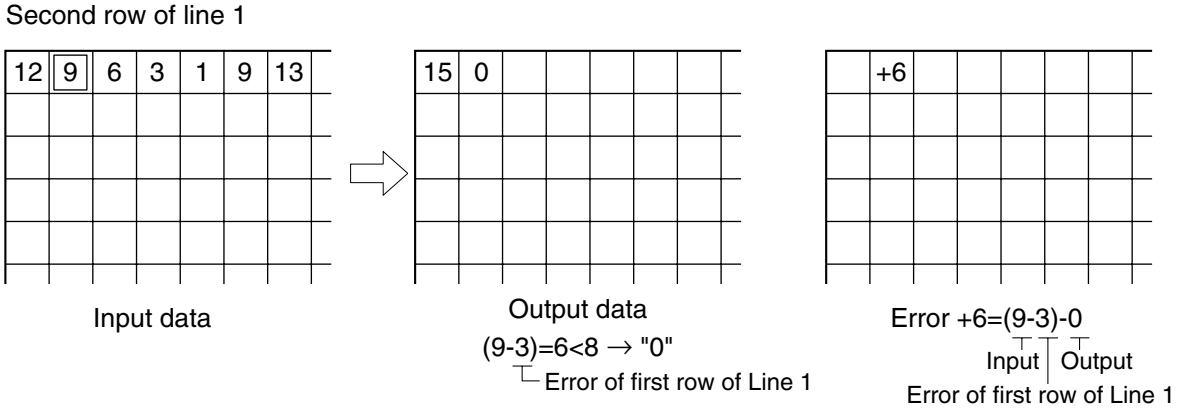

Figure 2-521

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Line 2 is processed using the first row of Line 2 as a reference. If the rest is processed similarly, the data becomes as shown in Figure 2-522.

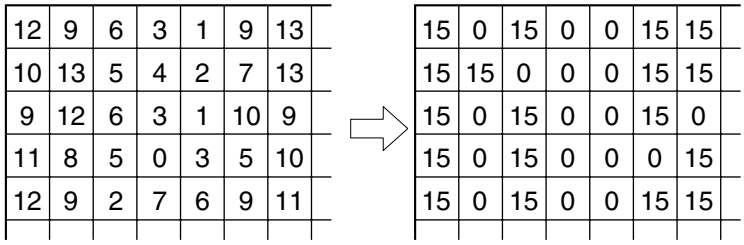

Figure 2-522

Figure 2-523 shows a comparison of binarizing with error diffusion processing, and binarizing without error diffusion processing (simple binarizing).

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

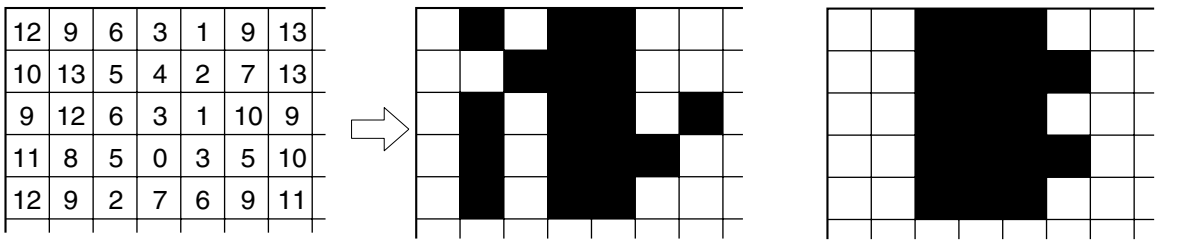

Figure 2-523

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c) Automatic Brightness Adjustment (ABC)

This adjustment automatically controls the brightness of the scanned image in the main body according to the density of the document's background in the simple binary mode.

The brightness is adjusted by assessing the brightness line by line, and adjusting the level for the next line to be scanned.

This processing is called ABC (Auto Back-ground Control) and this circuit is called ABC circuit in some cases.

When the number of picture elements of specified brightness in a line exceeds the predetermined value for the document size, the brightest output is transformed gradually, line by line.

Figure 2-524 shows the difference in output when reading a text document with a colored background.

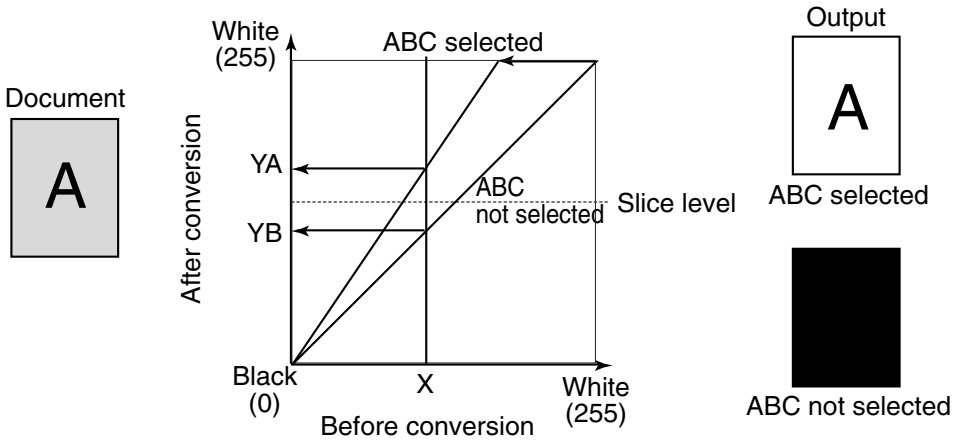

Figure 2-524

d) Hi-Speed Text Enhancement

This machine is equipped with a new processing circuit which uses “edge images” besides “ABC circuit” described in the previous section. Since the speed of binary AE processing done in the main body is faster than that of binary AE processing (advanced text enhancement) done with a computer, this processing is called “Hi-speed text enhancement.”

Figure 2-525 describes the block diagram of this processing circuit. And to make this diagram visually understandable, Figure 2-526 describes the images of the results of processing done by each unit.

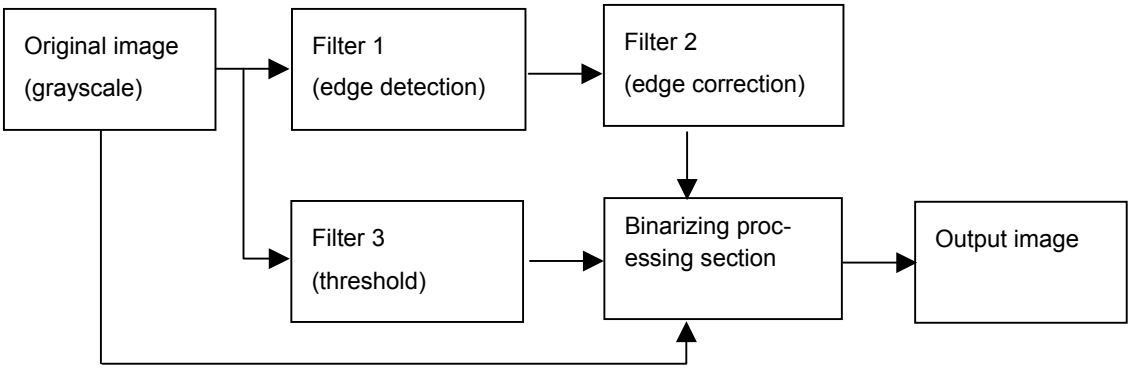

Figure 2-525

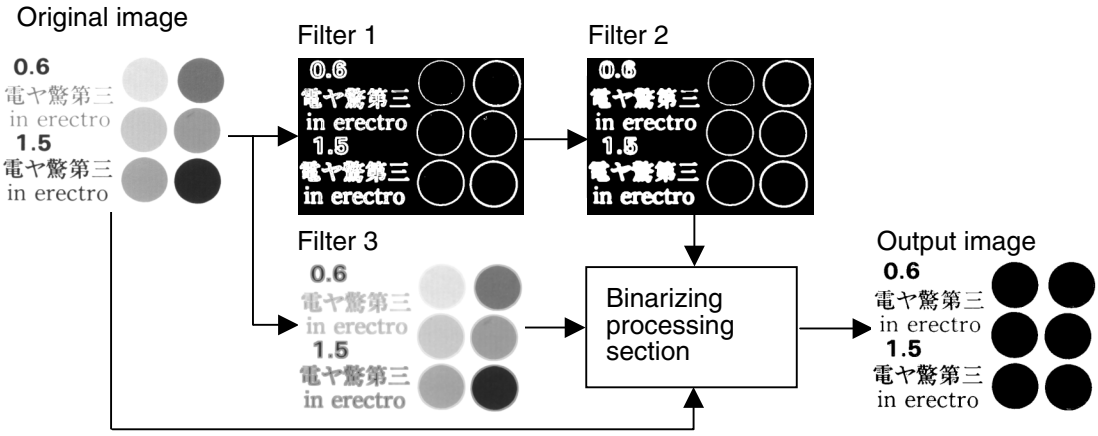

Figure 2-526

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The following paragraphs describe the overview of processing based on the block diagram.

The edges are detected through filters 1 and 2 and output to the binarizing processing section. Through filter 3, the threshold values of each picture element are calculated in accordance with the averaging method and output to the binarizing processing section.

The binarizing processing section breaks the picture elements of each edge image which was input down to “edge picture elements,” “inside picture element” and “background picture elements.” And then, it binarizes the edge picture elements according to the threshold values of each corresponding position. And it binarizes the in-edge picture elements according to the average of the threshold values calculated by binarizing the edge picture elements, and outputs all the background picture elements as white. Those picture element data is restored to images to create binary AE images.

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10) 3-dimensional Gamma Correction

A conventional machine compensates R, G and B individually. Thus, the 1-dimensional gamma correction is applied (Figure 2-257).

On the other hand, the 3-dimensional gamma correction applies to this machine to improve the quality of color images (Figure 2-528).

The 3-dimensional gamma correction means that how (R, G, B) data should be output is determined based on the original (R, G, B) 3-dimensional data. The colors, R, G and B correlate with each other. Thus, if R is changed, the other colors should be changed. This improves the color repeatability. This processing is not performed in case of grayscale data.

* 1-dimensional gamma correction

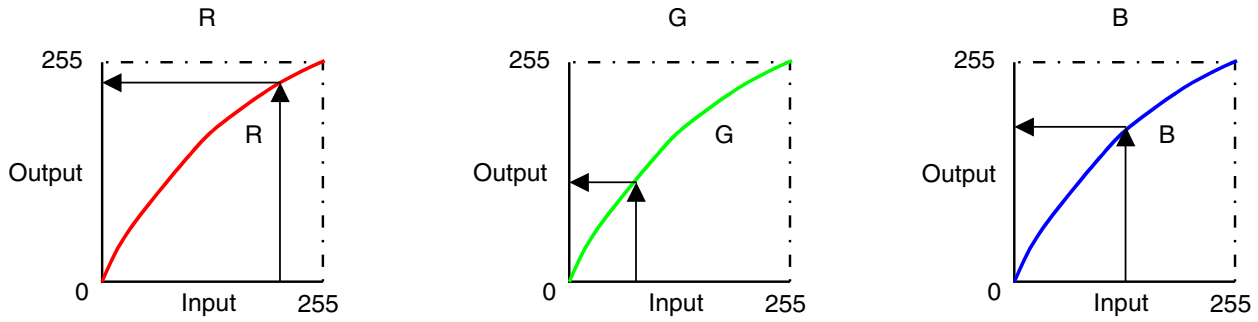

Figure 2-527

* 3-dimensional gamma correction

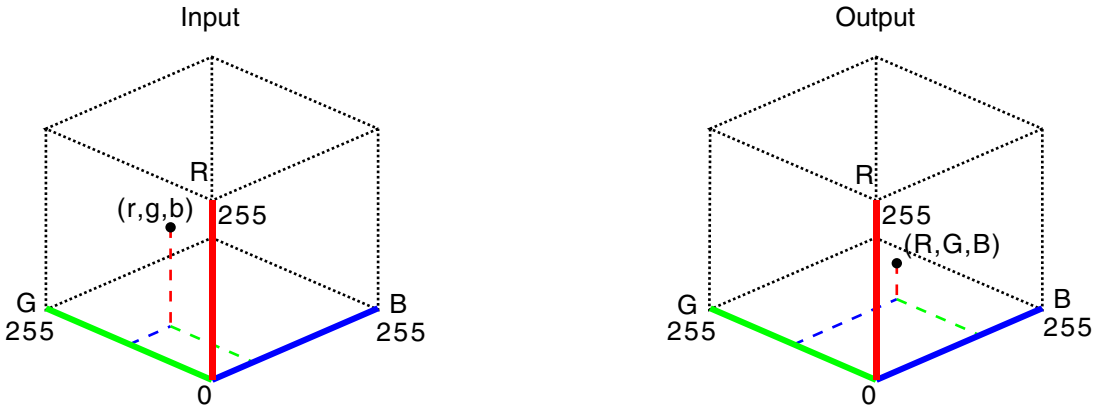

Figure 2-528

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Output values calculated in the 3-dimensional gamma correction is determined in two steps. The position of a 3-dimensional block is determined based on upper 3 bits of 8bit data of each color. And then, the position against that block is determined based on lower 5 bits. By dividing a procedure into two steps, the number of values included in the internal table can be reduced. And also, correction values of 8bit data of each color can be determined. (Figures 2-529 and 2-530)

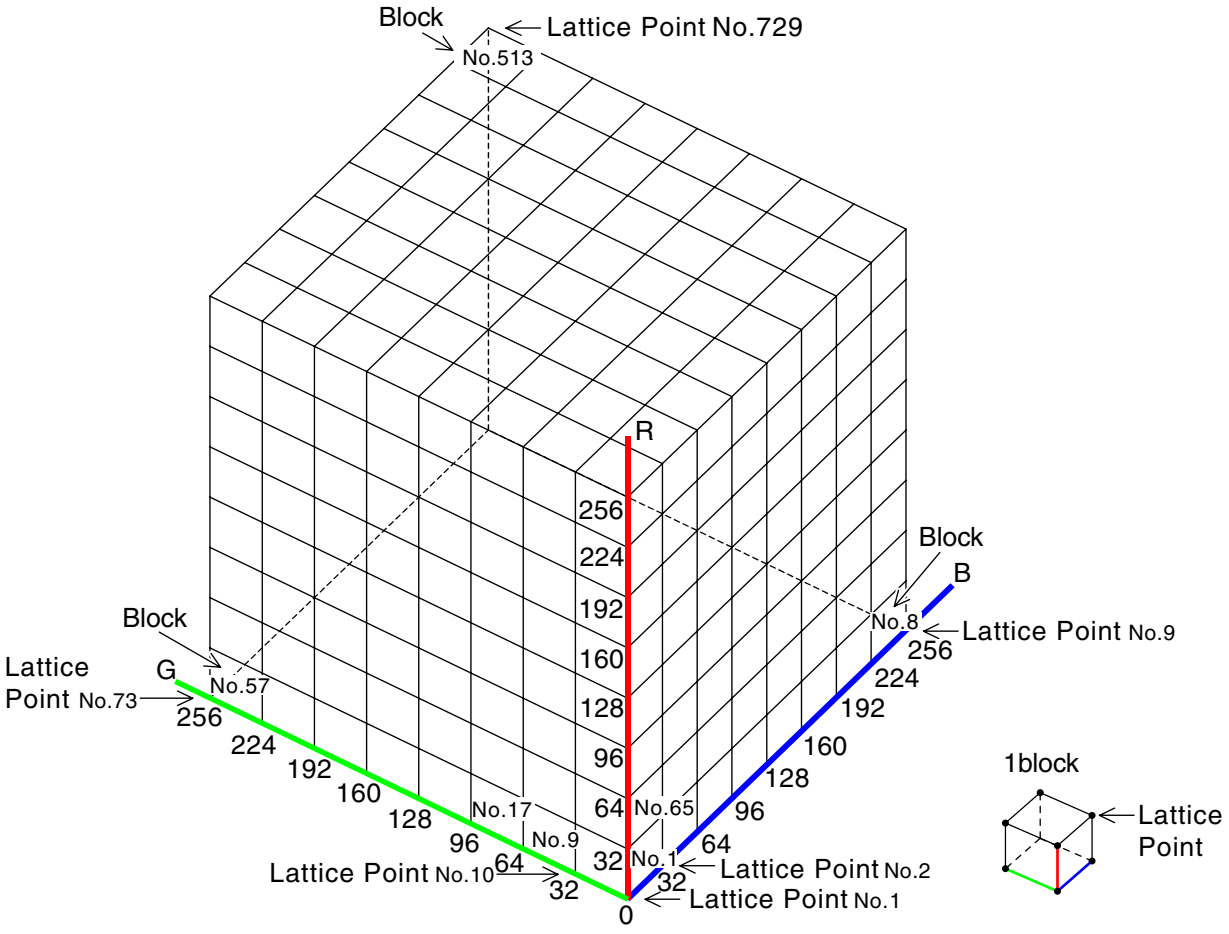

Figure 2-529

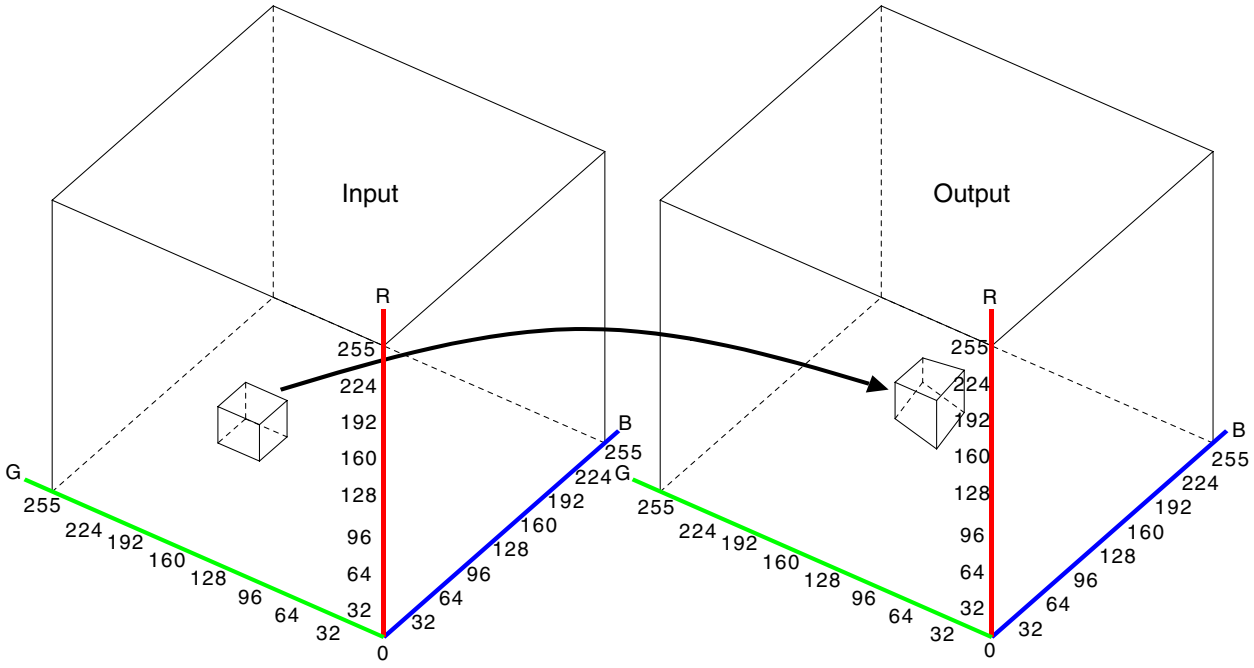

Figure 2-530

11) Custom Multi-Color Dropout

The performance of the color dropout can also be improved by applying the principle of the 3-dimensional gamma correction. In case of the conventional color dropout, only an LED which relates to a given color is turned on when an image is scanned. On the other hand, this machine always lights all the LEDs regardless of which mode it is placed in while scanning.

And it conducts the 3-dimensional gamma correction considering the specified color data for the original (R, G, B) data. This method is called custom color dropout.

The user specifies the range of color to be dropout. Figure 2-531 shows the setting screen.

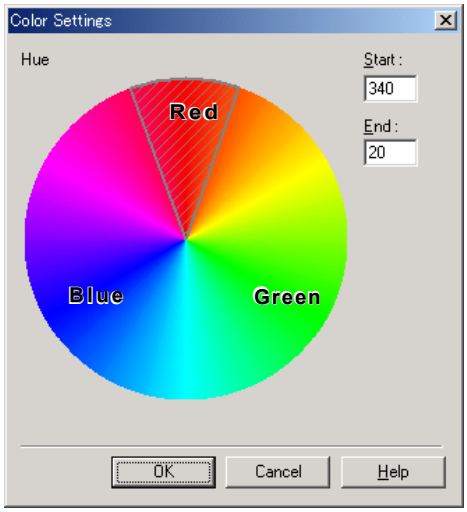

Figure 2-531

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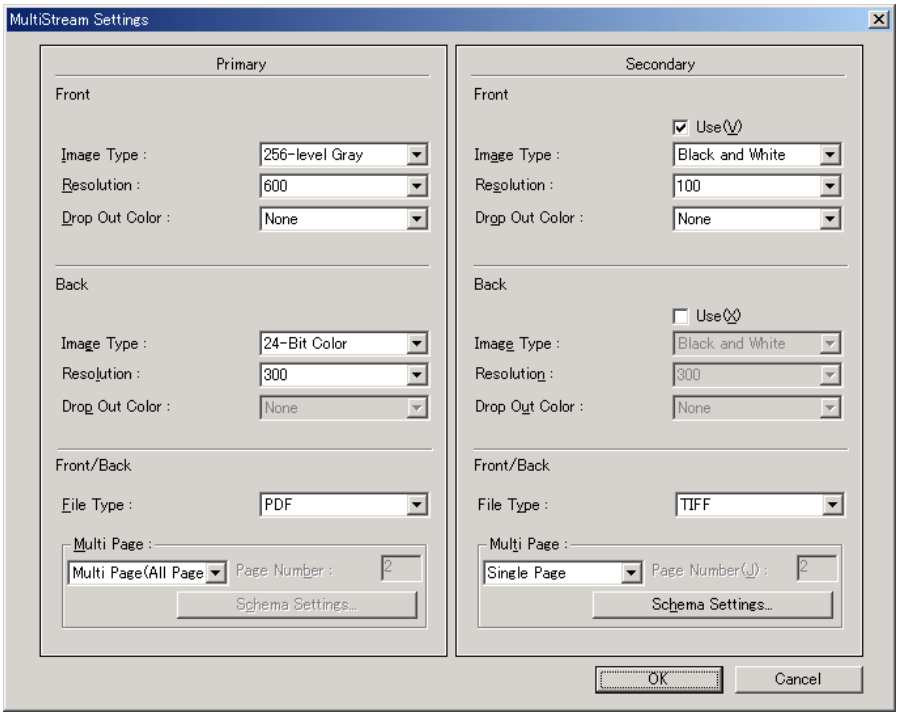
12) MultiStream

MultiStream is a function that outputs data in two different modes at a single scan.

Figure 2-532 shows a screen where 600dpi resolution for grayscale and 100dpi resolution for black & white have been set on the front side of the document, and the resulting outputs.

In this case, the SDRAM in this machine stores 600dpi gray scale data, outputs this data primarily and then, outputs 100dpi black & white data converted from the stored 600dpi data secondarily.



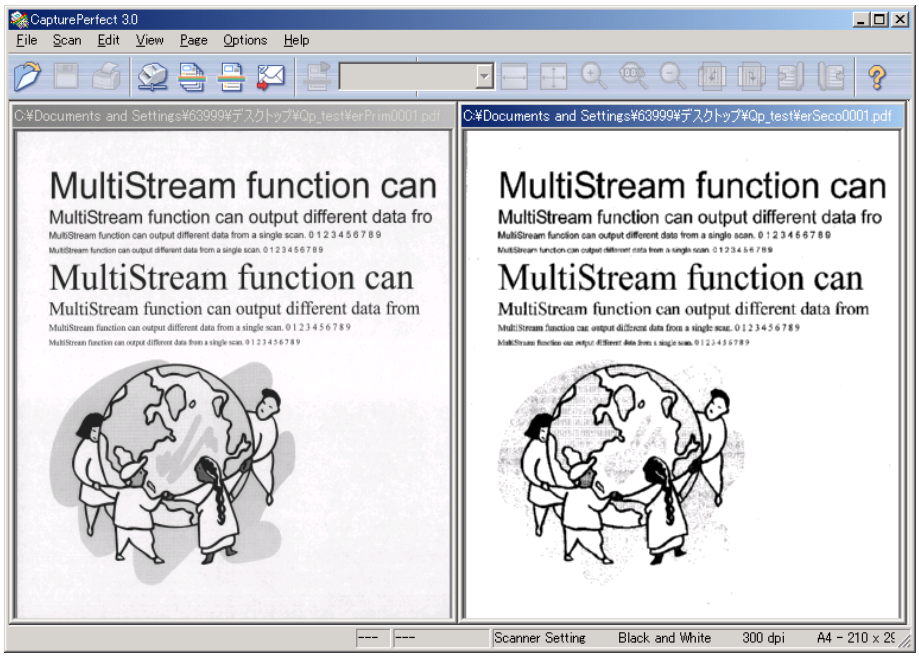


Figure 2-532

2. Image Processing in the Computer

1) Advanced Text Enhancement

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

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

For example, as shown in the image in Figure 2-533, a histogram for each block is calculated, and the optimum slice level is determined to binarize the picture elements.

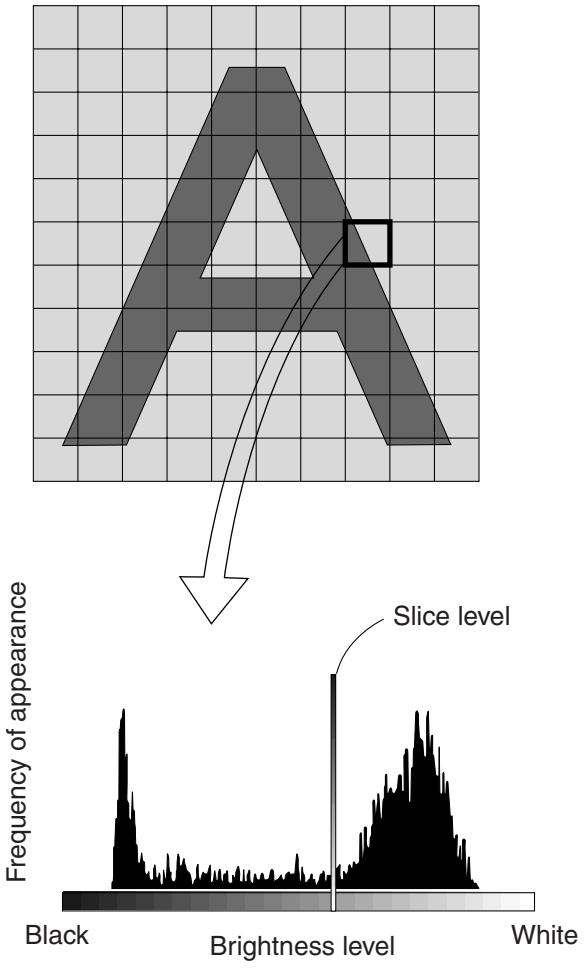


Figure 2-533

2) Automatic Size Detection

In case that the automatic size detection mode is selected, an image data with the maximum width and the length detected by the registration sensor in the feed direction is read.

However, this machine has an A4 width sensor so that it should not read unnecessary data. In case that the width of image data is the same as or more than that of A4-size paper, an image data with the maximum width of 310 mm is read. And in case that the width of image data is less than that of A4-size paper, an image data with the width of 220 mm is read.

The maximum outside frame is detected from the image data which has been read. The inside of the data is defined as the paper size and the margins are removed.

Moreover, in case that the mode which makes the volume of data increase is selected to enhance the processing speed, the machine converts the data into a black and white/100dpi data and outputs it to a computer. The maximum outside frame is computed based on this converted data. And an original data which is equal to such frame in size is output to a computer.

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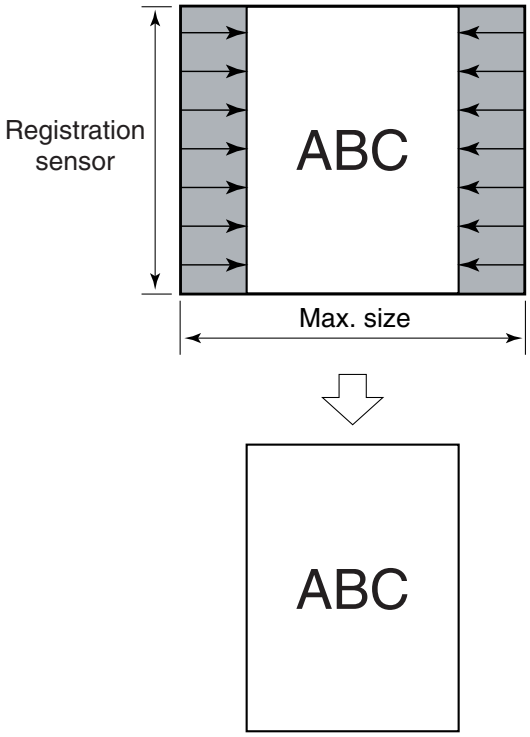

Figure 2-534

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

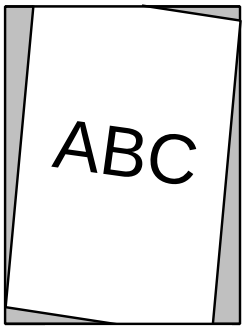

Figure 2-535

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

3) Skew Correction (Deskew)

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

The image data is then restored to the user-specified image size. (Figure 2-538)

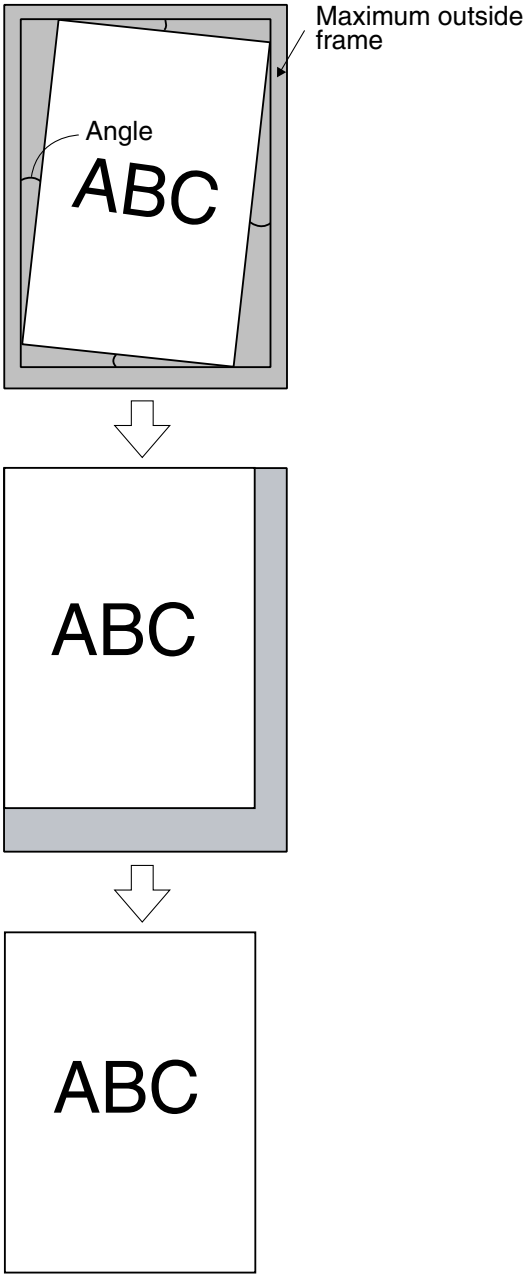

Figure 2-536

4) Black Border Removal

When the black border removal is selected, the image data is read with the specified read size.

The frame of document is detected based on this image data and the outside of the frame is converted into the white data. (Figure 2-537)

The conventional black border removal may vanish the letters if there are some letters on the edge of document and the document is skewed to much. This machine extracts the outer shape of document without skew after extracting the frame. Thus, no letters vanish. (Figure 2-538)

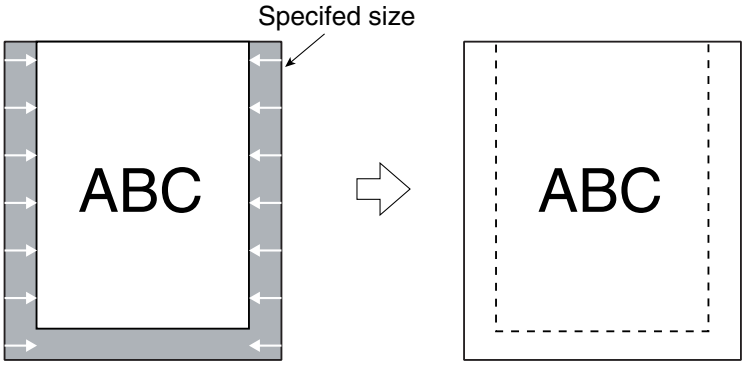

Figure 2-537

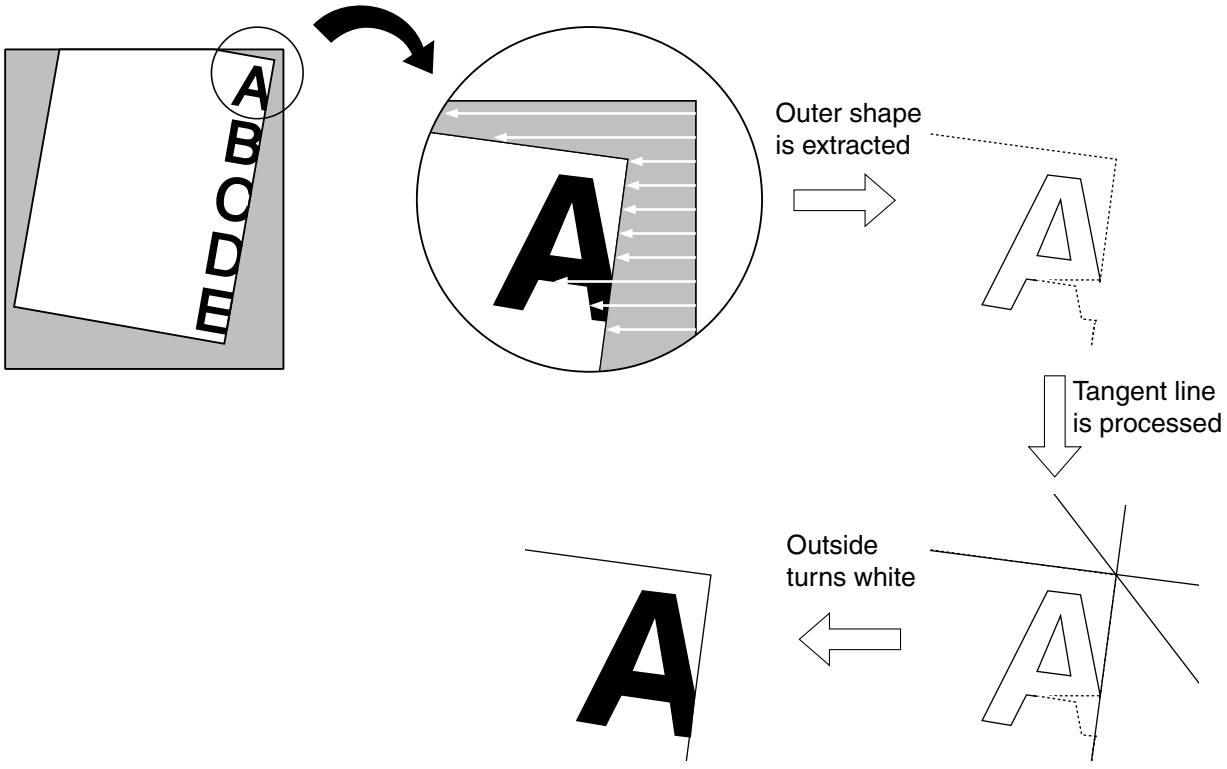

Figure 2-538

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5) Binder Hole Removal

When a document in which holes are punched is scanned, this function removes those holes by using the front and back sides of an image.

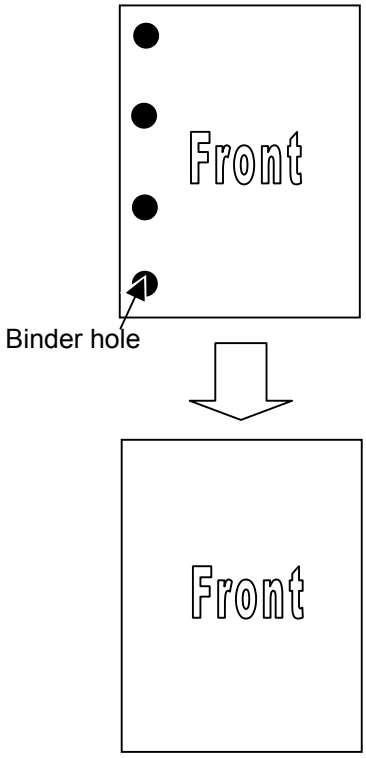

Figure 2-539

The procedures and principle are described below.

i) The front and back sides of document are read.

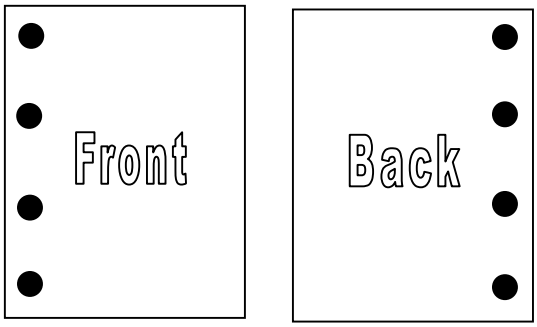

Figure 2-540

ii) The image of the back side is reversed

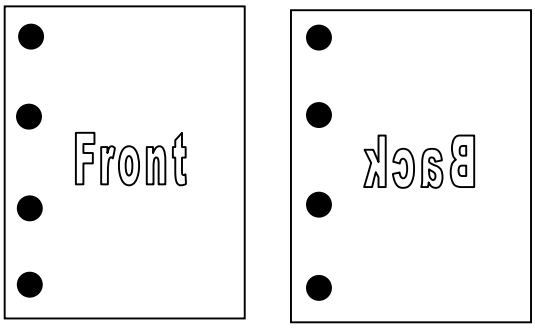

Figure 2-541

iii) The front side of a document is overlaid on the back. And the part of the overlapping images, in which the black points of the front and back sides overlap one another, is extracted from the target image area (margins with the width of 20 mm). And then, an image data is created. This image is called hole pattern image.

If there are some binder holes, a hole pattern image is created.

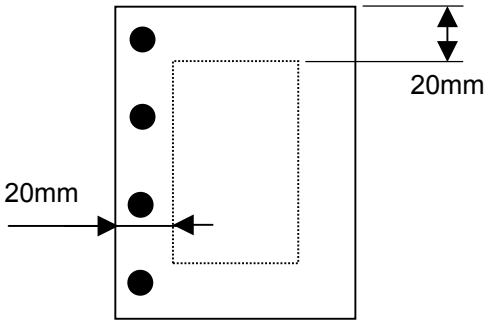

Figure 2-542

iv) In case that both the front and back side images have some black objects (which are not binder holes) on the same spots in the previous step, those should be determined as holes and a hole pattern image should be created. Thus, some black objects other than those binder holes will be deleted as well. In this case, the low-pass filter processing should be done to handle and delete small objects.

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v) The shapes (such as area, circumference, and center of balance) of the binder holes of the hole pattern, front and back side images are compared. If they are the same, those black objects are determined as binder holes. And then, they are removed from the front image.

vi) In case that both sides of document are scanned, after the binder holes on the front image are removed, those on the back side image are removed as well.

The binder hole removal function does not successfully work under the following conditions.

- In case that a binder hole and figure or character overlap one another, the binder hole is not removed because the shape of the hole on the front should be different from that on the back. However, if the object which overlaps a binder hole is a thin line which can be deleted by the low-pass filter processing, the hole is successfully removed.

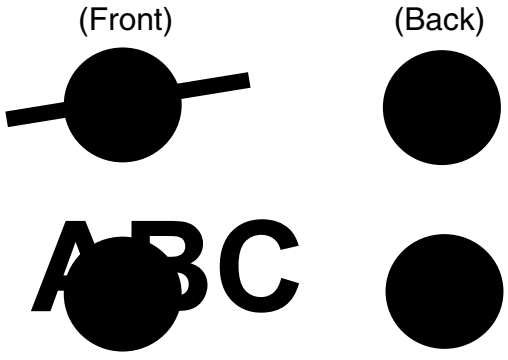

Figure 2-543

6) Blank Skip

Judgment as to whether or not to record a document is determined by comparing the actual number of picture elements of the document with the user-preset percentage (0% to 20%) of number of black picture elements.

However, the margin of an image data (10% of lengths of each side) is excluded. Thus, the number of black picture elements in the central area is compared with the user-defined number of black picture elements. If the number of black picture elements in this target area exceeds the predefined number, the data are recorded. If not, the data are not recorded.

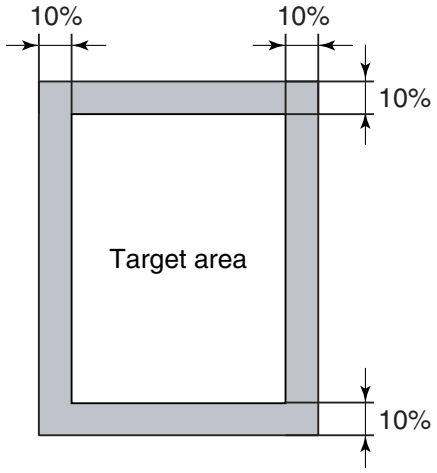

Figure 2-544

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7) Dot Erasing

Dot erasing is the process of erasing any unnecessary small black dots in the binary data in the document.

This is called black dot erasing.

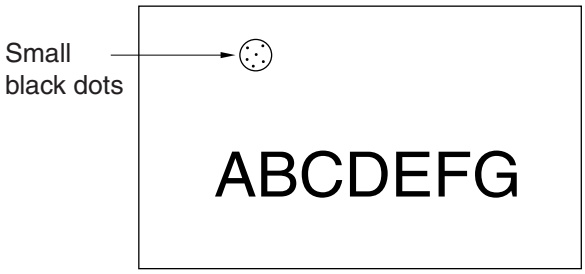

Figure 2-545

For dot erasing, the conversion table shown in Figure 2-540 is used.

When all the colors of the 8 dots around the target picture element differ from that of the target picture element, the target picture element is judged an “isolated dot” and erased.

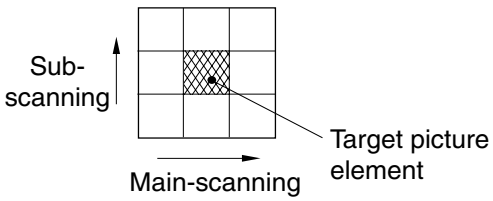

Figure 2-546

The white dots in a document with a black background can be erased using the same method. This is called white dot erasing.

8) Notch Erasing

Notch erasing is the process of compensating for any unevenness in binary output when horizontal and vertical straight lines are scanned. (Figure 2-547)

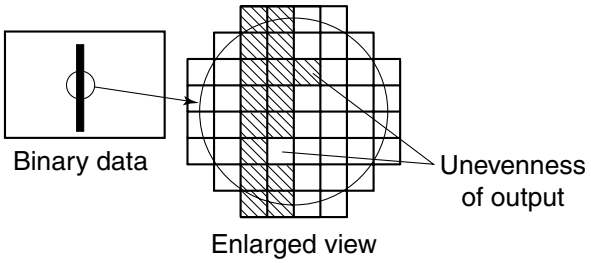

Figure 2-547

When the sequential three dots next to a target picture element among the eight dots are the same color as the target picture element and other five dots are different color, the target picture element is judged to be a notch and its output is reversed. (Figure 2-548)

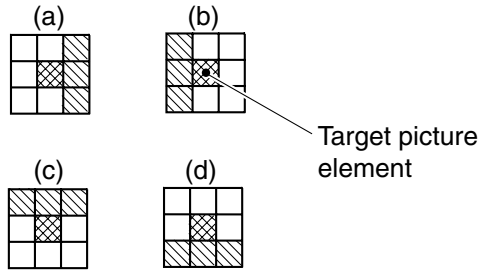

Figure 2-548

VI. POWER SUPPLY

1. Power Supply

The power supply PCBs of this machine use the dedicated parts for the 100V and 200V units. Figure 2-601 shows a block diagram of the power supply PCB.

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

The supplied AC power is converted by a rectifying bridge to unsmoothed 100 to 240 VUN and converted to 24 VDC.

24 VDC is output from the power supply PCB to the control PCB. The necessary voltage are generated in the control PCB. Each PCB receives DC voltage from the control PCB.

Note: A suffix, "U," which is attached to voltage figures, means that those power supplies are turned OFF when the machine is placed in the sleep mode.

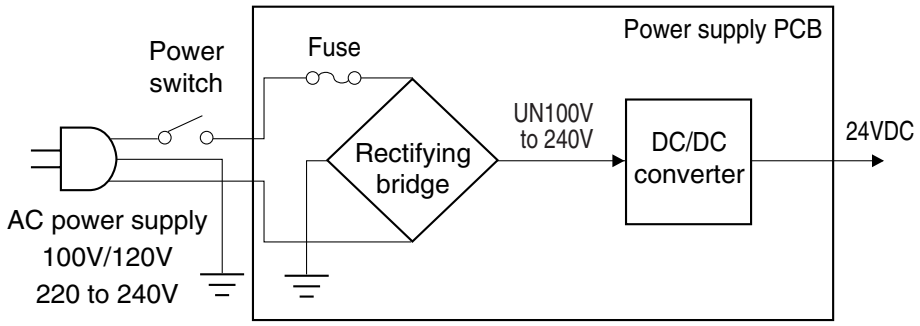

Figure 2-601

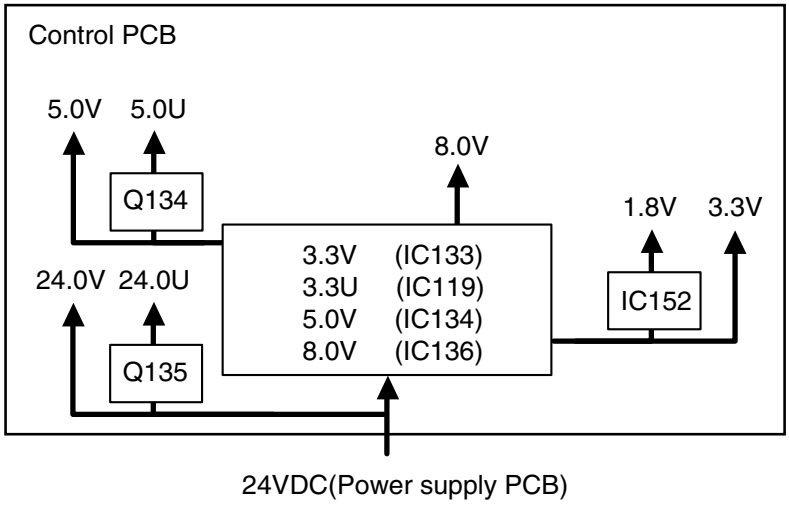

Figure 2-602

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2. Protection Function

If the load is shorted and there is an over-current situation, the protection function of the power supply PCB is activated and the output is stopped.

A fuse is used for protection on power supply PCB and control PCB. If an excessive current flows into the DC/DC converter, the fuse blows and stops the power supply to the PCB.

A fuse is also used for protection of the main motor and eject motor. If an excessive current flows in the 24 V supplied to the motor, the fuse blows and stops the power supply to the motor.

If the upper unit is opened, the open detect switch recognizes that it is opened, and the power to the main motor is cut.

3. Power Saving Mode

This machine will shift into the power saving mode if no button or no scan operation takes place for 10 seconds or more, when the power is on or scanning ends. In the power saving mode, power consumption is minimized and the electrical circuits enter the sleep state. The CPU, however, does not shift into the sleep state.

The machine returns to the standby mode when any communication is carried out on the computer side or when any button on the operation panel is pressed.

This machine is compliant with the standards defined by International Energy Star Program.

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VII. ELECTRICAL PARTS LAYOUT

1. Upper Unit

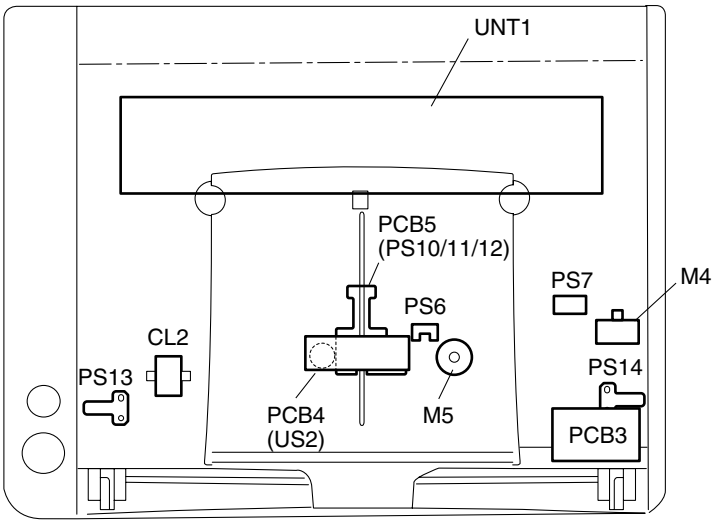

Figure 2-701

Category	Name	Symbol
Sensor	Pickup sensor	PS6
	Shading sensor (upper)	PS7
	Pre-registration sensor	PS10
	Registration sensor	PS11
	Manual feed sensor	PS12
	Skew sensor (left)	PS13
	Skew sensor (right)	PS14
	Ultrasonic sensor (rcv)	US2
Motor/clutch	Shading motor (upper)	M4
	Pickup motor	M5
	Feed clutch	CL2
PCB	Upper unit PCB	PCB3
	Ultrasonic sensor PCB (rcv)	PCB4
	Registration sensor PCB	PCB5
Unit	Reading unit (front)	UNT1

Table 2-701

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2. Lower Unit

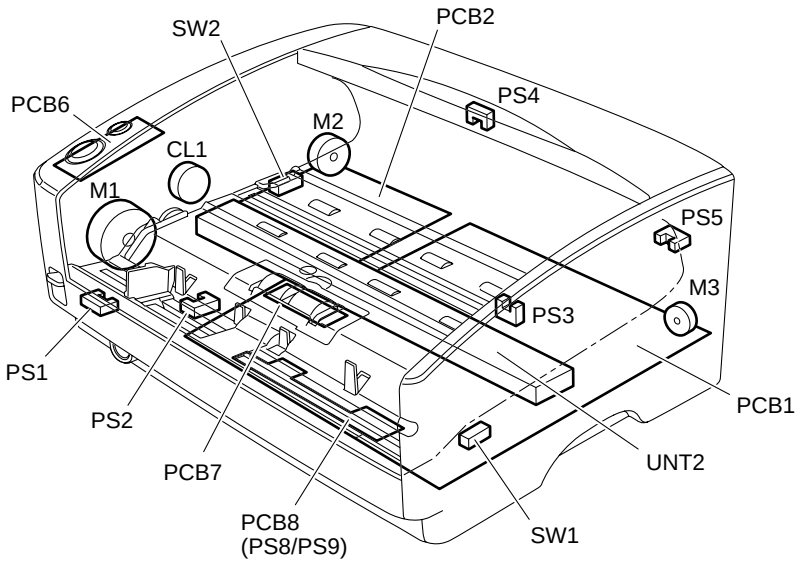

Figure 2-702

Category	Name	Symbol
Sensor	Separation lever sensor	PS1
	Stopper sensor	PS2
	Shading sensor (lower)	PS3
	Eject sensor	PS4
	Flapper sensor	PS5
	Document board sensor	PS8
	A4 width sensor	PS9
	Ultrasonic sensor (drv)	US1
Switch	Open detect switch	SW1
	Power switch	SW2
Motor/clutch	Main motor	M1
	Eject motor (U-turn)	M2
	Shading motor (lower)	M3
	Registration clutch	CL1
PCB	Control PCB	PCB1
	Power supply PCB	PCB2
	Operation PCB	PCB6
	Ultrasonic sensor PCB (drv)	PCB7
	Document board PCB	PCB8
Unit	Reading unit (back)	UNT2

Table 2-702

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VIII. PARTS LAYOUT OF EACH PCB

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

1. Controller PCB

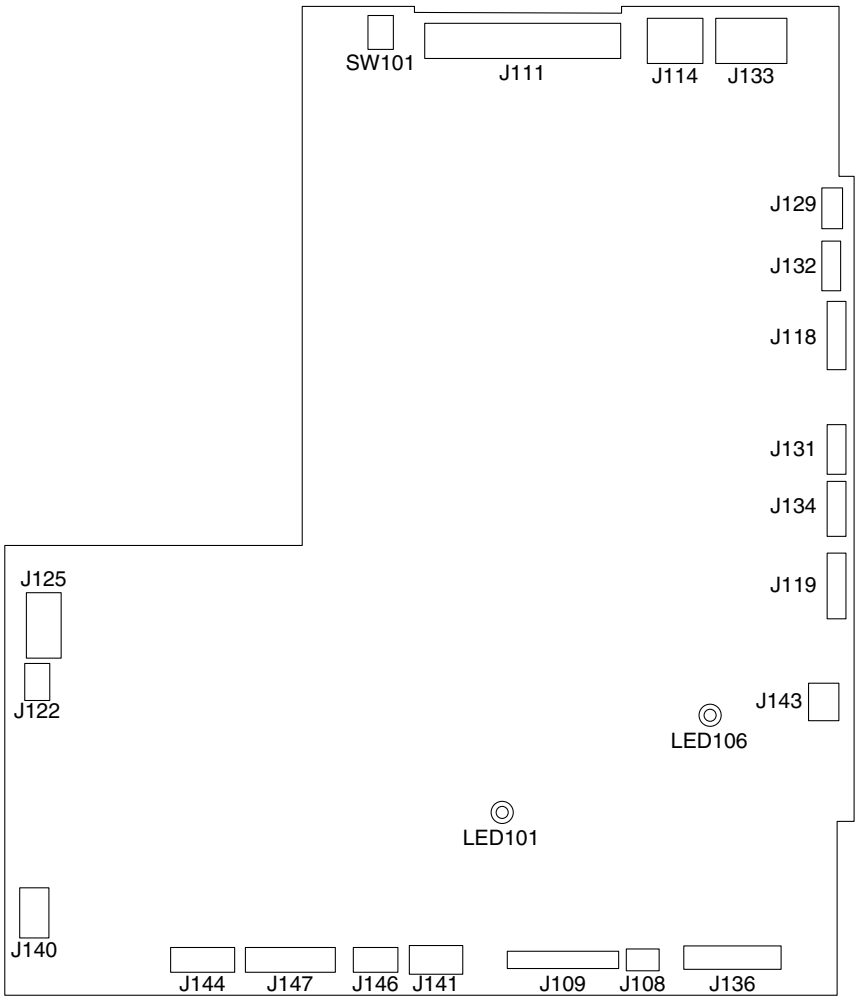

Figure 2-801

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Connector		Description
J108	3P	Open detect switch
J109	16P	Lower unit sensor (PS3/4/5/8/9)
J118	14P	Reading unit (front)
J119	14P	Reading unit (back)
J122	3P	DC power supply standby
J125	4P	DC power supply (+24V)
J129	5P	Reading unit (front) DC power
J131	6P	Reading unit (back) DC power
J132	8P	Reading unit (front)
J134	9P	Reading unit (back)
J136	32P	Upper unit PCB
J140	4P	Eject motor
J141	4P	Ultrasonic sensor PCB (drv)
J143	5P	Shading motor (lower)
J144	8P	Operation PCB, Registration clutch
J146	6P	Lower unit sensor (PS1/2)
J147	11P	Main motor

Table 2-801

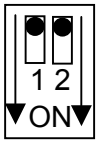
Switch	Description
SW101	SCSI ID settings | | 1 | 2 | | ID2 | OFF | OFF | | ID3 | ON | OFF | | ID4 | OFF | ON | | ID5 | ON | ON | Setting at shipping: ID2 

Table 2-802

LED	Description
LED100	CPU normal operation: Flashing
LED106	+24VDC supply: Lit

Table 2-803

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2. Power Supply PCB

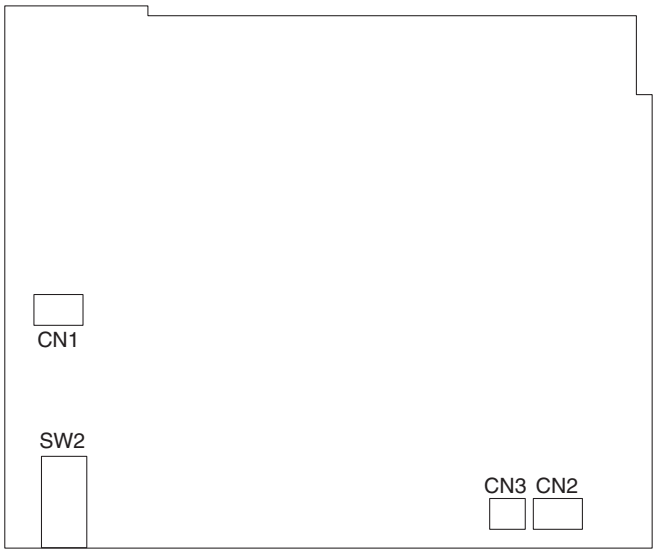

Figure 2-802

Connector		Description
CN1	2P	AC power supply input
CN2	4P	DC24V power supply output
CN3	3P	DC power supply standby signal

Table 2-802

Switch	Description
SW2	Power supply ON/OFF

Table 2-803

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CHAPTER 3

DISASSEMBLY & REASSEMBLY

I. EXTERNAL COVERS 3-1
II. UPPER UNIT.....3-7
III. LOWER UNIT.....3-18

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*** Notes on disassembling and assembling**

1) When the self tapping screws are installed, fit them into the same screw holes as before the disassembly in order not to damage the threads on the parts.
2) Many parts of this machine are secured by fittings. The parts must not be damaged by deforming excessively during work. They must be assembled so that they are not shifted or lifted.
3) When the parts are installed, be careful for the cables not to be pinched in a gap.

I. EXTERNAL COVERS

1. Pickup Tray

1) Bend the arm ①, unhook the fitting part. And remove the pickup tray ②.

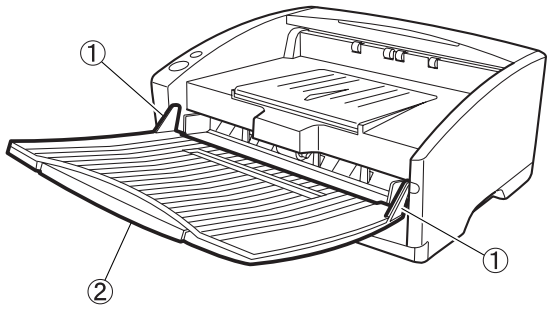

Figure 3-101

2. Top Cover

1) Remove the 2 screws ① (M3 self tapping type). And then, turn the top cover ② and unhook the left and right fitting parts. And then, remove top cover.

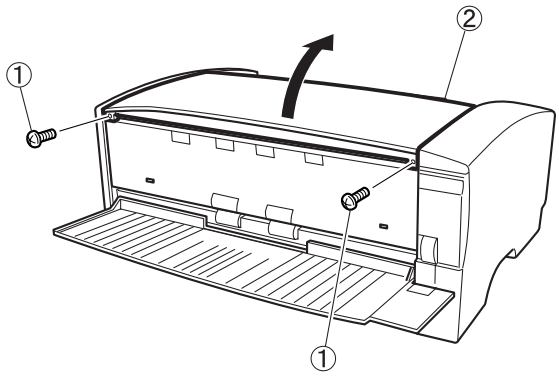

Figure 3-102

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3. Eject Cover

1) Remove the top cover.
2) Push the right and left fitting parts ① downward, turn the eject cover ② and pull it out to remove it.

Note: In this state of things, the eject tray 2 can be removed as well.

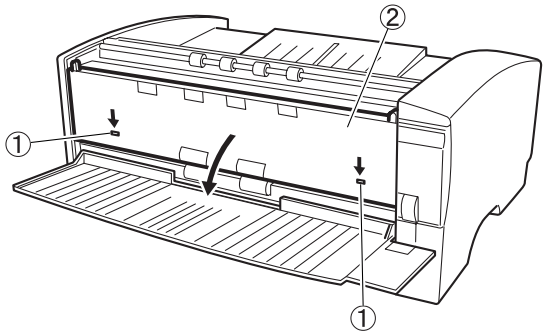

Figure 3-103

4. Eject Tray 2

1) Remove the top cover.
2) Remove the eject cover.
3) Pull out the eject tray 2 ① toward to remove it.

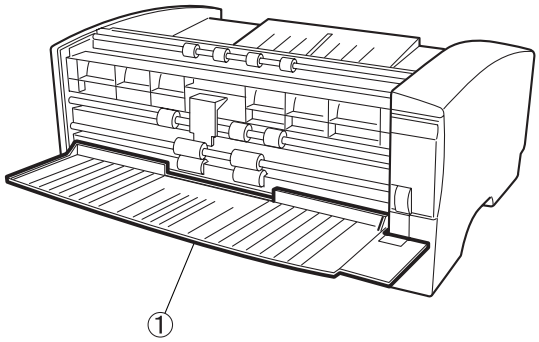

Figure 3-104

5. Left Cover

1) Remove the top cover and eject cover.
2) Slide the gear cover ①, unhook the side fitting part, unhook the upper and lower fitting parts and remove the gear cover.

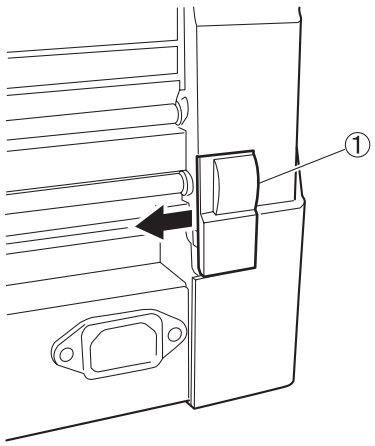

Figure 3-105

3) Remove the screws ① (M3 self tapping type) which are put one each on the inside of the front and backside.

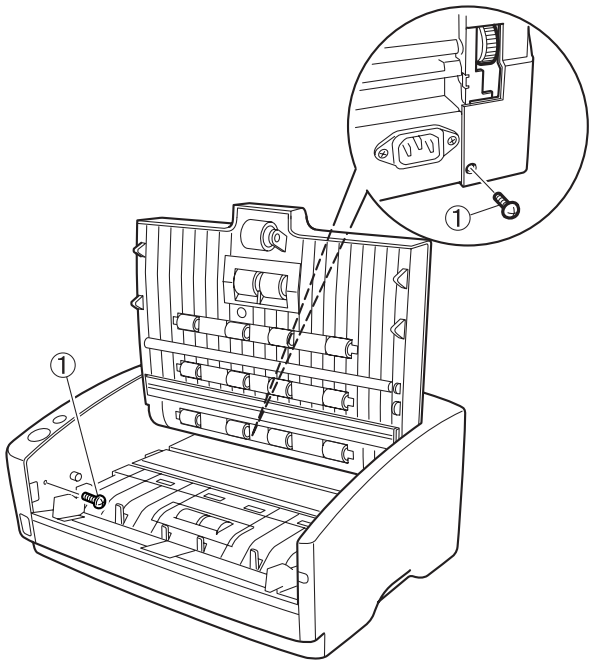

Figure 3-106

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4) Stand the main body to unhook the 2 fitting part ① in a lower part of the cover.

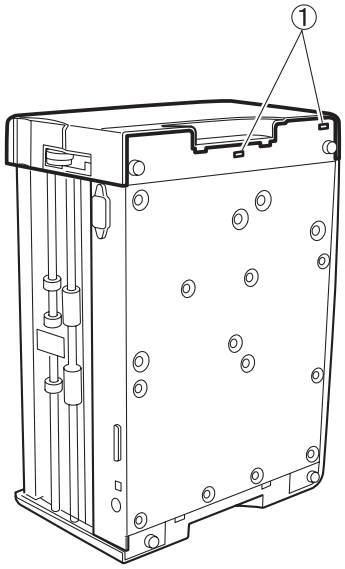

Figure 3-107

5) Lift the backside of the left cover ① to unhook the fitting part. And then, lift the front side of the left cover to unhook the upper and lower fitting parts. After that, remove the separation lever and left cover.

Note: Because the cables are connected to the inside of the left cover, do not pull it too hard.

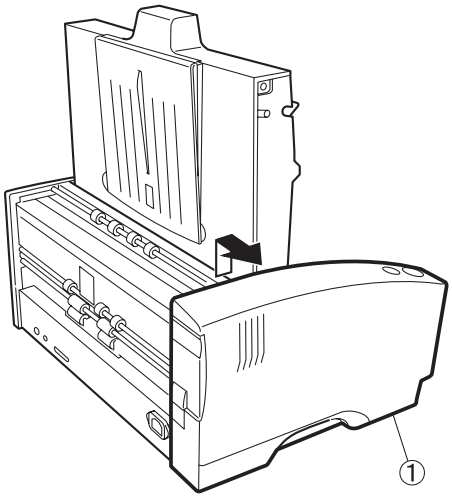

Figure 3-108

6) Disconnect the connector ① and remove the left cover ②.

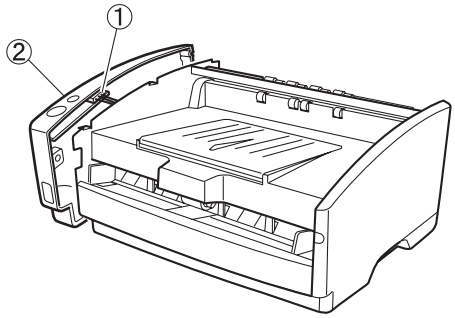

Figure 3-109

Note: Be careful not to be injured because the cross section of the side plate is exposed after the left cover is removed.

Note: Because the lever cover, operation PCB and key top are included into the left cover removed, remove such parts if necessary.

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6. Right Cover

1) Remove the screws ① (M3 self tapping type) which are put one each on the inside of the front and backside.

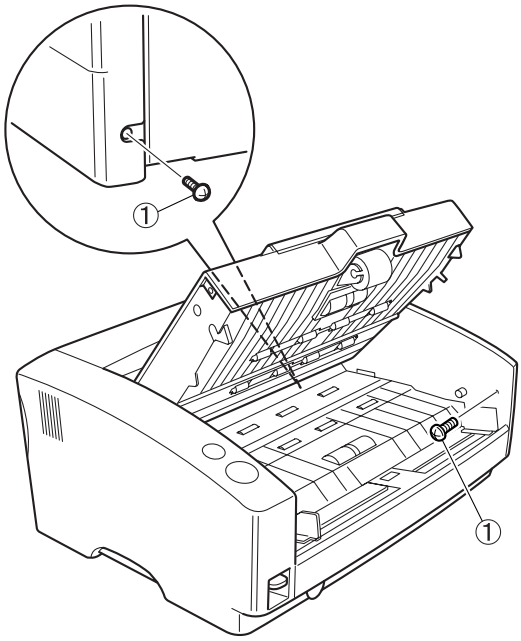

Figure 3-110

2) In case that the lower fitting part cannot be unhooked even though the upper side of the right cover is lifted, stand the main body to unhook the fitting part ① in a lower part of the cover.

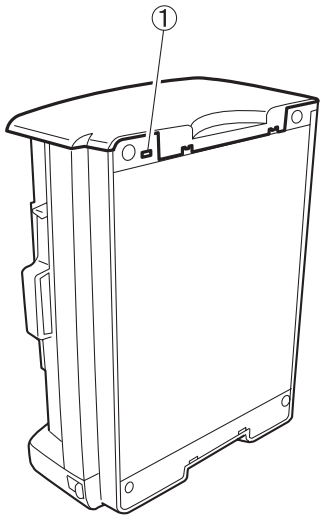

Figure 3-111

Note: Be careful not to be injured because the cross section of the side plate is exposed after the right cover is removed.

3) Lift the backside of the right cover ① to unhook the fitting part. And then, lift the front side of the right cover to unhook the upper and lower fitting parts. And remove the right cover.

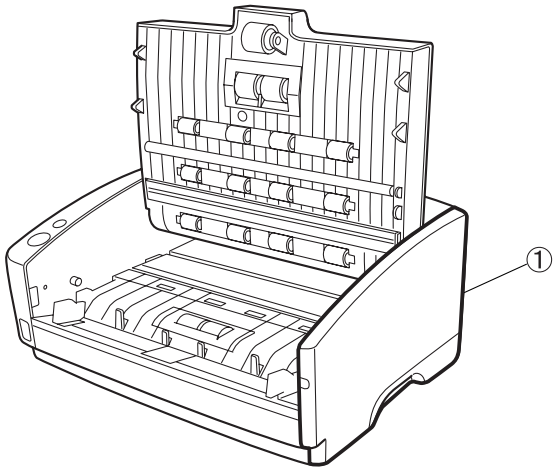

Figure 3-112

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7. Eject Tray 1

1) Remove the screws ① (M4 self tapping type) which are put one each on the right and left sides. And then, pull out the eject tray 1 ② about 10 mm. After unhooking the inside fitting part, lift the front side of the eject tray 1 to remove it.

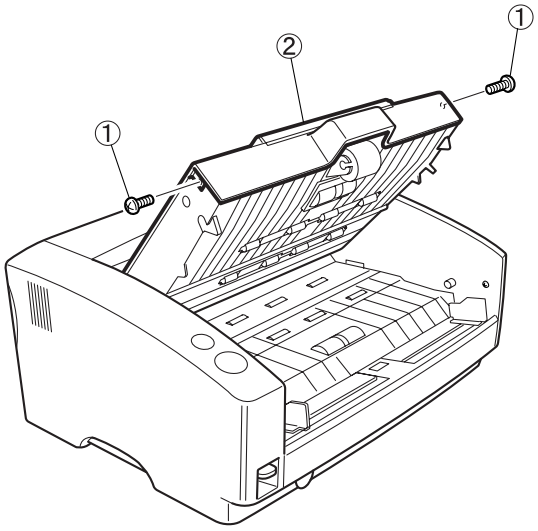

Figure 3-113

Note: Because the eject tray extension and eject roller U (follower) are included in the eject tray 1 removed, remove such parts if necessary.

*** Notes on replacing parts**

The eject tray 1 ① as a service part does not have a charge eliminating brush ②. If the eject tray 1 is replaced, prepare for a charge eliminating brush and attach it to the eject tray 1. Align the end of the silver sheet of the charge eliminating brush with the end of the eject tray and attach it straightly.

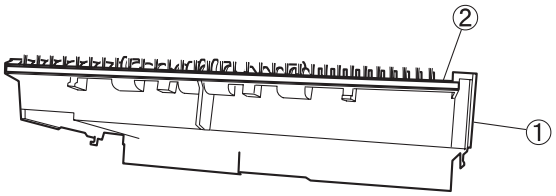

Figure 3-114

8. Lower Front Cover

1) Remove the left and right covers.
2) Unhook the left and right fitting parts ① And then, remove lower front cover ②.

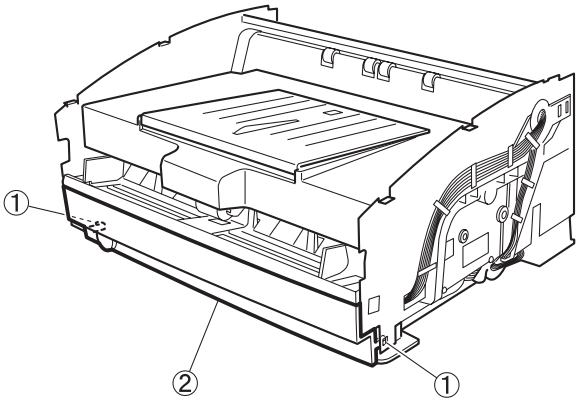

Figure 3-115

9. Entrance Guide Assembly

Note: In case that the document stopper is lowered, start from Step 3 because the left cover does not need to be removed.

1) Remove the left cover.
2) In case that the document stopper ① is raised, turn the rotor of the main motor ② counterclockwise to lower it.

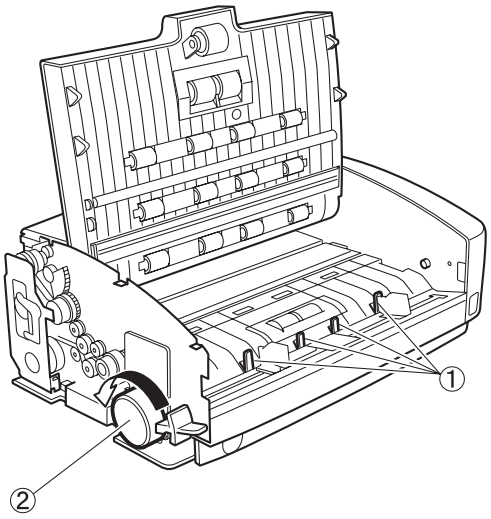

Figure 3-116

3) Remove the retard roller.
4) Remove the screws and shoulder ones two each. And then, lift the backside of the entrance guide assembly ③ to unhook the inside fitting part. After that, displace the document stopper slightly and pull out the entrance guide assembly toward to remove it.

Note: Because the cables are connected to the backside of the entrance guide assembly, do not pull it too hard.

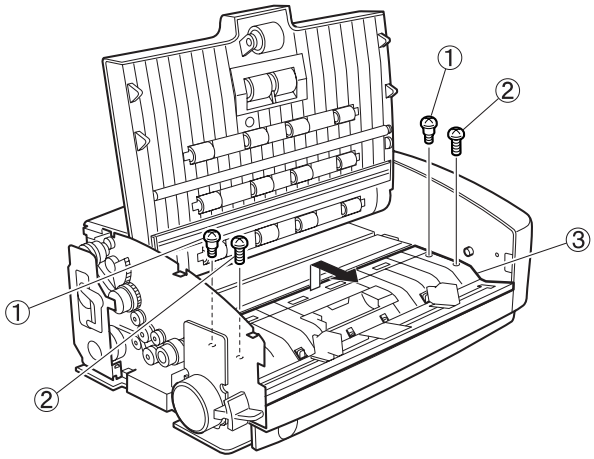

Figure 3-117

*** Notes on assembling**

Assemble the entrance guide assembly by passing it under the shaft projecting from the right and left side plates.

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II. UPPER UNIT

A. Common Procedures

1. Upper Unit

1) Remove the left and right covers.
2) Remove the eject tray 1.
3) Disconnect the 3 connectors ① on the control PCB and remove the cable fastener. And then, put the cables ② in the upper unit. Disconnect the 2 connectors ③ on the upper unit PCB and remove the cable fastener. And then, put the cables ④ out of the upper unit.

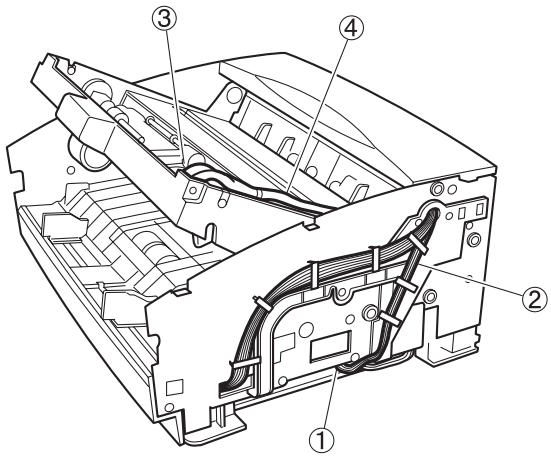

Figure 3-201

4) Remove the 4 screws ① (3 of 4 are M4 self tapping type). And then, remove the eject drive assembly ②.

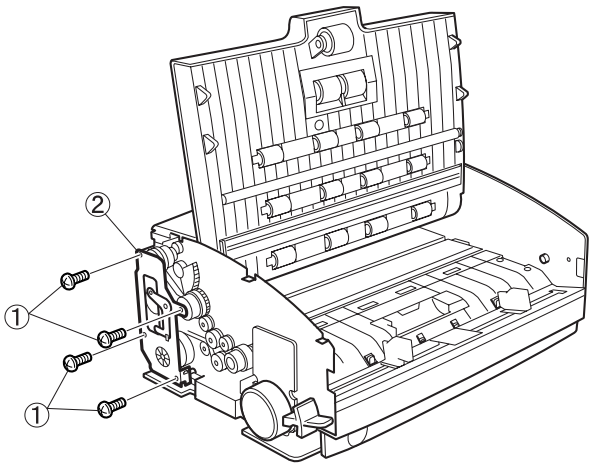

Figure 3-202

5) Remove the E ring ①. And then, remove the one way hinge ② and hinge gear ③. After that, unhook the inside fitting part to remove the upper unit gear ④.

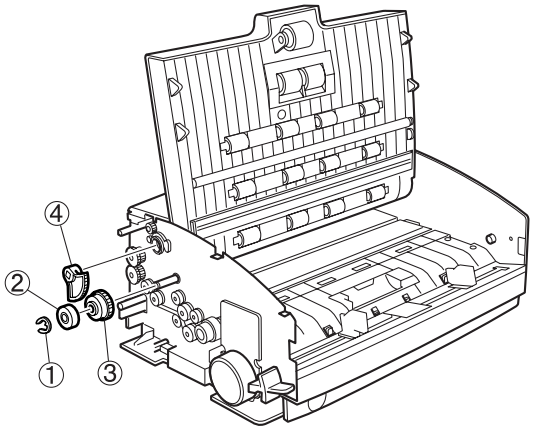

Figure 3-203

6) Remove the 2 screws ① (M3 x 3, with flange). And also, remove the left hinge guide ② from the side plate to remove the upper unit ③.

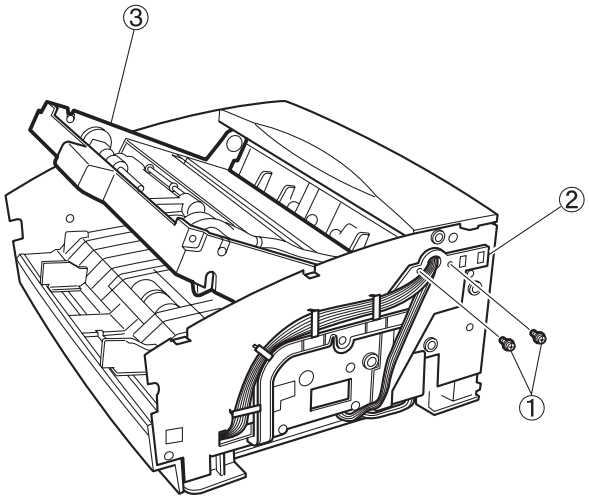

Figure 3-204

2. Shading Cover Assembly (Upper)

1) Remove the eject tray 1.
2) Disconnect the cable connected to the shading cover assembly.
3) Remove the 4 screws ① (M4 self tapping type). And then, remove the 2 grounding plate ② and shading cover assembly ③.

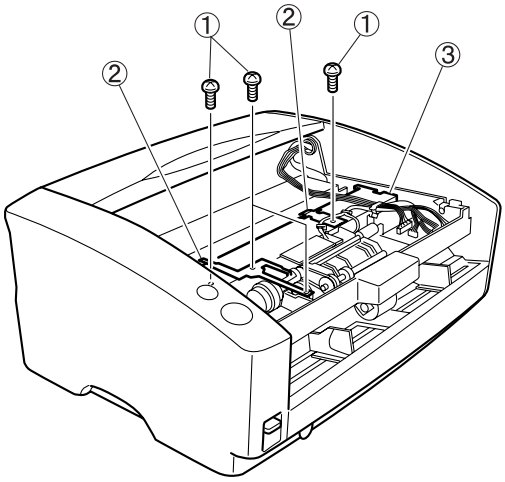

Figure 3-205

*** Notes on assembling**

Insert each protrusion of the cover into the left and right coil springs ① mounted on the platen roller unit. Do not forget reinstalling the grounding plate removed when the cover assembly is removed. And be careful for the cables not to be pinched in a gap.

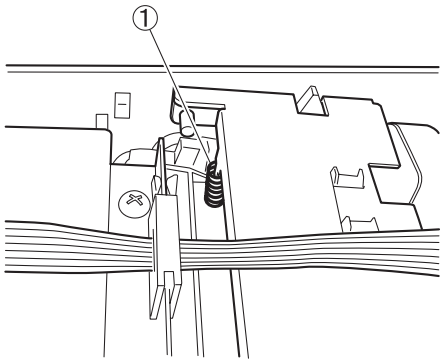

Figure 3-206

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3. Pickup Roller Holder

1) Remove the eject tray 1.
2) Remove the pickup roller.
3) Remove the 2 screws ① and the grounding plate ②. Remove the 2 screws ③ to keep the pickup motor ④ ready to be removed at any time. And then, unhook the fitting part ⑤ and pickup roller holder ⑥.

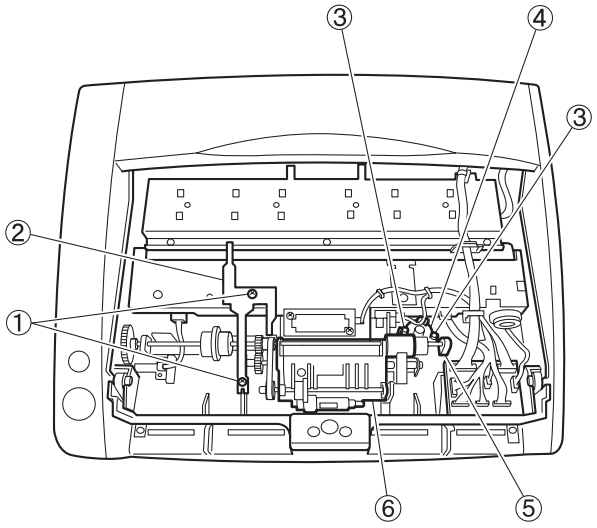

Figure 3-207

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B. FEED SYSTEM (ROLLERS AND OTHRS)

1. Follower Roller

Note: There are 3 lines of follower rollers but any line can be disassembled in the same way. However, the shape of the upper roller cover included in the back-side follower roller line is different from the others.

1) Fully open the upper unit.
2) Bend the lower center of the 4 frames of the upper roller cover ① and unhook the inside fitting part. And then, pull out the upper roller cover toward to remove it.

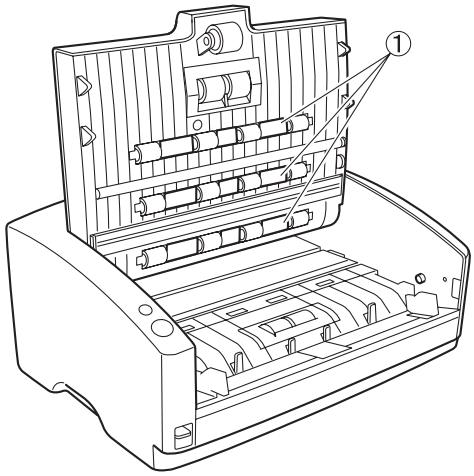

Figure 3-208

3) While keeping the rollers ① from jumping out, unhook the fitting part ② of both sides. And remove the rollers.

Note: Be careful not to lose the springs included two each in the rollers.

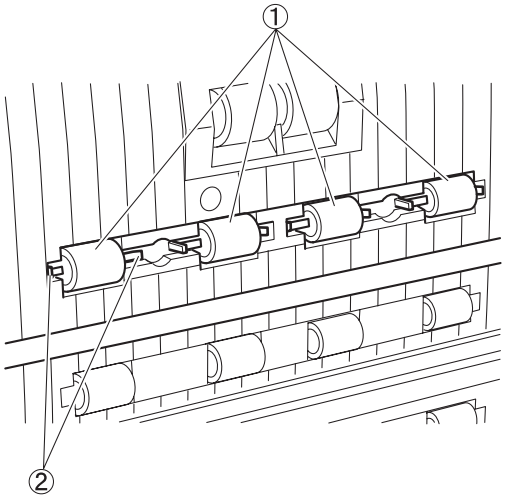

Figure 3-209

*** Notes on assembling**

Install the rollers so that the flat parts of the roller shaft should face outwardly.

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2. Platen Roller Unit (Upper)

1) Remove the eject tray 1.
2) Remove the shading cover assembly (upper).
3) Fully open the upper unit. Unhook the left and right fitting parts ① and shaft ②. And then, remove the platen roller unit (upper).

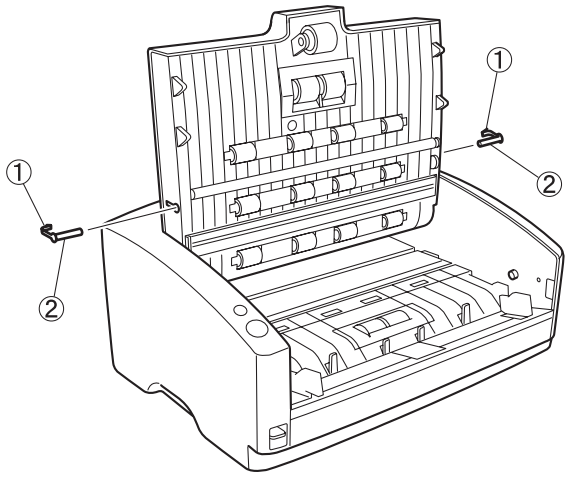

Figure 3-210

*** Notes on assembling**

Install the roller unit ① so that the edge of the left grounding plate ② in the unit should contact the lower parts of the cover ③ of the reading unit.

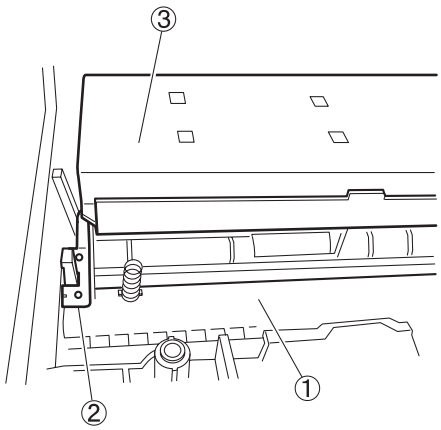

Figure 3-211

3. Eject Roller U

1) Remove the eject tray 1.
2) Pull out the axis ① to unhook it from the fitting part.

Note: There are 4 rollers installed but none of them is fixed on the axis. Thus, be careful not to lose any. And also, be careful not to lose the springs included two each in the rollers.

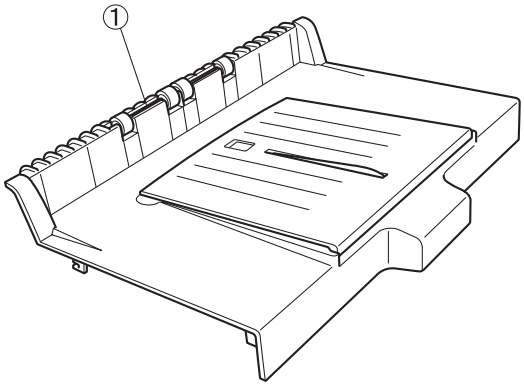

Figure 3-212

*** Notes on assembling**

Adjust the protrusions ① of the rollers as described in the following figure. Put downward the flat parts which each axis has two each and contact the shaft with the springs.

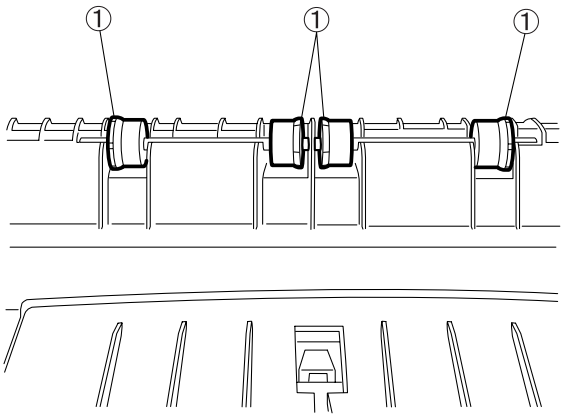

Figure 3-213

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C. DRIVE SYSTEM (MOTORS AND OTHERS)

1. Pickup Motor

1) Remove the eject tray 1.
2) Remove the shading cover assembly (upper).
3) Remove the 2 screws ①. And then, remove the pickup motor ②.

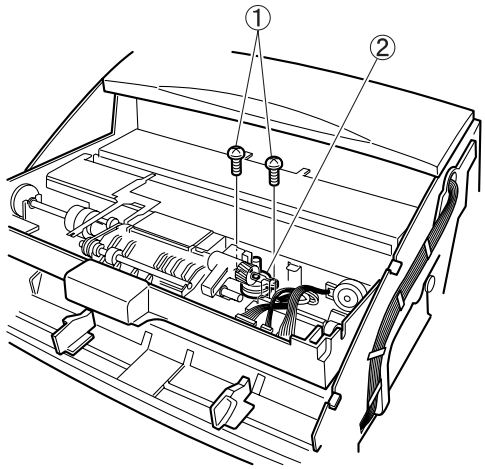

Figure 3-214

2. Shading Motor (Upper)

1) Remove the eject tray 1.
2) Remove the shading cover assembly (upper).
3) Remove the 2 screws ①. And then, remove the shading motor (upper) ②.

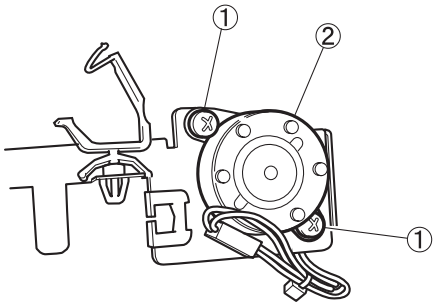

Figure 3-215

3. Feed Clutch

1) Remove the eject tray 1.
2) Remove the pickup roller holder.
3) Unhook the left and right fitting parts ①. After that, turn the bearing with stopper ② to remove it. And finally, remove the feed clutch ③.

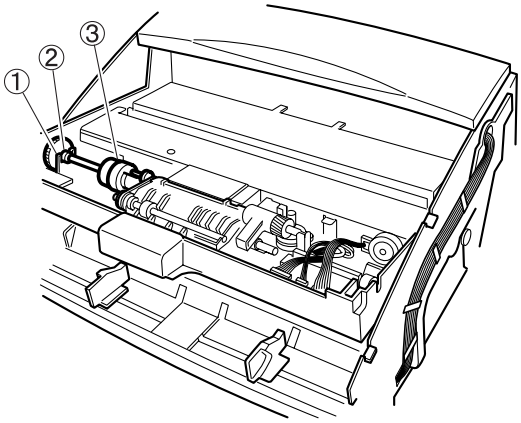

Figure 3-216

*** Notes on assembling**

Put the clutch rotation stoppers on the protrusions of the base.

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D. READING SYSTEM

1. Reading Unit (Front)

1) Remove the eject tray 1.
2) Disconnect the 2 connections ①.
   Remove the 3 screws ② (M4 self tapping type). And then, remove the cover ③.

Note: Remove them so that they are not damaged because the end of the grounding plate ④ is inserted in the cover.

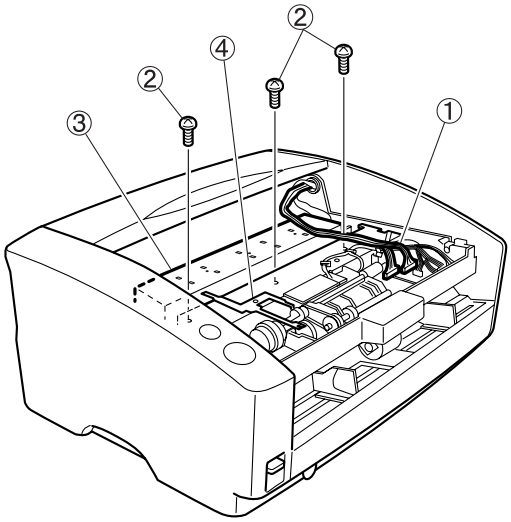

Figure 3-217

3) Disconnect the 3 connectors ①. And then, remove the reading unit (front).

Note: Because those connectors and pins of the cables for image signals are easily deformed, handle them with care.

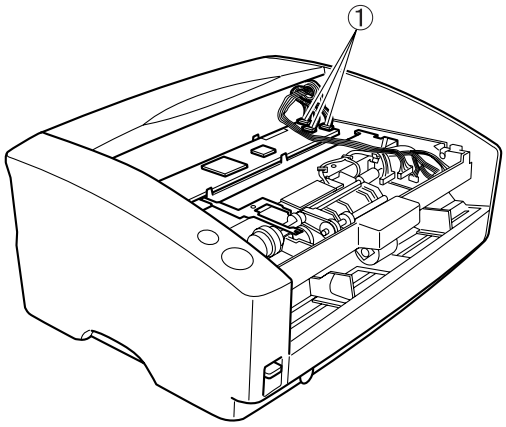

Figure 3-218

*** Notes on assembling**

To install the cover, place the rear projection ① under the torsion spring and insert the end of the grounding plate ② into the rectangular hole in the cover.

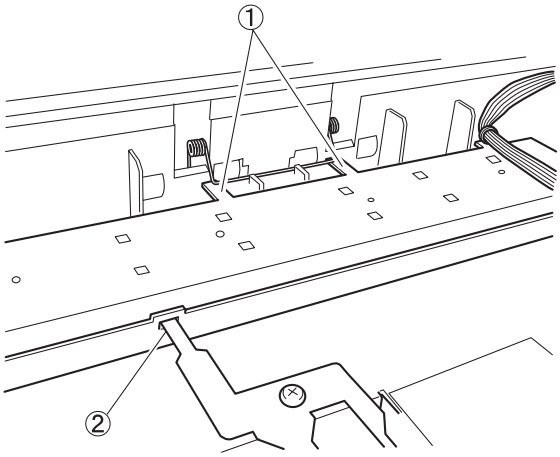

Figure 3-219

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2. Reading Unit PCB (Front)

1) Remove the reading unit (front).
2) Remove the 4 screws ① (thorough head and self tapping types). After unhooking the 2 fitting parts ②, disconnect the 2 FFC cables ③. And then, remove the reading unit PCB (front) ④.

Note: Do not remove the components of the CIS unit such as the CIS PCB and light guide except for the reading glass.

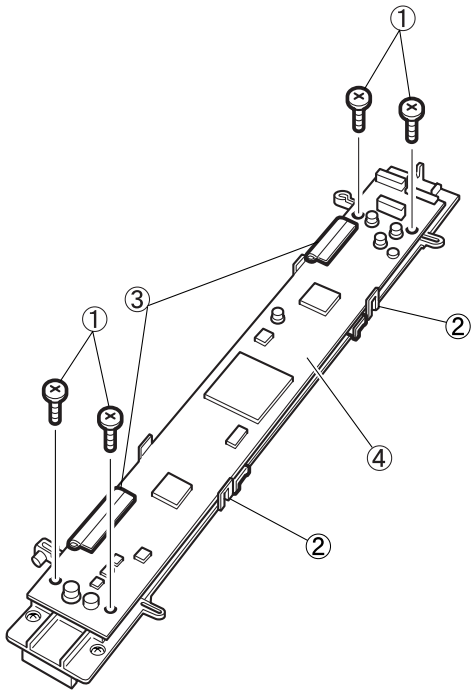

Figure 3-220

Note: The reading unit PCB for the front is totally the same as that for the back.

*** Notes on assembling**

Place the FFC cable between the CIS unit and the PCB so that it does not protrude to the outside.

3. CIS Unit (Front)

1) Remove the reading unit (front).
2) Remove the reading unit PCB.
3) After removing the 4 screws ① (self tapping type, black), unhook the fitting part ②. And then, remove the holder ③.

Note: After removing the holder, the left and right grounding plates ④ installed between the CIS unit and holder drops off.

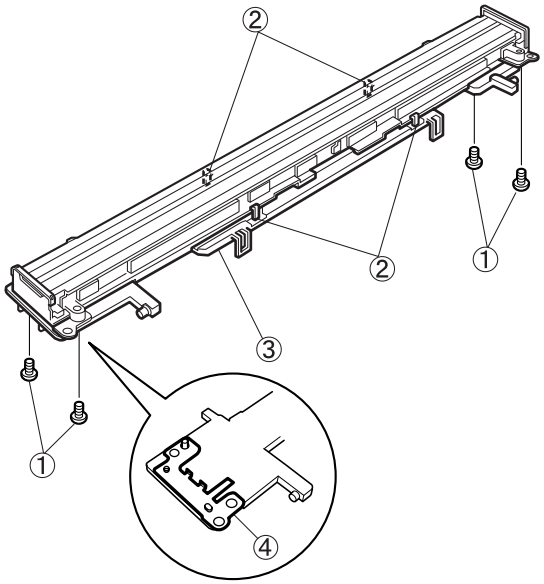

Figure 3-221

*** Notes on assembling**

When fixing the CIS unit on the holder, do not bend the CIS unit. If the reading glass is bent, the focal lengths will become inconsistent when a target is read.

Assemble the grounding plate by aligning it with the positioning.

Although both the CIS units for the front and back contain the same components, the directions of the glasses are different.

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4. Reading Glass (Front)

1) Fully open the upper unit.
2) Clean the area around the reading glass in order to prevent rubbish such as paper dust from getting into the CIS unit during the works.
3) Hold the center of the right stopper ① between the thumb and index finger or with tweezers and pull it out. And then, slide the reading glass ② to the right and unhook the inside fitting part. And remove the reading glass.

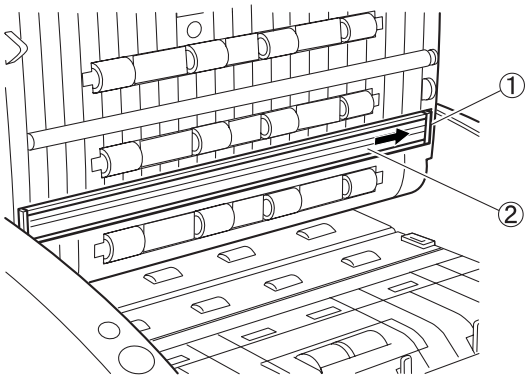

Figure 3-222

*** Notes on assembling**

Prevent rubbish such as paper dust from getting into the CIS unit. Clean its inside with an air blower if necessary. And clean the inner surface of the reading glass before reinstalling it.

5. Shading Plate (Upper)

1) Remove the eject tray 1.
2) Remove the shading cover assembly.
3) Remove the shading motor (upper).
4) Unhook the fitting part ①. And then, unhook the fitting part ② and the shading plate ③.

Note: Be careful not to make the white shading sheet dirty and do not bend it when not only disassembling but also assembling the reading system.

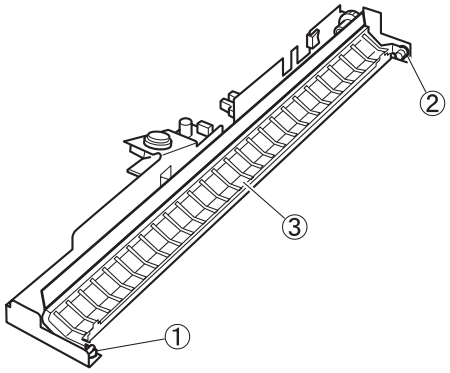

Figure 3-223

*** Notes on assembling**

After the shading motor is installed, the shading plate does not turn due to the motor load. Do not attempt to rotate it forcibly.

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E. ELECTRICAL SYSTEM (PCB AND OTHERS)

1. Upper Unit PCB

1) Remove the eject tray 1.
2) Unhook the fitting part ①. And then, remove the upper unit PCB ②. Disconnect all the cables which are connected to the PCB.

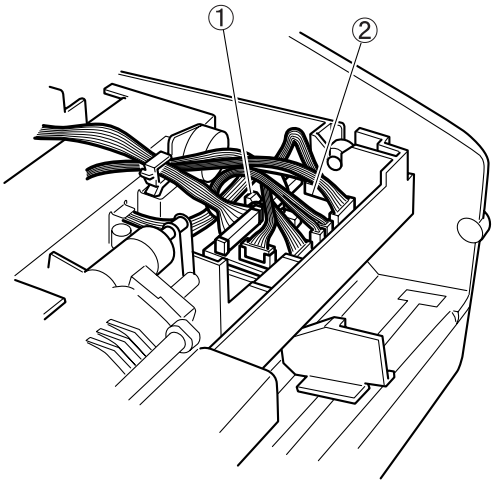

Figure 3-224

2. Ultrasonic Sensor (rcv)

1) Remove the eject tray 1.
2) Remove the 2 screws ①. And then, remove the ultrasonic sensor PCB ②.

Note: Do not pull the PCB too hard because it is connected to the sensor by the cables.

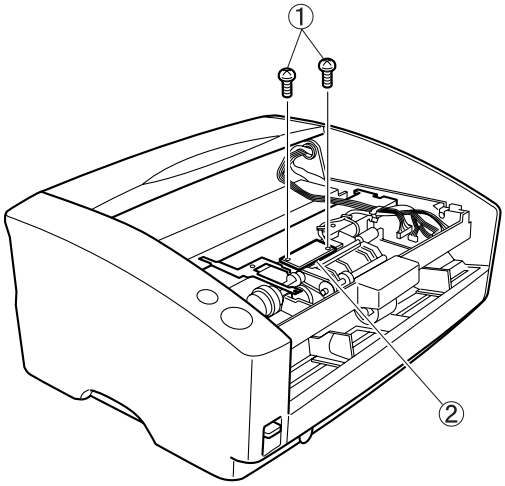

Figure 3-225

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3) Unhook the 2 fitting parts ①. Unhook the fitting part on the opposite side. And then, remove the sensor stopper ② and ultrasonic sensor ③.

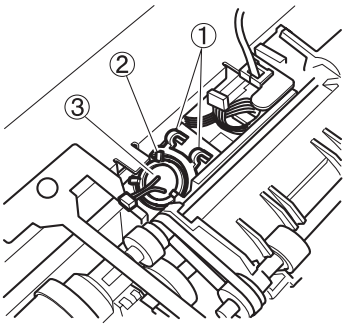

Figure 3-226

*** Notes on assembling**

Before installing the sensor stopper, install the fitting part of the opposite side.

Place the ultrasonic sensor cable on the hook of the sensor stopper so that it is not caught.

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III. LOWER UNIT

A. Common Procedures

1. Bottom Box

1) Remove the left and right covers.
2) Remove the lower front cover.
3) Disconnect the cable connector ① of the eject motor and push the cable in the bottom box.

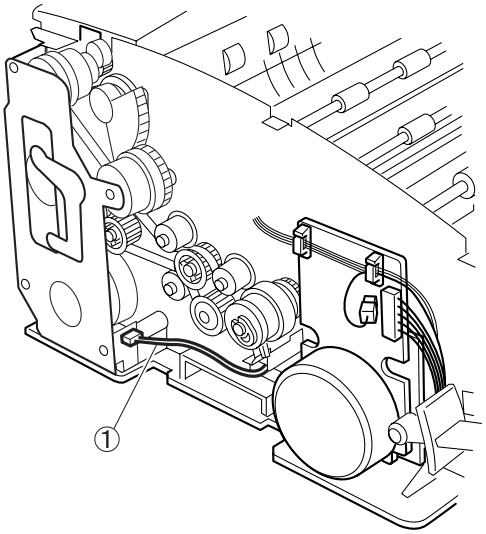

Figure 3-301

4) Put the main body upside down.

Note: Be careful not to be caught a finger. Do not bend the eject tray extension.

5) Disconnect the connectors ① connected at 7 spots and remove the 9 screws ② (M3 x 8, front: 2, back: 3, left: 2, right: 2).

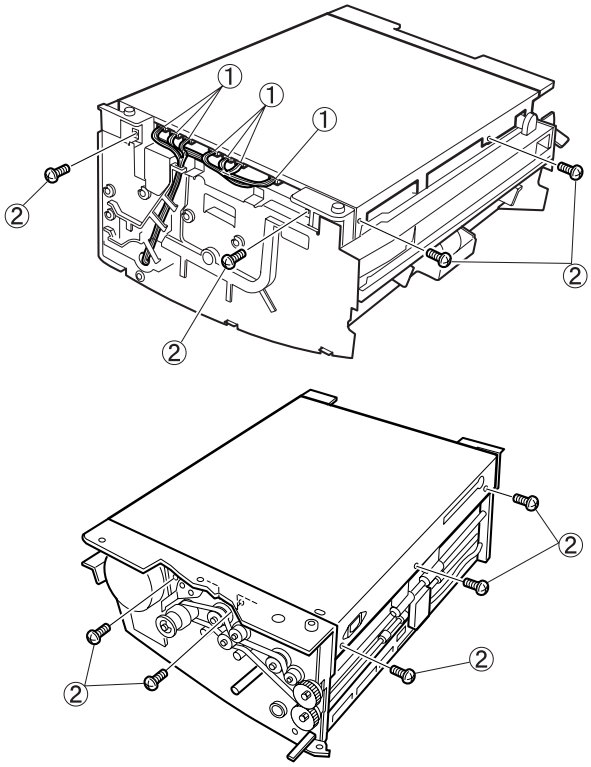

Figure 3-302

6) Lift the front side of the bottom box ① slightly. And then, open the backside of the bottom box to remove the 7 connectors ②.

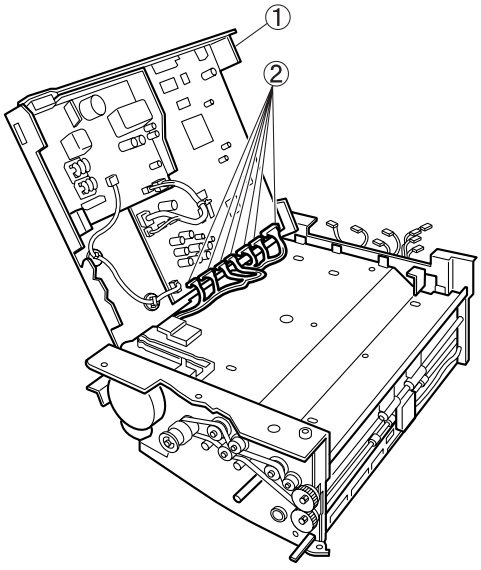

Figure 3-303

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*** Notes on assembling**

Be careful not to deform the end terminals of each connector when inserting them. Because those connectors and pins of the connectors for image signals are easily deformed, handle them with care.

Put the eject motor cable outside the frame before closing the bottom box.

2. Lower Roller Cover (Front)

1) Bend the left or right fitting parts ① to unhook it. And while lifting either side of the lower roller cover (front) ② slightly, unhook the fitting part on the opposite side. And then, remove the lower roller cover (front).

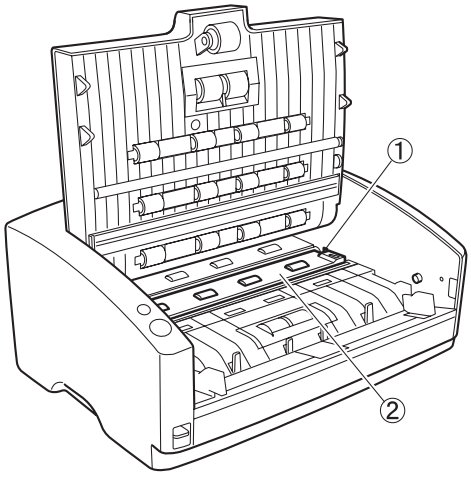

Figure 3-304

3. Lower Roller Cover (Rear)

1) Fully open the eject tray 2 and raise the flapper.
2) Bend the left or right fitting parts ① to unhook it. And while lifting either side of the lower roller cover (rear) ② slightly, unhook the fitting part on the opposite side. And then, remove the lower roller cover (rear).

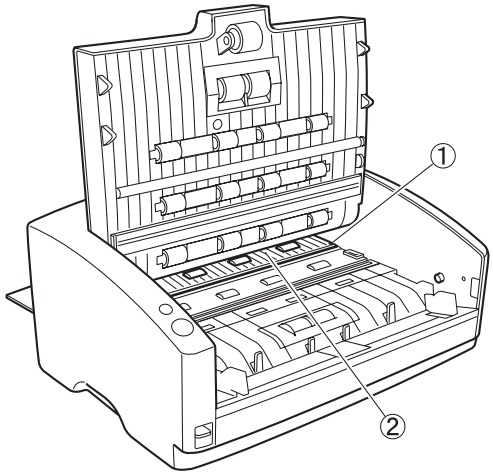

Figure 3-305

*** Notes on assembling**

Insert the roller cover under the flapper and push the projection on the rear side of the roller cover until it enters the main body. Then push the right and left fitting parts at the front.

B. FEED SYSTEM (ROLLERS AND OTHERS)

1. Registration Roller

1) Remove the left and right covers.
2) Remove the entrance guide assembly.
3) Loosen the timing belt tensioner.
4) Remove the left and right stoppers ①. Remove the clutch ②, pulley ③ and bearing ④. And remove the registration roller ⑤.

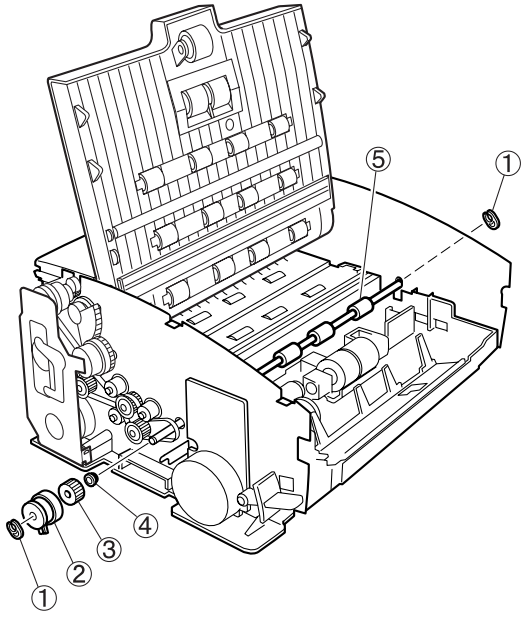

Figure 3-306

*** Notes on assembling**

Secure the tensioner after assembling the registration roller. The tensioner is adjusted automatically with a coil spring.

2. Platen Roller Unit (lower)

1) Remove the left and right covers.
2) Remove the upper unit.
3) Remove the lower roller cover (front).
4) Remove the lower roller cover (rear).
5) Unhook the 2 fitting parts ①. After that, turn the platen roller unit (lower) ② toward and remove the left and right arms ③ from the shaft. And remove the platen roller unit (lower).

Note: 2 springs are put between the unit and base. In case that those springs jump out, put them back to the original positions.

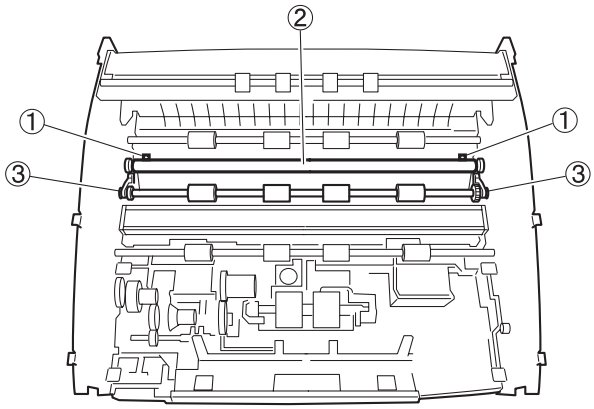

Figure 3-307

*** Notes on assembling**

Do not make the white shading sheet dirty and bend it when not only assembling but also disassembling the unit. Insert the protrusions on the back of the unit into the springs on the base.

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3. Reading Roller (middle)

1) Remove the left and right covers.
2) Remove the upper unit.
3) Remove the lower roller cover (front).
4) Remove the lower roller cover (rear).
5) Remove the platen roller unit (lower).
6) Loosen the timing belt tensioner.
7) Remove the stopper ① for the pulley. Remove the pulley, pin, bushing and bearing. And then, remove the right stopper ② . Remove the bushing and bearing. And remove the reading roller (middle) ③.

Note: Be careful not to lose the pin because it falls after the pulley is removed.

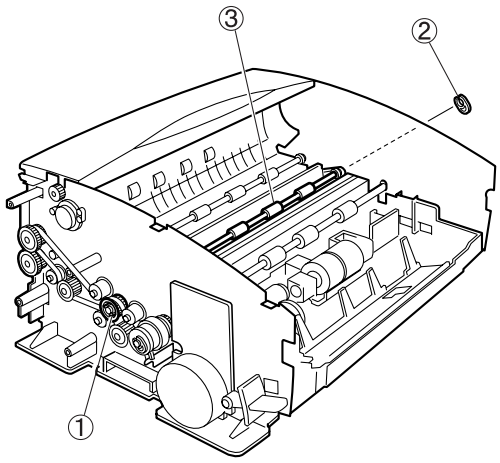

Figure 3-308

4. Reading Roller (Rear)

1) Remove the left and right covers.
2) Remove the upper unit.
3) Remove the lower roller cover (rear).
4) Loosen the timing belt tensioner.
5) Remove the stopper ① for the pulley. Remove the pulley, pin, and bearing. And then, remove the right stopper ② . Remove the bushing and bearing. And remove the reading roller (rear) ③.

Note: Be careful not to lose the pin because it falls after the pulley is removed.

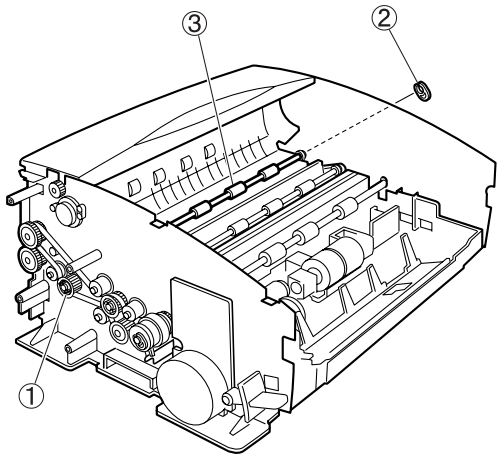

Figure 3-309

5. U-turn Roller

1) Remove the top cover.
2) Remove the eject cover and eject tray 2.
3) Remove the left and right covers.
4) Unhook the 2 fitting parts ①. And remove the sensor cover ②.

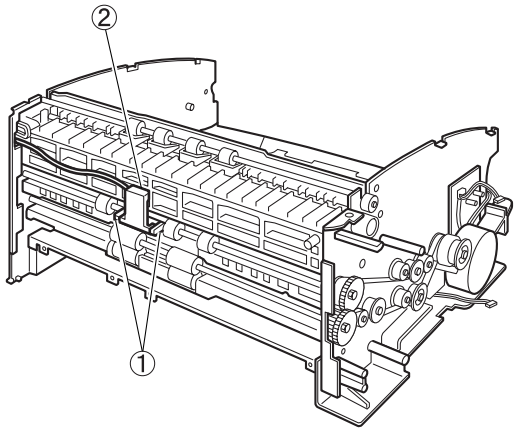

Figure 3-310

5) Remove the eject drive assembly. (See the eject motor section.)
6) Loosen the timing belt tensioner.
7) Remove the stopper ① for the pulley gear. Remove the gear and bearing. And, remove the right stopper ②. And then, after removing the bearing, remove the U-turn roller ③.

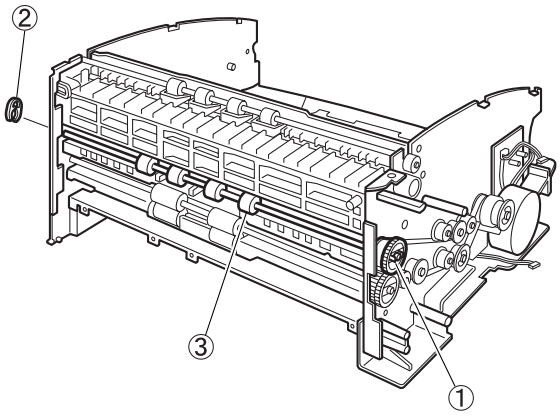

Figure 3-311

6. Eject Roller S (Drive)

1) Remove the top cover.
2) Remove the eject cover and eject tray 2.
3) Remove the left and right covers.
4) Remove the sensor cover.
   Refer to “U-turn Roller.”
5) Remove the eject drive assembly. (See the eject motor section.)
6) Remove the stopper ① for the gear. Remove the gear and bearing. And remove the right stopper ②. And then, after removing the bearing, remove the eject roller S (drive) ③.

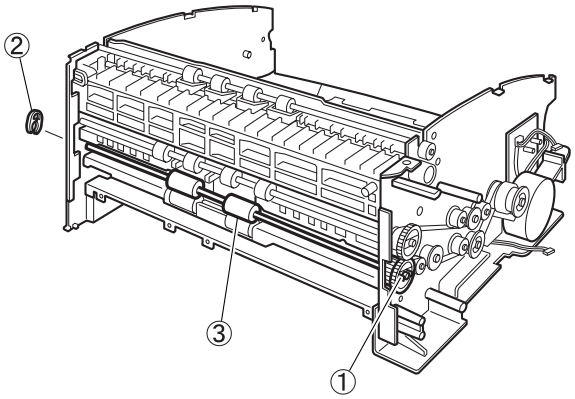

Figure 3-312

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7. Eject Roller S (follower)

1) Remove the top cover.
2) Remove the eject cover and eject tray 2.
3) Remove the left and right covers.
4) Remove the eject roller S (drive).
5) Remove the axis from the fitting part and pull it out, and then, remove the eject roller S ①.

Note: Be careful not to lose those 2 rollers because they are not fixed on the axis. And also, be careful not to lose those 2 springs which are put under the rollers.

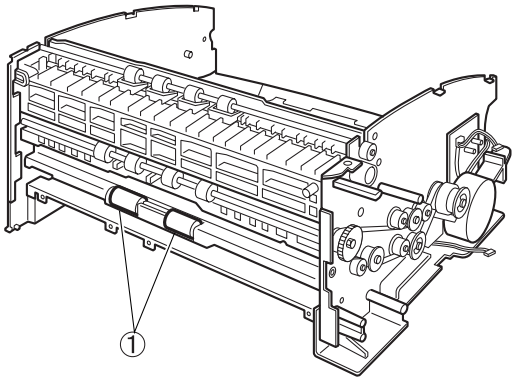

Figure 3-313

8. Eject Roller U

1) Remove the top cover.
2) Remove the eject cover and the eject tray.
3) Remove the left and right covers.
4) Remove the eject drive assembly. (See the eject motor section.)
5) Remove the stopper ① for the gear. Remove the gear and bearing. And then, remove the right E ring ②. After removing the washer and bearing, remove the eject roller U ③.

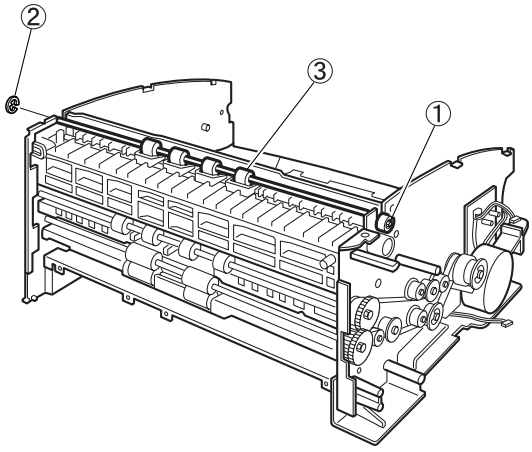

Figure 3-314

9. Document Guide

1) Remove the entrance guide assembly.
2) Unhook the fitting part ①. And remove the cover ②.

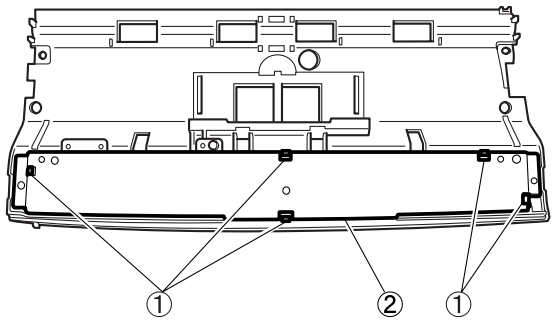

Figure 3-315

3) Fully open the document guides ① and remove the document guides from the box shaped hole.

Note: The gear ② can be removed as well in this state of things.

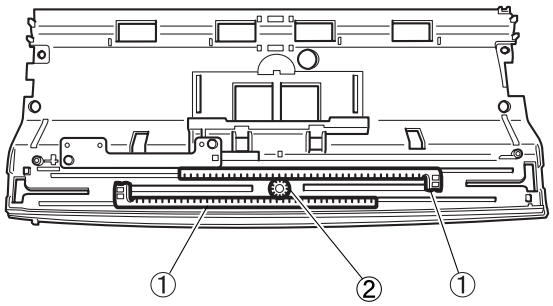

Figure 3-316

*** Notes on assembling**

Install the document guides so that the right document guide opens to the same level as the left one does.

10. Document Stopper

1) Remove the entrance guide assembly.
2) Turn the arm ① to displace it upward. Remove the spring ②. And unhook the fitting part ③. And then, after sliding the document stopper ⑥. so that the flat surface ④ is aligned with the fix guide ⑤, turn the document stopper to remove it.

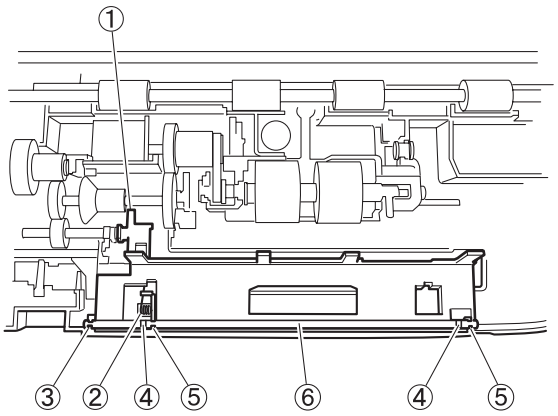

Figure 3-317

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C. DRIVE SYSTM (MOTORS AND OTHERS)

1. Main Motor

1) Remove the left cover.
2) Remove the 2 cables ① from the PCB of the main motor ②.
   Remove the 3 screws ③. And remove the main motor.

Note: The main motor has a PCB.

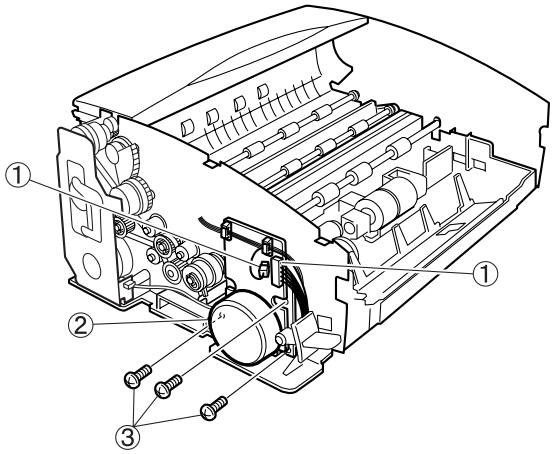

Figure 3-318

2. Eject Motor

1) Remove the left cover.
2) Disconnect the connector ① and remove the 4 screws ② (3 of 4 are M4 self tapping type). And remove the eject drive assembly ③.

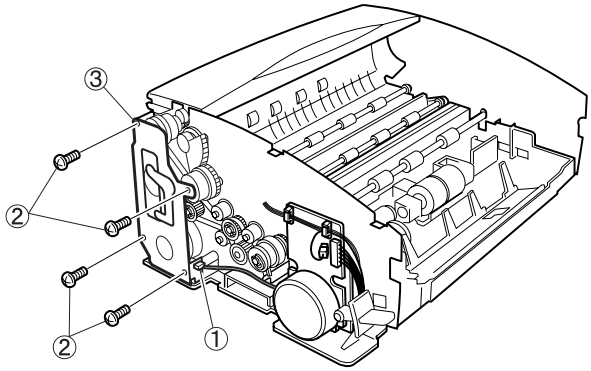

Figure 3-319

3) Remove the 2 screws ① (with a washer). Remove the eject motor assembly ②. And then, remove the 2 screws (with a washer). And remove the motor mount from the eject motor assembly.

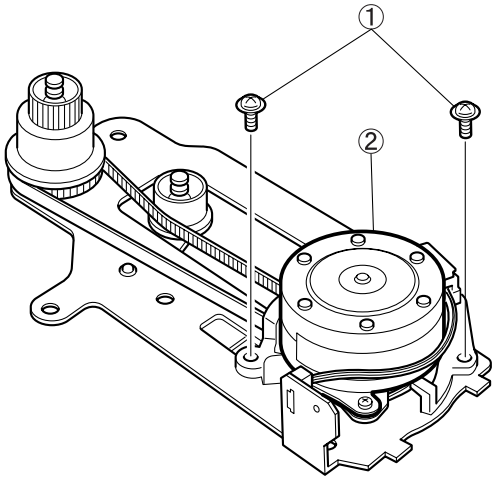

Figure 3-320

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3. Shading Motor (Lower)

1) Remove the right cover.
2) Remove the screw ①. And remove the shading motor assembly (lower) ②.

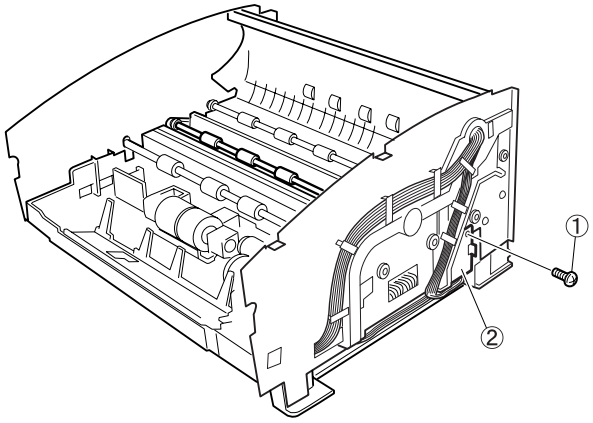

Figure 3-321

3) Remove the 2 screws ①. And remove the shading motor (lower) ②.

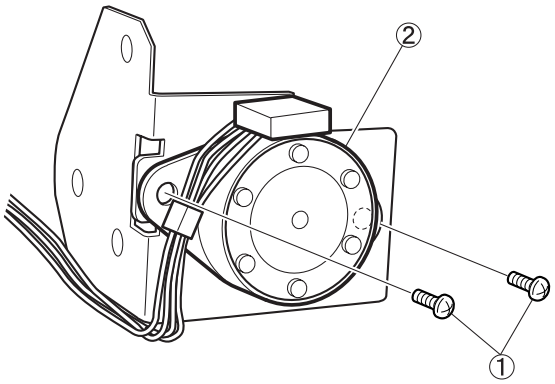

Figure 3-322

4. Registration clutch

1) Remove the left cover.
2) Remove the stopper ①. And remove the registration clutch ②.

Note: The cable connector has a stopper and is fixed securely. Remove it carefully.

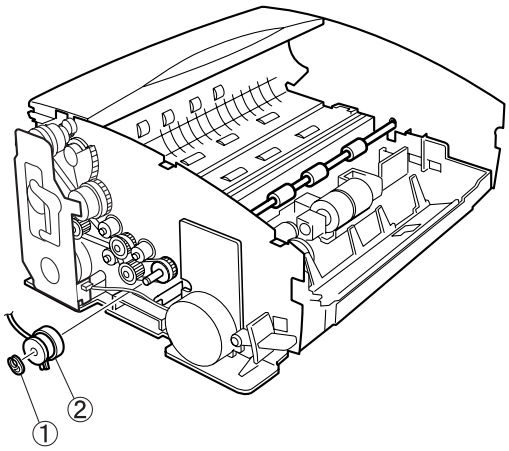

Figure 3-323

*** Notes on assembling**

Put the clutch rotation stopper on the protrusion with a tube.

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5. Adjustment of Tension of Timing Belt

1) Loosen the screw ① and release the hook of the spring ②. After that, stretch the timing belt ③ over the pulley and idler as described in the following figure.

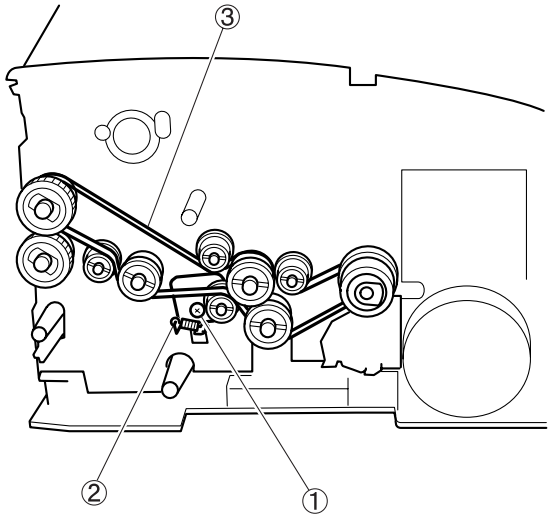

Figure 3-324

2) Put the hook of the spring back and tighten the screw. The tension of the timing belt is automatically adjusted in keeping with that of the spring.

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D. READING SYSTEM

1. Reading Unit (Back)

1) Remove the right cover.
2) Remove the entrance guide assembly.
3) Remove the lower roller cover (front).
4) Remove the 3 connectors ① on the reading unit.

Note: Because those connectors and pins of the cables for image signals are easily deformed, handle them with care.

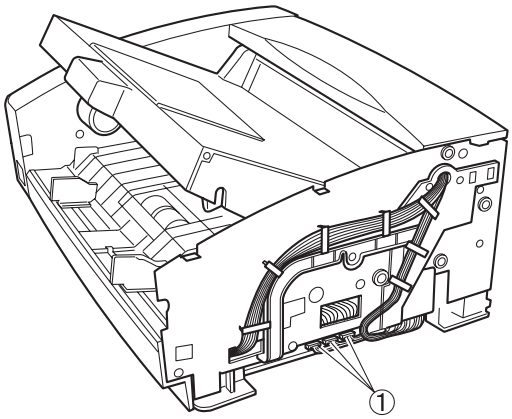

Figure 3-325

5) Remove the 2 screws ① (M3 x 8). And remove the reading unit (back) ②.

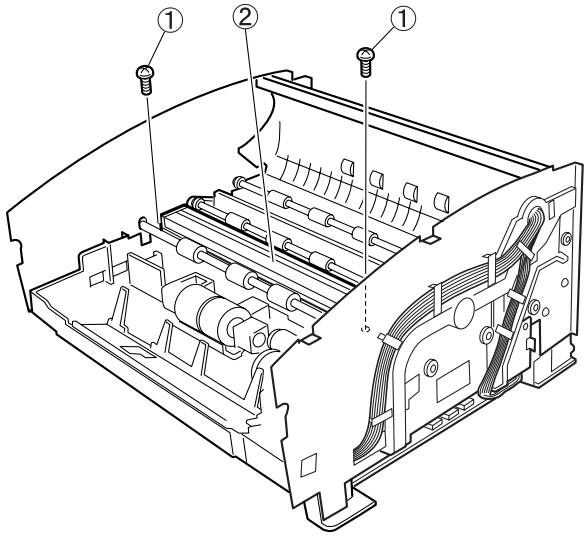

Figure 3-326

2. Reading Unit PCB (Back)

1) Remove the reading unit (back).
2) Remove the 4 screws ① (thorough head and self tapping type). And then, after unhooking the fitting parts ②, remove the 2 FFC cables ③. And remove the reading unit PCB (back) ④.

Note: Do not remove the components of the CIS unit such as the CIS PCB and light guide except for the reading glass.

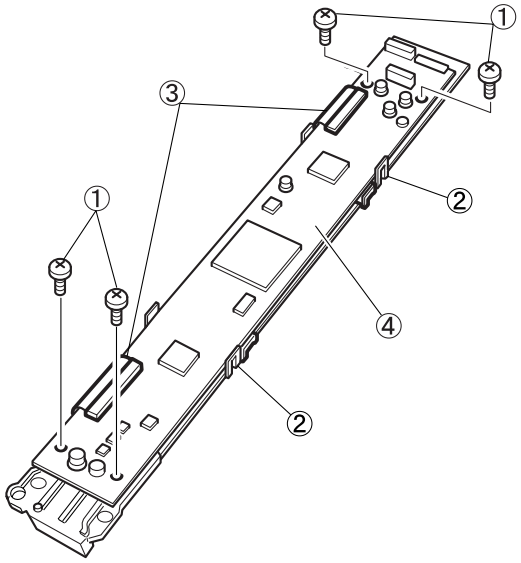

Figure 3-327

Note: The reading unit PCB for the front is totally the same as that for the back.

*** Notes on assembling**

Place the FFC cable between the CIS unit and the PCB so that it does not protrude to the outside.

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3. CIS Unit (Back)

1) Remove the reading unit (back).
2) Remove the reading unit PCB.
3) After removing the 4 screws ① (self tapping type, black), unhook the fitting part ②. And remove the holder ③.

Note: After the holder is removed, the left and right grounding plates ④ installed between the CIS unit and holder are released.

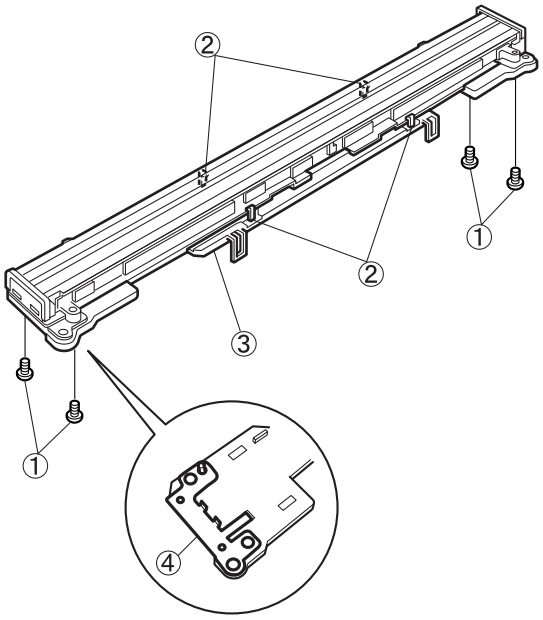

Figure 3-328

*** Notes on assembling**

When fixing the CIS unit on the holder, do not bend the CIS unit. If the reading glass is bent, the focal lengths will become inconsistent when a target is read.

Assemble the grounding plate by aligning it with the positioning.

Although both the CIS units for the front and back contain the same components, the directions of the glasses are different.

4. Reading Glass (Back)

1) Fully open the upper unit.
2) Clean the area around the reading glass in order to prevent rubbish such as paper dust from getting into the CIS unit during the works.
3) Hold the center of the left stopper ① between the thumb and index finger or with tweezers and pull it out. And then, slide the reading glass ② to the left and unhook the inside fitting part. And remove the reading glass.

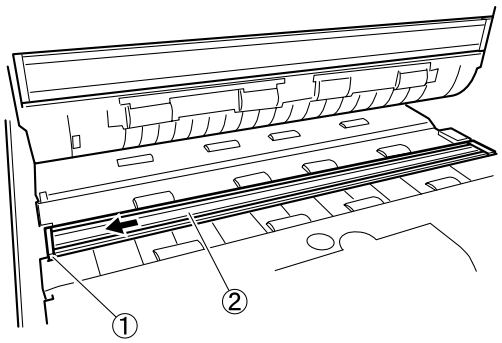

Figure 3-329

5. Shading Plate (Lower)

1) Remove the left and right covers.
2) Remove the upper unit.
3) Remove the lower roller cover (front).
4) Remove the lower roller cover (rear).
5) Remove the platen roller unit (lower).
6) Remove the shading motor assembly (lower).
   Refer to “Shading Motor (Lower).”
7) Turn the shading plate (lower) ① backward and remove the shaft ② from the support ③ . And remove the shading plate.

Note: Be careful not to make the white shading sheet dirty and do not bend it when not only disassembling but also assembling the reading system.

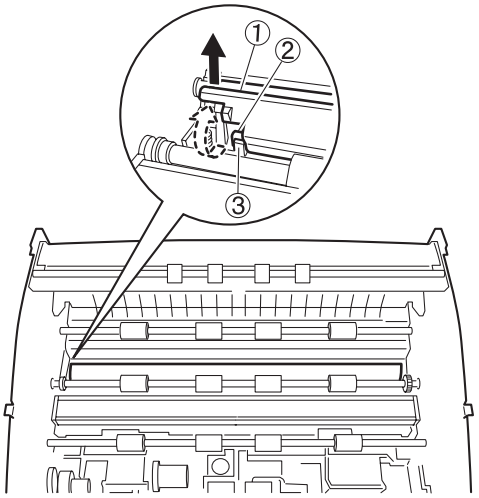

Figure 3-330

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E. ELECTRICAL SYSTEM (PCB AND OTHERS)

1. Control PCB

1) Remove the bottom box.
2) Remove the 2 connectors ① and 11 screws ② (roundhead). And remove the control PCB ③.

Note: The connector for the power supply is equipped with a stopper.

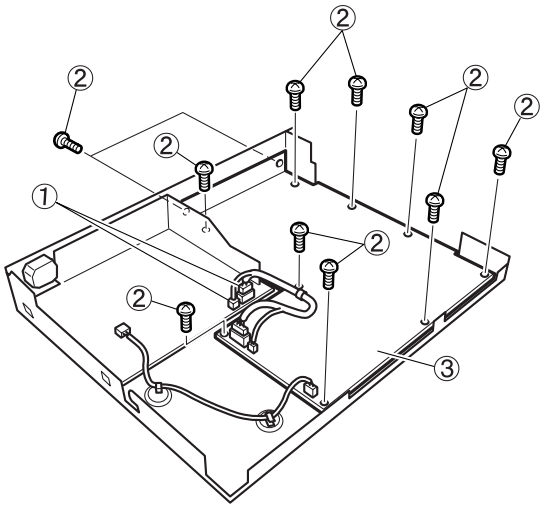

Figure 3-331

2. Power Supply PCB

1) Remove the bottom box.
2) Remove the 3 connectors ① and 6 screws ② (roundhead). And remove the power supply PCB ③.

Note: The connector for the power supply is equipped with a stopper.

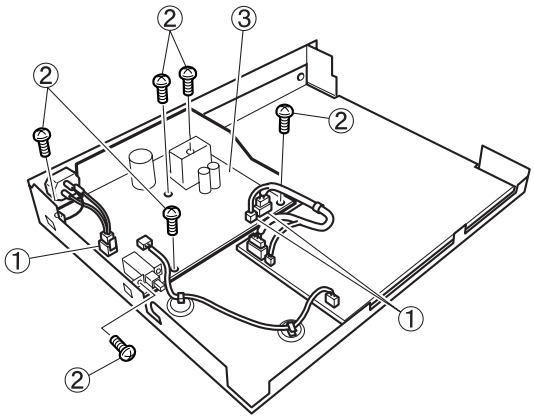

Figure 3-332

*** Notes on assembling**

Be aware that the power is turned off.

3. Document Board Sensor PCB

1) Remove the entrance guide assembly.
2) Unhook the fitting part ①. And remove the cover ②.

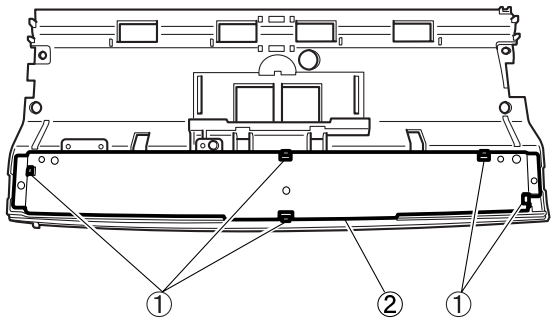

Figure 3-333

3) Remove the 2 screws ① (M3 self tapping). And remove the document board sensor PCB ②.

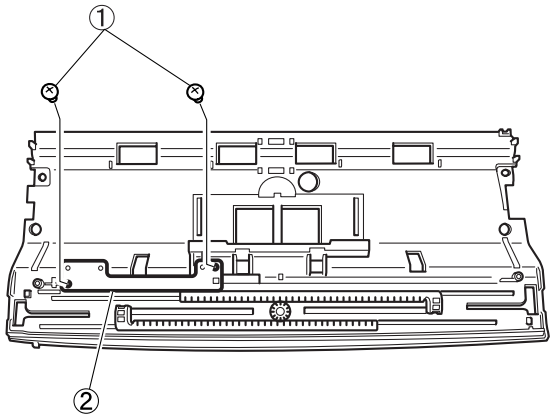

Figure 3-334

*** Notes on assembling**

Install the document guides so that the right document guide opens to the same level as the left one does.

4. Ultrasonic Sensor PCB (Drive)

1) Remove the entrance guide assembly.
2) Release the hook ① of the coil spring. And then unhook the left and right fitting parts ② and turn the bearing with stopper ③ to remove the axis. And remove the retard roller holder ④.

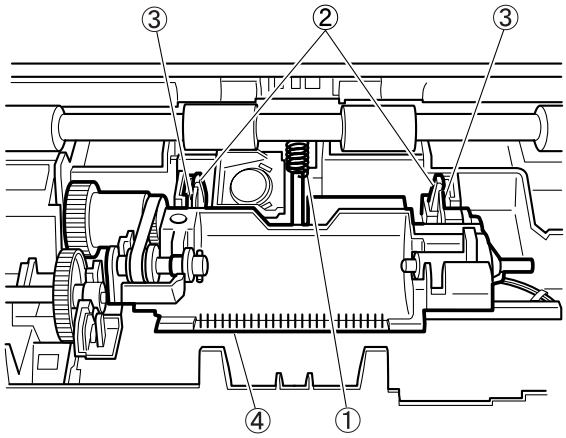

Figure 3-335

3) Push down the tops of the 3 fitting parts ① to remove the ultrasonic sensor ②. And unhook the fitting part ③. And then, remove the ultrasonic sensor PCB (drive) ④.

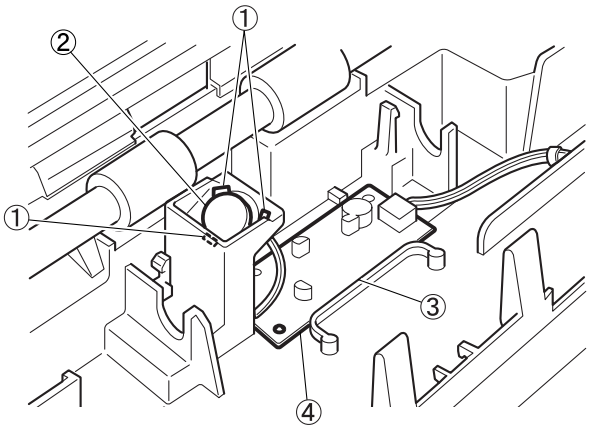

Figure 3-336

*** Notes on assembling**

Be sure to install the coil spring.

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CHAPTER 4

INSTALLATION & MAINTENANCE

I. INSTALLATION 4-1
II. PERIODICALLY REPLACED PARTS 4-5
III. CONSUMABLE PARTS 4-6
IV. LIST OF PERIODIC MAINTENANCE ITEMS.....4-7

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I. INSTALLATION

This machine is installed by the user. The user should be advised to install the printer by reading the user manual thoroughly.

If the machine is installed by a service technician, it must be carried out according to the user manual. The following section provides an overview.

1. Selection of Location

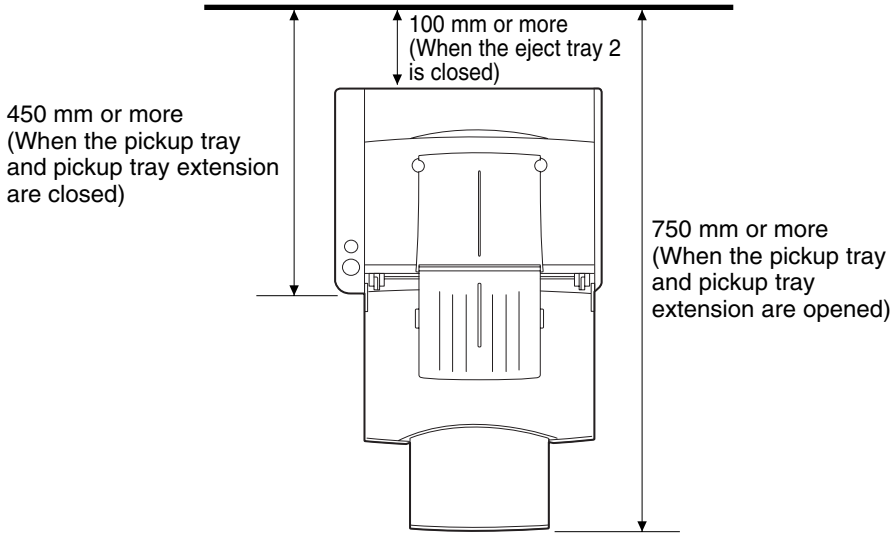

Figure 4-101

- Maintain sufficient spaces around the machine for operation and maintenance, and to allow ventilation.
- If read documents are discharged to the back of the machine (straight path), there must be a sufficient space for discharge them behind it.

2. Checking Items

Open the outer packaging box and take out the main body and other items packed with it. Check that there are no missing items. The unpacking procedure is indicated on the box.

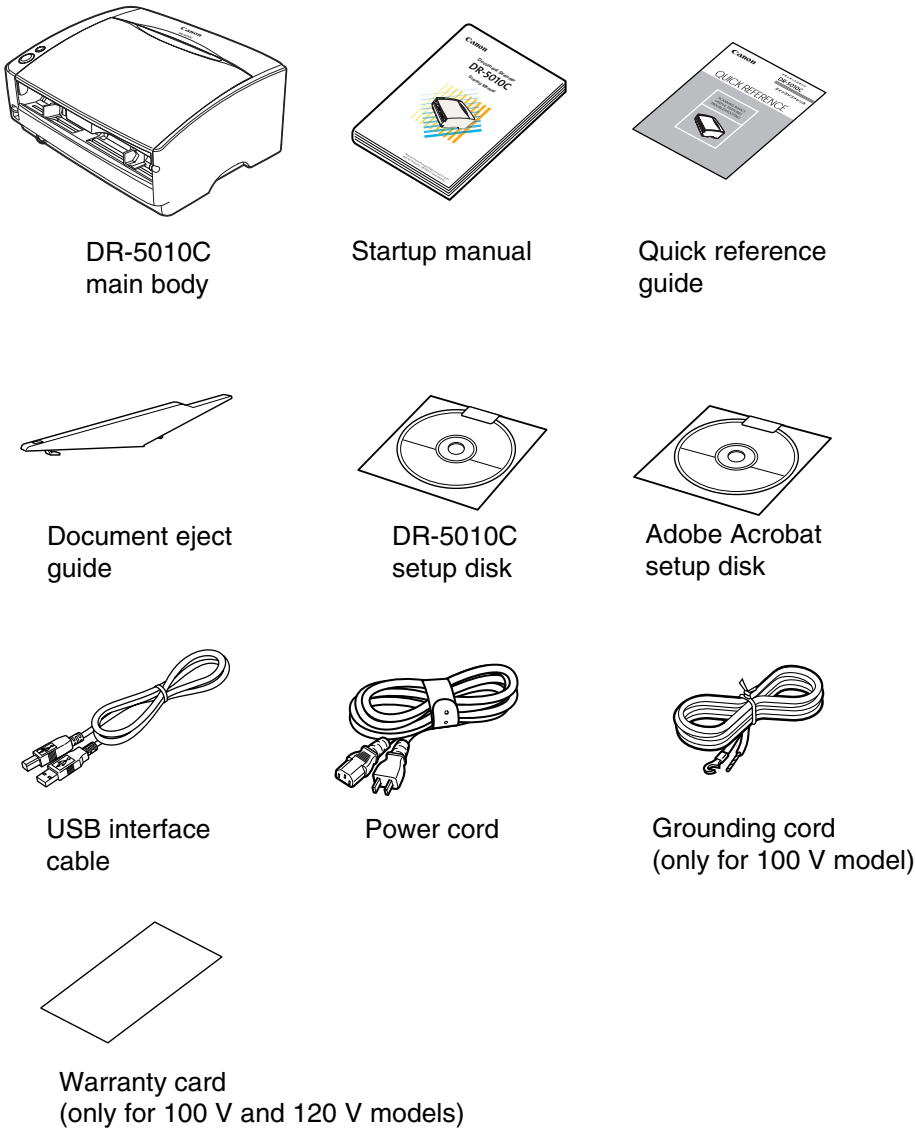

Figure 4-102

- The DR-5010C setup disk is inserted in the startup manual.
- Retain the outer packaging box and packing materials because they are required to store and transport this machine.

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3. Protection Material Removal

1) Remove the protection tape from the main body.

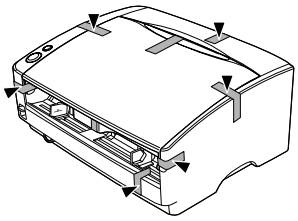

Figure 4-103

2) Open the pickup tray slowly and remove the protection tape.

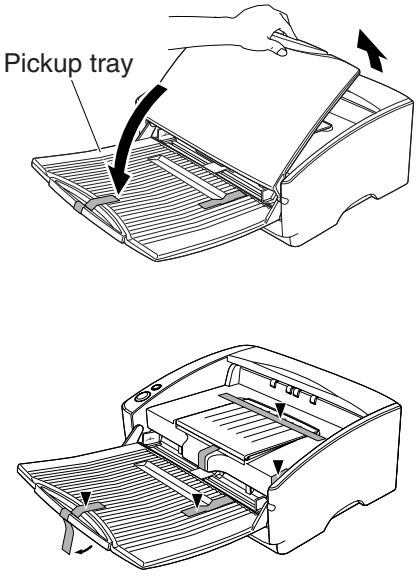

Figure 4-104

3) Open the upper unit slowly.

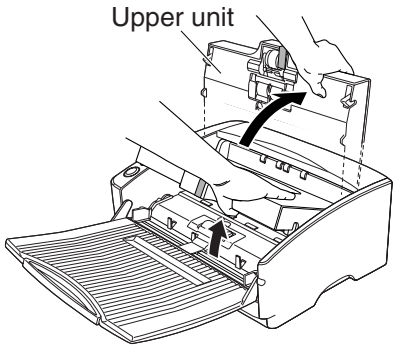

Figure 4-105

Note: Do not hold the pickup roller at the center when opening or closing the upper unit.

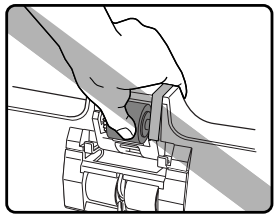

Figure 4-106

4) Remove the protection sheet and the protection material holding the pickup roller.

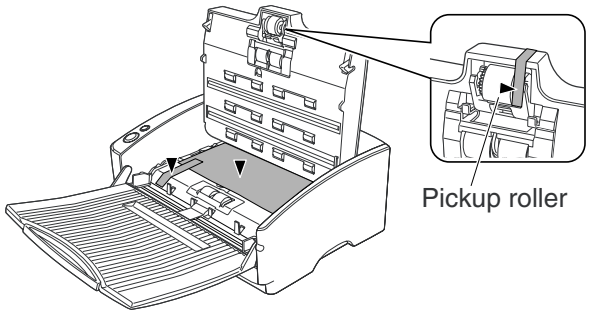

Figure 4-107

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5) Remove the roller cover and pull out the protection material that holds the retard roller. Reinstall the roller cover.

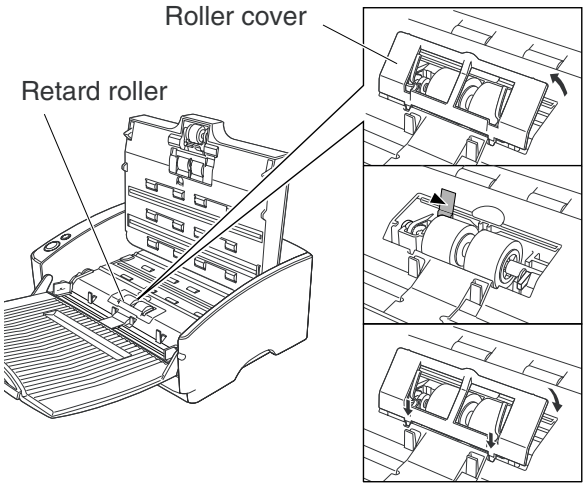

Figure 4-108

6) Close the upper unit slowly. Push both ends of the upper unit with both hands and close it.

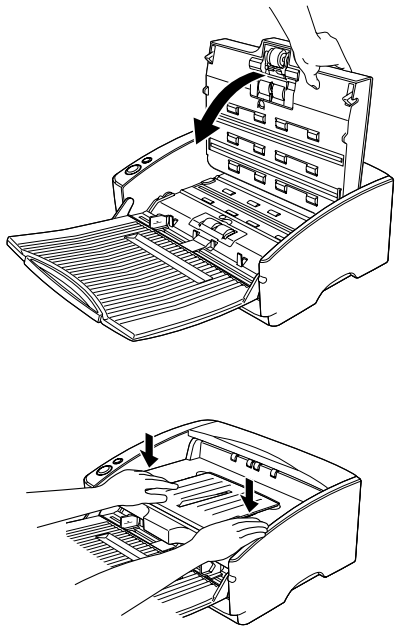

Figure 4-109

4. Connection to the computer

1) Check whether the computer has an I/F card and install one if necessary.
2) Connect an I/F cable. No SCSI cables are bundled. The SCSI connector of the machine is half-pitch 50 pins (pin type).
3) If SCSI is used, set SCSI-ID.
4) Connect the supplied power cord. Be sure to use the supplied power cord. Connect a grounding cord to a 100 V model.
5) Switch the machine ON and then turn the computer ON.
6) Let the computer to recognize the machine (scanner).
7) Install software (drivers and applications) necessary for the computer.
8) Restart the computer as required.

5. Operation Check

1) Install the supplied document eject guide as required.
2) Set documents.
3) Run the application software according to the operation procedure.
4) Check operation results.

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II. PERIODICALLY REPLACED PARTS

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

Reference: Differences periodically replaced parts and consumable parts

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

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III. CONSUMABLE PARTS

No.	Part name	Part number	Expected life	Remarks
1	Pickup roller	MG1-3684-000	250,000 sheets	Because of worn rollers, it is necessary to replace when pickup failures or document jams are occurred after roller cleaning. Replacement is done by users.
2	Feed roller	MA2-6772-000		
3	Retard roller	MG1-3457-000		

Table 4-301

Note: Each roller is assigned as service parts and an exchange roller kit is assigned as commercially available products for a set.

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IV. LIST OF PERIODIC MAINTENANCE ITEMS

This machine has no items for the periodic maintenance by service technicians.

If service technicians visit users, check the rollers and reading glass and direct “User’s Daily Maintenance” if they are very dirty.

Reference:
List of User’s Daily Maintenance Items

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

Unit name	Location/Parts	Intervals (sheets)			Remarks
		As necessary	250,000		
Feed section	Pickup roller	△	●		Wipe with cloth slightly moistened with water, then wipe dry. Do not bend the shading plate while cleaning.
	Feed roller	△	●		
	Retard roller	△	●		
	Registration rollers	△			
	Reading rollers	△			
Reading section	Reading glass	△			
	Shading plate	△			

Table 4-401

Remove the paper dust and other dust on the feed section including document detection sensors as necessary.

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CHAPTER 5

TROUBLESHOOTING

I. ERROR DISPLAY 5-1
II. SERVICE MODE.....5-2
III. IMAGE TROUBLESHOOTING 5-16
IV OPERATION TROUBLESHOOTING 5-19
V. AFTER REPLACING PARTS 5-22

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I. ERROR DISPLAY

1. Power Lamp

The DR-5010C does not have an error display area, but some errors are indicated by the power indicator on the operation panel of the DR-5010C.

If the DR-5010C operates normally, the power indicator lights. The power indicator flashes if the DR-5010C can not scan the document in case that the upper unit opens or the document jam occurs, etc.

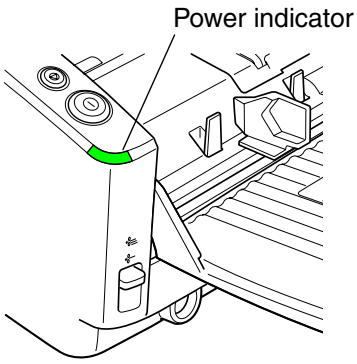

Figure 5-101

2. Error Messages

Error messages are displayed on the display connected to the computer.

The contents of the error message differ depending on the software that is used.

Most error messages are related to improper user operation and document jams. The user shall perform the remedy according to the error message. If the “motor abnormality,” etc. occur, the matter must be referred to a service technician.

The followings show the main error messages displayed when the “CapturePerfect 3.0” is used.

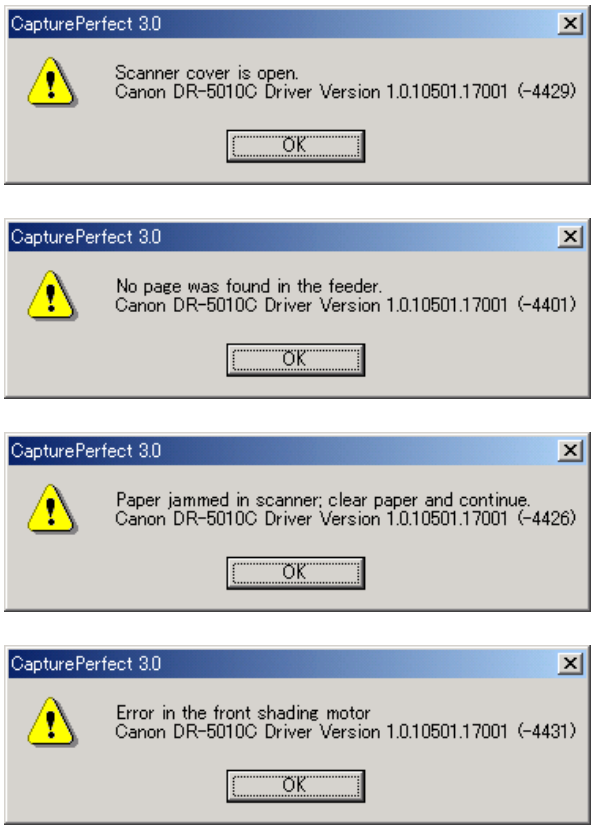

Figure 5-102

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II. SERVICE MODE

1. Outline

The service mode of the DR-5010C can be executed by installing on the computer for servicing the service mode software located in the setup disk provided with the DR-5010C.

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

Figure 5-201 shows the service screen.

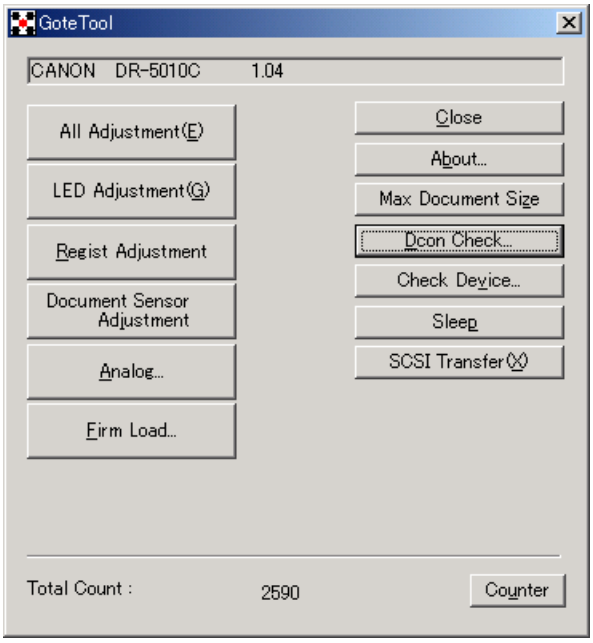

Figure 5-201

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

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

No.	Button name/Functions
1	All Adjustment Perform all adjustments related to image reading.
2	LED Adjustment Perform the CIS adjustments.
3	Regist Adjustment Perform the registration adjustments.
4	Document Sensor Adjustment Perform the document board adjustments.
5	Analog Display the analog value of each sensor.
6	Firm Load Change the firmware.
7	About Display this service mode version.
8	Max. Document Size Set the long document mode.
9	Dcon Check Check the operation of the hardware such as operation buttons, sensors, motors, etc.
10	Check Device Display the version of the internal devices of the DR-5010C.
11	Sleep Set the sleep mode.
12	SCSI Transfer Set the SCSI transfer speed.
13	Counter Display and change the total count (cumulative number of feed sheet) and the number of document jam.

Table 5-201

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2. Installation Procedure

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

1) Power ON the computer for servicing and start up the OS (Windows).
2) Set the setup disk supplied with the DR-5010C.
3) Copy the "\Driver\Tools" folder in the setup disk to one of the drives of the computer for servicing.

Note: For how to install the software provided with the DR-5010C, refer to the user manual.
However, for the specifications, such as the maximum number of documents that can be scanned at one time, see the computer system conditions described in the user manual.

3. Starting Up and Exiting Service Mode

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

1) Connect the computer for servicing with the DR-5010C using a SCSI interface cable or a USB interface cable.
2) After powering ON the DR-5010C, power ON the computer.
3) Open the installed "Tools" folder and start up the "GoteTool.exe" file. (See Figure 5-202.)
4) The password screen is displayed, so after inputting the six characters "market," select [OK]. (See Figure 5-203.)
5) The service screen is displayed.

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

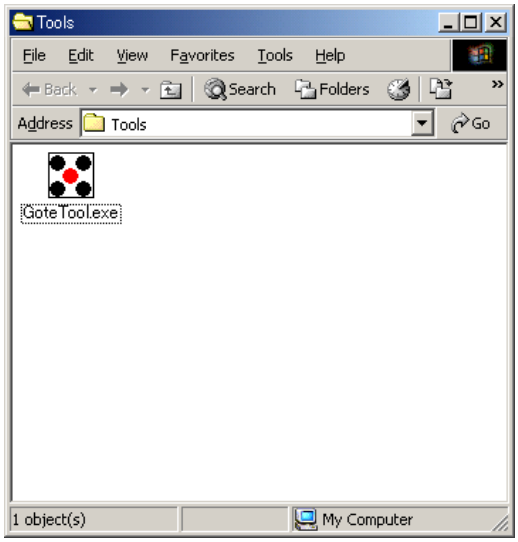

Figure 5-202

Figure 5-203

Note: After the DR-5010C is connected to the computer and the computer is powered ON for the first time, a screen requesting installation of “New Hardware” or a “Device Driver” is displayed. In this case, perform the “Scanner Recognition” according to the user manual.

Note: To execute the service mode with the user's computer, start up “GoteTool.exe” on the setup disk supplied with the DR-5010C. Do not copy this program to the user's computer. Do not let the user know the folder name and password to be used.

4. All Adjustment

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

This mode consists of three individual adjustment items: “LED Adjustment,” “Regist Adjustment” and “Document Sensor Adjustment.”

- Operating Procedure

1) Clean the document board sensor window, the shading plate and the reading glass. Do not bend the shading plate.
2) Set a piece of regular white copy paper (A4/LTR). Set the document guide position to the paper. This paper is used to perform “All Adjustment.”
3) Select [All Adjustment] on the service screen.

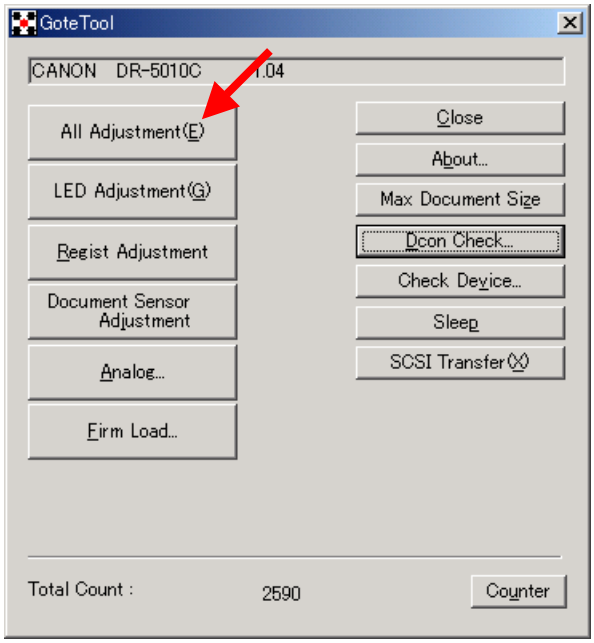

Figure 5-204

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4) The adjustment starts automatically. The progress screen appears on the display. "LED Adjustment," "Regist Adjustment," "Document Sensor Adjustment" are performed in this order.
An example of display is shown below.

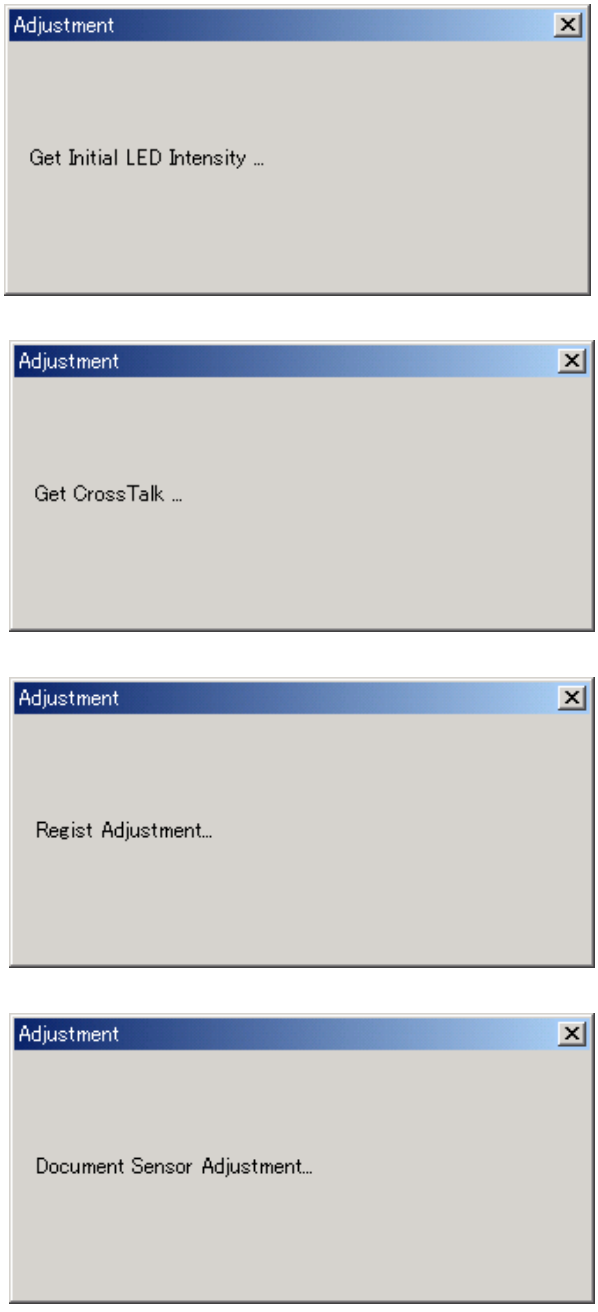

Figure 5-205

5) When the adjustment is finished, the progress screen disappears and the service screen appears.
It takes approx. 1 minute to finish.

- Errors

If an anomaly occurs in the adjustment value while executing this mode, an error screen is displayed, and adjustment is interrupted. If an error screen is displayed, select [OK] in the screen to stop adjustment. Then after checking the operating procedure, perform adjustment again. If adjustment is interrupted, the adjustment value remains the value prior to adjustment.
Sample error screens are shown below.

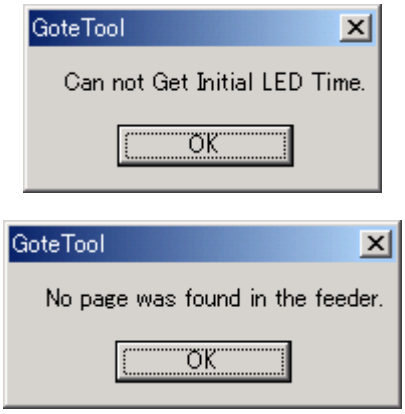

Figure 5-206

5. Individual Adjustments

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

- [LED Adjustment]
- [Regist Adjustment]
- [Document Sensor Adjustment]

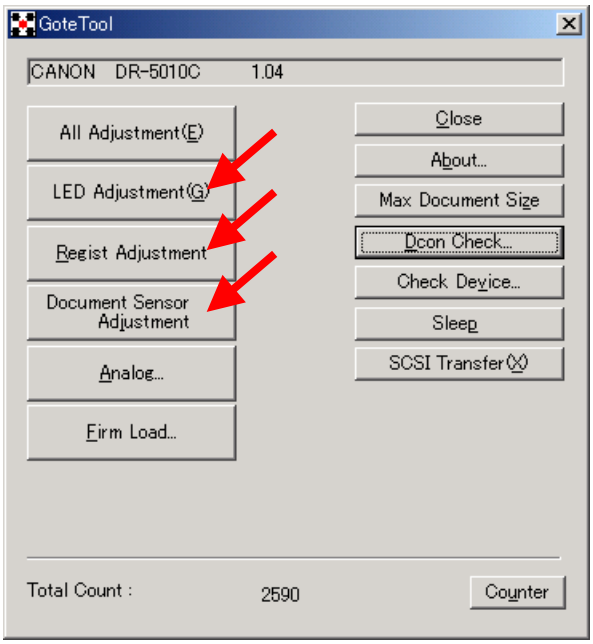

Figure 5-207

a. LED Adjustment

In this mode, 3-color LED intensity adjustment and 3-line sensor data output correction of the CIS unit are performed. Execute this mode after the CIS unit has been replaced.

- Operating Procedure

1) Clean the shading plate and the reading glass. Do not bend the shading plate.
2) Select [LED Adjustment] on the service screen.
3) The adjustment starts automatically. The progress screen appears on the display.
4) When the adjustment is finished, the progress screen disappears and the service screen appears.

b. Regist Adjustment

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

- Operating Procedure

1) Set a piece of regular white copy paper (A4/LTR). Set the document guide position to the paper.
2) Select [Regist Adjustment] on the service screen.
3) The adjustment starts automatically. The progress screen appears on the display.
4) When the adjustment is finished, the progress screen disappears and the service screen appears.

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c. Document Sensor Adjustment

The detection level of the document board sensor is adjusted in this mode. Execute this mode if there is a problem with document detection when a document is set.

Since this sensor is affected by stain on the sensor window and the external light, the sensor window should be cleaned and external light should be adjusted to the using state when executing this mode.

- Operating Procedure

1) Clean the document board sensor window.
2) Select [Document Sensor Adjustment] on the service screen.
3) The adjustment starts automatically. The progress screen appears on the display.
4) When the adjustment is finished, the progress screen disappears and the service screen appears.

6. Dcon Check

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

- Operation screen

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

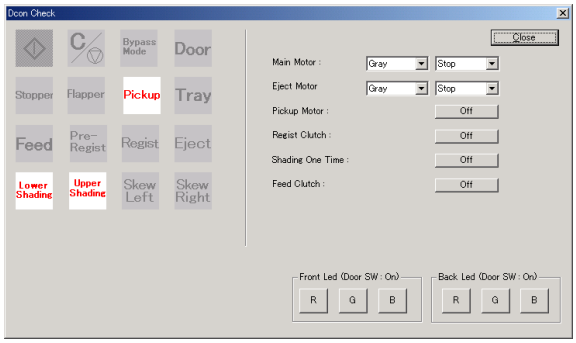

Figure 5-208

a. Operation button, lever

When the operation button and the lever is pressed, the corresponding mark lights.

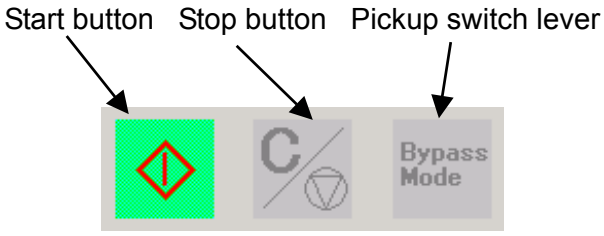

Figure 5-209

The pickup switch lever confirms the separation lever sensor. When the lever is pressed, it lights and the non-separation pickup mode (Bypass Mode) is set.

b. Sensors

When sensors and the open detect switch enter the detection state, the corresponding mark lights. The case where the pickup sensor and the shading sensors (upper and lower) enter the detection state is shown below.

Figure 5-210

The contents of marks are shown below.

Mark	Sensor name	Lighting state
Door	Open detect switch	The upper unit is open.
Stopper	Stopper sensor	The stopper is lowered.
Flapper	Flapper sensor	The flapper is in straight path mode.
Pickup	Pickup sensor	The pickup roller is raised.
Tray	Document board sensor	A document is set.
Feed	Manual feed sensor	The manual feed sensor detects a document.
Pre-Regist	Pre-registration sensor	The pre-registration sensor detects a document.
Resist	Registration sensor	The registration sensor detects a document.
Eject	Eject sensor	The eject sensor detects a document.
Lower Shading	Shading sensor (lower)	The shading plate (lower) enters the inside.
Upper Shading	Shading sensor (upper)	The shading plate (upper) enters the inside.
Skew Left	Skew sensor (left)	The skew sensor (left) detects a document.
Skew Right	Skew sensor (right)	The skew sensor (right) detects a document.

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c. Motor 1

This section describes the operation check of the main motor and the eject motor.

When a reading mode and a resolution are selected from the pulldown box corresponding to each motor, the motor turns at the speed that meets the condition.

The operation screen is shown below.

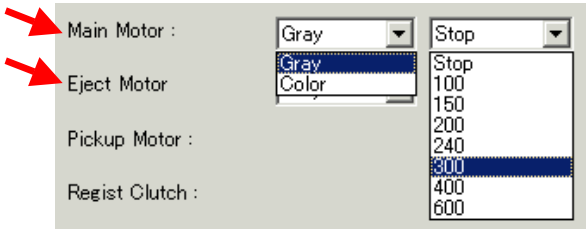

Figure 5-211

d. Motor 2, clutch

This section describes the operation check of other motor and clutch.

- Pickup Motor
- Regist Clutch (Registration cluch)
- Shading One time (Shading motor)
- Feed Clutch

When a reading mode and a resolution are selected from the pulldown box corresponding to each motor, the motor runs at the speed that meets the conditions.

The operation screen is shown below.

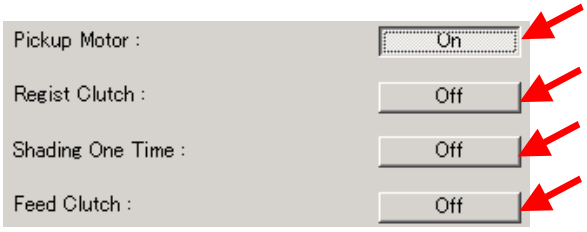

Figure 5-212

[Shading One time] can check the operation of both the upper and lower shading plates at the same time. The operation check of the shading plates can be performed by using the operation buttons for the user.

e. CIS unit LED

When the corresponding LED button is selected, the LED lights.

However, when the upper unit is opened to check lighting, the open detect switch turns OFF. Since the correct lighting operation is not performed in that state.

Therefore, after opening the upper unit, keep pressing the open detect switch with a sheet of thick paper, etc and then perform the operation.

- Operating Procedure

1) Fully open the upper unit.
2) Press and hold the open detect switch with a sheet of folded thick paper or the flat end of a bar. (When the open detect switch is ON, the pickup roller is raised.)

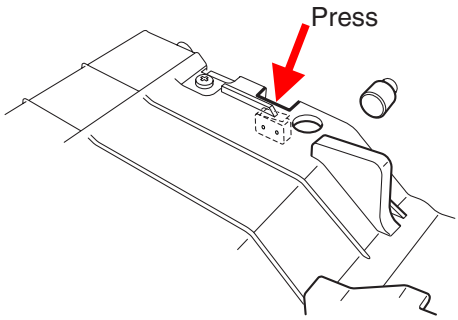

Figure 5-213

3) Select the corresponding LED button.

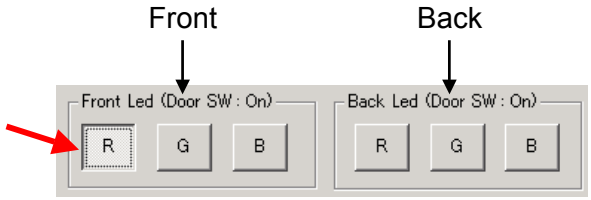

Figure 5-214

Note: If the open detect switch turns OFF when the LED lights, the machine may malfunction.

7. Analog

This mode is used to check analog data for sensors. However, the operation check of normal sensors is performed in the previous section “Dcon Check,” so this section describes the ultrasonic sensor and A4 width sensor.

a. Ultrasonic sensor

When [Analog] is selected on the service screen, [USS screen] is displayed.

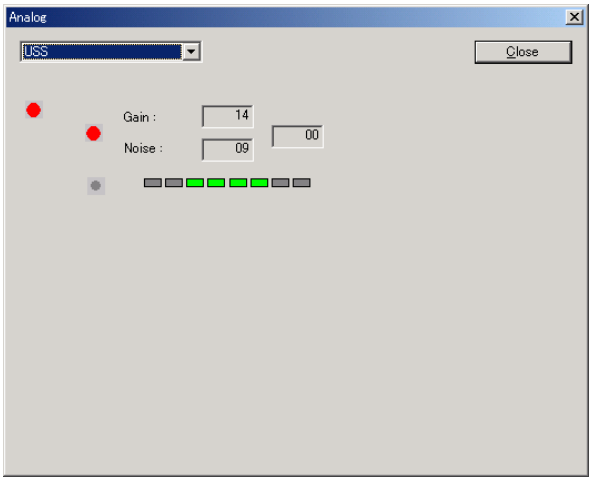

Figure 5-215

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When a sheet of paper is set on the ultrasonic sensor section, the “double feed judgment indicator” and “amplitude judgment indicator” light in red. The “phase judgment indicator” may light under some conditions. The screen displayed when a double feed is detected is shown below.

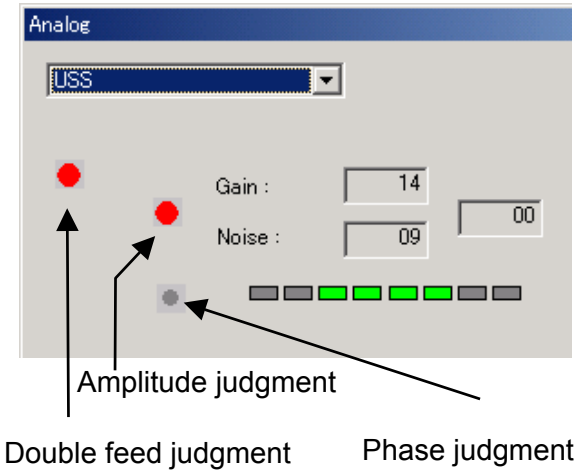

Figure 5-216

b. A4 width sensor

When [Feeder1] is selected on the [USS screen] pulldown box, [Feeder1 screen] is displayed.

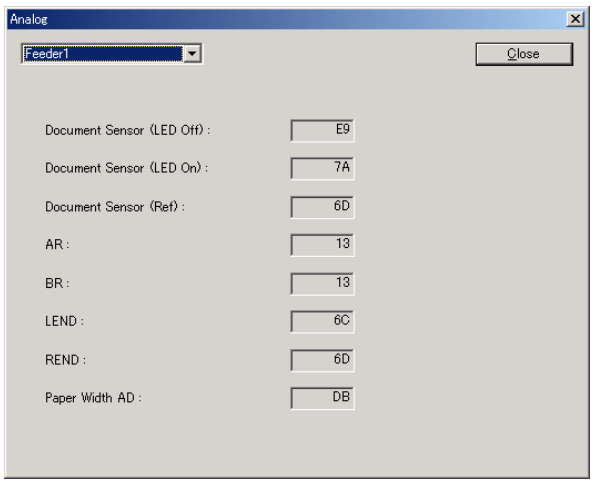

Figure 5-217

[Paper Width AD] at the bottom of the screen indicates the A4 width sensor. If the document guide is maximized, a large number, such as “DB,” is displayed. When the document guide is narrowed, the value decreases slightly before it becomes the A4 width, and when it reaches the A4 width position, the value becomes nearly zero, such as “0A,” and then the value does not change.

Figure 5-218

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8. Max Document Size

This mode is used to set the long document mode. However, the long document mode is not standard specification, so it is used for special users only. Do not use it for general users.

When the long document mode is set, the document length is 1000 mm at the maximum, but there are restrictions shown below:

- Document size: “Automatic detection” only
- Document thickness: 0.2 mm or less
- Image size: 128 MB or less
- Feed: Feed a sheet of paper. Performance of paper pickup/eject is not guaranteed.

When [Max Document Size] is selected on the service screen, the setting screen is displayed. To set the long document mode, change the setting to [1000.0(mm)] and press the [OK] button.

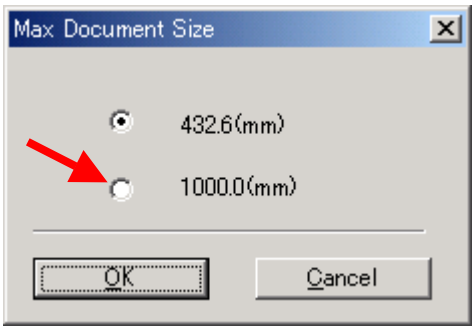

Figure 5-219

9. Sleep

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

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

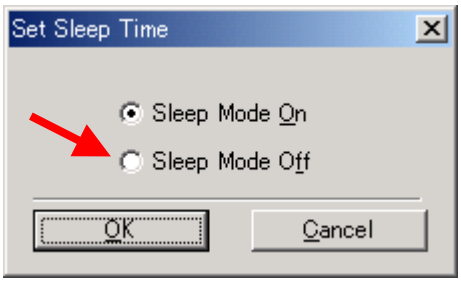

Figure 5-220

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10. SCSI Transfer

This mode is used to change the maximum value of the synchronizing transfer speed of the SCSI interface.

However, there is normally no problem with the factory setting (20 MB/sec), so change the setting only if the machine does not function properly.

When [SCSI Transfer] is selected on the service screen, the setting screen is displayed. Change the setting as required and press the [OK] button.

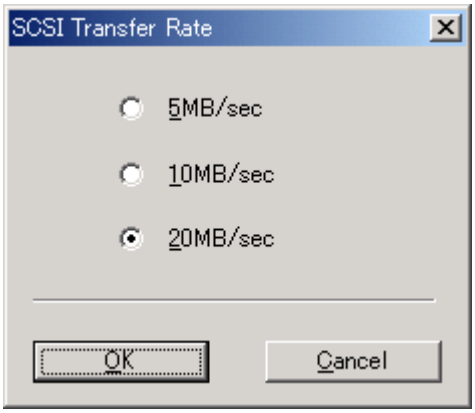

Figure 5-221

11. Check Device

This mode is used to check the versions of the internal devices of the DR-5010C and options (imprinter).

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

[MAIN] indicates the firmware of the control PCB and [DFD SUB] indicates the version number of the firmware of ultrasonic sensor PCB.

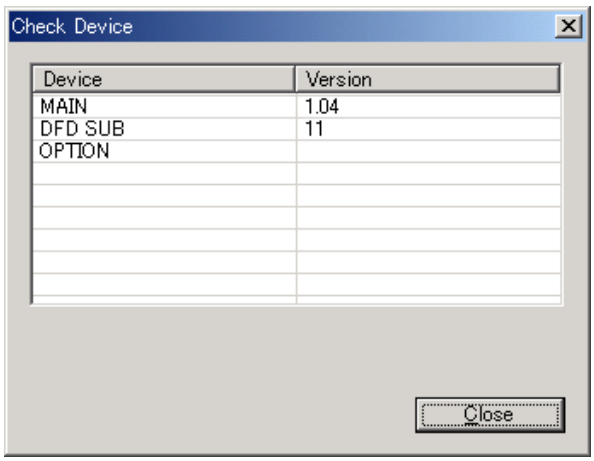

Figure 5-222

12. About

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

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

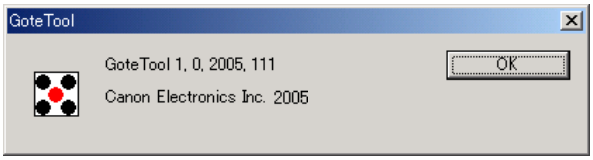

Figure 5-223

13. Counter

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

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

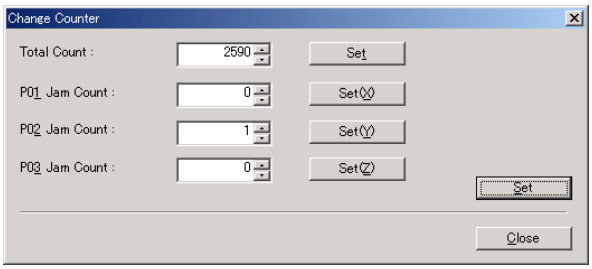

Figure 5-224

The contents of display are as follows:

- Total Count

  Indicates total count.
- P01_Jam Count

  Indicates the number of early reach jams.
- P02_Jam Count

  Indicates the number of residual jams.
- P03_Jam Count

  Indicates the number of fast feed jams.

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

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

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

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14. Firm Load

This mode is used to change the firmware of the DR-5010C. For details, refer to the service information issued during firmware changes. Be careful not to execute this mode by mistake.

- Operation procedure outline

1) Select [Firm Load] in the service screen.
2) The screen for selecting the file in which the firmware is saved is displayed.
3) Select and open the file.
4) The firmware is loaded to the DR-5010C.

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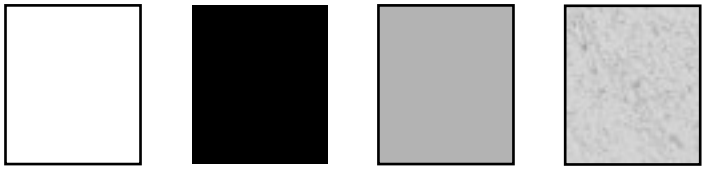
III. IMAGE TROUBLESHOOTING

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

1	No image is output (completely white, completely black, completely grey, mottled)



Cause/Faulty location	Step	Check Item	Result	Action
"Brightness" setting	1	Is the "Brightness" setting appropriate?	NO	Change the setting. Also change "Contrast" if necessary.
Reading glass	2	Is the reading glass clean?	NO	Clean it. If necessary, clean the roller too.
Shading plate	3	Is the shading plate clean?	NO	Clean it.
	4	Does the shading plate jump up to the platen roller?	NO	Check the reassembly of the shading plate and the operation of the shading motor.
LED adjustment	5	Is the problem solved when performing "LED Adjustment" in the service mode?	YES	End.
Connection of reading unit	6	Are the reading related cables connected properly?	NO	Check all connections.
CIS unit	7	Is the problem solved when the CIS unit is replaced?	YES	End.
Reading PCB	8	Is the problem solved when the reading PCB is replaced?	YES	End.
Control PCB	9	Is the problem solved when the control PCB is replaced?	YES	End.

Table 5-301

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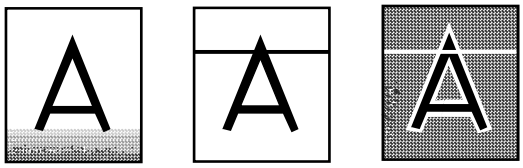
2	Uneven density, streaks (main-scanning direction)



Cause/Faulty location	Step	Check Item	Result	Action
Roller	1	Are the pickup roller, feed roller and retard roller properly installed?	NO	Install them properly.
	2	Are they dirty or deformed?	NO	Clean or replace them.
Gear/belt	3	Does it turn smoothly?	NO	Adjust or replace parts.
Main motor (M1)	4	Is the problem solved when the main motor is replaced?	YES	End.
CIS unit	5	Is the problem solved when the CIS unit is replaced?	YES	End.
Reading PCB	6	Is the problem solved when the reading PCB is replaced?	YES	End.
Control PCB	7	Is the problem solved when the control PCB is replaced?	YES	End.

Table 5-302

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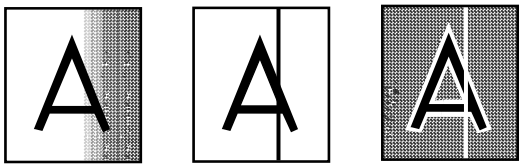
3	Uneven density, streaks (sub-scanning direction)



Cause/Faulty location	Step	Check Item	Result	Action
Reading glass	1	Is the reading glass clean?	NO	Clean it. If necessary, clean the roller too.
Shading plate	2	Is the shading plate clean?	NO	Clean it.
	3	Does the shading plate jump up to the platen roller?	NO	Check the reassembly of the shading plate and the operation of the shading motor.
CIS unit	4	Is the problem solved when the CIS unit is replaced?	YES	End.
Reading PCB	5	Is the problem solved when the reading PCB is replaced?	YES	End.
Control PCB	6	Is the problem solved when the control PCB is replaced?	YES	End.

Table 5-303

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IV. OPERATION TROUBLESHOOTING

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

1	No power

Note: The machine power indicator does not light.

Cause/Faulty location	Step	Check Item	Result	Action
Connection of power cord	1	Is the power cord connected?	NO	Connect it properly.
AC power supply voltage	2	Is the specified voltage being supplied at the outlet?	NO	Explain to the user that the trouble is not with the machine.
Power switch	3	Is the power switch turned ON?	NO	Turn the power switch ON.
Operation PCB	4	Disassemble the left cover. Are the cables connected to the operation PCB?	NO	Connect it properly.
Bottom box (connection)	5	Disassemble the bottom box. Are the power related cables connected?	NO	Connect it properly.
Bottom box (PCB)	6	Connect the power code and turn the power switch ON. Does the LED of the control PCB light or flash properly?	YES	The power is supplied properly. Find out the other causes such as sensors, motors, etc.
	7	Is the problem solved when the power PCB or control PCB is replaced?	YES	End.

Table 5-401

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2 Computer does not recognize the machine

Cause/Faulty location	Step	Check Item	Result	Action
Power supply	1	Is the power supplied to the machine?	NO	Perform the actions in section 1: “No power.”
Connection of SCSI/USB interface cable	2	Is the SCSI/USB interface cable properly connected?	NO	Connect it properly.
Power-on Sequence	3	Was the power to the machine turned on before the computer was turned on?	NO	Follow the proper power-on sequence.
SCSI ID settings	4	Is the SCSI ID set properly?	NO	Set them properly.
Computer, I/F card	5	Are the computer and I/F card set properly.?	NO	Use them properly.

Table 5-402

3 Motors do not operate

Cause/Faulty location	Step	Check Item	Result	Action
Power supply	1	Is the power supplied to the machine?	NO	Perform the actions in section 1: “No power.”
Connectors	2	Are the connectors for the faulty motor or sensor connected properly?	NO	Connect them properly.
Transmission system load	3	Is the transmission system driven by the motor normal? Are such parts as gears and belts normal?	NO	Remove the abnormal load. Replace needed parts.
Sensor	4	Is the operation normal when checking the sensor detection display in the service mode?	NO	Replace the sensor.
	5	Is the problem solved when performing “Document Sensor Adjustment” in the service mode?	YES	End.
Motor/clutch	6	Is the operation normal when checking the operation in the service mode?	NO	Replace the motor/clutch.
Control PCB	7	Is the problem solved when the control PCB is replaced?	YES	End.

Table 5-403

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

Cause/Faulty location	Step	Check Item	Result	Action
Document	1	Is the document within the specifications (thickness, dimensions, fold, curl, etc.)?	NO	Ask the user to use documents within the specifications.
Roller	2	Are the pickup roller, feed roller and retard roller properly installed?	NO	Install them properly.
	3	Are they dirty or deformed?	NO	Clean or replace them.
Double feed detection	4	Is the ultrasonic related sensor installation correct in case of double feed?	NO	Install them properly.
Parts in feed path	5	Are all parts that the documents contact properly installed (not loose or tilted)?	NO	Install them properly.
	6	Is the surface in contact with the document smooth (not scratched, no burrs)?	NO	Replace faulty parts.
Drive transmission system	7	Is any abnormal noise emitted when feeding documents? Are any gears broken or is the belt loose?	YES	Replace faulty parts. Tighten the belt properly.

Table 5-404

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V. AFTER REPLACING PARTS

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

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

1. Control PCB

1) When the SCSI is used, the SCSI ID must be set.
2) Perform “All Adjustment,” “Counter” in the service mode.
3) Perform the following service mode settings if required.
   - “Max Document Size”
   - “Sleep”
   - “SCSI Transfer”

2. CIS Unit

Perform “LED Adjustment” in the service mode.

3. Registration Adjustment

Perform “Regist Adjustment” in the service mode when failures occur on the head or end of scanned images after replacing or reassembling parts related to registration such as a registration sensor, sensor lever.

4. Document Board Sensor, Document Board Window, etc.

Perform “Document Sensor Adjustment” in the service mode when the document detection failures occur after replacing or reassembling parts related to the document board sensor.

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APPENDIX

I. GENERAL DIAGRAM A-1

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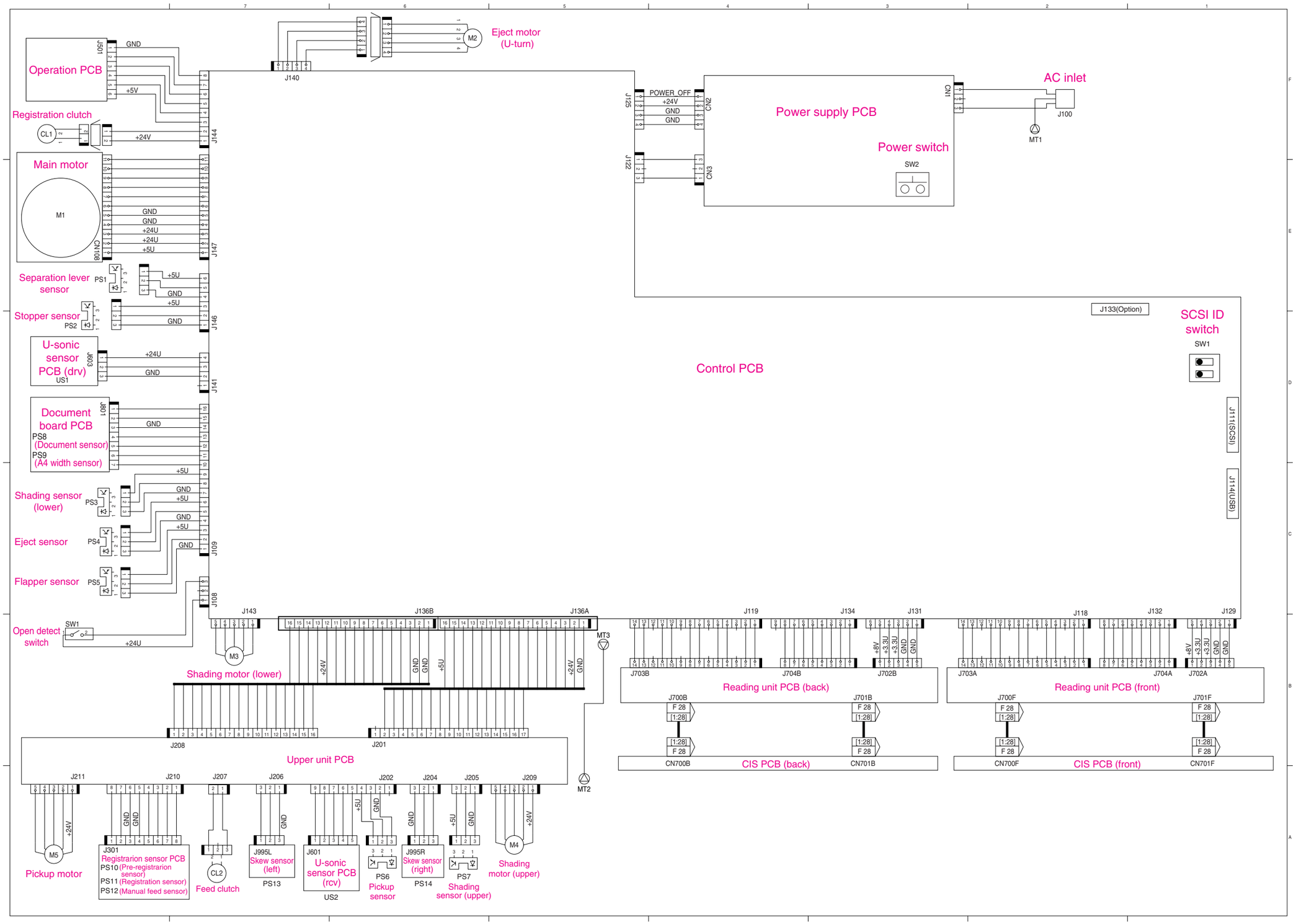
I. GENERAL DIAGRAM



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Canon

0305TG

DR-5010C

PARTS CATALOG

FIRST EDTION

DR-5010C	100V	50/60Hz	M11-0511
	120V	60Hz	M11-0513
	220-240V	50/60Hz	M11-0514
	220-240V KR	50/60Hz	M11-0516
	220-240V CN	50/60Hz	M11-0519

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MAR. 2005 **MY8-31A3-000**

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序

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製品に大きな変更がある場合は, 改訂版のパーツ･カタログを発行しますが, その他の場合は随時新しい情報をお届けします。
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キヤノン電子株式会社
品質保証部　品質推進課

PREFACE

This Parts Catalog contains listings of parts used in the DR-5010C.
Diagrams are provided with the listings to aid the service technician in identifying clearly, the item to be ordered.

Whenever ordering parts, consult this Parts Catalog for all of the information pertaining to each item. Be sure to include in the Parts Request, the full item description, the item part number and the quantity.

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本マニュアルについては, 機密保持等その取扱には十分注意して下さい。
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Use of this manual should be strictly supervised to avoid disclosure of confidential information.

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パーツカタログの見方

主要部品配置図について

部品図番号 (Figure No.) および各アセンブリの位置を捜すとき, 主要部品配置図を用います。

図中 [ ] 内は部品図名称, ( ) 内は部品図番号を示しています。

また,「イラスト索引」からも検索できます。

部品番号の捜し方

どのアセンブリに使用されている部品かを, 主要部品配置図またはイラスト索引で調べその部品図番号 (Figure No.) のページをめくります。

部品図の中からその部品をみつけ, そのキーNo.を部品番号リストの中から捜し出せば, 部品番号・部品名称を知ることができます。

注: 電源電圧・周波数等の仕様が異なる場合は, 同一のキーNo.に複数の部品番号が記されているので“REMARKS”欄を注意して見るようにしてください。

部品番号リストについて

部品番号リストの内容項目は次のとおりです。

(1) 部品図番号およびキーNo. (FIGURE & KEY No.)

部品図番号は, 各部品番号リスト欄の左上に示してあり, 各部品図に対応しています。

また, キーNo. は, 部品図中に示してある個々の部品に対応します。

(2) 部品番号 (PART NUMBER)

リストの2番目の欄には, 部品番号が示してあります。

部品を発注する際は, 必ずこの番号を明示してください。NPNと記載されている部品はサービスパーツに設定されていません。

注: 部品番号の末尾3桁を訂番といいます。部品改良等の目的で部品の一部が変更になった場合, 訂番が変わることがあります。これらの変更については, 技術情報 (Service Information) で随時連絡されますので, 常にこれらの情報も注意深く読むよう心がけてください。

(3) ラ ン ク (RANK)

Nと記載されている部品はサービスパーツに設定されていますが, 在庫はされていません。注文を受けてからの受注生産になります。

(4) 使用個数 (Q'TY)

4番目の使用個数欄に示してある数字は, 各部品図中における各部品の使用数量を示しています。

使用個数欄には数字の他に以下のアルファベット文字も表示されています。

AR 数量を限定せず, 組立時に必要に応じた数量を使用するもの, および個数の明記できないもの

(5) 部品名称 (DESCRIPTION)

個々の部品の名称が英文と和文で記されています。

部品発注の際, 部品名称も必ず明示してください。

電気部品等の主な仕様・型番は, 英文の末尾に記しているものもあります。

(6) 備考 (REMARKS)

電源電圧・周波数等の仕様の違いがある場合に, 表示しています。

これらの表示のないものについてはすべての機械に適用できます。

部品索引表 (NUMERICAL INDEX)

部品番号の索引が巻末にあります。

部品番号がわかっていて, 使用場所を調べる場合に活用できます。

索引表の左の欄が部品番号 (PART No.), 中央の欄が部品図番号 (FIGURE No.) とキーNo. (KEY No.), 右の欄が使用個数 (Q'TY) を示しています。

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HOW TO USE PARTS CATALOG

Assembly Location Diagrams

These diagrams show Figure Number and the locations of major assemblies of the machine. Figure names are identified in rectangular boxes [ ] , and Figure numbers are identified in elliptic boxes ( ) . Also, it is possible to be found out by "Illustration Index".

Finding a Parts Number

Refer to the Assembly Location Diagrams or Illustration Index, and find out the Figure Number. Turn to the page (s), and find its Key Number. Refer to the Parts List, and find the Key Number, Part Number and Description.

Note : While looking for a Part Number, pay particular attention to the voltage listed in the "REMARKS" column to ensure that the Part Number selected is for your type of machine.

Part List pages

The Parts List pages contain the following columns and information.

(1) Figure and Key Number.

The first column shows the Figure Number of the illustration corresponding to the Parts List, and the Key Number that identifies the part on the illustration.

(2) Part Number.

The second column shows the Part Number for the part. This Number must be used when ordering replacement parts or assemblies. Parts marked "NPN" are not service parts.

Note : The last three digits (suffix) of the Parts Number are called the Revision Number. The Revision Number is changed of the part is modified. Information regarding such changes will be provided by Service Information Bulletins. These Bulletins should be read carefully.

(3) Rank.

Parts marked "N" are service parts, but are not stock items. They are produced on a special-order basis.

(4) Quantity (Q'ty).

The quantity shown in this column is the number of parts used in the figure.

This column indicates the following alphabets as well as numeric characters.

AR This indicates that the quantity of a part is not specified, allowing the use of the number of parts needed for assembly and that the quantity cannot be mentioned clearly.

(5) Description.

The Description column lists the description in Japanese and in English. When ordering the part, such description should be use as well as the part number. Some major specifications and type numbers are described at the end of the description in English.

(6) Remarks.

When there are differences in the specifications of power supply voltage or others, the differences are described in this column.
If there are not such differences, the part is available for all machines.

Numerical Index

There is a Numerical Index at the end of this catalog. It can be used when looking for the location where the part is used, if you know the part number.
The first column shows the Part Number, the second column lists the Figure and Key Number and the third column shows the used quantities.

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FIGURE A ASSEMBLY LOCATION DIAGRAM
主要部品配置図

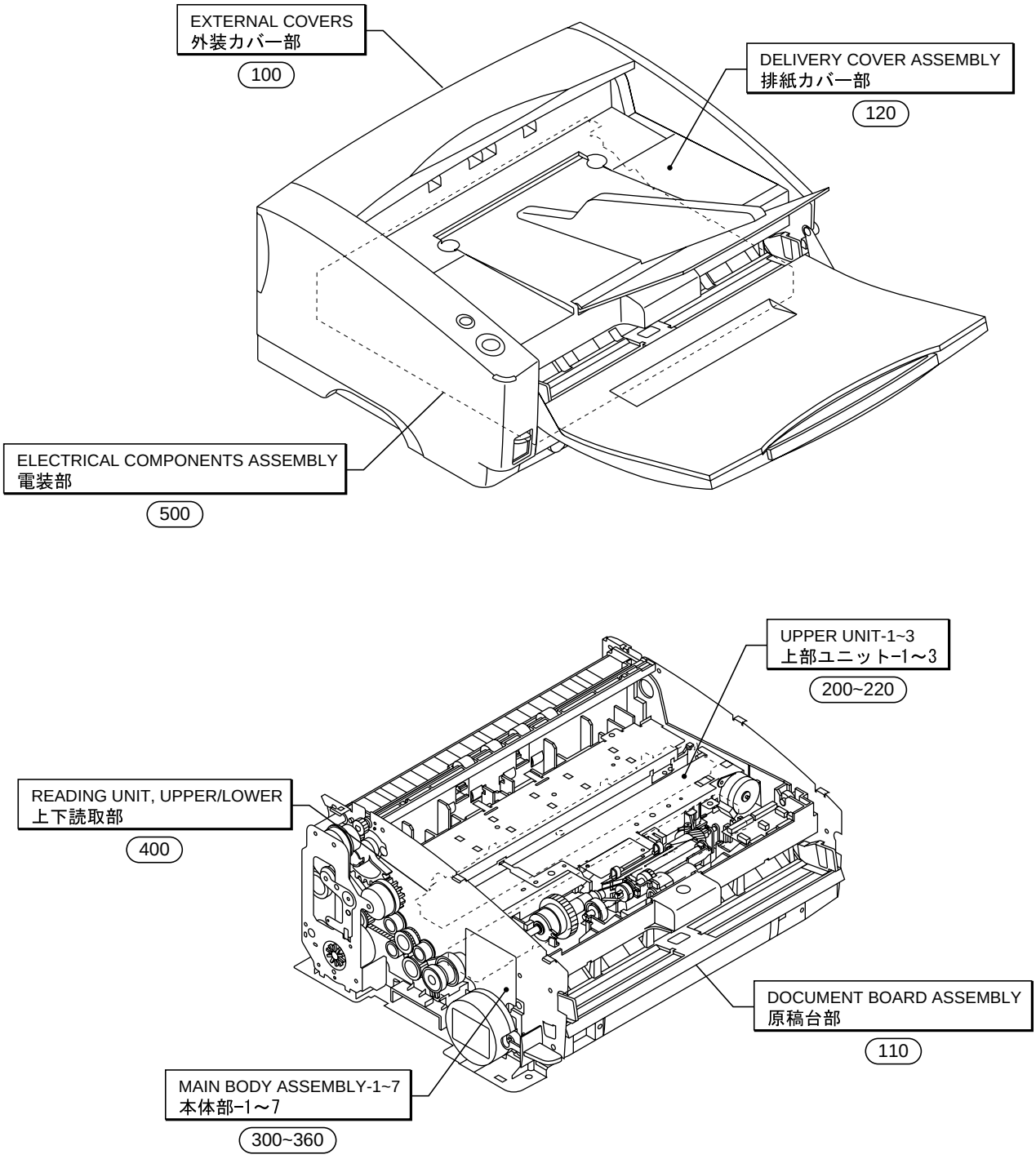

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FIGURE B-1

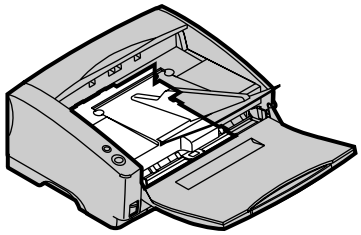
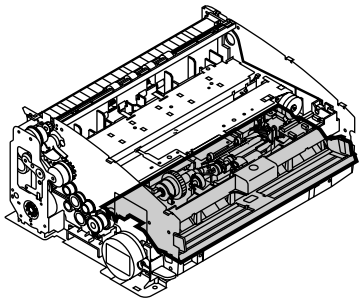
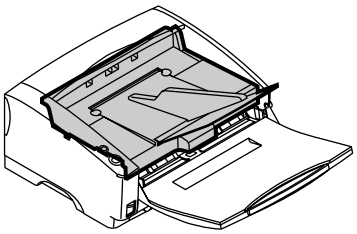
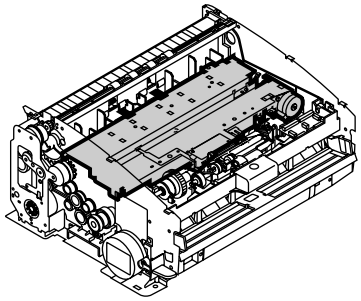
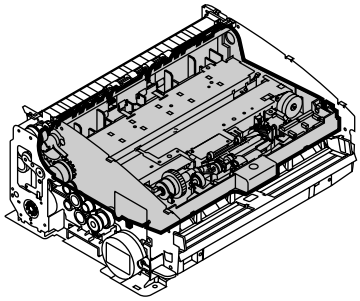
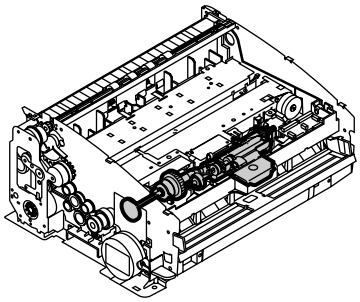
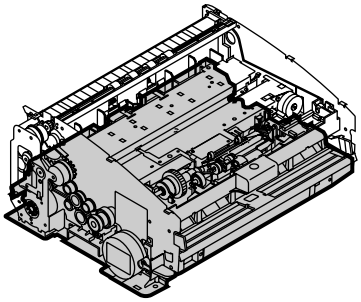
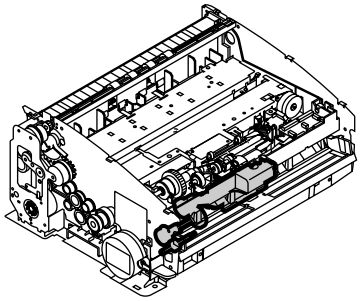
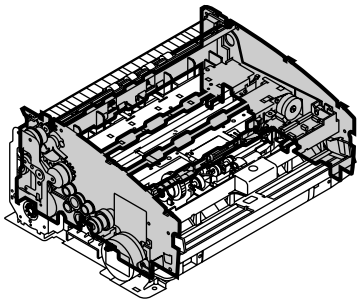
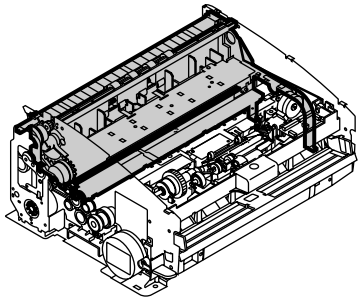
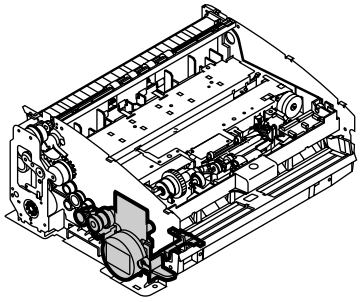
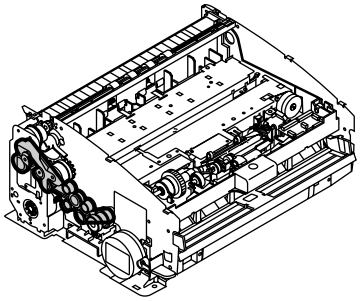
FIGURE 100 	FIGURE 110 	FIGURE 120 
FIGURE 200 	FIGURE 210 	FIGURE 220 
FIGURE 300 	FIGURE 310 	FIGURE 320 
FIGURE 330 	FIGURE 340 	FIGURE 350 

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FIGURE B-2

ILLUSTRATION INDEX-2
イラスト索引－2

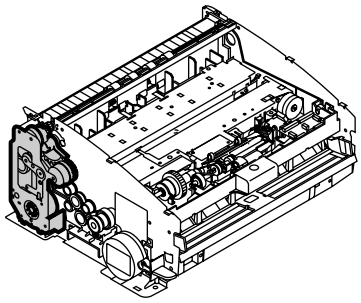
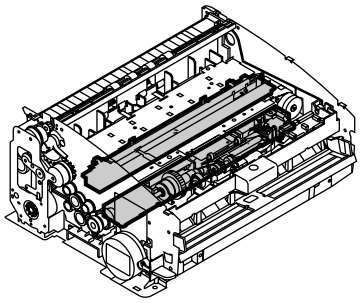
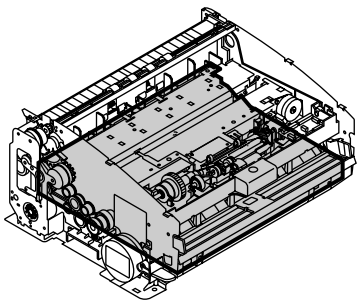
FIGURE 360 	**FIGURE 400** 	**FIGURE 500** 

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FIGURE 100 EXTERNAL COVERS
外装カバー部

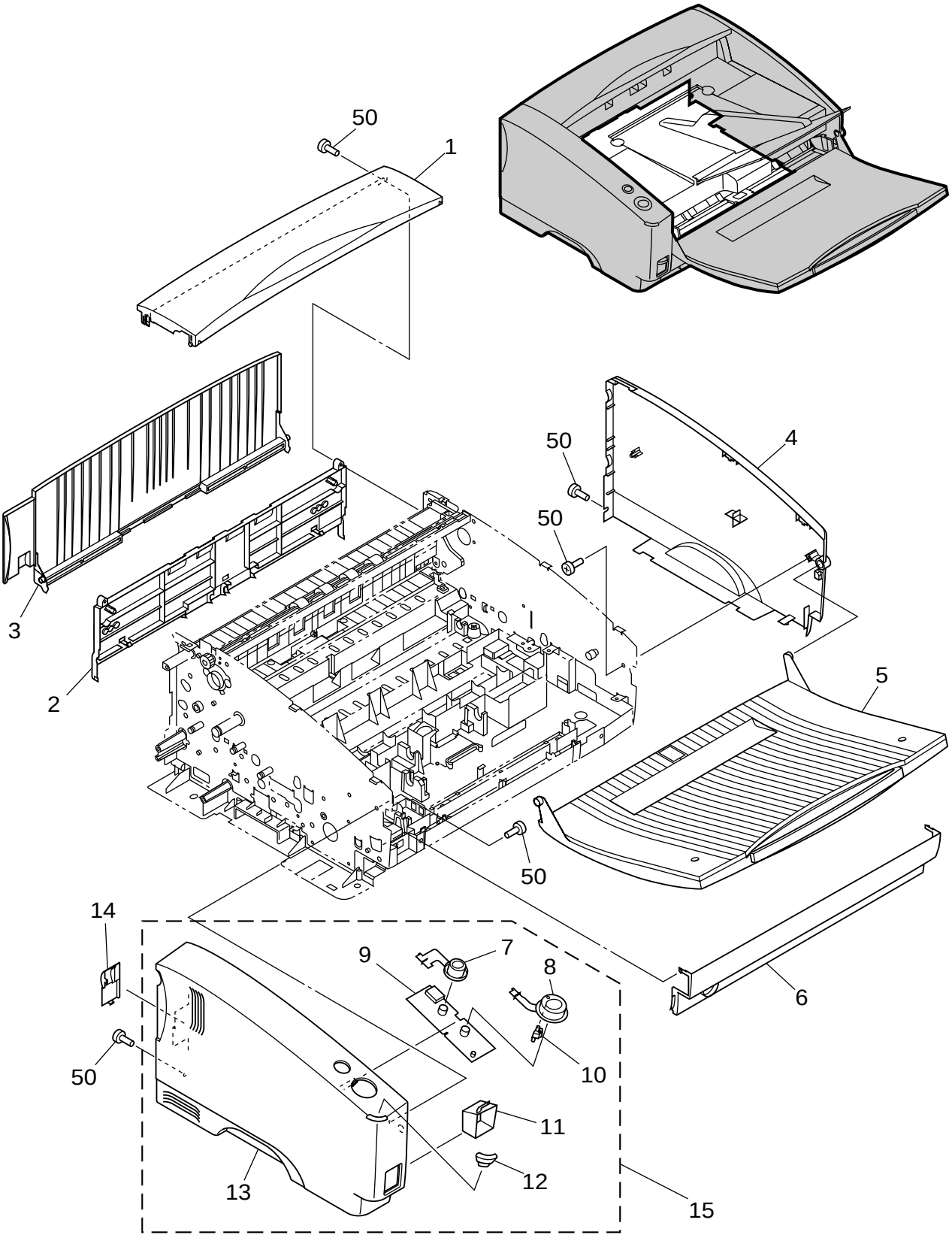

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FIGURE & KEY NO.	PART NUMBER	RANK	Q'TY	DESCRIPTION	REMARKS
100 - 1	MA2-7132-000		1	COVER, TOP ウエ カバー	
2	MA2-7136-000	N	1	COVER, ROLLER, REAR ローラ カバー	
3	MA2-7135-000		1	COVER, EJECT, REAR ハイシ カバー	
4	MA2-7131-000		1	COVER, RIGHT ミギ カバー	
5	MG1-3634-000		1	TRAY, PICKUP キュウシ トレイ ユニット	
6	MA2-7133-000		1	COVER, FRONT LOW マエ シタ カバー	
7	MA2-7130-000	N	1	BUTTON, SWITCH 2 スイッチ ボタン 2	
8	MA2-7129-000	N	1	BUTTON, SWITCH 1 スイッチ ボタン 1	
9	MG1-3662-000		1	PCB ASS'Y, OPERATION ソウサブ カイロ	
10	MA2-7147-000	N	1	GUIDE, LIGHT, KEY-TOP スイッチ レンズ	
11	MA2-7127-000	N	1	COVER, LEVER ヒブンリ レバー カバー	
12	MA2-7128-000	N	1	GUIDE, LIGHT, LED LED レンズ	
13	MA2-7126-000		1	COVER, LEFT ヒダリ カバー	
14	MA2-7134-000	N	1	COVER, GEAR ギア カバー	
15	MG1-3635-000	N	1	LEFT COVER ASSEMBLY ヒダリ カバー クミタテ	
50	XB4-5300-605		6	SCREW, TAPPING P, BH M3x6 Pタイト M3 L6	

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FIGURE 110 DOCUMENT BOARD ASSEMBLY
原稿台部

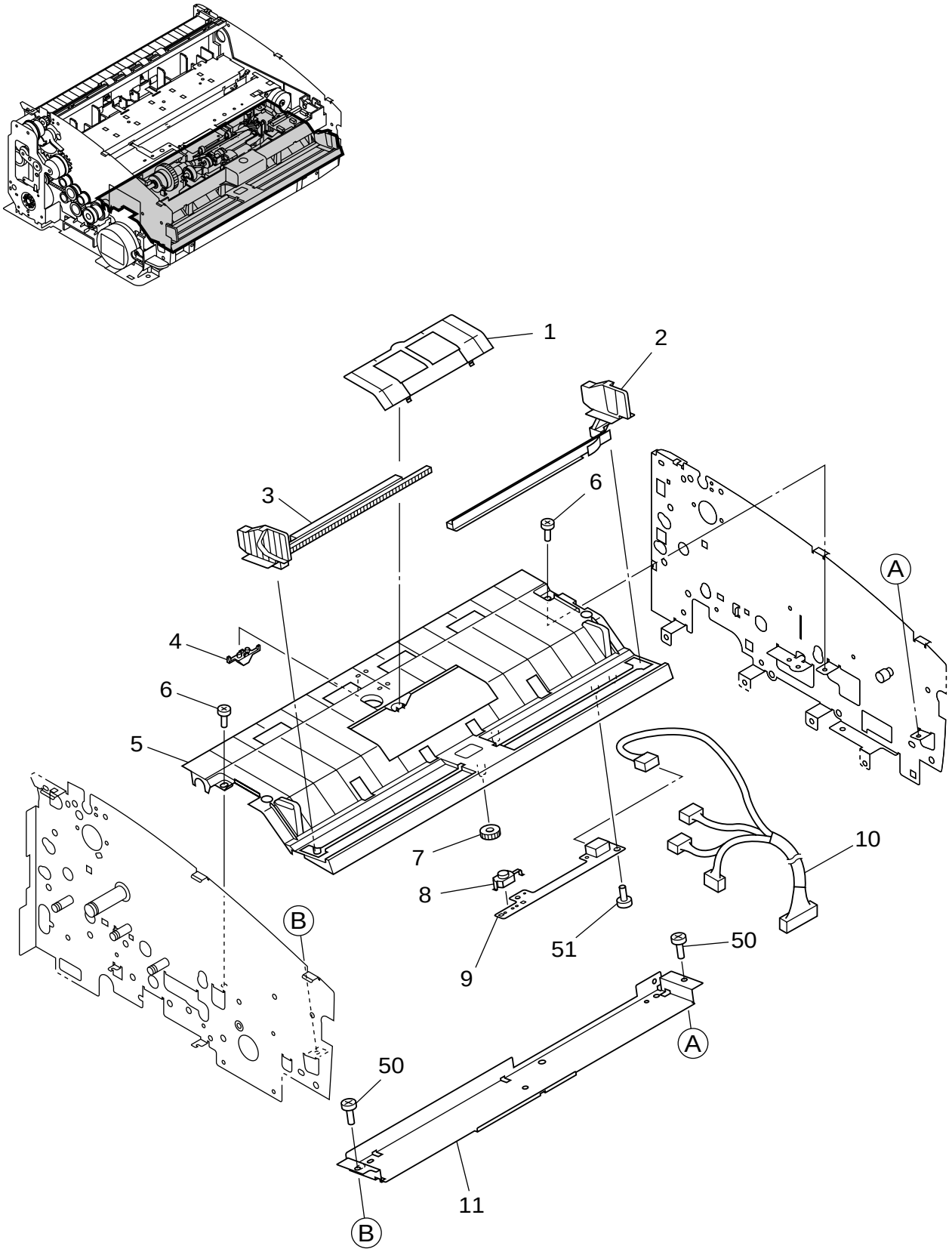

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FIGURE & KEY NO.	PART NUMBER	RANK	Q'TY	DESCRIPTION	REMARKS
110 - 1	MA2-7161-000	N	1	COVER, RETARD ROLLER ブンリ ローラ カバー	
2	MF1-4346-000		1	GUIDE, DOCUMENT, RIGHT ゲンコウ ガイド (ミギ)	
3	MF1-4345-000		1	GUIDE, DOCUMENT, LEFT ゲンコウ ガイド (ヒダリ)	
4	MA2-6802-000	N	2	GUIDE, LIGHT ライト ガイド	
5	MF1-4339-000	N	1	GUIDE, ENTRANCE イリグチ ガイド	
6	FS1-9010-000		2	SCREW, STEPPED M3 M3 ダンビス 2.2	
7	MS2-0081-000		1	GEAR, 14T ラック ギア	
8	MA2-7165-000	N	1	COVER, SENSOR センサー マド	
9	MG1-3663-000		1	PCB ASS'Y, DOCUMENT RACK ゲンコウダイ カイロ	
10	MG1-3676-000		1	CABLE ASS'Y, DOCUMENT RACK ゲンコウダイ タバセン	
11	MA2-7164-000	N	1	PLATE, GUIDE キセイ ガイド バン	
50	XB1-2300-405		2	SCREW, BH M3x4 バインド M3 L4	
51	XB4-5300-605		2	SCREW, TAPPING P, BH M3x6 Pタイト M3 L6	

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FIGURE 120 DELIVERY COVER ASSEMBLY
排紙カバー部

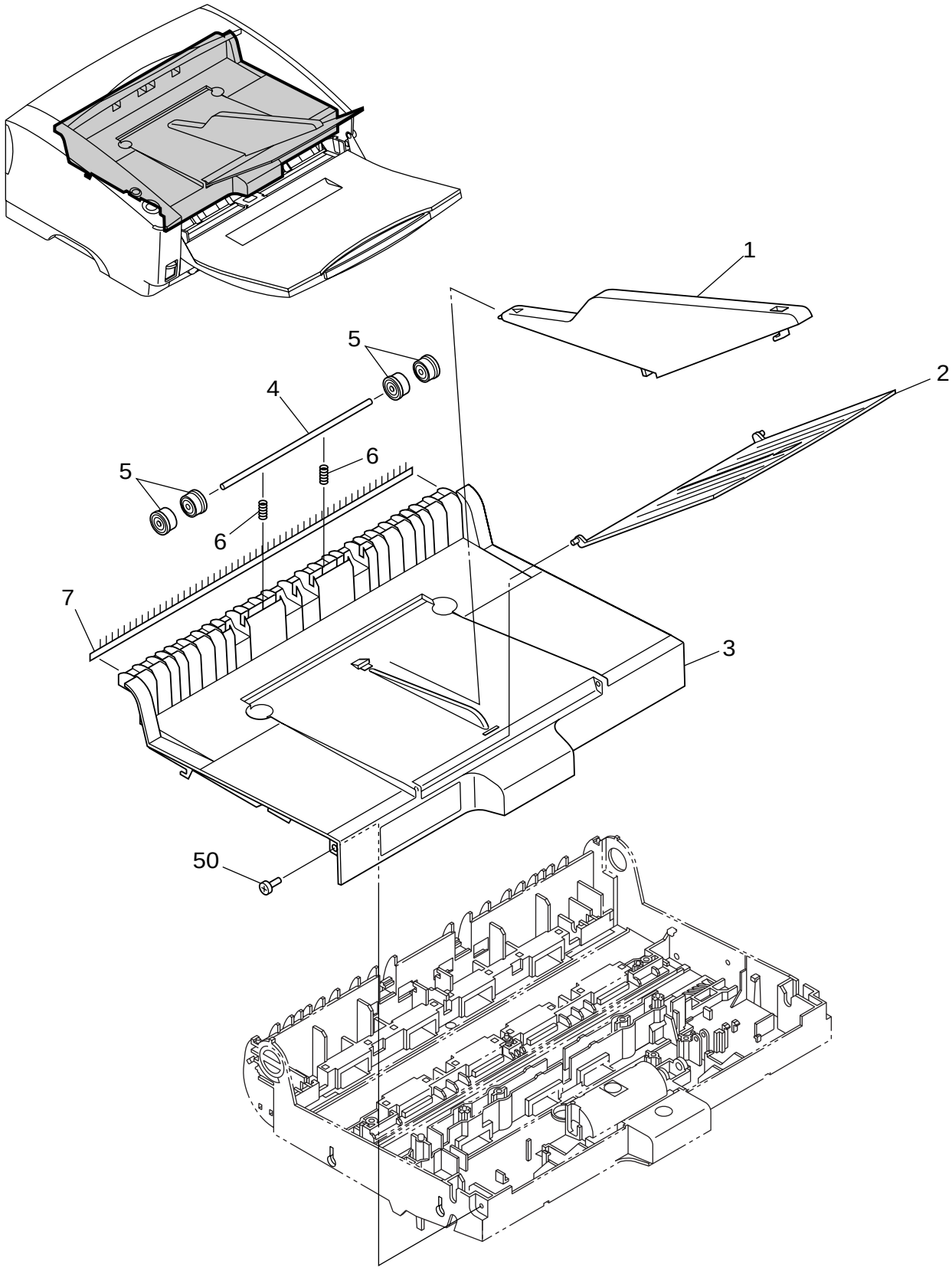

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FIGURE & KEY NO.	PART NUMBER	RANK	Q'TY	DESCRIPTION	REMARKS
120 - 1	MA2-6090-030	N	1	TRAY, DELIVERY, ASSIST 1 ハイシ ホジョ トレイ1	
2	MA2-7106-000		1	GUIDE, EJECT ハイシ エンチョウ ガイド	
3	MF1-4364-000		1	TRAY, EJECT ハイシ トレイ	
4	MA2-7107-000	N	1	SHAFT, EJECT ROLLER ハイシ ジュウドウ ローラ ジク	
5	MF1-4319-000		4	ROLLER, FOLLOWER, EJECT ハイシ ジュウドウ ローラ	
6	MS1-2495-000		2	SPRING, COMPRESSION ハイシ ジュウドウ ローラ バネ U	
7	MA2-7109-000	N	1	BRUSH, STATIC ELIMINATOR ジョデン ブラシ	
50	XB4-5400-809		2	SCREW, TAPPING P, BH M4x8 Pタイト M4 L8	

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FIGURE 200 UPPER UNIT-1
上部ユニット－1

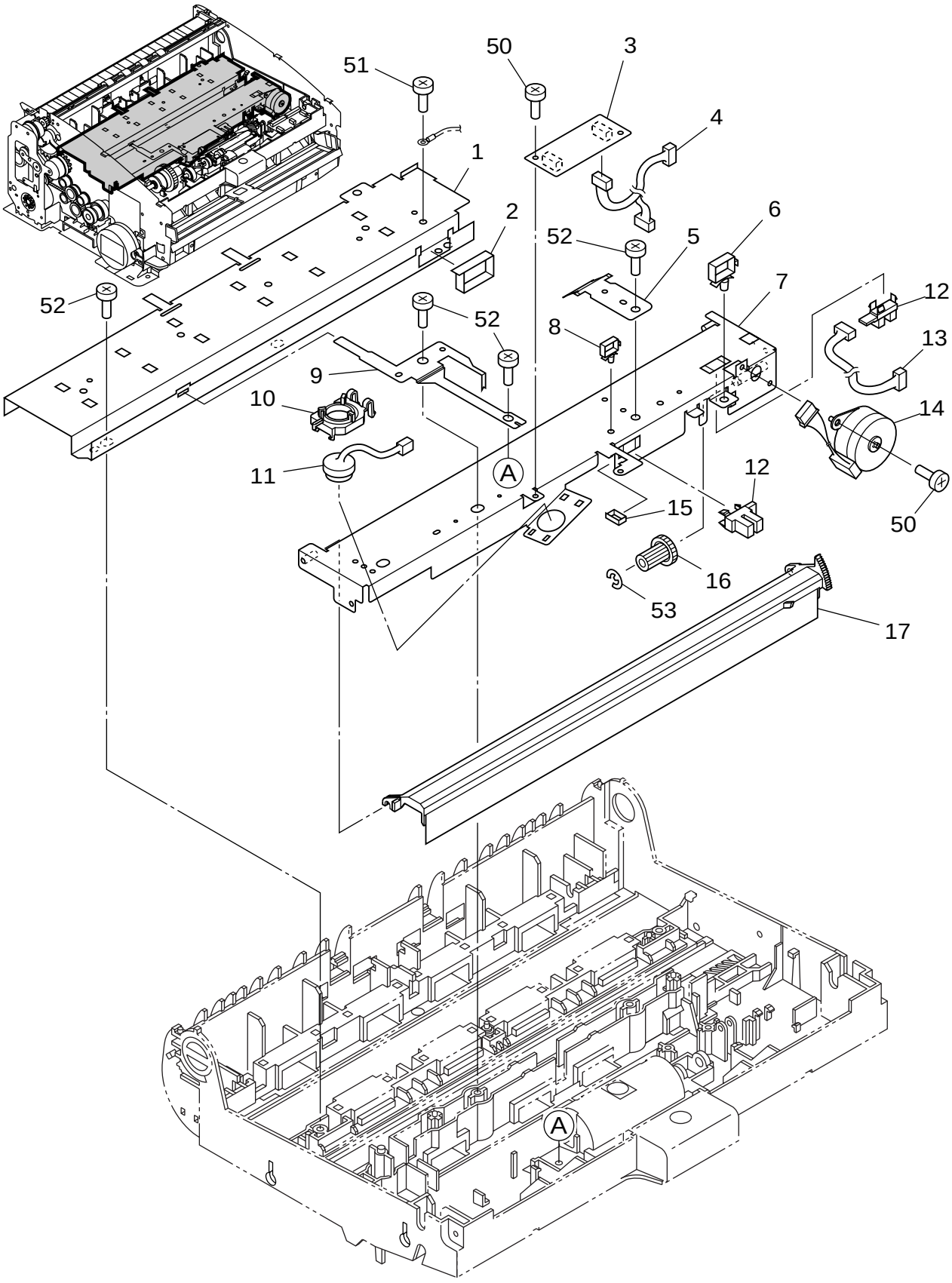

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FIGURE & KEY NO.	PART NUMBER	RANK	Q'TY	DESCRIPTION	REMARKS
200 - 1	MF1-4296-000	N	1	PLATE, SHIELD, CIS UNIT センサ シールド バン	
2	WT2-5674-000		1	CLAMP, CABLE, EDGE ロッキング エッジ サドル	
3	MG1-3496-020		1	PCB ASS'Y, U-SONIC, RECEIVE チョウオンパ レシーブ カイロ	
4	MG1-3670-000		1	CABLE ASS'Y, US-SENSOR, UP チョウオンパ センサ タバセン (ウエ)	
5	MA2-7443-000	N	1	PLATE, GROUNDING アース バン R	
6	WT2-5737-000		1	CLAMP, CABLE ワイヤ サドル	
7	MF1-4304-000	N	1	PLATE, U-SONIC チョウオンパ ステー	
8	WT2-5678-000		2	CLAMP, CABLE ワイヤ サドル	
9	MA2-7104-000	N	1	PLATE, GROUNDING アース バン	
10	MA2-7192-000	N	1	STOPPER, U-SONIC SENSOR チョウオンパ オサエ ダイ	
11	MH7-7039-000		1	OSCILLATOR, PIEZOELECTRIC US センサ	
12	WG8-5713-000		2	PHOTO-INTERRUPTER フォト インタラプタ	
13	MG1-3668-000		1	CABLE ASS'Y, SHADING SENSOR, UP シェーディング センサ ウエ タバセン	
14	MF1-4338-000		1	MOTOR, STEPPING, SHADING UPPER シェーディング モータ ウエ	
15	WT2-5056-000		2	CLAMP, CABLE ワイヤ サドル	
16	MS2-0101-000		1	GEAR, Z30-17 Z30 Z17 ハスバ ギア	
17	MF1-4309-000		1	PLATE, SHADING, UPPER シェーディング バン ウエ	
50	XB1-2300-405		4	SCREW, BH M3x4 バインド M3 L4	
51	XB2-4400-605		1	SCREW, PH M4x6 W/WASHERES W ザガネツキ ナベビス M4 L6	
52	XB4-5400-809		7	SCREW, TAPPING P, BH M4x8 Pタイト M4 L8	
53	XD2-1100-402		1	RING, E 4 キンテイ ワッシャ (034－4)	

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FIGURE 210 UPPER UNIT-2
上部ユニット－2

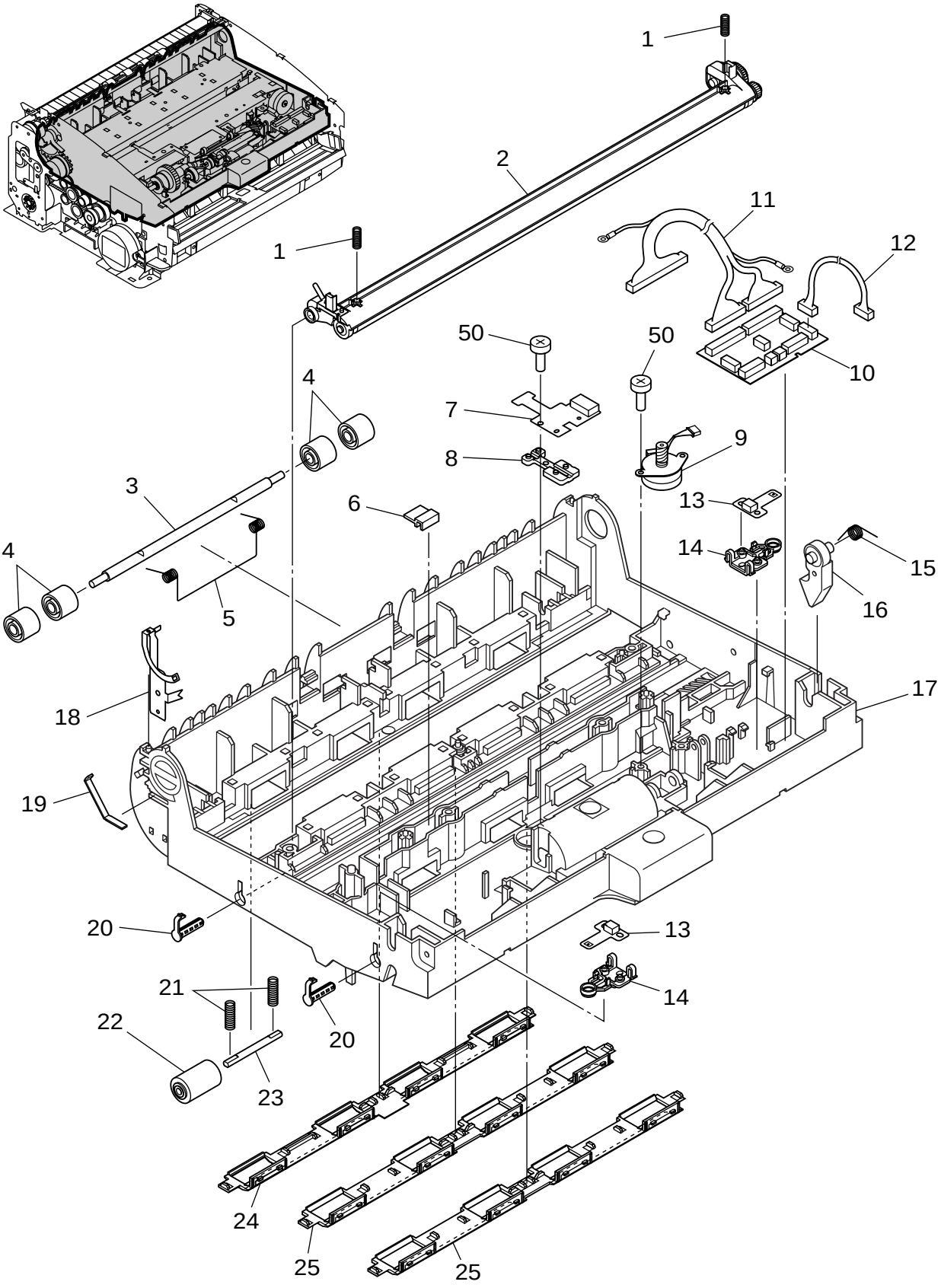

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FIGURE & KEY NO.	PART NUMBER	RANK	Q'TY	DESCRIPTION	REMARKS
210 - 1	MS1-2505-000		2	SPRING, COMPRESSION プラテン カアツ バネ ウエ	
2	MG1-3655-000		1	PLATEN ROLLER UNIT, UPPER プラテン ウエ ユニット	
3	MA2-7101-000	N	1	SHAFT, FOLLOWER ROLLER ジュウドウ ローラ ジク	
4	MA2-7100-000		4	ROLLER, FOLLOWER ジュウドウ ローラ	
5	MA2-7102-000		1	SPRING, TORSION ジュウドウ ローラ バネ	
6	MA2-6761-000		2	STOPPER, CABLE タバセン ドメ	
7	MG1-3667-000		1	PCB ASS'Y, REGISTRATION SENSOR レジスト センサ カイロ	
8	MA2-7182-000	N	1	COVER, SENSOR ゲンコウ ケンチ マド	
9	MF1-4338-000		1	MOTOR, STEPPING, SHADING UPPER シェーディング モータ ウエ	
10	MG1-3664-000		1	PCB ASS'Y, UPPER UNIT ジョウブ ユニット カイロ	
11	MG1-3677-000		1	CABLE ASS'Y, UPPER UNIT ジョウブ ユニット タバセン	
12	MG1-3669-000		1	CABLE ASS'Y, SKEW SENSOR シャコウ センサ (ミギ) タバセン	
13	MG1-3666-000		2	PCB ASS'Y, SKEW SENSOR シャコウ センサ カイロ	
14	MA2-7181-000	N	2	COVER, SENSOR ゲンコウ ケンチ マド	
15	MA2-7098-000		2	SPRING, TORSION ロック ツメ バネ	
16	MA2-7097-000	N	2	STOPPER ロック ツメ	
17	MF1-4360-000	N	1	FRAME, UPPER UNIT ウエ フレーム	
18	MA2-7096-000	N	1	PLATE, GROUNDING アース バン	
19	MA2-7103-000	N	2	PLATE, HOLDING ウエ ユニット ホジ バネ	
20	MA2-7180-000	N	4	SHAFT, SUPPORT, PLATEN プラテン ヨウドウ シジ ジク	
21	MS1-2494-000		24	SPRING, COMPRESSION ジュウドウ ローラ バネ	
22	MA2-7070-000		12	ROLLER, FOLLOWER ジュウドウ ローラ	
23	MA2-7099-000	N	12	SHAFT, ROLLER ジュウドウ ローラ ジク	
24	MF1-4298-000	N	1	GUIDE, FOLLOWER ROLLER 2 ジュウドウ ローラ ガイド 2	
25	MF1-4297-000	N	2	GUIDE, FOLLOWER ROLLER 1 ジュウドウ ローラ ガイド 1	
50	XB4-5300-605		3	SCREW, TAPPING P, BH M3x6 Pタイト M3 L6	

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FIGURE 220 UPPER UNIT-3
上部ユニット－3

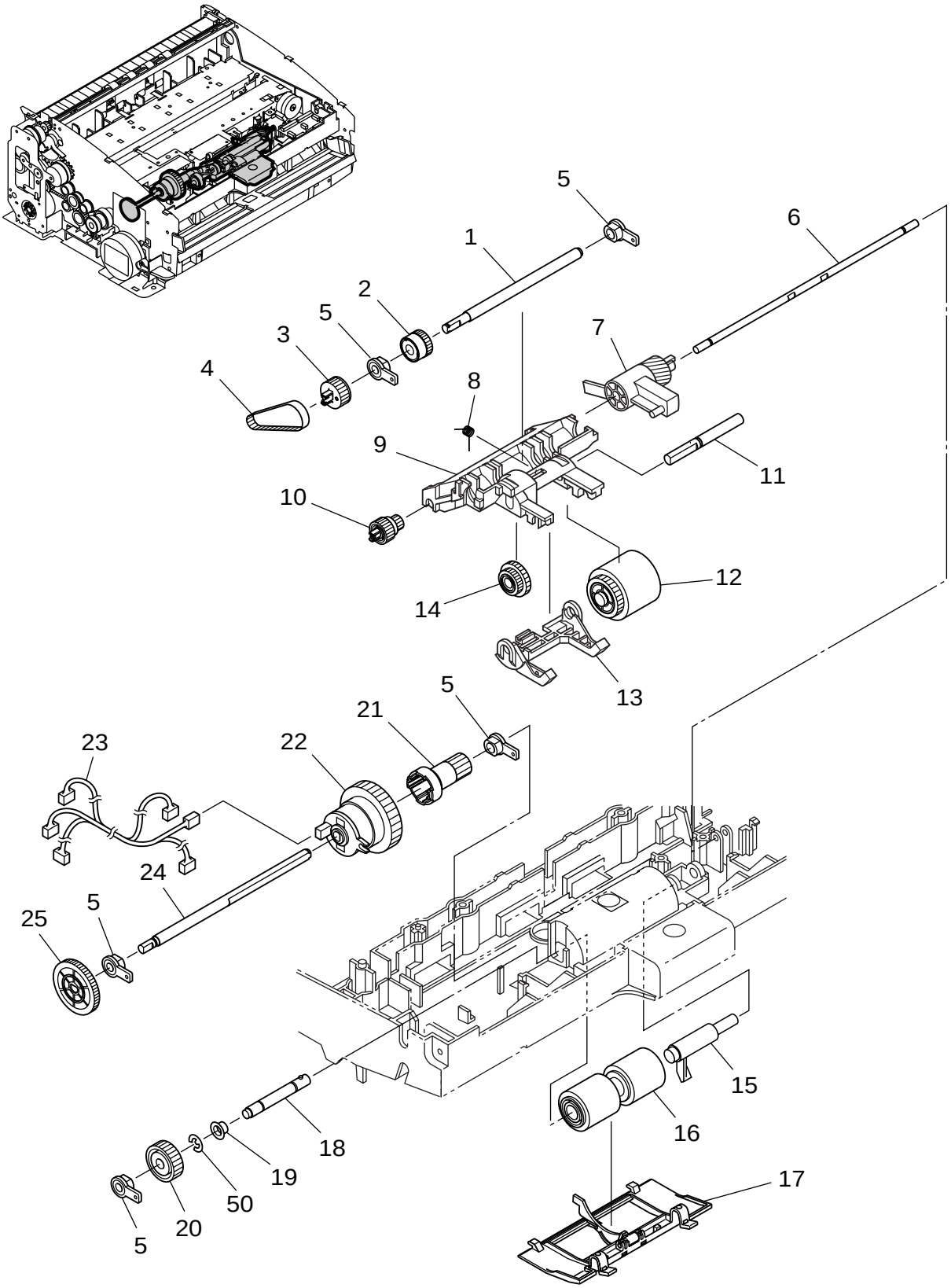

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FIGURE & KEY NO.	PART NUMBER	RANK	Q'TY	DESCRIPTION	REMARKS
220 - 1	MA2-7210-000	N	1	SHAFT, TRANSMISSION 1 ピックアップ クドウ デンタツ ジク 1	
2	MF1-4313-000		1	GEAR, ONE-WAY, Z28 ワンウェイ ギア Z28	
3	MS1-3187-000		1	PULLY, Z25 Z25 プーリ	
4	XF2-1605-640		1	BELT, TIMING 4-56T タイミング ベルト	
5	MA2-7200-000		5	BUSHING, W/STOPPER ヌケドメツキ ジクウケ	
6	MA2-7213-000	N	1	SHAFT, SUPPORT ピックアップ シジ ジク	
7	MA2-7214-000	N	1	LEVER, PICKUP ピックアップ レバー	
8	MA2-7212-000		1	SPRING, TORSION ピックアップ バネ	
9	MA2-7208-000	N	1	ARM, PICKUP ピックアップ アーム	
10	MS1-3188-000		1	GEAR, Z25, PULLY Z13 Z25 ギア Z13 プーリ	
11	MA2-7211-000	N	1	SHAFT, TRANSMISSION 2 ピックアップ クドウ デンタツ ジク 2	
12	MG1-3684-000		1	PICKUP ROLLER ピックアップ ローラ	
13	MA2-7209-000	N	1	LEVER, PICKUP ROLLER ピックアップ ローラ トリツケ レバー	
14	MS2-0108-000		1	GEAR, Z28-18 Z28 Z18 ダンギア	
15	MA2-7205-000	N	1	LEVER, RELEASE, FEED オクリ ローラ カイジョ レバー	
16	MA2-6772-000		1	FEED ROLLER フィード ローラ	
17	MG1-3656-000	N	1	COVER, FEED ROLLER フィード ローラ カバー	
18	MF1-4311-000	N	1	SHAFT, DRIVE, FEED フィード クドウ ジク	
19	FS1-1205-000		1	BUSHING ジクウケ (6X6)	
20	MF1-4312-000		1	GEAR, ONE-WAY, Z42 ワンウェイ ギア Z42	
21	MA2-7186-000		1	GEAR, Z23, CLUTCH クラッチ ギア Z23	
22	MH7-5055-000		1	CLUTCH, EM デンジ クラッチ (FEED)	
23	MG1-3671-000		1	CABLE ASS'Y, UPPER-LEFT ジョウブ ヒダリ タバセン	
24	MA2-7185-000	N	1	SHAFT, CLUTCH クラッチ ジク	
25	MS2-0107-000		1	GEAR, Z28 Z28 ギア	
50	XD2-1100-502		1	RING, E 5 キンテイ ワッシャ (034－5)	

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FIGURE 300 MAIN BODY ASSEMBLY-1
本体部－1

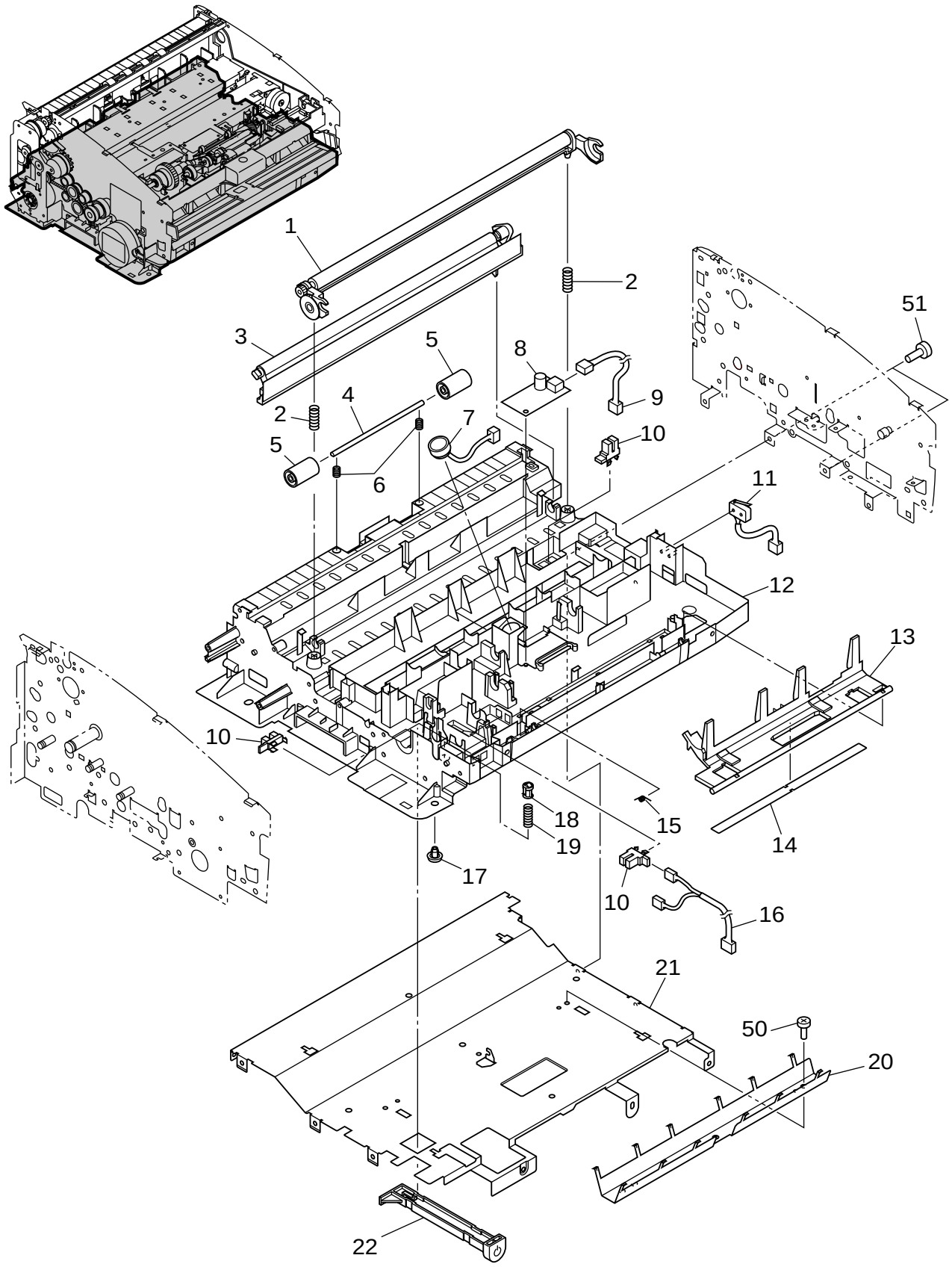

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FIGURE & KEY NO.	PART NUMBER	RANK	Q'TY	DESCRIPTION	REMARKS
300 - 1	MG1-3654-000		1	PLATEN ROLLER UNIT, LOWER プラテン シタ ユニット	
2	MS1-2492-000		2	SPRING, COMPRESSION プラテン カアツ スプリング シタ	
3	MF1-4308-000		1	PLATE, SHADING, LOWER シェーディング バン シタ	
4	MA2-7086-000	N	1	SHAFT, EJECT ROLLER ハイシ ジュウドウ ローラ ジク	
5	MA2-7085-000		2	ROLLER, FOLLOWER ジュウドウ ローラ	
6	MS1-2493-000		2	SPRING, COMPRESSION ハイシ ジュウドウ ローラ バネ S	
7	MH7-7039-000		1	OSCILLATOR, PIEZOELECTRIC US センサ	
8	MG1-3467-000		1	PCB ASS'Y, U-SONIC, DRIVE チョウオンパ ドライブ カイロ	
9	MG1-3680-000		1	CABLE ASS'Y, US-SENSOR, LOW チョウオンパ センサ タバセン (シタ)	
10	WG8-5713-000		3	PHOTO-INTERRUPTER フォト インタラプタ	
11	MG1-3681-000		1	SWITCH, MICRO ドア スイッチ タバセン	
12	MF1-4384-000	N	1	FRAME, CENTER センター フレーム	
13	MF1-4320-000	N	1	STOPPER, DOCUMENT ゲンコウ ストッパ	
14	MA2-7143-000	N	1	SHEET, PROTECTION ホゴ シート	
15	MA2-7189-000		1	SPRING, TORSION ヨウシ ストッパ スプリング	
16	MG1-3674-000		1	CABLE ASS'Y, STOPPER ストッパ タバセン	
17	XH9-0104-000	N	4	FOOT, RUBBER ゴム アシ	
18	MA2-7218-000	N	1	STOPPER, EXCHANGE キリカエ ラッチ	
19	MS1-2497-000	N	1	SPRING, COMPRESSION ヒブンリ バネ	
20	MA2-7084-000	N	1	PLATE, GROUNDING, READ ヨミトリ アース バン シタ	
21	MF1-4299-000	N	1	PLATE, SHIELD シールド バン	
22	MA2-7083-000	N	1	LEVER, POWER デンゲン レバー	
50	XA9-1116-000		3	SCREW, BH M3x5,ROUND-END M3 L5 サキマル ビス	
51	XB1-2300-805		2	SCREW, BH M3x8 バインド M3 L8	

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FIGURE 310 MAIN BODY ASSEMBLY-2
本体部－2

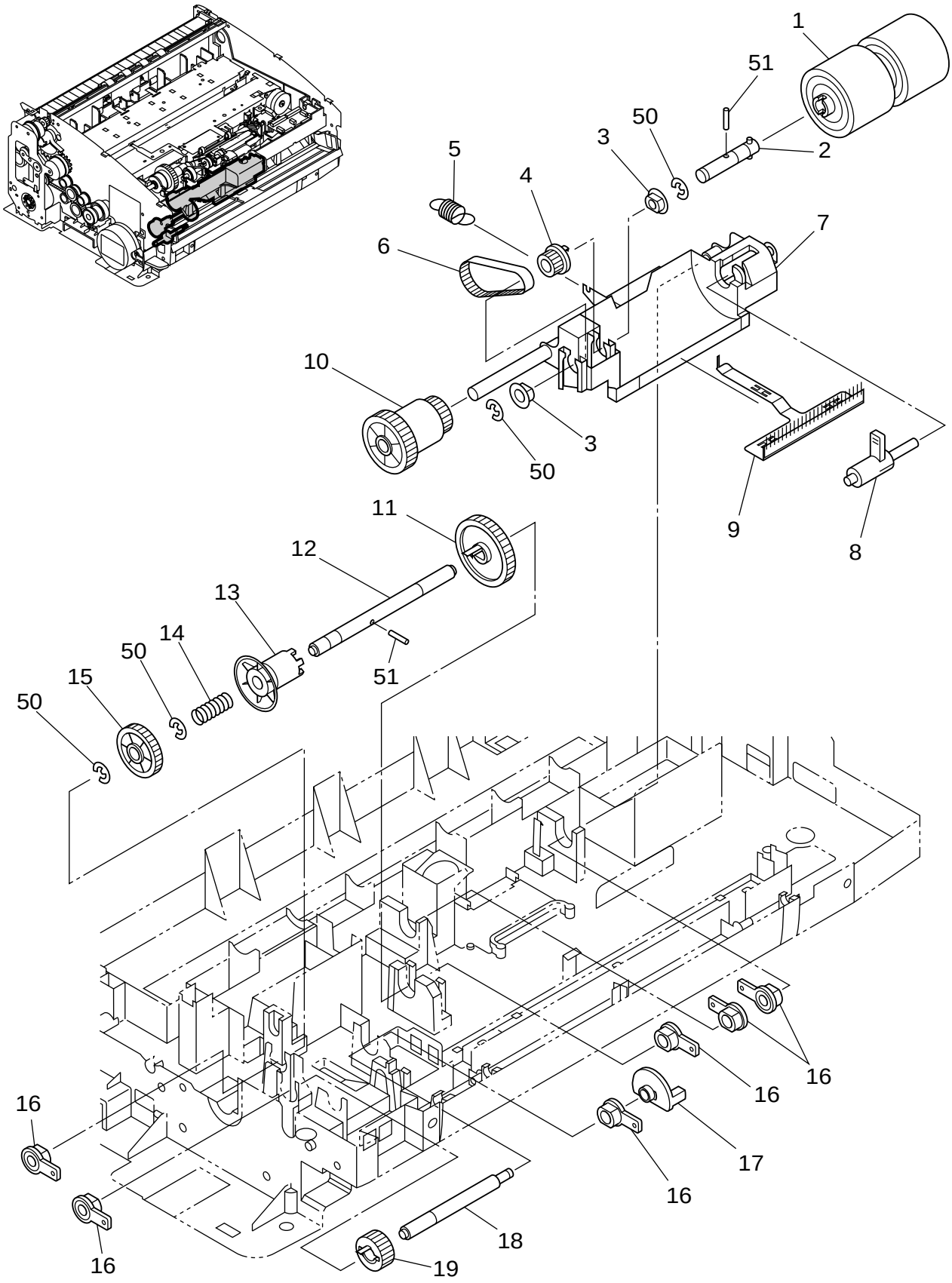

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FIGURE & KEY NO.	PART NUMBER	RANK	Q'TY	DESCRIPTION	REMARKS
310 - 1	MG1-3457-000		1	RETARD ROLLER リタード ローラ	
2	MF1-4306-000	N	1	SHAFT, DRIVE ブンリ ローラ クドウ ジク	
3	FS1-1205-000		2	BUSHING ジクウケ (6X6)	
4	MS1-3185-000		1	PULLY, Z17 Z17 プーリ	
5	MS1-2490-000		1	SPRING, TENSION ブンリ ローラ カアツ スプリング	
6	XF2-1605-040		1	BELT, TIMING 4-50T タイミング ベルト	
7	MA2-7166-000	N	1	MOUNT, SEPARATION UNIT ブンリ フロート ダイ	
8	MA2-7167-000	N	1	LEVER, RELEASE ブンリ ローラ カイジョ レバー	
9	MF1-4363-000	N	1	PLATE, GROUNDING, RETARD ROLLER ブンリ ローラ アース バン	
10	MS1-3186-000		1	GEAR, Z52, PULLY Z26 Z52 ギア Z26 プーリー	
11	MS2-0097-000		1	GEAR, Z61 Z61 ギア	
12	MA2-7174-000	N	1	SHAFT, SEPARATION ブンリ クドウ デンタツ ジク	
13	MA2-7172-000		1	SPACER, RELEASE クドウ カイジョ バン	
14	MS1-2491-000		1	SPRING, COMPRESSION ヒブンリ スプリング	
15	MA2-7173-000		1	GEAR, Z45 クドウ レンケツ ギア	
16	MA2-7200-000		6	BUSHING, W/STOPPER ヌケドメツキ ジクウケ	
17	MA2-7176-000	N	1	LEVER, RELEASE カイジョ レバー	
18	MA2-7177-000	N	1	SHAFT, TRANSMISSION デンタツ ジク	
19	MF1-4305-000		1	GEAR, ONE-WAY, Z30 ワンウェイ ギア Z30	
50	XD2-1100-502		4	RING, E 5 キンテイ ワッシャ (034－5)	
51	XD3-2200-102		2	PIN, DOWEL 2x10 ヘイコウ ピンH7 (145－2X10)	

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FIGURE 320 MAIN BODY ASSEMBLY-3
本体部－3

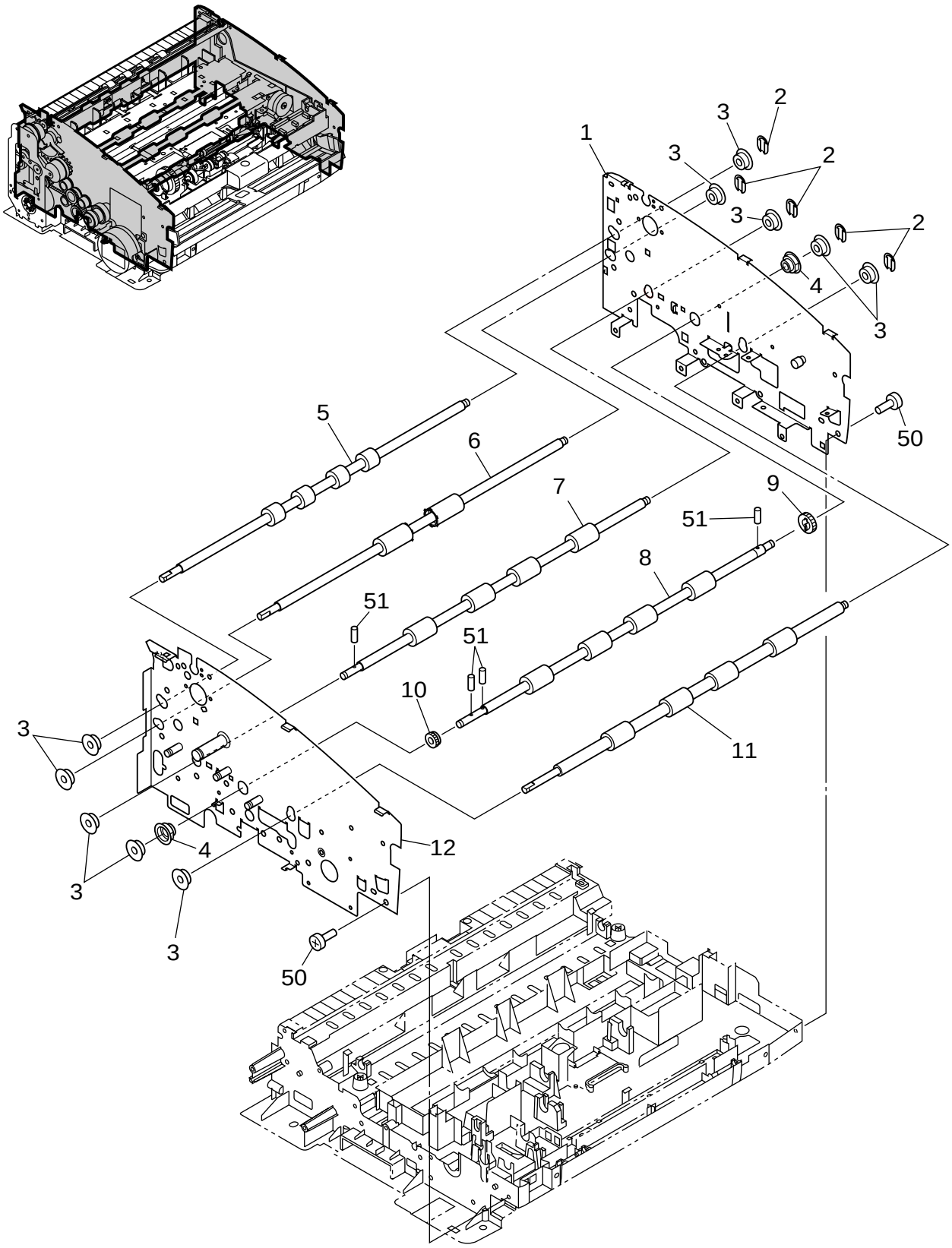

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FIGURE & KEY NO.	PART NUMBER	RANK	Q'TY	DESCRIPTION	REMARKS
320 - 1	MF1-4300-000	N	1	PLATE, RIGHT SIDE ミギ ソク バン	
2	MA2-7197-000	N	5	STOPPER, BEARING ベアリング ウケ	
3	XG9-0573-000		10	BEARING, BALL, FLANGE ツバツキ ベアリング	
4	MA2-7199-000		2	PIVOT, PLATEN プラテン ヒンジ	
5	MA2-7154-000		1	ROLLER, CARRY ハンソウ ローラ	
6	MA2-7156-000		1	ROLLER, EJECT, STRAIGHT ハイシ クドウ ローラ (ストレート)	
7	MA2-7153-000		1	ROLLER, READING, REAR ヨミトリ クドウ ローラ ウシロ	
8	MA2-7152-000		1	ROLLER, READING, CENTER ヨミトリ クドウ ローラ ナカ	
9	MS2-0094-000		1	GEAR, Z21 Z21 クドウ デンタツ ギア	
10	MS2-0093-000		1	GEAR, Z24 Z24 ギア	
11	MA2-7151-000		1	ROLLER, REGISTRATION, LOW レジスト ローラ シタ	
12	MF1-4301-000	N	1	PLATE, LEFT SIDE ヒダリ ソク バン	
50	XB4-5400-809		11	SCREW, TAPPING P, BH M4x8 Pタイト M4 L8	
51	XD3-2200-102		4	PIN, DOWEL 2x10 ヘイコウ ピンH7 (145－2X10)	

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FIGURE 330 MAIN BODY ASSEMBLY-4
本体部－4

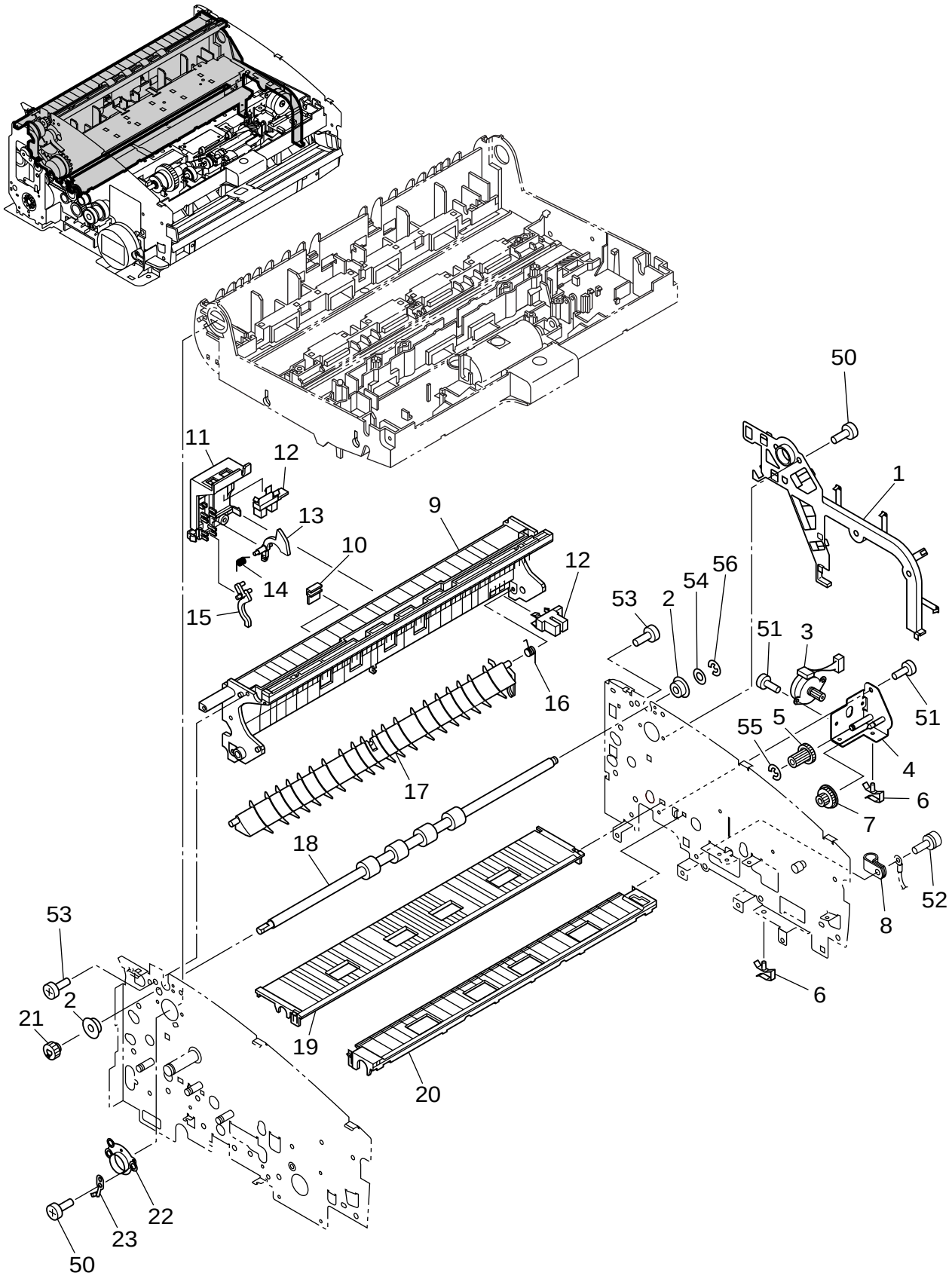

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FIGURE & KEY NO.	PART NUMBER	RANK	Q'TY	DESCRIPTION	REMARKS
330 - 1	MA2-7121-000	N	1	GUIDE, ROTATION, RIGHT ウエ ユニット ミギ カイテン ジク	
2	XG9-0573-000		2	BEARING, BALL, FLANGE ツバツキ ベアリング	
3	MF1-4337-000		1	MOTOR, STEPPING, SHADING LOWER シェーディング モータ シタ	
4	MA2-7204-000	N	1	PLATE, DRIVE, SHADING シェーディング クドウ バン シタ	
5	MS2-0101-000		1	GEAR, Z30-17 Z30 Z17 ハスバ ギア	
6	WT2-0507-000		2	HOLDER, CABLE ヨコガタ クランプ	
7	MS2-0102-000		1	GEAR, Z34-16 シェーディング クドウ ギア シタ	
8	WT2-5965-000		1	CLAMP, CABLE, GROWNDING グランディング クランプ	
9	MF1-4361-000	N	1	GUIDE, FEEDER ハンソウ ガイド	
10	MA2-6761-000		2	STOPPER, CABLE タバセン ドメ	
11	MA2-7111-000	N	1	HOLDER, SENSOR ハイシ センサ ホルダ	
12	WG8-5713-000		2	PHOTO-INTERRUPTER フォト インタラプタ	
13	MA2-7113-000	N	1	LEVER, SENSOR, U ハイシ センサ レバー U	
14	MA2-7114-000		1	SPRING, TORSION ハイシ センサ レバー バネ	
15	MA2-7112-000	N	1	LEVER, SENSOR, S ハイシ センサ レバー S	
16	MA2-7079-000		1	SPRING, TORSION フラッパ スプリング	
17	MA2-7078-000	N	1	FLAPPER フラッパ	
18	MA2-7155-000		1	ROLLER, EJECT, U-TURN ハイシ クドウ ローラ (ユー ターン)	
19	MA2-7120-000	N	1	GUIDE, REAR コウブ ガイド	
20	MA2-7119-000	N	1	GUIDE, CENTER チュウカン ガイド	
21	MS2-0109-000		1	GEAR, Z25, EJECT ROLLER ハイシ ローラ ギア	
22	MA2-7087-000	N	1	GUIDE, ROTATION ウエ ユニット カイテン ジク	
23	MA2-7088-000	N	1	PLATE, GROUNDING アース バン ソト	
50	XA9-0678-000		6	SCREW, TP M3x3 TP M3 L3	
51	XB1-2300-405		3	SCREW, BH M3x4 バインド M3 L4	
52	XB2-4400-605		1	SCREW, PH M4x6 W/WASHERES W ザガネツキ ナベビス M4 L6	
53	XB4-5400-809		4	SCREW, TAPPING P, BH M4x8 Pタイト M4 L8	
54	XD1-1106-215		1	SHIM, 6x0.5 ワッシャ マル6 T＝0.5	
55	XD2-1100-402		1	RING, E 4 キンテイ ワッシャ (034－4)	
56	XD2-1100-502		1	RING, E 5 キンテイ ワッシャ (034－5)	

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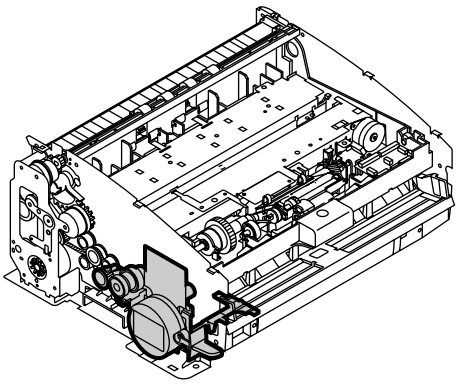
FIGURE 340 MAIN BODY ASSEMBLY-5
本体部－5



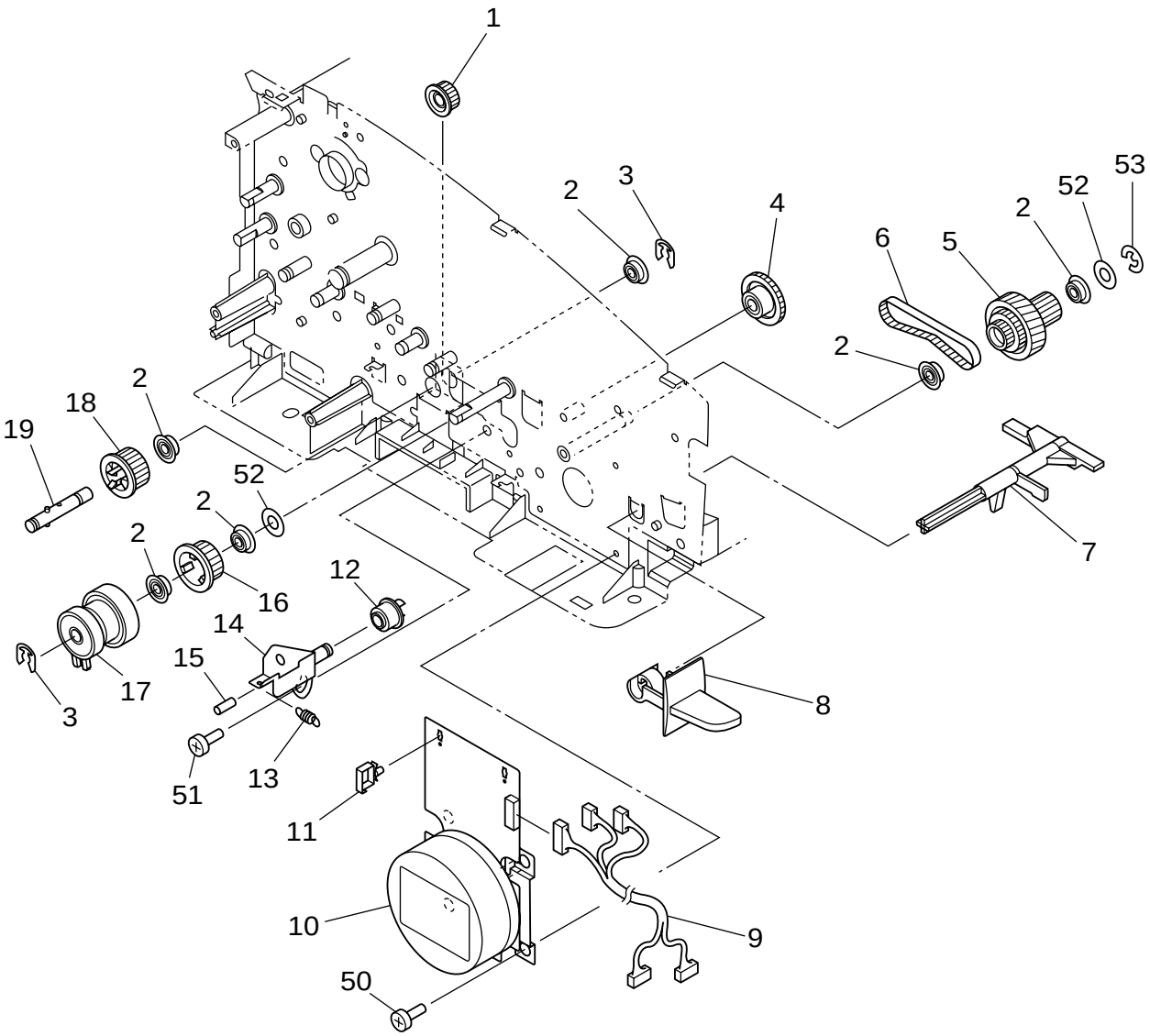


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FIGURE & KEY NO.	PART NUMBER	RANK	Q'TY	DESCRIPTION	REMARKS
340 - 1	MS1-3184-000		1	PULLY, Z22 Z22 プーリ	
2	XG9-0573-000		6	BEARING, BALL, FLANGE ツバツキ ベアリング	
3	MA2-7197-000	N	2	STOPPER, BEARING ベアリング ウケ	
4	MS2-0096-000		1	GEAR, Z22 Z22 クドウ レンケツ ギア	
5	MS2-0100-000		1	GEAR, Z56-18-27-22 メイン ダン ギア	
6	XF2-1611-040		1	BELT, TIMING 4-110T タイミング ベルト	
7	MA2-7158-000	N	1	SHAFT, LEVER, SEPARATION ヒブンリ レバー ジク	
8	MA2-7159-000	N	1	LEVER, SEPARATION ヒブンリ レバー	
9	MG1-3672-000		1	CABLE ASS'Y, MAIN-LEFT ホンタイ ヒダリ タバセン	
10	MH7-1138-000		1	MOTOR, DC, MAIN DC ブラシレス モータ	
11	WT2-5921-000		2	CLAMP, CABLE, REUSE リユース クランプ	
12	MA2-7191-000		1	ROLLER, IDOL ゲンソク アイドラー コロ	
13	MS1-2489-000		1	SPRING, TENSION ゲンソク テンション バネ	
14	MF1-4303-000	N	1	PLATE, TENSION ゲンソク テンション バン	
15	MA2-4533-000	N	1	TUBE チューブ	
16	MS1-3183-000		1	PULLY, Z30, CLUTCH クラッチ プーリ Z30	
17	MH7-5053-000		1	CLUTCH, EM デンジ クラッチ (REGIST)	
18	MS1-3182-000		1	PULLY, Z30, MAIN Z30 メイン プーリ	
19	MF1-4381-000	N	1	SHAFT, TRANSMISSION クドウ デンタツ ジク	
50	XB1-2300-405		3	SCREW, BH M3x4 バインド M3 L4	
51	XB6-7300-409		1	SCREW, TP M3x4 TP M3 L4	
52	XD1-1106-215		2	SHIM, 6x0.5 ワッシャ マル6 T=0.5	
53	XD2-1100-402		1	RING, E 4 キンテイ ワッシャ(034-4)	

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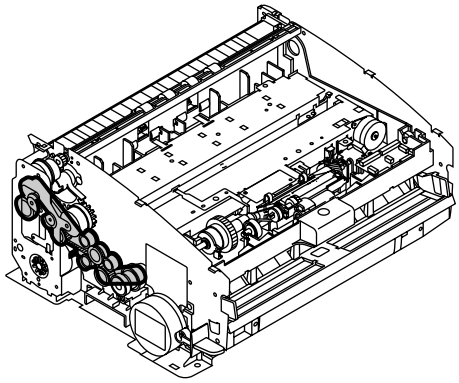
FIGURE 350 MAIN BODY ASSEMBLY-6
本体部－6



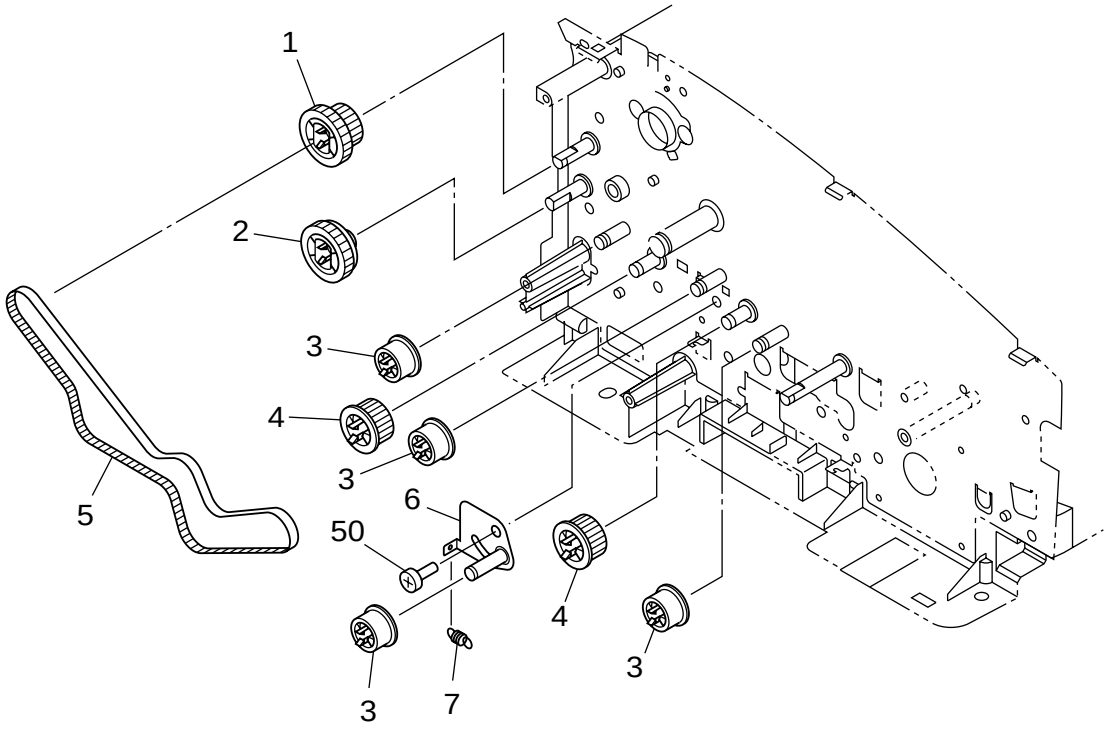


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FIGURE & KEY NO.	PART NUMBER	RANK	Q'TY	DESCRIPTION	REMARKS
350 - 1	MS2-0099-000		1	PULLY, Z30, GEAR Z24 Z30 プーリ Z24 ギア	
2	MS2-0098-000		1	GEAR, Z24 Z24 ガイブ シュツリョク ギア	
3	MA2-7196-000		4	ROLLER, IDOL, MAIN メイン アイドラ コロ	
4	MS1-3182-000		2	PULLY, Z30, MAIN Z30 メイン プーリ	
5	XF2-1621-960		1	BELT, TIMING 6-219T タイミング ベルト	
6	MF1-4302-000	N	1	PLATE, TENSION, MAIN メイン テンション バン	
7	MS1-2488-000		1	SPRING, TENSION メイン テンション バネ	
50	XB6-7300-409		1	SCREW, TP M3x4 TP M3 L4	

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FIGURE 360 MAIN BODY ASSEMBLY-7
本体部－7

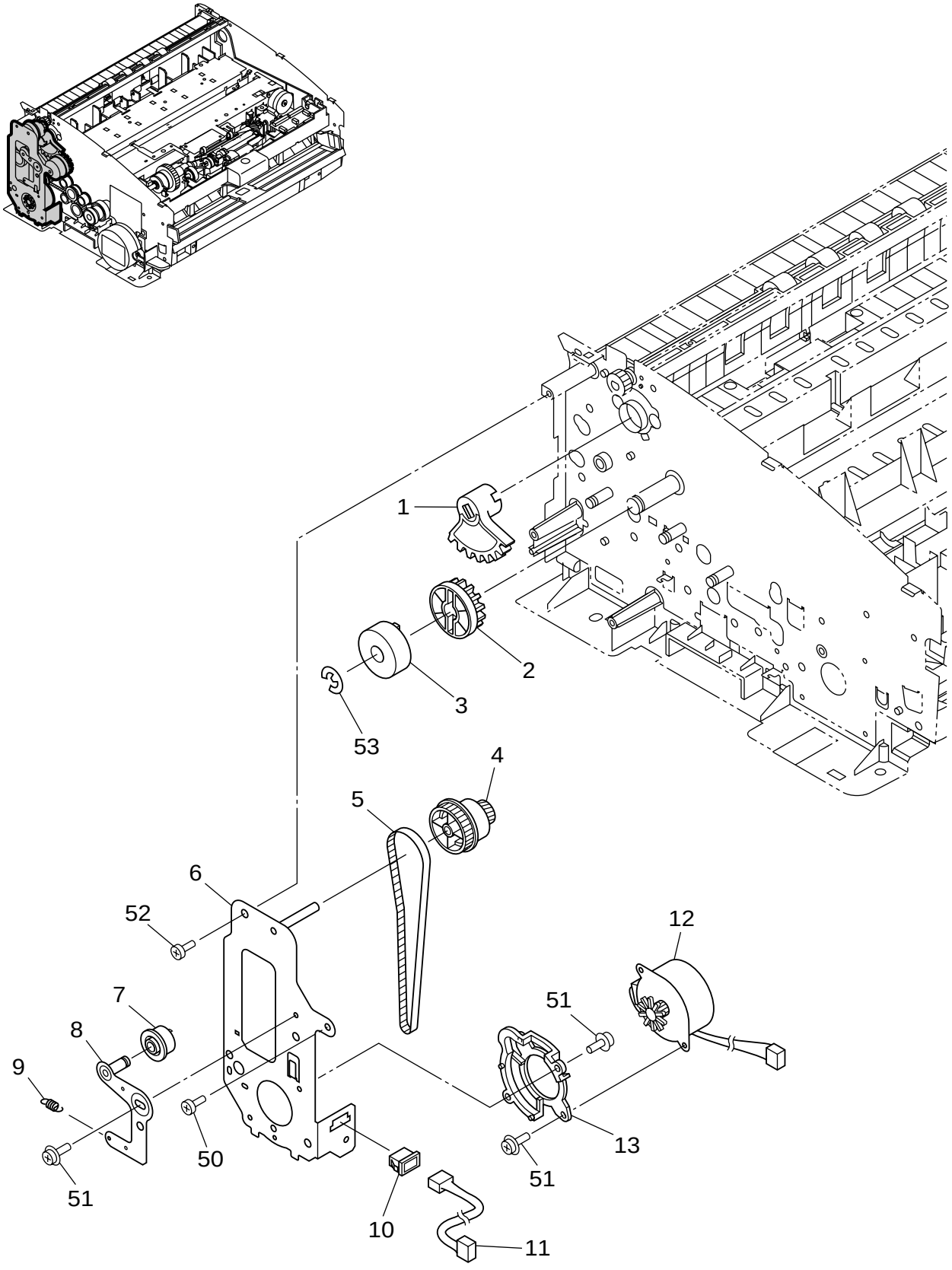

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FIGURE & KEY NO.	PART NUMBER	RANK	Q'TY	DESCRIPTION	REMARKS
360 - 1	MA2-7122-000		1	GEAR, ROTATION, UPPER UNIT ウエ ユニット ギア	
2	MS2-0110-000		1	GEAR, Z14 ワンウェイ ヒンジ ギア	
3	XZ9-0586-000	N	1	HINGE, ONE-WAY ワンウエイ ヒンジ	
4	MS1-3190-000		1	PULLY, Z46, GEAR Z25 ハイシ プーリ Z46 ギア Z25	
5	XF2-1115-140		1	BELT, TIMING 4-151T タイミング ベルト	
6	MF1-4314-000	N	1	PLATE, DRIVE, EJECT ハイシ クドウ バンキン	
7	MA2-7196-000		1	ROLLER, IDOL, MAIN メイン アイドラ コロ	
8	MF1-4315-000	N	1	PLATE, TENSION テンション バン	
9	MS1-2496-000		1	SPRING, TENSION スプリング	
10	VS1-7165-004		1	CONNECTOR チュウケイ コネクタ	
11	MG1-3673-000		1	CABLE ASS'Y, EJECT MOTOR ハイシ モータ タバセン	
12	MF1-4318-000		1	MOTOR, STEPPING, EJECT ハイシ モータ	
13	MA2-7110-000	N	1	MOUNT, MOTOR モータ マウント	
50	XB1-2300-405		1	SCREW, BH M3x4 バインド M3 L4	
51	XB2-8300-605		5	SCREW, BH M3x6, W/WASHERS バネ ヒラザツキ ビス M3 L6	
52	XB4-5400-809		3	SCREW, TAPPING P, BH M4x8 Pタイト M4 L8	
53	XD2-1100-802		1	RING, E 8 キンテイ ワッシャ (080)	

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FIGURE 400 READING UNIT, UPPER/LOWER
上下読取部

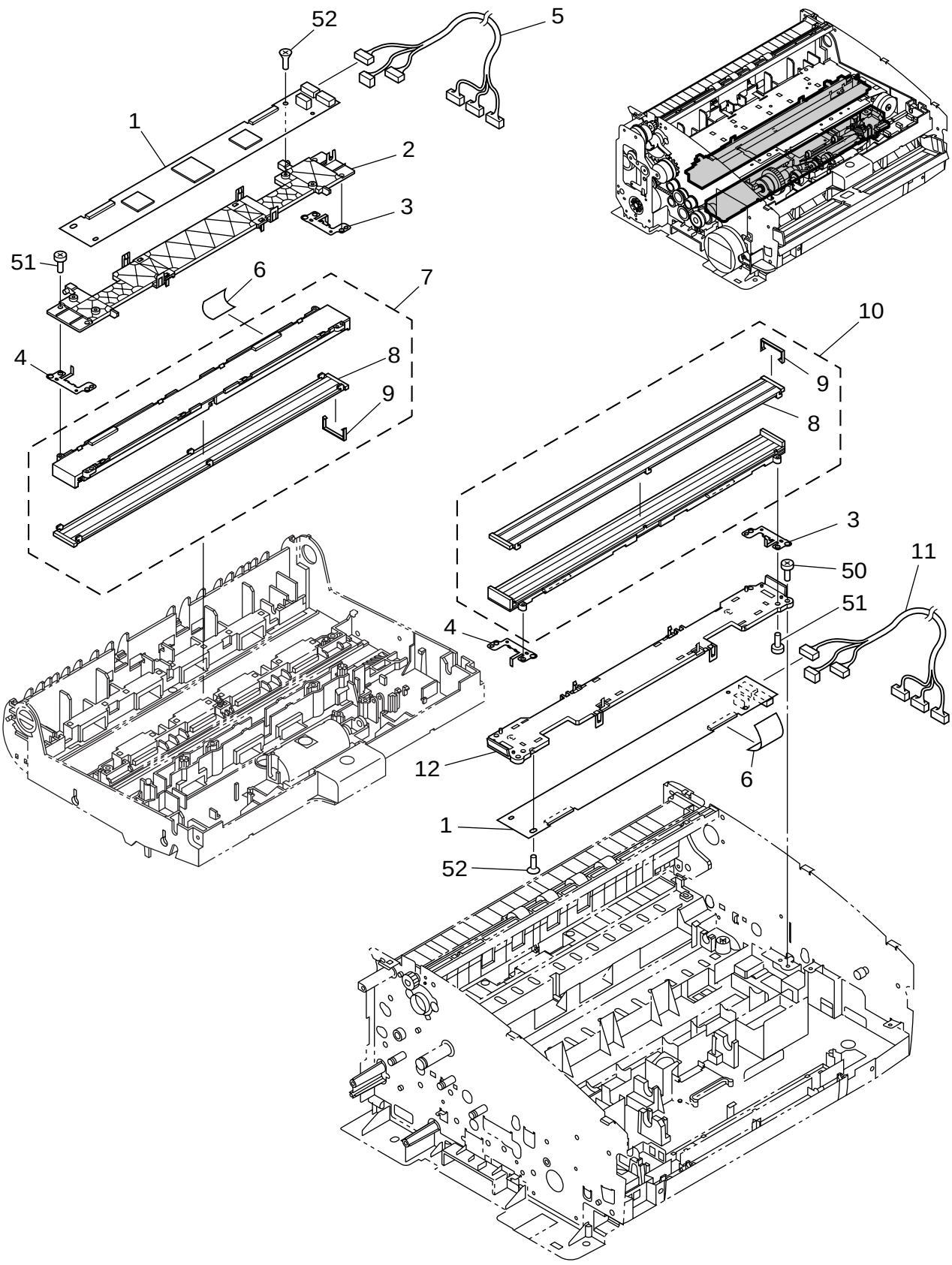

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FIGURE & KEY NO.	PART NUMBER	RANK	Q'TY	DESCRIPTION	REMARKS
400 - 1	MG1-3665-000		2	PCB ASS'Y, READING UNIT ヨミトリ ユニット カイロ	
2	MA2-7115-000	N	1	HOLDER, CIS UNIT, UPPER ウエ CIS ユニット ホルダ	
3	MA2-7118-000	N	2	PLATE, GROUNDING CIS アース バン	
4	MA2-7117-000	N	2	PLATE, GROUNDING CIS アース バン	
5	MG1-3678-000		1	CABLE ASS'Y, READING UNIT, FRONT オモテメン ヨミトリ ユニット タバセン	
6	MH2-5326-000		4	CABLE, FFC フラット ケーブル	
7	MG1-3630-000		1	CIS UNIT, UPPER イメージ センサ ウエ ユニット	
8	MF1-4294-000		2	READING GLASS ヨミトリ ガラス	
9	MA2-7139-000		2	STOPPER, GLASS ガラス ロック	
10	MG1-3631-000		1	CIS UNIT, LOWER イメージ センサ シタ ユニット	
11	MG1-3679-000		1	CABLE ASS'Y, READING UNIT, BACK ウラメン ヨミトリ ユニット タバセン	
12	MA2-7116-000	N	1	HOLDER, CIS UNIT, LOWER シタ CIS ユニット ホルダ	
50	XB1-2300-805		2	SCREW, BH M3x8 バインド M3 L8	
51	XB4-7300-809		8	SCREW, TAPPING B, BH M3x8 Bタイト M3 L8	
52	XB4-8300-805		8	SCREW, TAPPING B, FH M3x8 サラ B タイト M3 L8	

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FIGURE 500 ELECTRICAL COMPONENTS ASSEMBLY
電装部

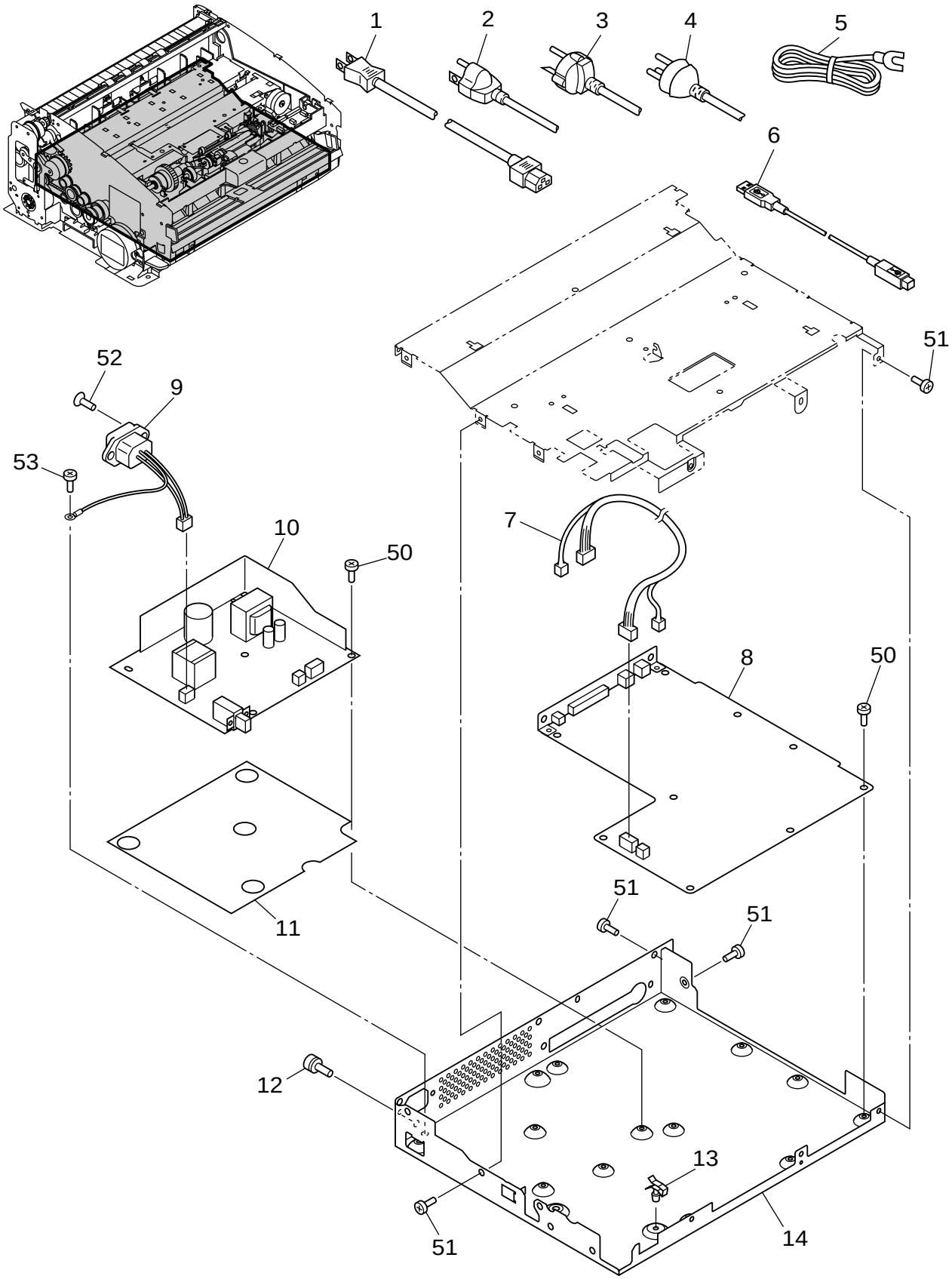

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FIGURE & KEY NO.	PART NUMBER	RANK	Q'TY	DESCRIPTION	REMARKS
500 - 1	RH9-1015-020		1	POWER CORD デンゲンコード 100V	100V
2	RH2-5145-020		1	POWER CORD デンゲンコード 120V	120V
3	RH2-5116-040		1	POWER CORD デンゲンコード 220−240V	220-240V
4	RH2-5344-030		1	POWER CORD デンゲンコード 220−240V CN	220-240V CN
5	FH2-5006-030		1	CORD, GROUNDING アースコード	100V
6	MH2-5313-000		1	CABLE, USB USB ケーブル	
7	MG1-3675-000		1	CABLE ASS'Y, DC POWER DC デンゲン タバセン	
8	MG1-3690-000		1	PCB ASS'Y, CONTROL コントロール カイロ (DCON)	
9	MG1-3755-000		1	CABLE ASS'Y, INLET インレット タバセン	
10	MH3-2061-000		1	PCB ASS'Y, POWER SUPPLY (100) デンゲン (100Vケイ)	100V, 120V
	MH3-2062-000		1	PCB ASS'Y, POWER SUPPLY (200) デンゲン (200Vケイ)	220-240V
11	MA2-7090-000	N	1	SHEET, INSULATOR ゼツエン シート	
12	FA9-2113-000		1	SCREW, M4 W/TOOTH WASHER キクザツキ バインド ビス	
13	WT2-0507-000		1	HOLDER, CABLE ヨコガタ クランプ	
14	MA2-7089-000	N	1	PLATE, BOTTOM ソコイタ	
50	XA9-1116-000		17	SCREW, BH M3x5,ROUND-END M3 L5 サキマル ビス	
51	XB1-2300-805		9	SCREW, BH M3x8 バインド M3 L8	
52	XB1-3300-605		2	SCREW, FH M3x6 サラビス M3 L6	
53	XB2-4400-605		1	SCREW, PH M4x6 W/WASHERES W ザガネツキ ナベビス M4 L6	

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部品索引表-1

PART NO.	FIGURE & KEY NUMBER	Q'TY	PART NO.	FIGURE & KEY NUMBER	Q'TY	PART NO.	FIGURE & KEY NUMBER	Q'TY
FA9-2113-000	500-12	1	MA2-7115-000	400-02	1	MA2-7182-000	210-08	1
			MA2-7116-000	400-12	1	MA2-7185-000	220-24	1
FH2-5006-030	500-05	1	MA2-7117-000	400-04	2	MA2-7186-000	220-21	1
			MA2-7118-000	400-03	2	MA2-7189-000	300-15	1
FS1-1205-000	220-19	1	MA2-7119-000	330-20	1	MA2-7191-000	340-12	1
↓	310-03	2	MA2-7120-000	330-19	1	MA2-7192-000	200-10	1
FS1-9010-000	110-06	2	MA2-7121-000	330-01	1	MA2-7196-000	350-03	4
			MA2-7122-000	360-01	1	↓	360-07	1
MA2-4533-000	340-15	1	MA2-7126-000	100-13	1	MA2-7197-000	320-02	5
MA2-6090-030	120-01	1	MA2-7127-000	100-11	1	↓	340-03	2
MA2-6761-000	210-06	2	MA2-7128-000	100-12	1	MA2-7199-000	320-04	2
↓	330-10	2	MA2-7129-000	100-08	1	MA2-7200-000	220-05	5
MA2-6772-000	220-16	1	MA2-7130-000	100-07	1	↓	310-16	6
MA2-6802-000	110-04	2	MA2-7131-000	100-04	1	MA2-7204-000	330-04	1
MA2-7070-000	210-22	12	MA2-7132-000	100-01	1	MA2-7205-000	220-15	1
MA2-7078-000	330-17	1	MA2-7133-000	100-06	1	MA2-7208-000	220-09	1
MA2-7079-000	330-16	1	MA2-7134-000	100-14	1	MA2-7209-000	220-13	1
MA2-7083-000	300-22	1	MA2-7135-000	100-03	1	MA2-7210-000	220-01	1
MA2-7084-000	300-20	1	MA2-7136-000	100-02	1	MA2-7211-000	220-11	1
MA2-7085-000	300-05	2	MA2-7139-000	400-09	2	MA2-7212-000	220-08	1
MA2-7086-000	300-04	1	MA2-7143-000	300-14	1	MA2-7213-000	220-06	1
MA2-7087-000	330-22	1	MA2-7147-000	100-10	1	MA2-7214-000	220-07	1
MA2-7088-000	330-23	1	MA2-7151-000	320-11	1	MA2-7218-000	300-18	1
MA2-7089-000	500-14	1	MA2-7152-000	320-08	1	MA2-7443-000	200-05	1
MA2-7090-000	500-11	1	MA2-7153-000	320-07	1			
MA2-7096-000	210-18	1	MA2-7154-000	320-05	1	MF1-4294-000	400-08	2
MA2-7097-000	210-16	2	MA2-7155-000	330-18	1	MF1-4296-000	200-01	1
MA2-7098-000	210-15	2	MA2-7156-000	320-06	1	MF1-4297-000	210-25	2
MA2-7099-000	210-23	12	MA2-7158-000	340-07	1	MF1-4298-000	210-24	1
MA2-7100-000	210-04	4	MA2-7159-000	340-08	1	MF1-4299-000	300-21	1
MA2-7101-000	210-03	1	MA2-7161-000	110-01	1	MF1-4300-000	320-01	1
MA2-7102-000	210-05	1	MA2-7164-000	110-11	1	MF1-4301-000	320-12	1
MA2-7103-000	210-19	2	MA2-7165-000	110-08	1	MF1-4302-000	350-06	1
MA2-7104-000	200-09	1	MA2-7166-000	310-07	1	MF1-4303-000	340-14	1
MA2-7106-000	120-02	1	MA2-7167-000	310-08	1	MF1-4304-000	200-07	1
MA2-7107-000	120-04	1	MA2-7172-000	310-13	1	MF1-4305-000	310-19	1
MA2-7109-000	120-07	1	MA2-7173-000	310-15	1	MF1-4306-000	310-02	1
MA2-7110-000	360-13	1	MA2-7174-000	310-12	1	MF1-4308-000	300-03	1
MA2-7111-000	330-11	1	MA2-7176-000	310-17	1	MF1-4309-000	200-17	1
MA2-7112-000	330-15	1	MA2-7177-000	310-18	1	MF1-4311-000	220-18	1
MA2-7113-000	330-13	1	MA2-7180-000	210-20	4	MF1-4312-000	220-20	1
MA2-7114-000	330-14	1	MA2-7181-000	210-14	2	MF1-4313-000	220-02	1

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NUMERICAL INDEX-2
部品索引表-2

PART NO.	FIGURE & KEY NUMBER	Q'TY	PART NO.	FIGURE & KEY NUMBER	Q'TY	PART NO.	FIGURE & KEY NUMBER	Q'TY
MF1-4314-000	360-06	1	MG1-3676-000	110-10	1	MS2-0081-000	110-07	1
MF1-4315-000	360-08	1	MG1-3677-000	210-11	1	MS2-0093-000	320-10	1
MF1-4318-000	360-12	1	MG1-3678-000	400-05	1	MS2-0094-000	320-09	1
MF1-4319-000	120-05	4	MG1-3679-000	400-11	1	MS2-0096-000	340-04	1
MF1-4320-000	300-13	1	MG1-3680-000	300-09	1	MS2-0097-000	310-11	1
MF1-4337-000	330-03	1	MG1-3681-000	300-11	1	MS2-0098-000	350-02	1
↓	200-14	1	MG1-3684-000	220-12	1	MS2-0099-000	350-01	1
MF1-4338-000	210-09	1	MG1-3690-000	500-08	1	MS2-0100-000	340-05	1
MF1-4339-000	110-05	1	MG1-3755-000	500-09	1	MS2-0101-000	200-16	1
MF1-4345-000	110-03	1				↓	330-05	1
MF1-4346-000	110-02	1	MH2-5313-000	500-06	1	MS2-0102-000	330-07	1
MF1-4360-000	210-17	1	MH2-5326-000	400-06	4	MS2-0107-000	220-25	1
MF1-4361-000	330-09	1				MS2-0108-000	220-14	1
MF1-4363-000	310-09	1	MH3-2061-000	500-10	1	MS2-0109-000	330-21	1
MF1-4364-000	120-03	1	MH3-2062-000	500-10	1	MS2-0110-000	360-02	1
MF1-4381-000	340-19	1						
MF1-4384-000	300-12	1	MH7-1138-000	340-10	1	RH2-5116-040	500-03	1
			MH7-5053-000	340-17	1	RH2-5145-020	500-02	1
MG1-3457-000	310-01	1	MH7-5055-000	220-22	1	RH2-5344-030	500-04	1
MG1-3467-000	300-08	1	MH7-7039-000	200-11	1			
MG1-3496-020	200-03	1	↓	300-07	1	RH9-1015-020	500-01	1
MG1-3630-000	400-07	1						
MG1-3631-000	400-10	1	MS1-2488-000	350-07	1	VS1-7165-004	360-10	1
MG1-3634-000	100-05	1	MS1-2489-000	340-13	1			
MG1-3635-000	100-15	1	MS1-2490-000	310-05	1	WG8-5713-000	200-12	2
MG1-3654-000	300-01	1	MS1-2491-000	310-14	1	↓	300-10	3
MG1-3655-000	210-02	1	MS1-2492-000	300-02	2	↓	330-12	2
MG1-3656-000	220-17	1	MS1-2493-000	300-06	2			
MG1-3662-000	100-09	1	MS1-2494-000	210-21	24	WT2-0507-000	330-06	2
MG1-3663-000	110-09	1	MS1-2495-000	120-06	2	↓	500-13	1
MG1-3664-000	210-10	1	MS1-2496-000	360-09	1	WT2-5056-000	200-15	2
MG1-3665-000	400-01	2	MS1-2497-000	300-19	1	WT2-5674-000	200-02	1
MG1-3666-000	210-13	2	MS1-2505-000	210-01	2	WT2-5678-000	200-08	2
MG1-3667-000	210-07	1	MS1-3182-000	340-18	1	WT2-5737-000	200-06	1
MG1-3668-000	200-13	1	↓	350-04	2	WT2-5921-000	340-11	2
MG1-3669-000	210-12	1	MS1-3183-000	340-16	1	WT2-5965-000	330-08	1
MG1-3670-000	200-04	1	MS1-3184-000	340-01	1			
MG1-3671-000	220-23	1	MS1-3185-000	310-04	1	XA9-0678-000	330-50	6
MG1-3672-000	340-09	1	MS1-3186-000	310-10	1	XA9-1116-000	300-50	3
MG1-3673-000	360-11	1	MS1-3187-000	220-03	1	↓	500-50	17
MG1-3674-000	300-16	1	MS1-3188-000	220-10	1			
MG1-3675-000	500-07	1	MS1-3190-000	360-04	1	XB1-2300-405	110-50	2

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↓	330-51	3	XF2-1605-040	310-06	1			
↓	340-50	3	XF2-1605-640	220-04	1			
↓	360-50	1	XF2-1611-040	340-06	1			
XB1-2300-805	300-51	2	XF2-1621-960	350-05	1			
↓	400-50	2						
↓	500-51	9	XG9-0573-000	320-03	10			
XB1-3300-605	500-52	2	↓	330-02	2			
			↓	340-02	6			
XB2-4400-605	200-51	1						
↓	330-52	1	XH9-0104-000	300-17	4			
↓	500-53	1						
XB2-8300-605	360-51	5	XZ9-0586-000	360-03	1			
XB4-5300-605	100-50	6						
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XD2-1100-502	220-50	1						
↓	310-50	4						
↓	330-56	1						
XD2-1100-802	360-53	1						
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