DR-4080U

SERVICE MANUAL

REVISION 0

Canon

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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 after-sales service and maintenance for maintaining the product quality and functions of the DR-4080U.

Contents

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

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

Quality Assurance Center
Canon Electronics Inc.

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CHAPTER 1

GENERAL DESCRIPTION

I. FEATURES

1. Capable of scanning A3/Ledger size document
Standard size up to A3/Ledger size can be scanned.

2. ADF+Flatbed type
Capable of scanning books/magazines using Flatbed (FB) scanner.

3. Simultaneous duplex scanning
Capable of high speed scanning, 45 sheets/minute for simplex and 82 pages/minute for duplex. (When 200dpi x 200 dpi binary is output using A4 size CCITT No.1 ducuments.)

4. Automatic document size detection provided
Automatic document size detection is provided to detect a standard document size at document reading.

5. Black/White gray scale output
Up to 8 bits of black/white gray scale output is available.

6. Double feed detection provided
Capable of indicating double feed occurrence by error alarm and LED indication (red light blinking) when documents are scanned.

7. Additional functions by option
Imprinter, Red color dropout unit and others can be attached.

Expected Life of Product
Whichever of the following three conditions comes first.
1) 5 years
2) Feeding: 3,000,000 sheets for ADF
3) Scanning 150,000 sheets for FB

II. SPECIFICATIONS

Category	Items	Descriptions
Appearance/Installation	1. Configuration	Desk-top type
	2. Power supply	AC100V, 50/60Hz AC120V, 50/60Hz AC220-240V, 50/60Hz
	3. Weight	31kg
	4. Temperature range	15-30°C (59-86°F)
	5. Humidity range	20-80%RH
	6. Maximum power consumption	1.8A (100V, 120V model) 1.0A (220-240V model)
	7. Noise	70dB or less
	8. Dimention	464(W) x 732(D) x 328(H)mm
	9. Output interface	SCSI-2

Table 1-1

Category	Items	Specifications	
		ADF	FB
Document reading	1. Reading method	CCD minification optical system (front side) Contact image sensor (back side)	CCD minification optical system
	2. Scanning method	Movement of document	Movement of CCD sensor carriage
	3. Optical resolution	400dpi (front side) 400dpi (back side)	400dpi
	4. Scanning resolution	100-600dpi (can be set by 1dpi)	100-600dpi (can be set by 1dpi)
	5. Light source	Green cold-cathode tube (front side) * Central wevelength λ=544nm Green/Red LED array (back side) * Central wavelength for green λ=570nm * Central wavelength for red λ=660nm	Green cold-cathode tube * Central wavelength λ=544nm
	6. Readable size	Width: 298mm, Length: 432mm	Width: 298mm, Length: 432mm

Table 1-2

Category	Items	Specifications
ADF document feeding	1. Document size	Minimum: width 106mm, length 148mm Maximum: width 306mm, length 432mm
	2. Paper thickness	Automatic feed: 50-127g/m^2 paper Manual feed: 40-127g/m^2 paper
	3. Document setting for pick-up	Aligning to the left, faced-up (picked up from the top)
	4. Delivery	Faced-down, stacked in regular order
	5. Feeding storage	Height: 20mm (or 200 sheets)
	6. Delivery storage	Height: 20mm (or 200 sheets)
	7. Feeding method	Automatic feed (AUTO)/Manual feed (MANUAL)
	8. Feeding mode	AUTO mode: Pick up stacked documents separating them one by one. MANUAL mode: Detect and pick up only a manually fed document. If more than 2 documents stuck are set, they can not be separated. Switching method of mode: Switching lever manually.
	9. Document size detection	A6, B6, A5, B5, A4/Letter/Legal, B4, A3, Ledger can be detected as typical sizes (in portrait direction). ＊ Unable to distinguish A4 size from Letter/Legal size. (In the service mode, it is possible to switch between A4 size series and Letter size series.)
	10. Skew angle detection	Skew angle can be detected up to 3 degrees, and detected data is transmitted to a PC.
	11. Skew detection	If skew angle is more than 3 degrees, feeding stops automatically.
	12. Documents excluded from guaranteed performance	• Any documents out of specified size or thickness for feeding. • Clipped or stapled documents. • Glued documents. • Uneven documents in thickness. (e.g. envelops, pasted documents) • Documents with wet ink. • Heat sensitive papers, carbon papers, non-carbon duplicate papers. • Greatly wrinkled or curled papers. (In principle, wrinkled or curled papers must be straightened before use.) • Creased or ripped papers. • Coated papers. • Fablics, metallic sheets, plastic sheets, and any documents made of non-paper materials. • Light-penetrating documents such as OHP sheet. • Photographic papers. • Any atypical papers in shape other than quadrangle. • Perforated papers. (Documents with only 2 holes punched can be fed, but holes should not be punched within 42 to 72mm from the left.)

Table 1-3 (To be continued)

Category	Items	Specifications						
ADF document feeding	13. Number of scanned documents * These number may differ depending on the computer used or other conditions.	No-compression (units=Simplex: sheets, Duplex: images)						

No-compression (units=Simplex: sheets, Duplex: images)

		100dpi	200dpi	300dpi	400dpi	500dpi	600dpi
Simplex	A4	55	45	31	24	14	11
	A3	44	36	22	14	8	6
	LTR	59	45	34	25	15	12
	LGR	43	37	22	14	8	6
Duplex	A4	108	82	43	27	17	12
	A3	80	52	24	14	8	5
	LTR	108	82	44	28	17	12
	LGR	78	50	24	14	8	5

MMR compression (units=Simplex: sheets, Duplex: images)

		100dpi	200dpi	300dpi	400dpi	500dpi	600dpi
Simplex	A4	55	45	31	24	19	15
	A3	44	36	24	18	13	8
	LTR	57	47	34	25	20	16
	LGR	43	34	24	18	13	8
Duplex	A4	108	82	59	44	34	28
	A3	82	64	46	34	22	14
	LTR	108	82	61	46	36	30
	LGR	80	62	44	34	22	14

Scanning conditions:

Method: counting the number of random sheets or images, excluding the first page and the last page, scanned continuously for 1 minute.

Document: CCITT No.1 (lengthwise)

Scanning mode: simple binary

Application software: PixView (Ver3.0)

Driver: ISIS

OS: Windows®95

CPU: Pentium® II 300MHz

Memory: 64MB

SCSI board: Adaptec AHA-2940AU

Table 1-3 (Continued)

Category	Items	Descriptions
Image processing	1. Image output method	Binary, Black/white gray scale (2bits, 3bits, 4bits, 8bits)
	2. Binary halftone method	Simple binary, Dither, Error diffusion ∗The following patterns are provided for dither output. • Bayer dither 64 • Bayer dither 16 • 0° halftone dot dither • 45° halftone dot dither • Downloaded dither by users (8 × 8, 5 patterns)
	3. Edge emphasis	5 steps in setting. ∗Smooth, None, Low, Medium, High
	4. Brightness	255 steps in setting.
	5. Contrast	16 steps in setting.
	6. Image processing	Mirror Image Black/white reversion Dot erasing (1 × 1, 2 × 2, 3 × 3, 4 × 4, 5 × 5, 6 × 6) Image area separation Ground-color follow Automatic binarising
	7. Image compression	MH, MR, MMR, JBIG, or No-compression
	8. Barcode detection	Type: Code39, Code 2/5 Interleaved, CODABAR Number of digits: 64, Size: width of minimum element (0.254mm), width of code (within readable area), height (10mm or higher), margins (10mm on each side [right/left]) Skew: 1° or less Direction: 0° or 180° designated Element ratio: 1: 2.2-3.0, PCS value: 0.75 or above Position: within readable area (margins included) Intervals: enough not to overlap each other (margins included) Number of barcodes: up to 5 areas on each side (front/back)
	9. Patch code detection	Type: Kodak Type2/3/T Size: width of minimum element (2mm), width of code (20mm), height (10mm or higher), margins (10mm on each side [right/left]) Skew: 1° or less Direction: 0° or 90° designated Element ratio: 1: 2.5, PCS value: 0.75 or above Position: within readable area (margins included) & enough intervals not to overlap with barcodes (margins included) Number of patch code: 1 area on each side (front/back)

Table 1-4

Category	Items	Descriptions
Others	1. Other functions	Double feed detection Dropout color for red (Option)
	2. Software packed	ISIS/TWAIN device driver PixView
	3. Options	Red lamp unit Imprinter Exchange Roller kit

Table 1-5
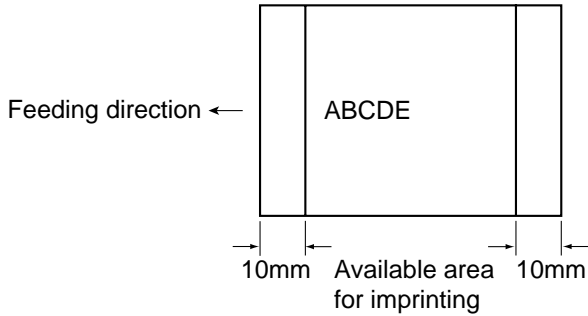
Category	Items	Descriptions
Imprinter	1. Imprinting positions	28, 62.5, 83.3, 97.5, 120.5, 141, 174.5, 202.5, 236,8, 248.5, and 270mm from the left.
	2. Area and direction available for imprinting	Up to 72 characters can be imprinted. Feeding direction ← ABCDE 10mm Available area 10mm for imprinting
	3. Imprinting resolution	Main imprinting direction (horizontal): 55.8dpi Subordinate imprinting direction (vertical): 95.1dpi
	4. Number of nozzles	12
	5. Characters available for imprinting	SP ! ” # $ % & ’ ( ) ∗ +, -. / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [¥] ^ _ a b c d e f g h i j k l m n o p q r s t u v w x y z {	} ¯ SP: space ¥: When “Japanese” is selected as display language on the operation panel, “¥” will be imprinted, but when other languages are selected, “\” will be imprinted.
	6. Temperature range	15-30°C (59-86°F)
	7. Humidity range	30-80%RH
	8. Documents unavailable for imprinting	Plastic films Coated papers
	9. Weight	0.6kg

Table 1-6

Category	Items	Descriptions
Imprinter head	1. Number of nozzles	12
	2. Resolution	Main imprinting direction (horizontal): 55.8dpi Sub imprinting direction (vertical): 95.1dpi
	3. Ink color	Black
	4. Estimated life	Approx. 500,000 characters (The life of IP Head for imprinting may be shortened depending on the priming process of nozzles.)
	5. Temperature range	15-30°C (59-86°F)
	6. Humidity range	30-80%RH
	7. Expiration for use	Before the expiration date indicated on the package. (For 2 years since its production date.) Once the package is opened, it should be used within 6 months.
Red lamp	1. Light source	Red cold-cathode tube *Central wevelength λ = 590 nm
	2. Supply	Red lamp unit including holder and Lamp Drive PCB.

Table 1-7

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

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. Electromagnetic Wave Interference Countermeasures

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

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

The "CAUTION LABEL" is affixed on the rear of the machine.

2. Power OFF in emergency

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

As it may cause injury, be careful not to get clothing (ties, long hairs, etc.) caught in the machine. If happened, turn the power off immediately.

Also, do not insert fingers in the feed assembly or under the document board while feeding documents.

3. Instruction Manual

Read the instruction manual thoroughly before using this machine.

4. Safety Precautions

a. Before servicing, unplug the power cord to prevent electrical shock hazard.

b. When replacing parts, use only manufacturer's recommended components for safety.

c. Check the condition of power cord. Replace if wear or if damage is evident.

d. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.

e. In the case of servicing with power ON, be cautious not to get an electric shock.

f. Do not touch any turning part until it stops completely. (Even if turning slowly, it may cause injury catching your fingers in. Pay enough attention to such turning parts as a fan.)

IV. NAMES OF PARTS

1. Front view

Document tray (Hopper)

ADF door release lever

ADF door

Document guide

Document cover

Manual feed select lever

ADF

Delivery document substopper

ADF release lever

Delivery document stopper

Fig. 1-1

2. Rear view

Document extension tray

Imprinter door

Power switch

SCSI Connectors

AC inlet

Fan exhaust vent

Power cord

Fig. 1-2

3. FB

Cover sheet

Operation panel

Standard mark

Power indicator

Document glass

Fig. 1-3

4. ADF

CIS glass

ADF glass
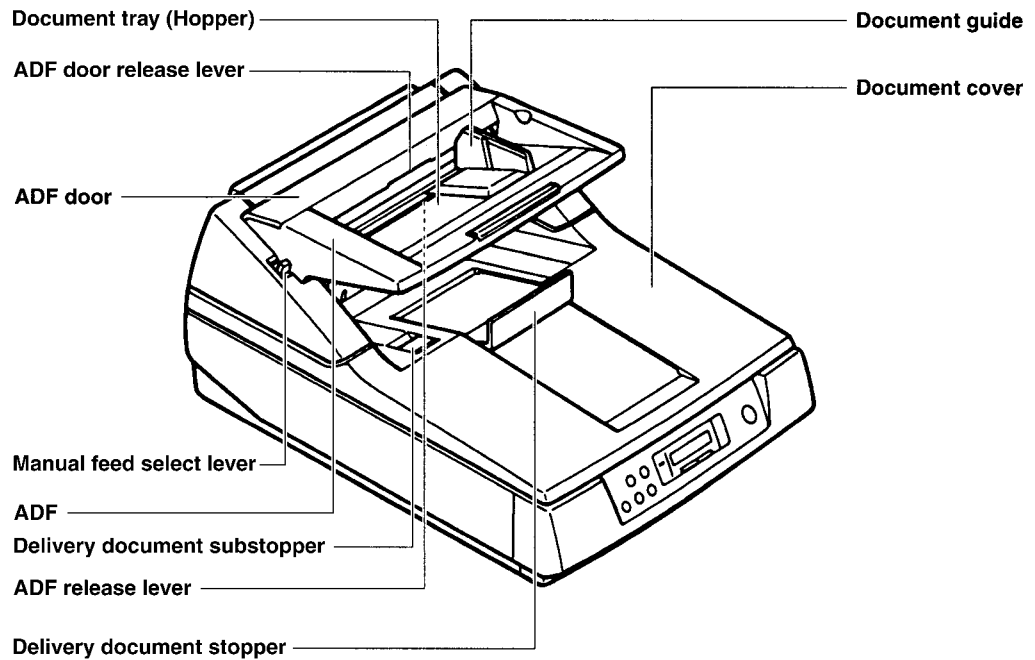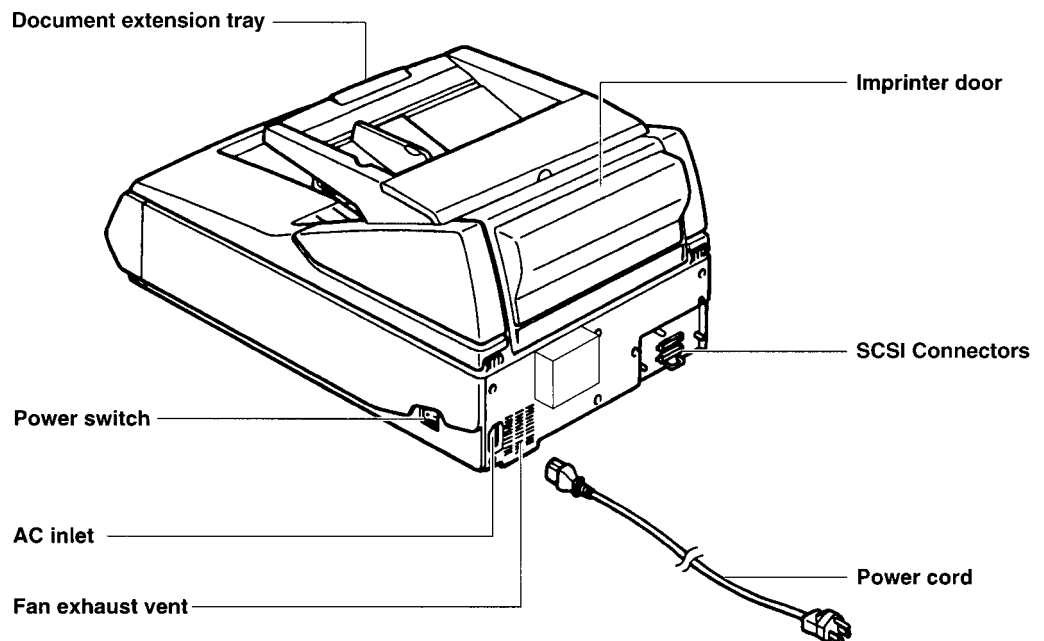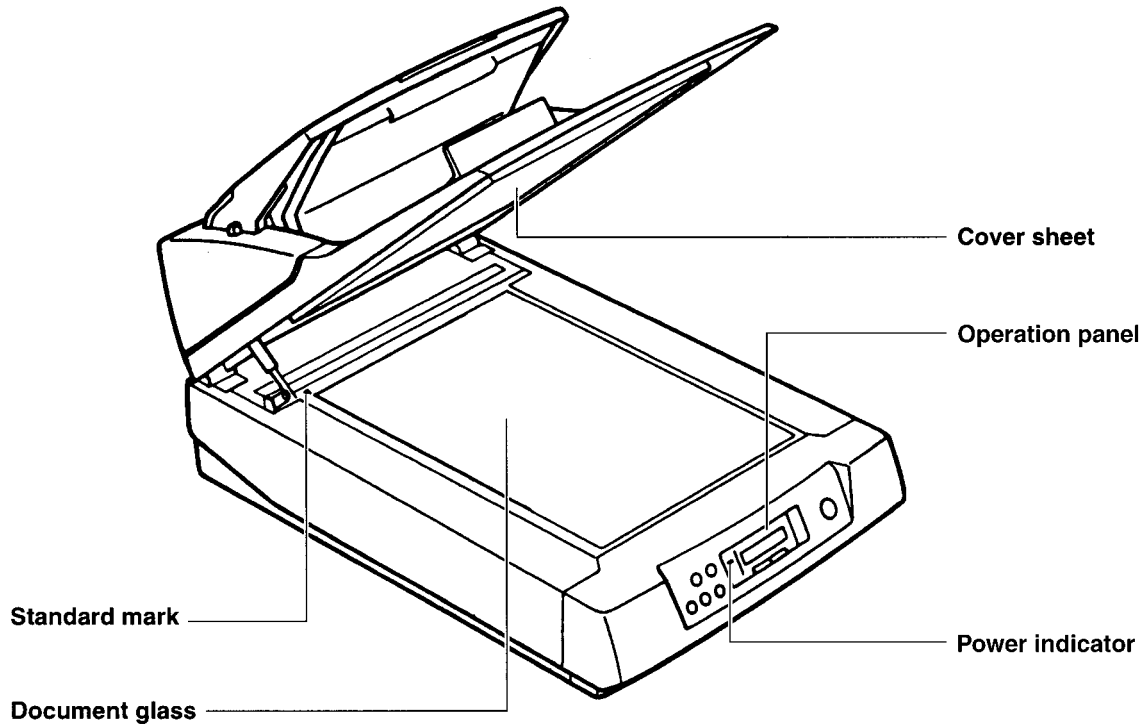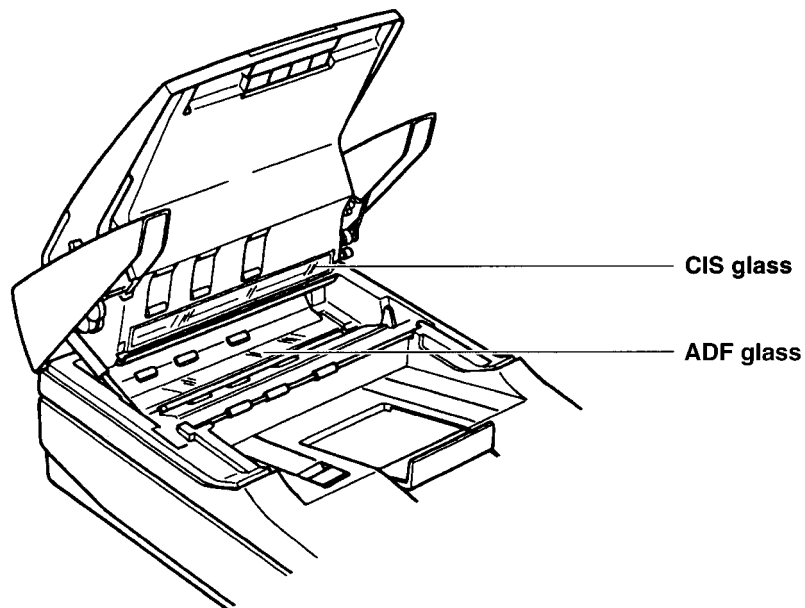
Fig. 1-4

V. DESCRIPTION OF OPERATION

A. SETTING

1. Display panel and keys

Fig. 1-5
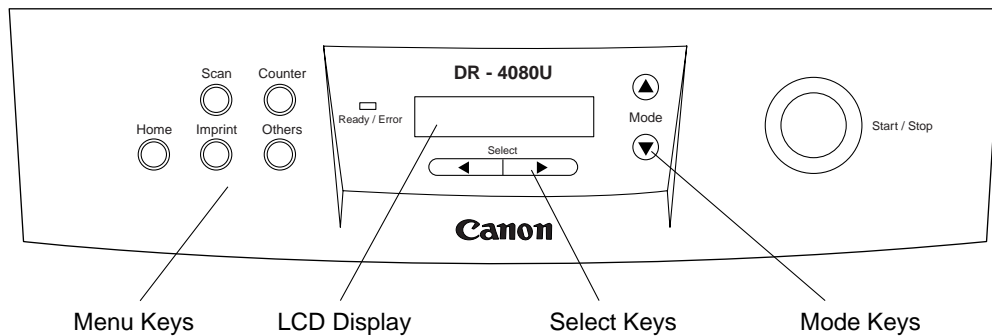
Scan : Press to enter the scan setting menu.

Counter : Press to enter the counter setting menu.

Imprint : Press to enter the imprinter setting menu.

Others : Press to enter other setting menu.

Home : Press to exit from the setting section and return to the ready status.
Also used to change the display language.

Start/Stop : Used to start or stop scanning a document.

LCD Display: Up to 32 characters can be displayed during scanning or setting.

▲ : Press to advance to the next mode in the selected menu.

▼ : Press to return to the previous mode in the selected menu.

► : Press to advance to the next value in the selected mode.

◄ : Press to return to the previous value in the selected mode.

2. Setting the language

a.   Turn the power on while pressing the Home key.

E	n	g	l	i	s	h							

Fig. 1-6

b.   Use the "▲" key or the "▼" key to select "English", "Japanese" or "German".

J	a	p	a	n	e	s	e						
ニ	ホ	ン	゛										

Fig. 1-7

c.   Press the Home key.
   • The display will change to the selected language, then the scanner will be ready.
   • This setting will remain until it is changed to another setting.

	レ	テ	゛	ィ									

Fig. 1-8

3. Setting the scanner (User Mode)

Fig. 1-9 shows a status changing flow.

By pressing another key, you can enter the other Setting Mode directly, without returning to the READY Mode.

The Imprinter Setting Mode will operate only if the Imprinter (optional) has been installed in the Main Unit.
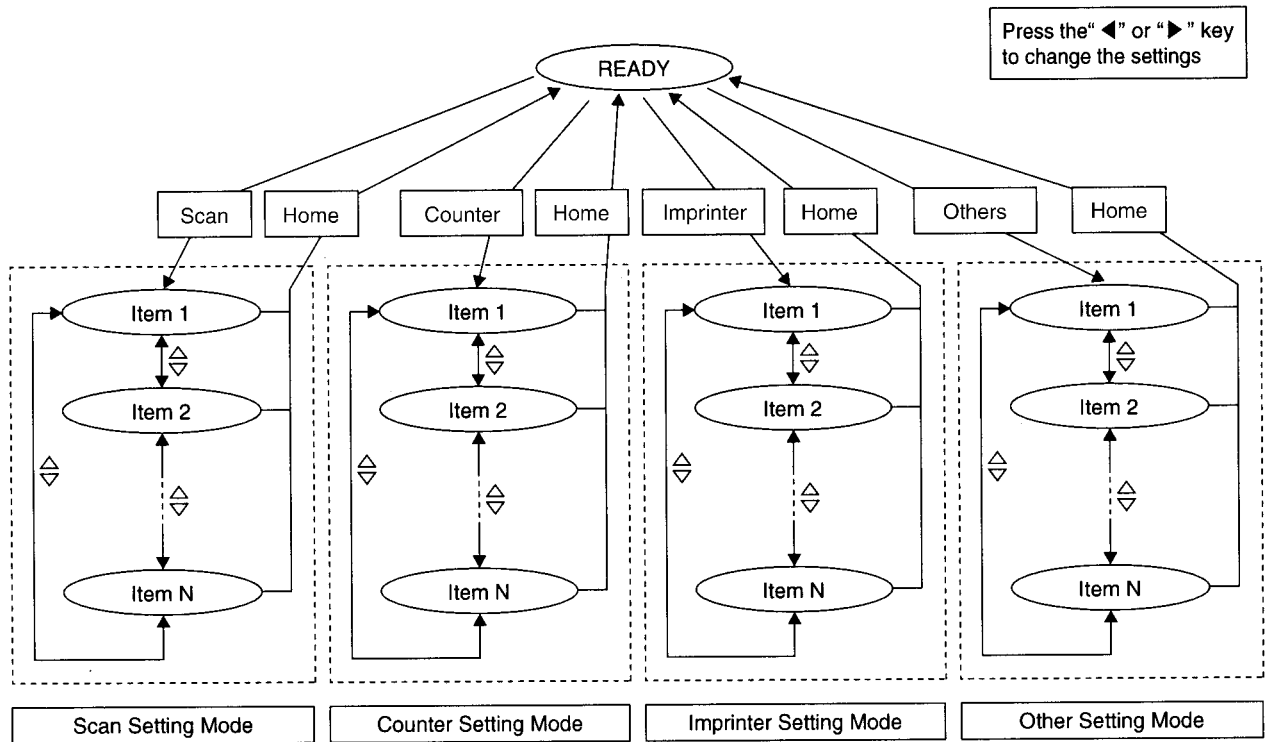

Fig. 1-9

a.   Scan Setting menu

Item	Contents
01. Front side brightness	Selection for density when scanning the front side of a document.
02. Front side image emphasis	Selection for emphasis when scanning the front side of a document.
03. Front side contrast	Selection for contrast when scanning the front side of a document.
04. Front side halftone	Selection for gradation when scanning the front side of a document.
05. Back side brightness	Selection for density when scanning the back side of a document.
06. Back side image emphasis	Selection for emphasis when scanning the back side of a document.
07. Back side contrast	Selection for contrast when scanning the back side of a document.
08. Back side halftone	Selection for gradation when scanning the back side of a document.
09. Dot erasing	Selection for dot erasing when scanning a document.
10. Double feed detection	Selection for choose to detect double feeding function.
11. Feed speed	Selection for feed speed when a document is being scanned.
12. Black line removal	Selection for choose to remove the black lines which appear at the top and bottom of the image after scanning the document.
13. Scanning mode	Selects whether documents are scanned at actual size or reduced (Fit to Page) size.
14. Save scanning settings (Select memory)	Selects the memory where the conditions are saved into.
14. Save scanning settings (Execution)	Saves the scanning conditions into the memory. (2 memory settings)
15. Load scanning setting	Loads the memory where the scanning conditions have already been saved. If "Default" is selected, all of the scanning conditions will return to the default values.

Table 1-8

b.   Counter Setting menu

Item	Contents
01. Select the counter displayed on the LCD	Selection to choose to display the cleared counter (scan counter) after scanning one time or to display the user set counter (user counter) on the LCD.
02. Setting the user counter	Selection for default number before scanning.
02. Setting the user counter extender	Selection for an increase in the default number.
02. Clear the user counter	Clears the counter which was set by the user.

Tabel 1-9

c.   Imprinter Setting menu

Depending on the setting of the "Counter setting menu", the page number of the scanned document will be printed. The imprinter option is required. If a host computer is connected, there may be settings required on the host computer as well.

Item	Contents
01. Setting the imprinter data	Allows for the selection of the printing content using an imprinter. The imprinter will print on the printing (front) side of the document scanned.
02. Setting the imprinter position	Allows for the selection of the printing position using a imprinter.

Table 1-10

d.   Other Setting menu

Item	Contents
01. Displaying the version	Displays the firmware version of the machine and imprinter. If an optional imprinter is not installed, the imprinter version will not be displayed.
02. Setting the buzzer	Selects whether the buzzer is turned on or off. If selection is in the "ON" position: When pressing a key, one short beep will be heard. When there is an error, 5 short beeps will be heard. When scanning is completed correctly, one long beep will be heard.
03. Setting the SCSI ID	Sets the SCSI ID number.
04. Setting the terminator	Sets "Enable" or "Disable".
05. Checking the roller cleaning warning	The alarm tells you it is time to check the roller. If it is near 100%, clean the roller.
05. Clearing the roller cleaning warning	Clear the "Clean Roller Warning ○○%" display.
06. Checking the roller modules replacement warning	The alarm tells you the roller needs to be changed. If it is near 100%, replace the pickup roller, separation roller and retard roller.
06. Clearing the roller modules replacement warning	Clear the "Replace Roll. Warning ○○%" display.
07. Displaying the product name	Displays the product name DR-4080U.
08. Setting the double feed sensor sesitivity	Selects the sensitivity of the Double Feed Sensor.
09. Setting the skew detection	Selects whether to detect skew to stop feeding or not.

Table 1-11

e.   Setting List

Mode		Item	Setting Contents (by pushing the "▶" or "◀" key)									Default
Scan Setting Mode	1	F. Brightness	Host	D4	D3	D2	D1	Normal	L1	L2	L3	L4	Host
	2	F. Emphasis	Host	Smooth	None	Low	Medium	High				Host
	3	F. Contrast	Host	H4	H3	H2	H1	Norm	L1	L2	L3	L4	Host
	4	F. Halftone	Host	Binary	Dither 64	Dither 16	Holftone Dot 32	Halftone Dot 64	Error diffusion			Host
	5	B. Brightness	Host	D4	D3	D2	D1	Normal	L1	L2	L3	L4	Host
	6	B. Emphasis	Host	Smooth	None	Low	Medium	High				Host
	7	B. Contrast	Host	H4	H3	H2	H1	Norm	L1	L2	L3	L4	Host
	8	B. Halftone	Host	Binary	Dither 64	Dither 16	Halftone Dot 32	Halftone Dot 64	Error diffusion			Host
	9	Dot Erasing	Host	None	1×1	2×2	3×3	4×4	5×5	6×6		Host
	10	Double Feed	Host	Not detect	Detect							Host
	11	Feed Speed	Host	Normal	Slow							Host
	12	Black Line	Host	Disable	Enable							Host
	13	Scanning Mode	Host	Actual	Fit to Page							Host
	14	Select Memory for saving scan condition	Memory1	Memory2								Memory1
		Set saving scan condition	Exec									
	15	Load Setting for scan condition	Memory1	Memory2	Default							Default
Counter Setting Mode	1	Disp. Counter	Scan	User								Scan
	2	Set User Counter	0-									0
		Set Increment value for User Counter	+1-+9									+1
		Clear User Counter	Clear									
Imprinter Setting Mode	1	Imprinter	Host	Count								Host
	2	Imprinter position	0-72 Char									0
Other Setting Mode	1	Version										
	2	Buzzer	ON	OFF								ON
	3	SCSI ID	0-7									6
	4	Terminator	Enable	Disable								Enable
	5	Clean Roller Warning	%									0%
		Clear "Clean Roller Warning"	Clear									
	6	Replace Roller Warning	%									0%
		Clear "Replace Roller Warning"	Clear									
	7	Product Name	DR-4080U									DR-4080U
	8	Double feed sensor sensitiviry	Host	Normal	High Sensitivity	Low Sensitivity						Host
	9	Skew detection	Detect	Not detect								Detect

The Imprinter Setting Mode can be entered only if the Imprinter is Installed.

Table 1-12

B. BASIC OPERATION

1. Loading Documents on the ADF

a. Documents that have been stapled together or stacked together (as in a file folder), will need to be separated.

  ① Fan the stack of documents to separate all the edges.

  ② Hold both ends and bend the documents as shown in Fig. 1-10.

  ③ To straighten the documents, hold firmly and pull them apart as shown in Fig. 1-10.
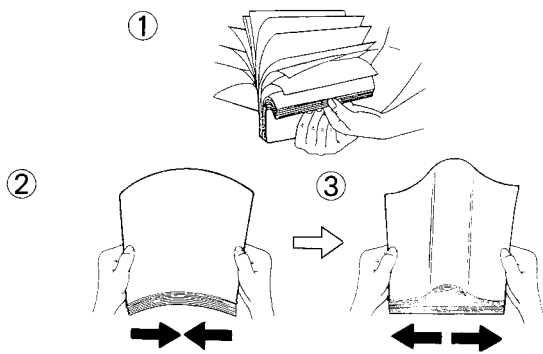
Repeat these steps as necessary.

Fig. 1-10

b. Carefully align the documents.

c. Adjust the document guide slightly larger than the actual size of the document.
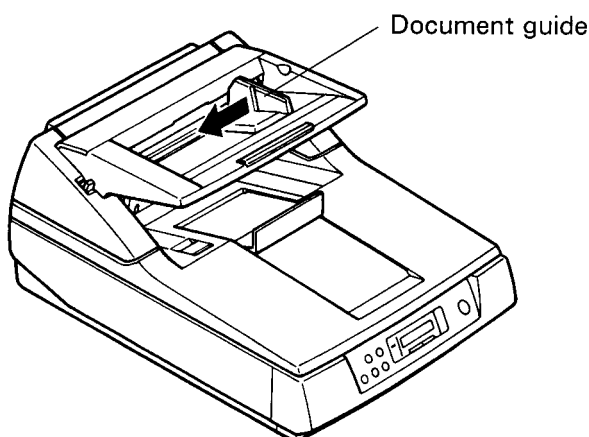

Fig. 1-11

d. Place the documents on the document tray with the side to be scanned facing up. Then push them in the direction of the arrow until they stop.

- Place the documents on the document tray by matching them with the left side of the document tray.

- For different sized documents, place them with the top left ends facing the left side of the document tray.
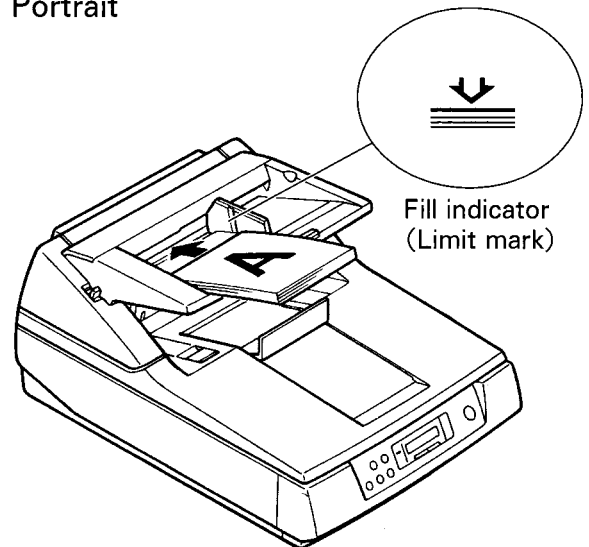
Portrait

Fill indicator
(Limit mark)

Fig. 1-12
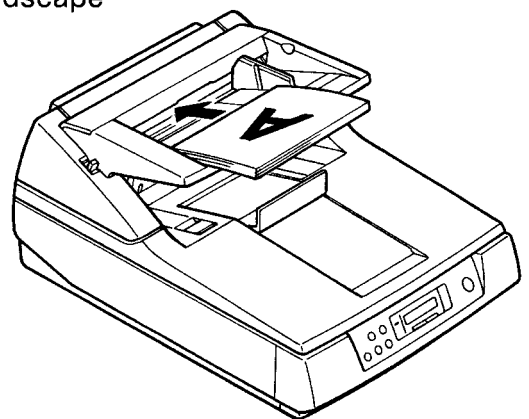
Landscape

Fig. 1-13

e. Adjust the document guide to the size of the document to be scanned.
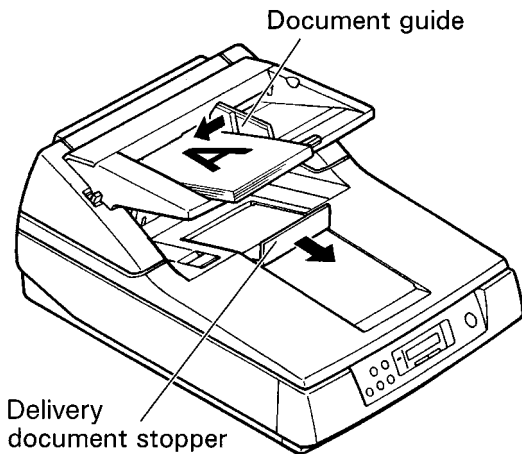   Adjust the delivery document stopper to the size of the document to be output, if required.

Fig. 1-14
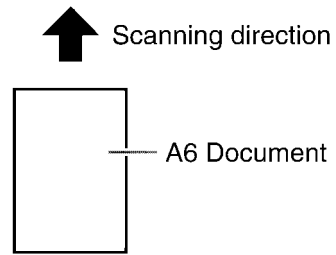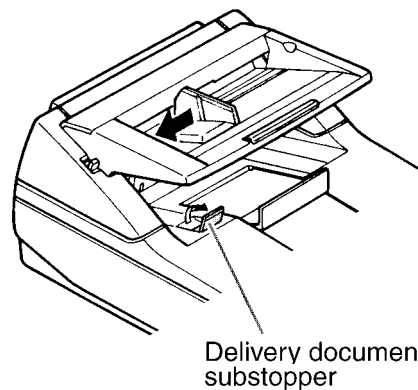
f. When using long paper, pull out the document extension tray from the hopper and the delivery document stopper from the document cover. Then adjust the delivery document stopper above the document cover a little longer than the actual length of the documnet. (See Fig. 1-15)
    When scanning A6 documents as shown Fig. 1-16, pull up the delivery document substopper. (See Fig. 1-17)
    After using the delivery document substopper, pull down it.
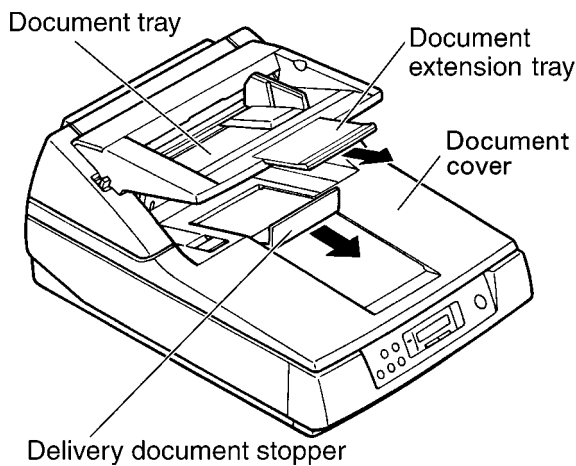
Fig. 1-15

Fig. 1-16

Fig. 1-17

2. Loading Documents on the Flatbed

a. Open the document cover.
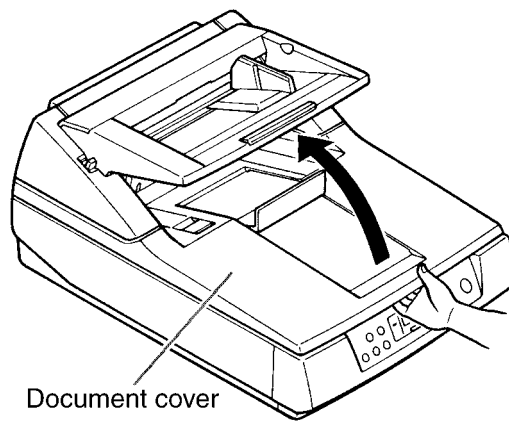
Fig. 1-18

b. Place the scanning side of the document face down on top of the document glass.
    • If the document is bent or folded, straighten it.

c. Match the longer side of the document with the standard mark.

Fig. 1-19

d. Close the document cover gently.
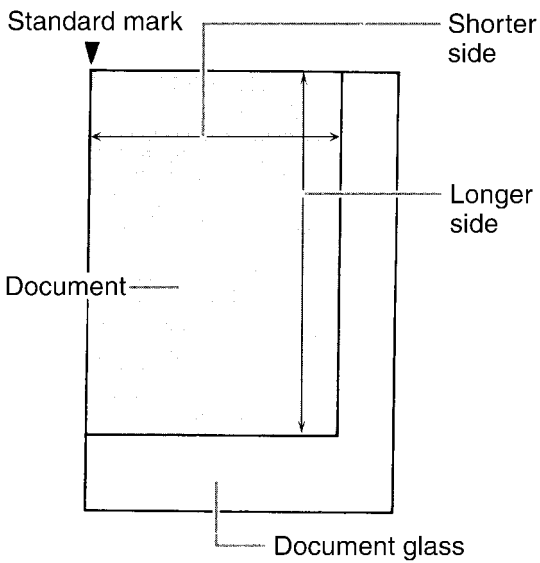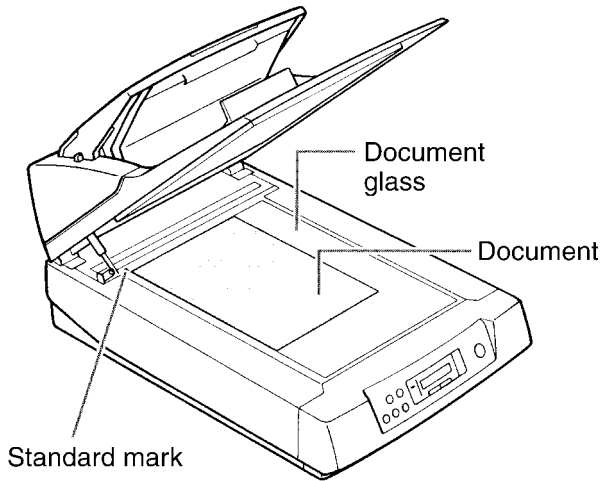
3. Feeding a Document Manually

When scanning a thin document with the ADF, set the manual feed select lever to "MANUAL" and the pages can be scanned one page at a time.

a. Set the manual feed select lever to "MANUAL".
    • The document tray is raised.
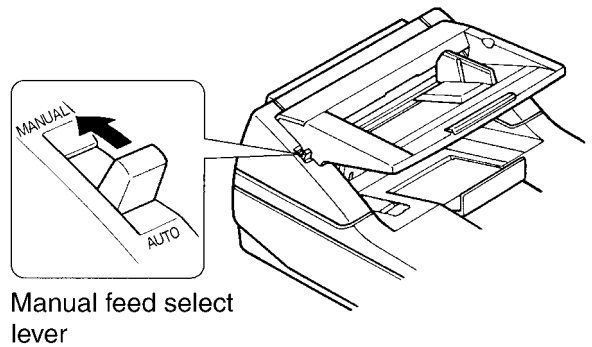
Fig. 1-20

b. Match the document guide with the size of the document.

Fig. 1-21

c. Insert the document into the paper slot one page at a time.

Note: Please remove any staples from the document before use.
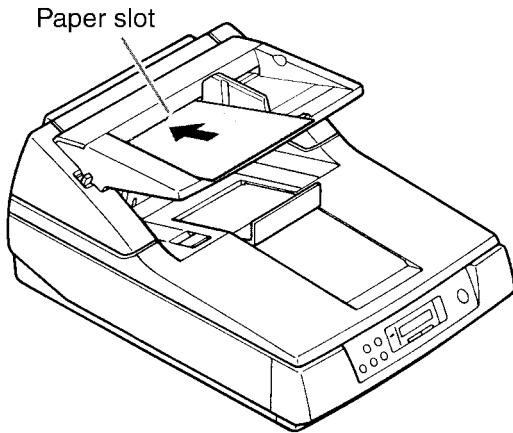
Fig. 1-22

C. CLEARING PAPER JAMS

Torn documents, thin documents or documents that are creased on the top edge may cause paper jams. If a paper jam occurs ("U xx JAM" will be displayed on the LCD), remove the jammed document according to the following procedure.

1. Removing paper jams from the pickup section

a. Use your fingers to hold down the ADF door release lever, open the ADF door and pull the jammed document towards the pickup section.
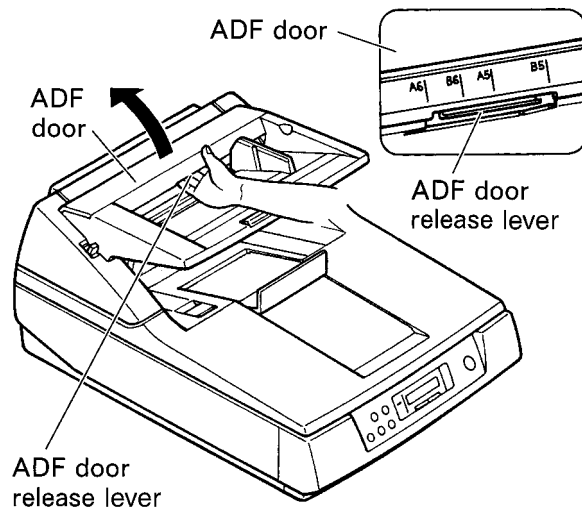
Fig. 1-23

b. Then close the ADF door.
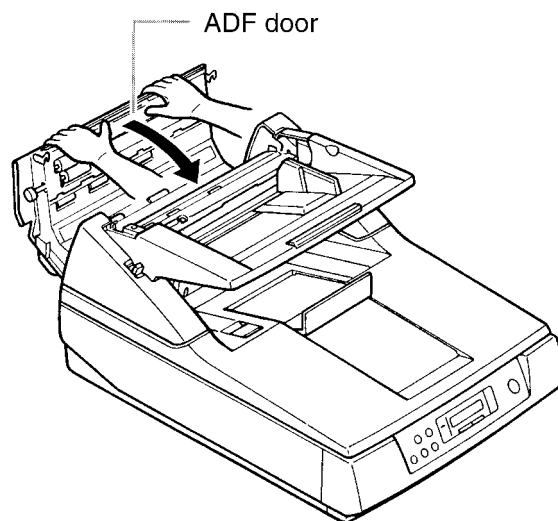
Fig. 1-24

2. Removing paper jams from the delivery section

a. If a jammed document appears at the exit part, open the front door and pull the document forward.
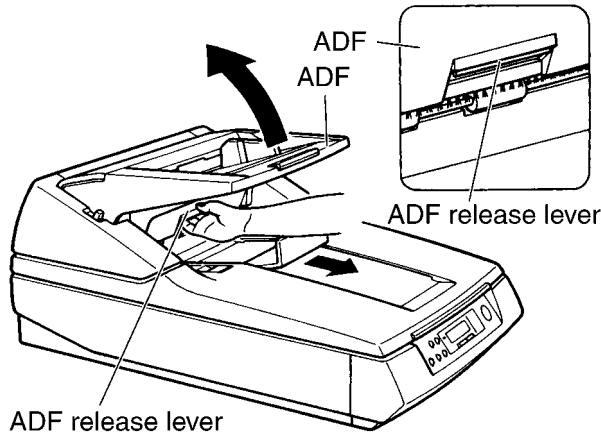
Fig. 1-25

b. Then close the front door.
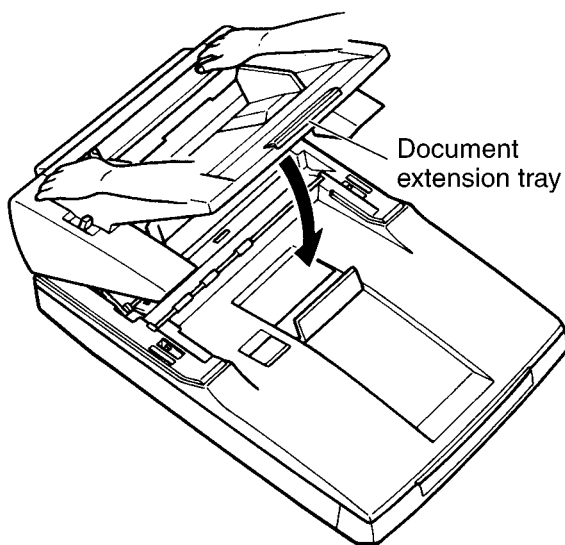
Fig. 1-26

D. REPLACING CONSUMABLE

1. Exchange Roller kit

If "Warning Replace Roller" message is displayed on the LCD, replace the pickup roller, separation roller and retard roller at the same time.

a. Turn the power off and unplug the power cord.
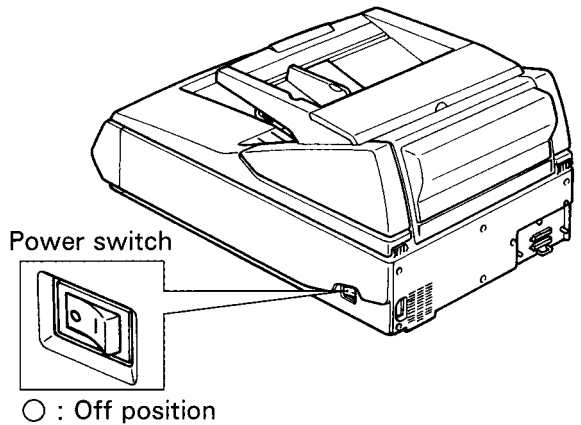
Fig. 1-27

b. Using your fingers, hold down the ADF door release lever, then open the ADF door completely.
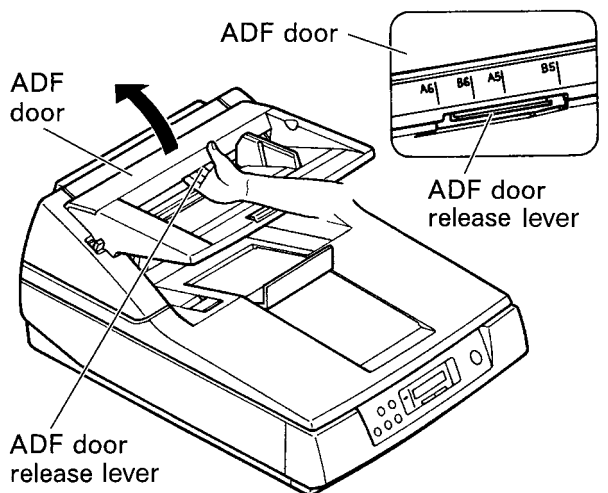
Fig. 1-28

c. Using your fingers, hold the upper guide plate and pull it towards you to open it.
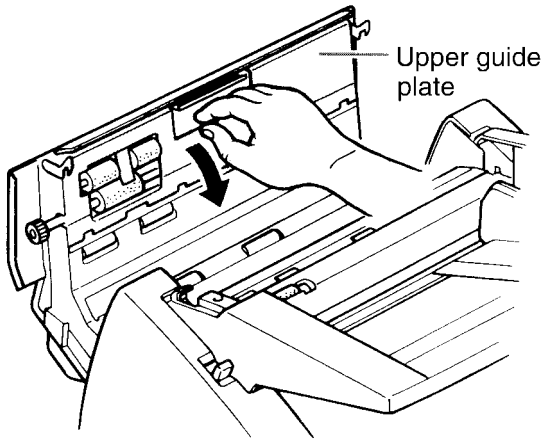
Fig. 1-29

d. Remove the upper guide plate by first lifting it slightly and then pulling it toward you.
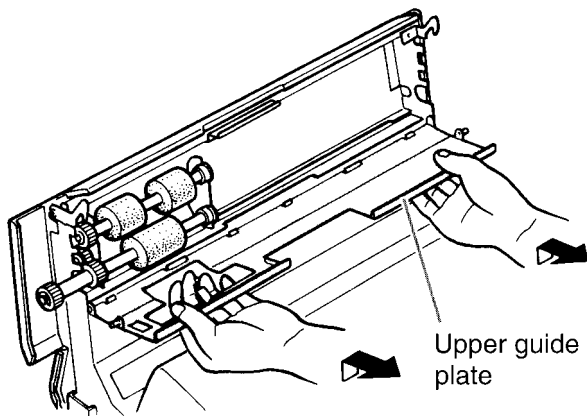
Fig. 1-30

e. Hold the pickup roller gear and pull the gear side in the direction of arrow ①. Now slide the gear side in the direction of arrow ②. Next, hold the seperation roller gear and pull the gear side in the direction of arrow ③, and then slide it in the direction of arrow ④ to remove it.
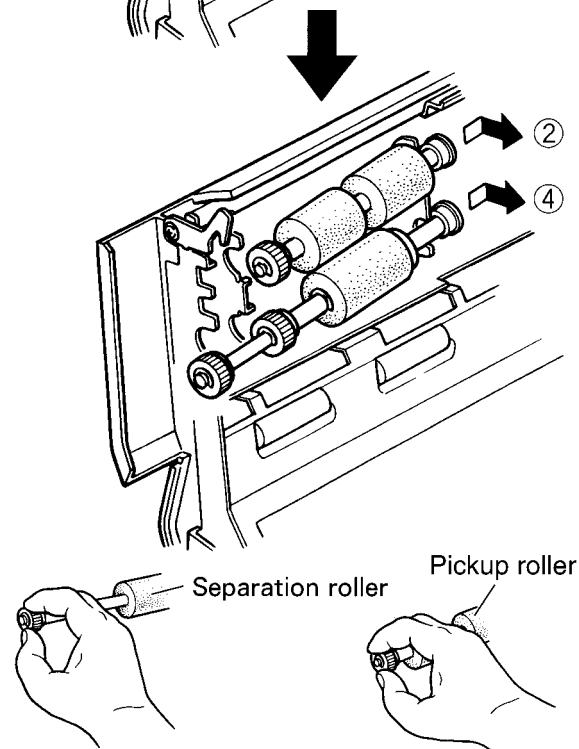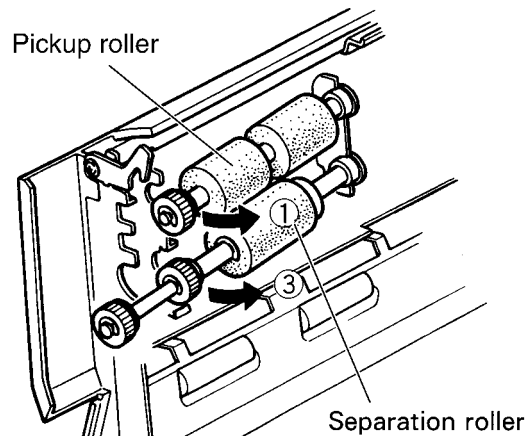
Fig. 1-31

f. Open the optional "Exchange Roller Kit", and take out the pickup roller and separation roller.

g. Install the new pickup roller and separation roller with the gears on the left side and the postgear side bearing slide into the right side guide grooves of the chassis. (①)
Then push up the gear side bearings until they click into place. (②)

•   Match the pickup roller and separation roller with the bearings and guide grooves, and then attach them.
When attaching the pickup roller and separation roller, push each bearing in the direction of the arrow ⇐ and attach.
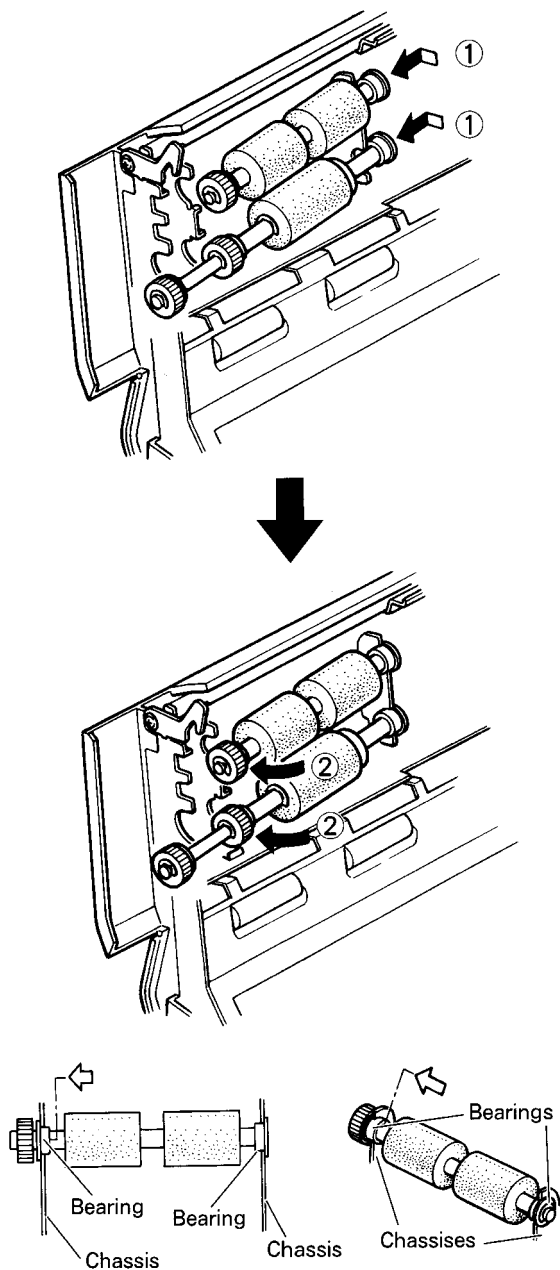
h. Tilt the upper guide plate at a slight angle pointing downward and attach it as shown in Fig. 1-33.
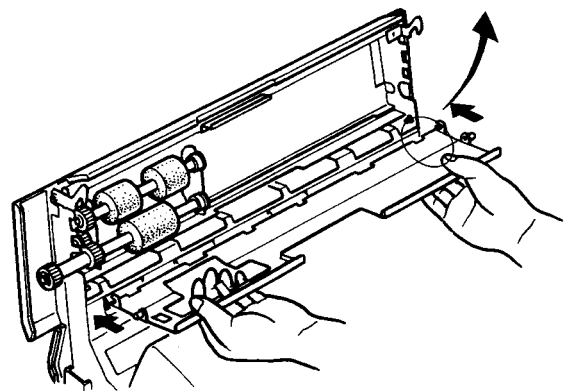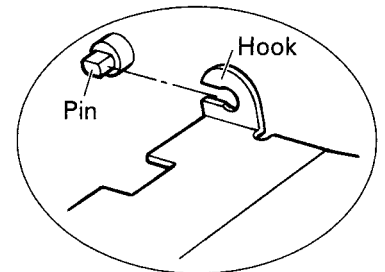
Fig. 1-33

i. Close the upper guide plate.

•   Push up the upper guide plate until it clicks into place.

Upper guide plate
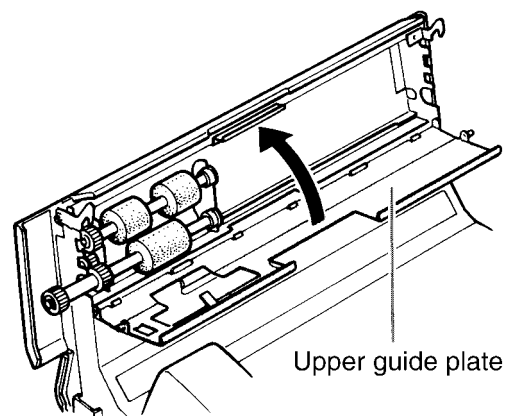
Fig. 1-34

Fig. 1-32

j. Using your fingers, hold the pickup guide plate and pull it towards you to open it.
    • When the conveyor is pulled towards you, the click-stop mechanism will be released.

Retard roller
Document guide
Pickup guide plate
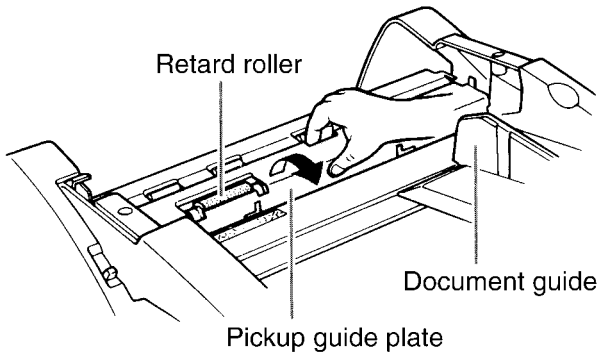
Fig. 1-35

k. Pull the right side of the shaft in the direction of arrow ① and hold it there.
    Pull the retard roller in the direction of arrow ②, and then remove it.

②
①
Shaft
Retard roller
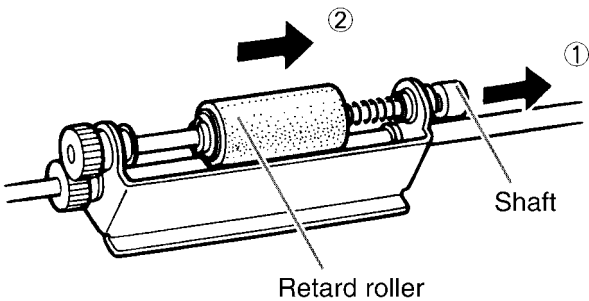
Fig. 1-36

l. Take out the retard roller in the optional "Exchange Roller Kit".
m. Pull the right side of the shaft in the direction of arrow ① and hold it there.
    Attach the new retard roller as shown in the direction of arrow ②. Return the right side of the shaft as shown in the direction of arrow ③.
Note: When the pin is not inserted in the notch properly, it may cause double feeding or a paper jam.

Retard roller
①
Shaft
②   ③
Notch A
Pin A
Pin B
Notch B
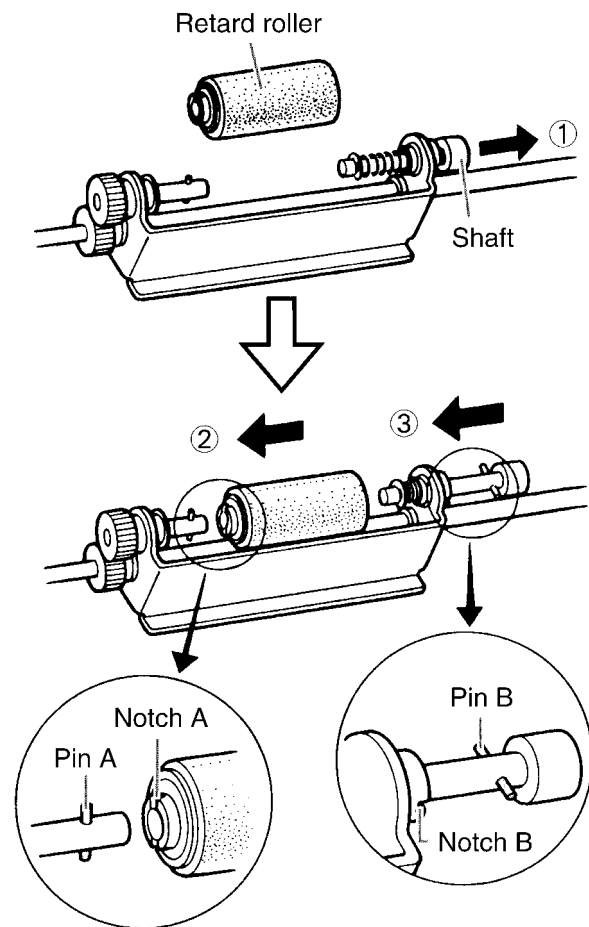
Fig. 1-37

n. While pushing down the retard roller, hold the pickup guide plate using hand, and close the pickup guide plate by pushing it into the unit.
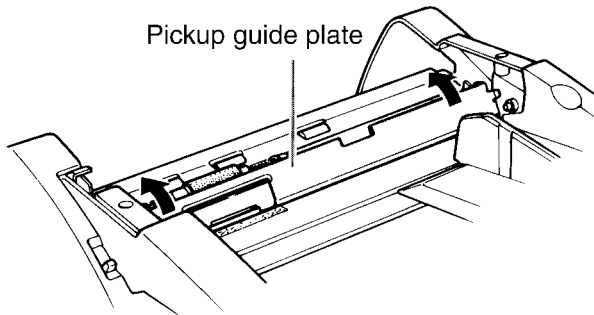
Fig. 1-38

o. Close the ADF door.
    • Push both sides of the ADF door down gently until it clicks into place.
    • After replacing rollers, clear the "Replace Roll. Warning" display.
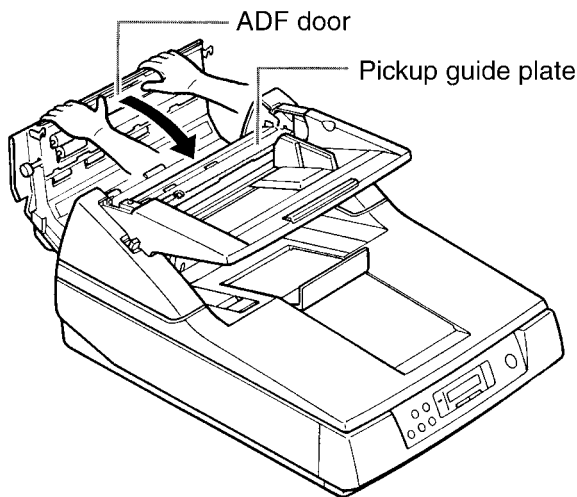
Fig. 1-39

2. Installing the Ink Cartridge

a. Press the protective sheet of the ink bag slowly using the pin until the ink accumulates as shown in the Fig. 1-40.
    • Because the ink bag may break, press the protective sheet.
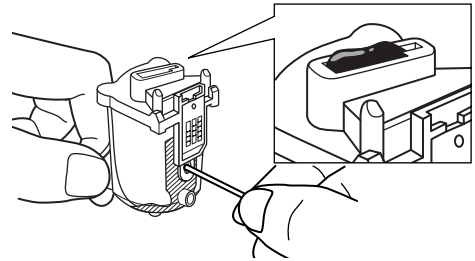
Fig. 1-40

b. Remove any excess ink with tissue paper.
c. Insert the ink cartridge's top side into the carriage. (①)
    Press the bottom side of the ink cartridge (②) into the carriage and then lock the ink cartridge adjusting lever. (③)
    • Follow the sequence of ① through ③ in the Fig. 4-41.
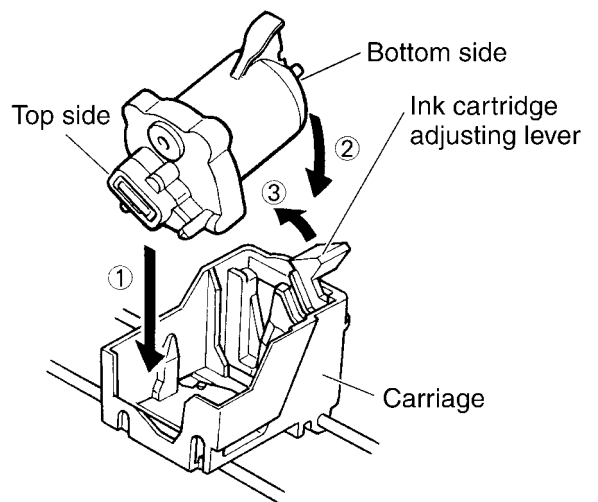
Fig. 1-41

Correcting faulty printing
- If the tip of the ink cartridge is dirty or the ink cartridge is not used for a long period of time, it may not print properly. Follow steps a. and b. in "Installing the Ink Cartridge", until the ink flows properly.
- If the ink does not flow even after performing the procedures above, the ink cartridge is at the end of its life.

VI. REGULAR INSPECTION BY USERS

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

1. Exterior
• Covers
  wipe with a cloth moistened with water or neutral detergent, and then wipe dry.

2. Optical Path
Wipe the following parts with a cloth moistened with water, and then wipe dry.
  • CIS glass
  • Document glass
  • White plate
  • CIS platen roller

3. Document Feed
Wipe the following rollers with a cloth moistened with water, and then wipe dry.
  • Pickup roller
  • Separation roller
  • Retard roller
  • Other feed rollers
Wipe off the dusts on the following sensor assemblies with a blower.
  • Document sensor
  • Size sensor
  • Double feed sensor
  • Starting position sensor
  • Delivery sensor
Note: Clean each of the rollers rotating them in the feed direction.

Moreover, as the power cord is plugged to the outlet for a long period of time, dust lay on the connected part and may cause leakage, fire and electric shock. To prevent this, instruct users to clean it regularly.

For the option (impriter, etc.), refer to the instruction manual about regular inspection by users.

CHAPTER 2

BASIC DESCRIPTION

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

I. OUTLINE

Fig. 2-1 shows a block diagram of the image processing.

Image Sensor	→	Amplifier	→	A/D converter	→	Image processor 1	→	Image processor 2	→	Image memory

Amplifier
- Amplification of signals
- Black clamp

Image processor 1
- Rearrangement of picture elements
- Ground-color follow
- Shading compensation
- Image resolution conversion
- Barcode processing

Image processor 2
- Simple binarizing
- Edge emphasis
- Dither processing
- Error diffusion
- Dot erasing
- Image area separation
- Gamma compensation
- Black/white reversion
- Mirror image
- Bit number changing

DMA controller
- Image memory
- Image compression processor
- SCSI controller → To personal computer

Fig. 2-1

Electric signals (analog) proportional to the density of each picture element, read by the image sensor, are sent one after another to the amplifier and the amplified signals are then sent to the A/D converter. At the A/D converter, the signals are converted to the digital signals proportional to the density.

Next, the signals separated into two pieces of 9 bit data respectively for the front and the back are sent to Image processor 1 where the following image processing is carried out.
- Rearrangement of picture elements
- Ground-color follow
- Shading compensation
- Image resolution conversion
- Barcode processing

The digital signals, after being processed by Image processor 1, are sent as a piece of 8 bit data to Image processor 2 where the following processing is carried out.
- Simple binarizing
- Edge emphasis
- Dither processing
- Error diffusion
- Dot erasing
- Image area separation
- Gamma compensation
- Black/white reversion
- Mirror image
- Bit number changing

The image data converted from the digital signals is sent in 16 bits to the DMA controller when the picture elements are accumulated to 16 for simple binary, or to 2 for gray scale.

The DMA controller consists of the image memory where image data and compressed image data is stored, the image compression processor where image compression by the MH, MR, MMR, or JBIG method is carried out, and the SCSI controller. Each of these sections controls data transfer with high speed via the DMA controller.

The image data processed by the DMA controller is stored in the image memory, and then sent to a personal computer via the SCSI controller.

II. IMAGE READING ASSEMBLY

1. Outline

Fig. 2-2 shows a composite diagram of the image reading assembly.

FB (Flatbed) and the front of a document for ADF (Automatic Document Feeding) are illuminated by a lamp (green cold-cathode tube). The reflected light is detected by photosensitive elements (CCD) via five mirrors and a lens, and then converted into electric signals.

The back of the document for ADF is illuminated by LED arrays. The reflected light is detected by photosensitive elements (CIS), and then converted into electric signals.

The image of the document is resolved into picture elements by the photosensitive elements, and the electrical signals corresponding to the density of each picture element are subjected to various processing by the image processor.
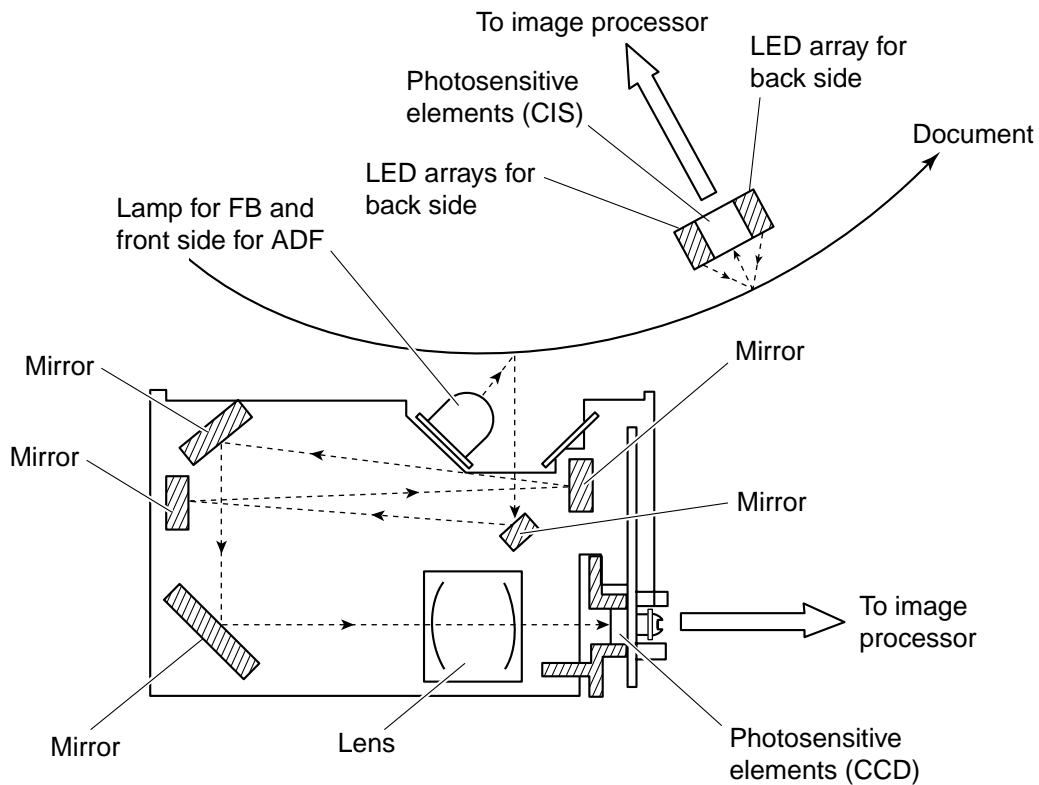
Fig. 2-2

2. Image Sensor

In this machine, CCD (Change-Coupled Device) is used as a photosensitive element device for FB and the front of a document for ADF. This CCD is a linear sensor consisting of 5,150 picture elements.

CIS (Contact Image Sensor) is also used as a photosensitive element device for the back of the document for ADF. This CIS is a linear sensor consisting of 4,736 picture elements.

Both CCD and CIS are adaptable to 400dpi optical resolution.

3. Light Source

In this machine, a green cold-cathode tube lamp is used as a light source to illuminate FB and the front of a document for ADF. A red cold-cathode tube lamp is available for the purpose of the red color dropout by option.

Two rows of LED arrays are used as light sources to illuminate the back of the document for ADF. These LED arrays contain green and red LEDs so that they can carry out the red color dropout. The green and red LEDs are lined up as shown in Fig. 2-3.

(G) (R) (G) (R) (G) (R) (G)

Fig. 2-3

4. Image Data

This machine scans an image and outputs it as image data to a personal computer.

DR-4080U selects and outputs binary image data and gray scale image data.

The following describes the differences between the respective image data.

a. Binary image data

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

As binary image data has just two tones, black and white, per picture element, it cannot output gray and other half tones. (Refer to Fig. 2-4.)

There are two kinds of processing; simple binary processing which divides tones into two at the specified level, and dither and error diffusion pro-

cessing which compensate the reproducibility of the tones.

Document   Image data
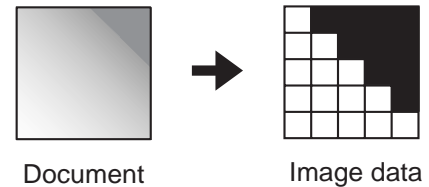
Fig. 2-4

b. Gray scale image data

Image data which can express not only black and white but gray and other half tones is called gray scale image data.

The number of tones becomes greater the more the number of bits per picture element. (Refer to Fig. 2-5.)

Document   Image data
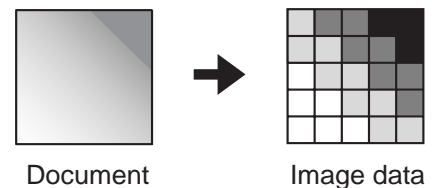
Fig. 2-5

III. Image Processing

The following describes various image processing. (Regarding an overall block diagram, refer to Fig. 2-1)

1. Black Clamp

Amplifying and black clamping of signals are carried out at the amplifier.

The light from the LEDs can not reach some parts of the photosensitive elements of the image sensor. The signals of those parts are called black level signals.

The difference between the voltage proportionate to the image density and the standard voltage is output from the image sensor.

As the true signal is the difference between the voltage proportionate to the image density and the black level signal, if the black level signal differs from the standard voltage, the true signal will not be amplified.

Making the black level signal the same as the standard voltage is called black clamping. This processing makes it possible to amplify the true signal. In the case of DR-4080U, this processing is carried out by the internal IC of the image sensor unit.

2. A/D Conversion

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

Fig. 2-6 shows the outputs of the digital signals after A/D conversion when they are 4 bit signals. (The input voltages shown differ from the actual values.)

If the output is in 4 bits, it is possible to output 16 types of values.

This machine outputs 8 bits at maximum, so 256 tonal values can be obtained.

As the number of output bits increases, the resulting digital signal represents the changes in image density of the document more faithfully with good tonality.
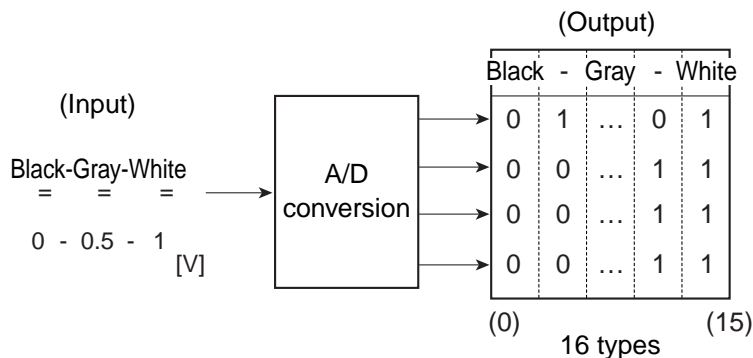
Fig. 2-6

3.   Rearrangement of Picture Elements

The image sensor (CIS) for the back side outputs picture element data dividing into two, the first half and the second half, so as to save time.

Because of that, Image processor 1 is equipped with 3 pieces of 32KB line buffer memory to rearrange the divided output picture element data mentioned above in the order of the original document.

4.   Ground-color Follow

Ground-color follow is a kind of processing which automatically adjusts the density of a document proportionate to the ground-color density of the document.

Firstly, this machine adjusts the density of the image for the front side of ADF by the analog amplifier after the CCD, and for the back side of ADF by adjusting the LED light intensity.

Secondly, this machine performs fine adjustment for the front and back sides in Image processor 1 that has the function of a digital amplifier.

The first analog adjustment is done in the beginning of continuous reading and the adjustment by the digital amplifier is done to the documents one by one.

5.   Shading Compensation (Black Compensation)

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

Compensation is done by storing in memory as compensation values the output from the image sensor on the condition that light sources are turned off, and then subtracting the compensation values from the output when an image is scanned.

Black clamping together with shading compensation (black compensation) is sometimes called the black compensation.

6.   Shading Compensation (White Compensation)

The output from the image sensor for each picture element can not be a uniform value, even if all the reflected light is detected by image sensor from a document whose whole density is uniform in the scanning direction. The reasons are as follows:

1)   The light intensity of each lamp is uneven.
2)   The light intensity of each LED is different.
3)   Each sensitivity of photosensitive elements in the image sensor is different.

To compensate unevenness in the output from the image sensor, as mentioned above, is called shading compensation.

In other words, when the reflected light from a document with uniform density is detected by image sensor, compensation is carried out by multiplying each image sensor output (corresponding to each picture element) with a fixed compensation factor so that all the outputs are equal.

The shading compensation data is stored in the program ROM (flash memory) and used after being copied in the shading RAM when the power of the machine is turned on.

7.   Resolution Conversion

Resolutions, in both horizontal and vertical scanning directions, can be selected in this machine between 600 dpi and 100 dpi (optionally set at 1 dpi intervals).

In the vertical scanning direction, the resolution is the same as the resolution selected at the horizontal scanning direction.

In the horizontal direction, documents are scanned with linear segment complementation. In the vertical direction, documents are scanned by changing the feeding speed of the documents for ADF, or by changing the moving speed of the carriage for FB.

In addition, in the case of 150 dpi or less resolutions (down to 100 dpi), neither the feeding speed of the documents nor the moving speed of the carriage can be increased; therefore, the documents are scanned by lowering the operating clocks of the image sensor.

8. Barcode Processing

As a method of barcode detection, this machine employs decoding by the software of a microcomputer. The image within the designated area for a barcode is recorded as 400dpi raw data in the barcode RAM, and then decoded by the software of the microcomputer.

With this machine, it is possible to designate up to 5 areas each for the front and back sides.

9. Simple Binarizing

Binary image data can only express picture elements in either "black" or "white."

In order to separate one picture element into either black or white, signals corresponding to the image density of the document must be cut off at a certain level, and anything above that level judged as "white" and anything below as "black." This is called binarizing.

The level, at which picture elements are to be divided into white or black, is called the "slice level" (or threshold value).

To binarize by changing the slice level without the dither or error diffusion processing is called the simple binarizing. This is good for text documents.

10. Edge Emphasis

Edge emphasis is a kind of processing which emphasizes light and shade in order to make the image appear sharp.

With this machine, it is possible to select the edge emphasis among 5 steps.

11. Dither Processing

In the case of scanning photographic documents, black and white, such as binary data, alone can not express halftone. Therefore, an image processing method called dither processing is used to express the halftone.

The dither processing is a processing method which gathers some picture elements in a block and expresses the density per block.

As to this machine, 64 (8×8) picture elements make 1 block. The data of the respective picture elements and the slice level of their dither patterns are compared so as to separate the block into black or white.

The following four patterns are available to be selected as a dither pattern.
• Bayer dither 64
• Bayer dither 16
• 0° halftone dot dither
• 45° halftone dot dither

Also, the dither patterns created by users can be loaded in the memory.

12. Error Diffusion

Error diffusion processing is used to binarize for the document which has gray color like a picture and photo.

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 bigger than the slice level, it is output as "15" (in the case of 4 bits).

The difference between the values of the input and output picture elements is then added to the next picture element to be processed.

The resultant picture element value with the added value is successively subjected to the next process as the input picture element value. As a result, the input picture element converted into a simply-binarized value and the average value of the overall density of the output image that has been processed using the error diffusion process, are practically the same.

13. Dot Erasing

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

This is a function to prevent the occurrence of a lot of small dots like sand soil as a result of edge emphasis as mentioned previously, if scanning a document with colored background or a dirty document.

Owing to this process, isolated dots on the image can be erased and the image is clearer, and at the same time, image compression ratio at encoding becomes higher and recording into the recording media can be more efficient.

Dot erasing of this machine can be selected among the following 6 patterns for the target picture element: 1×1, 2×2, 3×3, 4×4, 5×5, and 6×6.

When all dots around the target picture element are white, the target picture element is judged an "isolated dot" and erased.

14. Image Area Separation

As mentioned previously, the simple binarizing is good for text documents, and the dither processing and the error diffusion are available for photographic documents so that half tones can be expressed.

Image area separation is a function to automatically determine and separate the text part and the photo part existed in the same page of a document.

There is also a function called sub-window which is carried out when the image area separation does not function properly, or the position of the photo part in the image is already designated.

This function designates the area for the photo part in advance in order to carry out the dither processing or the error diffusion. With this machine, it is possible to designate 3 areas each for the front and back sides.

15. Gamma Compensation

As there is a difference between the density of a document detected by an image sensor and sensitive density by human eyes, it is necessary to compensate the output in order to obtain the appropriate density depending on the type of document. This is called gamma compensation.

In case of compensating for the contrast, such compensation as shown in Fig.2-7 is carried out and in case of compensating for the density, such compensation as shown in Fig. 2-8 is carried out.
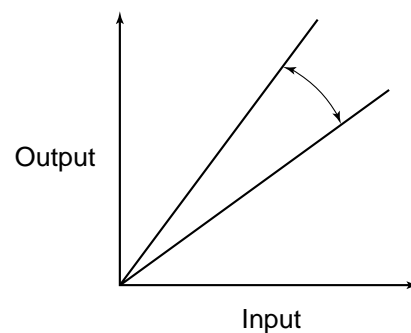
Fig. 2-7
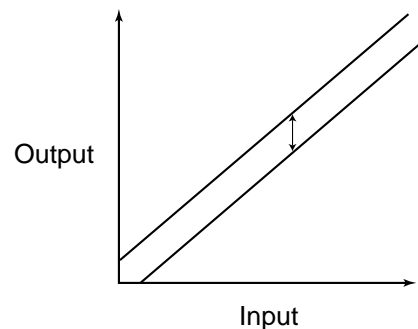
Fig. 2-8

16. Black/White Reversion

The density level of image data is reversed against the document, as shown in Fig. 2-9, by reversing the binary data. It is called Black/White reversion.

Black/White Reversion

Document   Output image
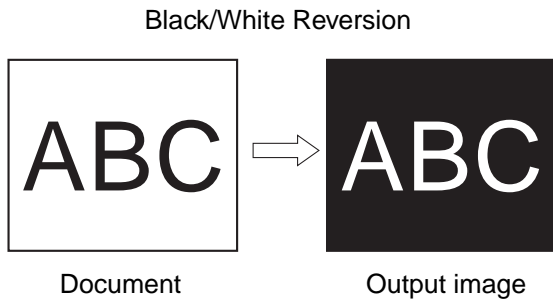
Fig. 2-9

17. Mirror Image

The image data on the document turned 180 degrees in the horizontal scanning direction is called mirror image.

Document   Output image
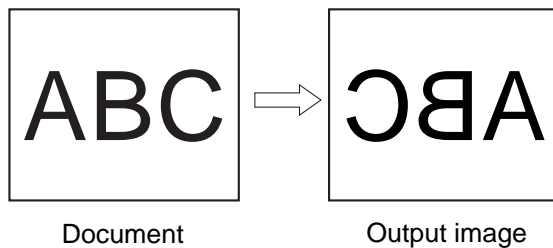
Fig. 2-10

18. Bit Number Changing

As this machine processes image data with 8 bits, it can output multi valued data having 256 tones per one picture element, and by changing the number of bits of the image data, the number of tones of the image can be changed.

By lowering the number of tones, the compression ratio when compressing an image can be heightened.

4 bits multi valued data has 16 tones and 2 bits multi valued data has 4 tones.

19. Image Memory

This machine equips 8 MB DRAM for image memory as standard.

Because scanning of documents is carried out one by one, in the case of simplex, the page memory equivalent to one page at minimum is required, and in the case of duplex, two pages at minimum.

In the case of binary scanning, the page memory equivalent to two pages for simplex, four pages for duplex, is normally ensured. Therefore, while the image data of the first scanned page stored in the page memory is being transferred to a personal computer via SCSI, the next scanning is carried out and the image data of the second scanned page can be stored in another page memory.

As a result, the reading and transfer of the image data are carried out at the same time so that the scanning speed can be increased.

At the time of image compression, the page memory is also ensured as in the case of no-compression described above. Then, the remaining memory is divided into units of 64 KB and ensured as memory blocks of compressed data. At least, 1 memory block is required and up to 10 blocks can be ensured. In this case, after the no-compression image data stored in the page memory is compressed, the said compressed data is stored in a memory block, and then transferred to a personal computer via SCSI. As a result of this, even if the transfer speed to the SCSI is slower than the image scanning speed, the scanning speed can be prevented from slowing down.

The image memory needs to be extended if the page data become considerably large because of a combination of the scanning resolution, the document size and the number of bits for scanning.

This machine is provided with 2 slots compatible with SIMM of 8 MB, 16 MB or 32 MB for the memory extension, which can be attained up to 64 MB at maximum.

20. Image Compression

This machine can carry out the following methods of image compression processing.
• MH
• MR
• MMR
• JBIG

21. Dropout Color

When a document is scanned, it is possible not to read a specific color in the document. The color that is not read is called the dropout color.
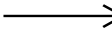
When red is specified as the dropout color, scanning is done with only the red light source illuminated.

When the red in the document is the same color as the light source, the reflected light has the same light intensity as the white part and is detected as white.

With this machine, red can be made the dropout color by changing the green lamp for FB and the front side of ADF to the red lamp (option), and illuminating the red LED for the back side.

CHAPTER 3

FUNCTIONS & OPERATION

1. In this Chapter, explanations are given about the purpose and role of each function and its relationship to the electrical and mechanical systems, and about the operational timing by functions of each component. In diagram, ▬▬▬▬ represents mechanical drive paths, and ───⟶ indicates the flow of electrical signals.

2. Signals in digital circuits are identified as "H" for High and "L" for Low. However, voltage differs depending on the circuit.
   Further, as PCB assemblies are not repaired at the customer's premises, only outlines of the operation of the circuits by means of block diagrams are given here.

I. OUTLINE

1. System Configuration

System configuration is as shown in Fig. 3-1.

```
                          ┌─────────────┐
                          │   Display   │
                          └──────┬──────┘
                                 │
 ┌─────────────┐        ┌────────┴──────────┐
 │   Printer   │────────│ Personal computer │
 └─────────────┘        │  ┌─────────────┐  │        ┌─────────────┐
                        │  │  I/F Board  │──┼────────│  DR-4080U   │
                        │  └─────────────┘  │        └─────────────┘
 ┌─────────────┐        │  ┌─────────────┐  │
 │  Keyboard   │────────│  │ Application │  │
 └─────────────┘        │  │  Software   │  │
                        │  ├─────────────┤  │
                        │  │Driver Software│ │
                        │  ├─────────────┤  │
                        │  │OS, Other software│
                        │  ├─────────────┤  │
                        │  │    Image    │  │
                        │  ├─────────────┤  │
                        │  │Recording Device│
                        │  └─────────────┘  │
                        └───────────────────┘
```

Fig. 3-1

Item	Function/Specification
DR-4080U	Inputs images
Personal computer	Controls the system, and is PC/AT compatible machine CPU: Pentium®, Clock: Min. 166 MHz recommended OS: Windows® 95/98/NT4.0 and later RAM: Min. 64 MB recommended
Display	Displays image, and displays searching and setting screen, etc. Resolution: 1024 x 768 or above.
Printer	Prints out image
Keyboard	Instructs image input, searching, etc.
Recording Device	Records image, searching ID and, softwares
I/F Board	Interfaces with SCSI Recommended: Adaptec AHA2940 series, AHA-1540 series
Application Software	Software for recording and searching image
Driver Software	Software for operating DR-4080U

Note: For details of the software supplied with DR-4080U, refer to the instruction manuals of each software.

Table 3-1

2. Machine Configuration

Machine configuration is as shown in Fig. 3-2.
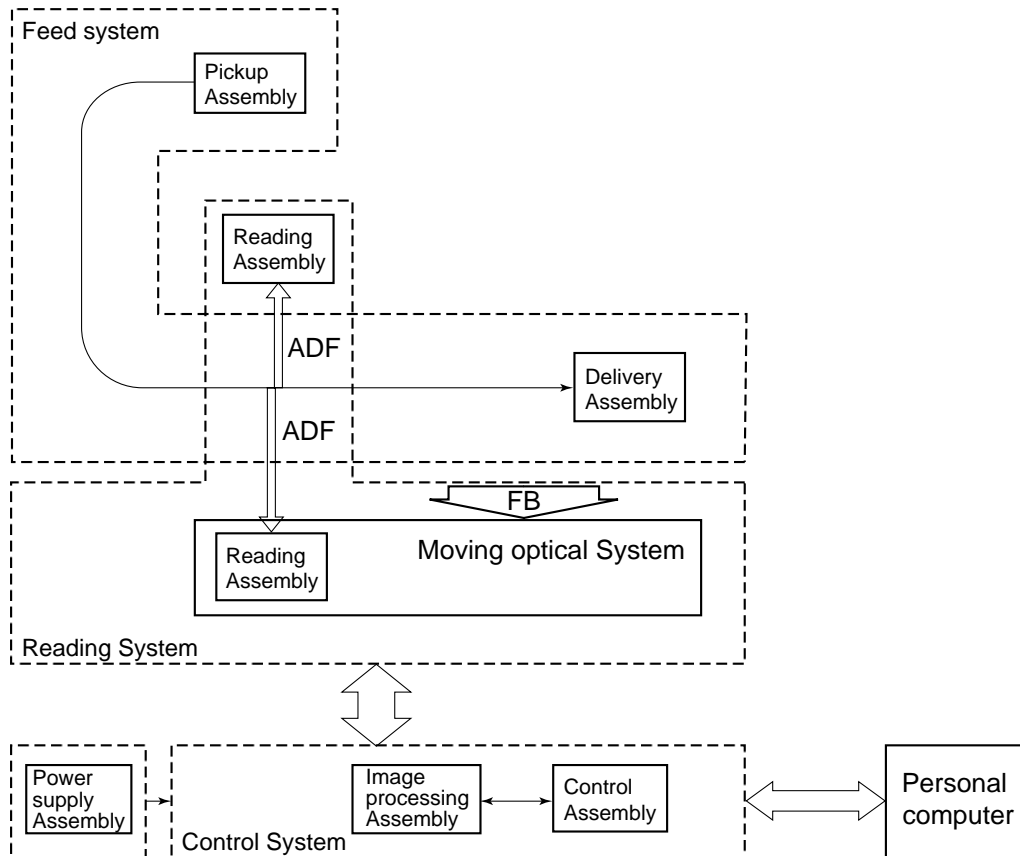
Fig. 3-2

a. Feed System
    Picks up, feeds and delivers documents.

b. Reading System
    Reads out image data with image sensors.

c. Control System
    The control system consists of the image processing assembly and the control assembly.
    The image processing assembly processes the image data read out by the reading assembly and outputs to a personal computer.
    The control assembly controls the feed system and the moving optical system.

d. Power Supply Assembly
    The power supply assembly converts the AC power supplied from outside into +24 VDC, ±5 VDC and +3 VDC, and supplies the converted power to the various PCB assemblies.

3. Main Drive

This machine employs two motors to feed a document - the feeding motor (M1) and the pickup motor (M2). There is also another motor to move the optical system (carriage) - the carriage motor (M3).

```
┌──────────────┐   ┌──────────┐   ┌──────────┐
│ Main Control │ → │  Mother  │ → │  Drive   │
│ PCB assembly │   │   PCB    │   │   PCB    │
│              │   │ assembly │   │ assembly │
└──────────────┘   └──────────┘   └──────────┘
```

Feed motor — Feed roller 1, Feed roller 2, Feed roller 3, CIS platen roller, Feed roller 4, Feed roller 5

Pickup motor — Pickup roller, Separation roller, Document tray

Carriage motor — Carriage
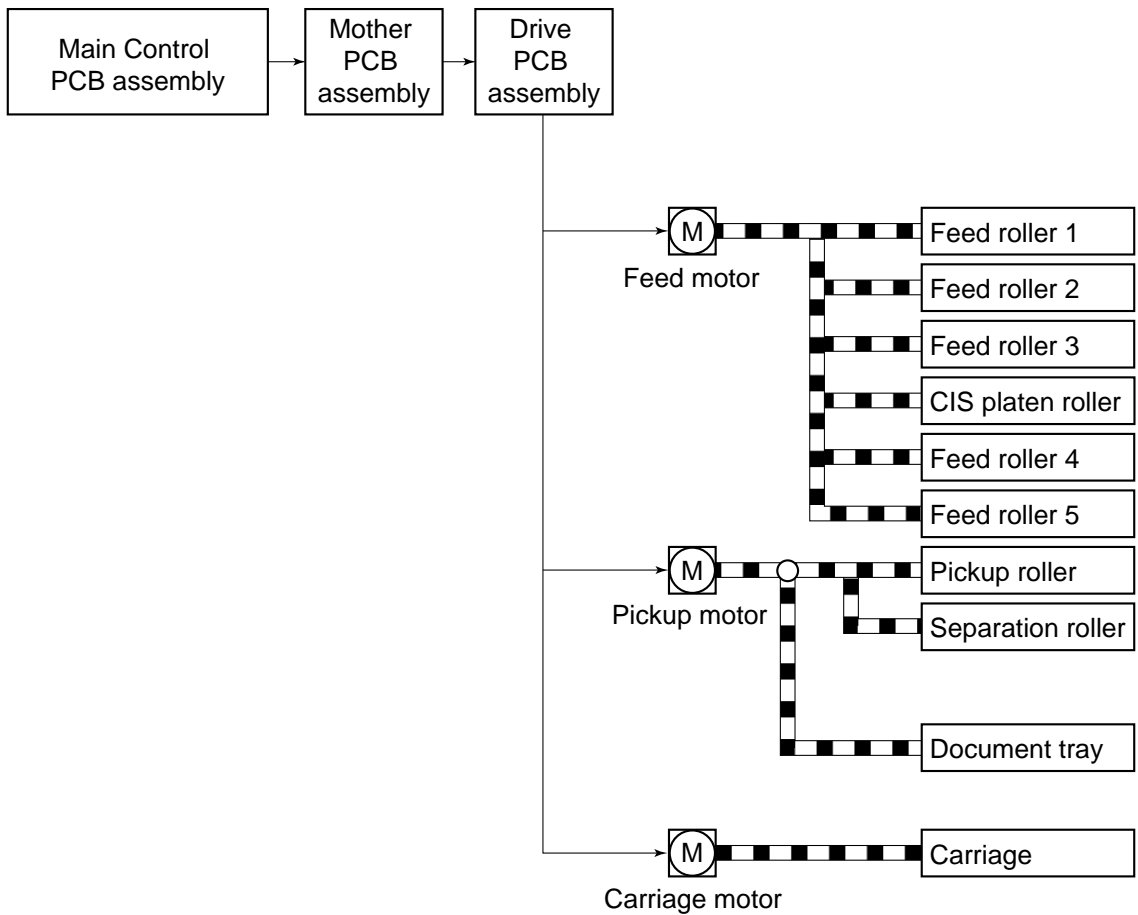
Fig. 3-3

4. Outline of Electrical Circuits

This machine carries out all the controls by one CPU (IC1109) on the main control PCB, except for the image processing.

Fig. 3-4 is a block diagram of the PCB assemblies.
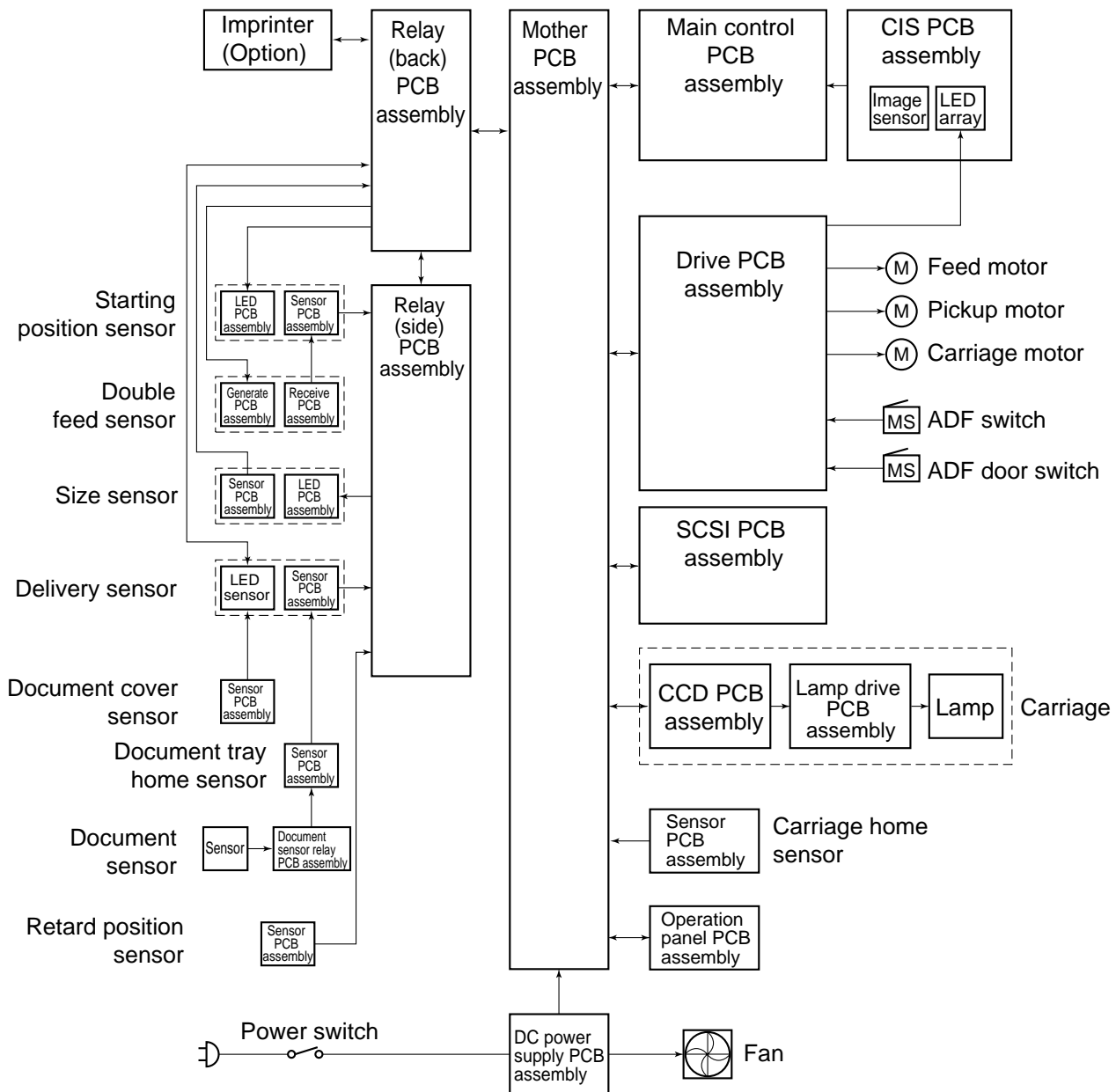
Fig. 3-4

5. Input to/Output from Main PCB Assembly

a. Main control PCB assembly

Fig. 3-5 shows the input to and output from the Main control PCB assembly.
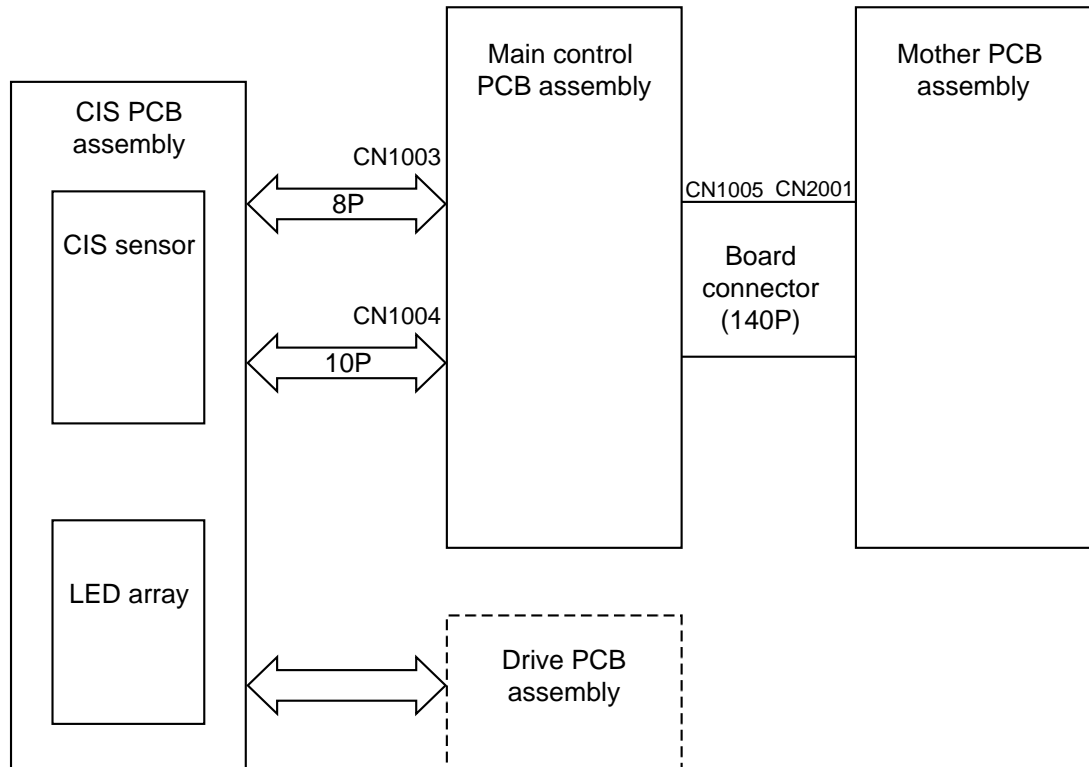
Fig. 3-5

b. Drive PCB assembly

Fig. 3-6 shows the input to and output from the Drive PCB assembly.
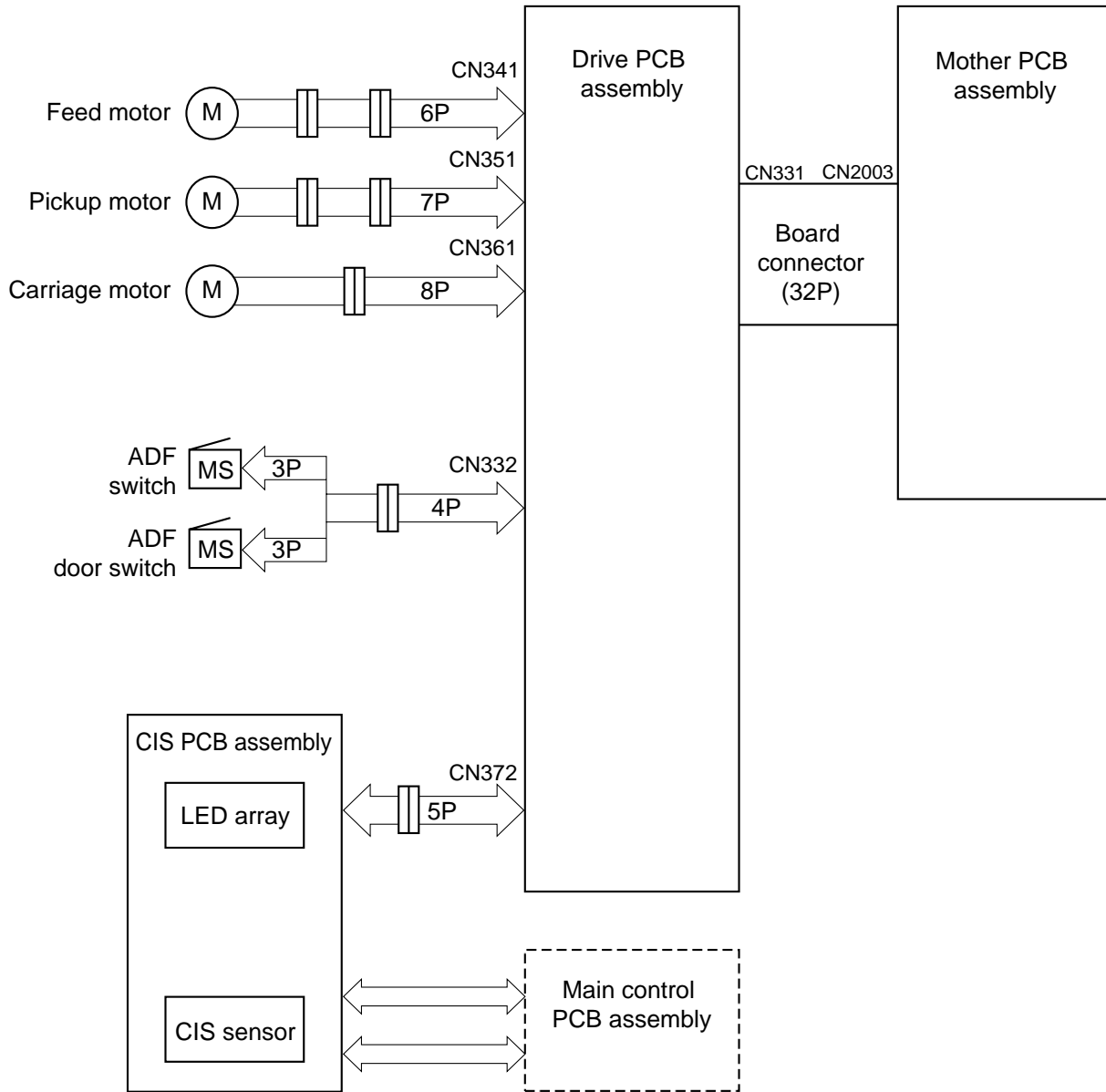
Fig. 3-6

c.   Relay (back) and Relay (side) PCB assemblies
     Fig. 3-7 shows the input to and output from
the Relay (back) and Relay (side) PCB assemblies.
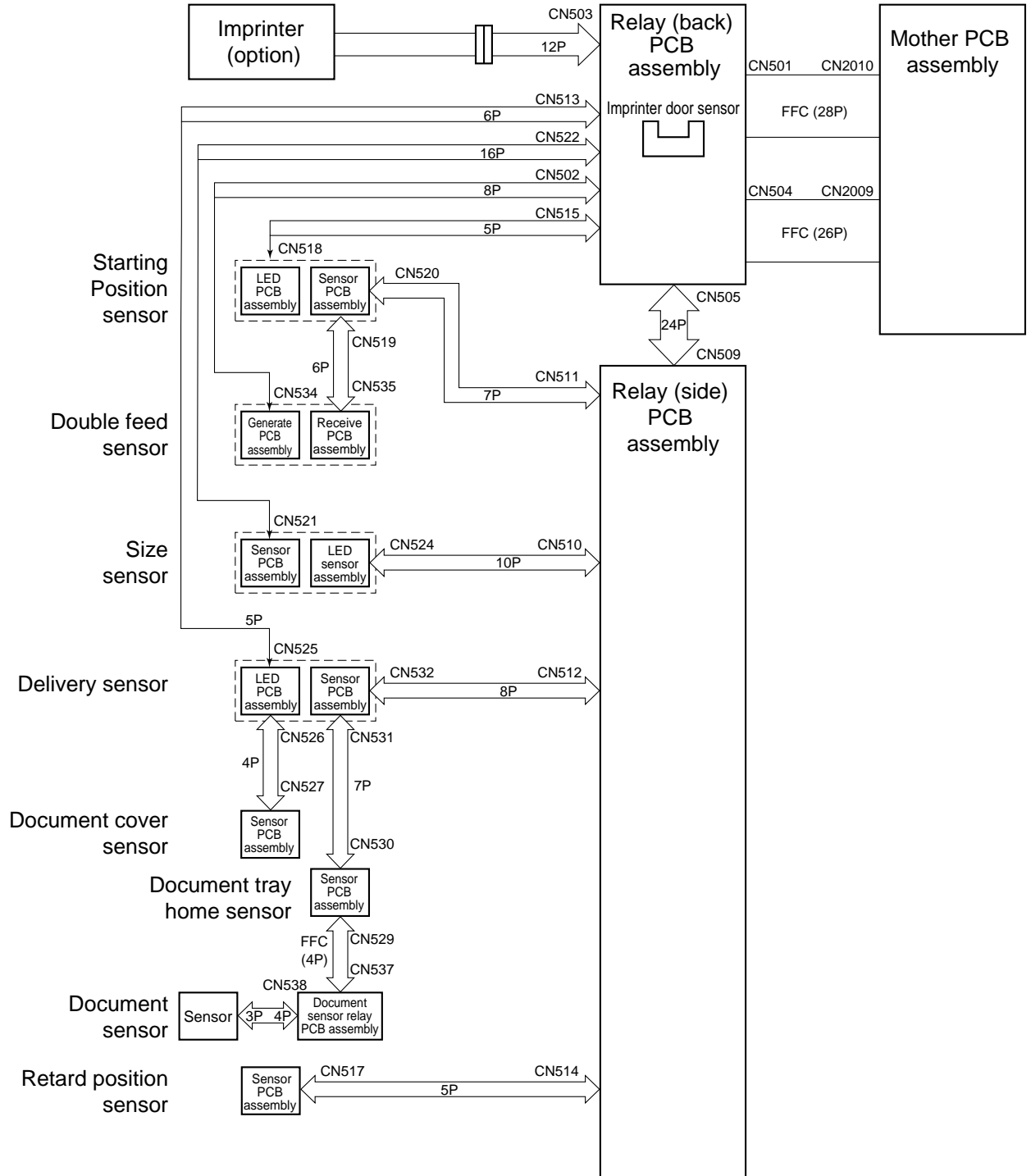
Fig. 3-7

d. Mother PCB assembly

Fig. 3-8 shows the input to and output from the Mother PCB assembly.
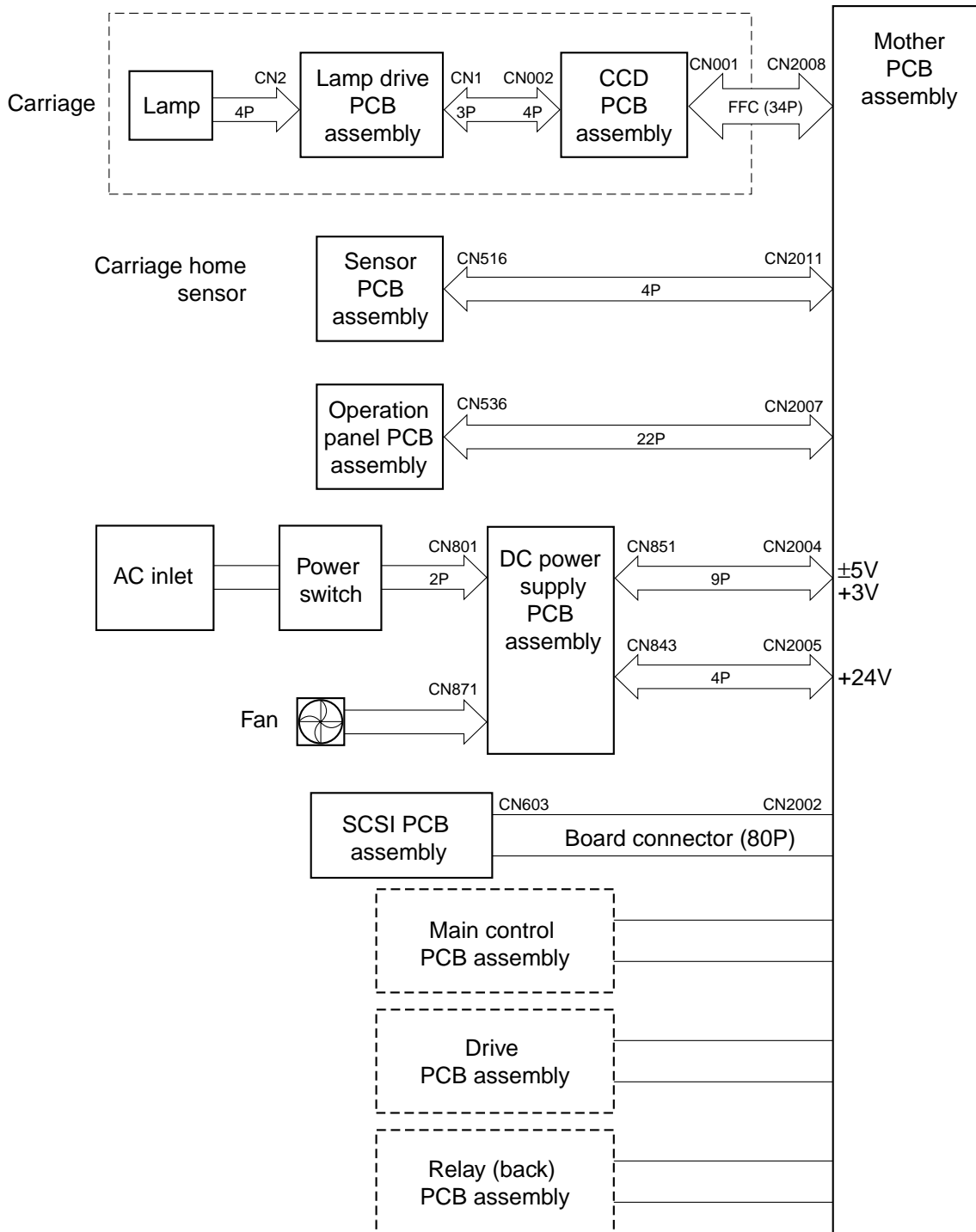
Fig. 3-8

6. Power ON Sequence

Fig. 3-9 shows the sequence of this machine operation when power is turned ON.

Indication can be indicated by Light Emitting Diode D1101 to D1106 on the Main control PCB assembly. (○: On, ●: Off)

The indication includes 6 diodes named D1101, D1102, ..., from the right respectively.

Power ON → CPU set → Work RAM clear → I/O initialization → LCD initialization	
LCD initialization	Indication ○○○○○○ "High Speed Scanner" is indicated on the operation panel.
Program ROM check — NG → Stop	Indication ○○○○○●
OK	
Work RAM check — NG → Stop	Indication ○○○○●○
OK	
CPU internal RAM check	Indication ○○○○●●
Barcode RAM check	Indication ○○○●○○
Shading A-RAM check	Indication ○○○●○●
Shading B-RAM check	Indication ○○○●●○
Line buffer A-RAM check	Indication ○○○●●●
Line buffer B-RAM check	Indication ○○●○○○
Line buffer C-RAM check	Indication ○○●○○●
Gamma RAM check	Indication ○○●○●○
①	

Fig. 3-9 (To be continued)

①

MTF A-RAM check	Indication ○○●○●●
MTF B-RAM check	Indication ○○●●○○
MTF C-RAM check	Indication ○○●●○●
Error diffusion A-RAM check	Indication ○○●●●○
Error diffusion B-RAM check	Indication ○○●●●●
EEP-ROM check	Indication ○●○○○○
JBIG initialization	Indication ○●○○○●
SRAM for JBIG check	Indication ○●○○●○
DRAM check	Indication ○●○○●●
SIMM 1 check	Indication ○●○●○○
SIMM 2 check	Indication ○●○●○●
DMA for JBIG check	Indication ○●○●●○

②

When all the above checks are good, the indication will be totally off. If any of the above indications is lighted, there is a problem with the check corresponding to the said indication.

Fig. 3-9 (Continued)

②

↓

Carriage
home check

↓

Black level
adjustment

↓

Black shading
adjustment

↓

Lamp,
LED lighted

↓

Document
tray
home check

↓

Feed motor
ON/OFF

↓

Remaining
documents
check

↓

Document
sensor
level check

↓

Double feed
sensor check

↓

Image sensor
input
level check

↓

Version
indicated

↓

End   (It takes approx. 30 sec.)

"Initializing ... >>>>>>>>>>>>>> " is indicated
on the operation panel.
(The ">" marks will disappear one by one as
the initialization proceeds.)

The machine name, additional memory size
and the version number (DR-4080U, M1.50
F1.03) are indicated on the operation panel.

"Ready" is indicated on the operation panel.

Fig. 3-9 (Continued)

II. EXPOSURE SYSTEM

1. Image Reading Assembly

Fig. 3-10 shows the image reading assembly.
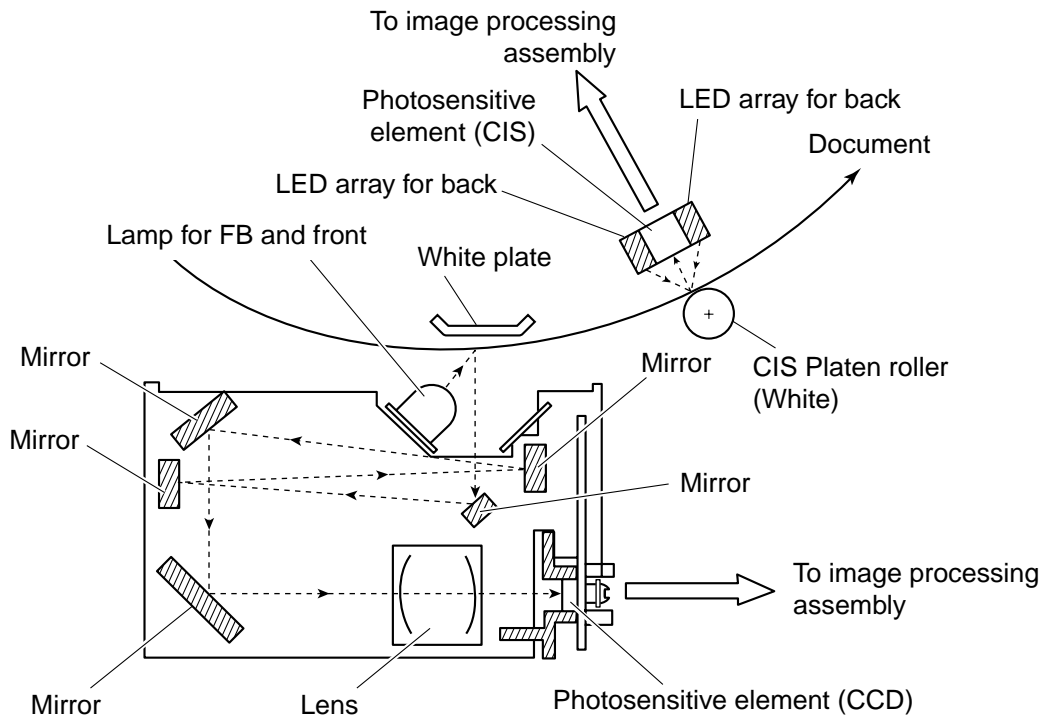
Fig. 3-10

- In case of ADF
  While feeding a document with the speed corresponding to the resolution, the image reading assembly illuminates the front of the document by the lamp and the back of the document by the LED array.
  The reflected light from the front of the document images on the CCD via 5 mirrors and a lens.
  The reflected light from the back of the document images on CIS in the same size.

- In case of FB
  While the carriage is moving with the speed corresponding to the resolution, the lamp illuminates a document.
  The reflected light from the document images on the CCD via 5 mirrors and a lens.

Light reflected from the document is photoelectrically converted by the image sensors and the resulting signals are variously processed by the image processing assembly.

With ADF, the white plate for the front reading assembly and the white CIS platen roller for the back reading assembly are used to make the outside of the document "white".

III. DOCUMENT FEED SYSTEM

A. OUTLINE

Fig. 3-11 shows the cross section of the document feed system and Fig. 3-12 shows a diagram of the drive belts. Fig. 3-14, Fig. 3-15 and Fig. 3-16 show the timing charts.

The various drive rollers are rotated by having drive transmitted from motors via gears and timing belts.

Also, various sensors for control are positioned in the system.

The document feed system is equipped with the following mechanism.

• Document tray driving mechanism
  During pickup, this assembly raises the document tray, and when pickup is finished, lowers it.

• Manual feed select mechanism
  When manual feed is selected, the lock of the retard roller is released to cancel the separation function.
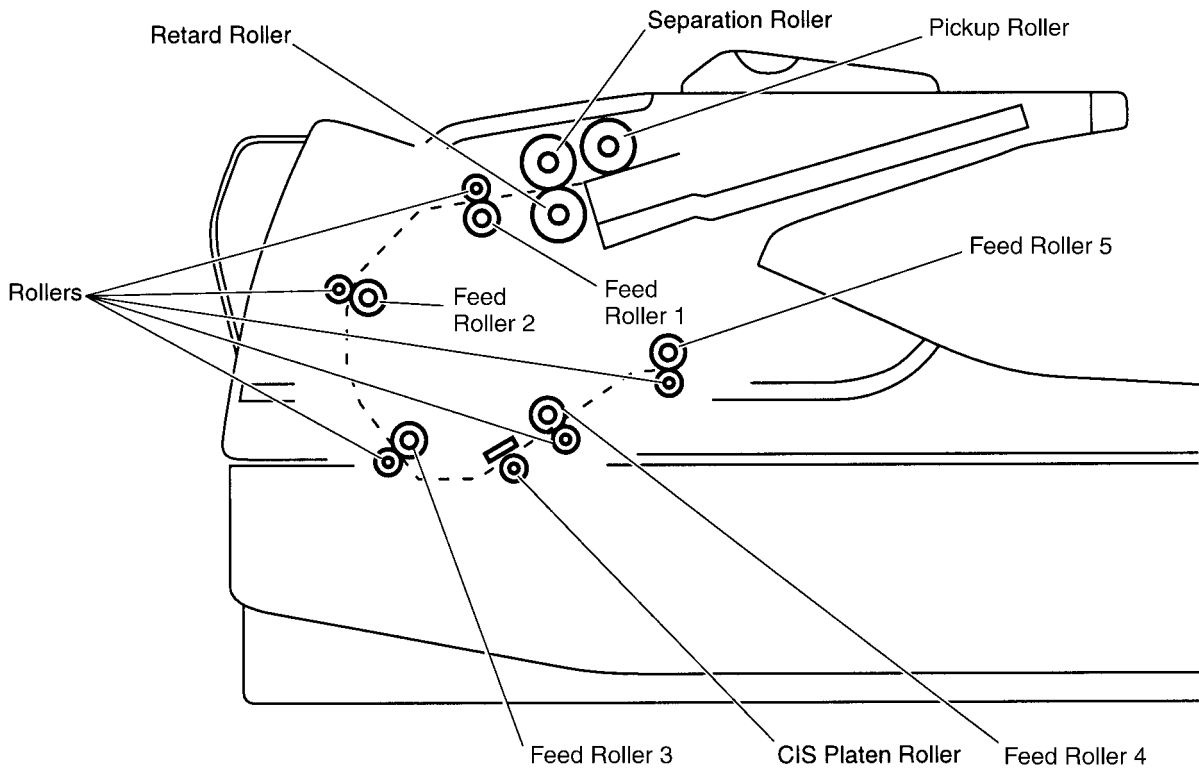
Fig. 3-11
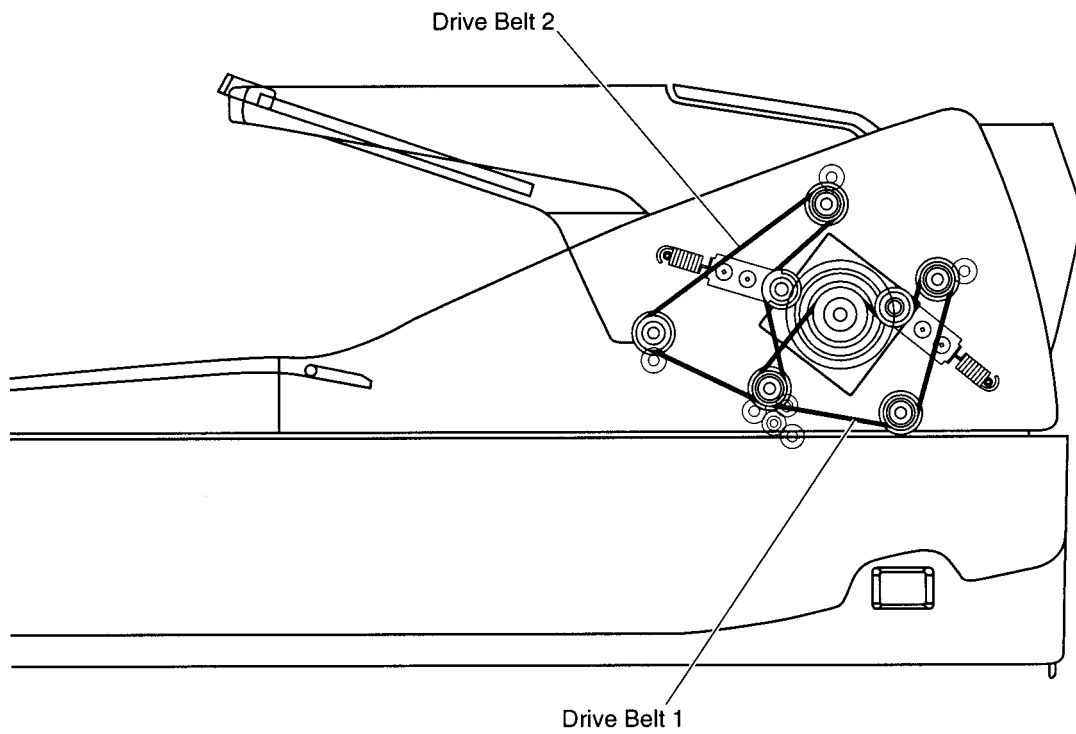
Fig. 3-12

ADF Timing Chart 1

Feed conditions: 1. Automatic pickup   2. Two sheets   3. Without imprinter
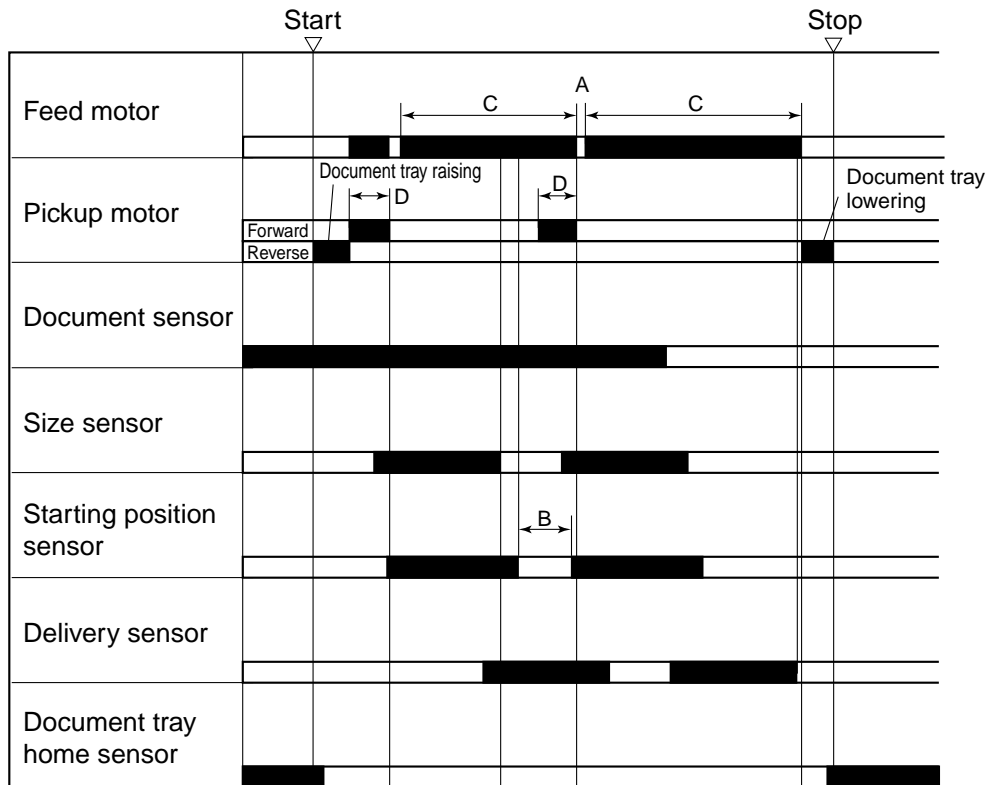
A: In case that the time for image processing and SCSI data transmission becomes long, Interval A also becomes longer.

B: In the case of simplex, Interval B is proportionate to the distance between the reading position of CCD and the starting position sensor plus 10mm. In the case of duplex, Interval B is proportionate to the distance between the reading position of CIS and the starting position sensor plus 10mm.

C: The length of time depends on the resolution and the document size. (The maximum feeding speed is approx. 150 dpi.)

D: The length of time depends on the resolution and the leading edge position of the document. (The maximum pickup speed is approx. 300 dpi.)

Fig. 3-13

ADF Timing Chart 2

Feed conditions: 1. Automatic pickup 2. Two sheets 3. With imprinter

Fig. 3-14
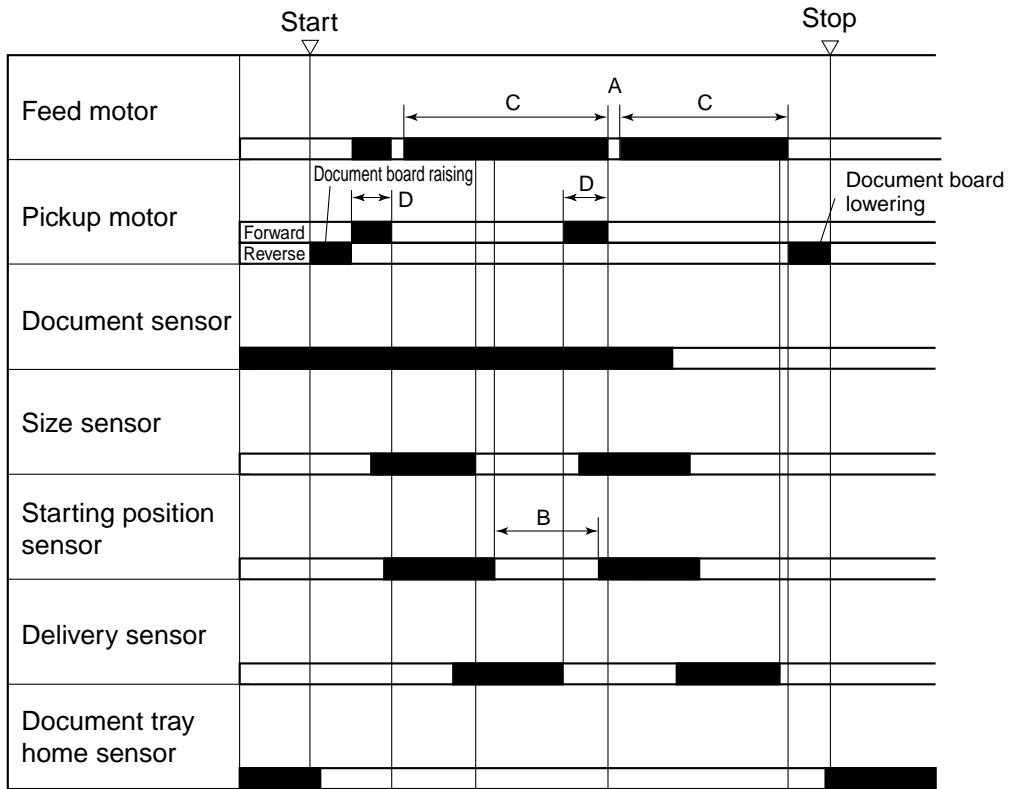
A: In case that the length of time for image processing and SCSI data transmission becomes long, Interval A also becomes longer.

B: With the imprinter, Interval B becomes longer because the next pickup will not begin until the previous document is delivered out in order not to let any document stop on the imprinter.

C: The length of time depends on the resolution and the document size. (The maximum feeding speed is approx. 150 dpi.)

D: The length of time depends on the resolution and the leading edge position of the document. (The maximum pickup speed is approx. 300 dpi.)

FB Timing Chart 1

Read conditions: 1. Document cover sensor ON (Close the document cover.)
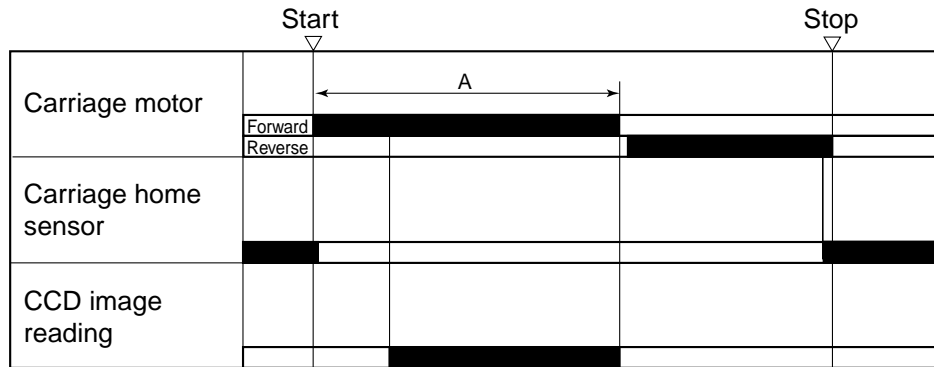
A: The length of time depends on the resolution and the document size.

Fig. 3-15

FB Timing Chart 2

Read conditions: 1. Document cover sensor OFF (Open the document cover.)
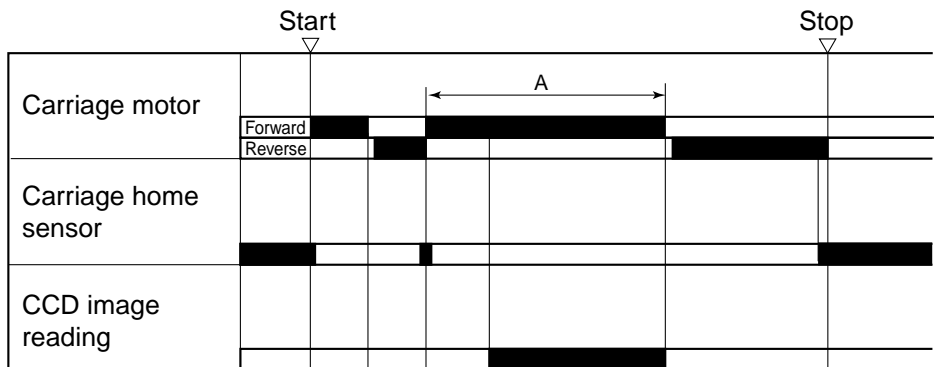
A: The length of time depends on the resolution and the document size.

Fig. 3-16

1. Paper Feed Mechanism
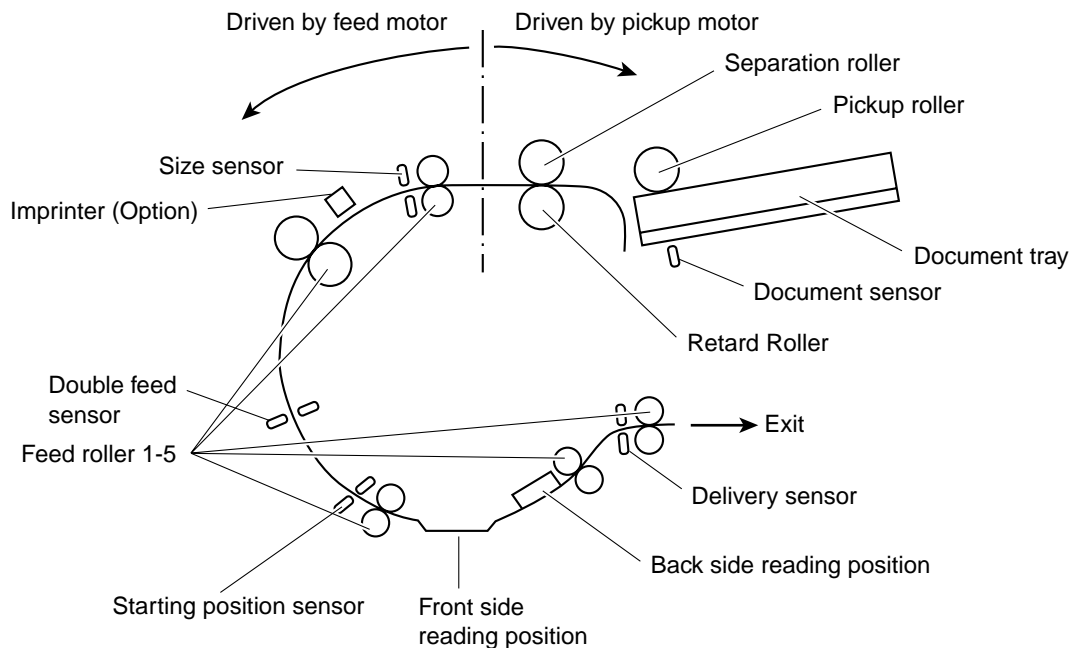
Fig. 3-17

a. When the paper is set on the document tray, and the scanning command is transmitted from PC, the document tray rises and the paper will be brought into contact with pickup roller.

b. The feed motor activated to rotate the feed roller 1 through 5.

c. The pickup motor activates to rotate the pickup roller and separation roller. Then, the pickup roller picks up the paper. A spring attaches the retard roller to separation roller. The supporting axis for the retard roller is connected to the gear fixed through the torque limiter and the timing belt's gear train. In case there is no or one paper picked up between separation roller and retard roller, retard roller rotates for the direction which separation roller rotates for by retard roller's slipping on torque limiter. On the other hands, in case there are more than 2 papers between separation roller and retard roller, limit torque is set so that load of torque limiter becomes higher according to slip friction each paper. As the result of this, only the first paper passes through the paper path, and the additional papers are prevented from passing through.

d. When the top of the paper passes through on size sensor via separation/retard roller and feed roller, pickup motor stops.

e. When the top of the first page reaches to reading position, CCD sensor and or CIS is driven to read.

f. When the end of the paper passes through on CIS (Back side reading position), feed motor stops, CIS waits for next reading start command from PC. At this time, if no following paper to read, the current reading paper is gone out.

g. When the end of the first page passes through on the size sensor on the continuous scanning mode, pickup motor starts again after an interval of approx. 100mm on duplex mode (approx. 60mm on simplex mode) and feed the following paper through the paper path.

h. Repeat the above c. to h..

i. After finishing all scanning process, document tray goes down to the original position and the series of Scanning sequence ends.

2. Manual Feed Mode

a. For multiple sheet's scanning, there is possibility that the first page and the second page will be separated, and the paper will be torn if paper is scanned while the retard roller is locked.

b. When manual feed select lever is set to "AUTO", the gear fixed with lever is connected to the retard roller. Thereby, the retard roller is locked through torque limiter.

c. When manual feed select lever is set to "MANUAL", the Gear B fixed with lever is free from Gear A connected to the retard roller. In this case, the retard roller operates as free roller for the separation roller, and does not operate paper separation function because the retard roller rotates independently.
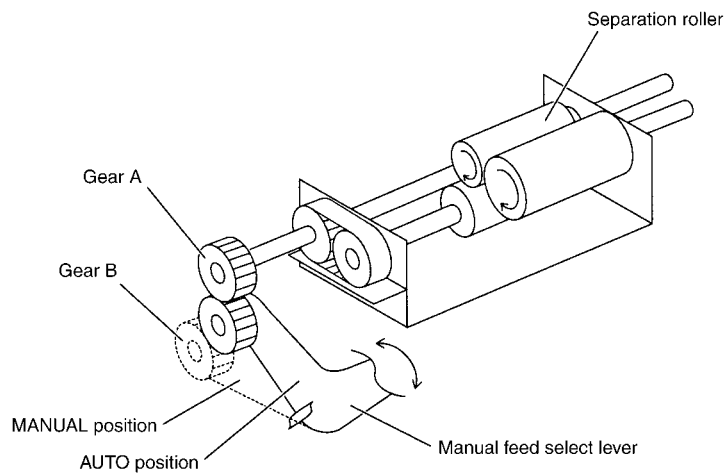
Fig. 3-18

3. Pickup Roller/Document Tray Lift Drive Mechanism

a. Pickup motor drives either pickup roller mechanism or document tray lift mechanism by selecting the direction of rotation.

b. The drive system is shown in Fig. 3-19.

1) The gear block ① belongs to drive system for pickup roller and separation roller.

2) The gear block ② belongs to drive system for document tray lift mechanism.

3) The gear block ③ belongs to drive system for pickup roller, separation roller, and document tray lift mechanism in common.

c. When the pickup motor drives in the direction of arrow A, pickup roller is activated, based on output axis. On the other hand, when the pickup motor drives in the direction of arrow B, document tray lift mechanism is activated. Gears marked with "∗" on each gear block have one way clutches. When the gears are activated to rotate against the direction of normal rotation, the one way clutches slipped and the series of rotation are not transmitted to the mechanical block.
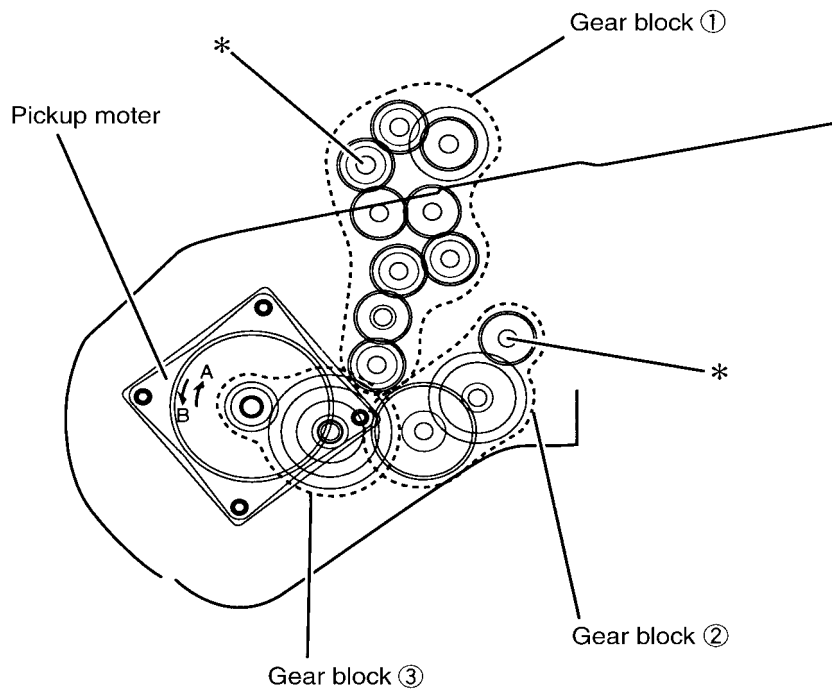
Fig. 3-19

4. Document Tray Lift Mechanism

a. Document tray is mounted on lift roller of document tray lift arm.

b. Document tray lift arm is supported by document tray cam through spring.

c. Document tray cam is an eccentric type cam, and is connected to document tray lift gear block mentioned in Fig. 3-19.

d. When document tray cam is in condition as shown in Fig. 3-21, the paper can be set.

e. When the document tray cam rotates in the direction of arrow, it pushes up spring, and enables to paper feeding by attaching document tray to pickup roller as shown in Fig. 3-22.

f. And when the document tray cam still more rotates in the direction of arrow, the cam rotates until the position as shown in Fig. 3-21, and document tray goes down.

Spring

Lift roller

Document tray lift arm

Document tray cam

Cam shaft

Document tray
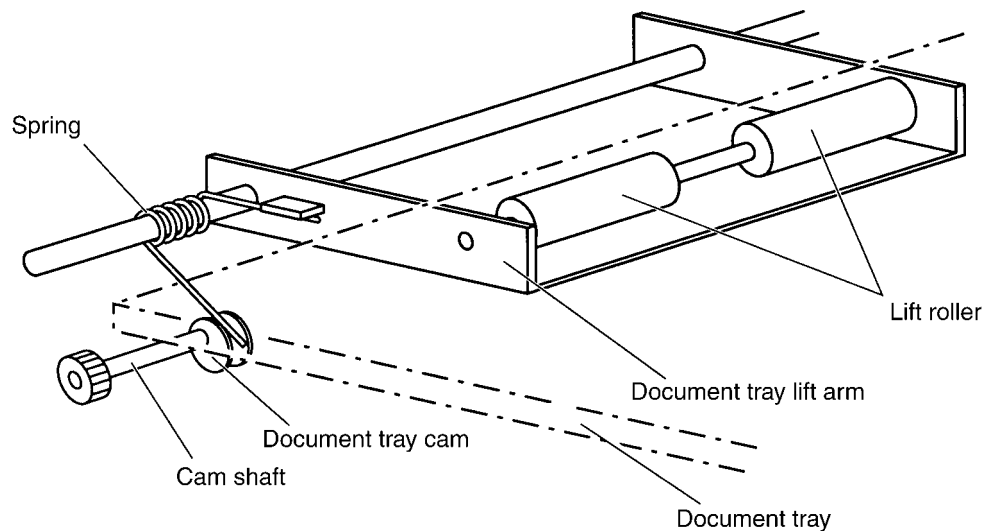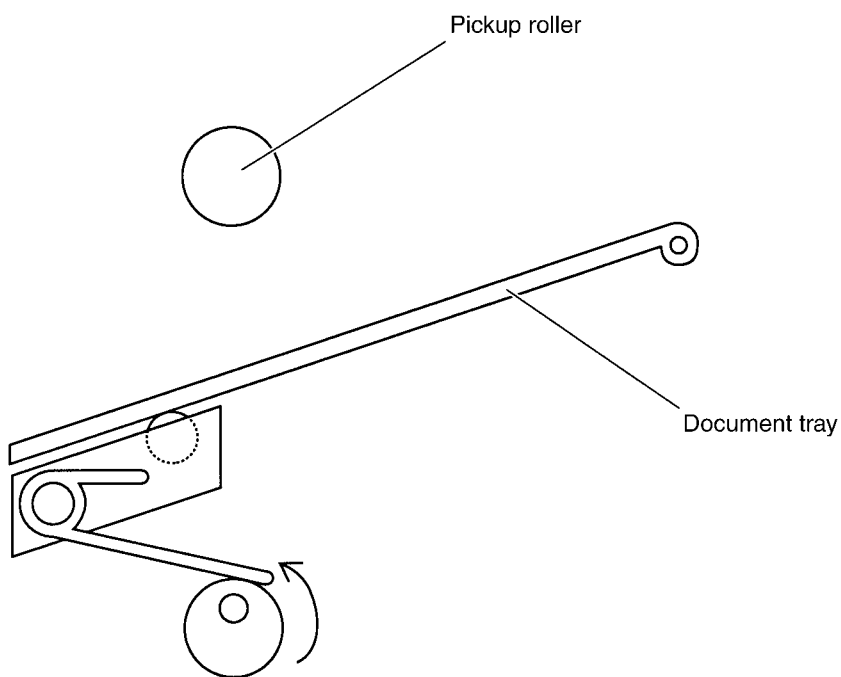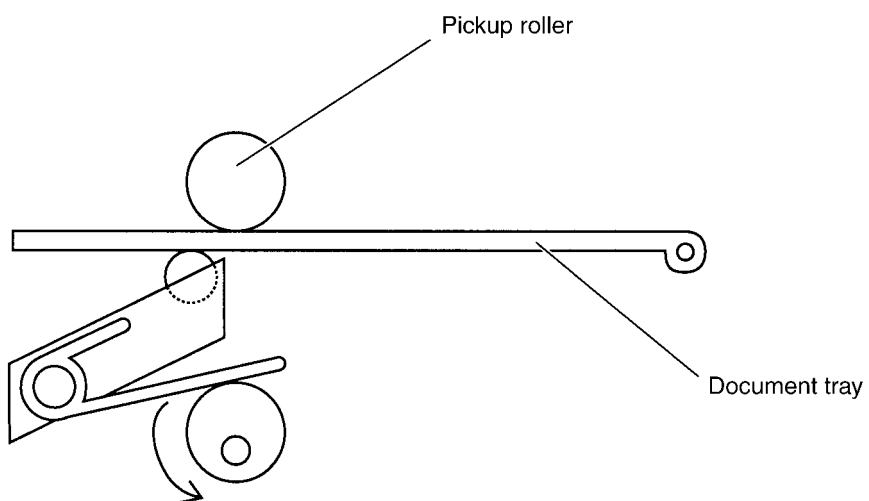
Fig. 3-20

Fig. 3-21

Fig. 3-22

B. FEED ERROR DETECTION

1. Outline

This machine is equipped with the sensors that detect whether a document is fed normally or not.
- Size sensor
- Starting position sensor
- Delivery sensor

The size sensor includes 9 individual sensors inside and the farthest left sensor is used to detect document feed error.

However, all of 9 sensors are used to detect any remained paper in the paper path.

To determine whether it is the document feed error or not depends on whether the document exists in the sensor at the timing of check for the output from CPU or not.

2. Jam in Pickup Assembly

a. Delay jam in pickup assembly

The document does not reach the size sensor within the specified time (T1) after the pickup roller started rotating.

"U11 JAM" shall be indicated.

T1: 5 seconds

3. Jam in Feeding Assembly

a. Delay jam in feeding assembly

The document does not reach the starting position sensor within the specified time (T2) after the edge of the document passed through the size sensor.

"U12 JAM" shall be indicated.

T2: It is the length of time that takes for the document to move 1.5 times longer than the distance between the size sensor and the starting position sensor. (It changes depending on the resolution.)

4. Jam in Delivery Assembly

a. Delay jam in delivery assembly

The document does not reach the delivery sensor within the specified time (T3) after the edge of the document passed through the starting position sensor.

"U14 JAM" shall be indicated.

T3: It is the length of time that takes for the document to move 1.5 times longer than the distance between the starting position sensor and the delivery sensor. (It changes depending on the resolution.)

b. Stagnation jam in delivery assembly

The aftermost edge of the document does not pass through the delivery sensor within the specified time (T4) after the leading edge of the document passes through the delivery sensor.

"U16 JAM" shall be indicated.

T4: It is the length of time that takes for the document to pass through the delivery sensor plus 500 msec. (It changes depending on the resolution and the paper size.)

C. DOUBLE FEED DETEC-TION

1. Outline

This machine is equipped with an ultrasonic wave generator and an ultrasonic wave receiver to detect double feed.

The double feed is detected by the attenuation rate of the ultrasonic wave irradiated on a fed document.

Because the first fed document becomes the basis of the detection, it is valid when the documents are the same in thickness as the first one.

If the double feed is detected, the alarm and error message "*** Warning *** Dbl Feed Occurred" shall be indicated after all the documents are fed.

If any error is indicated, it is necessary to check the image.

Note: In the case that the length of the document in the reading direction is shorter than 210 mm, the double feed detection will not work.

D. SKEW ANGLE DETECTION

1. Outline

This machine has a function to detect the skew angle of a document, if occurs, and transmit its data to a personal computer.

The skew angle detection is carried out by the farthest left sensor in the size sensor, which consists of 9 individual sensors, and the farthest right sensor within the document width. These two sensors detect the number of the stepping of the pickup motor to obtain the differential in time that the document edge passes the two sensors.

The skew angle (3 degrees at maximum) is calculated by this number of the stepping and the distance between the two sensors.

In order to insure the calculating time, the document feed stops at the waiting position for reading each time.

In the case of the skew angle detection, the pickup motor (stepping motor) is made to be 1-2 phase drive that increases the detection accuracy by reducing the stepping angle.

E. SKEW DETECTION

This machine has a function to detect skewing and, if it occurs, automatically stop feeding to protect the document.

The skew detection is carried out by the two farthest left sensors in the size sensor, which consists of 9 individual sensors. These two sensors detect the number of the stepping of the pickup motor to obtain the differential in time that the document edge passes the two sensors.

Skewing of the document is calculated by the number of the stepping and distance between the two sensors.

If there are more than 3 degrees of skewing, the document feed stops automatically.

When skewing is detected, an error message, "U12 Jam" is indicated and the document feed stops.

F. DOCUMENT SIZE DETEC-TION

1. Outline

This machine has 9 size sensors in its paper path to detect the size of a document.

Size sensors 0 to 8 align from the left side to the right side in the paper path, and determine the closest size to a document by detecting the number of the sensors covered by the document (document width).

The sizes which can be detected are the following typical sizes: A6, B6, A5, B5, A4/LGL/LTR, B4, LGR, A3.

Detected sizes corresponding to size sensors are as follows:
Size sensors from 0 to 1 → A6
Size sensors from 0 to 2 → B6
Size sensors from 0 to 3 → A5
Size sensors from 0 to 4 → B5
Size sensors from 0 to 5 → A4/LGL/LTR
Size sensors from 0 to 6 → B4
Size sensors from 0 to 7 → LGR
Size sensors from 0 to 8 → A3

Since the width of A4 size and that of LTR/LGL are almost the same for the detection, select either A4 or LTR in the service mode.

With ISIS driver, because of its document width detection and length control functions, LGL will be selected even if LTR is designated. Likewise, with TWAIN driver, because it has only the document width detection function, LTR will be selected when LTR is designated.

In order to detect LTR automatically with ISIS driver, both the document width detection and length control functions must be turned on.

IV. DESCRIPTION OF ELECTRICAL CIRCUITS

A. MAIN CONTROL PCB ASSEMBLY

1. Outline

The main control PCB assembly performs operation control of this machine and image processing except for image compression.

2. CPU Circuit

Fig. 3-23 shows a block diagram of the CPU circuit.

CPU (IC1109) is a 32-bit microprocessor that performs most controls, except for image processing, such as the motor control, the reading adjustment, the sensor adjustment, and control of the SCSI controller.

EEP-ROM records the total number of reading, the reading position adjustment information, and such setting information of the operation panel as SCSI ID and Terminator ON/OFF.

Flash Memory (IC1102) is a program ROM that stores the software to operate the machine. For work, 64 KB RAM (32 KB $\times$ 2) is provided.

Sensor A is a document sensor consisting of LED and phototransistor that performs the sensor sensitivity adjustment by controlling the LED light intensity via the D/A converter. (analog control)

Sensor B is a position detection sensor consisting of photointerrupter. It is also an ON/OFF sensor to detect the carriage home position and document tray home position. (digital control)
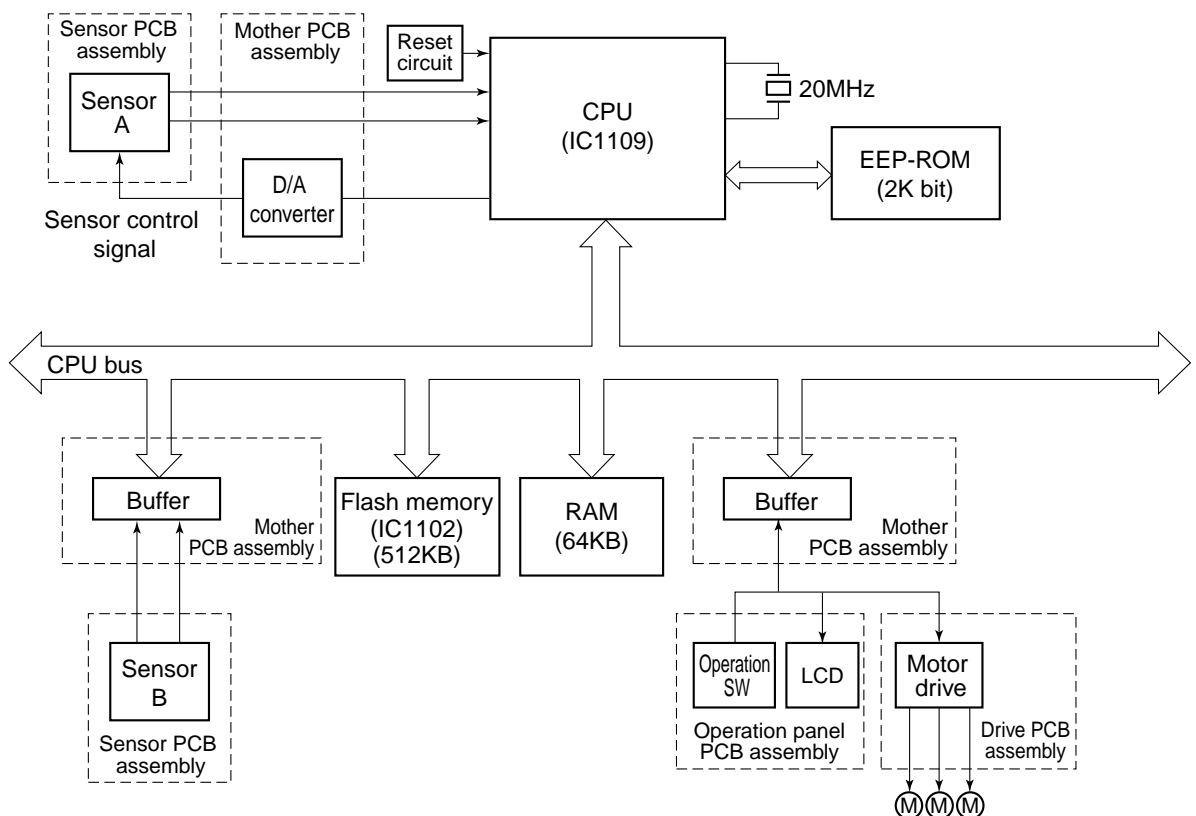
Fig. 3-23

3.   Image Processing Circuit

Fig. 3-24 shows a block diagram of the image data flow.

The analog signals, divided into odds and evens, output from the image sensor for front (CCD) are amplified by the amplifier on the CCD PCB assembly and then output.

The CCD PCB assembly contains the circuits for the sample hold, gain control and black clamp.

The analog signals, divided into right and left, output from the image sensor for back (CIS) are directly output.

The two lines of output from the image sensors for front and back are synthesized by the high speed analog switch (MPX).

They are, then, converted into 9-bit digital signals by the A/D converter and output to the Image processor 1 controller (SENSOR-Chip).

The image data input to the Image processor 1 controller undergo such image processing as the rearrangement of picture elements, shading compensation and barcode processing using such respective memories as line buffer, shading RAM and barcode RAM.

They are, then, output as 8-bit digital signals to the Image processor 2 controller (IMAGE-Chip).

The image data input in the Image processor 2 controller undergo such image processing as the edge emphasis, error diffusion and gamma compensation using such respective memories as MTF RAM, ED RAM and GM RAM.

They are, then, output as 16-bit digital signals to the DMA controller (TIARA-Chip). As this output is in 16 bits, binary data are output by every 16 picture elements, and gray scale data by 2 picture elements.
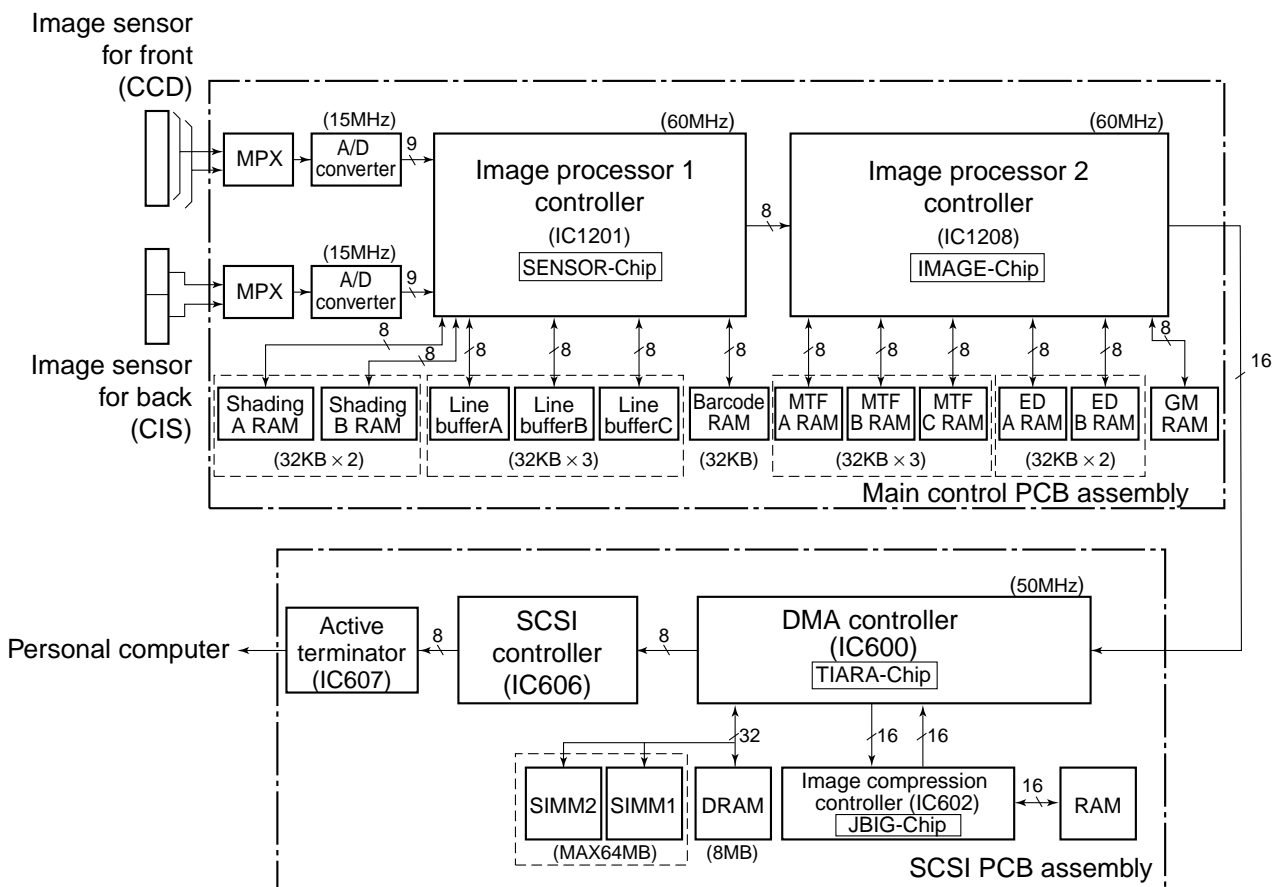
Fig. 3-24

B. SCSI PCB ASSEMBLY

The image data input to the DMA controller, shown in the block diagram of the image data flow in Fig. 3-24, is stored in the DRAM for the image compression, and then output to the SCSI controller.

The processing mentioned above is carried out in the DMA control that does not involve CPU.

The image compression controller (JBIG-Chip) is adaptable to such image compression methods as MH, MR, MMR and JBIG.

SIMM1, 2 are extension memories to supplement the DRAM (8 MB) when the image data becomes larger than the capacity of the DRAM, and can be extended up to 64 MB at maximum. (Adaptable to 8 MB, 16 MB and 32 MB of SIMM.)

C. DRIVE PCB ASSEMBLY

1. Outline

Fig. 3-25 shows a block diagram of the drive PCB assembly.

Because of using +24 V for motor driving, this circuit has door switches, one on the ADF and the other on the ADF door, as mechanical safety devices.

In addition to that, this circuit contains fusing elements (ICP) on the +24 V lines to the motor drivers as electrical safety device.

Hybrid stepping motors are used for the motors and hybrid driver ICs are used for the motor drivers.

Moreover, this circuit also contains the light modulation circuit for LED lighting of the image sensor for back (CIS) that controls voltage to the LED. There are 2 circuits for the green LED and the red LED respectively.

This circuit is supplied with +24 V, which is then converted into +38 V by the DC/DC converter. This is a power supply for imprinter (option). For safety, a poly SW is used. (The poly SW is a protection element that will have high electrical resistance resulting from temperature rise caused by large electric current.)
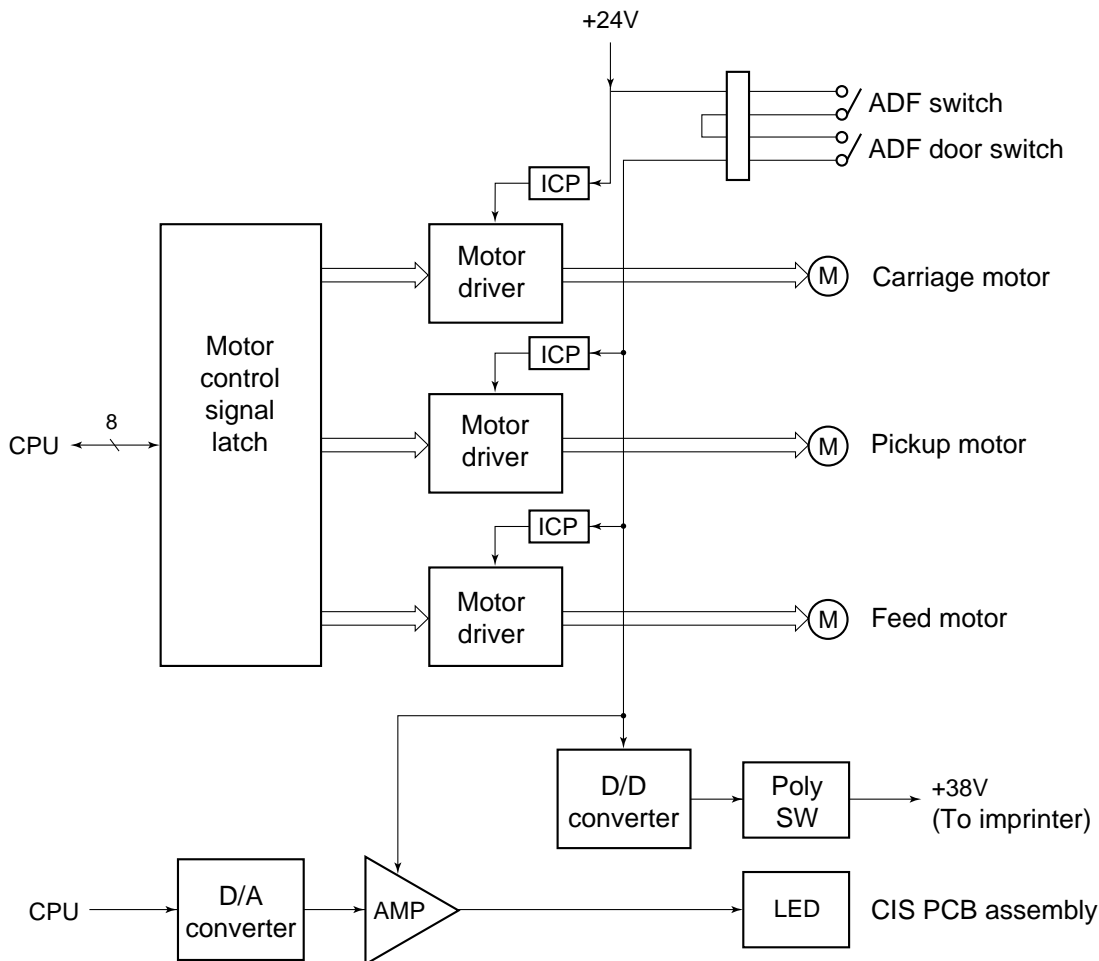
Fig. 3-25

V. OPTIONS

1. Imprinter

a.   Outline

This machine is capable of printing characters on the document if an imprinter is installed in the machine.

Control of printing for the imprinter is performed by the internal CPU of the imprinter and serial communication with the CPU of the DR-4080U is carried out.

The printing position in the width direction is set by selecting one of the 11 installation holes in the machine. The printing position in the feed direction is set from the operation panel or the personal computer at a position 10 mm or more from the leading edge of the document. The printing ink is stored in the ink container which is an integral part of the IP head. The IP head is a consumable and is replaced by the user when it runs out of ink.

For setting the printing positions and for other operating methods, refer to the instruction manual.

The installation of the imprinter is done by the service technician. Refer to Chapter 5, Installation, on how to install the imprinter.

Table 3-2 shows the main specification.

No.	Item	Description
1	Printing method	On demand type, ink jet method
2	Configuration 1) Main body 2) Consumable	 Imprinter unit IP head
3	IP head related 1) Image density 2) Ink 3) Setting method	 12 nozzles/slant 1 row Water base ink, Color: Black With lever
4	Printed related 1) Characters 2) Number of figures 3) Printing direction 4) Printing position	 a) Numerals: 0 to 9 b) Alphabet: A to Z (Capital/small letter) c) Symbols: Refer to instruction manual Max. 72 Parallel to feed direction a) Width direction: Select one from 11 installation holes b) Feed direction: Set 10 mm or more from leading edge
5	Power supply	Supplied from DR-4080U

Table 3-2

b. Electrical Circuit

Fig. 3-26 shows a block diagram of the im-
printer circuit.
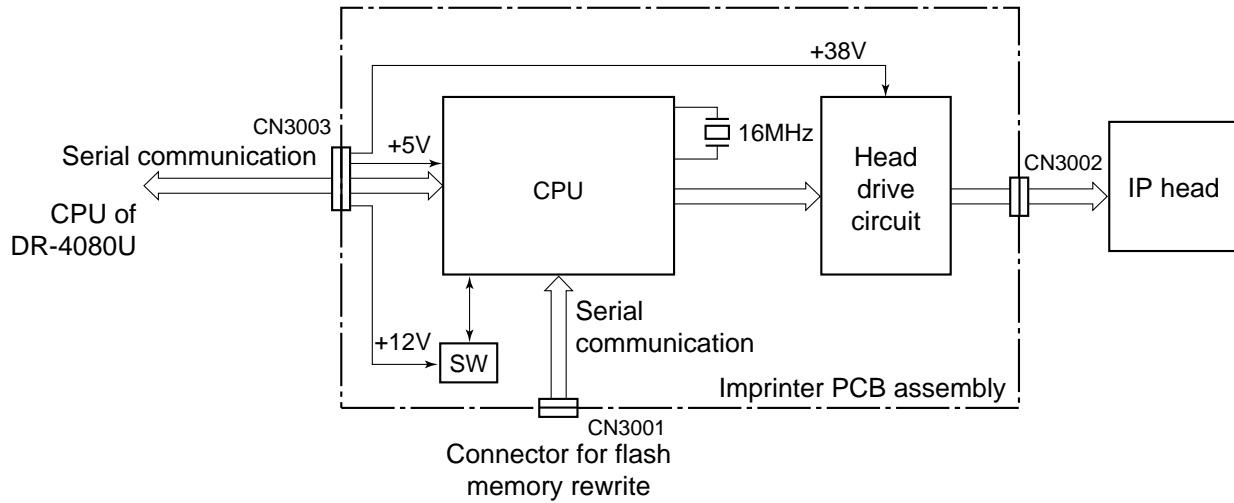
Fig. 3-26

VI. INTERFACE

1. Outline

When sending data from this machine to a personal computer, the data is transmitted by an interface. This machine uses SCSI-2 (Small Computer System Interface-2) as the interface.

Fig. 3-27 shows the input and output of data used by SCSI, and Table 3-3 shows the connectors and names of the signals.

The connector numbers of the SCSI PCB assembly are CN600A and CN600B.
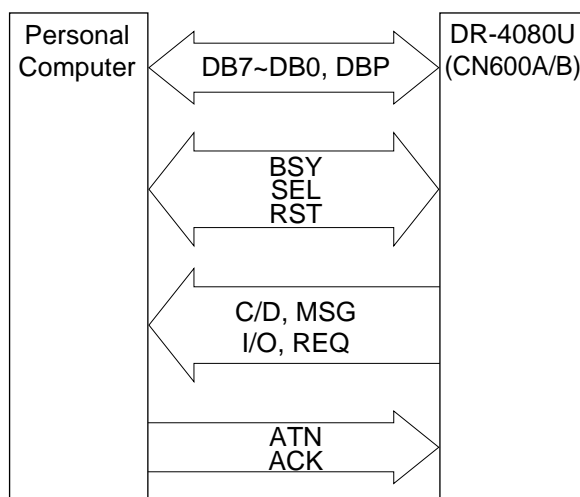
Fig. 3-27

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

The asterisk "*"at the end of the name of a signal denotes the signal is a low active one.

Table 3-3

The route of the data, SCSI bus, is made up of data signals (1 byte + parity bit = 9 signals) and control signals (9 signals) for a total of 18.

2. Control Method

The following is a brief explanation of the method of controlling DR-4080U using SCSI bus.

Data is transmitted by setting the required state (phase) with control signals. Table 3-4 shows the explanation of the various phases.

The equipment connected to the SCSI bus is called the SCSI device. Also, the side that issues the command for data transmission is called the "initiator" and the side receiving the command and providing the data is called the "target." (Refer to Fig. 3-28)

No.	Item	Explanation	
1	BUS FREE phase	State in which SCSI bus is not used in any SCSI device	Phase which decides the state of use of the SCSI
2	ARBITRATION phase	Decides the SCSI device to use the SCSI bus	
3	SELECTION phase	Decides target when the initiator uses the SCSI bus	
4	RESELECTION phase	Target requests initiator for reconnection	
5	COMMAND phase	Command from initiator to target	Transmission phase of data
6	DATA phase	Data input/output is carried out in accordance with command	
7	STATUS phase	Denotes the result of whatever was carried out in accordance with command	
8	MESSAGE phase	Control data is being input/output between initiator and target	

Table 3-4
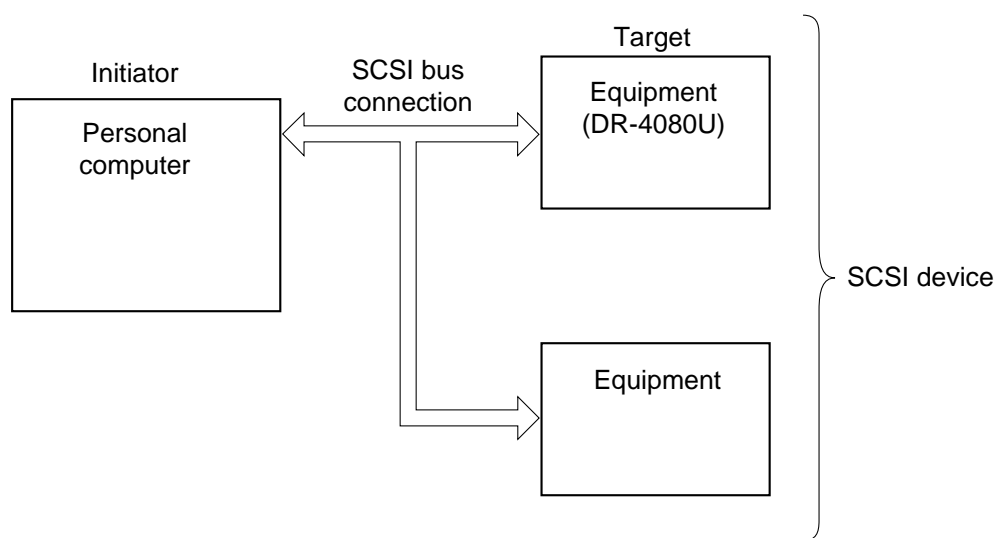
Fig. 3-28

Table 3-5 shows the basic communication sequence.

No.	Personal computer side	Direction of communication	DR-4080U side
1	Command to start recording	→→	
2			Feed starts
3	Command inquiring about whether or not there is data and the state of feed	→→	
4		←←	Availability or not of data and status of feed
5	1) If during feeding and there is no data, return to No. 3. 2) If feeding is stopped and there is no data, go to No. 9. 3) If there is data, go to No. 6.		
6	Data read command	→→	
7		←←	Data output
8	1) Return to No. 6 until there is no more data for 1 page of document. 2) Return to No. 3 when there is no more data for 1 page of document.		
9	End		

Table 3-5

VII.   POWER SUPPLY

1.   Outline

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

AC power is supplied to the DC power supply PCB assembly by turning on the power switch.

The 100 to 240 VAC power supplied is converted to unsmoothed 100 to 240 VUN by voltage doubler rectifier, if low, or bridge rectifier, if high, and sent to the booster assembly. At the booster assembly, the power is temporarily raised to approx. 300 VUN and then sent to the transformer.

The output from the transformer is +24 VDC, and then ±5 VDC, +3 VDC and +5 VADC are generated.

The DC/DC converter in the mother PCB assembly generates +12 VDC and the DC/DC converter in the drive PCB assembly generates +38 VDC.

A fuse to protect against overcurrent and a circuit to protect against overvoltage are provided in the DC power supply PCB assembly.

Fig. 3-29 shows the power supply related block diagram.
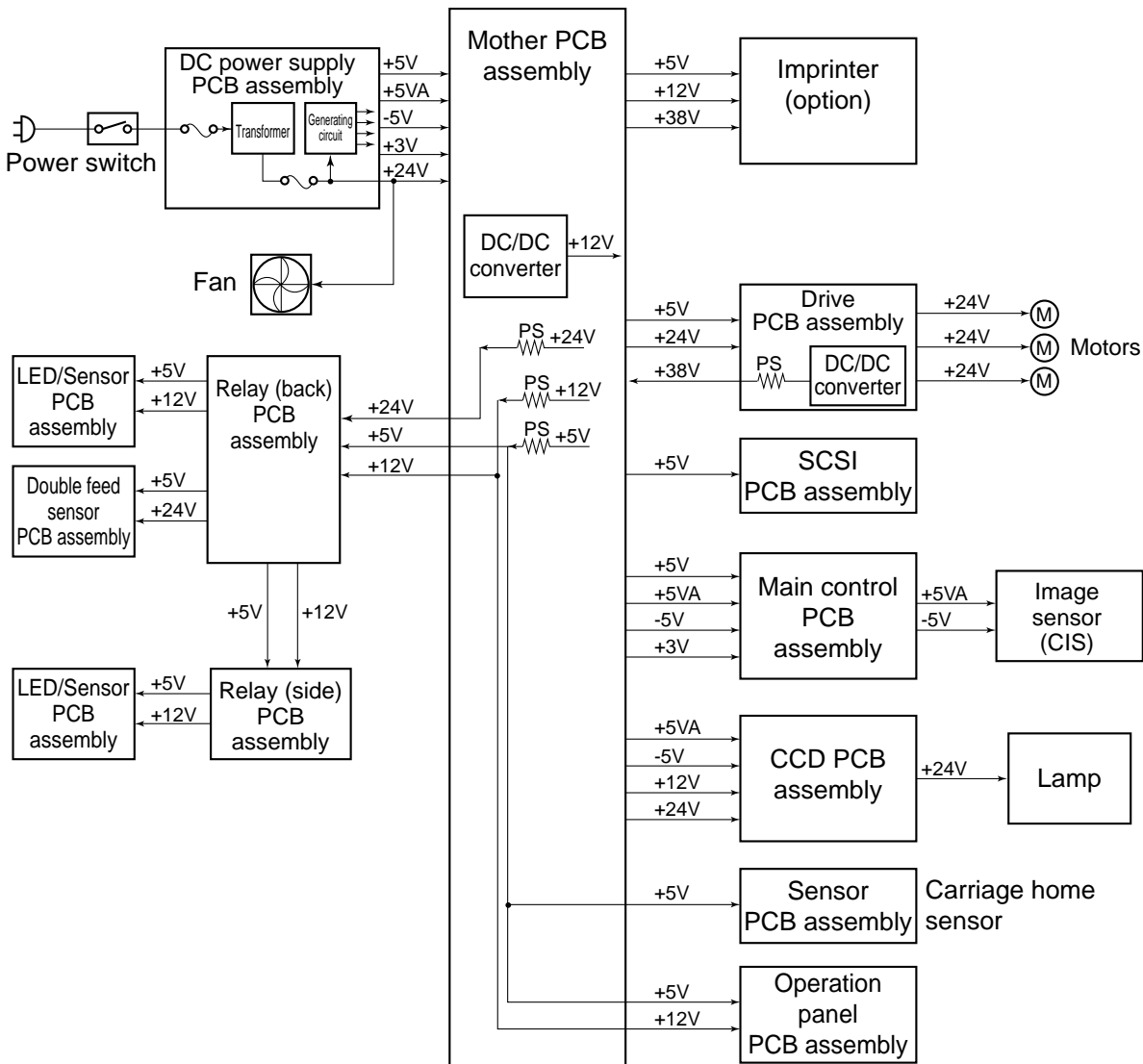
Fig. 3-29

2. Protective Function of Power Supply Circuit

The DC power supply PCB assembly has four types to generate the power: a feedback from the primary side by the transformer for generating +24 V, a chopper type for generating +5 V, a regulator type for generating +3 V and a chopper plus regulator type for generating +5 VA and -5 V.

If the load goes into a short circuit state due to some abnormality, and there is an overcurrent, the protective function is activated and output is stopped.

When output stops, it can be automatically restored by turning the power switch off, eliminating the cause of the short circuit, discharging the capacitor (for about 5 minutes) and then turning on the power switch.

In the case of +24 V output, a fuse is used as protection against overcurrent and the voltage required is generated from +24 V.

The mother PCB assembly generates +12 V (the regulator type) and the drive PCB assembly generates +38 V (the chopper type).

For +5, +12, and +24V on the mother PCB assembly that are supplied to the sensors on the sensor PCB assemblies, a protective elements (poly SW) is used to protect the sensors.

For +38 V on the drive PCB assembly that is supplied to the imprinter, the protective element (poly SW) is used to protect the imprinter and a fusing element (ICP) is used to protect the motors.

VIII. LAYOUT OF ELECTRICAL COMPONENTS

A. MOTORS
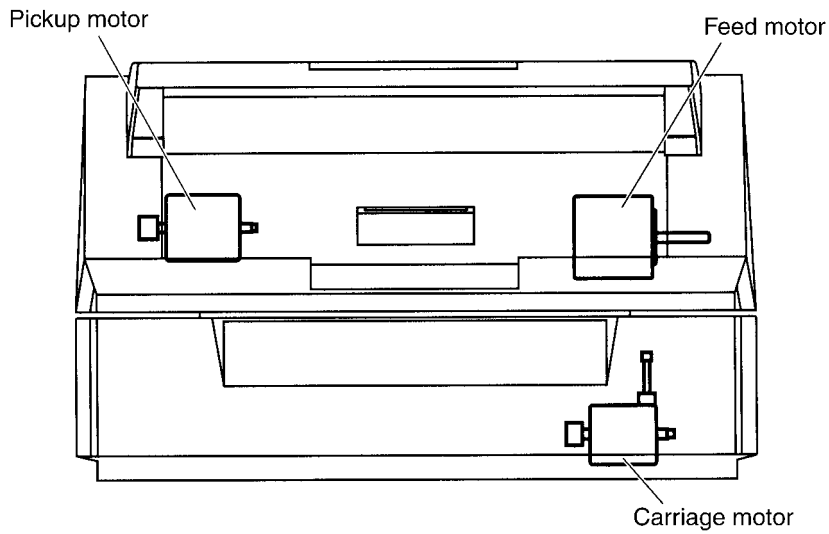
Fig. 3-30

B. OPTICAL UNITS AND IMPRINTER
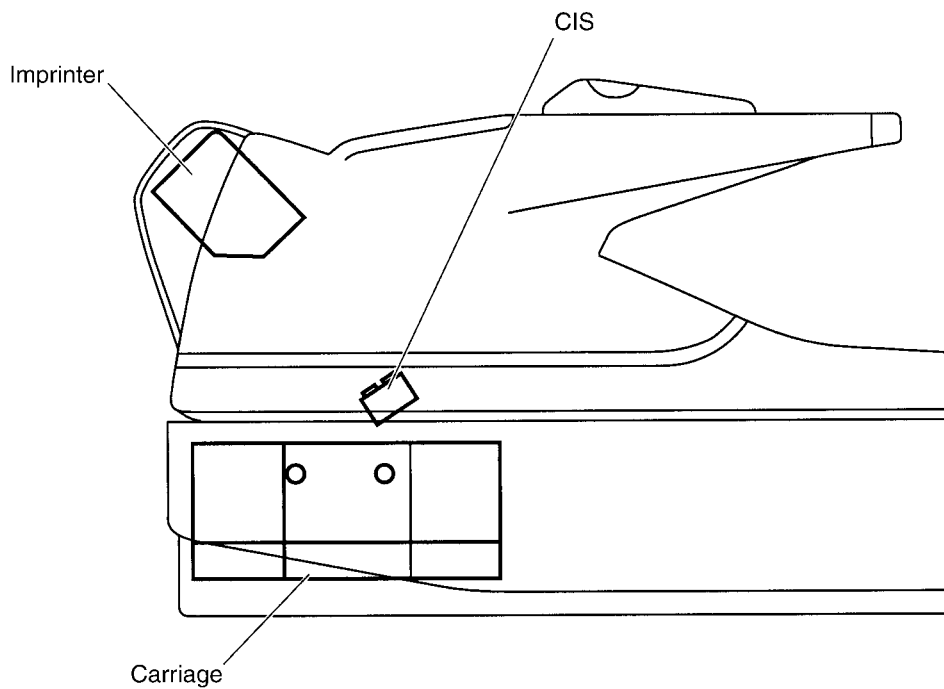
Fig. 3-31

C. PCB ASSEMBLIES
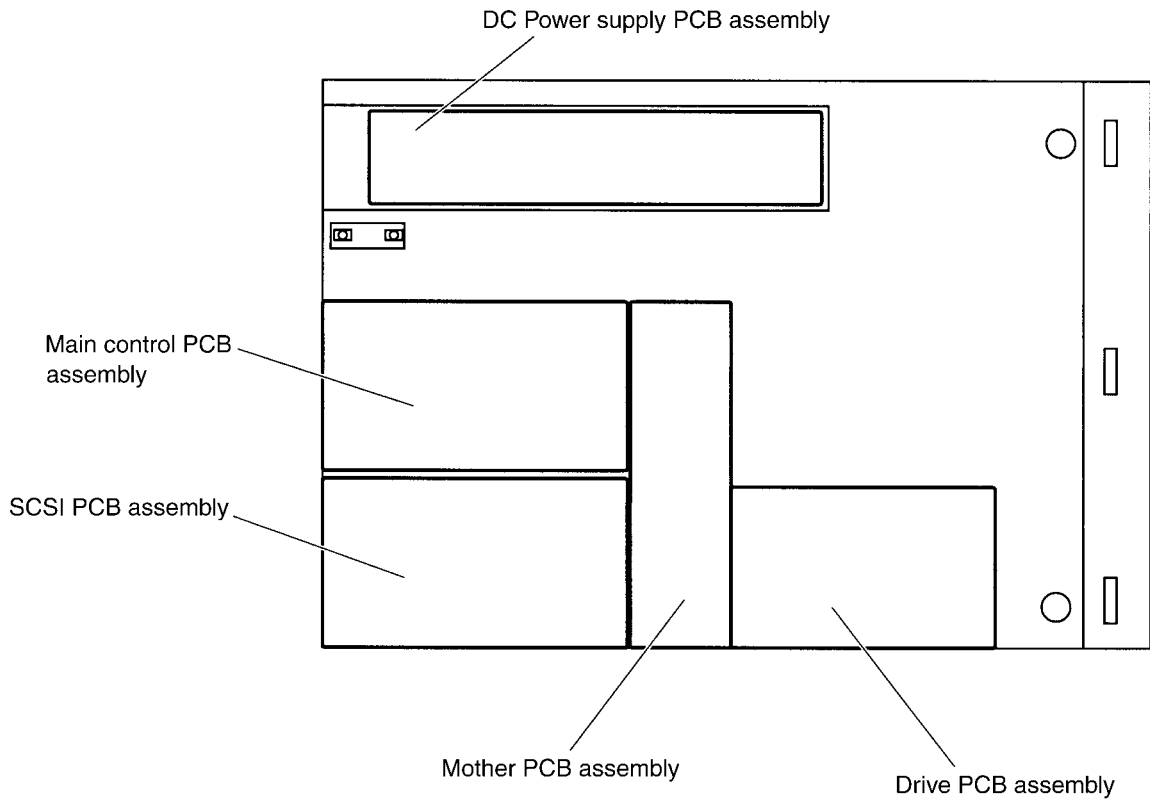
Fig. 3-32
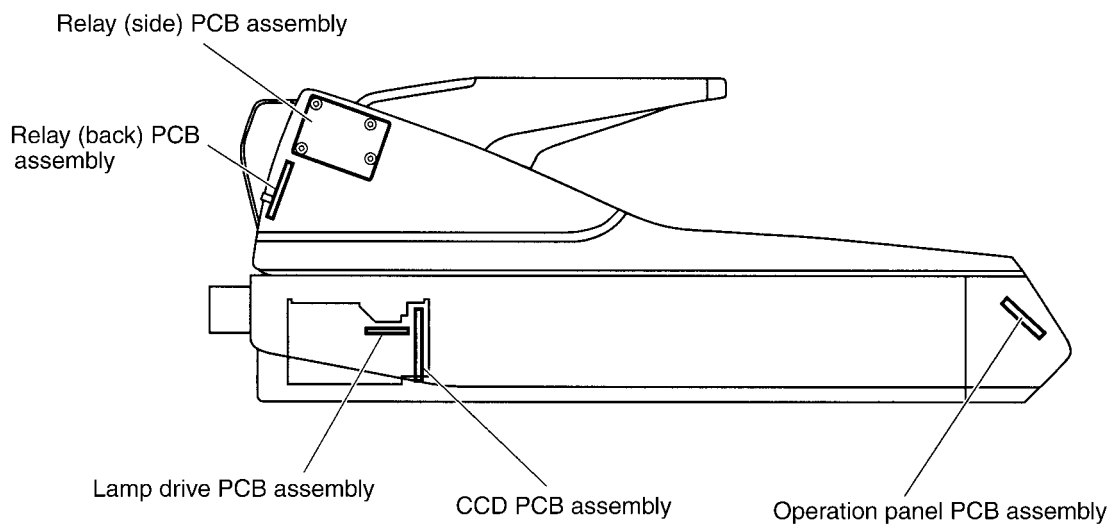
Fig. 3-33

D. SENSOR PCB ASSEMBLIES AND SWITCHES

Document sensor

ADF Switch

Document tray home sensor
PCB assembly

Size sensor PCB assembly

Size LED PCB assembly

Retard position sensor
PCB assembly

Delivery sensor
PCB assembly

Delivery LED PCB
assembly

Double feed sensor
(G) PCB assembly

Imprinter door sensor

ADF Door switch

Starting position sensor
PCB assembly

Carriage home sensor
PCB assembly

Starting position
LED PCB assembly

Double feed sensor (R)
PCB assembly

Document cover sensor
PCB assembly

Fig. 3-34

IX. List of VR, SW, LED and others FOR EACH PCB assemblY

The following is a list of VR (variable resistor), setting SW (switch), LED and others mounted on the PCB assemblies, which can be required for servicing in the field.

Anything excluded from the list is exclusively for the factory. Since any adjustment or check using the parts excluded from the list requires special tools and measuring instruments, mostly with high accuracy, those parts should not be touched in the field.

A. MAIN CONTROL PCB ASSEMBLY
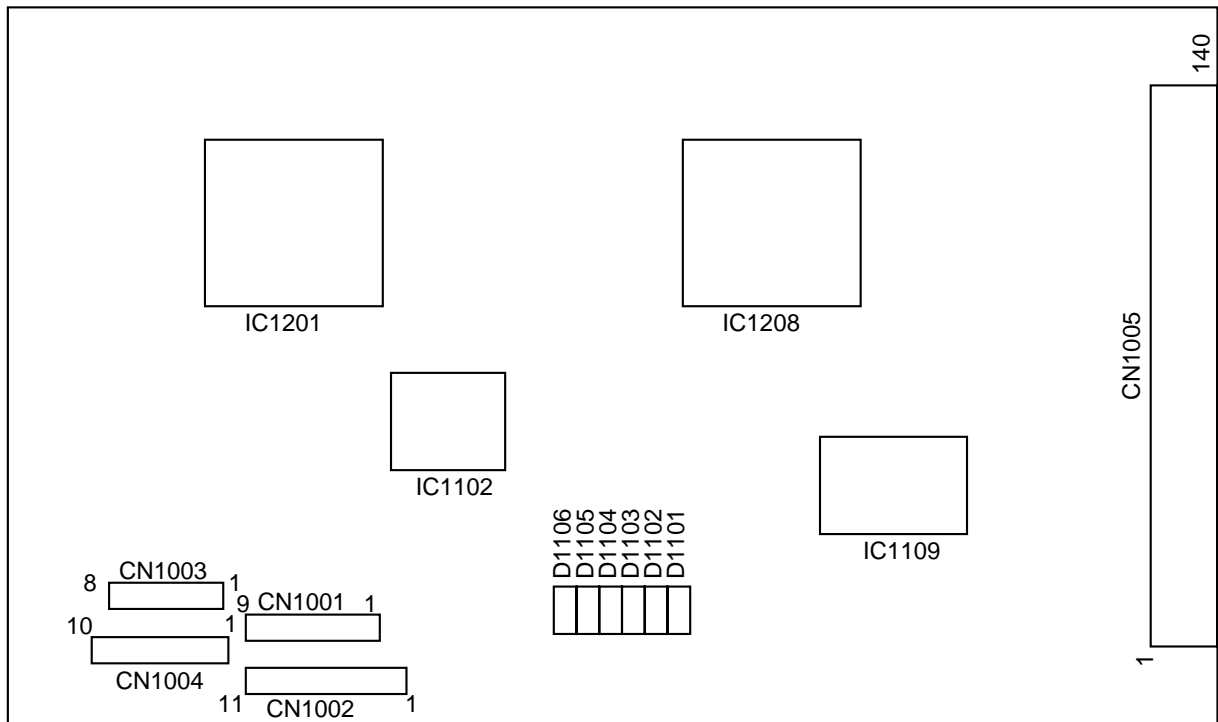
Fig. 3-35

D number	Description
D1101-1106	Power ON sequence indication LED

Table 3-6

IC number	Description
IC1102	Flash memory (program ROM)
IC1109	Microcomputer (CPU)
IC1201	Image processing 1 controller (SENSOR-Chip)
IC1208	Image processing 2 controller (IMAGE-Chip)

Table 3-7

B. SCSI PCB ASSEMBLY
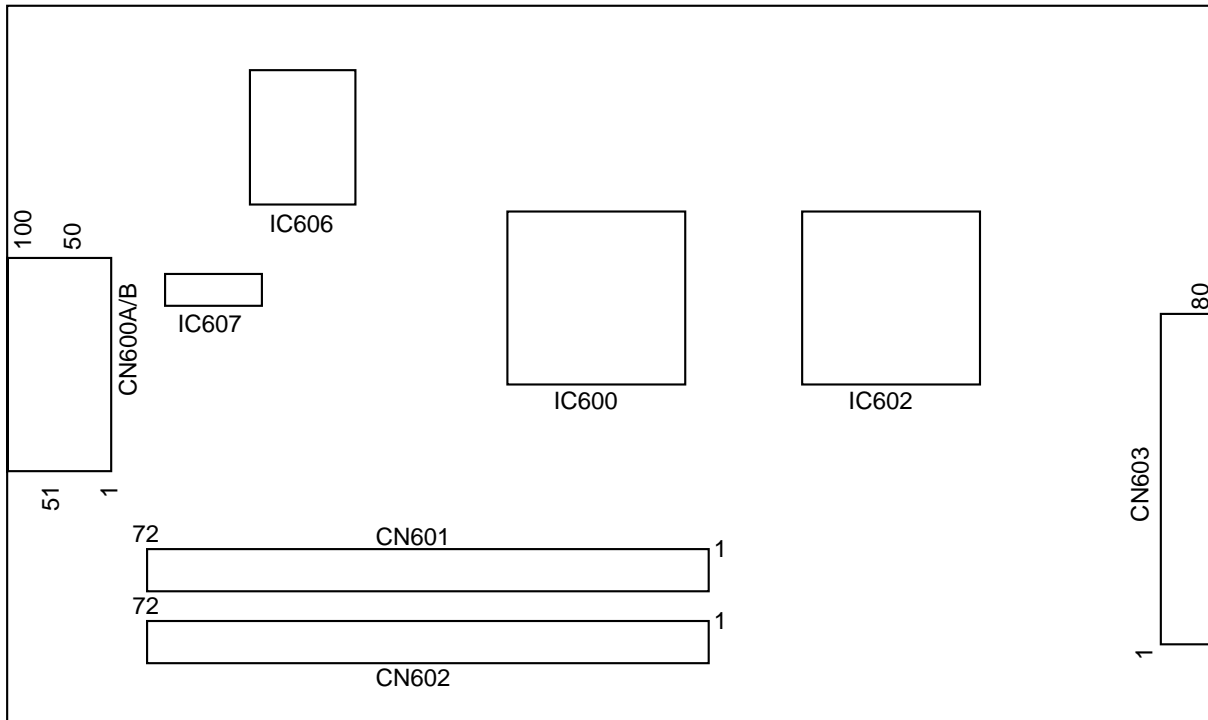
Fig. 3-36

CN number	Description
CN600A/B	SCSI connector
CN601	Memory extension connector 1 for SIMM
CN602	Memory extension connector 2 for SIMM

Table 3-8

IC number	Description
IC600	DMA controller (TIARA-Chip)
IC602	Image compression controller (JBIG-Chip)
IC606	SCSI controller
IC607	Active terminator

Table 3-9

C. DRIVE PCB ASSEMBLY
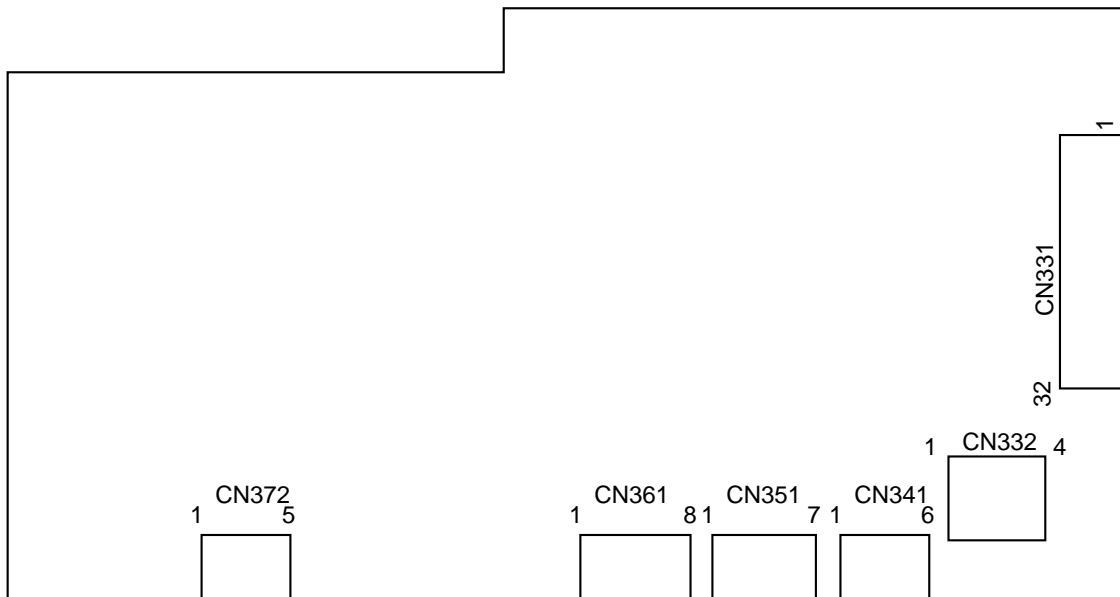
Fig. 3-37

D. MOTHER PCB ASSEMBLY
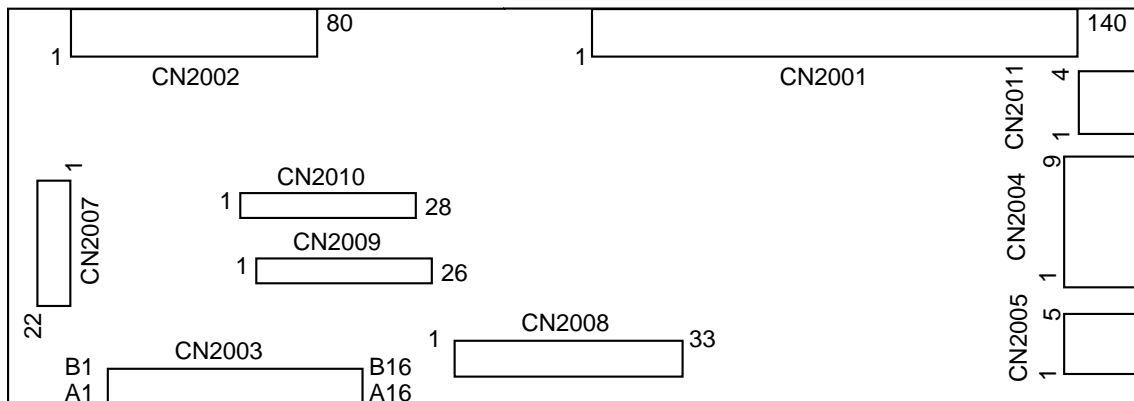
Fig. 3-38

E. DC POWER SUPPLY PCB ASSEMBLY

Fig. 3-39

F. RELAY (BACK) PCB ASSEMBLY
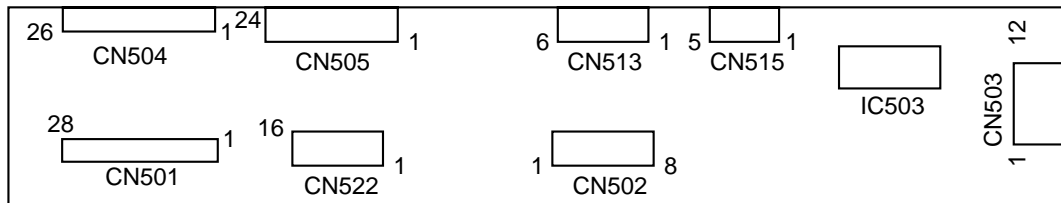
Fig. 3-40

IC number	Description
IC503	Imprinter door sensor

Table 3-10

G. RELAY (SIDE) PCB ASSEMBLY
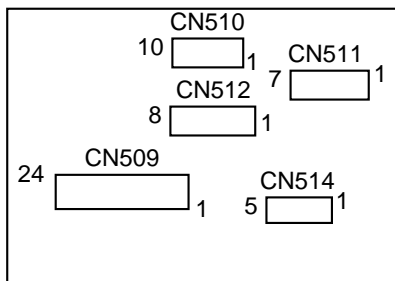
Fig. 3-41

H. OPERATION PANEL PCB ASSEMBLY
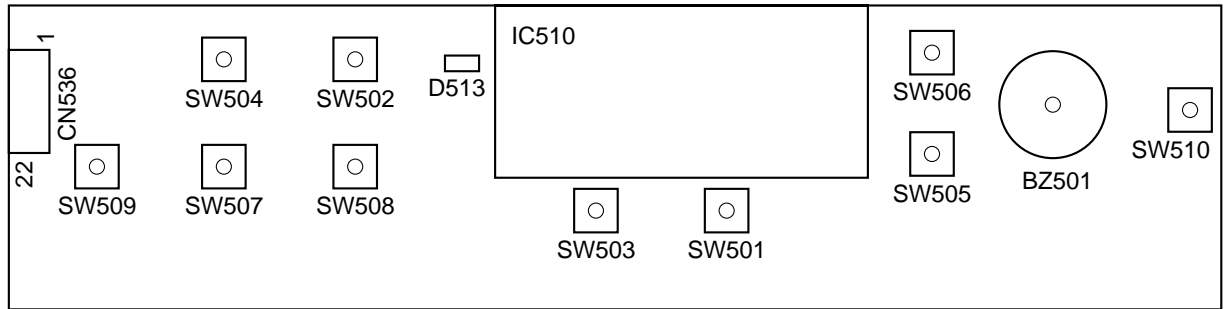
Fig. 3-42

D number	Description
D513	Ready/Error indication LED (green/red)

Table 3-11

IC number	Description
IC510	LCD display panel

Table 3-12

BZ number	Description
BZ501	Buzzer

Table 3-13

SW number	Description
SW501	► key switch
SW502	Counter key switch
SW503	◄ key switch
SW504	Scan key switch
SW505	▼ key switch
SW506	▲ key switch
SW507	Imprint key switch
SW508	Others key switch
SW509	Home key switch
SW510	Start/Stop key switch

Table 3-14

I. LAMP DRIVE PCB ASSEMBLY
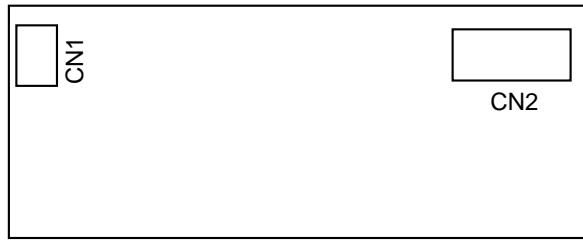
Fig. 3-43

J. CCD PCB ASSEMBLY
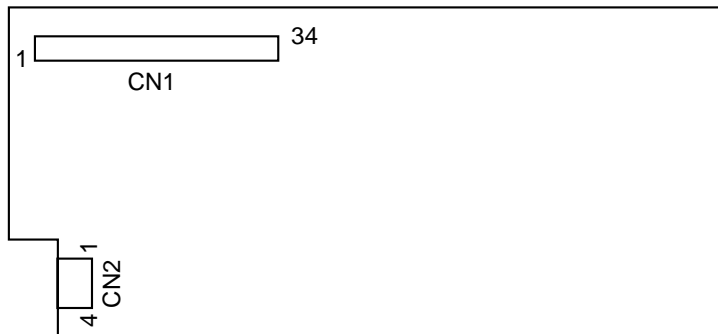
Fig. 3-44

K. SIZE SENSOR PCB ASSEMBLY
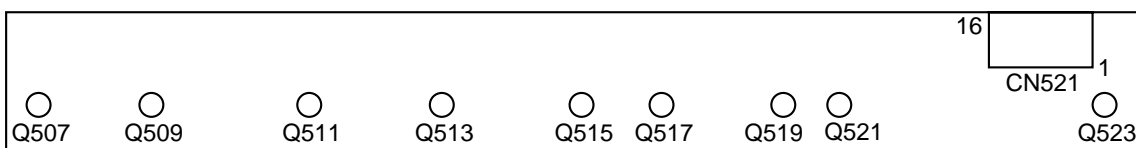
Fig. 3-45

Q number	Description
Q507-523	Size sensor (phototransistor)

Table 3-15

L. SIZE LED PCB ASSEMBLY
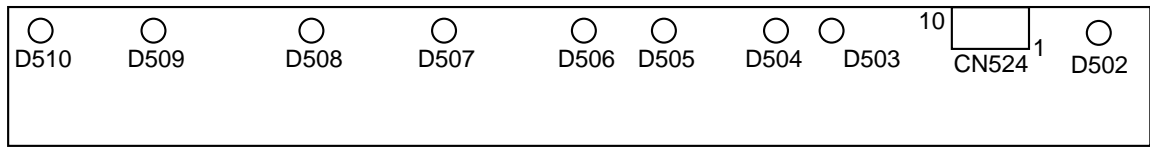
Fig. 3-46

D number	Description
D502-510	Size sensor LED

Table 3-16

M. STARTING POSITION SENSOR PCB ASSEMBLY
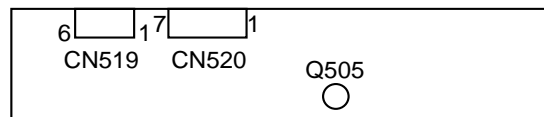
Fig. 3-47

Q number	Description
Q505	Starting position sensor (phototransistor)

Table 3-17

N. STARTING POSITION LED PCB ASSEMBLY
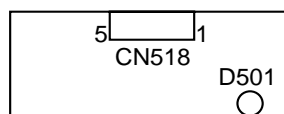
Fig. 3-48

D number	Description
D501	Starting position sensor LED

Table 3-18

O. DELIVERY SENSOR PCB ASSEMBLY
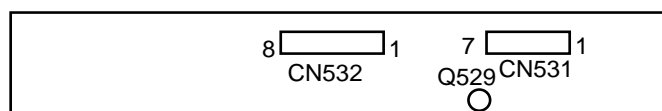
Fig. 3-49

Q number	Description
Q529	Delivery sensor (phototransistor)

Table 3-19

P. DELIVERY LED PCB ASSEMBLY
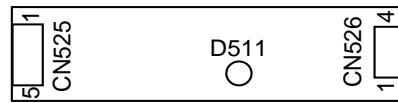
Fig. 3-50

D number	Description
D511	Delivery sensor LED

Table 3-20

Q. DOUBLE FEED SENSOR (G) PCB ASSEMBLY
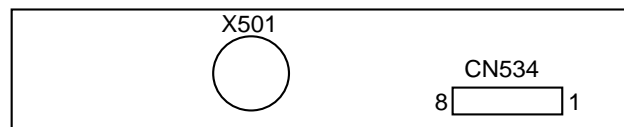
Fig. 3-51

X number	Description
X501	Ultrasonic wave generator for double feed detection

Table 3-21

R. DOUBLE FEED SENSOR (R) PCB ASSEMBLY
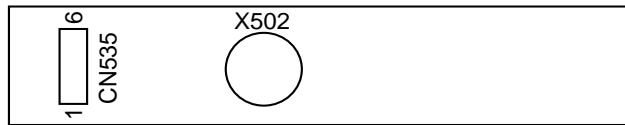
Fig. 3-52

X number	Description
X502	Ultrasonic wave receiver for double feed detection

Table 3-22

S. DOCUMENT COVER SENSOR PCB ASSEMBLY
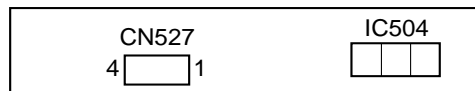
Fig. 3-53

IC number	Description
IC504	Document cover sensor (photointerrupter)

Table 3-23

T. DOCUMENT TRAY HOME SENSOR PCB ASSEMBLY
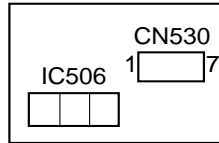
Fig. 3-54

IC number	Description
IC506	Document tray home sensor (photointerrupter)

Table 3-24

U. RETARD POSITION SENSOR PCB ASSEMBLY
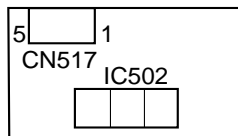
Fig. 3-55

IC number	Description
IC502	Retard position sensor (photointerrupter)

Table 3-25

V. CARRIAGE HOME SEN-SOR PCB ASSEMBLY
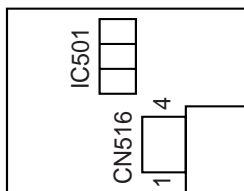
Fig. 3-56

IC number	Description
IC501	Carriage home sensor (photointerrupter)

Table 3-26

W. DOCUMENT SENSOR RE-LAY PCB ASSEMBLY
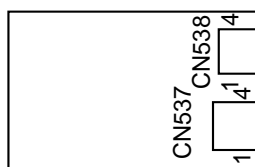
Fig. 3-57

CHAPTER 4

DISASSEMBLY & REASSEMBLY

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

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

I. Disassembly Flowchart

The flowchart indicates disassembly items of the Covers, Unit Components and PCB assemblies. When reassembling, perform the steps in the reverse order unless otherwise noted in Reassembling Notes.

```
                                    START

      II.5            IV.2            II.1                    III.21
White Cover Sheet   SCSI PCB       Rear Cover           Outer Guide Plate

  IV.16      IV.21          IV.1        II.2             IV.12          IV.10
Delivery   Document      Main Control  Left Cover    Double Feed    Size Sensor
LED PCB    Cover Sensor  PCB                          Sensor (G)     PCB
           PCB                          II.3          PCB
                                      Right Cover

                                        II.4
                                      Front Cover

  III.8        III.9       III.10      III.11       II.11          IV.6
Pickup       Separation   Retard     CIS Platen   Document       Operation Panel
Roller       Roller       Roller     Roller       Glass          PCB

                                                   II.12
                                                  ADF Glass

                                   III.1
                                  Carriage

   III.5        III.4                          II.18
Lamp Module   Power Supply                   Shield Plate
              Box and Cover

  III.6      IV.4       III.7      III.2        IV.3            IV.20
Power      DC Power     Fan      Carriage      Drive PCB    Carriage Home
Switch     Supply PCB           Motor                       Sensor PCB
                                 III.3          IV.5
                                Drive Belt 3   Mother PCB

   II.10            II.7         II.8          II.9         II.6
Document Tray    ADF Right    ADF Rear      Imprinter    ADF Left
                 Cover        Cover         Door         Cover

 IV.9      II.13     II.14      III.12    II.16      IV.18        IV.8          IV.19
Document  Document  White     Drive     Inner     Relay (Back)  Retard        Relay (Side)
Sensor    Tray      Plate     Belt 2    Guide     PCB           Position      PCB
Relay PCB Base                          Plate                   Sensor PCB
                              III.13
                    II.15    Drive Belt 1
                  Delivery
                  Guide Plate

  IV.7          III.14      III.14      III.15     III.20     IV.11        IV.13       III.17
Document Tray   Feed Roller Feed Roller ADF Door   Feed       Size LED    Double Feed  Gas Damper
Home Sensor PCB 3,4,5       1,2         Switch     Motor      PCB         Sensor (R)
                                                              III.16      PCB          II.17
  III.18      IV.17      III.19                               Pickup Motor            Lower Guide
ADF Switch   Delivery    CIS                                                           Plate
             Sensor PCB                                       IV.15
                                                            Starting Position          IV.14
                                                            Sensor PCB                Starting
                                                                                      Position
                                                                                      LED PCB
```

Fig. 4-1

II. Exterior

1. Rear Cover

1) Remove 7 screws.
2) Remove the Rear Cover.
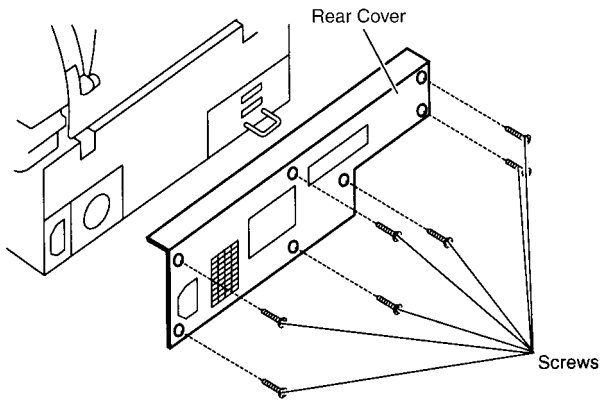
Fig. 4-2

2. Left Cover

1) Remove Rear Cover. (See II.1)
2) Remove 3 screws.
3) Slide Left Cover toward the back, as shown in Fig 4-3.
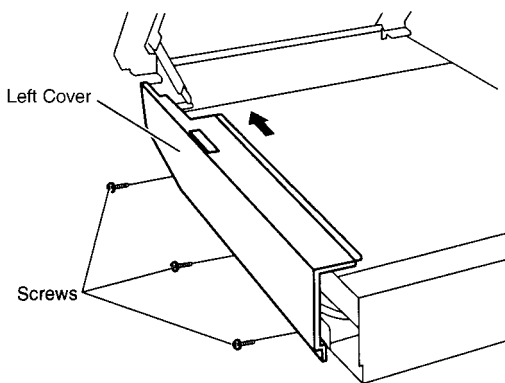
Fig. 4-3

4) Lift Left Cover up, as shown in Fig. 4-4.
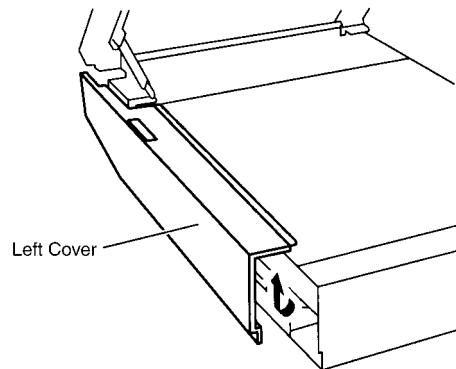
Fig. 4-4

5) Centralize the axis (fulcrum) of the lever and turn Left Cover toward the right, as shown in Fig. 4-5. While turning, bring it down toward the inside (toward the left).
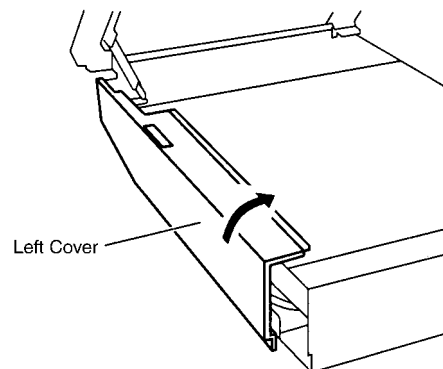
Fig. 4-5

6) Detach the screw-fixed hook on the back of Left Cover from the chassis, and remove later.

3.   Right Cover

1)   Remove Rear Cover. (See II.1)
2)   Remove 3 screws.
3)   Slide the Right Cover backward as shown in Fig. 4-6.
4)   Remove the Right Cover.
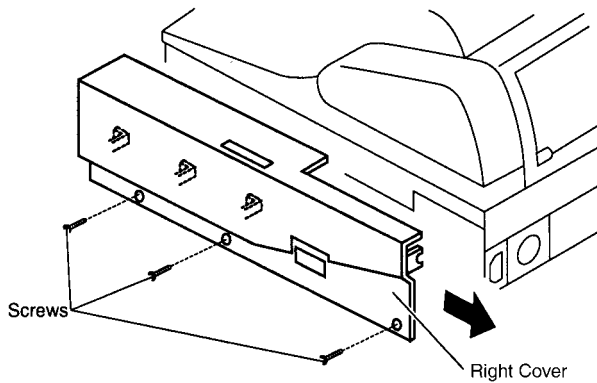
Fig. 4-6

4.   Front Cover

1)   Remove the Left Cover. (See II.2)
2)   Remove the Right Cover. (See II.3)
3)   Remove 3 screws (A) and 2 screws (B).
4)   Disconnect CN536.
5)   Remove the Front Cover.
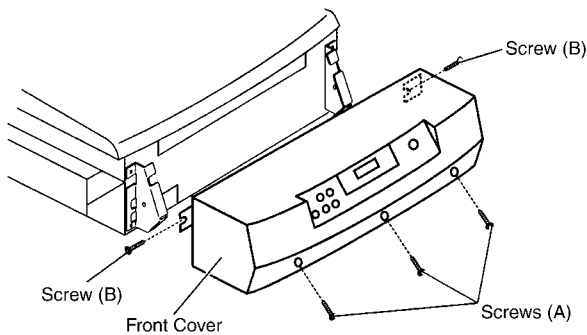
Fig. 4-7

5.   White Cover Sheet

1)   Peel off White Cover Sheet, as shown in Fig. 4-8.
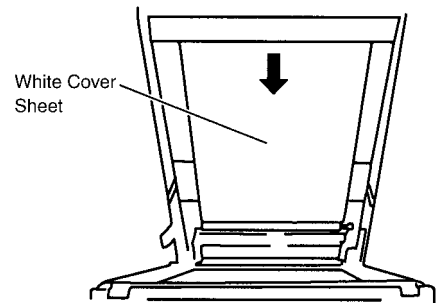
Fig. 4-8

Note: Regarding how to put it on, refer to the label stuck on the back of White Cover Sheet.

6.   ADF Left Cover

1)   Remove 2 screws (A).
2)   Open ADF.
3)   Remove screw (B).
4)   Remove the ADF Left Cover.
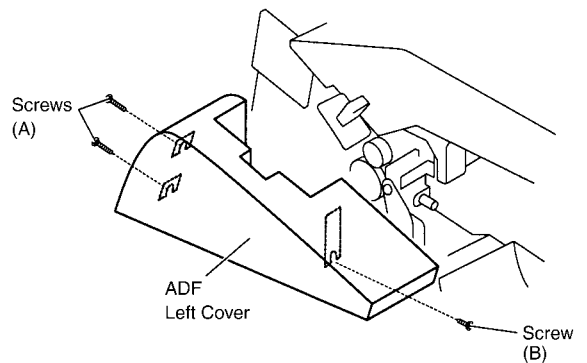
Fig. 4-9

7. ADF Right Cover

1) Remove 2 screws (A).
2) Open ADF.
3) Remove screw (B).
4) Remove the ADF Right Cover.
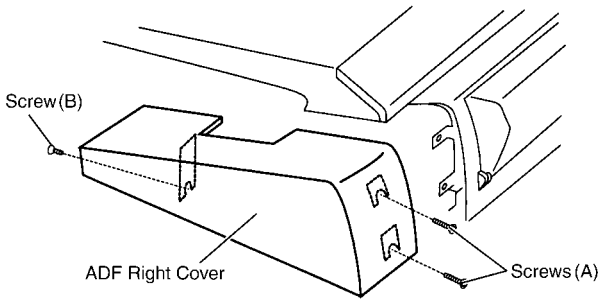
Fig. 4-10

8. ADF Rear Cover

1) Open ADF Door.
2) Loosen 4 screws and remove the ADF Rear Cover.
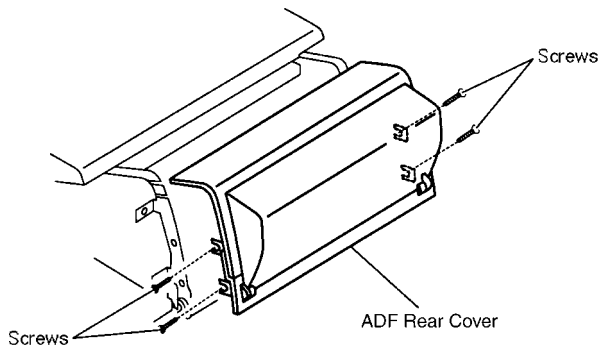
Fig. 4-11

9. Imprinter

1) Push the Imprinter Door, as shown in Fig. 4-12.
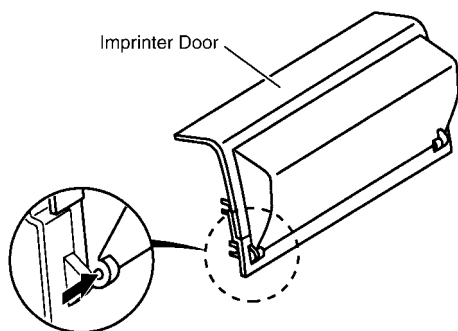
Fig. 4-12

10. Document Tray

1) Open ADF.
2) Push the Document Tray, as shown in the Fig. 4-13.
3) Disconnect CN529.
   Note: When connecting CN529, printed character on cable should be upper side.
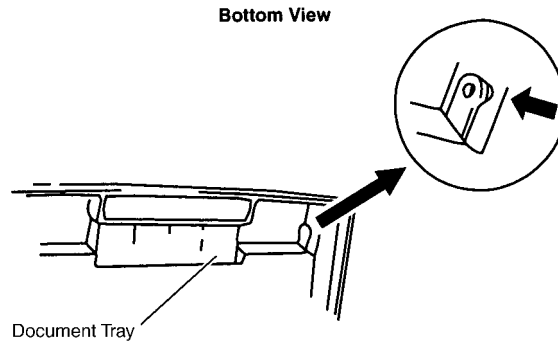
Fig. 4-13

11. Document Glass

1) Open Document Cover.
2) Remove Left Cover. (See II.2)
3) Remove Right Cover. (See II.3)
4) Remove Front Cover. (See II.4)
5) Loosen 2 screws (A).
6) Remove 6 screws and Document Glass.
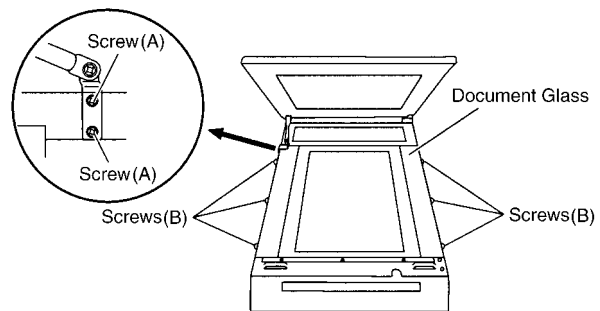
Fig. 4-14

12. ADF Glass

1) Open Document Cover.
2) Remove Left Cover. (See II.2)
3) Remove Right Cover. (See II.3)
4) Remove 4 screws (A).
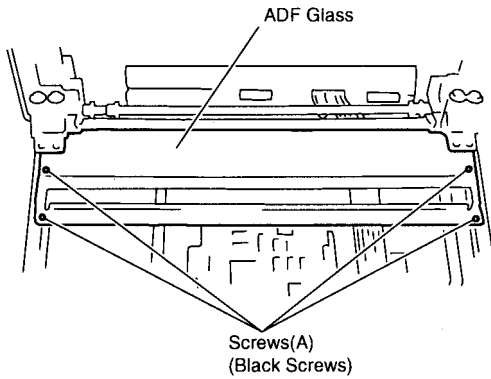
Fig. 4-15

5) Remove 2 screws (B) and ADF Glass.
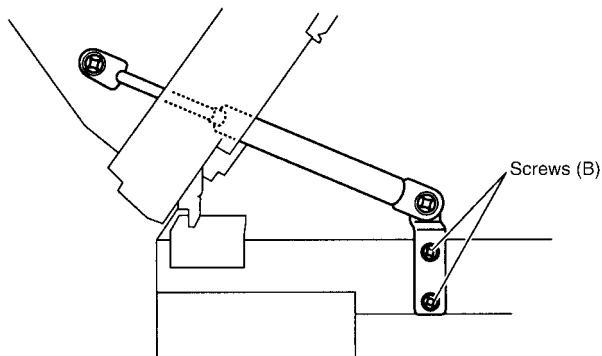
Fig. 4-16

13. Document Tray Base

1) Remove Document Tray. (See II.10)
2) Remove 2 screws (A).
3) Remove 2 screws (B) from the bottom of Document Tray Base.
4) Remove 2 screws (C) from the top of Document Tray Base.
5) Remove the Document Tray Base.
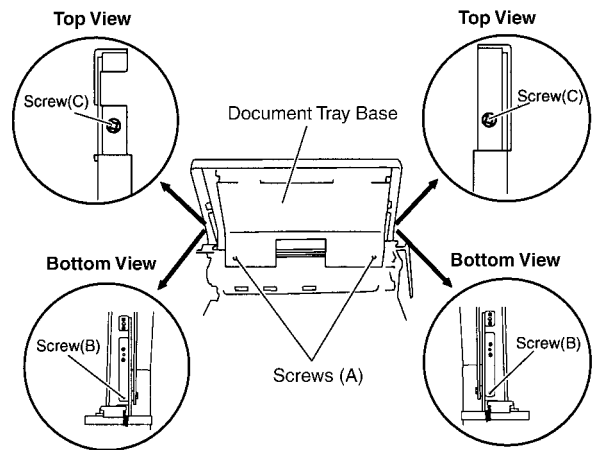
Fig. 4-17

14. White Plate

1) Remove ADF Right Cover. (See II.7)
2) Open ADF.
3) Loosen 2 screws.
4) Remove White Plate.
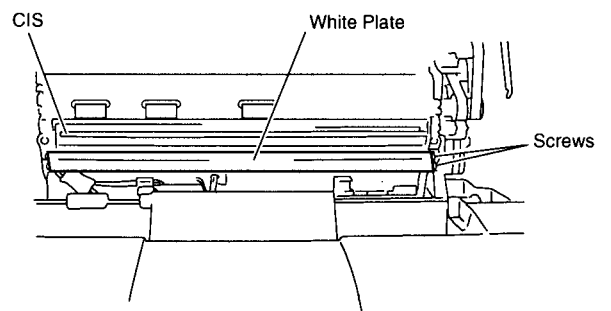
Fig. 4-18

15. Delivery Guide Plate

1) Open ADF.
2) Remove 4 screws and Delivery Guide Plate.
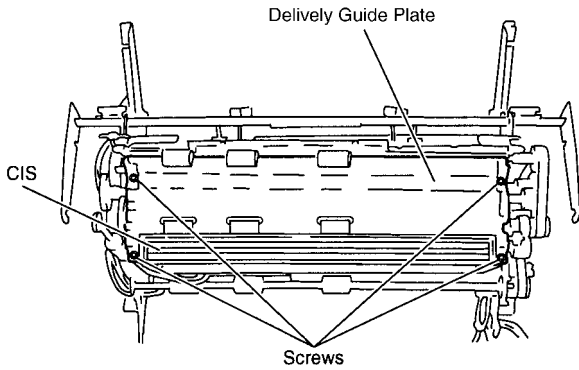
Fig. 4-19

16. Inner Guide Plate

1) Remove ADF Rear Cover. (See II.8)
2) Open ADF Door.
3) Remove 6 screws and Inner Guide Plate.
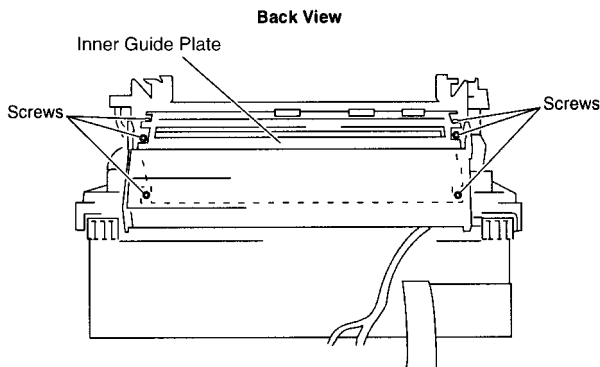
Fig. 4-20

17. Lower Guide Plate

1) Remove ADF Left Cover. (See II.6)
2) Remove ADF Right Cover. (See II.7)
3) Remove Gas Damper. (See III.17)
4) Open ADF.
5) Remove 4 screws (A).
6) Remove 2 screws (B) and Lower Guide Plate.
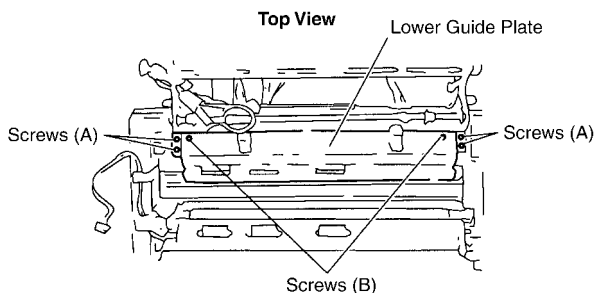
Fig. 4-21

18. Shield Plate

1) Remove Carriage. (See III.1)
2) Remove screw (B) and Shield Plate 2.
3) Remove 11 screws (A) and Shield Plate 1.
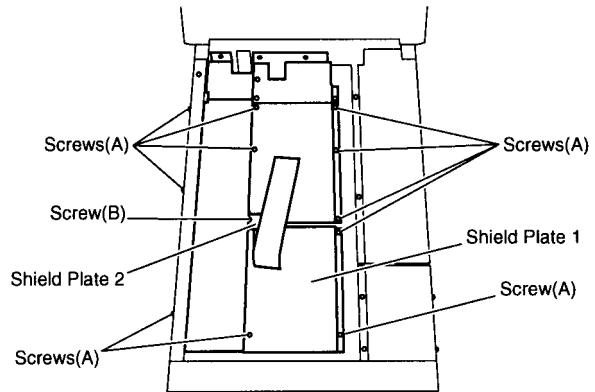
Fig. 4-22

4) Remove 6 screws (C) and Shield Plate 3.
5) Remove 6 screws (D), Shield Plate 4, and Shield Plate 5.
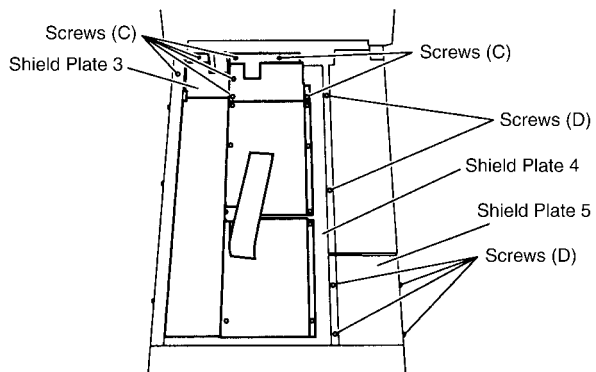
Fig. 4-23

III. Unit Components

1. Carriage

1) Remove Document Glass. (See II.11)
2) Remove ADF Glass. (See II.12)
3) Remove 2 screws (A) and Loosen screw (B) and pull out Shaft, as shown in Fig. 4-24.
4) Disconnect Connector from Carriage.
   Note: When assembling, supply the cable to this carriage so that "CCD" character is seen from front side.

5) Remove Carriage.
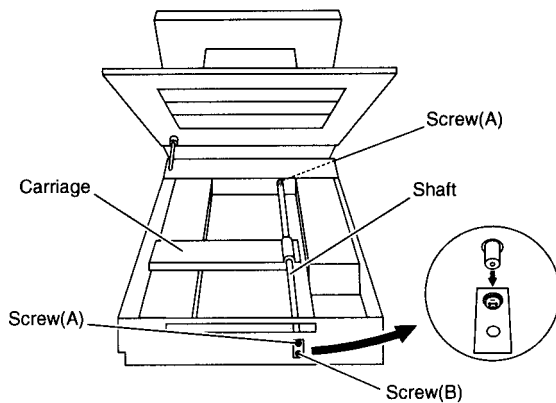
Fig. 4-24

2. Carriage Motor

1) Remove Shield Plate. (See II.18)
2) Remove 2 screws (A).
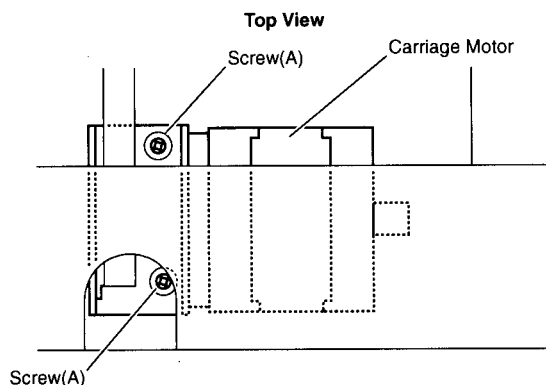
Fig. 4-25

3) Remove 4 nuts from the bottom side of this scanner.
4) Disconnect Carriage Motor Connector.
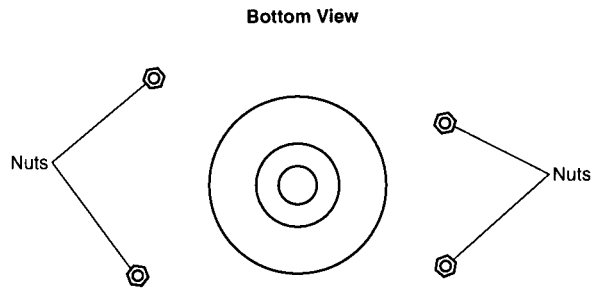
Fig. 4-26

3. Drive Belt 3

1) Remove Carrige Motor. (See III.2)
2) Remove Drive Belt 3, as shown in Fig. 4-27.
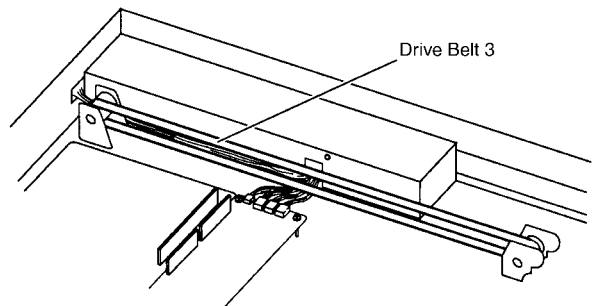
Fig. 4-27

4. Power Supply Box and Cover

1) Remove Optical Carriage. (See III.1)
2) Remove 3 screws (A), as shown in Fig. 4-28.
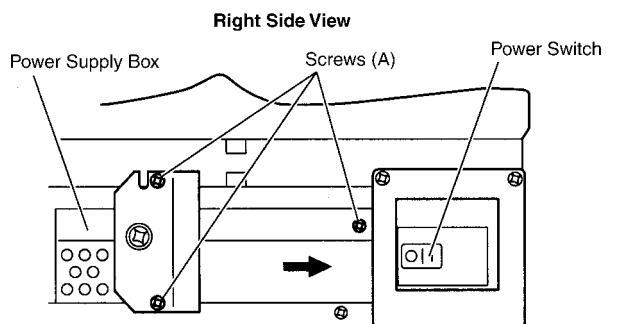
Fig. 4-28

3) Remove screw (B), as shown in Fig. 4-29.

Back View
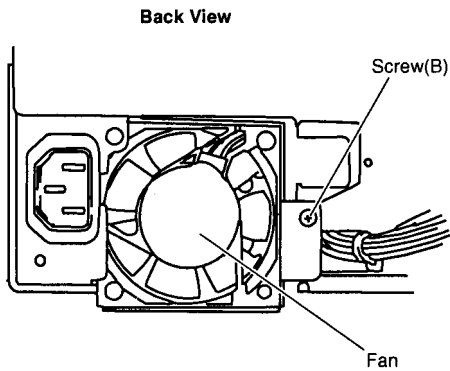
Fig. 4-29

4) Slide Power Supply Box to the back side, according to the arrow as shown in Fig. 4-28.
5) Remove 6 screws and Power Supply Cover.
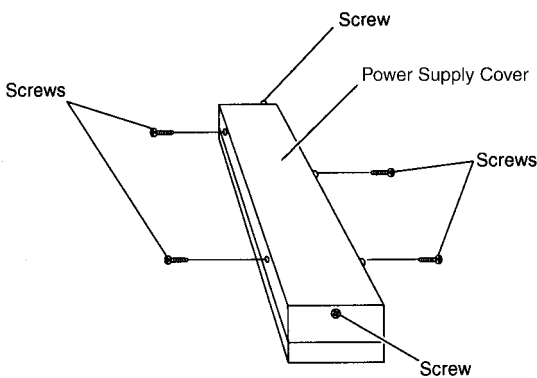
Fig. 4-30

5. Lamp Module

1) Remove Carriage. (See III.1)
2) Remove 2 screws (A) and brackets.
3) Remove 4 screws (B) and Cover.
4) Disconnect Lamp Module Connector.
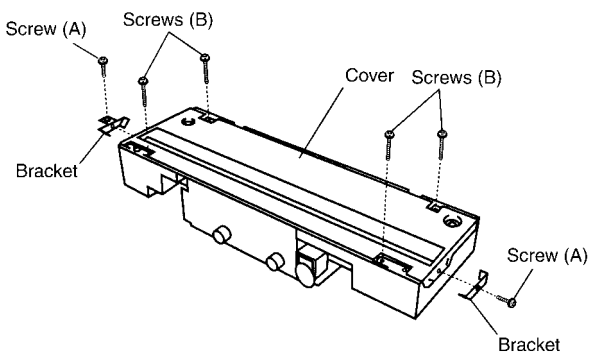
Fig. 4-31

5) Remove 2 screws (C), and Lamp Module.
    Note: • Lamp is easy to break.
    • Lamp becomes higt temperature.
    • Lamp module has high voltage part.
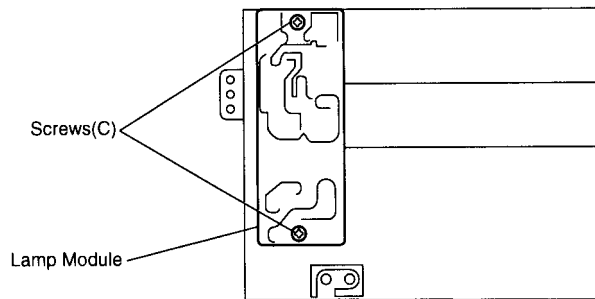
Fig. 4-32

6. Power Switch

1) Remove Power Supply Box and Cover. (See III.4)
2) Remove Power Switch from the chassis. (Pull out while pressing both sides of the locking section)
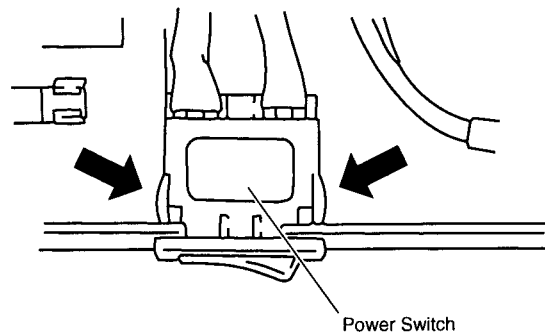
Fig. 4-33

> **WARNING**
> **When replacing the Power Switch or Inlet, the wiring must be installed as illustrated.**
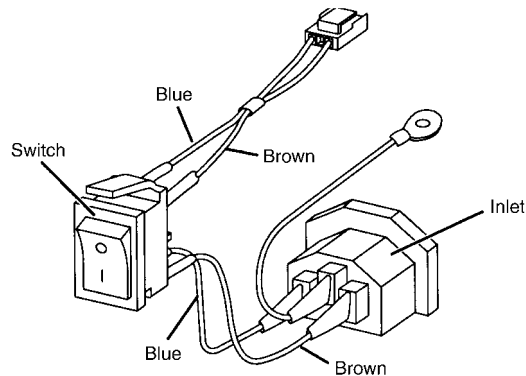
Fig. 4-34

7. Fan

1) Remove Rear Cover. (See II.1)
2) Remove Power Supply Box and Cover. (See III.4)
3) Disconnect Fan connector.
4) Remove 2 screws (A), screw (B), and Fan, as shown in Fig. 4-35.
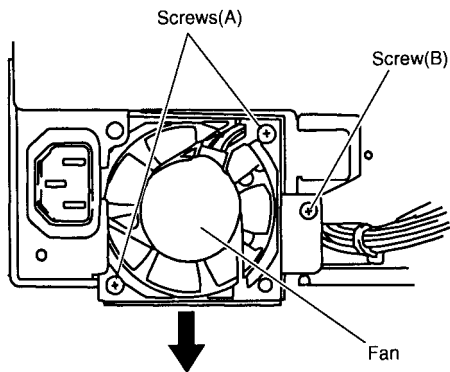
Fig. 4-35

8. Pickup Roller

1) Open ADF Door.
2) Open Upper Guide Plate.
3) Unlock the Pickup Roller from the notching hole of chassis and remove it.
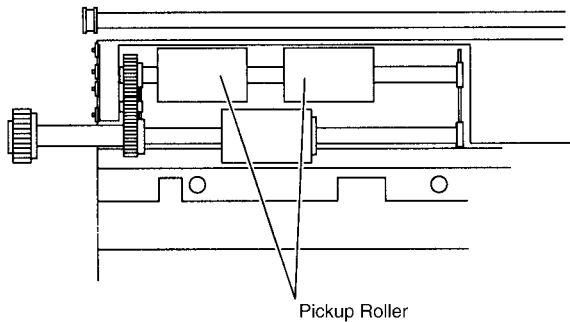
Fig. 4-36

9. Separation Roller

1) Open ADF Door.
2) Open Upper Guide Plate.
3) Unlock the Separation Roller from the notching hole of chassis and remove it.
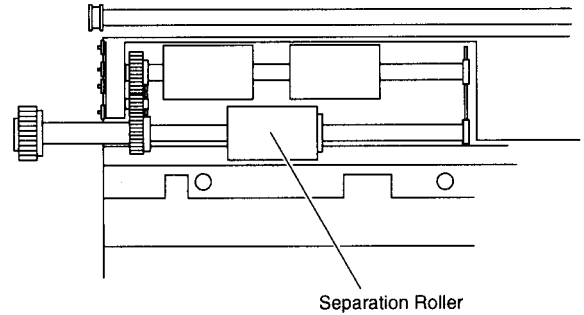
Fig. 4-37

10. Retard Roller

1) Open ADF Door.
2) Open Pickup Guide Plate.
3) Grip the Retard Roller and slide, as shown in Fig. 4-38.
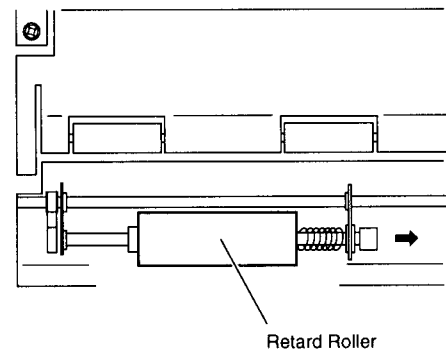
Fig. 4-38

11. CIS Platen Roller

1) Open ADF.
2) Unlock the CIS Platen Roller from the notching hole of chassis and remove it.

CIS Platen Roller
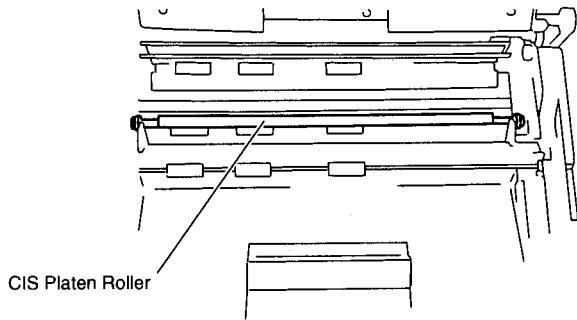
Fig. 4-39

12. Drive Belt 2

1) Remove ADF Right Cover. (See II.7)
2) Loosen 2 screws and remove Drive Belt 2.
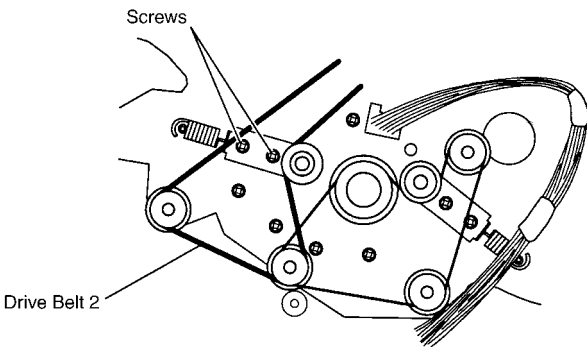
Screws

Drive Belt 2

Fig. 4-40

13. Drive Belt 1

1) Remove ADF Right Cover. (See II.7)
2) Remove Drive Belt 2. (See III.12)
3) Loosen 2 screws and remove Drive Belt 1.

Screws

Drive Belt 1
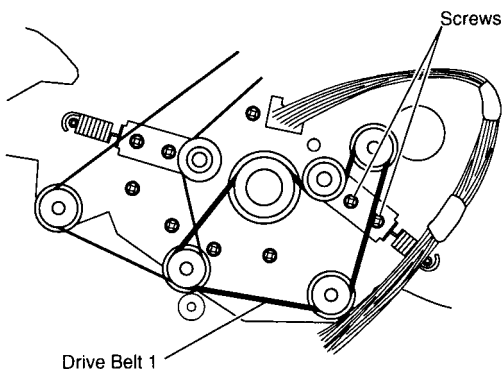
Fig. 4-41

14. Feed Roller 1-5

1) Remove Inner Guide Plate. (See II.16)
2) Remove ADF Right Cover. (See II.7)
3) Unlock Feed Roller (1, 2) from the notching hole of the chassis and remove them.
4) Remove Delivery Guide Plate. (See II.15)
5) Unlock Feed Roller 3, 4, and 5 from the notching hole of the chassis and remove them.

Right Side View

Feed Roller 1

Feed Roller 2

Feed Roller 5

Feed Roller 4

Feed Roller 3

Feed Roller seen from arrow point

Feed Roller 1

Feed Roller 2

Feed Roller 3

Feed Roller 4
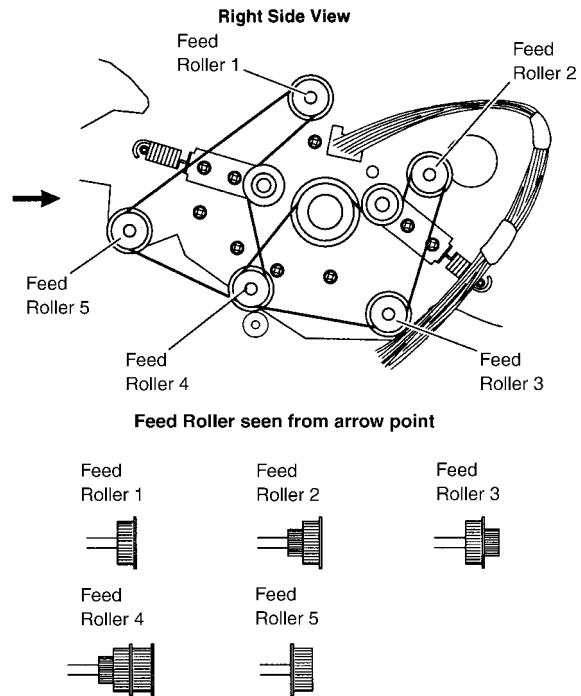
Feed Roller 5

Fig. 4-42

15. ADF Door Switch

1) Remove Inner Guide Plate. (See II.16)
2) Remove ADF Right Cover. (See II.7)
3) Disconnect ADF Door Switch connector.
4) Remove screw and ADF Door Switch.

Back View
ADF Door Switch

Side View
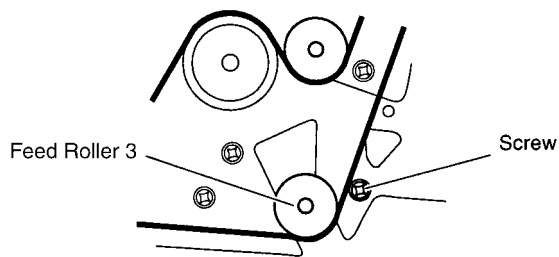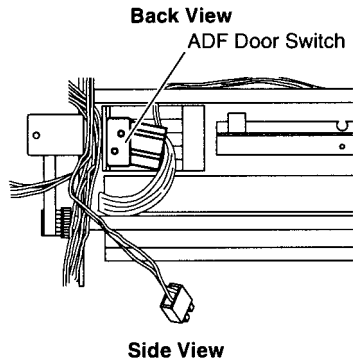
Fig. 4-43

Feed Roller 3

Screw

16. Pickup Motor

1) Remove Inner Guide Plate. (See II.16)
2) Remove Feed Roller 1, 2. (See III.14)
3) Remove Delivery Guide Plate. (See II.15)
4) Remove RELAY (SIDE) PCB. (See IV.19)
5) Remove 2 E-rings and Gears.
6) Remove 2 screws (A) as shown in Fig. 4-44.
7) Remove SIZE LED PCB. (See IV.11)
8) Disconnect Pickup Motor connector and Pickup Motor.

Screws(A)

Gears

Pickup Motor Gear

E-rings
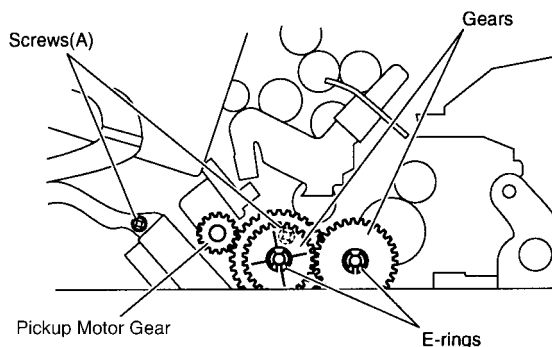
Fig. 4-44

17. Gas Damper

1) Remove ADF Left Cover. (See II.6)
2) Open Document Cover.
3) Remove 2 screws and Gas Damper.

Screws

Gas Damper
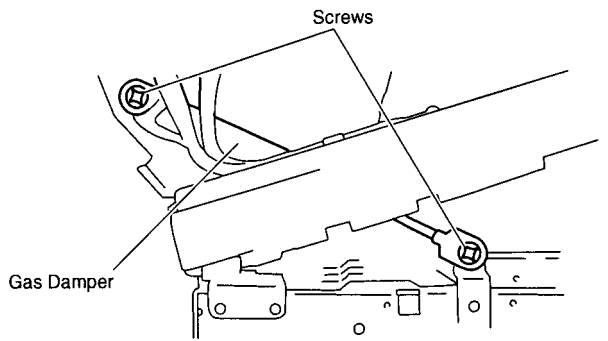
Fig. 4-45

18. ADF Switch

1) Open ADF.
2) Remove Delivery Guide Plate. (See II.15)
3) Disconnect ADF Switch connector.
4) Remove screw and ADF Switch.

Front View

Side View

ADF Switch
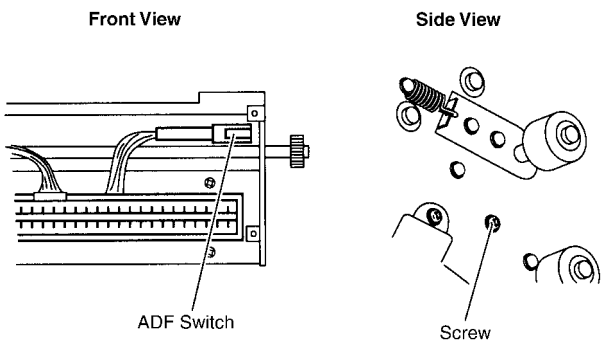
Screw

Fig. 4-46

19. CIS

1) Remove White Plate. (See II.14)
2) Remove Delivery Guide Plate. (See II.15)
3) Remove 4 screws and CIS.
4) Disconnect CIS connector.

Fig. 4-47

20. Feed Motor

1) Remove Inner Guide Plate. (See II.16)
2) Remove Delivery Guide Plate. (See II.15)
3) Remove ADF Right Cover. (See II.7)
4) Remove 2 screws.
5) Disconnect Feed Motor connector, and re-move Feed Motor.
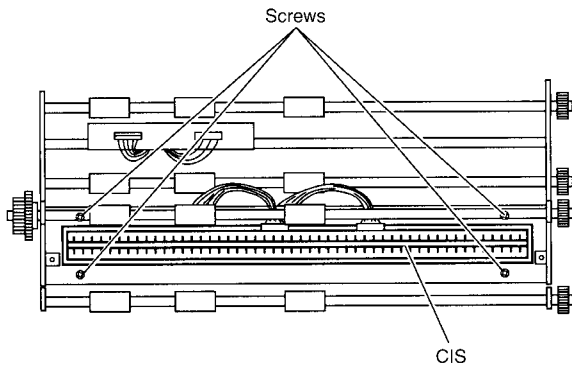
Fig. 4-48

21. Outer Guide Plate

1) Open the ADF Door.
2) Remove the Upper Guide Plate.
3) Remove 6 screws and Outer Guide Plate.
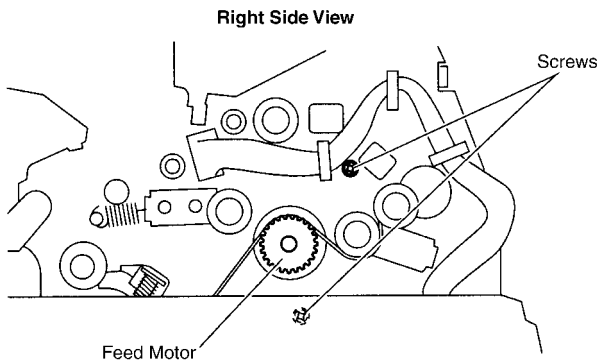
Fig. 4-49

IV. PCB Assemblies

1. Main Control PCB

1) Remove Rear Cover. (See II.1)
2) Remove 2 screws and Main Control PCB.
3) Disconnect all connectors from/to Main Control PCB.
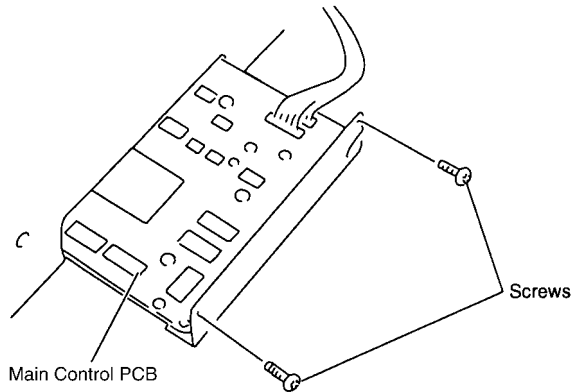
Fig. 4-50

2. SCSI PCB

1) Remove 3 thumb screws.
2) Pull out SCSI PCB.
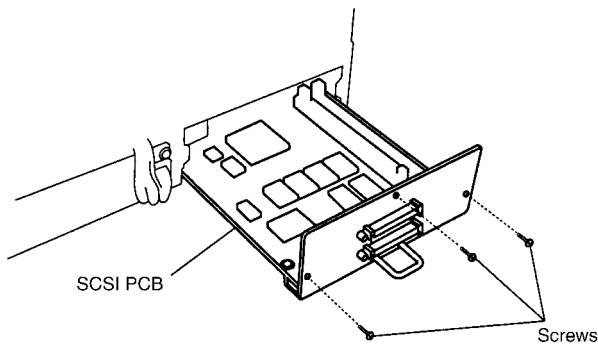
Fig. 4-51

3. Drive PCB

1) Remove Document Glass. (See II.11)
2) Remove Carriage. (See III.1)
3) Remove Shield Plate. (See II.18)
4) Remove 4 screws and Drive PCB.
5) Disconnect all connectors from/to Drive PCB.
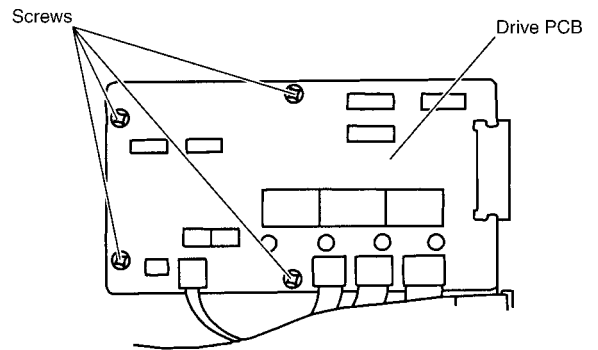
Fig. 4-52

4. DC Power Supply PCB

1) Remove Document Glass. (See II.11)
2) Remove Power Supply Box and Cover. (See III.4)
3) Remove 11 screws and DC Power Supply PCB.
4) Disconnect all connectors from/to DC Power Supply PCB.

Top View

Side View
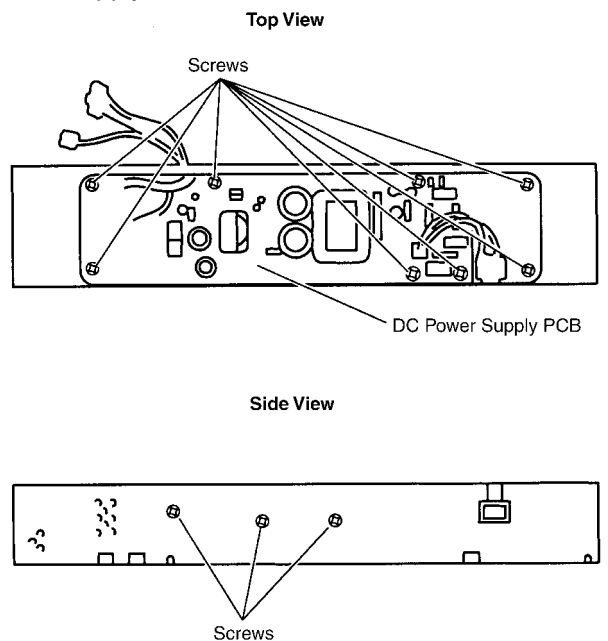
Fig. 4-53

5. Mother PCB

1) Remove Document Glass. (See II.11)
2) Remove Carriage. (See III.1)
3) Remove Shield Plate. (See II.18)
4) Remove Drive PCB. (See IV.3)
5) Remove 5 screws and Mother PCB.
6) Disconnect all connectors from/to Mother PCB.

Screws

Mother PCB
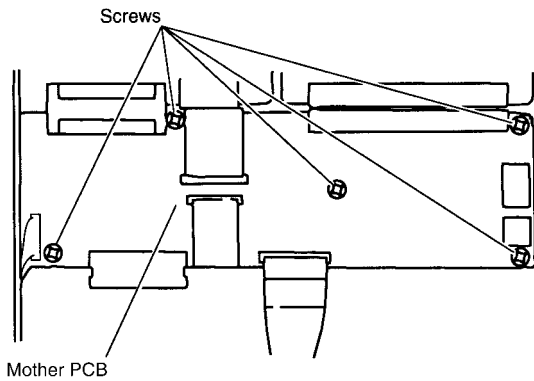
Fig. 4-54

6. Operation Panel PCB

1) Remove Front Cover. (See II.4)
2) Remove 7 screws and Opration Panel PCB.
3) Disconnect CN536.

Screws

Screws   Operation Panel PCB
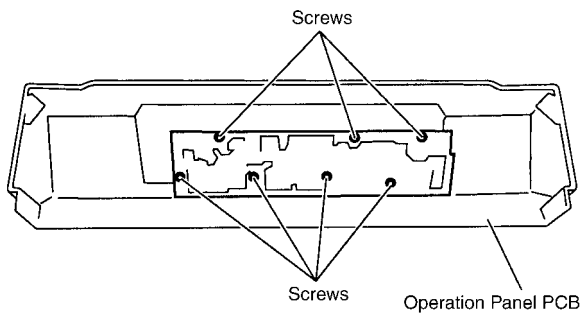
Fig. 4-55

7. Document Tray Home Sensor PCB

1) Remove Delivery Guide Plate. (See II.15)
2) Remove screw and Document Tray Home Sensor PCB.
3) Disconnect CN529 and CN530.

Document Tray
Home Sensor PCB   Screw
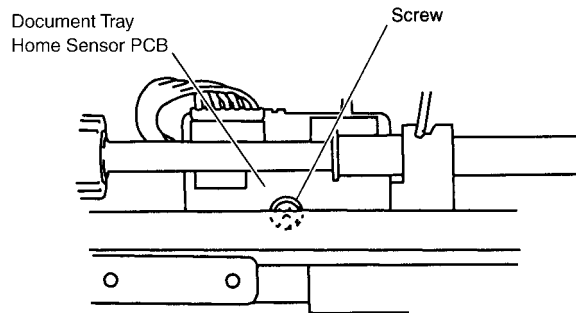
Fig. 4-56

8. Retard Position Sensor PCB

1) Remove ADF Left Cover. (See II.6)
2) Remove screw and Retard Position Sensor PCB.
3) Disconnect CN517.

Retard Position
Sensor PCB   Screw
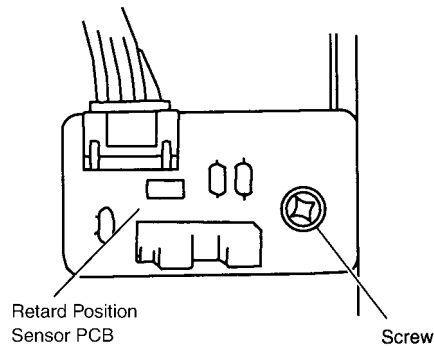
Fig. 4-57

9. Document Sensor Relay PCB

1) Remove Document Tray. (See II.10)
2) Remove 2 screws and Document Sensor Relay PCB.
3) Disconnect CN537 and CN538.

Fig. 4-58

10. Size Sensor PCB

1) Remove Outer Guide Plate. (See III.21)
2) Remove 3 screws and Size Sensor PCB.
3) Disconnect CN521 having this PCB.

Front View

Screws

Size Sensor PCB   Outer Guide Plate
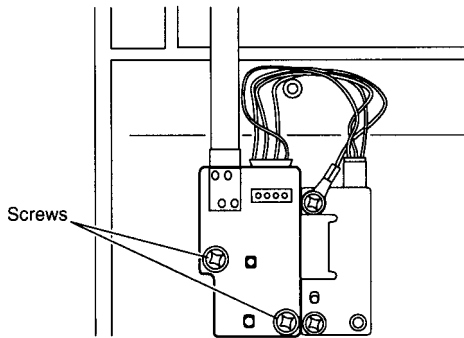
Fig. 4-59

11. Size LED PCB

1) Remove ADF Rear Cover. (See II.8)
2) Remove Inner Guide Plate. (See II.16)
3) Remove 3 screws and Size LED PCB.
4) Disconnect CN524.

Screws

Size LED PCB
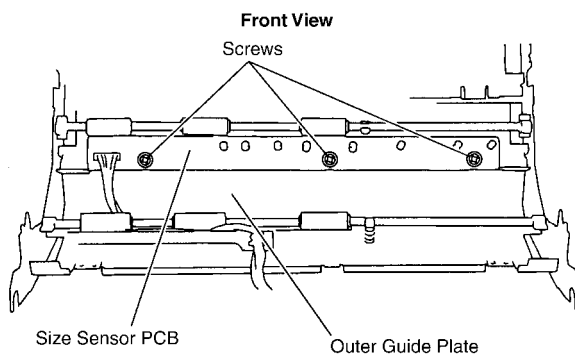
Fig. 4-60

12. Double Feed Sensor (G) PCB

1) Remove Outer Guide Plate. (See III.21)
2) Remove 3 screws (A) from Fitting Plate with Double Feed Sensor (G) PCB.
3) Disconnect CN534.

(From Back)   Double Feed   Screw (A)
                Sensor (G) Board   (From Back)
Screws (A)
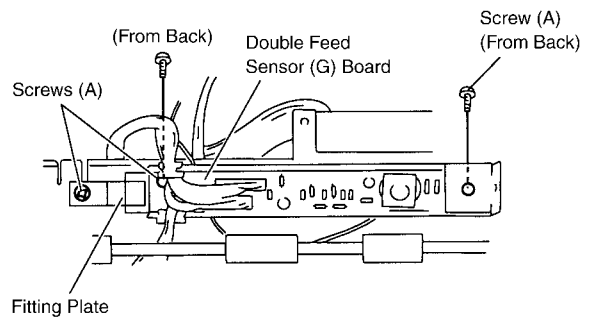
Fitting Plate

Fig. 4-61

4) Remove 2 screws (B) and Double Feed Sensor (G) PCB.

Double Feed Sensor (G) PCB
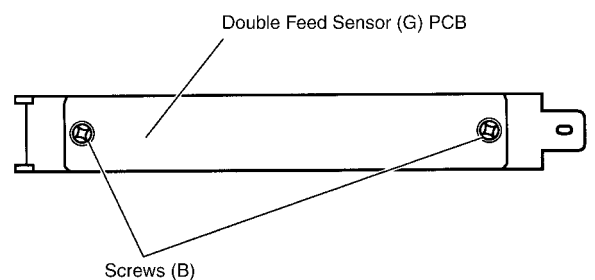
Screws (B)

Fig. 4-62

13. Double Feed Sensor (R) PCB

1) Remove Inner Guide Plate. (See II.16)
2) Remove 2 screws (A) from Fitting Plate with Double Feed Sensor (R) PCB.
3) Disconnect CN535.

Screw (A)
Screw (A)
Fitting Plate
Double Feed Sensor (R) PCB

Fig. 4-63

4) Remove 2 screws (B) and Double Feed Sensor (R) PCB.

Double Feed Sensor (R) PCB
Screws (B)

Fig. 4-64

14. Starting Position LED PCB

1) Remove Lower Guide Plate. (See II.17)
2) Remove 2 screws and Starting Position LED PCB.
3) Disconnect CN518.

Screws
Starting Position LED PCB
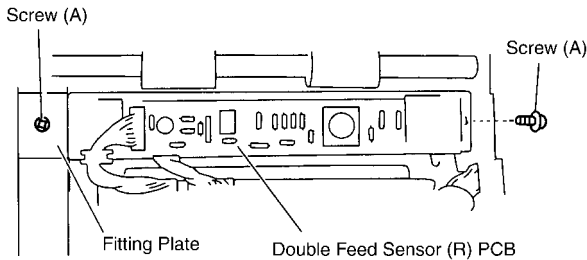
Fig. 4-65

15. Starting Position Sensor PCB

1) Remove Pickup Motor. (See III.16)
2) Remove 2 screws (A) from Fitting Plate with Starting Position Sensor PCB.
3) Disconnect CN519 and CN520.

Screw (A)
Screw (A)
Fitting Plate
Starting Position Sensor PCB
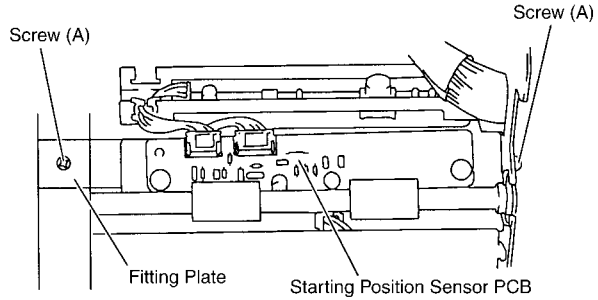
Fig. 4-66
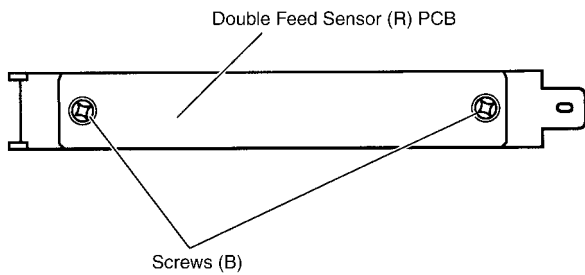
4) Remove 2 screws (B) and Starting Position Sensor PCB.

Starting Position Sensor PCB
Screws (B)
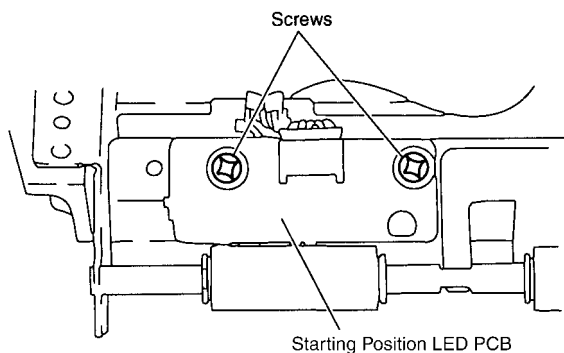
Fig. 4-67

16. Delivery LED PCB

1) Open Document Cover.
2) Remove White Cover Sheet. (See II.5)
3) Remove 2 screws and Delivery LED PCB.
4) Disconnect CN525 and CN526.

Delivery LED PCB
Screws
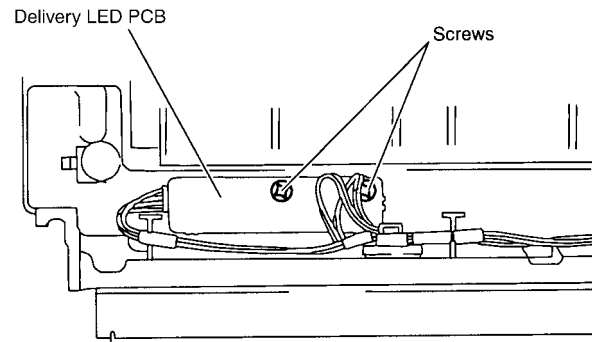
Fig. 4-68

17. Delivery Sensor PCB

1) Remove Delivery Guide Plate. (See II.15)
2) Remove 2 screws and Delivery Sensor PCB.
3) Disconnect CN531 and CN532.

Screws

Delivery Sensor PCB

Fig. 4-69

18. Relay (Back) PCB

1) Remove Imprinter Door. (See II.9)
2) Remove 5 screws and Relay (Back) PCB.
3) Disconnect CN501, CN502, CN503, CN504, CN505, CN513, CN515, and CN522.

Screws   Cover Sheet
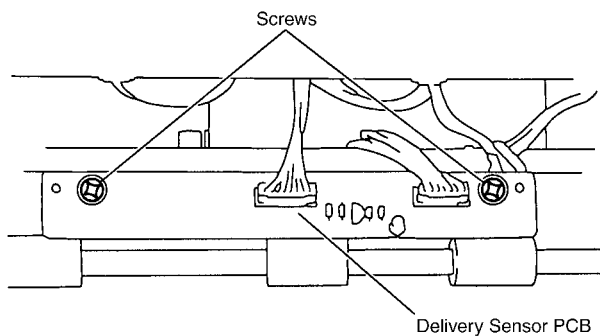
Relay (Back) PCB

Fig. 4-70

19. Relay (Side) PCB

1) Remove ADF Left Cover. (See II.6)
2) Remove 4 screws and Relay (Side) PCB.
3) Disconnect all connectors from/to Relay (Side) PCB.

Relay (Side) PCB   Screws
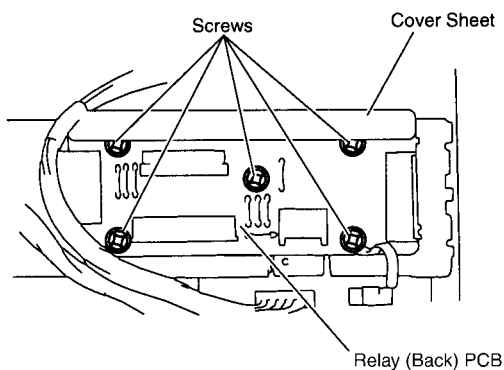
Screws

Fig. 4-71

20. Carriage Home Sensor PCB

1) Remove Document Glass. (See II.11)
2) Remove ADF Glass. (See II.12)
3) Remove Shield Plate. (See II.18)
4) Remove 2 screws and Carriage Home Sensor PCB.
5) Disconnect CN516.

Carriage Home
Sensor PCB
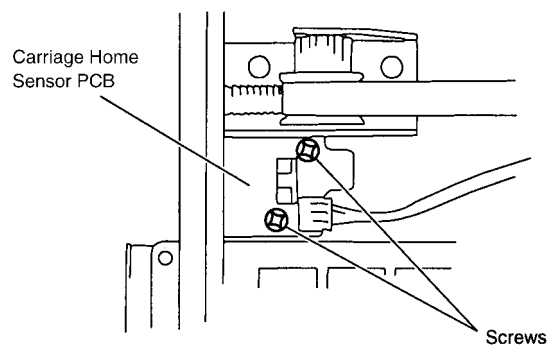
Screws

Fig. 4-72

21. Document Cover Sensor PCB

1) Remove White Cover Sheet. (See II.5)
2) Remove 2 screws and Document Cover Sensor PCB.
3) Disconnect CN527.
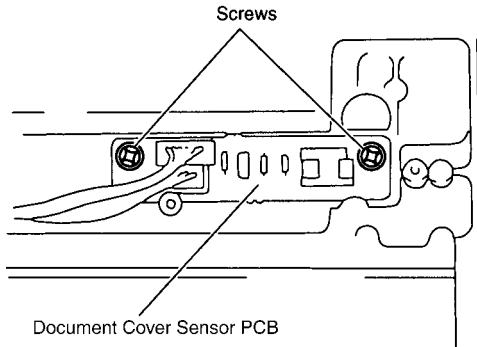
Fig. 4-73

CHAPTER 5

INSTALLATION

This product undergoes exhaustive adjustment and testing before it is shipped from the factory. Installation after unpacking at the field is important for demonstrating the machine's performance to be the same as when it passed factory inspections.

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

I. SELECTION OF LOCATION

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

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

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

■ The temperature should be between 15 to 30 °C (59 to 85°F), and relative humidity between 20 to 80 % RH. In particular, do not install the machine near water faucets, hot water heaters, humidifiers, and refrigerators.

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

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

250 mm (9.8") or more

200 mm (7.9") or more

300 mm (11.8") or more
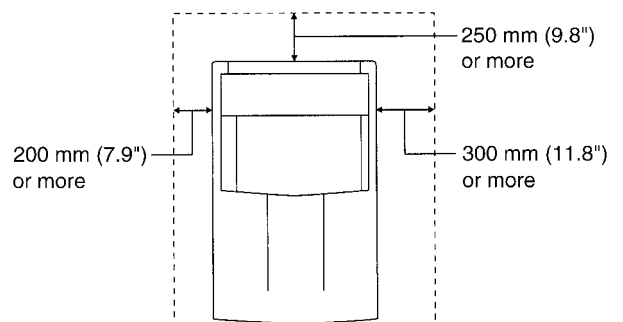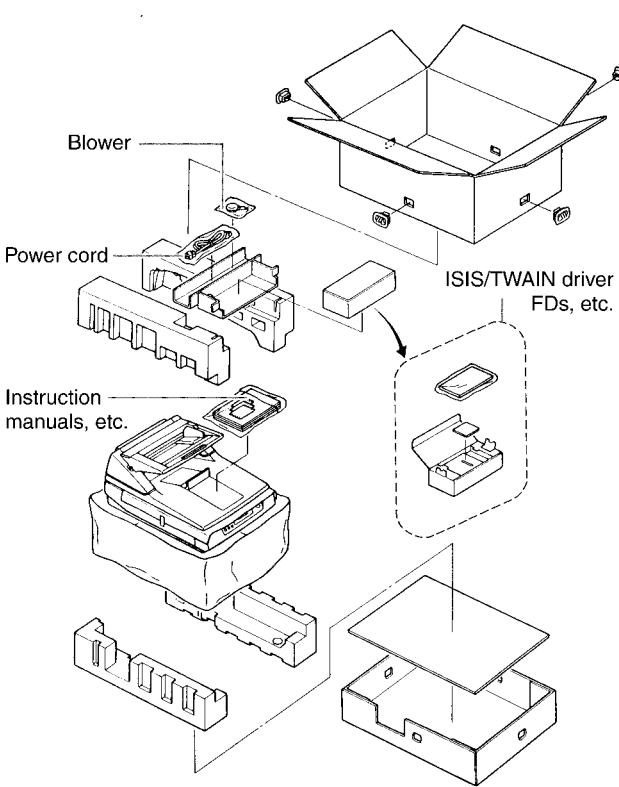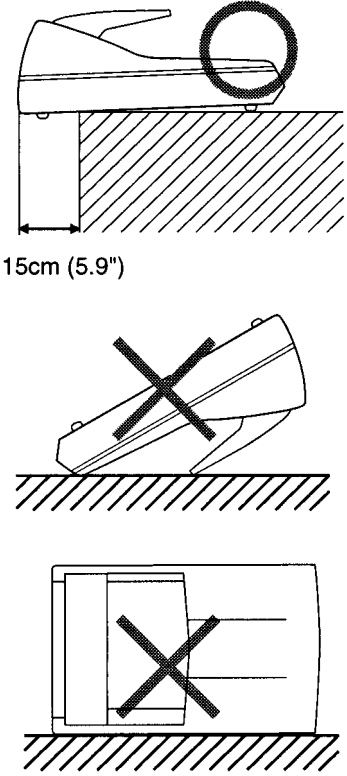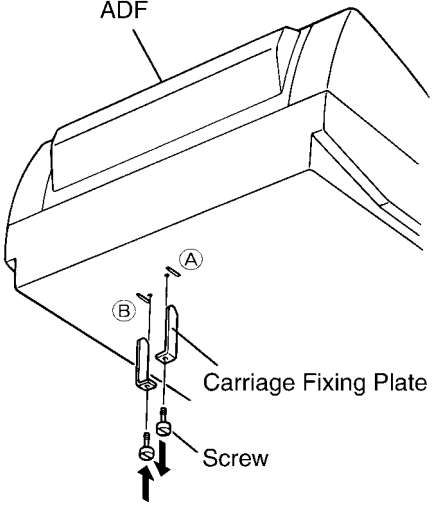
Fig. 5-1
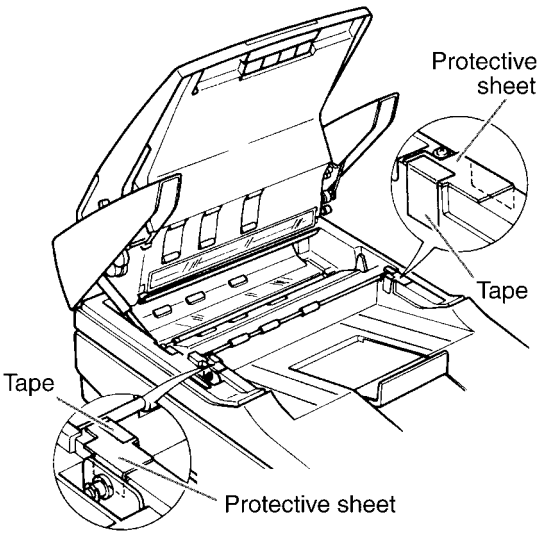
II. UNPACKING & INSTALLATION

If the machine (in its shipping container) has been stored in a cold location, it should not be un-packed in a warm room until it has had time to warm up. Otherwise, moisture may condense on the metal and glass parts, resulting in trouble. At least one hour should be allowed for the machine to warm up to room temperature before the shipping container is opened.
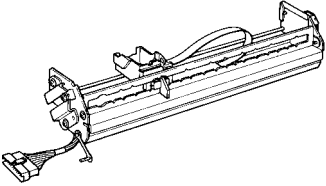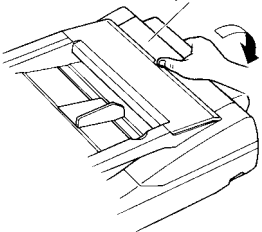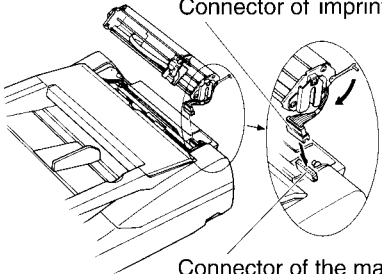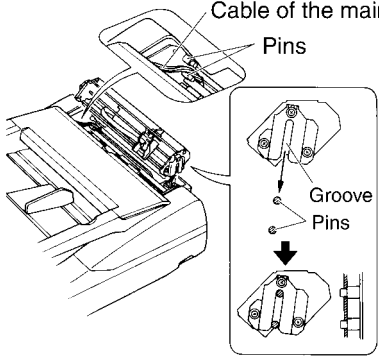
No.	Procedure	Inspection and Remarks
1	Open the container and take out the parts and other materials packed inside. Check if anything is missing. The container weighs approx. 39 kg. Its external dimensions are approx. 600 (W) × 850 (D) × 400 (H) mm. ① Main body ② Power cord (1 cord for 100/120V models, 2 cords for 220-240V model) ③ Instruction manual (Hardware) ④ Instruction manual (Software) ⑤ ISIS driver FD (1 FD) ⑥ TWAIN driver FD (1 FD) ⑦ Pix View FD (4 FDs) ⑧ ISIS/TWAIN/Pix View license agreement ⑨ Blower ⑩ Warranty card (100V and 120V models only) ⑪ Customer registration card (100V model only)	

No.	Procedure	Inspection and Remarks
2	Move the main body where it is to be installed and place it protruding the rear of the main body approx. 150 mm from the edge of a table. **Note:** Do not turn the main body upside down or stand on its side. When moving it, two people, one in the front and the other in the rear, should hold the bottom of the main body. The machine weighs approx. 31 kg.	15cm (5.9")
3	Remove the carriage fixing plate mounted on Section Ⓐ of the bottom by the screws, and remount it on Section Ⓑ.	ADF Ⓐ Ⓑ Carriage Fixing Plate Screw
4	Place the main body on the table properly.	
5	Remove all the retaining tapes from the respective parts.	Check all the covers for possible damage during transportation.
6	Open the document cover, and remove the protective sheet from the document glass.	

No.	Procedure	Inspection and Remarks
7	Open the ADF, and remove two protective sheets.	Protective sheet Tape Tape Protective sheet
8	Connect the power cord.	
9	Connect a personal computer and the machine using a SCSI cable.	
10	Turn on the power of the machine. **Note:** Check if "Ready" appears on the display.	
11	Set the SCSI ID and terminator of the machine if necessary. (Use the "Others" key.)	For details, refer to the instruction manual.
12	Turn on the power of the personal computer and install the driver software and application software.	For details, refer to the instruction manual.
13	Check if the machine operates normally.	For details on how to operate it, refer to the instruction manual.
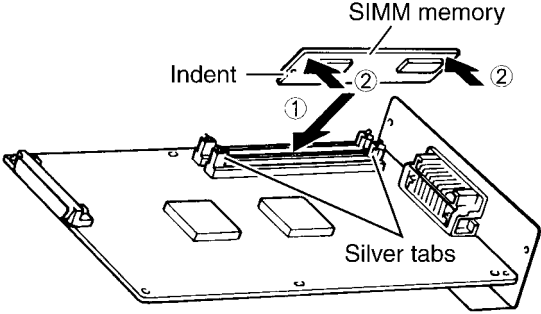
III. IMPRINTER MOUNTING PROCEDURE

No.	Procedure	Inspection and Remarks
1	Open the container and take out the parts and other materials packed inside. Check if anything is missing. ① Imprinter ② Instruction manual **Note:** IP head is sold separately.	
2	Turn off the power of the DR-4080U and unplug the power cord.	
3	Open the imprinter door.	Imprinter door
4	Insert the connector of the imprinter into the connector of the main body. **Note:** The connectors should be inserted completely.	Connector of imprinter Connector of the main body
5	Match the pins of the main body with the grooves of the imprinter and insert the pins into the grooves. **Note:** The imprinter should be installed completely.	Cable of the main body Pins Groove Pins
6	Attach the IP head.	For details on how to attach it, refer to the instruction manual.
7	Close the imprinter door.	
8	Check if the machine operates normally.	For details on how to operate it, refer to the instruction manual.

IV. RED LAMP MOUNTING PROCEDURE

No.	Procedure	Inspection and Remarks
1	Open the container and take out the parts packed inside. Check if anything is missing. ① Red lamp module	**Note:** Handle the lamp with care since it is easy to break.
2	Remove the rear cover.	Refer to Chapter 4, II. 1
3	Remove the left cover.	Refer to Chapter 4, II. 2
4	Remove the right cover.	Refer to Chapter 4, II. 3
5	Remove the front cover.	Refer to Chapter 4, II. 4
6	Remove the document glass.	Refer to Chapter 4, II. 11
7	Remove the ADF glass.	Refer to Chapter 4, II. 12
8	Remove the carriage.	Refer to Chapter 4, III. 1
9	Remove the lamp module.	Refer to Chapter 4, III. 5
10	Replace the lamp module with the red lamp. Reassemble the machine in the reverse order of the disassembly.	
11	Enter the service mode and change the lamp setting to red.	
12	Carry out the shading and CCD tests in the test mode of the service mode.	
13	Check if the machine operates normally.	For details on how to operate it, refer to the instruction manual.

V. EXTENSION MEMORY MOUNTING PROCEDURE

No.	Procedure	Inspection and Remarks
1	Open the container and take out the parts packed inside. Check if anything is missing. ① SIMM memory	Recommended SIMM • 72 pins • 32 bits, non-parity • Access time: 70 ns or less • Memory size: Adaptable to 8 MB, 16 MB and 32 MB, and possible to be extended with up to 2 memory boards (64 MB at maximum).
2	Remove 3 screws, and then remove the SCSI PCB.	Refer to Chapter 4, IV. 2
3	Insert the SIMM memory in the connector of the SCSI PCB at the degree of ① and press both sides of ② in the direction shown by an arrow until the stopper clicks.	
4	Mount the SCSI PCB.	
5	Check if the machine operates normally.	For details on how to operate it, refer to the instruction manual.

The size of extension memory (MB) required in each scan mode is shown in Table 5-1 to Table 5-6.

If there is not enough memory, TWAIN driver displays a message of memory shortage and halts scanning, whereas ISIS driver continues scanning and transmits only a quantity of data equivalent to memory size to a personal computer. In other words, when there is not enough memory, ISIS driver can not hold all the scanned images. Therefore, always check the scanned images when outputting large size, high resolution, or gray scale images, and add an extension memory if necessary.

Simplex/8bit

dpi Size	Resolution					
	100	200	300	400	500	600
A3	0	0	16	24	40	64
A4	0	0	8	8	16	32
A5	0	0	0	0	8	16
A6	0	0	0	0	0	8
B4 (JIS)	0	0	8	16	32	48
B5 (JIS)	0	0	0	8	16	24
B6 (JIS)	0	0	0	0	8	8
Double Letter	0	0	16	24	40	64
Legal	0	0	8	16	24	40
Letter	0	0	8	8	16	32

Table 5-1

Simplex/4bit

dpi Size	Resolution					
	100	200	300	400	500	600
A3	0	0	8	8	16	32
A4	0	0	0	0	8	16
A5	0	0	0	0	0	8
A6	0	0	0	0	0	0
B4 (JIS)	0	0	0	8	16	24
B5 (JIS)	0	0	0	0	8	8
B6 (JIS)	0	0	0	0	0	0
Double Letter	0	0	8	8	16	32
Legal	0	0	0	8	8	16
Letter	0	0	0	0	8	16

Table 5-3

Duplex/8bit

dpi Size	Resolution					
	100	200	300	400	500	600
A3	0	8	32	64	-	-
A4	0	0	16	24	40	64
A5	0	0	8	8	16	32
A6	0	0	0	0	8	16
B4 (JIS)	0	8	24	40	64	-
B5 (JIS)	0	0	8	16	32	48
B6 (JIS)	0	0	0	8	16	24
Double Letter	0	8	32	64	-	-
Legal	0	8	16	32	64	-
Letter	0	0	16	24	40	64

Table 5-2

Duplex/4bit

dpi Size	Resolution					
	100	200	300	400	500	600
A3	0	0	16	24	40	64
A4	0	0	8	8	16	32
A5	0	0	0	0	8	16
A6	0	0	0	0	0	8
B4 (JIS)	0	0	8	16	32	48
B5 (JIS)	0	0	0	8	16	24
B6 (JIS)	0	0	0	0	8	8
Double Letter	0	0	16	24	40	64
Legal	0	0	8	16	24	40
Letter	0	0	8	8	16	32

Table 5-4

Simplex/Binary

dpi / Size	Resolution					
	100	200	300	400	500	600
A3	0	0	0	0	0	8
A4	0	0	0	0	0	0
A5	0	0	0	0	0	0
A6	0	0	0	0	0	0
B4 (JIS)	0	0	0	0	0	0
B5 (JIS)	0	0	0	0	0	0
B6 (JIS)	0	0	0	0	0	0
Double Letter	0	0	0	0	0	8
Legal	0	0	0	0	0	0
Letter	0	0	0	0	0	0

Table 5-5

Duplex/Binary

dpi / Size	Resolution					
	100	200	300	400	500	600
A3	0	0	0	0	8	16
A4	0	0	0	0	0	8
A5	0	0	0	0	0	0
A6	0	0	0	0	0	0
B4 (JIS)	0	0	0	0	8	8
B5 (JIS)	0	0	0	0	0	0
B6 (JIS)	0	0	0	0	0	0
Double Letter	0	0	0	0	8	16
Legal	0	0	0	0	0	8
Letter	0	0	0	0	0	8

Table 5-6

VI. MOVING THE MACHINE

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

No.	Procedure	Inspection and Remarks
1	Turn the power off, and remove all the cords connected to the machine.	
2	Open the document cover, and cover the document glass with a protective sheet.	
3	Remount the carriage fixing plate of the bottom on the fixed position (Section Ⓐ).	Refer to II. UNPACKING & INSTALLATION, Section 2 and 3.
4	Make such possible moving parts as the document cover and the imprinter door fixed with tapes.	
5	Put the machine into the container.	

CHAPTER 6

MAINTENANCE & SERVICING

I. BASIC PERIODIC SERVICING PROCEDURE

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

No.	Procedure	Inspection	Remarks
1	Pay your respects to the supervisor.	Check current status	
2	Record a document and conduct a document search.	• Document feed • Results of document record and search. • Abnormal noise	Confirm the counters into the service mode.
3	Replace parts (only when necessary).		
4	Clean the document feed assembly and optical assembly.		
5	Conduct the shading compensation again (only when necessary).		For details, refer to the section on service mode in Chapter 7.
6	Re-check the results, and record a document and conduct a document search again.		
7	Clean around the machine.		
8	Make any required entries into the Service Sheet, and report to the supervisor.		

Table 6-1

II. PARTS TO BE REPLACED PERIODICALLY

Parts must be replaced periodically to maintain the machine's functions to a constant standard.

The following table shows parts that must be replaced periodically (parts that greatly influence machine operation when they are no longer functional but are not externally deformed or damaged).

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

As of May 12, 1999

No.	Description	Parts Number	Q'ty	Number of Sheets for Replacement	Remarks
1	Pickup roller	MD2-2776	1	300,000	
2	Separation roller	MD2-2772	1	300,000	
3	Retard roller	MD2-2777	1	300,000	
4	Drain pad	MD2-2822	1	(1,500,000)	Machine with imprinter installed only
5	Green lamp	MD2-2702	1		Lit: 1,000 hours
	Red lamp (option)	(M18-0661)	1		Lit: 1,000 hours

Table 6-2

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

III. CONSUMABLE PARTS

This machine has not consumable parts.

The following table shows the IP head for the imprinter (option) that is set as a consumable (sales goods). This is replaced by the user.

As of May 12, 1999

No.	Parts Name	Destination	Catalog No.	Remarks
1	IP head	Worldwide	M99-0041	Replace when the ink runs out. Expected life is approx. 500,000 characters.

Table 6-3

Note: Used IP head must be collected and disposed of according to local bylaws.

IV. PERIODIC SERVICING LIST

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

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

Unit Name	Location/Parts	Maintenance Cycle			Remarks
		Every 300,000 sheets	Every 900,000 sheets	others	
Document Feed Assembly	Pickup roller	●			
	Separation roller	●			
	Retard roller	●			
	Other rollers	△			
	Document sensors	△	□		Check LED gain. (Test mode 8)
	Double feed sensor	△			
Optical Path	CIS glass	△			
	Document glass	△			
	White plate	△			
	CIS platen roller	△			
Others	Drive belt & gears		◎		
	Drain pad			●	Machine with imprinter installed only.
	Green lamp		◎		Lit: 1,000 hours
	Red lamp (option)		◎		Lit: 1,000 hours

Table 6-4

Note: For the cleaning of each roller and glass, wipe with a cloth moistened with water, and then wipe dry.

Be sure to clean the rollers while turning them into the direction of document feed, except for the retard roller. The retard roller should be wiped in the single direction (from the right to the left).

If the rollers and glasses are very dirty, instruct the user to perform "Chapter 1, VI. Regular Inspection by Users".

CHAPTER 7

TROUBLESHOOTING

I. ERROR INDICATION AND DISPOSITION

An error code is expressed by a combination of alphabets and numerals in 3 digits, and its status by numerals (hexadecimal) in 8 digits.

Fig. 7-1 shows a list of error codes.

1. Error Indication

This machine will indicate an error code, an error message, and its status on the display of the operation panel if any error occurs.

Category	Error Code	Message	Status				Content
			ST1	ST2	ST3	ST4	
Document	U10	No Document	10	00	00	00	No paper error
	U11	Jam	11	×	00	00	Delay jam in pickup assembly (ST2: expected remaining papers)
	U12	Jam	12	×	×	00	Delay jam in feed assembly (ST2: expected remaining papers, ST3: Skew detect)
	U14	Jam	14	×	00	00	Delay jam in delivery assembly (ST2: expected remaining papers)
	U16	Jam	16	×	00	00	Stagnation jam in delivery assembly (ST2: expected remaining papers)
	U18	Remained Doc.	18	×	×	00	Document remains in the machine. ST2: 3 = Delivery sensor 5 = Starting position sensor 6 = Size sensor 0 7 = Document sensor ST3: 0 = Size sensor 1 1 = Size sensor 2 2 = Size sensor 3 3 = Size sensor 4 4 = Size sensor 5 5 = Size sensor 6 6 = Size sensor 7 7 = Size sensor 8
	U23	Double Feed	1C	×	00	00	Double feed error ST2: 0 = Document at waiting position 1 = No document at waiting position)
Door	U30	Front Door	20	00	00	00	ADF is open.
	U31	ADF Door	21	00	00	00	ADF door is open.
	U34	Top Door	24	00	00	00	Imprinter door is open.
	U35	Doc. Cover	25	00	00	00	Document cover is open.
Others	U41	Adjust Error	58	00	00	00	Scanning position adjustment error
	U50	Not installed I/F Board	A0	00	00	00	SCSI PCB is not installed.

Table 7-1 (To be continued)

Category	Error Code	Message	Status				Content
			ST1	ST2	ST3	ST4	
Hardware	F17	Call service	87	00	00	00	DRAM error
	F18	Call service	88	00	00	00	SIMM 1 error
	F19	Call service	89	00	00	00	SIMM 2 error
	F20	Call service	8A	×	×	×	Barcode RAM error (ST2: Data, ST3/4: Address)
	F21	Call service	8B	×	×	×	Black shading RAM error (ST2: Data, ST3/4: Address)
	F22	Call service	8C	×	×	×	White shading RAM error (ST2: Data, ST3/4: Address)
	F23	Call service	8D	×	×	×	Buffer A RAM error (ST2: Data, ST3/4: Address)
	F24	Call service	8E	×	×	×	Buffer B RAM error (ST2: Data, ST3/4: Address)
	F25	Call service	8F	×	×	×	Buffer C RAM error (ST2: Data, ST3/4: Address)
	F26	Call service	90	×	×	×	Gamma RAM error (ST2: Data, ST3/4: Address)
	F27	Call service	91	×	×	×	MTF A RAM error (ST2: Data, ST3/4: Address)
	F28	Call service	92	×	×	×	MTF B RAM error (ST2: Data, ST3/4: Address)
	F29	Call service	93	×	×	×	MTF C RAM error (ST2: Data, ST3/4: Address)
	F30	Call service	94	×	×	×	ED A RAM error (ST2: Data, ST3/4: Address)
	F31	Call service	95	×	×	×	ED B RAM error (ST2: Data, ST3/4: Address)
	F34	Call service	98	00	00	00	EEPROM error
	F35	Call service	99	00	00	00	TIARA-Chip error
	F36	Call service	9A	00	00	00	SENSOR-Chip error
	F37	Call service	9B	00	00	00	IMAGE-Chip error
Mechanical	F40	Call service	30	×	00	00	Document tray [hopper] drive error ST2: 0 = Error in rising 1 = Error in lowering)
	F41	Call service	31	×	00	00	Carriage drive error ST2: 0 = Reverse direction 1 = Scanning direction)
Sensor	F50	Call service	40	00	00	00	Size sensor 0 adjustment error
	F51	Call service	41	00	00	00	Starting position sensor adjustment error
	F55	Call service	42	00	00	00	Delivery sensor adjustment error

Table 7-1 (Continued)

Category	Error Code	Message	Status				Content
			ST1	ST2	ST3	ST4	
Reading Unit	F60	Call service	50	00	00	00	Front-side gain adjustment error
	F61	Call service	51	00	00	00	Front-side black level adjustment error
	F63	Call service	53	00	00	00	Back-side black level adjustment error
	F68	Call service	54	00	×	00	Front-side lamp lighting error (ST3: AD input value)
	F69	Call service	55	×	×	00	Back-side LED lighting error (ST2: Lighting value, ST3: AD input value)
Sensor	F71	Call service	48	00	00	00	Size sensor 1 adjustment error
	F72	Call service	49	00	00	00	Size sensor 2 Adjustment error
	F73	Call service	4A	00	00	00	Size sensor 3 Adjustment error
	F74	Call service	4B	00	00	00	Size sensor 4 Adjustment error
	F75	Call service	4C	00	00	00	Size sensor 5 Adjustment error
	F76	Call service	4D	00	00	00	Size sensor 6 Adjustment error
	F77	Call service	4E	00	00	00	Size sensor 7 Adjustment error
	F78	Call service	4F	00	00	00	Size sensor 8 Adjustment error
	F80	Call service	60	×	×	00	Double feed sensor error (ST2: DA output value, STS3: AD input value)

Table 7-1 (Continued)

Note: Example for reading (Error Code U18)

If ST2 indicates 48 (hexadecimal), it means that a document remains in the delivery sensor or size sensor 0.

$$48 \text{ (hexadecimal)} = \underline{}1\ 0\ 0\ 1\ 0\ 0\ 0 \quad \text{(binary)}$$

7 6 5 4 3 2 1 0   (ST2)

→ Delivery sensor
→ Size sensor 0
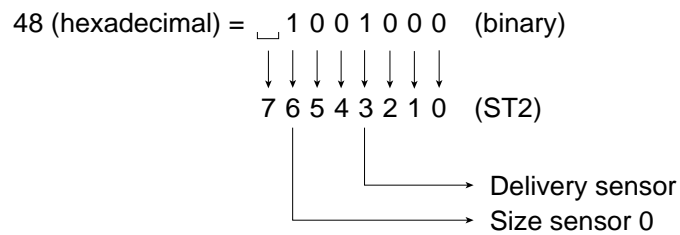
2. Error Disposition

Table 7-2 shows a list of corrective actions for the errors.

Error Code	Possible Cause	Action
U10	Document sensor does not work. 1) Paper has not been properly set. 2) The back side of the last scanning is black. 3) A connector for the sensor signal is loosen. 4) Document sensor is damaged.	1) Fix the creased or ripped paper. 2) Place a sheet of white paper under the bottom sheet of the original, as a dummy. 3) Confirm operation of the sensor in the test mode. If the sensor does not work, the connector has come loose. Attach the connector correctly. 4) Check whether the cable and/or relay PCBs are broken.
U11	Paper does not pass through the pickup assembly in the correct timing. 1) Slip caused by dirt of the roller. 2) ADF door has not been closed properly. 3) Double feed. 4) Sensor error.	1) Replace the pickup roller, separation roller and retard roller if they are worn down. 2) Close ADF door properly. 3) Clean the separation roller and retard roller. Confirm whether the retard roller is properly set. Replace the pickup roller, separation roller and retard roller if they are worn down. 4) Clean any paper dust on the sensor section.
U12	Paper does not reach to the starting position sensor. 1) Pickup roller and separation roller are slipping. 2) Skewing 3) Following paper that caused double feed is left inside the sensor. 4) Sensor error	1) Clean the paper feed roller, separation roller and retard roller. Replace those rollers if they are worn down. 2) Clean the paper feed roller, separation roller and retard roller. Replace those rollers if they are worn down. 3) Clean the separation roller and retard roller. 4) Clean any paper dust on the sensor section.
U14	Paper does not reach to the delivery sensor. 1) Slip caused by dirt of the roller. 2) Sensor error 3) Paper path has not been properly assembled.	1) Clean the feed roller. 2) Clean any paper dust on the sensor section. 3) Assemble the paper path properly.
U16	Paper does not pass the delivery sensor. 1) Slip caused by dirt of the roller. 2) Sensor error 3) Paper path has not been properly assembled.	1) Clean the feed roller. 2) Clean any paper dust on the sensor section. 3) Assemble the paper path properly.

Table 7-2 (To be continued)

Error Code	Possible Cause	Action
U18	1) Paper remains in the machine. 2) Document sensor is ON. ① LED is broken. ② Sensor is broken. 　Confirm the LED and sensor operation state. 　1. Start the document sensor test in the test mode. 　2. Open the paper path and shine a light on the sensor. If the sensor turns ON, there is a problem with the LED, and if not, a problem with the sensor. ③ Paper path is not assembled correctly. ④ LED or sensor is leaning ⑤ Sensor is covered with paper dust.	1) Remove paper. 2) ① Replace the LED. 　② Replace the sensor. ③ Assemble the paper path correctly. ④ Replace the LED or sensor. ⑤ Clean any dust on the sensor section.
U30	Error code U30 does not turn off even though the ADF is closed. 1) ADF switch is not being pressed correctly. 2) ADF switch is broken.	 1) Check the assembled state of the ADF switch. 2) Replace the ADF switch.
U31	Error code U31 does not turn off even though the ADF door is closed. 1) ADF door switch is not being pressed correctly. 2) ADF door switch is broken.	 1) Check the assembled state of the ADF switch. 2) Replace the ADF door switch.
U34	Error code U34 does not turn off even though the imprinter door is closed. 1) The connector to the imprinter door sensor is loosen. 2) Imprinter door sensor is broken.	 1) Connect the cables correctly. 2) Replace the relay (back) PCB.
U35	Error code U35 does not turn off even though the document cover is closed. 1) The connector of the document cover sensor is loosen. 2) Document cover sensor is broken.	 1) Connect the cables correctly. 2) Replace the document cover sensor PCB.
U41	Error code U41 does not turn off even though the automatic adjustment is carried out again. 1) Image sensor is broken. 2) Main control PCB is broken.	 1) Replace the image sensor. 2) Replace the main control PCB.
U50	Error code U50 does not turn off even though the SCSI PCB is installed. 1) SCSI PCB is broken.	 1) Replace the SCSI PCB.
F17	Poor soldering around the DRAM (IC610 to IC613) on the SCSI PCB.	Replace the SCSI PCB.

Table 7-2 (Continued)

Error Code	Possible Cause	Action
F18	Additional SIMMs are not mounted correctly.	Remount the SIMMs.
F19	Additional SIMMs are not mounted correctly.	Remount the SIMMs.
F20 | F37	Poor soldering on the main control PCB.	Replace the main control PCB. Error code devices detected by Error code ST1 are: ST1 8A: IC1204 8B: IC1202 8C: IC1203 8D: IC1205 8E: IC1206 8F: IC1207 90: IC1211 91: IC1212 92: IC1213 93: IC1214 94: IC1209 95: IC1210 98: IC1103 99: IC600 9A: IC1201 9B: IC1208
F40	Document tray [hopper] home sensor does not operate properly. 1) The connector to the document tray [hopper] home sensor is not properly inserted. 2) The document tray [hopper] home sensor is broken.	1) Mount the connector properly. 2) Replace the document tray [hopper] home sensor PCB.
F41	Carriage home sensor does not operate properly. 1) The connector to the carriage home sensor PCB is not properly inserted. 2) The carriage home sensor is broken. 3) The carriage is still fixed by the carriage fixing plate used during transportation.	1) Mount the connector properly. 2) Replace the carriage home sensor PCB. 3) Disengage the carriage from the carriage fixing plate.
F50 | F78	1) Paper dust on the sensor section. 2) LED or sensor is leaning. 3) LED has reached the end of its life.	1) Clean the sensor section. 2) Straighten the LED or sensor. 3) Replace the LED PCB.
F80	1) Paper dust on the double feed sensor section. 2) The double feed sensors are broken.	1) Clean the sensor section. 2) Replace the double feed sensor (G) / (R) PCBs.

Table 7-2 (Continued)

II. IMAGE TROUBLESHOOTING

Note: There are times when image trouble is caused by the display device or the printer used by the user. In such a case, the trouble cannot be rectified with this machine.

1	Image not displayed (completely white, completely black, all gray, mottled)
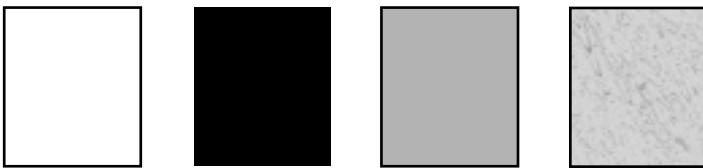
Cause/Faulty Location	Step	Check Item	Result	Action
"Brightness" setting	1	Is setting of "Brightness" appropriate?	NO	Change the setting. Also change "Contrast" if necessary.
Reading glass	2	Is reading glass clean?	NO	Clean. Also clean roller if necessary.
CIS, Carriage connection	3	Are CIS and carriage correctly connected?	NO	Connect properly.
Shading compensation	4	Is trouble solved when shading compensation is carried out?	YES	End.
CIS	5	Is trouble solved when CIS is replaced?	YES	End. (Carry out setting and adjustment afterwards.)
Carriage	6	Is trouble solved when carriage is replaced?	YES	End. (Carry out setting and adjustment afterwards.)
Main Control PCB	7	Is trouble solved when main control PCB is replaced?	YES	End. (Carry out setting and adjustment afterwards.)

2   **Uneven density, streak (horizontal scanning direction)**
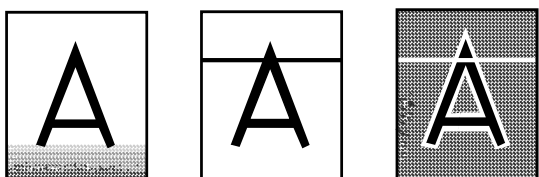
Cause/Faulty Location	Step	Check Item	Result	Action
Roller	1	Dirty or deformed?	NO	Clean, replace roller.
Gear, belt	2	Turning smoothly?	NO	Adjust assemblage, replace parts.
Feed motor, carriage motor	3	Is trouble solved when feed motor and carriage motor are replaced?	YES	End.
CIS, carriage	4	Is trouble solved when CIS and carriage unit is replaced?	YES	End. (Carry out setting and adjustment afterwards.)
Main control PCB	5	Is trouble solved when Main control PCB is replaced?	YES	End. (Carry out setting and adjustment afterwards.)

3   **Uneven density, streak (vertical scanning direction)**
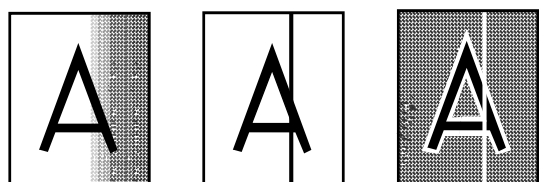
Cause/Faulty Location	Step	Check Item	Result	Action
Reading glass	1	Is reading glass clean?	NO	Clean. If necessary clean roller too.
Shading compensation	2	Is trouble solved when shading compensation is carried out?	YES	End.
CIS	3	Is trouble solved when CIS is replaced?	YES	End. (Carry out setting and adjustment afterwards.)
Carriage	4	Is trouble solved when carriage is replaced?	YES	End. (Carry out setting and adjustment afterwards.)
Main control PCB	5	Is trouble solved when Main control PCB is replaced?	YES	End. (Carry out setting and adjustment afterwards.)

4	Part of image is not displayed

Cause/Faulty Location	Step	Check Item	Result	Action
Size sensor PCB	1	Is there any sensor that does not output?	YES	Replace size sensor PCB.
Shading compensation	2	Is trouble solved when shading compensation is carried out?	YES	End.
CIS	3	Is trouble solved when CIS is replaced?	YES	End. (Carry out setting and adjustment afterwards.)
Carriage	4	Is trouble solved when carriage is replaced?	YES	End. (Carry out setting and adjustment afterwards.)
Main control PCB	5	Is trouble solved when main control PCB is replaced?	YES	End. (Carry out setting and adjustment afterwards.)

III. OPERATION TROUBLESHOOTING

| 1 | **Personal computer does not recognize the machine** |

Note: The cause of the trouble is related to SCSI I/F connection. Refer to the instruction manual for this machine or personal computer used.

| 2 | **Power does not come on** |

Note 1: When power switch is turned on but LCD on operation panel does not light up, faulty power supply is suspected.

Note 2: Immediately after AC power supply is turned off, the capacitor of the DC power supply PCB is still charged. So, connecting/disconnecting connectors shall be performed more than 10 seconds after the AC power supply is turned off.

Cause/Faulty Location	Step	Check Item	Result	Action
Connection of power cord	1	Is power cord connected?	NO	Connect properly.
AC power supply voltage	2	Is specified voltage being supplied to outlet?	NO	Explain to the customer that the trouble is not caused by this machine.
Connection of connector (DC power supply-related)	3	Are the connector of the DC power supply PCB and that of the mother PCB properly connected?	NO	Connect properly.
DC power supply PCB	4	Is the trouble solved when the DC power supply PCB is replaced?	YES	End.

3 Feed motor does not rotate

Cause/Faulty Location	Step	Check Item	Result	Action
DC power supply	1	Is power being supplied to the machine?	NO	Carry out the section on "Power does not come on."
Connection of connector	2	Are two relay connectors between CN341 of drive PCB and feed motor properly connected?	NO	Connect properly.
Load of transmission system	3	Is transmission system, which is the load on the motor, in order?	NO	Eliminate the abnormal load.
Drive PCB	4	Is drive PCB normal?	NO	Replace the drive PCB.
Feed motor	5	Does feed motor rotate normally after replaced?	YES	Replace the feed motor.
			NO	Replace the main control PCB.

4 Pickup motor (M2) does not rotate

Cause/Faulty Location	Step	Check Item	Result	Action
DC power supply	1	Is power being supplied to the machine?	NO	Carry out the section on "Power does not come on."
Connection of connector	2	Are two relay connectors between CN351 of drive PCB and pickup motor properly connected?	NO	Connect properly.
Load of transmission system	3	Is transmission system, which is the load on the motor, in order?	NO	Eliminate the abnormal load.
Drive PCB	4	Is drive PCB normal?	NO	Replace the drive PCB.
Pickup motor	5	Does pickup motor rotate normally after replaced?	YES	Replace the pickup motor.
			NO	Replace the main control PCB.

5	Carriage motor does not rotate

Cause/Faulty Location	Step	Check Item	Result	Action
DC power supply	1	Is power being supplied to the machine?	NO	Carry out the section on "Power does not come on."
Connection of connector	2	Are two relay connectors between CN361 of drive PCB and carriage motor properly connected?	NO	Connect properly.
Load of transmission system	3	Is transmission system, which is the load on the motor, in order?	NO	Eliminate the abnormal load.
Drive PCB	4	Is drive PCB normal?	NO	Replace the drive PCB.
Carriage motor	5	Does carriage motor rotate normally after replaced?	YES	Replace the carriage motor.
			NO	Replace the main control PCB.

IV. FEED TROUBLESHOOTING

| 1 | Jam, double feed, wrinkles occur |

Cause/Faulty Location	Step	Check Item	Result	Action
Document	1	Does document conform to specifications (in thickness, dimensions, fold, curl, etc.)?	NO	Scan the document with Flatbed.
Roller	2	Is roller clean?	NO	Clean. If necessary, clean the reading glass too.
Parts in paper path	3	Are the parts that the document contacts properly attached (not inserted completely, tilted)?	NO	Attach properly.
	4	Is the surface in contact with the document smooth (not scratched, no burrs)?	NO	Replace the defective parts.
Drive transmission system	5	Is an abnormal noise emitted when feeding? Is gear broken or belt loose?	YES	Replace the defective parts. Rectify the tautness of the belt.

V. SERVICE MODES

A. OUTLINE

This machine has two service modes. One is the setting mode that carries out the system counter indication and the change of the adjustment values by operating the keys on the operation panel. The other is the test mode that carries out such tests as a feed test without connecting the machine to a personal computer.

Fig. 7-1 shows a status change flow.
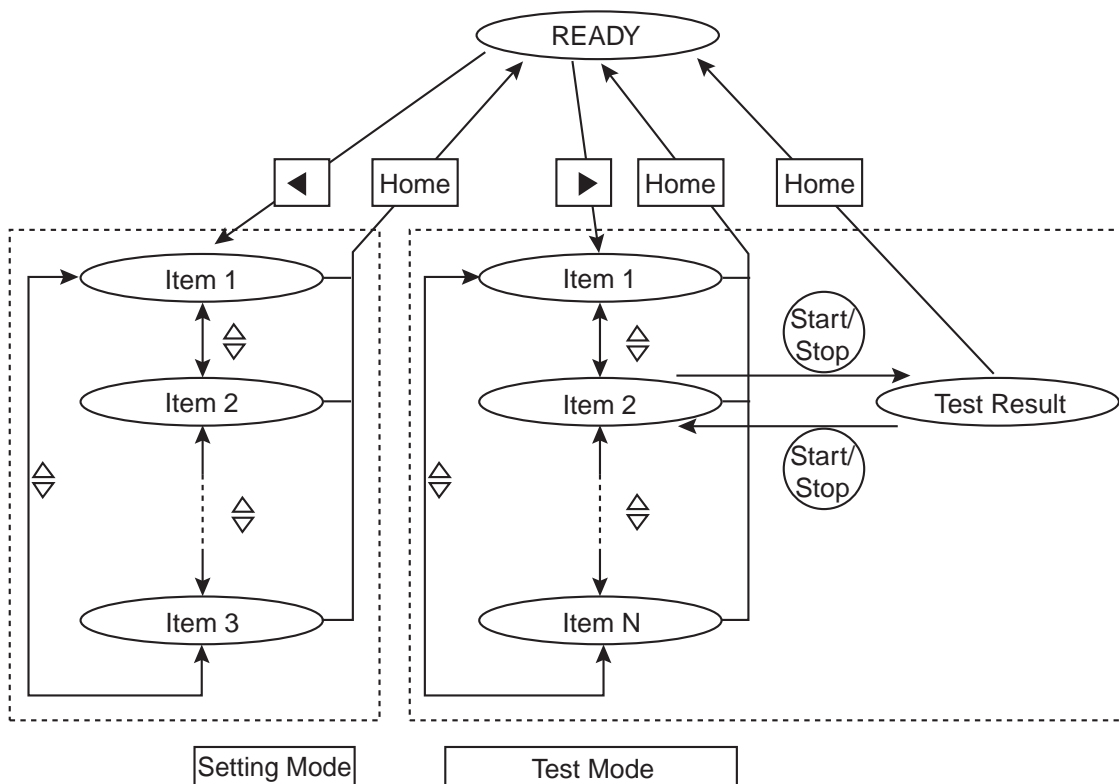
Fig. 7-1

B. LIST OF SERVICE MODES

Table 7-3 shows a list of Service Modes.

Mode		Item	Setting Value/Content								Default
Setting Mode	1	System counter									(0)
	2	Warning setting for cleaning roller	5,000 to 1,000,000 pages (set by 1,000 pages)								20,000
	3	Warning setting for replacing roller	5,000 to 1,000,000 pages (set by 1,000 pages)								300,000
	4	Detect size for adjusting position	A4	Letter							A4
	5	Adjust value for front width manually	1-128								(128)
	6	Adjust value for front h. position manually	8-248								(128)
	7	Adjust value for front v. position manually	28-228								(128)
	8	Adjust value for paper length manually	28-228								(128)
	9	Adjust value for back v. position manually	118-138								(128)
	10	Adjust value for back h. position manually	28-228								(128)
	11	Adjust value for FB v. position manually	8-248								(128)
	12	Adjust value for FB h. position manually	28-228								(128)
	13	Adjust value for FB length manually	28-228								(128)
	14	Lamp	Green	Red							Green
	15	Double feed detection level	118	128	138						(128)
	16	Set default	Exec								
Test Mode	1	Feed test (Set resolution and test)	100-600								200
		Feed test (Set paper size and test)	A4	A5	A6	B4	B5	B6			A4
			Ltr	Lgl	A3	Ldr	Max				
		Feed test (Set length control and test)	OFF	ON							ON
	2	Carriage test (Set resolution and test)	100-600								200
		Carriage test (Set paper size and test)	A4	A5	A6	B4	B5	B6			A4
			Ltr	Lgl	A3	Ldr					

Table 7-3 (To be continued)

Mode		Item	Setting Value/Content									Default
Test Mode	3	CCD test AMP1	× 1	× 2								× 1
		CCD test AMP2	0-255									173
	4	B. CIS LED level	0-255									255
	5	F. CCD black level	0-255									
	6	B. CIS black level	0-255									
	7	Document sensor	Exec									
	8	Sensor sensitive level	Exec									
	9	Door & home sensors	Exec									
	10	Double feed sensitive level	0-255									190
	11	Document tray test	Exec									
	12	Feed motor	Exec									
	13	Pickup motor	Exec									
	14	Adjust width automatically	Exec									
	15	Adjust front h. position automatically	Exec									
	16	Adjust front v. position automatically	Exec									
	17	Adjust paper length automatically	Exec									
	18	Adjust back h. position automatically	Exec									
	19	Adjust back v. position automatically	Exec									
	20	Adjust FB h. position automatically	Exec									
	21	Adjust FB v. position automatically	Exec									
	22	Adjust FB length automatically	Exec									
	23	Adjust all position & length automatically	Exec									
	24	Aging	Exec									
	25	Init. EEPROM	Exec									
	26	Adjust shading automatically	Exec									
	27	Adjust double feed sensor	Exec									

Table 7-3 (Continued)

C. OPERATING METHOD

1. Entering Service Mode

Turn the power ON while pressing the Scan key and Other key at the same time.

A message, "READY" will be displayed after the conventional initialization.

(The state of the machine is ready for entering the service mode.)

Press the ◄ key to enter the setting mode.
Press the ► key to enter the test mode.
Press the Home key to return to the "READY" message to start the normal (user) operation.

2. Exiting Service Mode

Pressing the Home key in the service mode brings back to the "READY" message, but the operational state still remains in the service mode. Therefore, turn the power OFF once to exit from the service mode.

3. Basic Operation

1) While the item is displayed, press the ▲ key or ▼ key to change it.
2) While the item is displayed, press the ► key or ◄ key to change its setting value/content.
3) In the test mode, press the Start/Stop key to execute a test.

D. SETTING MODE

1. System counter

Display the system counter (total counter).

Note: Since the value indicated in the system counter is not absolute, it may be used as a guidepost only.

0	1	.	S	y	s	t	e	m		C	o	u	n	t	.
												1	2	3	4

2. Warning setting for cleaning roller

Set the number of pages to display the warning for cleaning roller by pressing the ► key or ◄ key.

The setting value can be changed by 1,000 pages.

0	2	.	C	l	e	a	n		R	o	l	l	e	r	
			2	0	0	0	0				P	a	g	e	s

3. Warning setting for replacing roller

Set the number of pages to display the warning for replacing roller by pressing the ► key or ◄ key.

The setting value can be changed by 1,000 pages.

0	3	.	R	e	p	l	a	c	e		R	o	l	l	.
			3	0	0	0	0	0				P	a	g	e	s

4. Detect size for adjusting manually

Set either A4 or Letter for the Paper Size Detection since the width of the A4 size and that of the Letter size are almost the same.

Press the ► key or ◄ key to select A4 or Letter.

0	4	.	D	e	t	e	c	t		S	i	z	e		
														A	4

5. Adjust value for front width manually

Set the adjustment value for the front horizontal resolution by pressing the ► key or ◄ key.

The adjustment value can be changed by 0.1 % .

Minus (-): reducing

0	5	.	F	r	o	n	t		W	i	d	t	h		
						–		0	.	4	%		1	2	4

6. Adjust value for front horizontal position manually

Set the adjustment value for the front horizontal start position by pressing the ▶ key or ◀ key.
The adjustment value can be changed by 0.1 mm.
Minus (-): leftward
Plus (+): rightward

0	6	.	F	r	o	n	t		H	.	P	o	s	.		
					+		2	.	9	m	m		1	5	7	

7. Adjust value for front vertical position manually

Set the adjustment value for the front vertical start position by pressing the ▶ key or ◀ key.
The adjustment value can be changed by 0.1 mm.
Minus (-): upward
Plus (+): downward

0	7	.	F	r	o	n	t		V	.	P	o	s	.		
					–		0	.	9	m	m		1	1	9	

8. Adjust value for paper length manually

Set the adjustment value for the paper length by pressing the ▶ key or ◀ key.
The adjustment value can be changed by 0.1%.
Minus (-): shortening
Plus (+): lengthening

0	8	.	L	e	n	g	t	h								
					–		0	.	3	%		1	2	5		

Note: After changing this setting value, always check "7. Adjust value for front vertical position manually" and "10. Adjust value for back vertical position manually."

9. Adjust value for back horizontal position manually.

Set the adjustment value for the back horizontal position by pressing the ▶ key or ◀ key.
The adjustment value can be changed by 0.1 mm.
Minus (-): leftward
Plus (+): rightward

0	9	.	B	a	c	k		H	.	P	o	s	.			
					+		1	.	0	m	m		1	3	8	

10. Adjust value for back vertical position manually

Set the adjustment value for the back vertical start position by pressing the ▶ key or ◀ key.
The adjustment value can be changed by 0.1 mm.
Minus (-): upward
Plus (+): downward

1	0	.	B	a	c	k		V	.	P	o	s	.			
					–		1	.	2	m	m		1	1	6	

11. Adjust value for FB horizontal position manually

Set the adjustment value for the FB horizontal start position by pressing the ▶ key or ◀ key.
The adjustment value can be changed by 0.1 mm.
Minus (-): leftward
Plus (+): rightward

1	1	.	F	B		H	.	P	o	s	.					
					–		4	.	2	m	m			8	6	

12. Adjust value for FB vertical position manually

Set the adjustment value for the FB vertical start position by pressing the ▶ key or ◀ key.
The adjustment value can be changed by 0.1 mm.
Minus (-): upward
Plus (+): downward

1	2	.	F	B		V	.	P	o	s	.					
					+		0	.	2	m	m		1	3	0	

13. Adjust value for FB paper length manually

Set the adjustment value for the FB paper length by pressing the ▶ key or ◀ key.
The adjustment value can be changed by 0.1%.
Minus (-): shortening
Plus (+): lengthening

1	3	.	F	B		L	e	n	g	t	h					
					–		0	.	1	%		1	2	7		

Note: After changing this value, always check "12. Adjust value for FB vertical position manually."

14. Lamp

Set the lamp color.
Select Green or Red by pressing the ▶ key or ◀ key.

1	4	.	L	a	m	p									
												G	r	e	e	n

15. Double feed detection level

Set the double feed detection level, mainly to correct its irregularity found between the machines.
Select 118, 128, or 138 by pressing the ▶ key or ◀ key.
Note: Do not change the value initially set at the factory.

1	5	.	D	o	u	b	l	e		F	e	e	d		
		S	l	i	c	e		+		0			1	2	8

16. Set default

Clear all the settings changed on the operation panel and return to the default values.
Press both of the ▶ key and ◀ key at the same time to execute setting the default. A message, "COMPLETION" will be displayed when it is completed.
Note: The following settings will not be defaulted: SCSI-ID, Terminator, System counter, Adjusting values, Operational panel display language, Double feed detection level.

1	6	.	S	e	t		D	e	f	a	u	l	t		
									E	x	e	c	=	<	>

E. TEST MODE

1. Feed test

Carry out the document feed test with ADF.
Set the resolution for the ADF feed test by pressing the ▶ key or ◀ key.
The resolution can be changed by 10 dpi.

0	1	.	F	e	e	d		T	e	s	t				
	R	e	s	.		2	0	0			S	T	A	R	T

Press the ▲ key to set the paper size for the ADF feed test.
Press the ▶ key or ◀ key to select A4, A5, A6, B4, B5, B6, Max, Ltr, Lgl, Ldr, or A3.

0	1	.	F	e	e	d		T	e	s	t				
	S	i	z	e			A	4			S	T	A	R	T

Press the ▲ key to set the paper length control ON/OFF for the ADF feed test.
Press the ▶ key or ◀ key to select ON or OFF.

0	1	.	F	e	e	d		T	e	s	t				
				L	C			O	N		S	T	A	R	T

During the above setting procedure, press the Start/Stop key to start the feed test.
When the papers run out or the Start/Stop key is pressed again, the feed test stops.

2. Carriage test

Carry out the carriage operation test.
Set the resolution for the carriage test by pressing the ▶ key or ◀ key.
The resolution can be changed by 10 dpi.

0	2	.	C	a	r	r	i	a	g	e		T	e	s	t
	R	e	s	.		2	0	0			S	T	A	R	T

Press the ▲ key to set the paper size for the carriage test.
Press the ▶ key or ◀ key to select A4, A5, A6, B4, B5, B6, Max, Ltr, Lgl, Ldr, or A3.

0	2	.	C	a	r	r	i	a	g	e		T	e	s	t
	S	i	z	e			A	4			S	T	A	R	T

During the above setting procedure, press the Start/Stop key to start the carriage test.
When the Start/Stop key is pressed again, the carriage test stops.

3. CCD test

Carry out the CCD and amplifier test.
Set the gain of Amplifier 1.
Select ×1 or ×2 by pressing the ▶ key or ◀ key.

0	3	.	C	C	D		A	m	p		T	e	s	t	
	A	m	p		1		x	1			S	T	A	R	T

Press the ▲ key to set the gain of Amplifier 2.
Set the gain between 0 and 255 by pressing the
▶ key or ◀ key.

0	3	.	C	C	D		A	m	p		T	e	s	t	
	A	m	p		2			1	6		S	T	A	R	T

During the above setting procedure, press the
Start/Stop key to display a peak in the gain of
the amplifier.

0	3	.	C	C	D		A	m	p		T	e	s	t	
	P	e	a	k			2	2	0			S	T	O	P

When the Start/Stop key is pressed again, the
CCD and amplifier test stops.
If the setting values of the amplifiers are:
Amplifier 1 = ×1, Amplifier 2 = 16,
then a normal peak indicated will be between 85
and 268 for the green lamp, between 85 and 230
for the red lamp.

4. CIS LED level test

Carry out the back CIS LED level test.
Set the LED intensity between 0 and 255 by
pressing the ▶ key or ◀ key.

0	4	.	B	.	C	I	S		L	E	D				
	L	e	v	.		2	5	5				S	T	A	R	T

Press the Start/Stop key to illuminate the LED
and display a peak at the set level.

0	4	.	B	.	C	I	S		L	E	D				
	P	e	a	k		4	6	3				S	T	O	P

When the Start/Stop key is pressed again, the
back CIS LED level test stops.
If the level is set at 255, a normal peak indicated
will be 255 or above.

5. CCD black level test

Carry out the front CCD black level test.
Set the front CCD black offset output between 0
and 255 by pressing the ▶ key or ◀ key.

0	5	.	F	.	C	C	D		B	l	k		L	e	v
	L	e	v	.		1	1	1			S	T	A	R	T

Press the Start/Stop key to display a peak at
the set level.

0	5	.	F	.	C	C	D		B	l	k		L	e	v
	P	e	a	k			0				S	T	O	P

When the Start/Stop key is pressed again, the
CCD black level test stops.
A normal value of the level, which is set auto-
matically when the power is turned ON, will be
between 75 and 170.

6. CIS black level test

Carry out the back CIS black level test.
Set the back CIS black offset output between 0
and 255 by pressing the ▶ key or ◀ key.

0	6	.	B	.	C	I	S		B	l	k		L	e	v
	L	e	v	.		1	3	2			S	T	A	R	T

Press the Start/Stop key to display a peak at
the set level.

0	6	.	B	.	C	I	S		B	l	k		L	e	v
	P	e	a	k			0				S	T	O	P

When the Start/Stop key is pressed again, the
CIS black level test stops.
A normal value of the level, which is set auto-
matically when the power is turned ON, will be
between 107 and 158.

7. Document Sensor

Carry out the document sensor operation test.

0	7	.	D	o	c	.	S	e	n	s	o	r			
													S	T	A	R	T

Press the Start/Stop key to display a status of
the document sensor operation.

0 = No document
1 = Document existing

P	0	1	2	3	4	5	6	7	8	S	E			
0	0	0	0	0	0	0	0	0	0	0	0			

P: Document sensor
0: Size sensor 0
1: Size sensor 1

2: Size sensor 2
3: Size sensor 3
4: Size sensor 4
5: Size sensor 5
6: Size sensor 6
7: Size sensor 7
8: Size sensor 8
S: Starting position sensor
E: Delivery sensor

When the Start/Stop key is pressed again, the document sensor operation test stops.

8.   Sensor sensitive level

Display the document sensor LED illuminating level.

0	8	.	D	o	c	.	S	e	n	s	.	L	e	v	.
											S	T	A	R	T

Press the Start/Stop key to display the LED illuminating level in hexadecimal (0 to F).

X: No level adjustment
0: Bright
F: Dark

P	0	1	2	3	4	5	6	7	8	S	E				
X	2	2	2	2	2	2	2	2	2	2	2				

P: Document sensor
0: Size sensor 0
1: Size sensor 1
2: Size sensor 2
3: Size sensor 3
4: Size sensor 4
5: Size sensor 5
6: Size sensor 6
7: Size sensor 7
8: Size sensor 8
S: Starting position sensor
E: Delivery sensor

When the Start/Stop key is pressed again, the document sensor operation test stops.
If the illuminating level is darker than 8, carry out a check.

9.   Door & home sensors

Check the state of the door & home position sensors.

0	9	.	D	o	o	r	&	H	o	m	e				
										S	T	A	R	T	

Press the Start/Stop key to display the state of the sensors.

1: Door open, or in home position
0: Door closed, or not in home position

F	A	T	D						H		C		R		
0	0	0	0						1		1		0		

F: ADF
A: ADF door
T: Imprinter door
D: Document cover
H: Document tray [hopper] home sensor
C: Carriage home sensor
R: Retard position sensor

When the Start/Stop key is pressed again, the display of the state stops.

10. Double feed sensor level

Display the ultrasonic wave generating level from the double feed sensor.
Set the ultrasonic wave generating level between 0 and 255 by pressing the ► key or ◄ key.

1	0	.	D	b	l		F	e	e	d		S	e	n	.
	L	e	v	.		1	2	0			S	T	A	R	T

Press the Start/Stop key to display a peak at the set level.

1	0	.	D	b	l		F	e	e	d		S	e	n	.
	P	e	a	k			8	7	7			S	T	O	P

When the Start/Stop key is pressed again, the display of the level stops.
If the level is set at 120, a normal peak indicated will be between 800 and 1024.

11. Document tray [hopper] test

Check the up-and-down movement of the document tray.

1	1	.	H	o	p	p	e	r		T	e	s	t		
											S	T	A	R	T

Press the $\boxed{\text{Start/Stop}}$ key to start the up-and-down movement.

1	1	.	H	o	p	p	e	r		T	e	s	t		
P	r	e	s	s		=		S	T	O	P		K	e	y

When the $\boxed{\text{Start/Stop}}$ key is pressed again, the movement stops.

12. Feed motor test

Check the operation of the feed motor.

1	2	.	C	o	n	v	e	y	o	r	M	o	t	o	r
											S	T	A	R	T

Press the $\boxed{\text{Start/Stop}}$ key to rotate the feed motor.

1	2	.	C	o	n	v	e	y	o	r	M	o	t	o	r
P	r	e	s	s		=		S	T	O	P		K	e	y

When the $\boxed{\text{Start/Stop}}$ key is pressed again, the motor stops.

13. Pickup motor test

Check the operation of the pickup motor.

1	3	.	F	e	e	d		M	o	t	o	r			
											S	T	A	R	T

Press the $\boxed{\text{Start/Stop}}$ key to rotate the pickup motor.

1	3	.	F	e	e	d		M	o	t	o	r			
P	r	e	s	s		=		S	T	O	P		K	e	y

When the $\boxed{\text{Start/Stop}}$ key is pressed again, the motor stops.

14. Adjust width automatically

Carry out the automatic adjustment for the front width by scanning Test chart A.

1	4	.	A	d	j	.	F	.	W	i	d	t	h		
											S	T	A	R	T

Place Test chart A (its printed side faced up) on the document tray and press the $\boxed{\text{Start/Stop}}$ key to start the automatic adjustment.

If the adjustment is carried out properly, "No Error" will be indicated, and if not, "U41 Adjust Error" will be indicated.

Note: Trim Test chart A into the A4 size before using it.

15. Adjust front horizontal position automatically

Carry out the automatic adjustment for the front horizontal position by scanning Test chart A.

1	5	.	A	d	j	.	F	.	H	.	P	o	s	.	
											S	T	A	R	T

Place Test chart A (its printed side faced up) on the document tray and press the $\boxed{\text{Start/Stop}}$ key to start the automatic adjustment.

If the adjustment is carried out properly, "No Error" will be indicated, and if not, "U41 Adjust Error" will be indicated.

Note: Trim Test chart A into the A4 size before using it.

16. Adjust front vertical position automatically

Carry out the automatic adjustment for the front vertical position by scanning Test chart A.

1	6	.	A	d	j	.	F	.	V	.	P	o	s	.	
											S	T	A	R	T

Place Test chart A (its printed side faced up) on the document tray and press the $\boxed{\text{Start/Stop}}$ key to start the automatic adjustment.

If the adjustment is carried out properly, "No Error" will be indicated, and if not, "U41 Adjust Error" will be indicated.

Note 1: Trim Test chart A into the A4 size before using it.

Note 2: This adjustment should be carried out after "17. Adjust paper length automatically."

17. Adjust paper length automatically

Carry out the automatic adjustment for the paper length by scanning Test chart A.

1	7	.	A	d	j	.	L	e	n	g	t	h		
										S	T	A	R	T

Place Test chart A (its printed side faced up) on the document tray and press the Start/Stop key to start the automatic adjustment.

If the adjustment is carried out properly, "No Error" will be indicated, and if not, "U41 Adjust Error" will be indicated.

Note: Trim Test chart A into the A4 size before using it.

18. Adjust back horizontal position automatically

Carry out the automatic adjustment for the back horizontal position by scanning Test chart A.

1	8	.	A	d	j	.	B	.	H	.	P	o	s	.
										S	T	A	R	T

Place Test chart A (its printed side faced down) on the document tray and press the Start/Stop key to start the automatic adjustment.

If the adjustment is carried out properly, "No Error" will be indicated, and if not, "U41 Adjust Error" will be indicated.

Note: Trim Test chart A into the A4 size before using it.

19. Adjust back vertical position automatically

Carry out the automatic adjustment for the back vertical position by scanning Test chart A.

1	9	.	A	d	j	.	B	.	V	.	P	o	s	.
										S	T	A	R	T

Place Test chart A (its printed side faced down) on the document tray and press the Start/Stop key to start the automatic adjustment.

If the adjustment is carried out properly, "No Error" will be indicated, and if not, "U41 Adjust Error" will be indicated.

Note 1: Trim Test chart A into the A4 size before using it.

Note 2: This adjustment should be carried out after "17. Adjust paper length automatically."

20. Adjust FB horizontal position automatically

Carry out the automatic adjustment for the FB horizontal position by scanning Test chart A.

2	0	.	A	d	j	.	F	B	.	H	.	P	o	s	.
											S	T	A	R	T

Place Test Chart A on the document glass and press the Start/Stop key to start the automatic adjustment.

If the adjustment is carried out properly, "No Error" will be indicated, and if not, "U41 Adjust Error" will be indicated.

Note: Trim Test chart A into the A4 size before using it.

21. Adjust FB vertical position automatically

Carry out the automatic adjustment for the FB vertical position by scanning Test chart A.

2	1	.	A	d	j	.	F	B	.	V	.	P	o	s	.
											S	T	A	R	T

Place Test chart A on the document glass and press the Start/Stop key to start the automatic adjustment.

If the adjustment is carried out properly, "No Error" will be indicated, and if not, "U41 Adjust Error" will be indicated.

Note 1: Trim Test chart A into the A4 size before using it.

Note 2: This adjustment should be carried out after "22. Adjust FB length automatically."

22. Adjust FB length automatically

Carry out the automatic adjustment for the FB length by scanning Test chart A.

2	2	.	A	d	j	.	F	B	.	L	e	n	g	t	h
											S	T	A	R	T

Place Test chart A on the document glass and press the Start/Stop key to start the automatic adjustment.

If the adjustment is carried out properly, "No Error" will be indicated, and if not, "U41 Adjust Error" will be indicated.

Note: Trim Test chart A into the A4 size before using it.

23. Adjust all position & length automatically

Carry out the automatic adjustment for all positions & lengths by scanning Test chart A. (The adjustments from 14 to 22 will be carried out at a time.)

2	3	.	A	d	j	.	A	l	l	.	P	o	s	.	
												S	T	A	R	T

Place 6 sheets of Test chart A (the printed side of the top 4 sheets faced up and that of the bottom 2 sheets faced down) on the document tray and 1 sheet of Test chart A on the document glass. Press the Start/Stop key to start the automatic adjustment.

If the adjustment is carried out properly, "No Error" will be indicated, and if not, "U41 Adjust Error" will be indicated.

Note: Trim Test chart A into the A4 size before using it.

24. Aging

Carry out a sequence of the memory check, the ADF feeding operation and the FB reading operation repeatedly.

2	4	.	A	g	i	n	g								
												S	T	A	R	T

Press the Start/Stop key to start the aging.

2	4	.	A	g	i	n	g								
P	r	e	s	s		=		S	T	O	P		K	e	y

When the Start/Stop key is pressed again, the aging stops.

25. Initialize EEPROM

Carry out the EEPROM initialization.

2	5	.	I	n	i	t	.	E	E	P	R	O	M		
									E	x	e	c	=	<	>

Press the ▶ key and ◀ key at the same time to start the initialization.

When the initialization is completed, "No Error" will be indicated.

Note 1: When this initialization is carried out, all the information installed in the scanner will be reset. Do not carry out this initialization if unnecessary, because all the values set at the factory, including the system counter, will be cleared.

Note 2: If the initialization needs to be carried out, write down the values set at the factory so as to set them again after the initialization is done.

26. Adjust shading automatically

Carry out the automatic shading adjustment by scanning the shading adjustment chart.

2	6	.	A	d	j	.	S	h	a	d	i	n	g		
												S	T	A	R	T

Place the shading adjustment chart on the document tray and press the Start/Stop key to start the automatic adjustment.

It takes about 4 minutes to complete it.

27. Adjust double feed sensor

Carry out the automatic double feed sensor adjustment by scanning the double feed sensor adjustment chart.

2	7	.	A	d	j	.	D	b	l		F	e	e	d	
												S	T	A	R	T

Place approx. 20 to 30 sheets of the double feed sensor adjustment chart on the document tray and press Start/Stop key to start the automatic adjustment.

It stops automatically when the adjustment is completed.

VI. AFTER REPLACING PARTS

There are some parts used in this machine that will not properly exhibit the functions of the machine merely by replacing the parts. Those parts require adjustments and settings in the service mode after replaced or disassembled/reassembled.

1. Main control PCB
The following adjustments in the service mode will be required after the main control PCB is replaced.
1) Shading adjustment (Test mode 26)
2) Automatic scanning position & length adjustment (Test mode 23)
3) Double feed sensor adjustment (Test mode 27)

2. Flash memory (Flash ROM)
The following adjustment in the service mode will be required after the flash memory is replaced.
1) Shading adjustment (Test mode 26)

3. Carriage (CCD)
The following adjustments in the service mode will be required after the carriage is replaced.
1) Shading adjustment (Test mode 26)
2) Automatic scanning position & length adjustment (Test mode 23)

4. CIS
The following adjustments in the service mode will be required after the CIS is replaced.
1) Shading adjustment (Test mode 26)
2) Automatic scanning position & length adjustment (Test mode 23)

5. Starting position sensor/LED PCBs
The following adjustments in the service mode will be required after the starting position sensor/LED PCBs are replaced.
1) Automatic scanning position & length adjustment (Test mode 23)

6. Double feed sensor (G)/(R) PCBs
The following adjustment in the service mode will be required after the double feed sensor (G)/(R) PCBs are replaced.
1) Double feed sensor adjustment (Test mode 27)

7. Carriage home sensor PCB
The following adjustment in the service mode will be required after the carriage home sensor PCB is replaced.
1) Automatic scanning position & length adjustment (Test mode 23)

8. Feed roller
The following adjustment in the service mode will be required after the feed roller is replaced.
1) Automatic scanning position & length adjustment (Test mode 23)

9. CIS platen roller (White roller)
The following adjustment in the service mode will be required after the CIS platen roller is replaced.
1) Shading adjustment (Test mode 26)

10. White plate
The following adjustment in the service mode will be required after the white plate is replaced.
1) Shading adjustment (Test mode 26)

11. Lamp
The following adjustment in the service mode will be required after the lamp is replaced.
1) Shading adjustment (Test mode 26)

12. Feed Assembly
The following adjustment in the service mode will be required after the parts in the feed assembly are replaced or disassembled/reassembled.
1) Automatic scanning position & length adjustment (Test mode 23)

APPENDIX

MOTHER PCB

IMPRINTER
(Option)

CN503 Imprinter Door SENSOR

DOCUMENT COVER SENSOR PCB
CN527

DELIVERY LED PCB
CN526 CN525

DELIVERY SENSOR PCB
CN531 CN532

SIZE SENSOR PCB
CN521

SIZE LED PCB
CN524

DOUBLE FEED SENSOR [GENERATE] PCB
CN534

DOUBLE FEED SENSOR [RECEIVE] PCB
CN535

STARTING POSITION LED PCB
CN518

STARTING POSITION SENSOR PCB
CN519 CN520

CN513
CN522
CN502
CN515
CN505

RELAY [BACK] PCB

CN501 FFC CN2010

CN504 FFC CN2009

CN509
CN511
CN510
CN512
CN514

RELAY [SIDE] PCB

DOCUMENT TRAY HOME SENSOR PCB
CN530 CN529 FFC

DOCUMENT SENSOR RELAY PCB
CN537 CN538

DOCUMENT SENSOR

RETARD POSITION SENSOR PCB
CN517

CN2008 FFC CN001 CCD PCB CN002 LAMP DRIVE PCB LAMP

CN2003 CN331

DRIVE PCB

CN341 Feed Motor M
CN351 Pickup Motor M
CN361 CARRIAGE MOTOR M
CN332 24V DOOR SWITCH
CN372 LED Control

SCSI PCB

Compression RAM
Compression IC
1/2 50MHz

VIDEO Data Bus
CPU Address Bus
CPU Data Bus
16 A1
16 A0-A3
DMA 16
Gate Array TIARA
32 DRAM
SIMM 1 Socket
SIMM 2 Socket

40MHz SCSI-C 8 A0-A8 DMA 16

CN2002 CN603

MAIN CONTROL PCB

VIDEO Data 16
GA-IMAGE
γ RAM
MTF RAM
ED RAM
60MHz

GA-SENSOR
Shading RAM
Line Buffer RAM
Barcode RAM
AD
AD

Decoder
I/O
Flash ROM
SRAM

CPU
20MHz EEPROM

CN2001 CN1005

CIS
CN1003
CN1004

AC Inlet
Power Switch
CN801

DC POWER SUPPLY PCB

CN851 +5V,-5V,3V CN2004
CN843 24V CN2005

Fan
CN871

OPERATION PANEL PCB
LCD CN536 CN2007

CARRIAGE HOME SENSOR PCB
CN516 CN2011

A – 2

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Main Control (7/13)

A – 8   CANON ELECTRONICS INC.   CANON DR-4080U REV.0 SEPT. 1999 PRINTED IN JAPAN (IMPRIME AU JAPON)

Main Control (8/13)
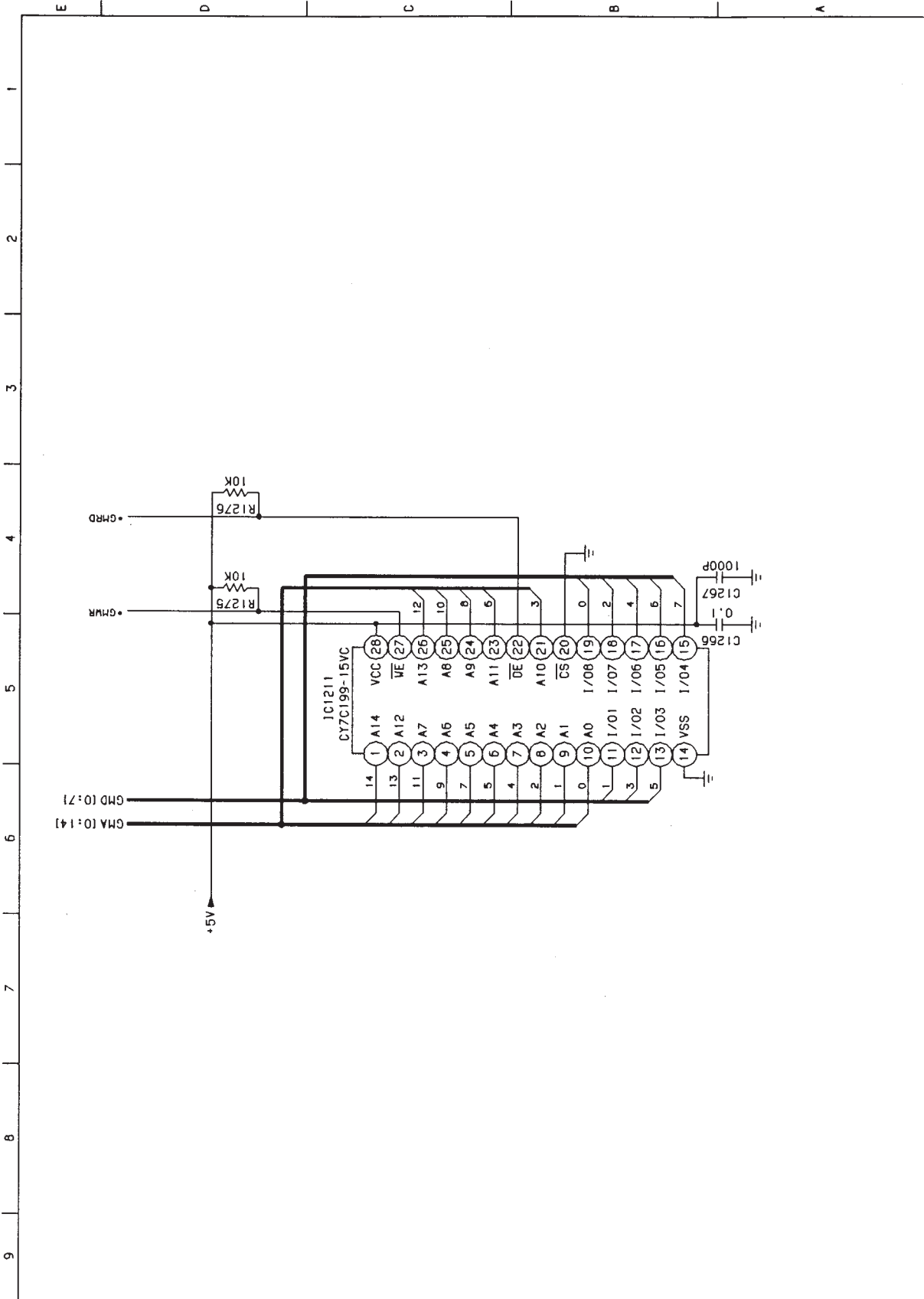
Main Control (10/13)
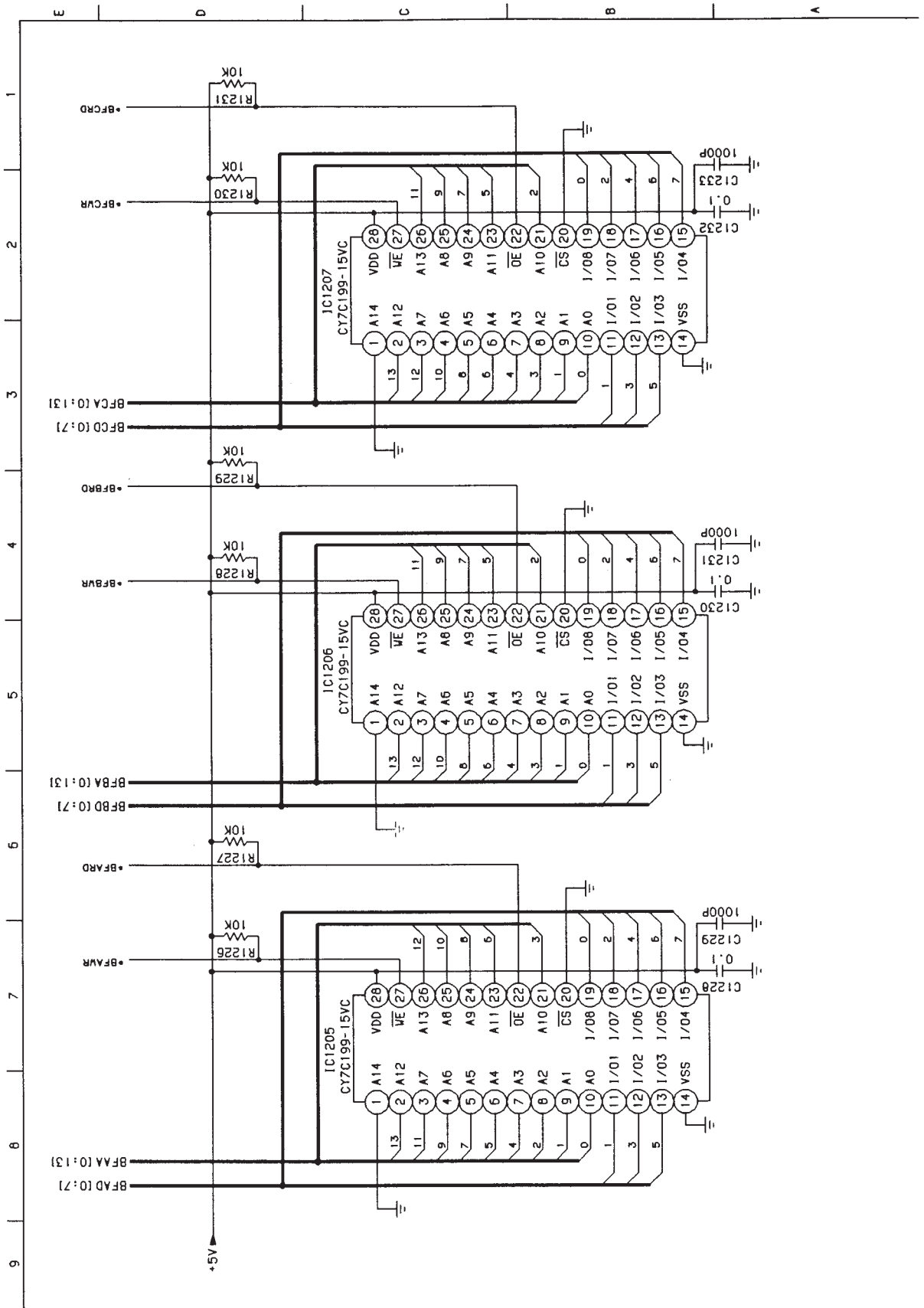
Main Control (11/13)
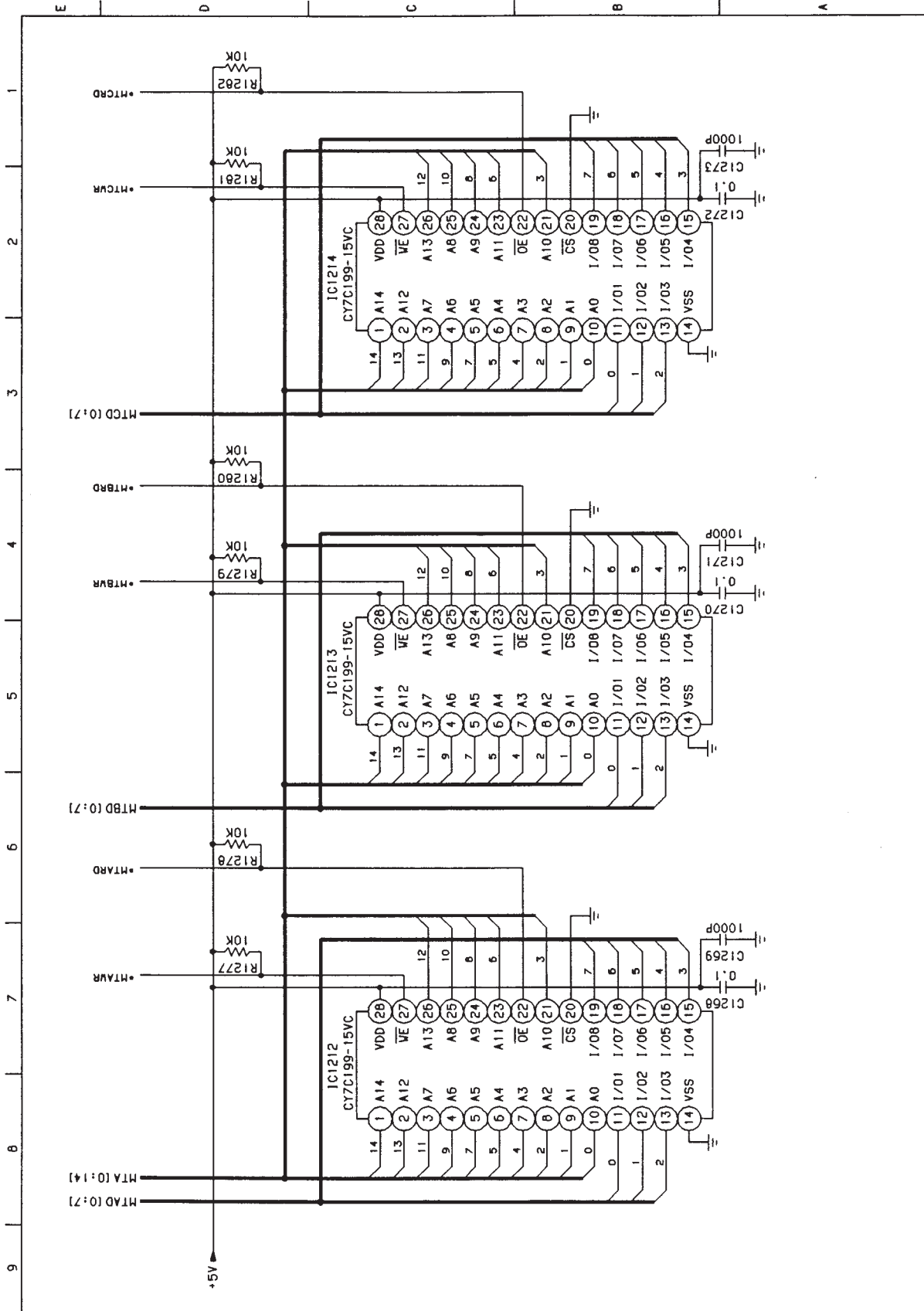
Main Control (12/13)

Main Control (13/13)

(5V)
(0)

f=25MHz
Duty: 50%

IC502
PM-2MC (25MHz)

JBIG

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CANON DR-4080U REV.0 SEPT. 1999 PRINTED IN JAPAN (IMPRIME AU JAPON)
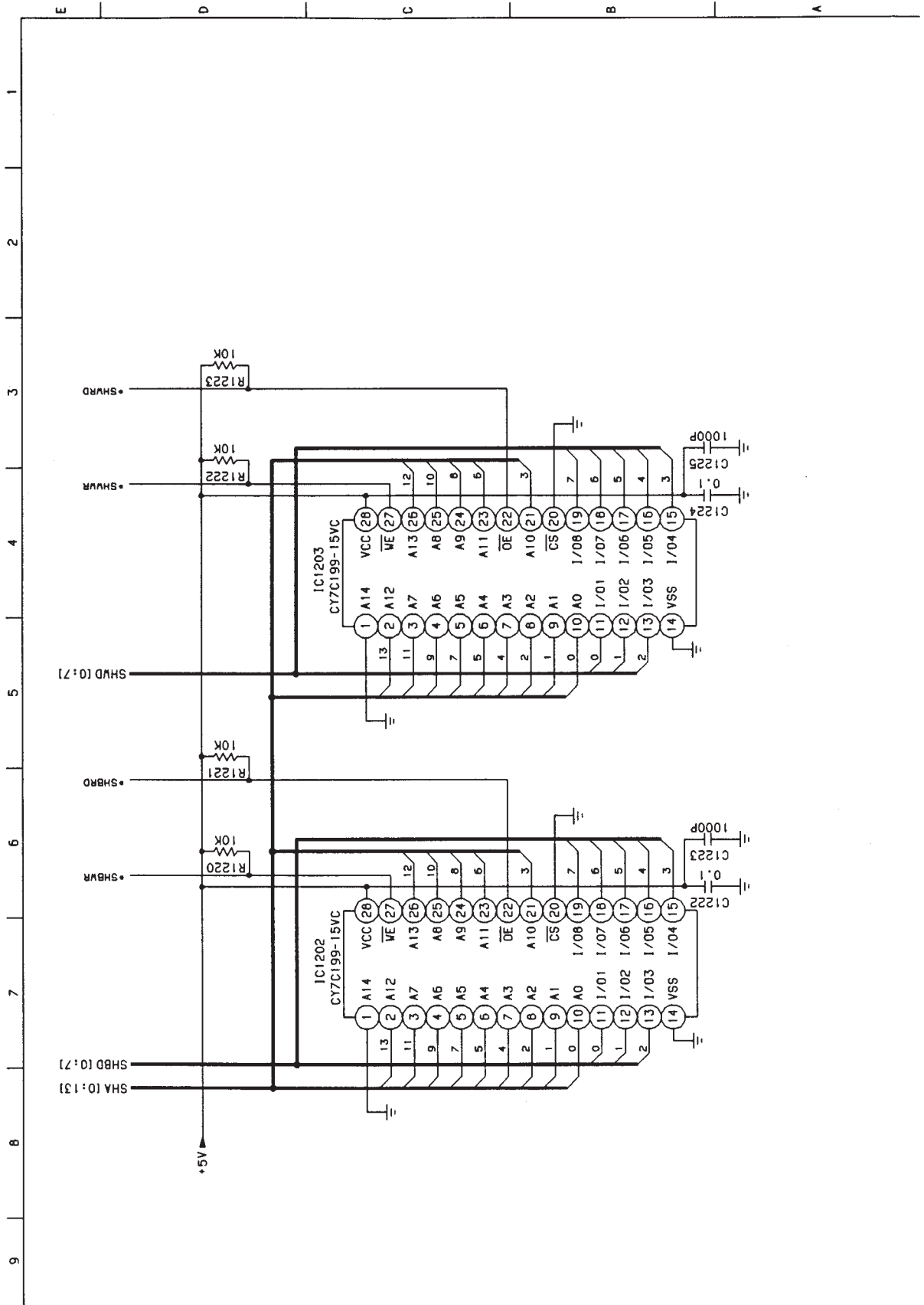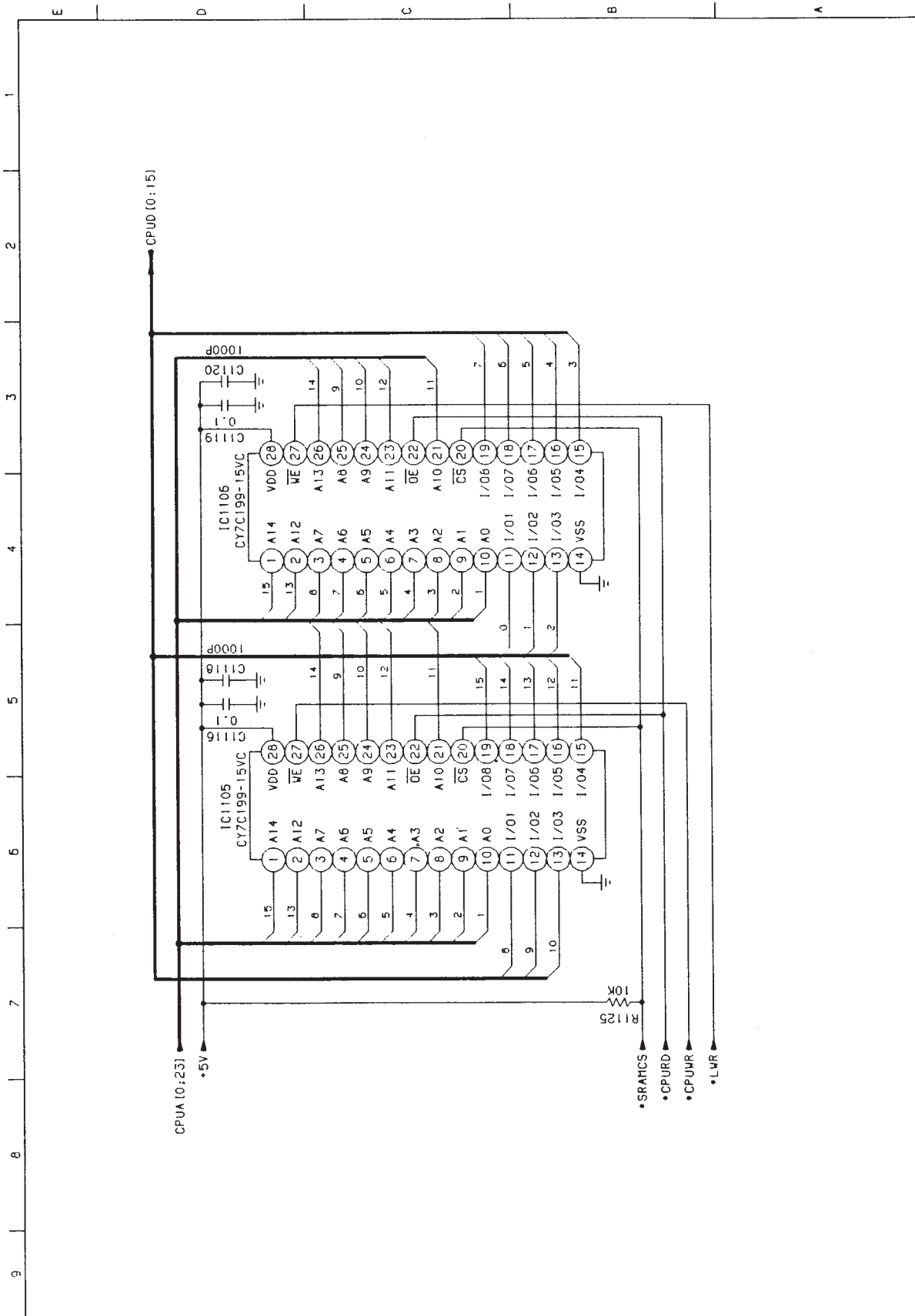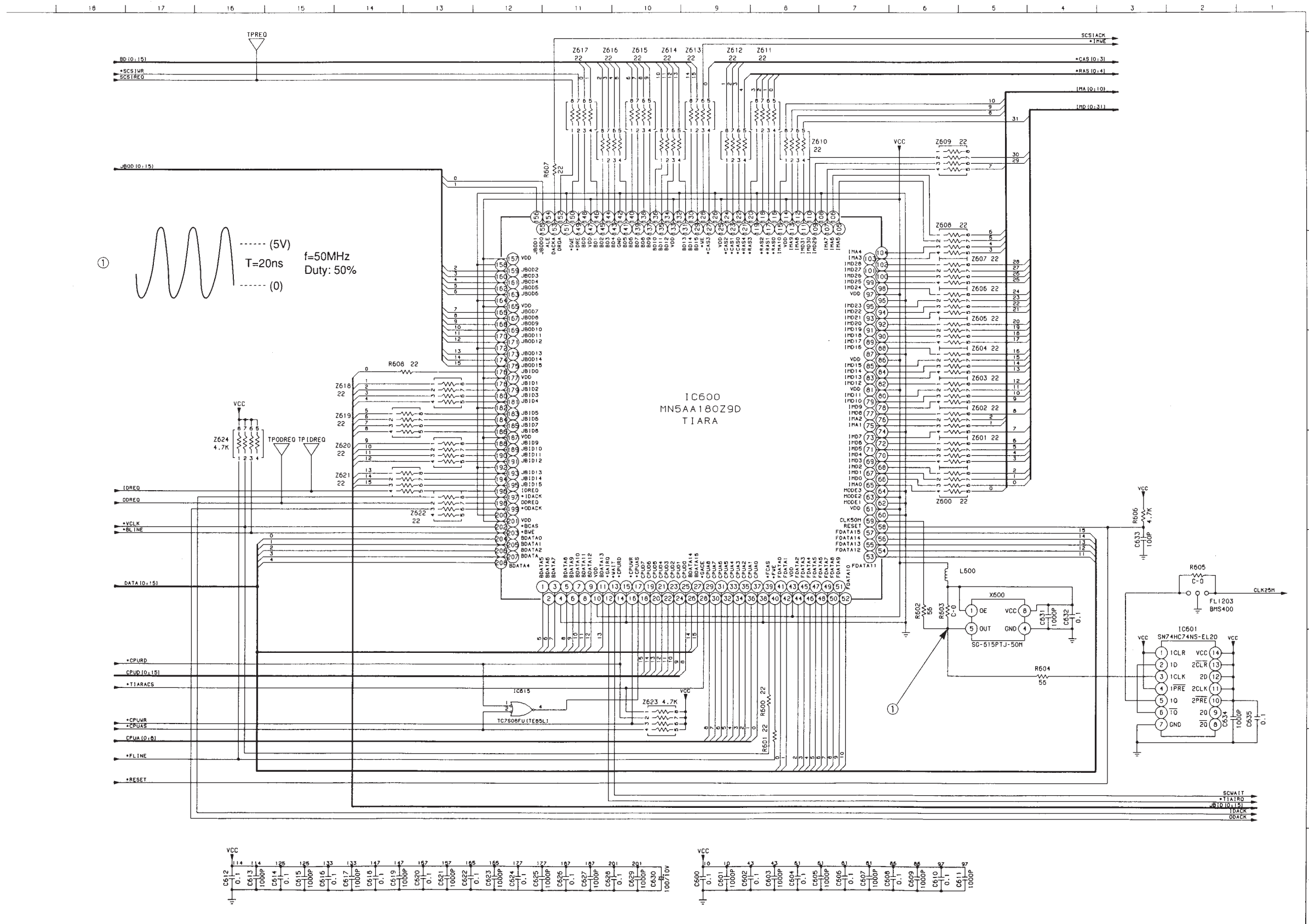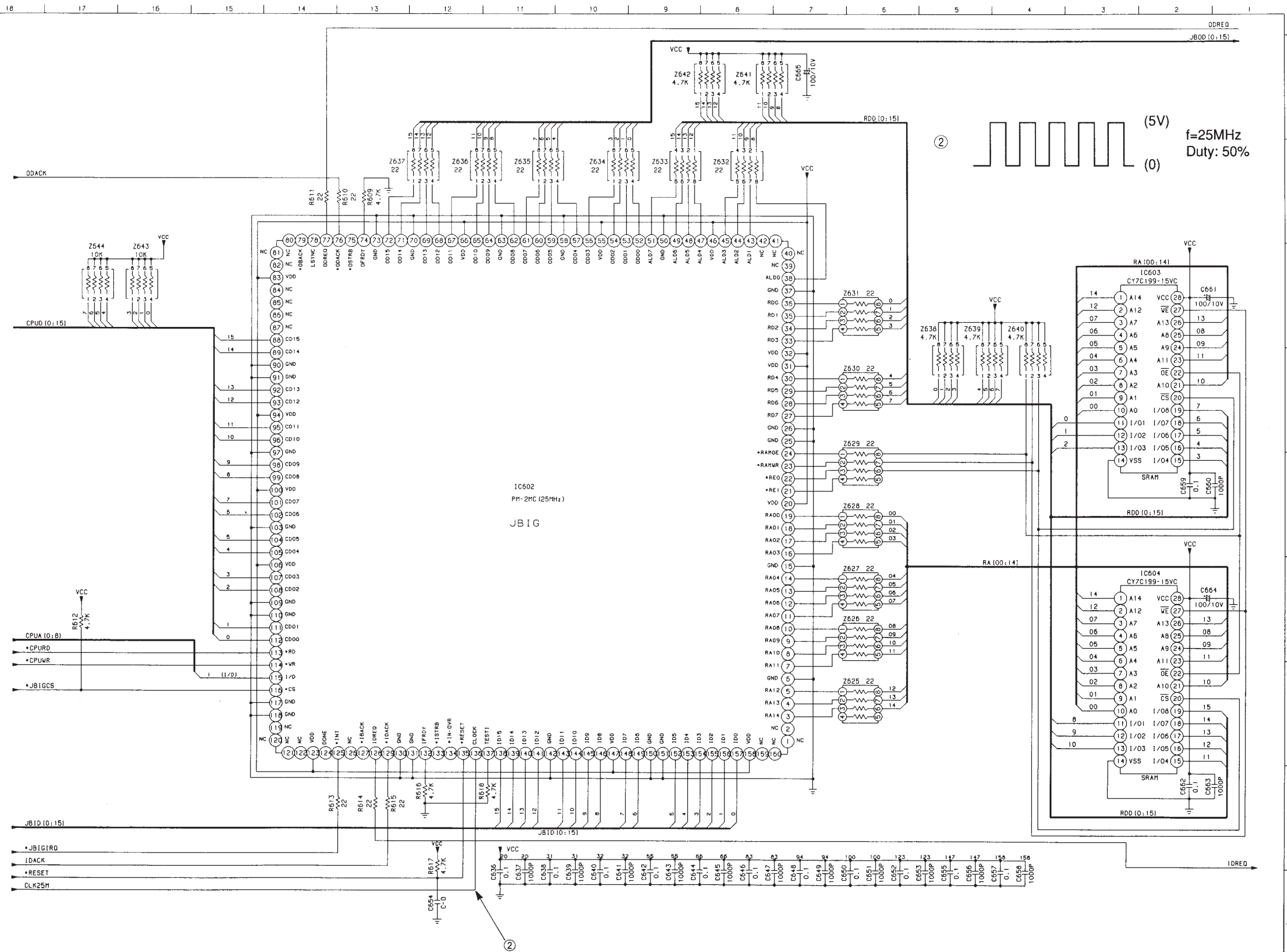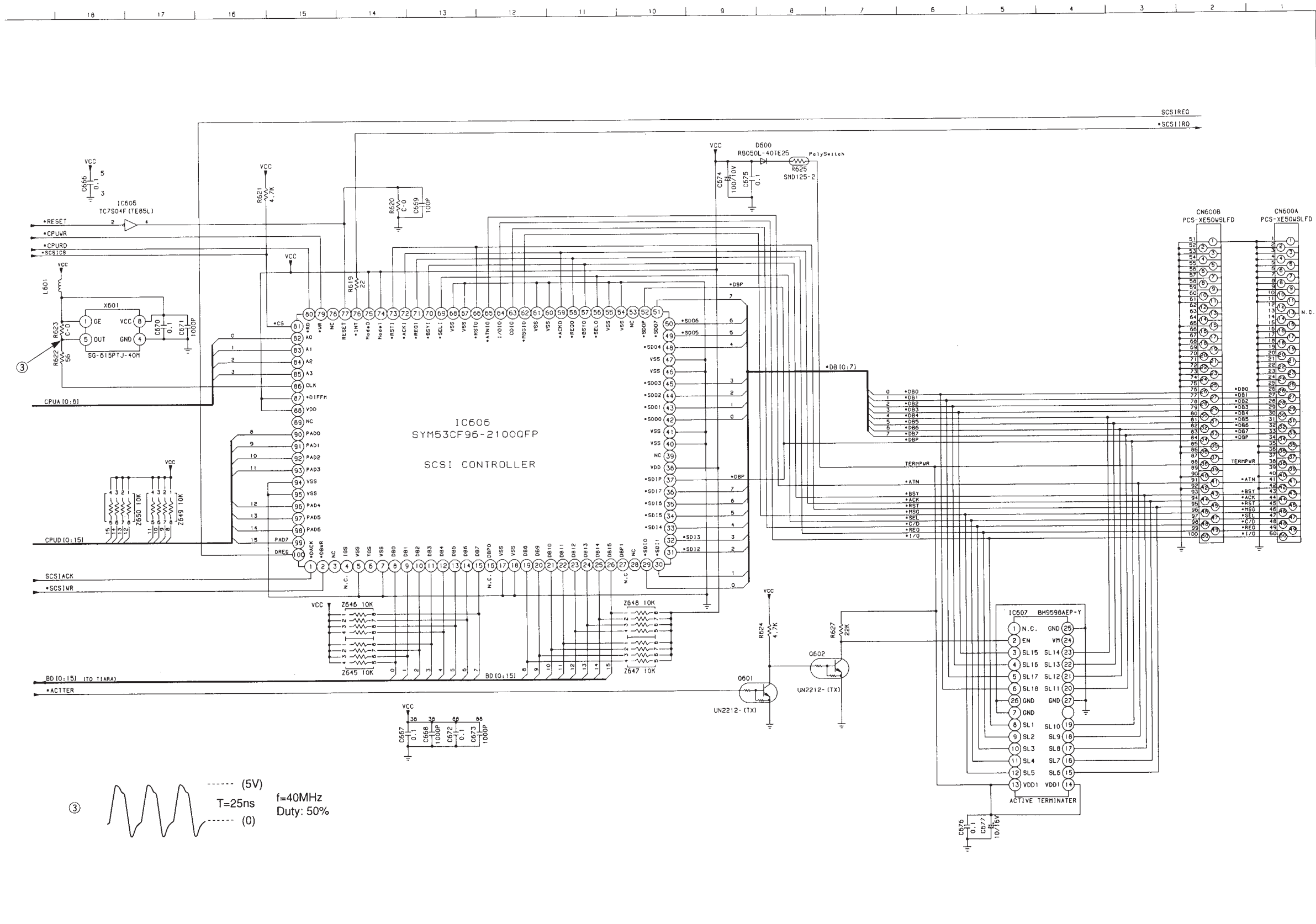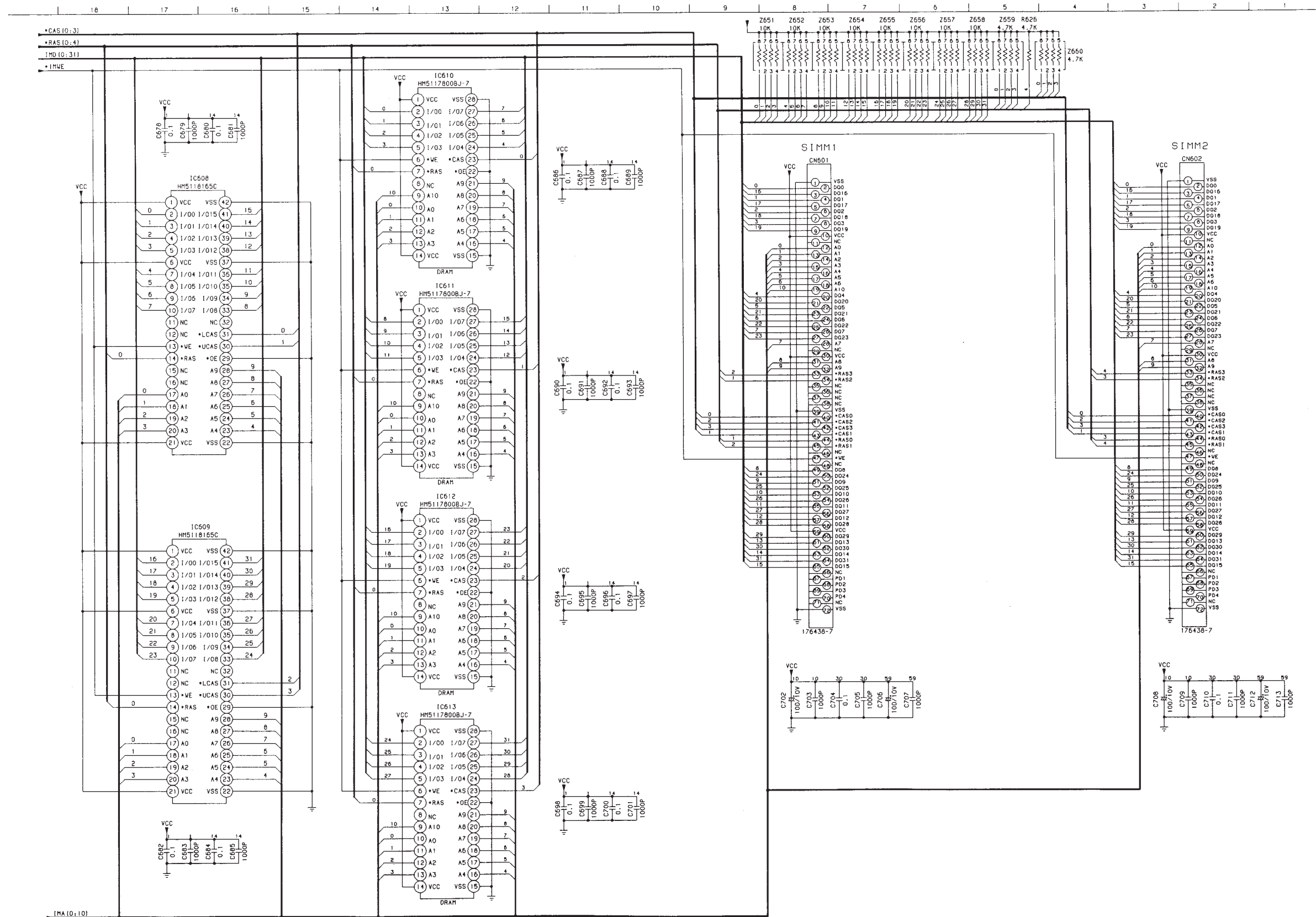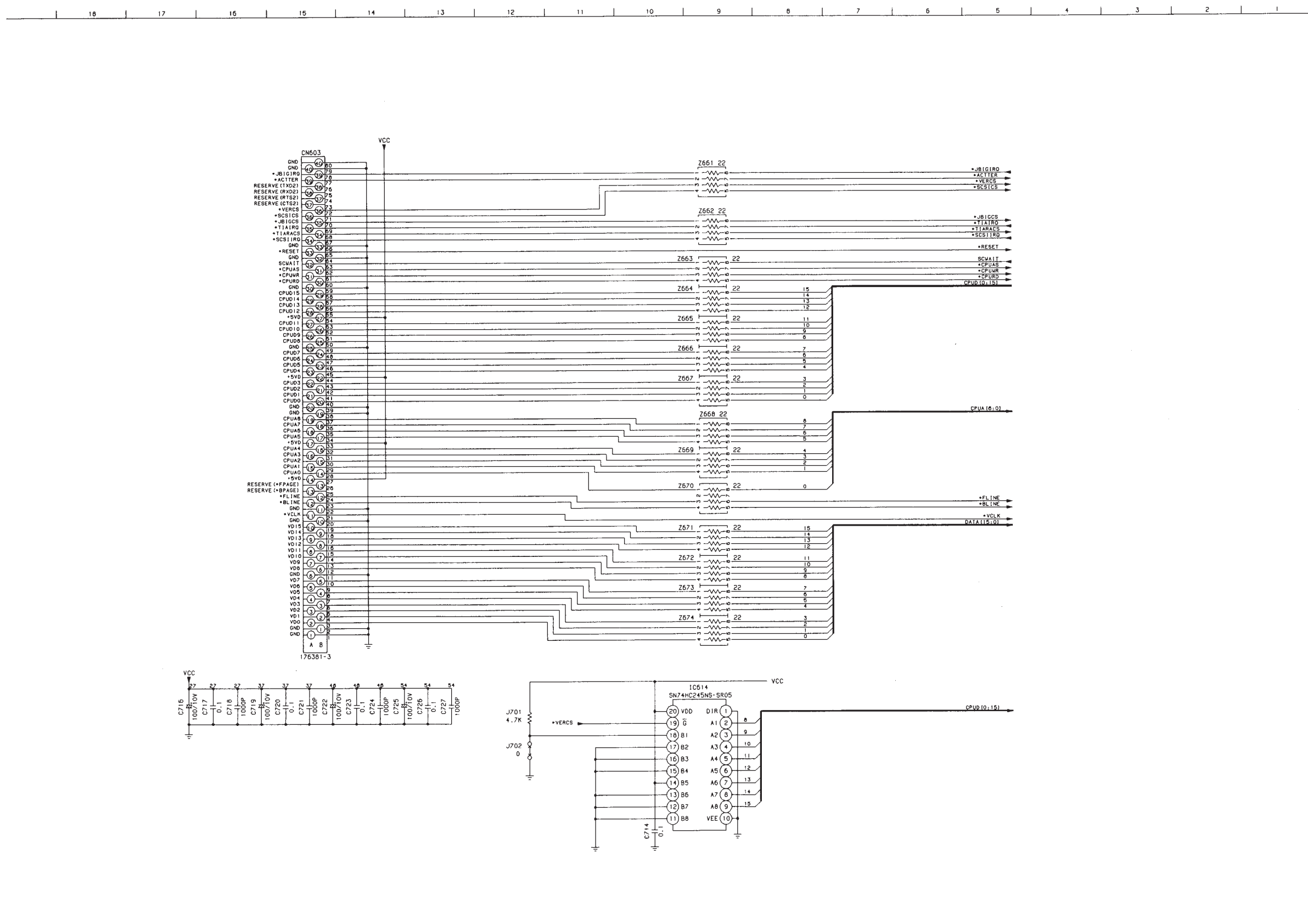
IV. DRIVE CIRCUIT DIAGRAM

Drive (1/7)
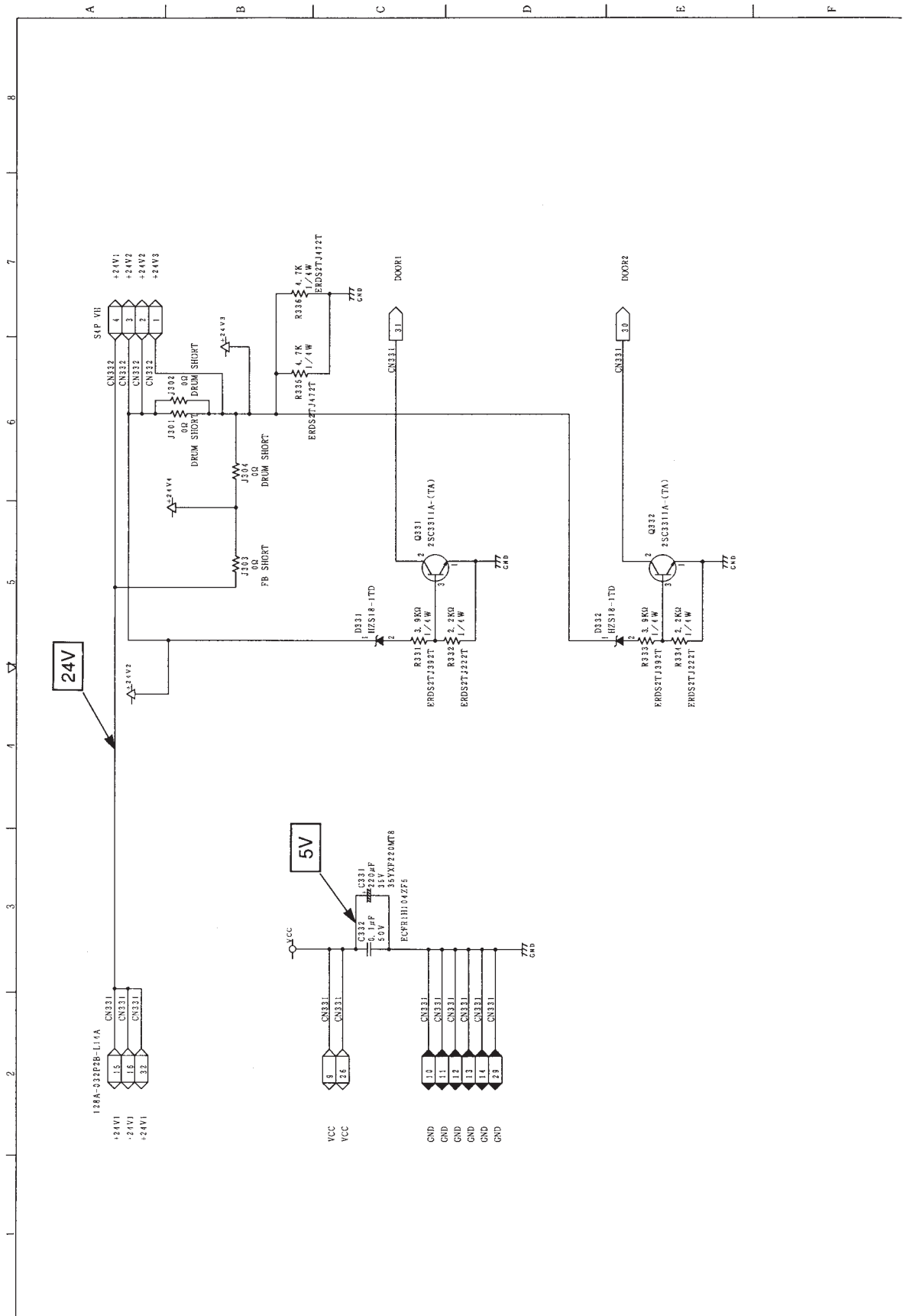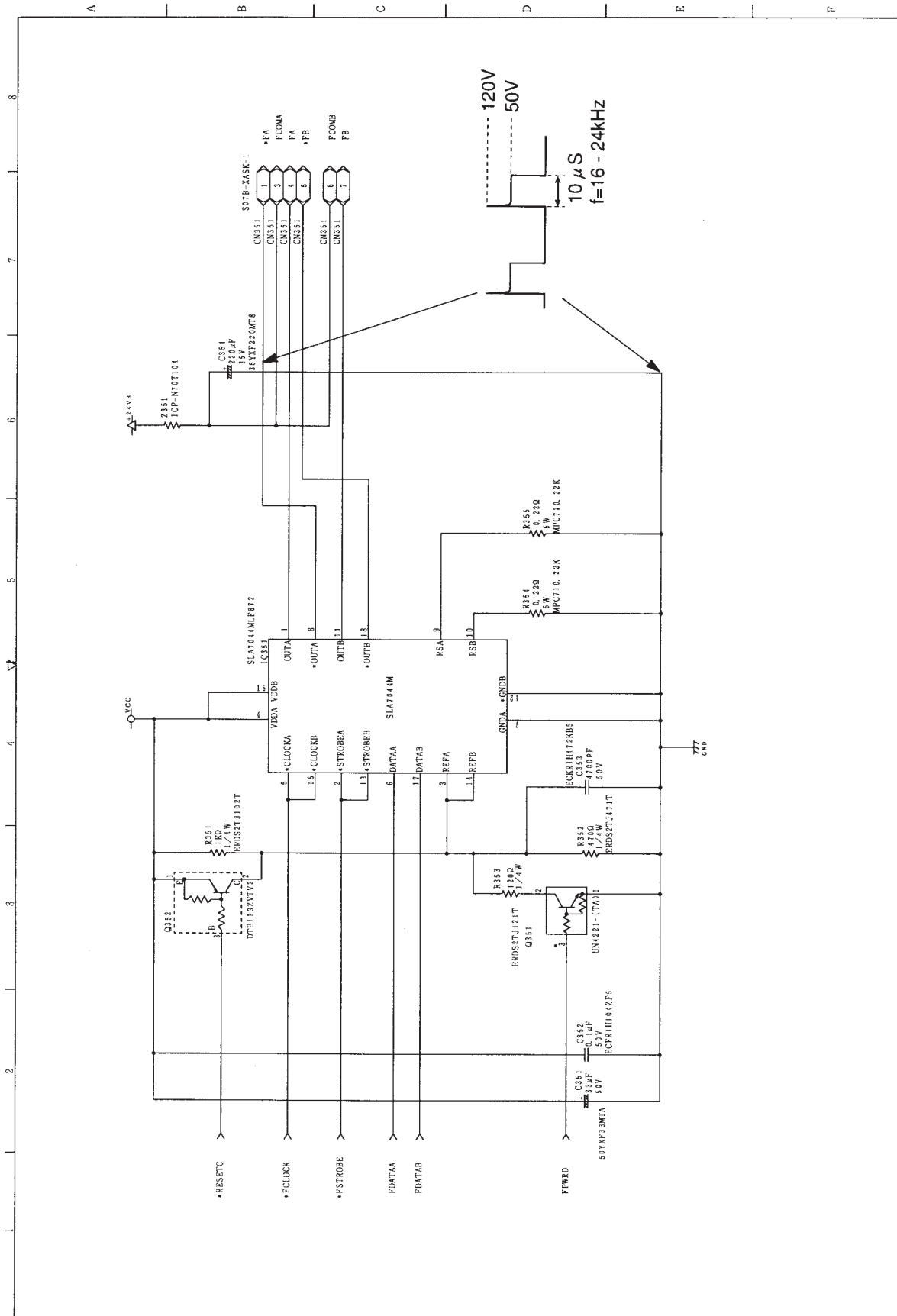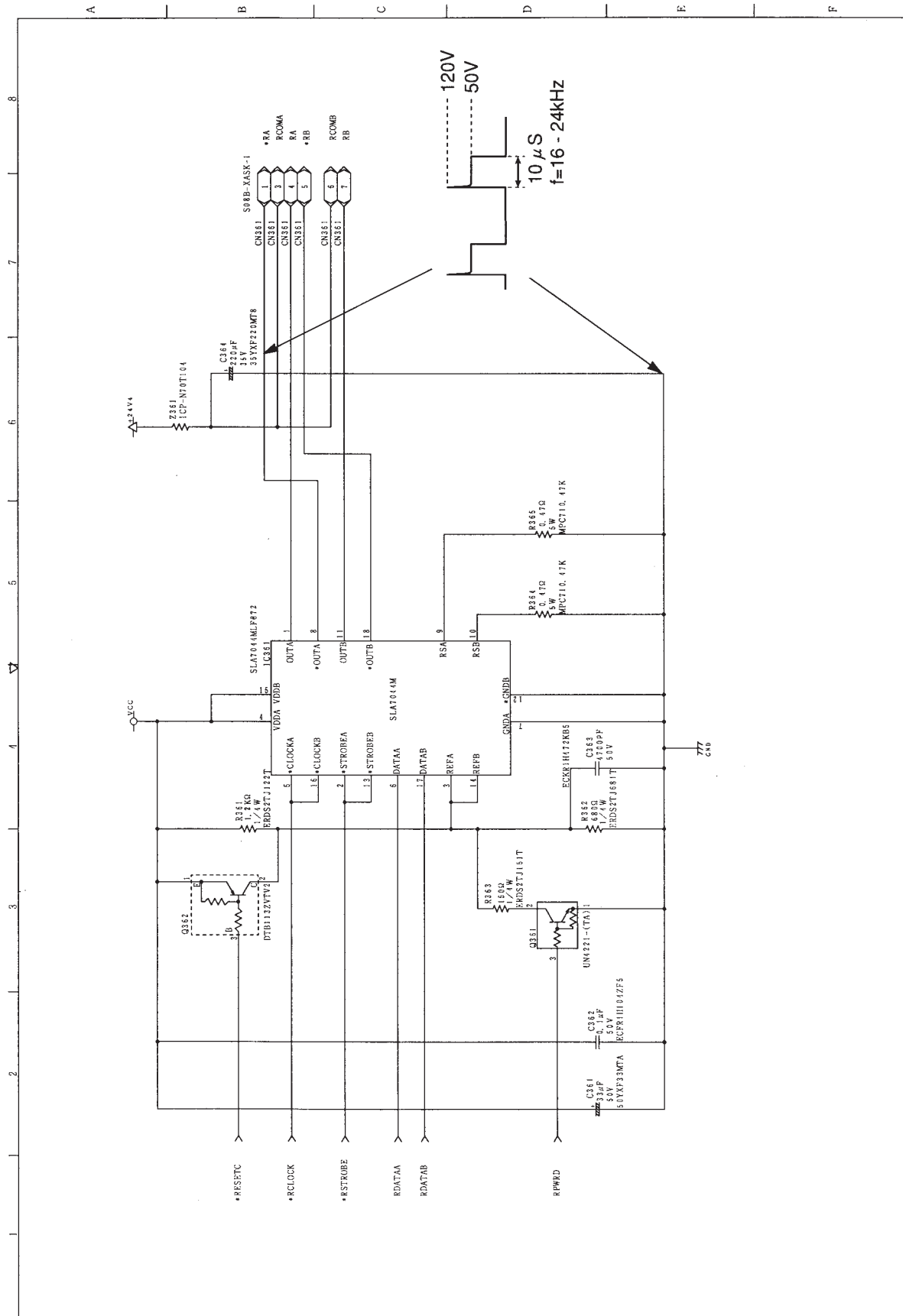
Drive (3/7)
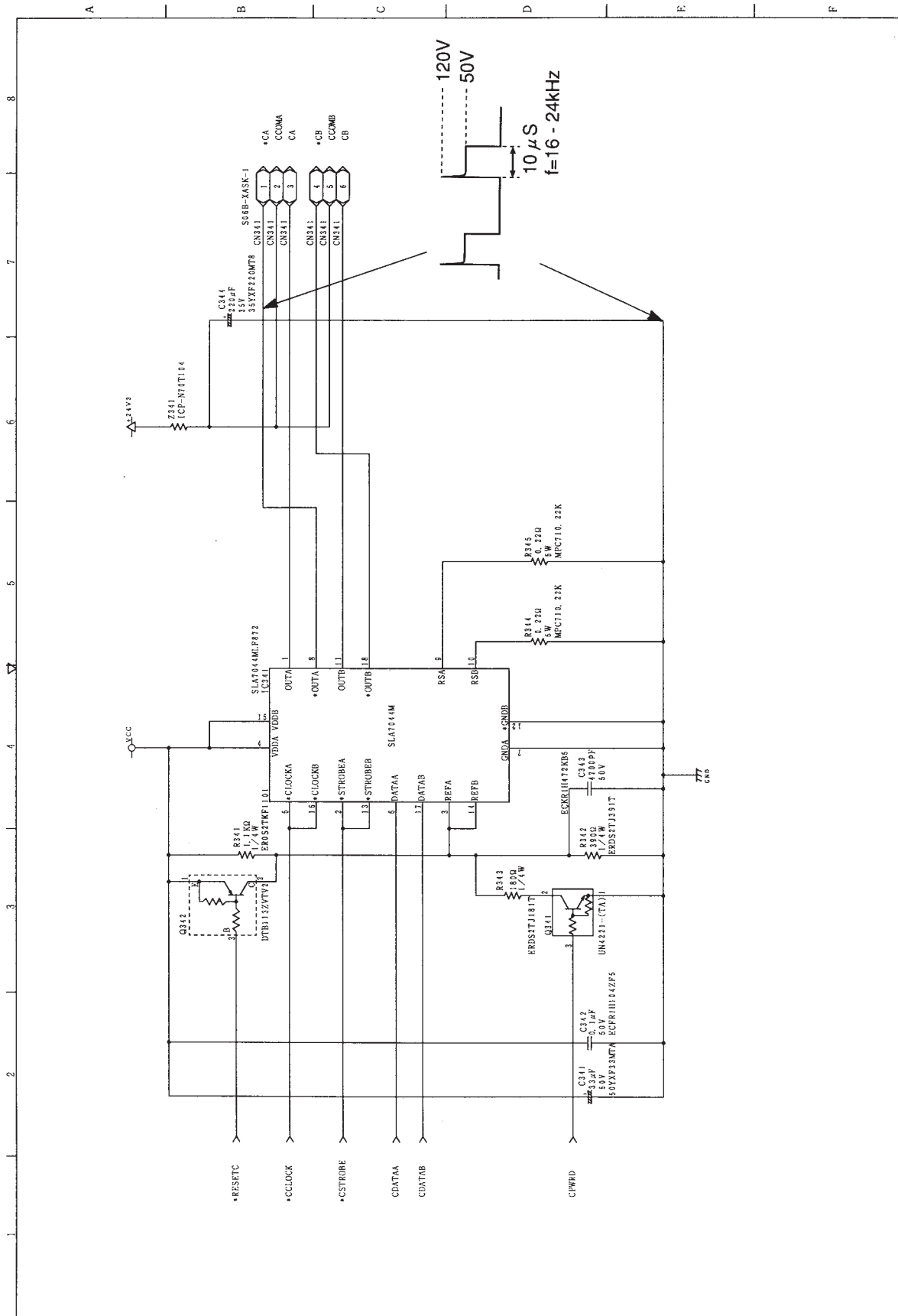
Drive (5/7)
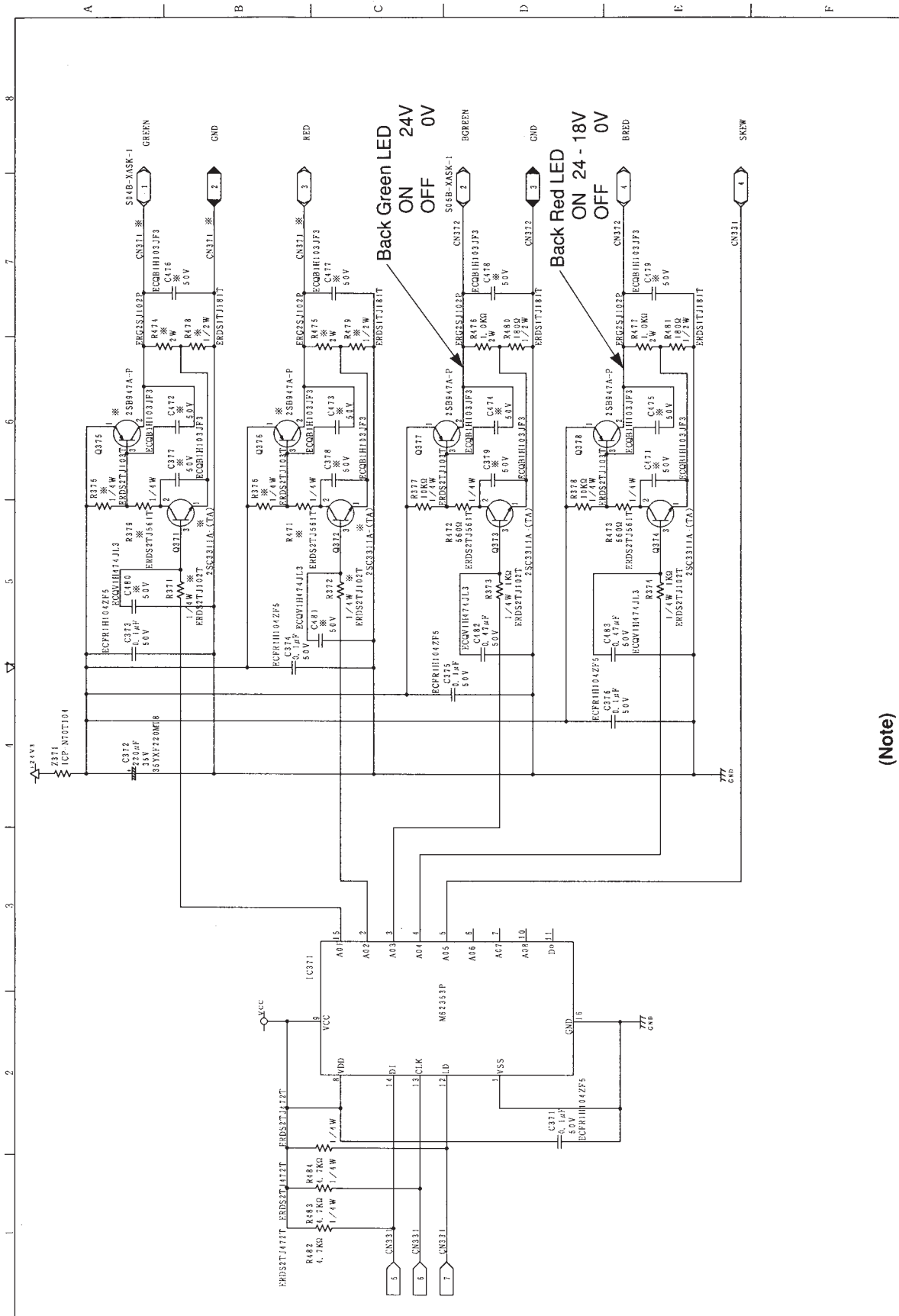
(Note)
"※" mark means 'not mounted'.
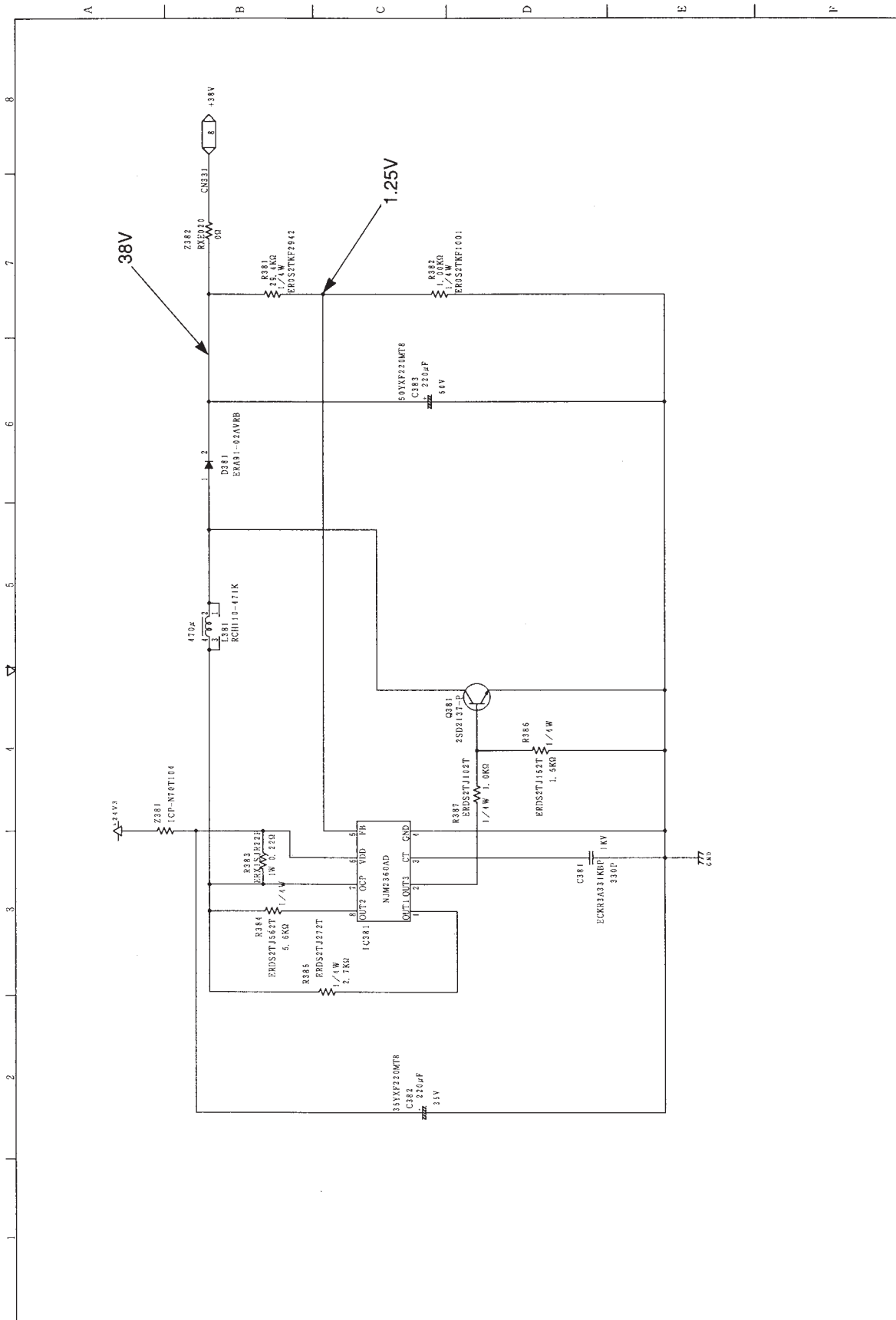
Drive (7/7)
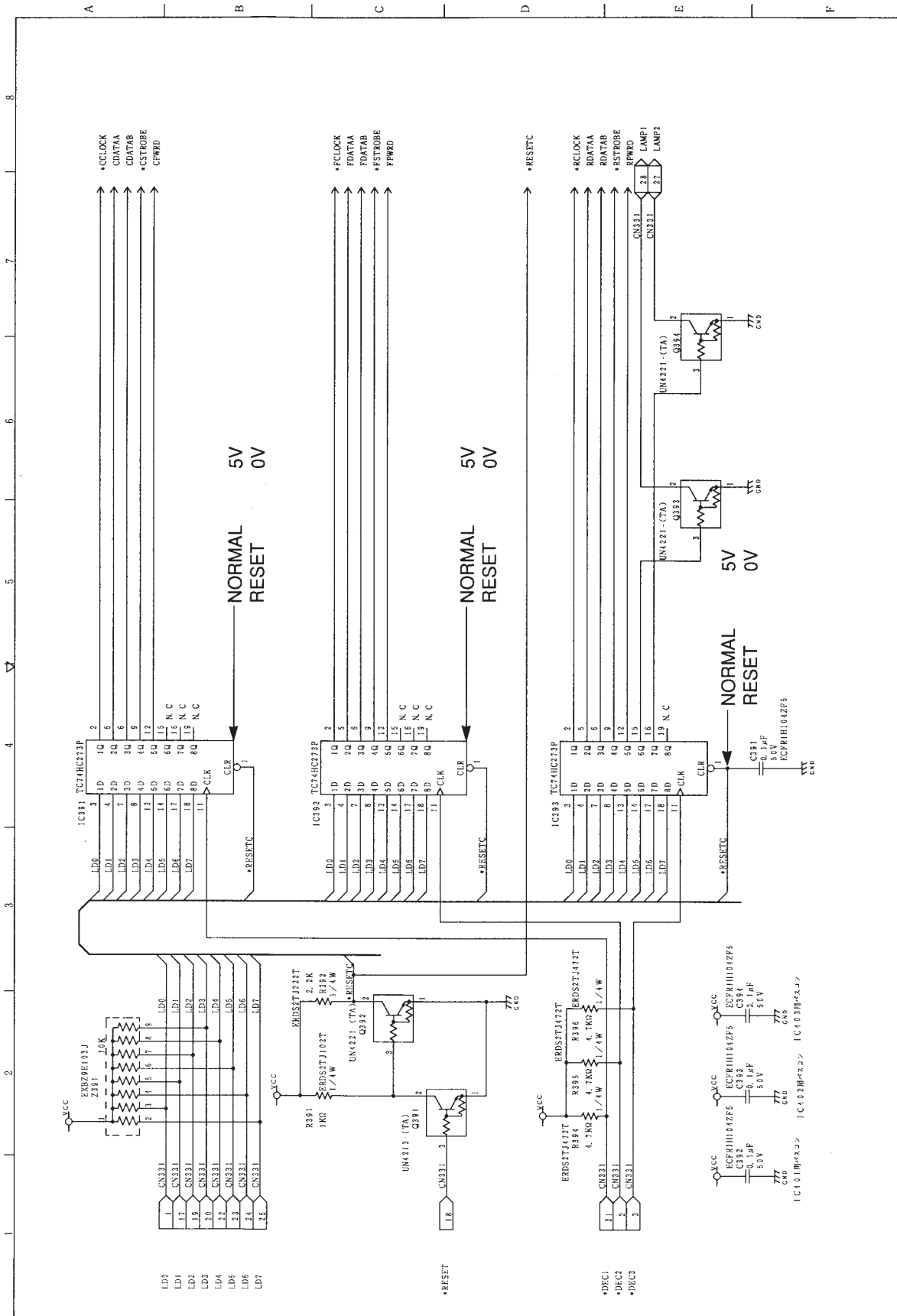
V. DC POWER SUPPLY CIRCUIT DIAGRAM

DC Power Supply (1/3)
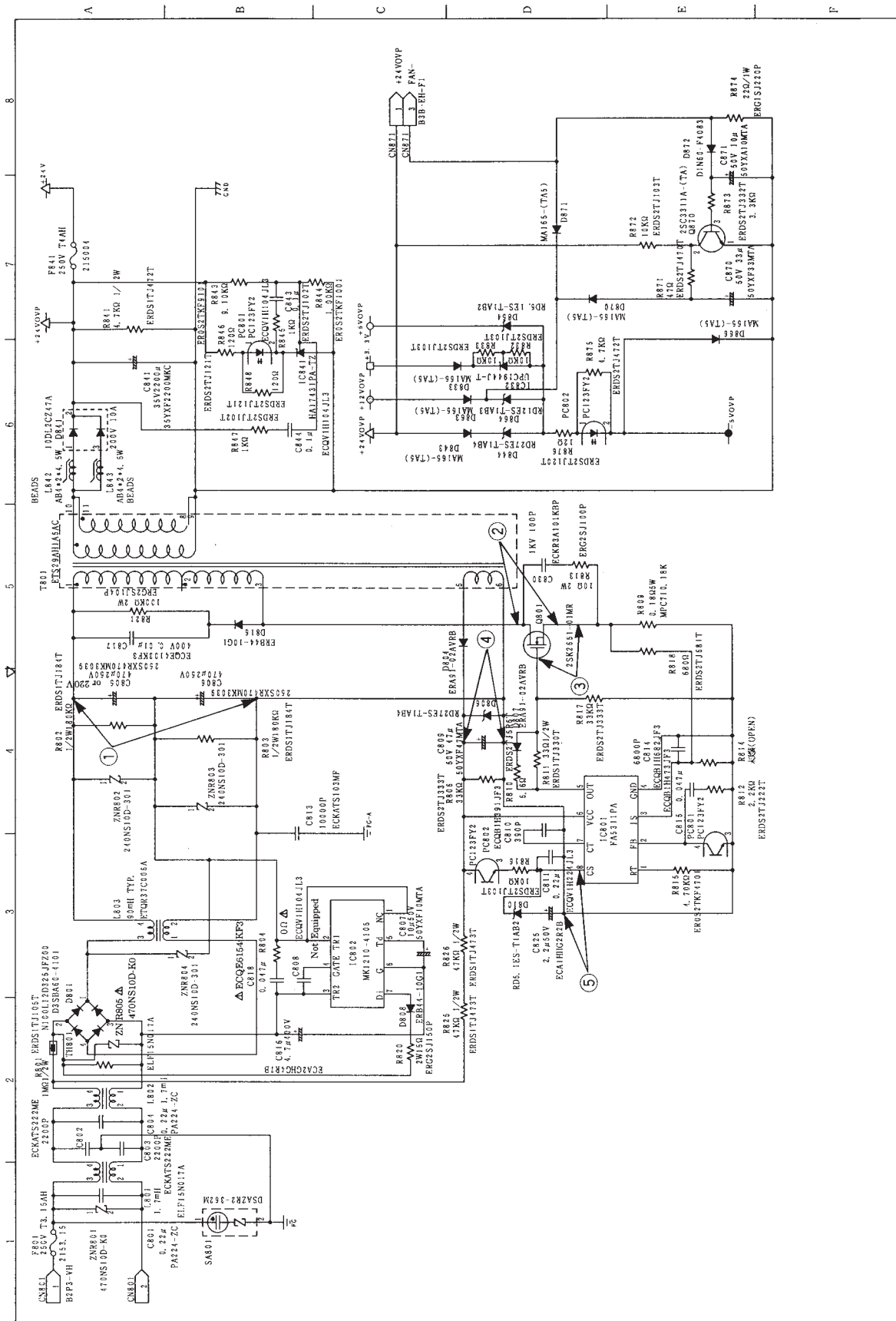
DC Power Supply (2/3)

①   AC   120V: 320V   DC   (NO Load, Fan Only)
         AC   220V: 300V   DC   (NO Load, Fan Only)
         AC   230V: 310V   DC   (NO Load, Fan Only)
         AC   240V: 330V   DC   (NO Load, Fan Only)
         AC   100V: 270V   DC   (NO Load, Fan Only)

②   Q801
         D - S

500V - 600V
$f=135kHz$ (No Load, Fan Only)
0V

③   Q801
         G - S

500V - 600V
$f=135kHz$ (No Load, Fan Only)
0V
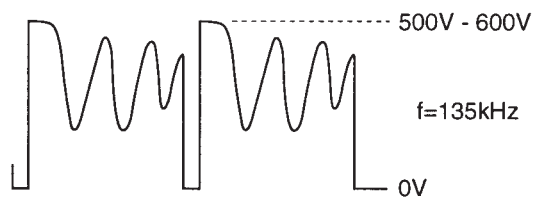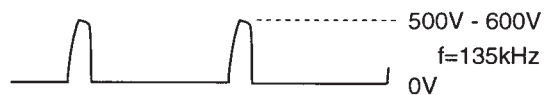
④   C809   DC 15 - 22V

⑤   Normal: 3.6V   DC   Over-voltage protector operation check
         Protection circuit functioning: 8V   DC   Fan protector operation check
         Note: If the protection circuit is functioned, turn OFF the power switch. After 5 minutes
                 or more, turn ON the power switch again for restart
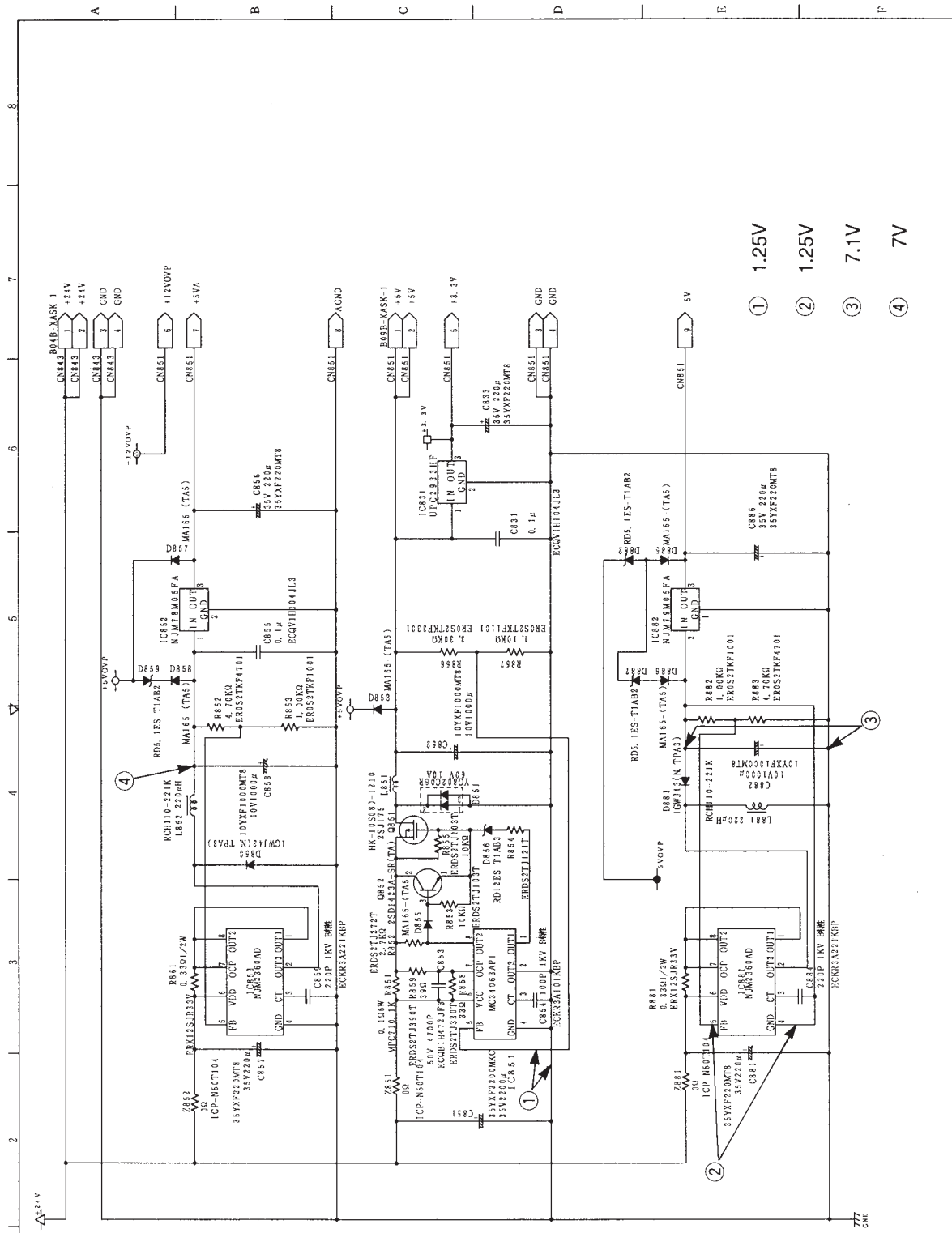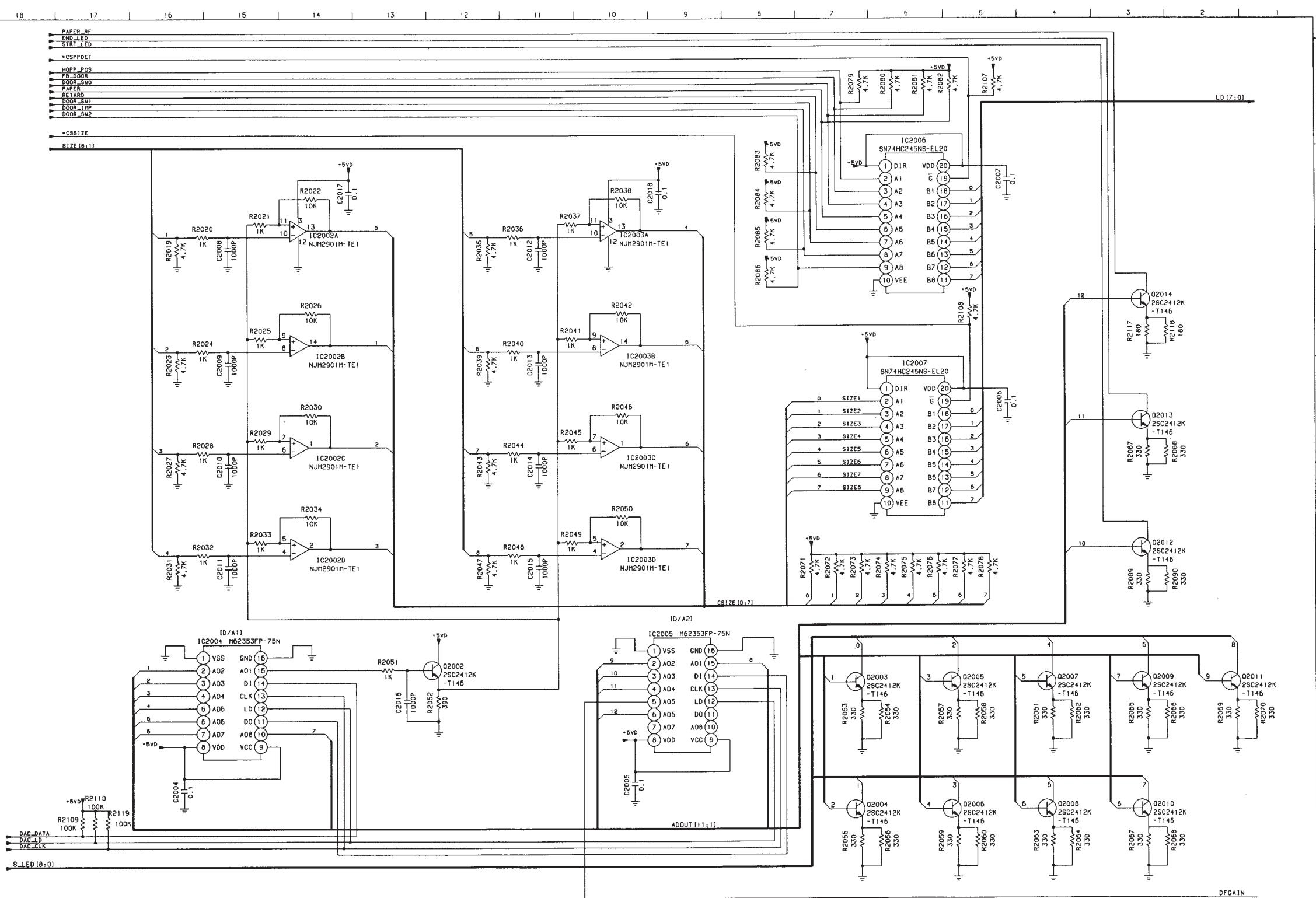
CANON ELECTRONICS INC.   CANON DR-4080U REV.0 SEPT. 1999 PRINTED IN JAPAN (IMPRIME AU JAPON)
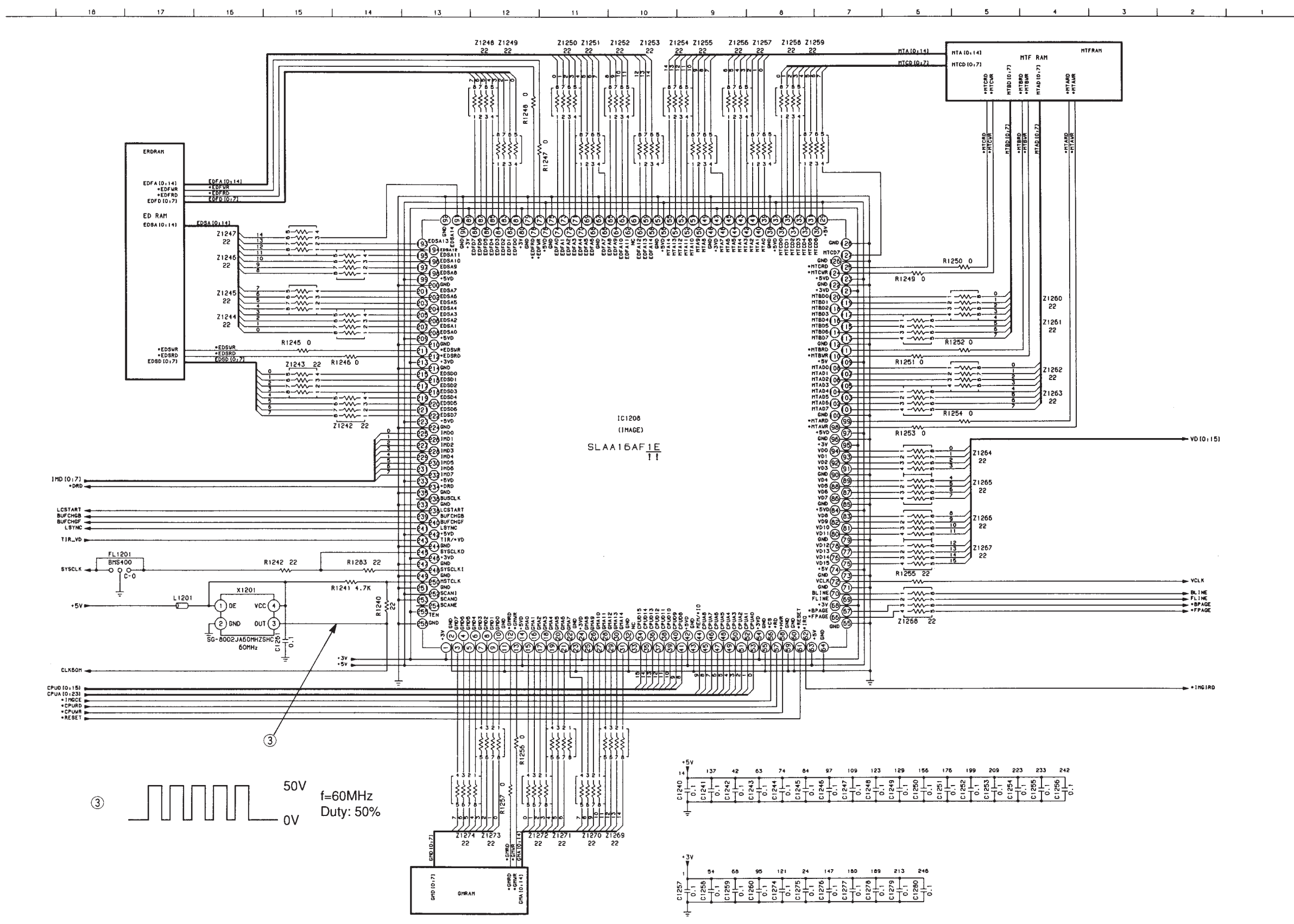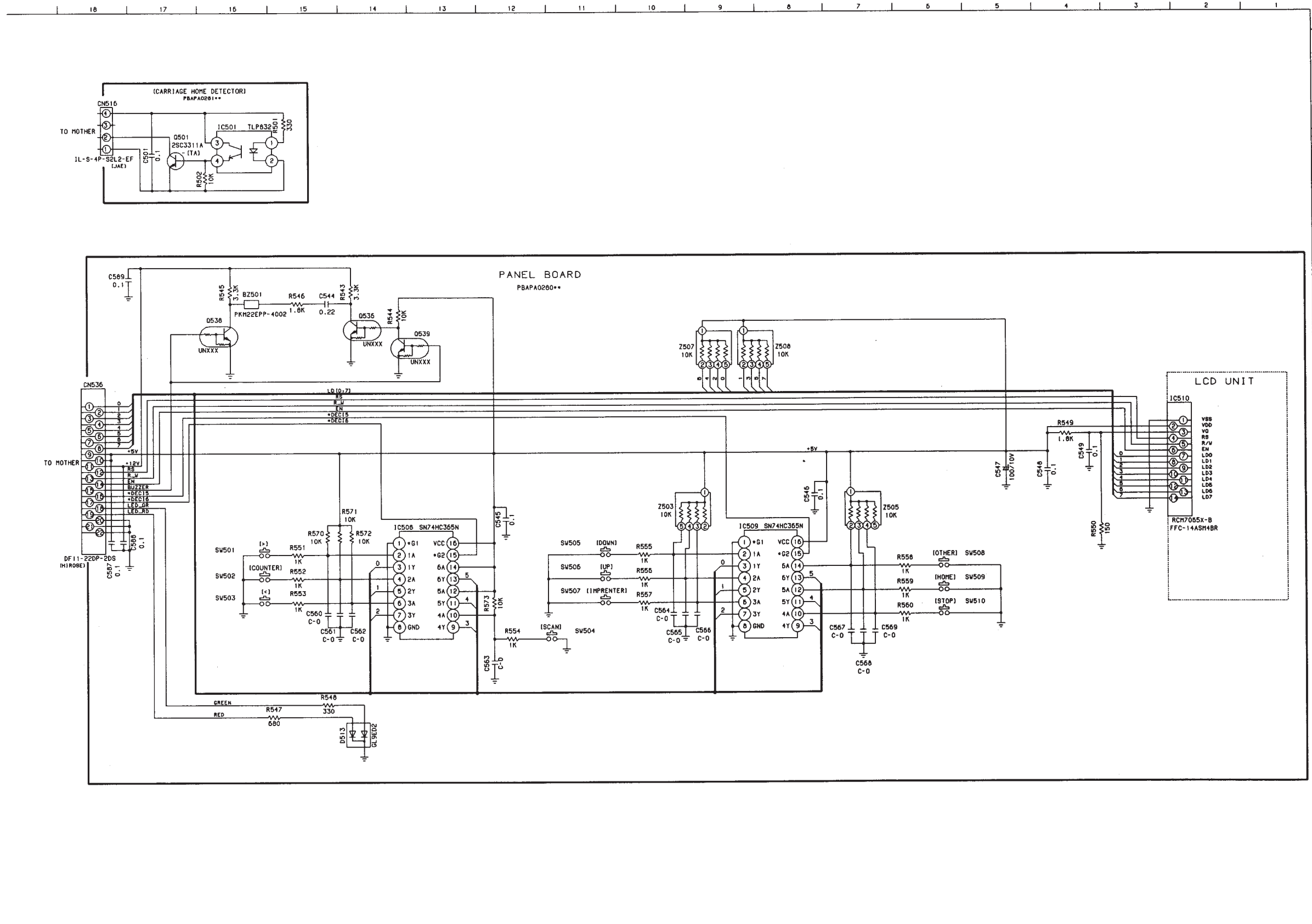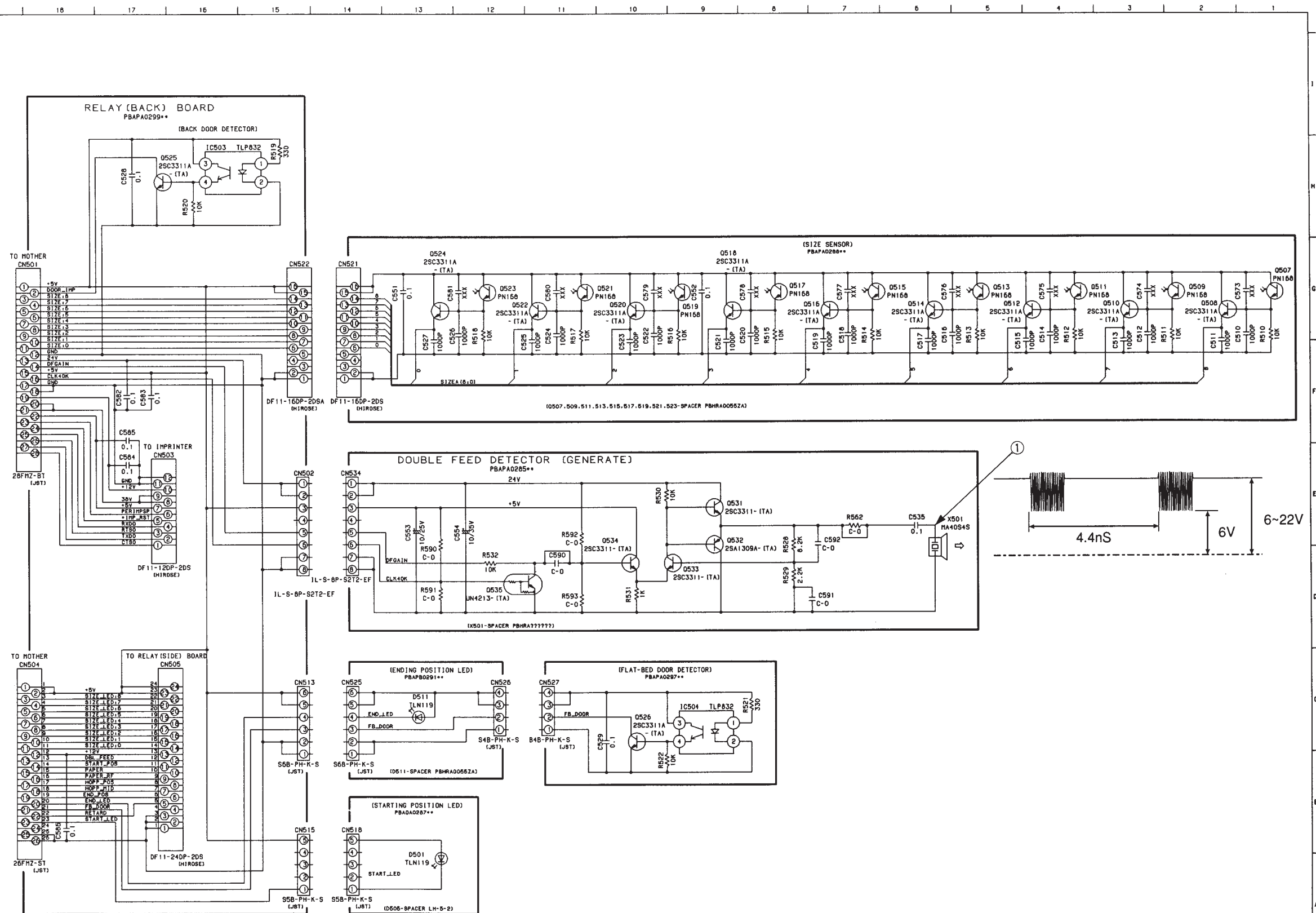
X. RELAY (SIDE)/SIZE LED/STARTING POSITION SENSOR/DOUBLE FEED SENSOR (R)/RETARD POSITION SENSOR/ DELIVERY SENSOR/DOCUMENT TRAY HOME SENSOR/DOCUMENT SENSOR RELAY CIRCUIT DIAGRAM
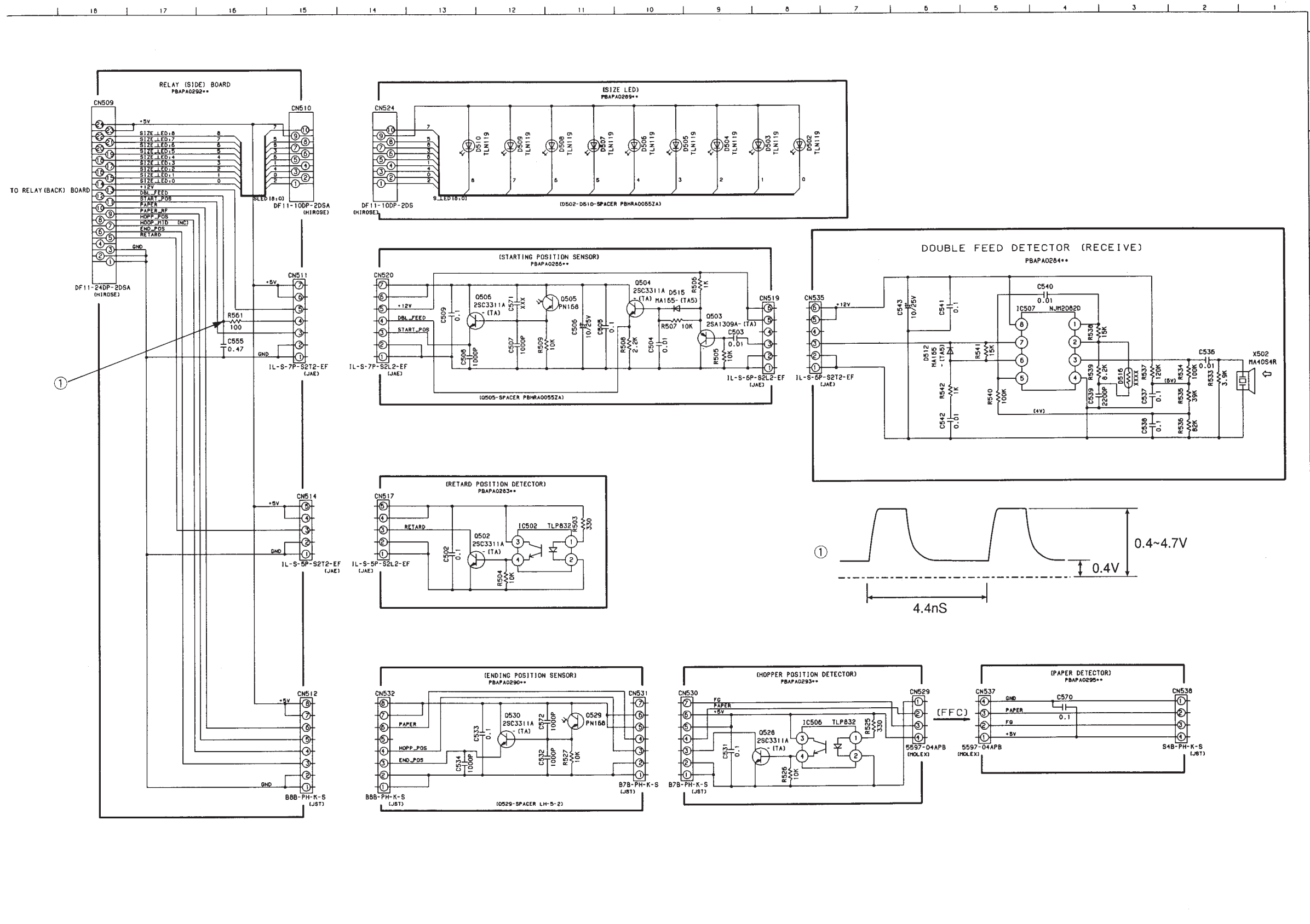
XI. LIST OF SIGNALS AND PIN NUMBERS

Note: Signal names which begin with asterisk (*) indicates that the corresponding signal is LOW when active.

CN1003 (MAIN CONTROL) – (CIS)

Pin No.	Signal Name	Description
1	CIS IN 1	Contact Image Sensor Signal1
2	AGND	Analog Ground
3	+5V	+5V
4	-5V	-5V
5	CISSP1	Start Pulse1 for CIS
6	GND	Ground
7	CISCLK1	Clock1 for CIS
8	GND	Ground

Table A-1

CN1004 (MAIN CONTROL) – (CIS)

Pin No.	Signal Name	Description
1	CIS IN2	Contact Image Sensor Signal2
2	AGND	Analog Ground
3	+5V	+5V
4	-5V	-5V
5	CISSP2	Start Pulse2 for CIS
6	GND	Ground
7	CISCLK2	Clock2 for CIS
8	GND	Ground
9	CIS SIZE DET1	CIS Size detect1
10	CIS SIZE DET2	CIS Size detect2

Table A-2

CN1005 (MAIN CONTROL) – CN2001 (MOTHER)

Pin No.	Signal Name	Description
1	AGND	Analog Ground
2	AGND	Analog Ground
3	CCD EVEN	CCD EVEN Data
4	-5V	-5V
5	CCD ODD	CCD ODD Data
6	AGND	Analog Ground
7	CCDROG	CCD ROG
8	GND	Ground
9	CCDCLAMP	CCD Clamp
10	CCDS/H	CCD Sample Hold
11	GND	Ground
12	CCD RST	CCD RESET pulse
13	CCD P2	CCD DATA CLOCK2
14	CCD P1	CCD DATA CLOCK1
15	GND	Ground
16	CCD DET2	CCD Board detect2
17	CCD DET1	CCD Board detect1
18	LED (RD)	LED (Red)
19	LED (GR)	LED (Green)
20	+5VA	+5V (for Analog)
21	+5VD	+5V (for Digital)

Pin No.	Signal Name	Description
22	RESERVE	
23	RESERVE	
24	RESERVE	
25	RESERVE	
26	TXD0	TXD0 for Pre Imprinter
27	RXD0	RXD0 for Pre Imprinter
28	RTS0	RTS0 for Pre Imprinter
29	CTS0	CTS0 for Pre Imprinter
30	*JBIGIRQ	JBIG interrupt request
31	*ACTTER	Active Terminator Enable
32	DA LD2	D/A Load 2
33	ANALOG GAIN2	GAIN Select Signal
34	ANALOG GAIN1	(Not Used)
35	ANALOG LD	Analog Control Signal Strobe
36	RESERVE	Start Pulse for Post Imprinter
37	+5VD	+5V (for Digital)
38	+5VD	+5V (for Digital)
39	PRE IMP SP	Start Pulse for Pre Imprinter Door Sensor
40	BUZZER	Buzzer Pulse
41	TXD2	TXD2 for Video serial interface
42	RXD2	RXD2 for Video serial interface
43	RTS2	RTS2 for Video serial interface
44	CTS2	CTS2 for Video serial interface
45	AN0	Alternate output data bus0
46	AN1	Alternate output data bus1
47	AN2	Alternate output data bus2
48	AN3	Alternate output data bus3
49	AN4	Alternate output data bus4
50	AN5	Alternate output data bus5
51	GND	Ground
52	GND	Ground
53	E (LCD)	LCD Enable
54	R/W (LCD)	LCD Read/Write Enable
55	RS (LCD)	LCD Resistor Select
56	CLK40K	Clock output 40kHz
57	D/ALD	D/A Load
58	D/ACLK	D/A Clock
59	D/ADATA	D/A Data
60	RESET (IMP.)	Reset (for Imprint)
61	*CS	Chip Select for SCSI
62	*CS	Chip Select for JBIG
63	*IRQ3	TIARA Interrupt request
64	*CS6	Chip Select for TIARA
65	IRQ1	SCSI Interrupt request
66	*BUSEN	Bus Driver Enable
67	*CS CARRIGE	Chip Select for CARRIGE
68	*CS FEED	Chip Select for FEED
69	*CS CONVEYOR	Chip Select for CONVEYOR
70	*CS SIZE	Chip Select for SIZE

CN1005 (MAIN CONTROL) – CN2001 (MOTHER) (continued)

Pin No.	Signal Name	Description
71	*CS KEY2	Chip Select for KEY2
72	*CS KEY1	Chip Select for KEY1
73	*CS PAPER	Chip Select for PAPER
74	*CS I/F BOARD	Chip Select for I/F BOARD
75	*RESET	Reset
76	*WAIT	CPU Wait
77	*CPUAS	CPU Address strobe
78	*CPUWR	CPU Write
79	*CPURD	CPU Read
80	GND	Ground
81	GND	Ground
82	CPUD15	CPU Data15
83	CPUD14	CPU Data14
84	CPUD13	CPU Data13
85	CPUD12	CPU Data12
86	CPUD11	CPU Data11
87	CPUD10	CPU Data10
88	CPUD9	CPU Data9
89	CPUD8	CPU Data8
90	+5VD	+5V (for Digital)
91	+5VD	+5V (for Digital)
92	CPUD7	CPU Data7
93	CPUD6	CPU Data6
94	CPUD5	CPU Data5
95	CPUD4	CPU Data4
96	CPUD3	CPU Data3
97	CPUD2	CPU Data2
98	CPUD1	CPU Data1
99	CPUD0	CPU Data0
100	GND	Ground
101	GND	Ground
102	CPUA8	CPU Address8
103	CPUA7	CPU Address7
104	CPUA6	CPU Address6
105	CPUA5	CPU Address5
106	CPUA4	CPU Address4
107	CPUA3	CPU Address3
108	CPUA2	CPU Address2
109	CPUA1	CPU Address1
110	CPUA0	CPU Address0
111	+5VD	+5V (for Digital)
112	+5VD	+5V (for Digital)
113	*FPAGE	Front Page Enable
114	*BPAGE	Back Page Enable
115	FWEN	Front Line Enable
116	BWEN	Back Line Enable
117	GND	Ground
118	WRSTB	Video Clock
119	GND	Ground
120	VD15	Video Data 15
121	VD14	Video Data 14
122	VD13	Video Data 13
123	VD12	Video Data 12
124	VD11	Video Data 11
125	VD10	Video Data 10
126	VD9	Video Data 9

Pin No.	Signal Name	Description
127	VD8	Video Data 8
128	GND	Ground
129	VD7	Video Data 7
130	VD6	Video Data 6
131	VD5	Video Data 5
132	VD4	Video Data 4
133	VD3	Video Data 3
134	VD2	Video Data 2
135	VD1	Video Data 1
136	VD0	Video Data 0
137	+3VD	+3V
138	+3VD	+3V
139	GND	Ground
140	GND	Ground

Table A-3

CN603 (SCSI) – CN2002 (MOTHER)

Pin No.	Signal Name	Description
1	GND	Ground
2	GND	Ground
3	VD0	Video Data 0
4	VD1	Video Data 1
5	VD2	Video Data 2
6	VD3	Video Data 3
7	VD4	Video Data 4
8	VD5	Video Data 5
9	VD6	Video Data 6
10	VD7	Video Data 7
11	GND	Ground
12	VD8	Video Data 8
13	VD9	Video Data 9
14	VD10	Video Data 10
15	VD11	Video Data 11
16	VD12	Video Data 12
17	VD13	Video Data 13
18	VD14	Video Data 14
19	VD15	Video Data 15
20	GND	Ground
21	WRSTB	Video Clock
22	GND	Ground
23	*BWEN	Back Line Enable
24	*FWEN	Front Line Enable
25	BPAGE	N.C.
26	FPAGE	N.C.
27	+5VD	+5V
28	CPUA0	CPU Address0
29	CPUA1	CPU Address1
30	CPUA2	CPU Address2
31	CPUA3	CPU Address3
32	CPUA4	CPU Address4
33	+5VD	+5V
34	CPUA5	CPU Address5
35	CPUA6	CPU Address6
36	CPUA7	CPU Address7
37	CPUA8	CPU Address7
38	GND	Ground
39	GND	Ground
40	CPUD0	CPU Data0

CN603 (SCSI) – CN2002 (MOTHER)
(continued)

Pin No.	Signal Name	Description
41	CPUD1	CPU Data1
42	CPUD2	CPU Data2
43	CPUD3	CPU Data3
44	+5VD	+5V
45	CPUD4	CPU Data4
46	CPUD5	CPU Data5
47	CPUD6	CPU Data6
48	CPUD7	CPU Data7
49	GND	Ground
50	CPUD8	CPU Data8
51	CPUD9	CPU Data9
52	CPUD10	CPU Data10
53	CPUD11	CPU Data11
54	+5VD	+5V
55	CPUD12	CPU Data12
56	CPUD13	CPU Data13
57	CPUD14	CPU Data14
58	CPUD15	CPU Data15
59	GND	Ground
60	*CPURD	CPU Read
61	*CPUWR	CPU Write
62	*CPUAS	CPU Address strobe
63	SCWAIT	CPU Wait from TIARA
64	GND	Ground
65	*RESET	Reset
66	GND	Ground
67	*SCSI IRQ	SCSI input request
68	*TIARACS	Chip Select for TIARA
69	*TIAIRQ	TIARA input request
70	*JBIGCS	Chip Select for JBIG
71	*SCSICS	Chip Select for SCSI
72	*VERCS	Chip Select for VER
73	CTS2	(Not Used)
74	RTS2	(Not Used)
75	RXD2	(Not Used)
76	TXD2	(Not Used)
77	*ACTTER	Active Terminator Control
78	*JBIGIRQ	JBIG input request
79	GND	Ground
80	GND	Ground

Table A-4

CN351 (DRIVE) – Pickup Motor

Pin No.	Signal Name	Description
1	*FA	Pickup Motor phase-A (-)
2	–	N.C.
3	FCOMA	24V for Pickup Motor
4	FA	Pickup Motor phase-A (+)
5	*FB	Pickup Motor phase-B (-)
6	FCOMB	24V for Pickup Motor
7	FB	Pickup Motor phase-B (+)

Table A-5

CN2003 (MOTHER) – CN331 (DRIVE)

Pin No.	Signal Name	Description
1	LD0	Local Data Bus 0
2	CS	CSFEED
3	CS	CSCAR
4	SKEW	SKEW
5	D/A DATA	DAC DATA
6	D/A CLK	DAC CLK
7	D/A LD	DAC LD2
8	+38V	+38V
9	VCC	+5VD
10	GND	Ground
11	GND	Ground
12	GND	Ground
13	GND	Ground
14	GND	Ground
15	+24V	+24V
16	+24V	+24V
17	LD1	Local Data Bus 1
18	RESET	Reset
19	LD2	Local Data Bus 2
20	LD3	Local Data Bus 3
21	CS	CSCONV
22	LD4	Local Data Bus 4
23	LD5	Local Data Bus 5
24	LD6	Local Data Bus 6
25	LD7	Local Data Bus 7
26	VCC	+5VD
27	LAMP2 SWITCH	LAMP SW2
28	LAMP1 SWITCH	LAMP SW1
29	GND	Ground
30	DOOR2 SWITCH	LAMP SW2
31	DOOR1 SWITCH	LAMP SW1
32	+24V	+24V

Table A-6

CN341 (DRIVE) – Feed Motor

Pin No.	Signal Name	Description
1	*CA	Feed Motor Phase-A (-)
2	CCOMA	+24V for Feed Motor
3	CA	Feed Motor Phase-A (+)
4	*CB	Feed Motor Phase-B (-)
5	CCOMB	24V for Feed Motor
6	CB	Feed Motor Phase-B (+)

Table A-7

CN361 (DRIVE) – CARRIAGE MOTOR

Pin No.	Signal Name	Description
1	*RA	Carriage Motor Phase-A (-)
2	–	N.C.
3	RCOMA	24V for Carriage Motor
4	RA	Carriage Motor Phase-A (+)
5	*RB	Carriage Motor Phase-B (-)
6	RCOMB	24V for Carriage Motor
7	RB	Carriage Motor Phase-B (+)
8	–	N.C.

Table A-8

CN332 (DRIVE) – 24V INTERLOCK SWITCH

Pin No.	Signal Name	Description
1	+24V3	ADF Switch for +24V
2	+24V2	ADF Door Switch for +24V
3	+24V2	ADF Door Switch for +24V
4	+24V1	+24V

Table A-9

CN372 (DRIVE) – (CIS)

Pin No.	Signal Name	Description
1	–	N.C.
2	GREEN	Green
3	GND	Ground
4	Red	Red
5	–	N.C.

Table A-10

CN801 (DC POWER SUPPLY) – Power Switch

Pin No.	Signal Name	Description
1	NEUTRAL	Neutral
2	–	N.C.
3	LIVE	Live

Table A-11

CN871 (DC POWER SUPPLY) – Fan

Pin No.	Signal Name	Description
1	+24V0VP	+24V
2	–	N.C.
3	FAN	Fan

Table A-12

Power Switch – A/C Inlet

Pin No.	Signal Name	Description
1	NEUTRAL	Neutral
2	–	N.C.
3	LIVE	Live

Table A-13

CN2007 (MOTHER) – CN536 (OPERATION PANEL)

Pin No.	Signal Name	Description
1	LD0	L-Data 0
2	LD1	L-Data 1
3	LD2	L-Data 2
4	LD3	L-Data 3
5	LD4	L-Data 4
6	LD5	L-Data 5
7	LD6	L-Data 6
8	LD7	L-Data 7
9	+5VS	+5V
10	+5VS	+5V
11	+12VS	+12V
12	LCD RS	LCD Resistor Select
13	LCD R W	LCD Read/Write Enable

Pin No.	Signal Name	Description
14	LCD E	LCD Enable
15	BUZZER	Buzzer Pulse
16	KEY1	KEY1 Enable
17	KEY2	KEY2 Enable
18	LEDGR	LED (Green)
19	LEDRD	LED (Red)
20	GND	Ground
21	GND	Ground
22	GND	Ground

Table A-14

CN2010 (MOTHER) – CN501 (RELAY [BACK])

Pin No.	Signal Name	Description
1	CTS0	CTS0 for Pre Imprinter
2	TXD0	TXD0 for Pre Imprinter
3	RTS0	RTS0 for Pre Imprinter
4	RXD0	RXD0 for Pre Imprinter
5	IMP RST	Imprinter Reset
6	PREIMPSP	Start Pulse for Post imprinter Door Sensor
7	+5V	+5V
8	38V	38V
9	38V	38V
10	+12V	+12V
11	GND	Ground
12	GND	Ground
13	CLK40K	Clock output 40kHz
14	+5V	+5V
15	DFGAIN	
16	+24V	+24V
17	GND	Ground
18	SIZE 0	Paper Size Sensor 0
19	SIZE 1	Paper Size Sensor 1
20	SIZE 2	Paper Size Sensor 2
21	SIZE 3	Paper Size Sensor 3
22	SIZE 4	Paper Size Sensor 4
23	SIZE 5	Paper Size Sensor 5
24	SIZE 6	Paper Size Sensor 6
25	SIZE 7	Paper Size Sensor 7
26	SIZE 8	Paper Size Sensor 8
27	DOOR IMP	Imprinter Door Status
28	+5V	+5V

Table A-15

CN2009 (MOTHER) – CN504 (RELAY [BACK])

Pin No.	Signal Name	Description
1	GND	Ground
2	GND	Ground
3	–	N.C.
4	START LED	Starting LED
5	RETARD	Retard
6	FB DOOR	Flat Bed Door Status
7	END LED	Ending LED
8	END POS	Ending Position
9	HOPP MID	Hopper MID
10	HOPP POS	Hopper Position
11	PAPER RF	LED Current Control
12	PAPER	Paper
13	START POS	Paper Position
14	DBL FEED	Double Feed
15	+12V	+12V
16	SIZE 0	Paper Size LED 0
17	SIZE 1	Paper Size LED 1
18	SIZE 2	Paper Size LED 2
19	SIZE 3	Paper Size LED 3
20	SIZE 4	Paper Size LED 4
21	SIZE 5	Paper Size LED 5
22	SIZE 6	Paper Size LED 6
23	SIZE 7	Paper Size LED 7
24	SIZE 8	Paper Size LED 8
25	+5V	+5V
26	+5V	+5V

Table A-16

CN2011 (MOTHER) – CN516 (CARRIAGE HOME SENSOR)

Pin No.	Signal Name	Description
1	GND	Ground
2	CARRIAGE	Carriage
3	–	N.C.
4	VCC	+5V

Table A-17

CN2008 (MOTHER) – CN001 (CCD)

Pin No.	Signal Name	Description
1	+24V	+24V
2	+24V	+24V
3	GND	Ground
4	GND	Ground
5	LAMP SW1	LAMP SW 1
6	LAMP SW2	LAMP SW 2
7	CCDDET2	CCD Board detect 2
8	AGND	Analog Ground
9	AGND	Analog Ground
10	CCD ODD	CCD ODD DATA
11	AGND	Analog Ground
12	CCD EVEN	CCD EVEN DATA
13	GND	Ground
14	CCDDET1	CCD Board detect 1
15	VCC	+5V
16	DAC DATA	DAC Data

Pin No.	Signal Name	Description
17	DAC CLK	DAC Clock
18	CCD CLMP	CCD Clamp
19	ANLG LD	Analog Control Signal Strobe
20	GAIN2	GAIN 2
21	GAIN1	GAIN 1
22	GND	Ground
23	CCD ROG	CCD ROG
24	CCD P1	CCD DATA Clock 1
25	CCD P2	CCD DATA Clock 2
26	GND	Ground
27	GND	Ground
28	CCD RST	CCD RESET pulse
29	GND	Ground
30	CCD SH	CCD Sample Hold
31	GND	Ground
32	GND	Ground
33	-5V	-5V
34	+12V	+12V

Table A-18

CN503 (RELAY [BACK]) – Imprinter (Option)

Pin No.	Signal Name	Description
1	CTS0	TXD0 for Imprinter serial interface
2	TXD0	RXD0 for Imprinter serial interface
3	RTS0	RTS0 for Imprinter serial interface
4	RXD0	CTS0 for Imprinter serial interface
5	IMP RST	Imprinter Reset
6	SP	Start Signal
7	VCC	+5V
8	+38V	+38V
9	+38V	+38V
10	+12VS	+12V
11	GND	Ground
12	GND	Ground

Table A-19

CN2004 (MOTHER) – CN851 (DC POWER SUPPLY)

Pin No.	Signal Name	Description
1	+5V	+5V
2	+5V	+5V
3	GND	Ground
4	GND	Ground
5	+3.3VD	+3.3V
6	+12V OVP	+12V
7	+5VA	+5V
8	AGND	Analog Ground
9	-5V	-5V

Table A-20

CN2005 (MOTHER) – CN843 (DC POWER SUPPLY)

Pin No.	Signal Name	Description
1	+24V	+24V
2	+24V	+24V
3	GND	Ground
4	GND	Ground

Table A-21

CN002 (CCD) – LAMP DRIVE

Pin No.	Signal Name	Description
1	GND	Ground
2	LAMP1	Lamp Control 1
3	GND	Ground
4	24V	+24V

Table A-22

CN529 (DOCUMENT TRAY HOME SENSOR) – CN537 (DOCUMENT SENSOR RELAY)

Pin No.	Signal Name	Description
1	GND	Ground
2	PAPER	Paper
3	FG	Flame Ground
4	+5V	+5V

Table A-23

CN526 (DELIVERY LED) – CN527 (DOCUMENT COVER SENSOR)

Pin No.	Signal Name	Description
1	GND	Ground
2	FB DOOR	FB DOOR status
3	+5V	+5V
4	+5V	+5V

Table A-24

CN531 (DELIVERY SENSOR) – CN530 (DOCUMENT TRAY HOME SENSOR)

Pin No.	Signal Name	Description
1	GND	Ground
2	GND	Ground
3	HOPP POS	Hopper Position
4	PAPER	Paper
5	+5V	+5V
6	+5V	+5V
7	–	N.C.

Table A-25

CN513 (RELAY [BACK]) – CN525 (DELIVERY LED)

Pin No.	Signal Name	Description
1	GND	Ground
2	GND	Ground
3	FB DOOR	Flat-Bed Door Sig.
4	END LED	Ending LED
5	+5V	+5V
6	+5V	+5V

Table A-26

CN522 (RELAY [BACK]) – CN521 (SIZE SENSOR)

Pin No.	Signal Name	Description
1	GND	Ground
2	GND	Ground
3	–	N.C.
4	–	N.C.
5	–	N.C.
6	SIZE 0	Paper Size Sensor 0
7	SIZE 1	Paper Size Sensor 1
8	SIZE 2	Paper Size Sensor 2
9	SIZE 3	Paper Size Sensor 3
10	SIZE 4	Paper Size Sensor 4
11	SIZE 5	Paper Size Sensor 5
12	SIZE 6	Paper Size Sensor 6
13	SIZE 7	Paper Size Sensor 7
14	SIZE 8	Paper Size Sensor 8
15	+5V	+5V
16	+5V	+5V

Table A-27

CN502 (RELAY [BACK]) – CN534 (DOUBLE FEED SENSOR (G))

Pin No.	Signal Name	Description
1	+24V	+24V
2	+24V	+24V
3	+5V	+5V
4	–	N.C.
5	DFGAIN	Double-Feed Gain Sig.
6	CLK40K	Clock Output 40kHz
7	GND	Ground
8	GND	Ground

Table A-28

CN515 (RELAY [BACK]) – CN518 (STARTING POSITION LED)

Pin No.	Signal Name	Description
1	START LED	Starting LED
2	–	N.C.
3	–	N.C.
4	–	N.C.
5	+5V	+5V

Table A-29

CN505 (RELAY [BACK]) – CN509 (RELAY [SIDE])

Pin No.	Signal Name	Description
1	GND	Ground
2	GND	Ground
3	GND	Ground
4	–	N.C.
5	RETARD	Retard
6	END POS	Ending Position
7	HOPP MID	Hopper MID
8	HOPP POS	Hopper POS
9	PAPER RF	LED Current Control
10	PAPER	Paper
11	START POS	Paper Position
12	DBL FEED	Double Feed
13	+12V	+12V
14	SIZE LED 0	Paper Size LED 0
15	SIZE LED 1	Paper Size LED 1
16	SIZE LED 2	Paper Size LED 2
17	SIZE LED 3	Paper Size LED 3
18	SIZE LED 4	Paper Size LED 4
19	SIZE LED 5	Paper Size LED 5
20	SIZE LED 6	Paper Size LED 6
21	SIZE LED 7	Paper Size LED 7
22	SIZE LED 8	Paper Size LED 8
23	+5V	+5V
24	+5V	+5V

Table A-30

CN511 (RELAY [SIDE]) – CN520 (STARTING POSITION SENSOR)

Pin No.	Signal Name	Description
1	GND	Ground
2	GND	Ground
3	START POS	Starting Position
4	DBL FEED	Double Feed
5	+12V	+12V
6	+5V	+5V
7	+5V	+5V

Table A-31

CN510 (RELAY [SIDE]) – CN524 (SIZE LED)

Pin No.	Signal Name	Description
1	SIZE LED 2	Paper Size LED 2
2	SIZE LED 0	Paper Size LED 0
3	SIZE LED 4	Paper Size LED 4
4	SIZE LED 1	Paper Size LED 1
5	SIZE LED 6	Paper Size LED 6
6	SIZE LED 3	Paper Size LED 3
7	SIZE LED 8	Paper Size LED 8
8	SIZE LED 5	Paper Size LED 5
9	+5V	+5V
10	SIZE LED 7	Paper Size LED 7

Table A-32

CN514 (RELAY [SIDE]) – CN517 (RETARD POSITION SENSOR)

Pin No.	Signal Name	Description
1	GND	Ground
2	GND	Ground
3	RETARD	Retard
4	+5V	+5V
5	+5V	+5V

Table A-33

CN512 (RELAY [SIDE]) – CN532 (DELIVERY SENSOR)

Pin No.	Signal Name	Description
1	GND	Ground
2	GND	Ground
3	END POS	Ending Position
4	HOPP POS	Hopper Position
5	PAPER RF	LED Current Control
6	PAPER	Paper
7	+5V	+5V
8	+5V	+5V

Table A-34

CN538 (DOCUMENT SENSOR RELAY) – DOCUMENT SENSOR

Pin No.	Signal Name	Description
1	GND	Ground
2	Paper	Paper
3	FG	Flame Ground
4	+5V	+5V

Table A-35

XII. LIST OF SPECIAL TOOLS

The following lists the special tools that are required for servicing this machine in addition to the standard tool set.

No.	Tool name	Tool No.	Shape	Rank	Purpose/Remarks
1	Test sheet set	TKM-0271	A4 copy size	A	• Feed/Image checking • One side printed • 10 sheets/set
2	Test chart A set	TKM-0301	Special size (317 x 470 mm)	B	• Image position adjusting • One side printed • 10 sheets/set
3	Shading paper set	TKM-0302	Special size (224 x 301 mm)	B	• Shading compensation • 10 sheets/set
4	Adjustment paper set	TKM-0303	A4 copy size	B	• Double feed adjusting • 50 sheets/set

Note: Rank

A= Each service technician should carry one with him.

B= A group of about five service technicians should share one.

C= Each workshop should keep one.

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