brother

FACSIMILE EQUIPMENT
SERVICE MANUAL

MODELS: MFC-9420CN

Confidential

Confidential

PREFACE

This Service Manual is intended for use by service personnel and details the specifications, construction, theory of operation, and maintenance for the Brother machines noted on the front cover. It includes information required for troubleshooting and service--disassembly, reassembly, and lubrication--so that service personnel will be able to understand equipment function, repair the equipment in a timely manner and order spare parts as necessary.

To perform appropriate maintenance so that the machine is always in the best possible condition for the customer, service personnel must adequately understand and apply this manual.

HOW THIS MANUAL IS ORGANIZED

This manual is made up of nine chapters and appendices.

CHAPTER 1 PARTS NAMES AND FUNCTIONS

Contains external views and names of components and describes their functions. Information about the keys on the control panel is included to help you check operation or make adjustments.

CHAPTER 2 SPECIFICATIONS

Lists the specifications of each model, which enables you to make a comparison of different models.

CHAPTER 3 THEORY OF OPERATION

Gives an overview of the scanning and printing mechanisms as well as the sensors, actuators, and control electronics. It aids in understanding the basic principles of operation as well as locating defects for troubleshooting.

CHAPTER 4 TRANSFER OF DATA LEFT IN THE MACHINE TO BE SENT FOR REPAIR

Describes how to transfer data left in the machine to be sent for repair. The service personnel should instruct end users to follow the transfer procedure given in this chapter if the machine at the user site cannot print received data due to the printing mechanism defective. End users can transfer received data to another machine to prevent data loss.

CHAPTER 5 DISASSEMBLY/REASSEMBLY AND LUBRICATION

Details procedures for disassembling and reassembling the machine together with related notes. The disassembly order flow provided enables you to see at a glance the quickest way to get to component(s) involved.
At the start of a disassembly job, you check a disassembly order flow that guides you through a shortcut to the object components.
This chapter also covers screw tightening torques and lubrication points to which the specified lubricants should be applied during reassembly jobs.

CHAPTER 6 ADJUSTMENTS AND UPDATING OF SETTINGS REQUIRED AFTER PARTS REPLACEMENT

Details adjustments and updating of settings, which are required if the head/carriage unit, main PCB and some other parts have been replaced.

CHAPTER 7 CLEANING

Provides cleaning procedures not covered by the User's Manual. Before starting any repair work, clean the machine as it may solve the problem concerned.

CHAPTER 8 MAINTENANCE MODE

Describes the maintenance mode which is exclusively designed for the purpose of checks, settings and adjustments using the keys on the control panel.
In the maintenance mode, you can update memory (EEPROM: electrically erasable programmable read-only memory) contents for optimizing the drive conditions of the head/carriage unit, paper feed roller or paper ejection roller (if they have been replaced) or for setting the CIS scanner area, for example. You can also customize the EEPROM according to the shipment destination of the machine concerned. In addition, you can perform operational checks of the LCD, control panel PCB or sensors, perform a print test, display the log information or error codes, and modify firmware switches (WSW).

CHAPTER 9 ERROR INDICATION AND TROUBLESHOOTING

Details error messages and codes that the incorporated self-diagnostic functions display if any error or malfunction occurs. If any error message appears, refer to this chapter to find which components should be checked or replaced.
The latter half of this chapter provides sample problems that could occur in the main sections of the machine and related troubleshooting procedures. This will help service personnel pinpoint and repair defective components.

APPENDIX 1 SERIAL NUMBERING SYSTEM

Shows the location of serial number labels put on some parts and lists the coding information pertaining to the serial numbers.

APPENDIX 2 FIRMWARE INSTALLATION

Provides instructions on how to update firmware stored in the flash ROM on the main PCB or load firmware to a new main PCB from the host PC.
No hardware replacement is required for updating.

APPENDIX 3 CUSTOMIZING CODES ACCORDING TO SHIPPING DESTINATION

Lists the customizing codes for the various preferences exclusively designed for each destination (e.g. language). Those codes are stored in the memory (EEPROM) mounted on the main PCB. If the main PCB is replaced with a new one, therefore, you will need to set the proper customizing codes with the machine in the maintenance mode.

APPENDIX 4 FIRMWARE SWITCHES (WSW)

Describes the functions of the firmware switches, which can be divided into two groups: one is for customizing preferences designed for the shipping destination (as described in Appendix 3) and the other is for modifying preferences that match the machine to the environmental conditions. Use the latter group if the machine malfunctions due to mismatching.

APPENDIX 5 WIRING DIAGRAM

Provides the wiring diagram that helps you understand the connections between PCBs.

APPENDIX 6 CIRCUIT DIAGRAMS

Provides the circuit diagrams of the NCU PCB and power supply PCB.

APPENDIX 7 VIEWING THE EVENT LOG FILE

When installing the printer driver, the installer logs events that occur during the installation process in the event log file. This appendix views a sample of the event log file. Selecting Start | Program | Brother | MFL-Pro Suite *model name* | Installation Diagnostics reads out the event log file.

This manual describes the models and their versions destined for major countries.
The specifications and functions are subject to change depending upon each destination.

TABLE OF CONTENTS

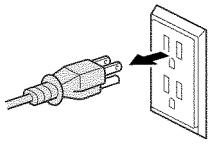
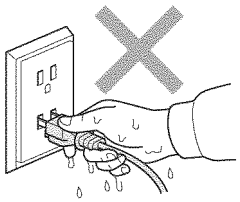
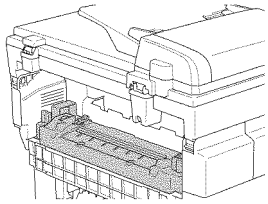
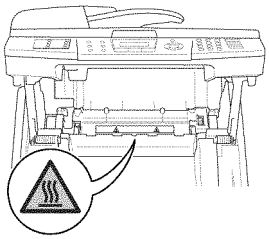
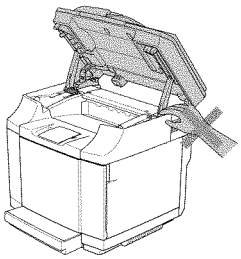
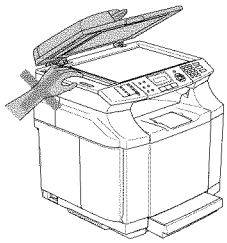
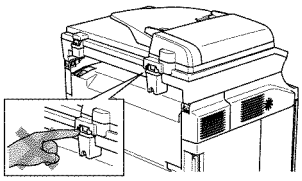
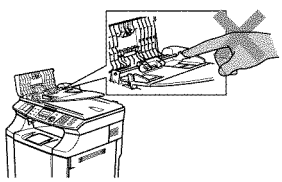
SAFETY PRECAUTIONS

To use the MFC safely

Please keep these instructions for later reference and read them before attempting any maintenance.

NOTE: If there are faxes in the machine memory, you need to print them or save them before you turn off the power and unplug the MFC.

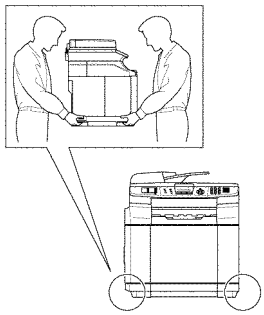
WARNING

⚠	There are high voltage electrodes inside the machine. Before you clean the inside of the machine, make sure you have unplugged the telephone line cord first and then the power cord from the AC power outlet.	
⚠	Do not handle the plug with wet hands. Doing this might cause an electrical shock.	
⚠	The fusing unit becomes extremely hot during operation. Wait until it has cooled down sufficiently before replacing consumable items. The fusing unit is marked with a caution label. Please do not remove or damage the label.	 
⚠	To prevent injuries, be careful not to put your hands on the edge of the machine under the document cover or scanner unit.	 
⚠	To prevent injuries, be careful not to put your fingers in the area shown in the illustrations.	 

Do not use a vacuum cleaner to clean up scattered toner. Doing this might cause the toner dust to ignite inside the vacuum cleaner, potentially starting a fire. Please carefully clean the toner dust with a clean dry soft, lint-free cloth and dispose of it according to local regulations.

WARNING

- This machine is heavy and weighs approximately 74.5 lb (33.8 kg). To prevent injuries, use at least two people to lift the machine. Be careful not to trap your fingers when you set the machine back down.
- When you lift the machine make sure you use the handholds at the bottom four corners of the machine. Keep the machine horizontal when you carry it.
- Use caution when installing or modifying telephone lines. Never touch telephone wires or terminals that are not insulated unless the telephone line has been disconnected at the wall jack. Never install telephone wiring during a lightning storm. Never install a telephone wall jack in a wet location.
- This product must be installed near an AC power outlet that is easily accessible. In case of an emergency, you must disconnect the power cord from the AC power outlet to shut off the power completely.
- To reduce the risk of shock or fire, use only a No.26 AWG or larger telecommunication line cord.



CAUTION

Lightning and power surges can damage this product! We recommend that you use a quality surge protection device on the AC power line and on the telephone line, or unplug the cords during a lightning storm.

WARNING

IMPORTANT SAFETY INSTRUCTIONS

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to people, including the following:

1. Do not use this product near water, for example, near a bath tub, wash bowl, kitchen sink or washing machine, in a wet basement or near a swimming pool.
2. Avoid using this product during an electrical storm. There may be a remote risk of electric shock from lightning.
3. Do not use this product to report a gas leak in the vicinity of the leak.
4. Use only the power cord provided with the machine.

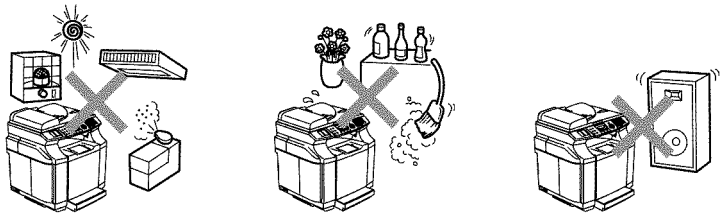
SAVE THESE INSTRUCTIONS

CHOOSING A LOCATION

Place your machine on a flat, stable surface that is free of vibration and shocks. Put the machine near a telephone wall jack and a standard, grounded AC power outlet. Choose a location where the temperature remains between 50°F and 90.5°F (10°C and 32.5°C) and the humidity is between 20% to 80% (without condensation).

CAUTION

- Avoid placing your machine in a high-traffic area.
- Do not place the machine near heaters, air conditioners, refrigerators, water, chemicals or devices that contain magnets or generate magnetic fields.
- Do not expose the machine to direct sunlight, excessive heat, open flames, salty or corrosive gasses, moisture, or dust.
- Do not connect your machine to an AC power outlet controlled by wall switches or automatic timers.
- Disruption of power can wipe out information in the machine's memory.
- Do not connect your machine to an AC power outlet on the same circuit as large appliances or other equipment that might disrupt the power supply.
- Avoid interference sources, such as speakers or the base units of cordless phones.
- Do not put objects on top of the machine.



ABOUT COPYING

CAUTION

It is illegal to copy bills. Never copy bills.

CHAPTER 1

PARTS NAMES & FUNCTIONS

CHAPTER 1 PARTS NAMES & FUNCTIONS

This chapter contains external views and names of components and describes their functions. Information about the keys on the control panel is included to help you check operation or make adjustments.

CONTENTS

1.1 EQUIPMENT OUTLINE

Front view

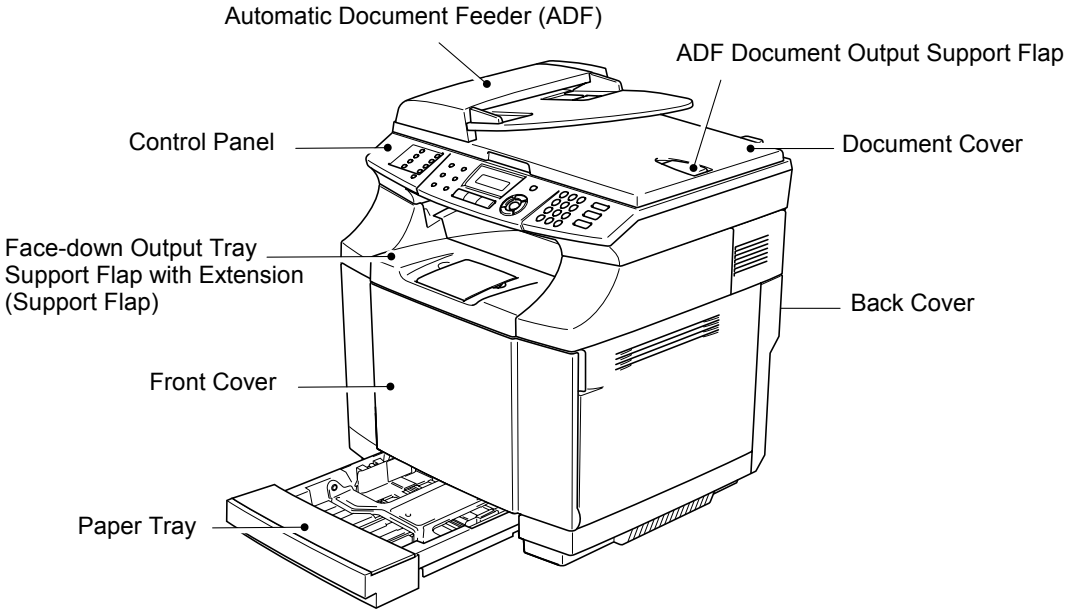


Fig. 1-1

Back view

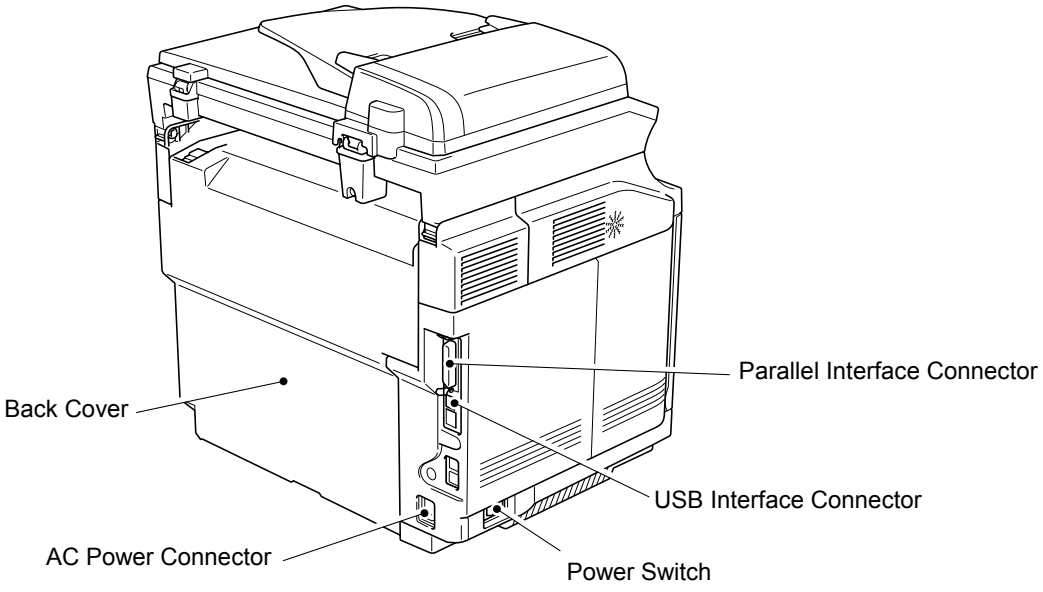


Fig. 1-2

1.2 CONTROL PANEL

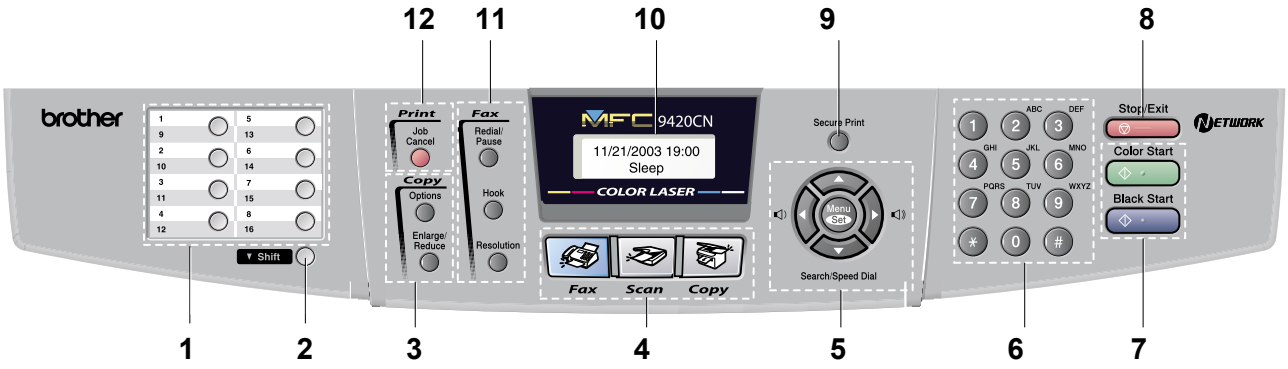


Fig. 1-3

1. One-Touch Keys
These 8 keys give you instant access to 16 previously stored numbers.
2. Shift Key
To access One-Touch numbers 9 to 16, hold down **Shift** as you press the One-Touch key.
3. Copy Keys (Temporary settings)
Enlarge/Reduce Lets you reduce or enlarge copies depending upon the ratio you select. **Options** You can quickly and easily select temporary settings for copying.
4. Mode Keys
Fax Lets you access Fax mode. **Scan** Lets you access Scan mode. **Copy** Lets you access Copy mode.

5. Navigation Keys
Menu/Set The same key is used for Menu and Set operations. Lets you access the Menu to program and store your settings in the machine. ◄) ◄)) When listening to the speaker in Fax mode or on standby, you can press these keys to adjust the volume. In standby mode you can press these keys to adjust the ring volume. ▼ **Search/Speed Dial** Lets you look up numbers that are stored in the dialing memory. It also lets you dial stored numbers by pressing # and a three-digit number. ◄ ► Press to scroll forward or backward to a menu selection. ▲ or ▼ Press to scroll through the menus and options.
6. Dial Pad Keys
Use these keys to dial telephone or fax numbers and as a keyboard for entering information into the machine. The # key lets you temporarily switch the dialing mode during a telephone call from Pulse to Tone. (For Canada only.)

7. Color Start, Black Start
Color Start Lets you start sending faxes or making copies in full color. Also lets you start a scanning operation (in color or black, depending on the scanning setting in the ControlCenter2.0 software). **Black Start** Lets you start sending faxes or making copies in black and white. Also lets you start a scanning operation (in color or black, depending on the scanning setting in the ControlCenter2.0 software).
8. Stop/Exit
Stops an operation or exits from the menu.
9. Secure Print Key
Lets you print out data saved in memory by entering your four-digit password.

10. Liquid Crystal Display (LCD)
Displays messages on the screen to help you set up and use your machine.
11. Fax and Telephone Keys
Redial/Pause Redials the last number you called. It also inserts a pause in quick dial numbers. **Hook** Press before dialing if you want to make sure a fax machine will answer, and then press **Black Start** or **Color Start**. Also, press this key after picking up the handset of an external telephone during the F/T double/pseudo-ring. **Resolution** Sets the resolution when you send a fax.
12. Printer Key
Job Cancel You can cancel a print job and clear the printer memory.

1.3 COMPONENTS

The equipment consists of the following major components:

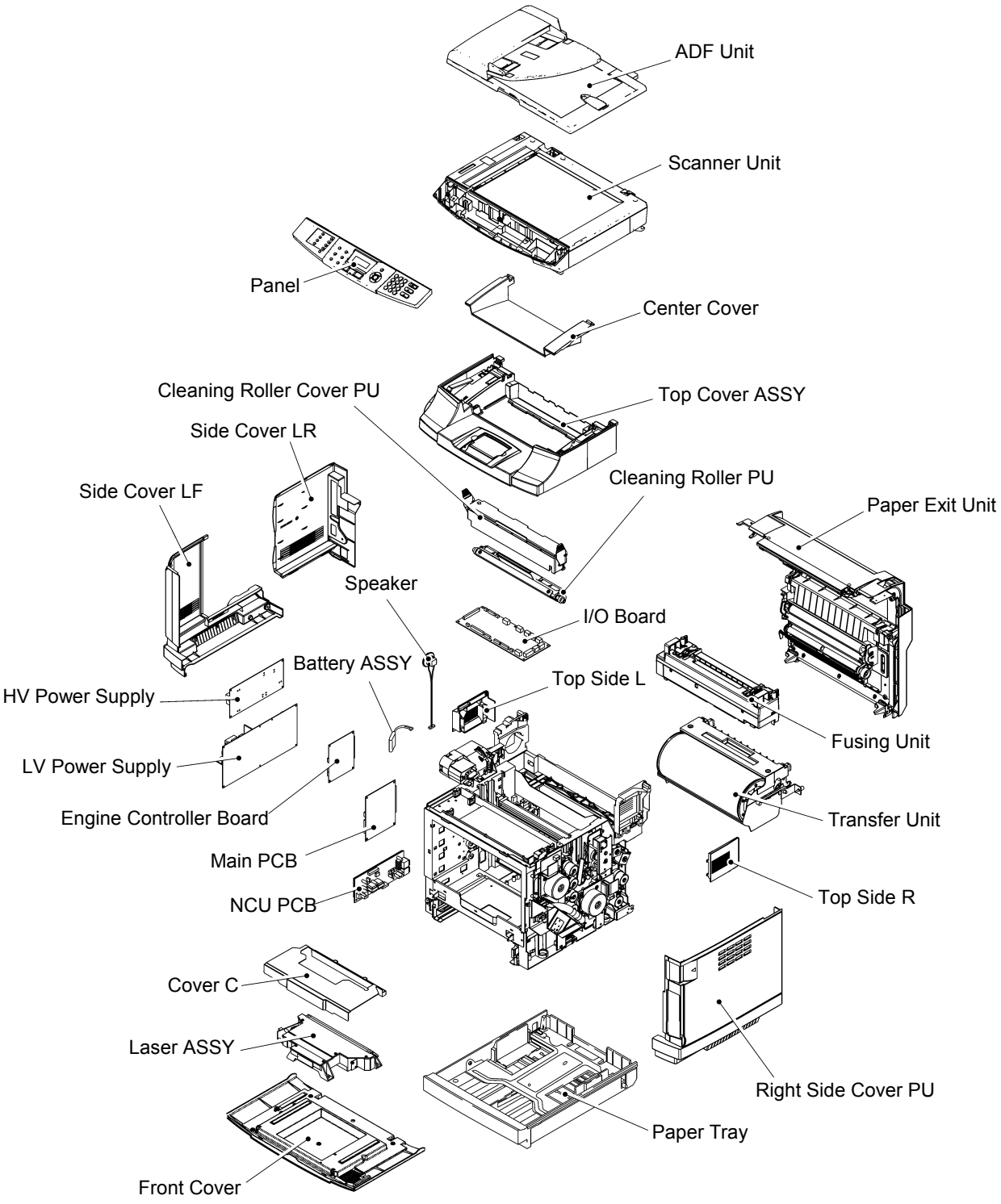


Fig. 1-4

CHAPTER 2

SPECIFICATIONS

CHAPTER 2 SPECIFICATIONS

This chapter lists the specifications of this model, which enables you to make a comparison of different models.

CONTENTS

2.1 GENERAL

2.1.1 General Specifications

Memory Capacity	64 MB
Automatic Document Feeder (ADF)	Up to 35 sheets
Paper Tray	250 Sheets (20 lb (80 g/m^2))
Printer Type	Four cycle color laser
Print Method	Electrophotography by semiconductor laser beam scanning
Liquid Crystal Display (LCD)	16 characters x 2 lines
Power Source	120V AC 50/60Hz, 220 to 240V AC 50/60Hz
Power Consumption	Peak: 1300w Sleep: Average 16w Standby: Average 155w
Dimensions (W x D x H)	482mm x 512mm x 534mm (with out carton)
Weight	Without OPC belt/Toner cartridge: 30.5kg (67.2lb)
Temperature	Operating: 10 to 32.5°C (50°F to 90.5°F) Storage: 0 to 40°C (32°F to 104°F)
Humidity	Operating: 20 to 80% (without condensation) Storage: 10 to 90% (without condensation)

2.1.2 Paper Specifications

(1) Paper type

		Standard Paper Tray (Tray 1)	Optional lower tray (Tray 2)
Paper size		A4, Letter, Legal, B5 (JIS/ISO), Executive, A5, COM10, DL, 104.8 x 210 mm to 215.9 x297 mm (4.1 x 8.3 in. to 8.5 x 11.7 in.)	A4, Letter, B5 (JIS/ISO), Executive
Number of sheets	Plain paper	Up to 250 sheets (20 lb or 80 g/m^2)	Up to 530 sheets (20 lb or 80 g/m^2)
	Thick paper	Up to 40 sheets (44lb or 165g/m^2)	Up to 1.76 in. (44 mm) loading height
	Transparencies	Up to 50 sheets	N/A
	Labels	Up to 80 sheets	N/A
	Envelopes	Up to 15 sheets or 7 sheets for H/H* condition.	N/A

* H/H = High temperature/High humidity

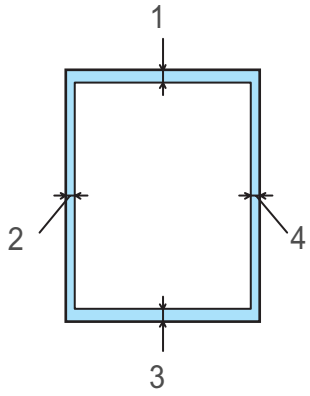
(2) Recommended paper specifications

Basis weight (lb (g/m^2))	16-24 (75-90)
Thickness (µm)	80-110
Roughness (sec.)	Higher than 20
Stiffness (cm^3/100)	90-150
Grain direction	Long grain
Volume resistivity (ohm)	$10e^9$ - $10e^{11}$
Surface resistivity (ohm-cm)	$10e^{10}$ - $10e^{12}$
Filler	$CaCO_3$ (Neutral)
Ash content (wt%)	Below 23
Brightness (%)	Higher than 80
Opacity (%)	Higher than 85

2.1.3 Printable Area

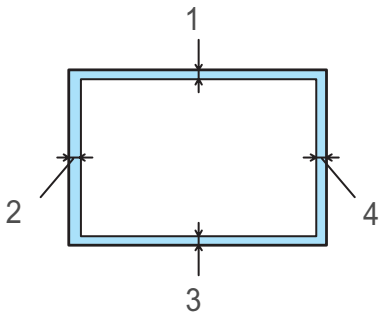
The edges of the paper that cannot be printed on are shown below.

< Portrait >



	For all available paper sizes
1	4.2 mm (0.17 in.)
2	4.2 mm (0.17 in.)
3	4.2 mm (0.17 in.)
4	4.2 mm (0.17 in.)

< Landscape >



	For all available paper sizes
1	4.2 mm (0.17 in.)
2	4.2 mm (0.17 in.)
3	4.2 mm (0.17 in.)
4	4.2 mm (0.17 in.)

NOTE:

We recommend that you do not print within 15mm (0.6 in.) of the edges of envelopes.

2.2 SPECIFICATIONS LIST

(1/6)

	SL4C-FB		
	US/Canada	Europe	Asia/Pacific
Model Name	MFC-9420CN		
GENERAL			
Print Engine	Laser (SL-5)		
Scanning Method	CIS		
CPU Speed	266MHz		
Back up Clock	Yes (up to 60 hours)		
Operating Environment Temperature	10 -32.5 degrees Centigrade		
Humidity	20% - 80% (without condensation)		
On/Off Switch	Yes		
AC Cord Inlet	Yes		
Demo Print	Yes	N/A	N/A
Demo Model	N/A		
Starter Toner	Starter Toner (BK:up to 5,000 pages C,M,Y:up to 3,000 pages)		
Simultaneous Operation	Yes		
Input / Output Width	147.3-215.9 mm / 104.8-215.9 mm 5.8"-8.5" / 4.13"-8.5"		
Input / Output Length	147.3-356.0 mm/ 210-297 mm 5.8"-14" / 8.27"-11.69" (Standard tray) 147.3-356.0 mm/ 210-356 mm 5.8"-14" / 8.27"-11.69" (Optional Legal tray)		
ADF	up to 35 sheets (XX4024 or 4200 20lbs, environment: temp. 20-30C humiditiy 50-70%)		
Paper Capacity	250 sheets		
Optional Paper Tray	Yes (530 sheets : LT-27CL)		
Multi-Purpose Tray	N/A		
Output Paper Capacity(sheets)	up to 250 sheets (80g/m2, face down)		
Lower Tray - Automatic Detection	Yes		
LCD Size	16 characters x 2 lines		
LCD Dimension (W x L)	47 x 10.9 mm		
LCD Back-Light	Yes (1-color)		
On-Screen Programming	Yes		
Memory Capacity (Standard : MByte)	64 Mbyte (RAM)		
Memory BackUp	Yes (up to 60 hours for standard memory)		
Optional Memory	Yes (one 144-pin DIMM slot) expandable up to 576MB		
Memory Security	Yes		
Transmission Lock	N/A		
Setting Lock	Yes		
Dimensions w/ Carton (WxDxH)	US/CAN outer box : 674 x 715 x 770mm US/CAN inner box : 575 x 625 x 740mm		
Dimensions w/o Carton (WxDxH)	US/CAN : 482 x 512 x 534mm		
Weight w/ Carton	US/CAN outer box : 45 kg / 97.0 lb US/CAN inner box : 40 kg / 88.2 lb		
Weight w/o Carton	US/CAN : 30.5 kg / 74.5 lb		
Color			
Power Source	120V AC 50/60(Canada)Hz	220-240V AC 50/60Hz	
Power Consumption (Sleep/Standby/Peak)	16W/155W/1300W		
Power Save (CPU Sleep)	N/A	TBD	
Sleep Mode (00-99min : w/ OFF mode)	Yes		
Energy Star Compliant (USA Only)	Yes	N/A	
Total Print pages Counter (Internal / LCD / Print)	Yes / Yes/ Yes		
Copy pages Counter (Internal / LCD / Print)	Yes / Yes/ Yes		

	SL4C-FB		
	US/Canada	Europe	Asia/Pacific
Model Name	MFC-9420CN		
GENERAL			
PC print pages Counter (Internal / LCD / Print)	Yes / Yes/ Yes		
Fax RX pages Counter (Internal / LCD / Print)	Yes / Yes/ Yes		
Warm up Time (from SLEEP mode)	Less than 45 seconds at 23C (73.4F)		
Paper Type(Media) Setting	Yes		
TELEPHONE			
Handset	N/A		
Off Hook Alarm	N/A		
Power Failure Phone	N/A		
Power Failure Dilalling	N/A		
Chain Dialing	Yes		
Automatic Redial	Yes		
PBX Feature	N/A	Yes	
Speaker Phone	N/A		
Handset Volume	N/A		
Speaker Volume	Yes (3 steps + OFF)		
Buzzer Volume	Yes (3 steps + OFF)		
Ring Volume	Yes (3 steps + OFF)		
Hold/Mute Key	Yes		
Music on Hold	N/A		
Monitoring the Line on Hold with Music	N/A		
One-Touch Dial	16 (8 x 2) locations		
Speed Dial	200 locations		
Figures of One-Touch & Speed Dial	20 digits		
Resisterable Number Of Characters	15 characters		
Group Dial	Yes (up to 8 groups)		
Telephone Index (Search)	Yes (with ↓ key)		
Pre-registered for FAX BACK SYSTEM (USA)	N/A		
Caller ID	Yes	N/A	Yes(Australia/New Zealand/Singapore/Hong Kong only)
Call Waiting Caller ID	N/A		
Call waiting Ready (Only for USA)	N/A		
Distinctive Ringing	Yes	Yes (UK/Denmark only)	Yes(Australia/New Zealand/Singapore/Hong Kong only)
FAX			
Modem Speed	33,600bps (Fax)		
Transmission Speed	Approx. 3seconds (Brother#1,MMR)		
ITU-T Group	Super G3		
Coding Method	MH / MR / MMR / JPEG		
Color FAX (Document Send / Receive)	Yes/ Yes		
Color FAX (Memory Send / Receive)	N/A (If the machine is under the condition of error in printing, the machine receives color fax in memory temporariliy)		
Fax/Tel Switch	Yes		
Super Fine	Yes (TX & RX)		
Gray Scale	256		
Contrast	Yes (Auto/Light/Dark)		
Smoothing	N/A		
Dual Access	Yes		
Enhanced Remote Activate	Yes		
Station ID	Yes (20digits / 20characters)		
Remote Maintenance	Yes		
RX Mode Indication	LCD		
Resolution Indication	LCD		
Delayed Timer	Yes (up to 50)		
Polled Sending	Yes (EUR Secure Polling)		

	SL4C-FB		
	US/Canada	Europe	Asia/Pacific
Model Name	MFC-9420CN		
FAX			
Multi Transmission	N/A		
Multi Resolution Transmission	N/A		
Next-Fax Reservation	N/A		
Batch Transmission	Yes		
Call Reservation Over Auto TX	N/A		
Call Reservation Over Manual TX	N/A		
Quick-Scan(Memory transmission)	Approx. 2 seconds/page (A4 standard)		
Memory Transmission (ITU-T Chart)	up to 400 pages (ITU-T Test Chart, Standard Resolution, MMR) up to 500 pages ((Brother #1Chart, Standard Resolution, MMR)		
ECM(Error Correction Mode)	Yes		
Error Re-Transmission	Yes		
Broadcasting	Yes (266 locations = One-Touch Dial + Speed Dial)		
Manual Broadcasting	Yes (50 locations)		
Easy Receive/Fax Detect	Yes		
Polling Receiving	Yes		
Auto Reduction	Yes		
Duplex Fax Receive	N/A		
Out-of-Paper Reception (ITU-T Chart)	up to 400 pages (ITU-T Test Chart, Standard Resolution, MMR) up to 500 pages ((Brother #1Chart, Standard Resolution, MMR)		
PC Fax	Yes (Send & Receive)		
LIST/REPORT			
Activity Report/Journal Report	Yes (up to 200)		
Transmission Verification Report	Yes		
Coverpage	Yes (Super)		
Help List	Yes		
Call Back Message	N/A		
Caller ID List	Yes	N/A	Yes (Australia/New Zealand/Singapore/Hong kong only)
Quick Dial List	N/A		
Quick Dial List (empty box is not printed out)	Yes		
Tel Index List	N/A		
Memory Status List	N/A		
System Setup(User Setting) List	Yes		
Order Form	N/A	Yes	
INTERFACE			
External TAD Interface	Yes		
Host Interface (Serial)	N/A		
Host Interface (IEEE1284)	Yes (Auto Switching : IEEE1284/USB/10/100Base-TX)		
Host Interface (Hi-Speed USB2.0)	Yes (Auto Switching : IEEE1284/USB/10/100Base-TX)		
Ethernet (10/100Base-TX)	Standard (Auto Switching : IEEE1284/USB/10/100Base-TX)		
Cable included	N/A		
Acceptable Media Card Slot	N/A		
PRINTER			
Color/Mono	Color		
Engine Type	Laser (SL-5)		
Resolution	600x600dpi, 2400dpi class		
Speed(ppm)	up to 8ppm - color / up to 31 ppm - monochrome		
Duplex Printing Speed (ppm)	N/A (optional duplex unit is not available)		
First Print Out Time	Less than 15 seconds (monochrome) / Less than 21 seconds (color) average 13 seconds (monochrome) / average 19 seconds (color)		

	SL4C-FB		
	US/Canada	Europe	Asia/Pacific
Model Name	MFC-9420CN		
PRINTER			
Standard Print Language	Windows GDI		
Emulation	PCL6 & BR-Script 3		
Secure Print	Yes		
Resident Fonts	PCL : (Bitmap font:Letter Gothic 16.66, OCR-A, OCR-B, Scalable font: 66 fonts) PS: PS compatible fonts : 66 fonts		
Fonts Disk Based	Yes (49 TrueType Fonts)		
Paper Handling Size	Cut Sheet: Letter, Executive, A4, A5, B5 [,Hagaki (Japan only)] Envelopes: COM10, DL Custom Size: 100-215.9mm(Width) x 210-356mm(Length) Optional: Legal Tray Available (LT-27LG) Custom size paper is not able to pick from Lower Tray.		
Manual Feed Slot	N/A		
Paper Type	Thin, Plain, Thick, Thicker, Transparencies, Recycled Paper		
Other Paper Type	Envelopes, Labels		
Sheet Weight (Paper Cassette)	Standard tray: 60 - 210 g/m2 (16 - 55 lbs.) Optional lower paper tray: 60 - 105 g/m2 (16 - 28 lbs.) Legal Cassette : 60 - 210 g/m2 (16 - 55 lbs.)		
(Manual Feed Slot)	N/A		
(ADF)	64 - 90 g/m2 (17 - 24 lb)		
Printer Driver	Win98(SE)/Me and NT4.0WS/2000/XP Driver with Auto Installer Program Mac OS9.1 - 9.2/ OSX 10.2.4 or greater		
Utility Software	Yes (Remote Printer Console for PCL6)		
Variable Dot Print	N/A		
Shingling Print	N/A		
Color Enhancement	N/A		
COPY			
Color/Mono	Color		
Speed	up to 8ppm - color / up to 31 ppm - monochrome		
First Copy Out Time (from READY mode)	Mono 20 seconds Color 32 seconds		
Multi Copy(Stack)	Yes (up to 99)		
Multi Copy(Sort)	Yes		
Reduction/Enlargement(%)	25% - 400% in 1% increments		
Resolution(dpi)	600 x 600 dpi		
Manual Duplex Copy	N/A		
N in 1	Yes		
Poster	Yes		
Image Enhancement	N/A		
SCANNER			
Color/Mono	Color		
Resolution (Optical)	From Glass: max 1200 x 2400 dpi (color & mono) From ADF : max 1200 x 600 dpi (color & mono)		
Resolution (Interporated)	9,600 x 9,600 dpi		
Gray Scale	256		
Color Depth (Int. / Ext.)	48 bit / 24 bit		
Scan Key	Yes		
Scan Image Key	N/A		
Scan / OCR Key	N/A		
Scan to E-mail Key	N/A		

	SL4C-FB		
	US/Canada	Europe	Asia/Pacific
Model Name	MFC-9420CN		
MESSAGE CENTER/MESSAGE MANAGER			
TAD Type	N/A		
ICM Recording Time	N/A		
OGM (MC;MC Pro;Paging;F/T)	N/A		
Memo/Recording Conversation	N/A		
Toll Saver	N/A		
Remote Access	Yes		
Fax Retrieval	Yes		
Fax Forwarding	Yes		
Paging	Yes	N/A	
BUNDLED SOFTWARE (For Windows)			
Printer Driver	Yes		
TWAIN (WIA for XP)	Yes		
Viewer	Yes (PaperPort 9.0)		
Control Center	Yes		
PC Fax Send : FaxShare Software by Brother	Yes		
PC Fax Receive (Parallel & USB only)	Yes		
PC-Fax Protocol Compliance (machine side)	Class 2 (for RX)		
Remote Setup	Yes (IEEE1284/USB only)		
BRAdmin Professional	Yes		
WebBRAdmin	Yes (download from Brother Web Site)		
Network Print Software(LPR)	Yes		
Network Print Software(NetBIOS/SMTP)	N/A		
Support OS version	Win98/98SE/Me/2000/XP, Win NT4.0WS Driver with Auto installer Program		
BUNDLED SOFTWARE (For MAC)			
Printer Driver	Yes		
TWAIN	Yes (Mac OS X 10.1 is N/A)		
Viewer	Yes (PageManager)		
Control Center	Yes (OS X only)		
PC Fax Send : FaxShare Software by Brother	Yes		
PC Fax Receive (Parallel & USB only)	N/A		
Remote Setup	Yes (for Mac OS X and USB only)		
Support OS version	Mac OS9.1 - 9.2, OSX 10.2.4 or greater		
PHOTO CAPTURE CENTER	N/A		

	SL4C-FB		
	US/Canada	Europe	Asia/Pacific
Model Name	MFC-9420CN		
NETWORK			
Standard/Option	Standard		
Model Name	Embedded : NC-6300h		
Share Printer	Yes		
Share Scanner	Yes		
Share PC FAX	Yes		
Internet FAX (ITU T.37 simple mode)	Yes		
Scan to E-mail Server	Yes		
ITU SUB Addressing	N/A		
Support OS version	Win98(SE)/Me and NT4.0WS/2000/XP Mac OS 9.1 - 9.2, Mac OS X 10.2.4 or greater (Simple Network Configuration is supported with OS 10.2.4 or greater)		
Network connection	Ethernet 10/100Base-TX Auto Negotiation		
Support Protocols	TCP/IP (TELNET, SNMP, HTTP, TFTP, ARP,RARP, BOOTP, DHCP, APIPA(Auto IP), WINS/NetBIOS, DNS, LPR/LPD, Custom Raw Port/Port9100, POP3/SMTP, IPP, FTP, mDNS)		
Network Management	BRAdmin Professional Web Based Management MIB-II as well as Brother private MIB		
Option	NC−2200W, NC−2100p		
CONSUMABLE			
Toner Cartridge Black	TN-04BK : up to 10,000 pages w/ 5% coverage		
Toner Cartridge Cyan, Magenta, Yellow	TN-04C,M,Y : up to 6,600 pages w/ 5% coverage		
Waste Toner Pack	WT-4CL : 12,000-image		
OPC Belt	OP-4CL : 60,000-image by coninuous printing		
Fuser Unit	FP-4CL : 60,000-page		
SERVICE (Not to be used in sales leaflet)			
Machine Life	240,000-page or 5 years		
Monthly Volume	30,000-page		
Periodical Replacement Parts	Transfer Roller 120,000-page Transfer Belt Cleaner 120,000-images Paper Pick-up Roller/ Separator Pad 120,000-page Transfer Belt 300,000-images		
MTBF	5,000 hours		
MTTR	0.5 hours or less		

CHAPTER 3

THEORY OF OPERATION

CHAPTER 3 THEORY OF OPERATION

This chapter gives an overview of the scanning and printing mechanisms as well as the sensors, actuators, and control electronics. It aids in understanding the basic principles of operation as well as locating defects for troubleshooting.

CONTENTS

3.1 OVERVIEW

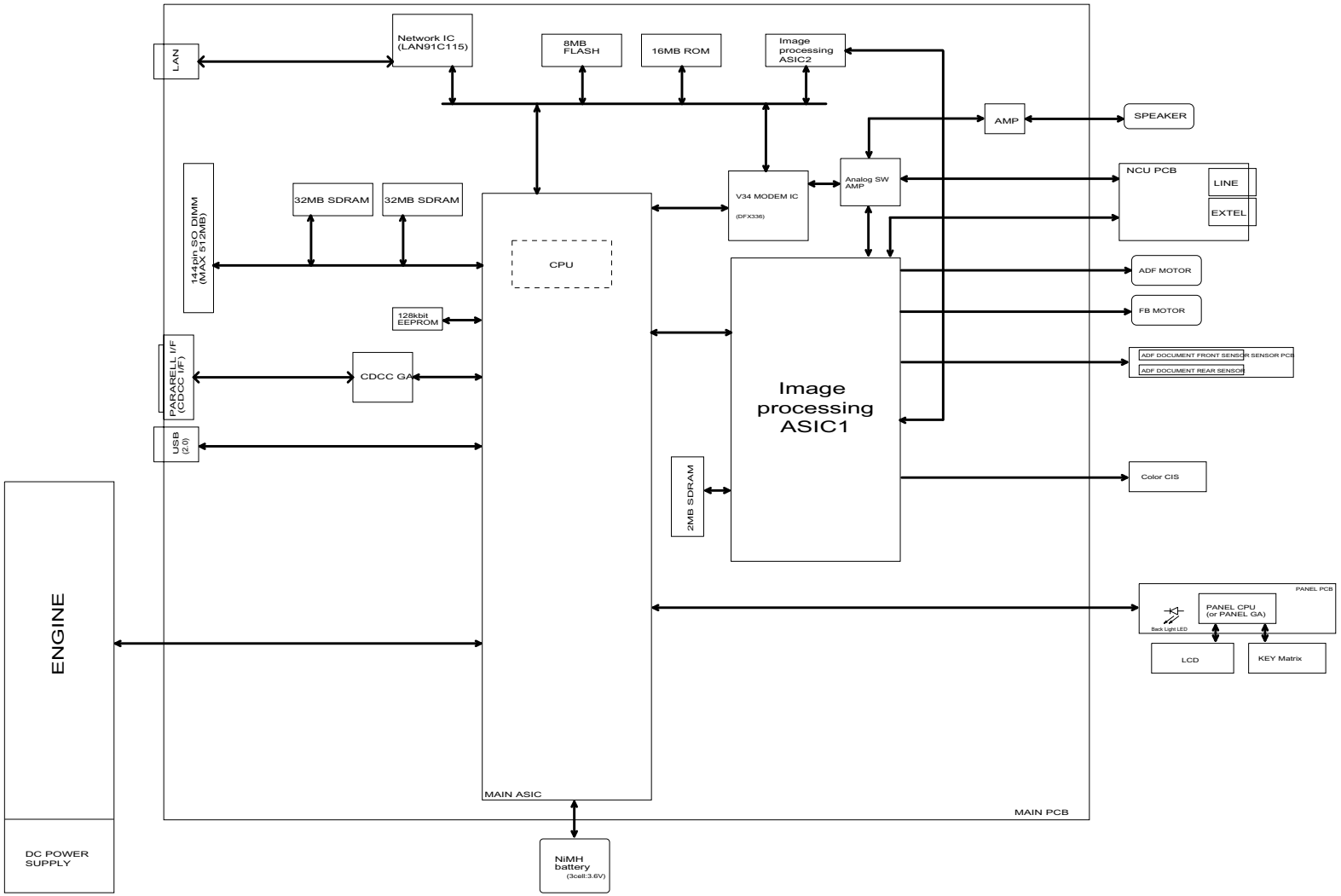


Fig. 3-1

3.2 PRINTING MECHANISM

<Mechanical & Electrical Structures>

This laser beam color printer (hereinafter called "Machine") consists of five mechanical systems; Print, Scanning, Transfer, Paper transport and control system. The machine produces color printing through the interactive operations of these five systems as shown in Fig.3-2.

(1) Print System

The print system consists of the following 6 (six) functional parts located around the OPC belt which form a toner image on the OPC belt.

- Charger Part
- Exposure Part
- Development Part
- First Transfer Part
- Discharger Part
- Cleaner Part

(2) Laser Scanning System

The scanning system consists of the following 2 (two) functional parts which form an electrostatic latent image on the OPC belt by scanning it with a laser beam.

- Scanner Unit
- Scanner Motor (SCM)

(3) Transfer System

The transfer system consists of the following 3 (three) functional parts and transfers the toner image formed on the transfer drum onto the page.

- First Transfer (Transfer Belt)
- Second Transfer Part (Paper Transfer)
- Drum Cleaner Unit

(4) Paper Transport System

The paper transport system consists of the following 5 (five) functional parts and picks up paper from the paper tray, separates the paper from the transfer drum and exits it from the machine body after fusing the toner image on the paper.

- Paper Tray
- Transport Rollers
- Paper Discharger
- Fusing Unit
- Paper Exit

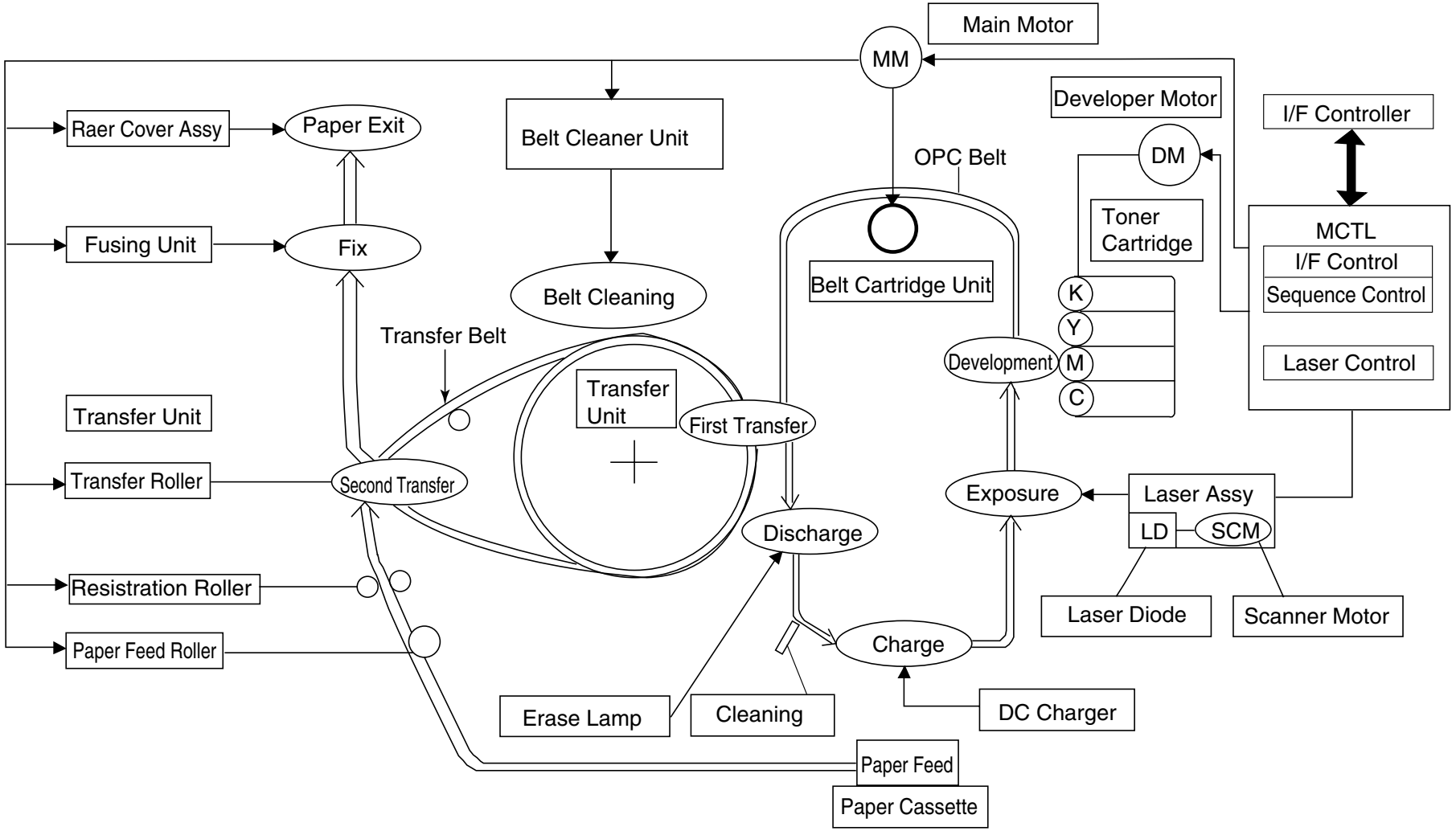


Fig. 3-2

(5) Control System

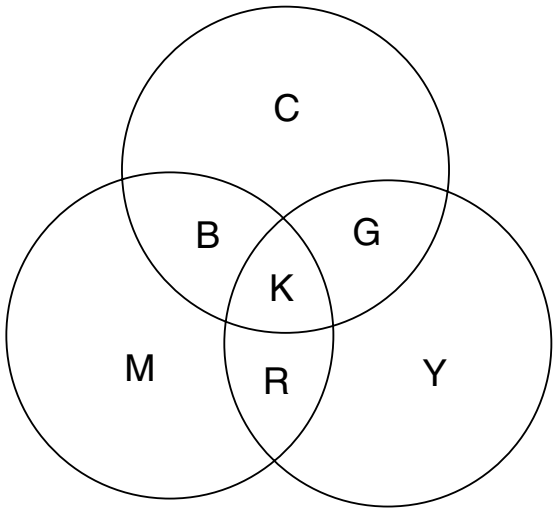
The control system consists of the following 4 (four) control parts and runs the machine by processing the interface signals transmitted from the host computer and interfacing to the print, transfer, scanning and transport systems.

- Sequence Control
- Laser Control
- Fusing Temperature Control
- Interface Control

<Basic Mechanism of Color Printing>

(1) Principle of Color Printing

Color printing is made through the subtractive process by combining the three primary colors, yellow, magenta, and cyan. Fig.3-3 shows the three primary colors and subtractive process:



Y: Yellow
M: Magenta
C: Cyan
R: Red
G: Green
B: Blue
K: Black

Fig. 3-3

(2) Basic Color Printing Process

1) The machine has a toner cartridge of each color yellow, magenta, cyan and black as shown in Fig.3-4.
2) The toner image developed using the primary colors is transferred to the transfer drum for the printed color combination as shown in Fig.3-5 (a).
3) The toner image formed on the transfer drum is transferred to the transported paper as shown in Fig.3-5 (b).
4) The toner on the paper is fused by the thermal fusing unit to fix the toner image onto the paper as shown in Fig.3-5 (c).

Summarizing the above processes, a toner color layer is formed on the transported paper, and subsequently, the color image is made through the subtractive process.

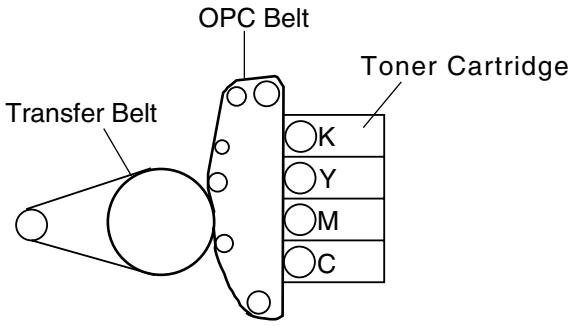


Fig. 3-4

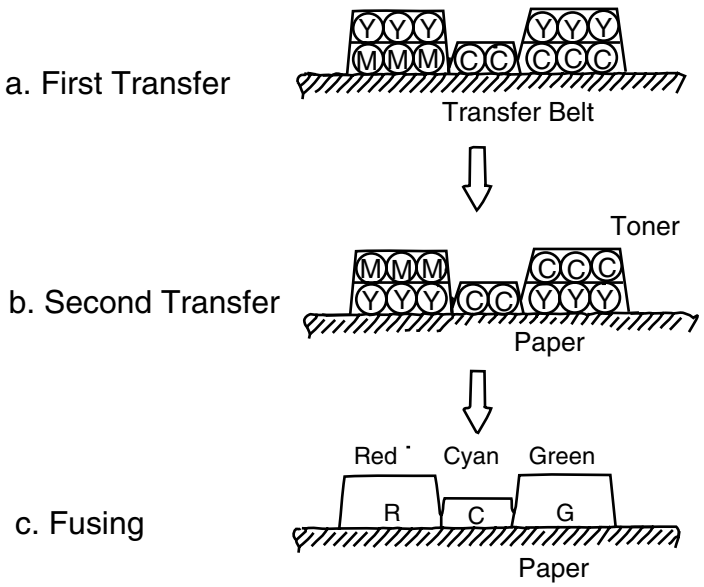


Fig. 3-5

<Structure of the OPC Belt>

The OPC belt consists of a surface layer having a photoconductor (OPC) of organic material, the inner layer of an insulator material (PET / Mylar) and an aluminum deposit layer in between. The OPC belt is located as shown in Fig.3-6 as the main part of the print system.

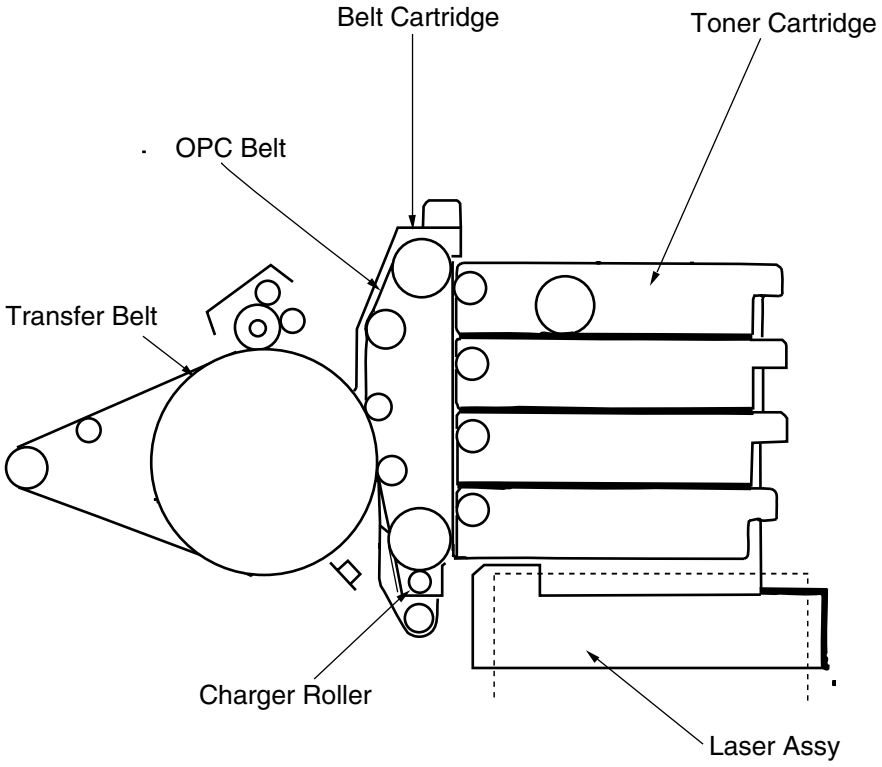


Fig. 3-6

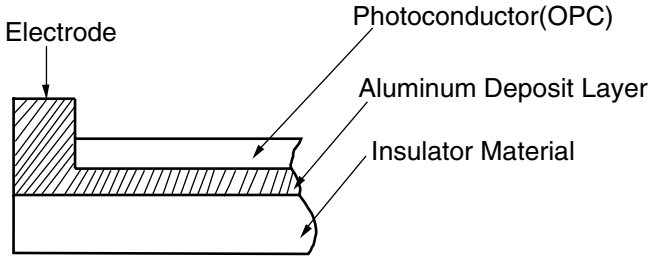


Fig. 3-7

3.2.1 Print System and Transfer System

Fig.3-8 shows the basic structure of the print system having the OPC belt as the main part and the transfer system having the transfer drum as the main part. Color printing is made by actuating the each process in the print system and transfer system.

4 cycles of actions 1 to 6 are required to form a full 24 bit color image on the transfer drum, only one cycle of actions 7, 8 and 9 is required to transfer the image to the paper from the transfer drum ready for fixing by actions 10 and 11.

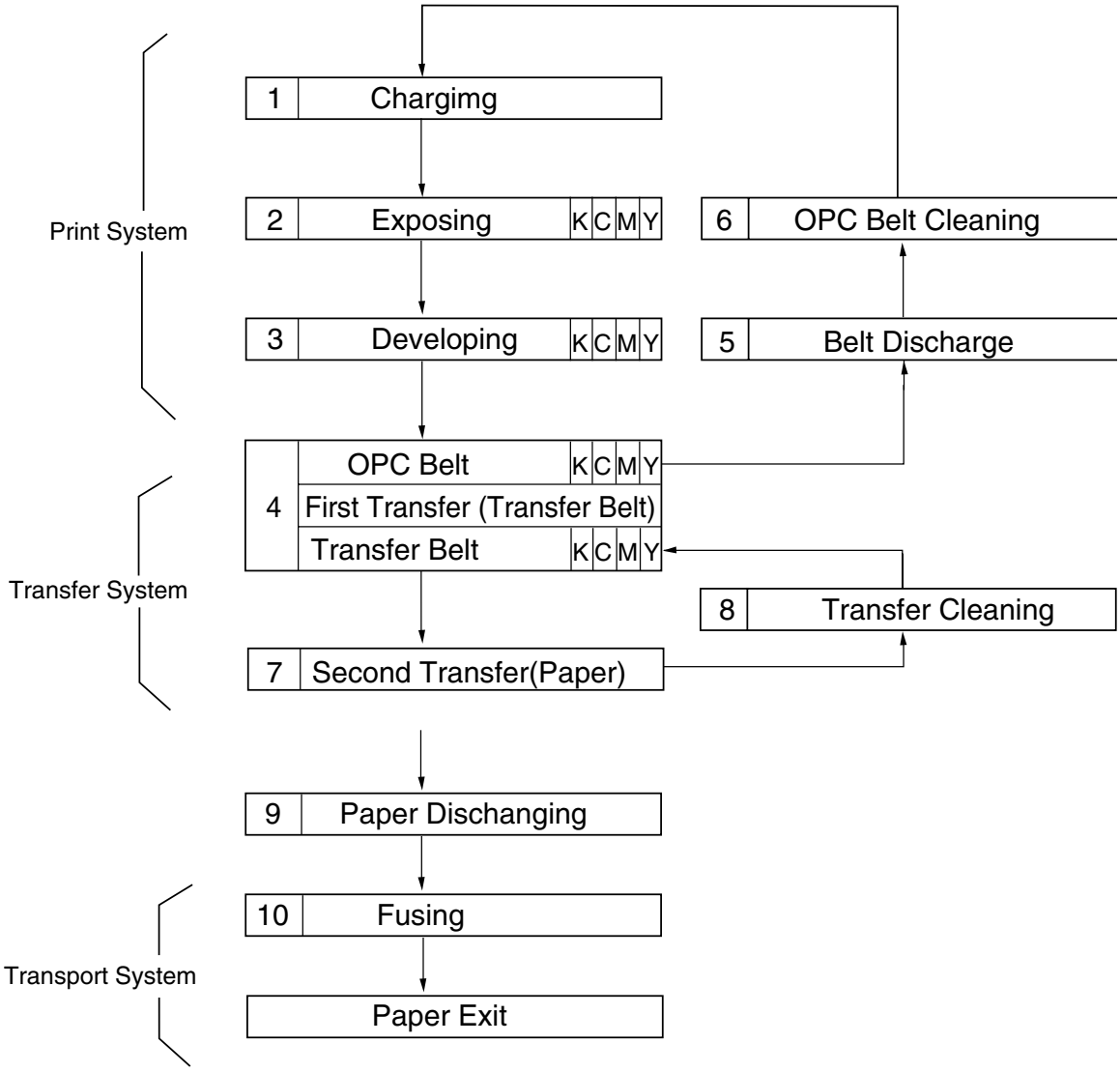


Fig. 3-8

[1] Structure of the machine

No.	Component part	Process
1	OPC Charger Roller PU	Charging
2	Laser ASSY PU	Exposing
3	Toner Cartridge PU	Developing
4	Belt Cartridge PU	Receiving of image
5	Transfer Belt (Transfer Unit PU)	Transferring of image
6	Belt Discharger Erase Lamp	Discharging of OPC belt
7	Cleaning Blade	Cleaning of OPC belt
8	Transfer Roller ASSY PU	Transferring
9	Cleaning Roller PU	Cleaning of transfer belt
10	Fusing Unit FU	Fusing
11	Back Cover ASSY PU (Paper Exit Unit)	Exiting of paper

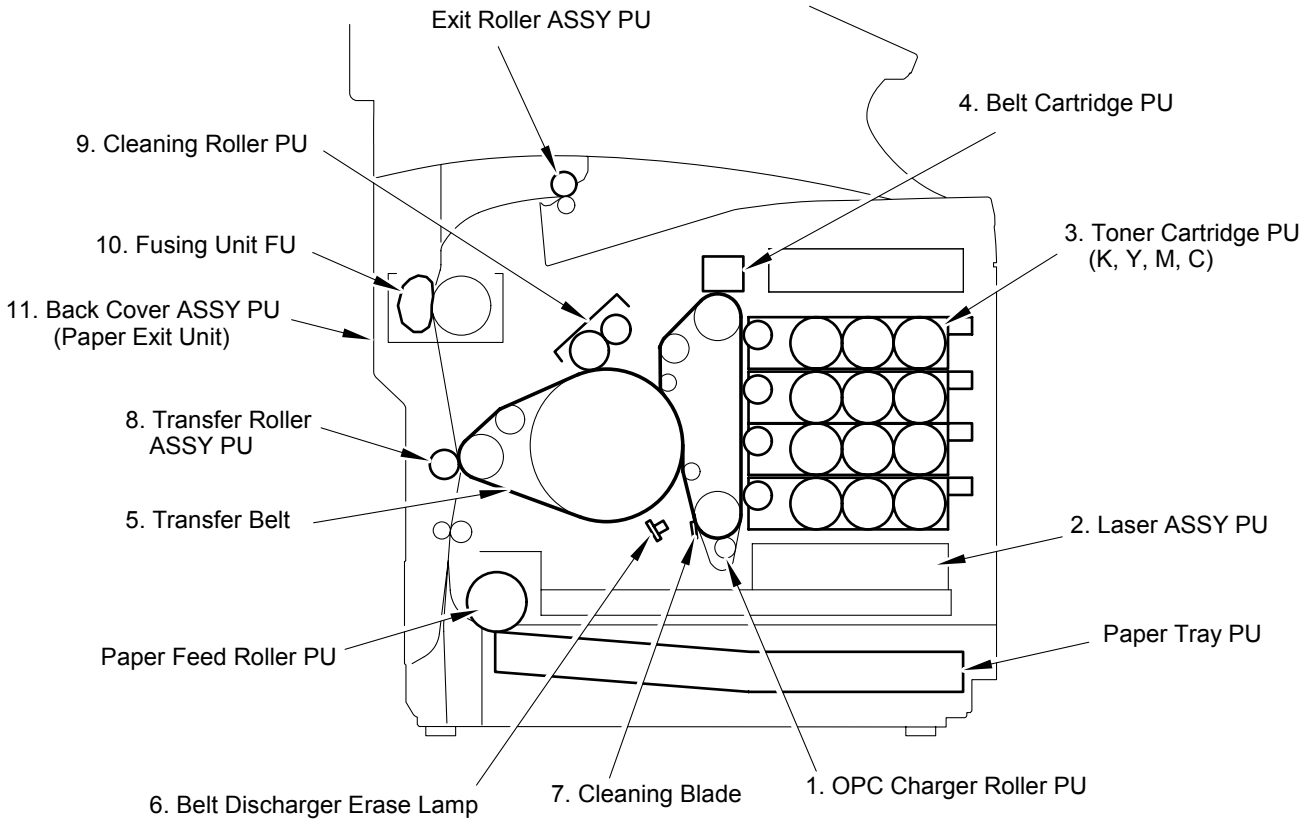


Fig. 3-9

[2] Basic structure of the printing system

A toner image is formed through the potential of the OPC belt varying in each of the charger, exposure, development, transfer and cleaning processes.

(1) Process of Print System (See Fig.3-10.)

1) The OPC belt is biased to the voltage -CBV(V) by the power supply CBV.
2) A negative high voltage is applied to the charger unit by the power supply CHV, and a corona is generated as the result.
3) The developer magnetic roller of the toner cartridges is biased to -DBV(V) by the power supply DBV.
4) The frame potential of the transfer drum is GND.

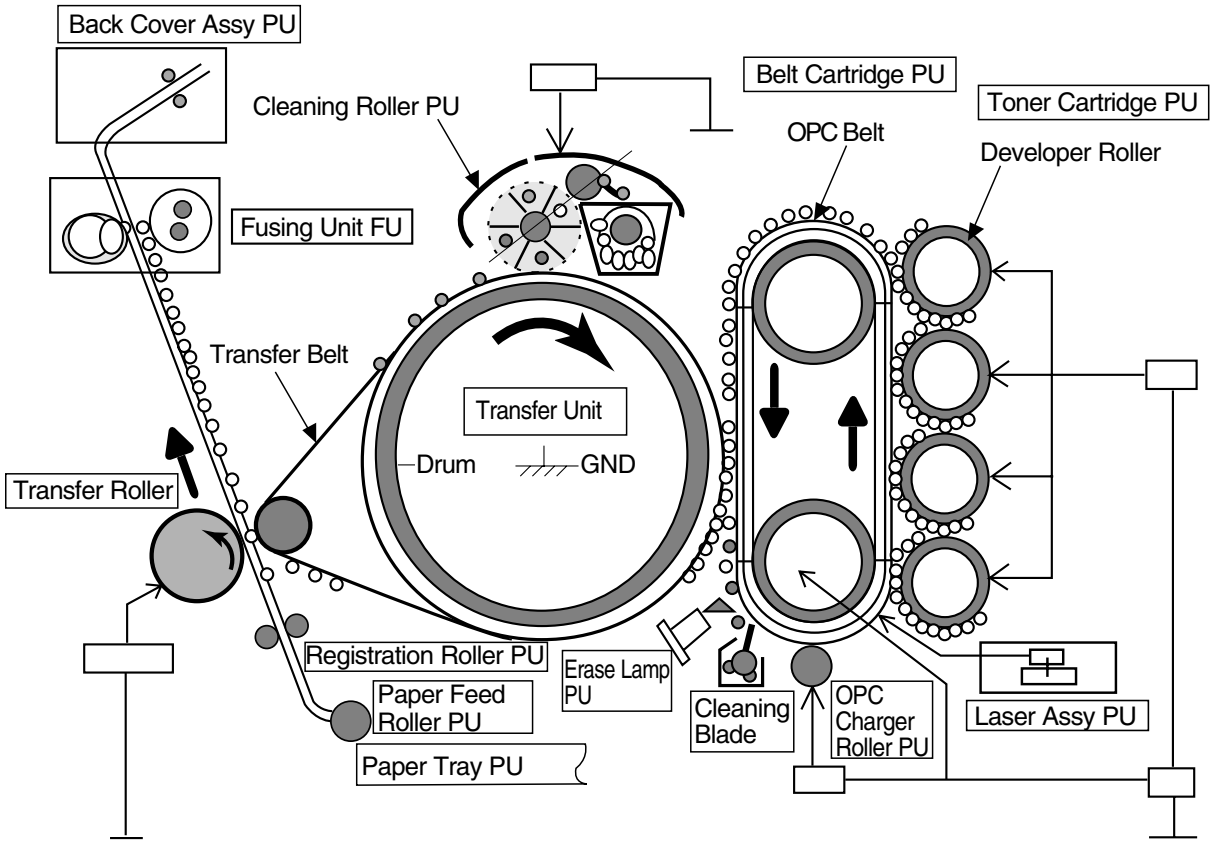


Fig. 3-10

(2) Variation of OPC Belt Potential (See Fig.3-11.)

1) The OPC belt is initially biased to -CBV(V).
2) The OPC belt surface is evenly charged to V_0(V) in the charging process.
3) The potential of the exposure part of the OPC belt is reduced to -VR(V) as it is exposed to the laser beam in the process of exposing, and an electrostatic latent image is formed on the OPC belt as the result.
4) Negatively charged toner is moved onto the exposed part of the OPC belt in the development process due to the difference of potential between -VR(V) (the latent image) and -DBV(V), and a visible toner image is formed as the result.
5) Negatively charged toner on the OPC belt moves to the transfer drum surface in the transfer process because the GND potential of the transfer drum is greater than -VR(V) of the OPC belt.
6) The OPC belt is discharged by the erase lamp.

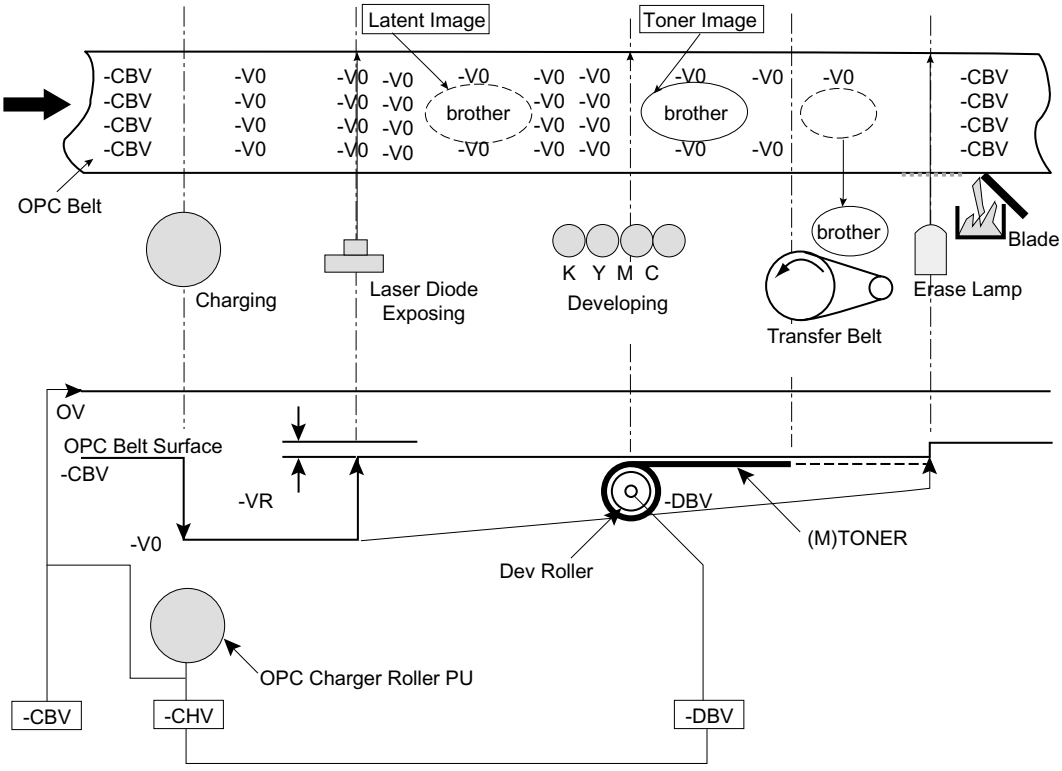


Fig. 3-11

[3] Details of each process

1	Charging

The charging process means that OPC belt is evenly charged by the OPC charger roller PU.

(1) Structure of the charger unit (Refer to Fig.3-9 and Fig.3-12)

1) OPC charger roller PU is located as shown in Fig.3-9.
2) Charge high voltage is applied to the OPC charger roller PU.
3) Brush surface of the charger roller contacts and charges the OPC belt surface evenly.

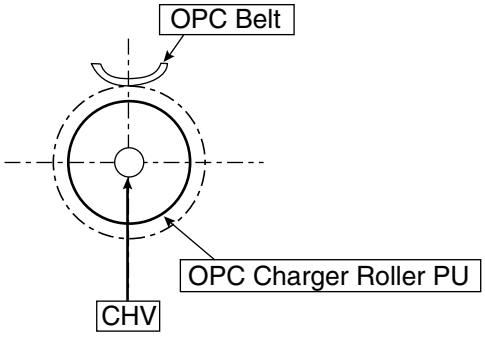


Fig. 3-12

(2) Process of charging (Refer to Fig.3-13.)

1) The status of the OPC belt surface before charging is -CBV(V).
2) OPC charger roller PU charges evenly the OPC belt surface till $-V_0$(V) by generating negative charge.

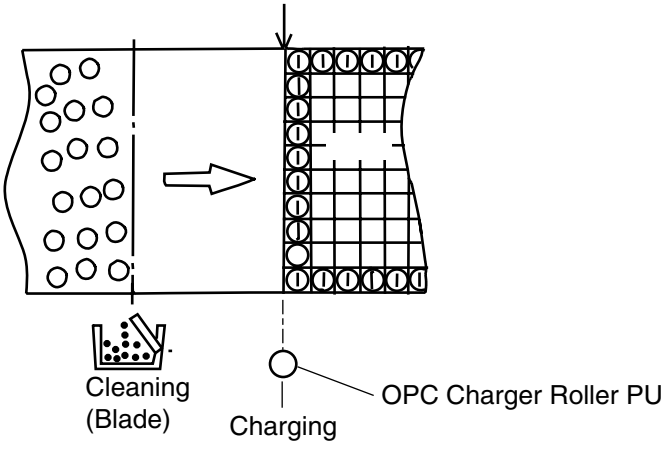


Fig. 3-13

2	Exposing

The exposing process means that the OPC belt surface is exposed to the laser beam to form an electrostatic latent image.

(1) Structure of Laser ASSY PU

1) Laser ASSY PU is located as shown in Fig.3-9.
2) Luminous source of the laser beam is a semiconductor laser.
3) Scanning is made to laser light on OPC belt as converting the laser beam to the beam light through lens and reflective mirror to form an electrostatic latent image.

(2) Process of Exposing (Refer to Fig.3-14.)

1) The OPC belt surface has been charged to the potential -Vo(V) in the charging process.
2) Laser beam is scanned as rectangular to the forwarding direction of OPC belt.
3) High speed switching of laser is made according to the transmitted image data.
4) Charge of the areas radiated by the laser beam is discharged, where the potential is -VR(V).
5) An invisible electrostatic latent image is formed on the OPC belt as shown in Fig.3-14.

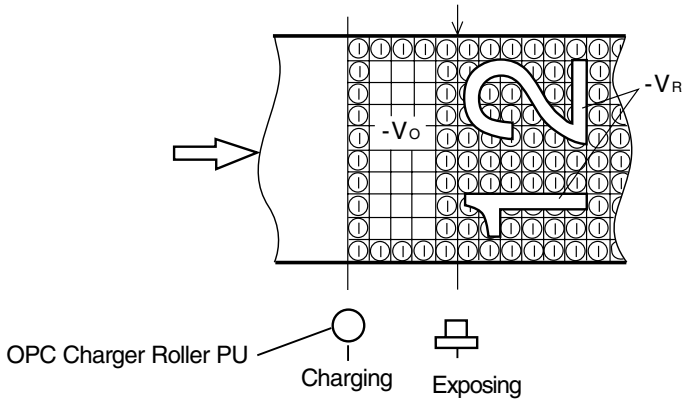


Fig. 3-14

3	Developing

Developing process means that an electrostatic latent image on OPC belt is made visible with toner.

(1) Structure of toner cartridge PU (Refer to Fig.3-9 & 3-15.)

1) Toner cartridge PU is located as shown in Fig.3-9.
2) Four toner cartridges are made available from the top to bottom in the order of specified color as black, yellow, magenta and cyan.
3) Each color toner is loaded in the corresponding toner cartridge PU.

(2) Process of developing (Refer to Fig.3-9, 3-15, 3-16, and 3-17.)

1) Toner adheres to the Dev.roller of toner cartridge PU.
Developing is processed by this Dev.roller contacting the OPC belt surface.
2) Dev.roller has been biased to the potential -DBV(V). Fig.3-16 describes the relationship established between the potential of toner, the potential $-V_0$(V) at the non-exposed area of OPC belt and the potential -VR(V) at the exposed area of OPC belt.
3) Developing is processed by the toner adhering to the OPC belt due to the attraction between the potential of toner and the potential -VR(V) at the exposed area of OPC belt. (Toner image is formed (visible) on the OPC belt.)
4) On the other hand, no development takes place at the non-exposed area because the potential of toner and that of OPC belt is identical pole and therefore repels each other.

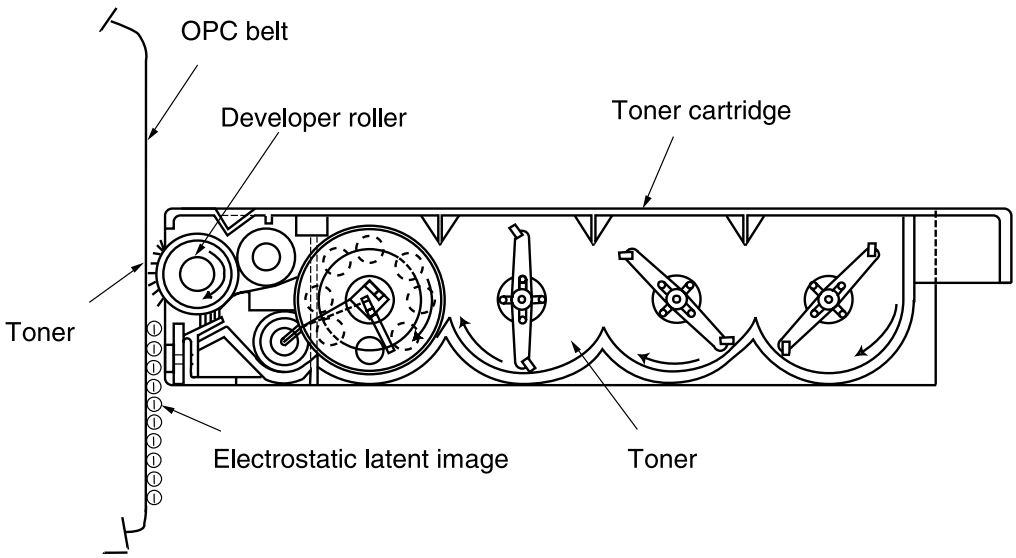


Fig. 3-15

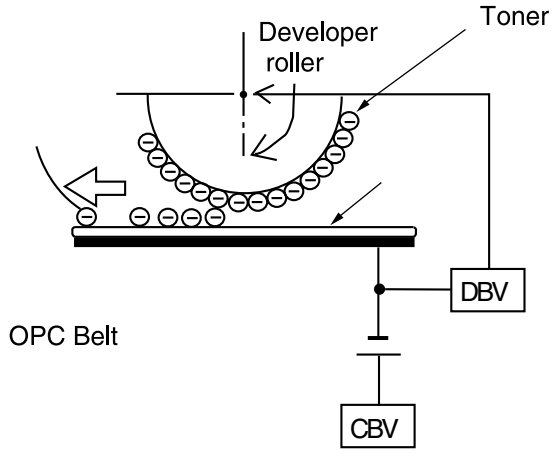


Fig. 3-16

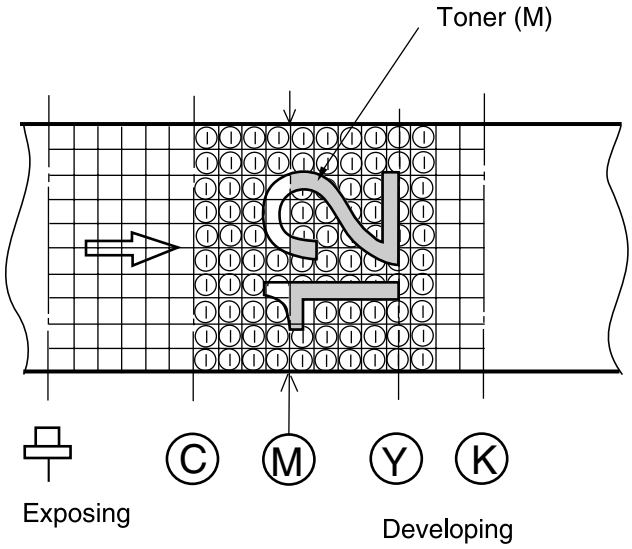


Fig. 3-17

4	First Transfer (Belt)

The first transfer process means that the toner images on the OPC belt is transferred onto the transfer belt.

(1) Structure of the transfer belt (Refer to Fig.3-9.)

1) First transfer part is located as shown in Fig.3-9.
2) Material of the drum is aluminum.
3) The belt composed of the special film is provided to the drum surface as shown in Fig.3-18.
4) As transfer belt contacts the OPC belt, it rotates synchronous with the drum.

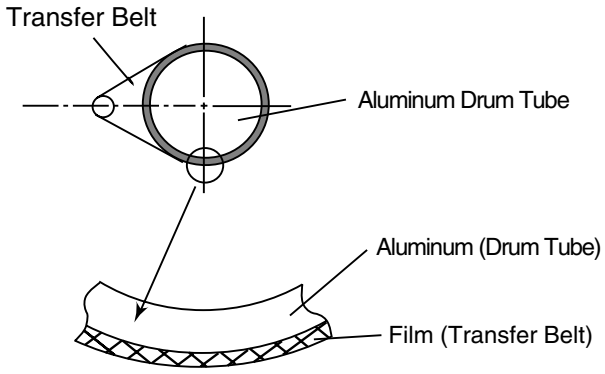


Fig. 3-18

(2) Process of first transfer (Refer to Fig.3-19.)

1) OPC belt that has been through the development process rotates as contacting and synchronizing with the transfer belt and drum.
2) OPC belt has been biased to the potential of -CBV(V). Potential of the transfer belt is nearly GND.
3) Toner on the OPC belt is moved onto the transfer belt due to the difference of potential between the OPC belt and transfer belt.
4) Toner that has been developed by each color is moved from the OPC belt onto the transfer belt, and two color toner image is overlapped on the transfer belt.
5) Upon completion of the first transfer process, the toner image is transferred onto a paper in the process of paper transfer.

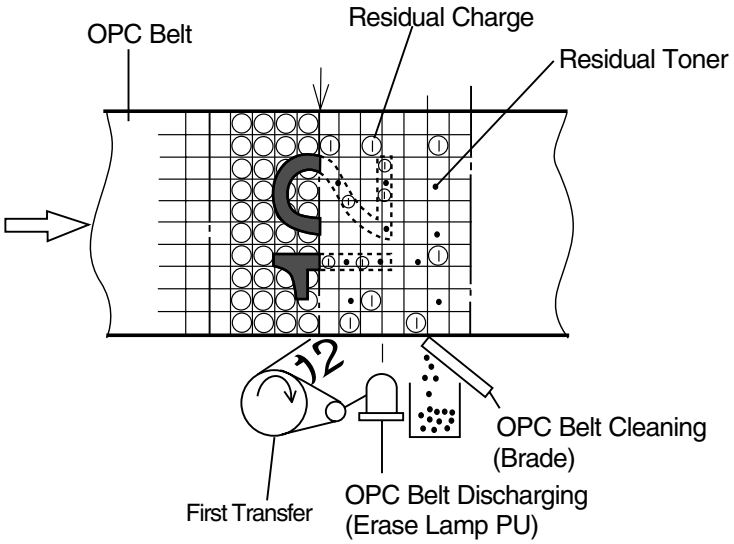


Fig. 3-19

5	Belt Discharging (Erase Lamp)

OPC belt discharging process means that upon completion of the first transfer process, LED light is radiated on the OPC belt prior to cleaning the belt to discharge the residual charge for electrical cleaning.

(1) Structure of erase lamp PU

1) Erase lamp PU is located as shown in Fig.3-9.

2) Luminous source of erase lamp is the 6 pieces of light emitting diodes (LED).

(2) Process of discharging (Refer to Fig.3-20.)

1) Though a toner image is transferred to the transfer belt in the first transfer process, there is still a residual charge on the OPC belt.

2) Residual charge -VR(V) on the OPC belt is discharged by the radiation of erase lamp's light prior to cleaning the belt.

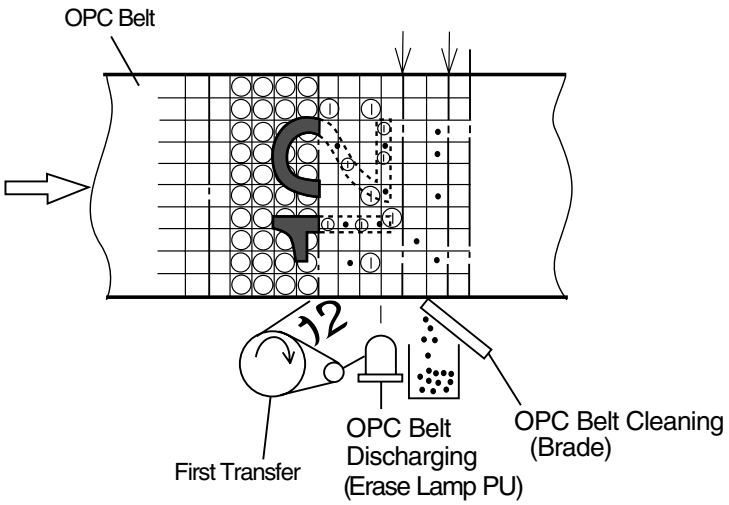


Fig. 3-20

6	Belt Cleaning

OPC belt cleaning process means that the residual toner adhering to the OPC belt surface is mechanically scavenged.

(1) Structure of belt cleaning

Blade for the OPC belt cleaning is located to the belt cartridge as shown in Fig.3-9.

(2) Process of OPC belt cleaning (Refer to Fig.3-21.)

1) There is a residual toner on the OPC belt as it has not been transferred in the process of first transfer.
2) Residual toner is mechanically scavenged by the blade edge.
3) The scavenged residual toner is collected in the waste toner pack by the waste toner feeder.

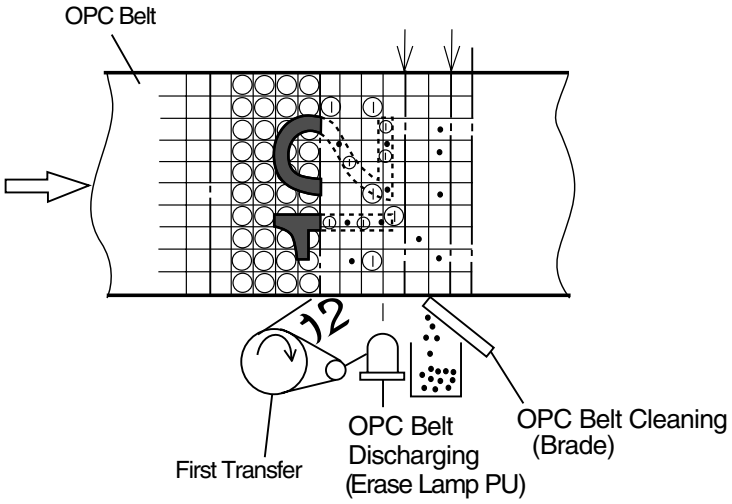


Fig. 3-21

7	Second Transfer (Paper)

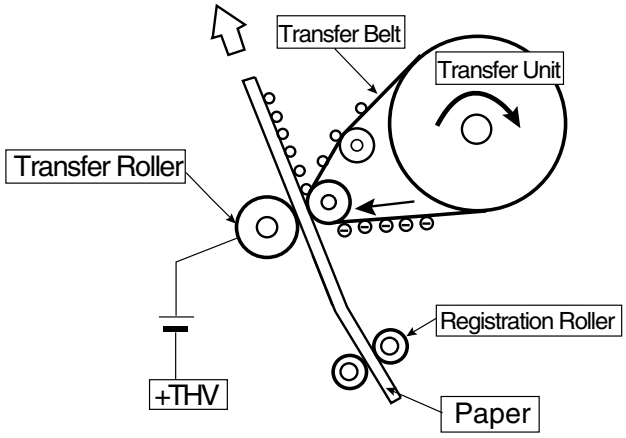
Second transfer process means that the toner image on the transfer belt is transferred onto the transported paper.

(1) Structure of belt cleaning

1) Transfer roller for the second transfer is located as shown in Fig.3-9.
2) Transfer roller is normally separated from the transfer belt.
3) Transfer roller is positively biased by the power supply THV.
4) Transfer roller contacts to the transfer belt in the second transfer process.
5) Transported paper passes between the transfer roller and transfer belt.

(2) Process of belt cleaning (Refer to Fig.3-22.)

1) Paper is transported as synchronizing with the transfer belt.
2) Transfer roller operates as synchronizing with the transported paper, and contacts with the transfer belt through the transported paper.
3) Transported paper passes between the transfer roller and transfer belt. In this instance, the positive high voltage (THV) is injected to the transfer roller.
4) Negatively charged toner is moved to the positively charged paper.
5) Transported paper with the toner transferred is transported to the paper discharging process.



THV: Power Supply for Transfer Roller Bias.

Fig. 3-22

8	Drum Cleaning

Transfer belt cleaning process means that the residual toner on the transfer belt is removed.

(1) Structure of transfer unit cleaner PU (Refer to Fig.3-23.)

1) Transfer unit cleaner PU is located as shown in Fig.3-9.
2) Cleaning brush is a semiconductor type fur brush to clean the surface of transfer belt as rotating. However, the cleaning brush stays away from the transfer belt while imaging on the transfer belt.
3) Belt cleaning roller is positively biased by the positive voltage FCBV(V).
4) FCBV(V) is injected to the cleaning brush as well, and the cleaning brush is self-biased by the resistance of brush.
5) Cleaning roller rotates as contacting to the belt cleaning brush.

(2) Process of transfer belt cleaning (Refer to Fig.3-23.)

1) There is the residual toner on the surface of transfer belt after the paper transfer process.
2) Cleaning brush is positively self-biased. Cleaning brush has the negatively charged residual toner fall off from the surface of transfer belt, and electrically absorbs the residual toner into the belt cleaning brush.
3) Cleaning roller has been biased to the positive FCBV(V), the residual toner absorbed into the cleaning brush is attracted by the positive FCBV(V) is adhered to the surface of cleaning roller.
4) Waste toner adhering to the surface of cleaning roller PU is scavenged by the cleaning blade and collected to the waste toner pack by the waste toner feeder.

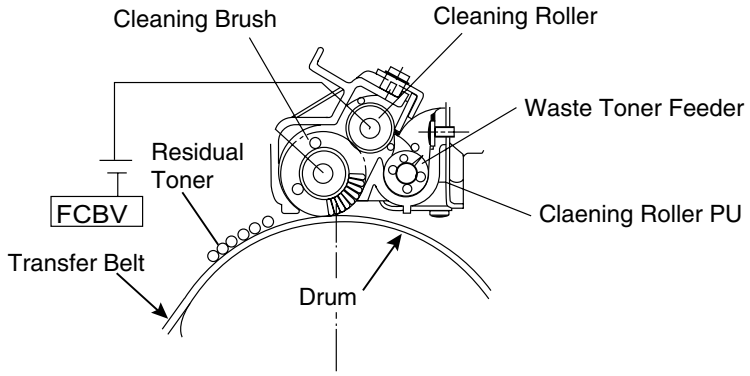


Fig. 3-23

3.2.2 Laser ASSY PU

This machine employs a semiconductor laser diode as a light source. This laser diode is controlled by the fast switching according to transmitted image data (video signal).

The generated laser light scans over the OPC belt through a polygon mirror and lens, by which electrostatic latent images will be formed on the OPC belt.

(1) Structure of laser unit (Refer to Fig.3-24.)

Laser ASSY PU is located as shown in Fig.3-24.

Laser ASSY PU consists of following parts;

1	Laser ASSY:	Light emitting source incorporating a laser diode.
2	Cylinder Lens:	Condenser of laser beam.
3	Polygon Mirror:	Hexahedral mirror scanning the laser beam.
4	F-θ Lens:	Focus lens for laser beam.
5	Scanner Motor:	Motor to rotate the polygon mirror.
6	Mirror:	Reflecting mirror for the laser beam path.
7	LDC:	Laser diode control circuit.
8	PD:	Photo detector.
9	BTD Mirror:	Beam timing detector mirror to guide the laser beam to PD.

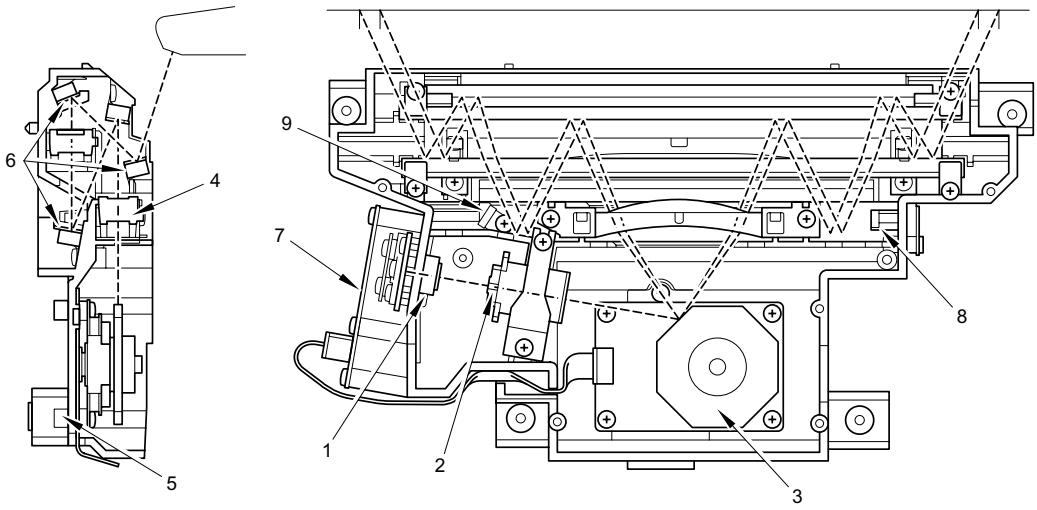


Fig. 3-24

(2) Specification:

Specification of laser unit is described as follows:

Item	Specifications
Rated Output of Laser Diode	5mW.
Wave Length of Laser Beam	Approx.785nm.
Scanning Density	600dpi
Scanning Width	314mm
Rotations Per Minutes of Scanner Motor	35,904rpm
Number of Polygon Mirror Faces	8

3.2.3 Paper Transportation System

(1) Outline

This machine employs the automatic paper feeding with the paper tray.

When toner images are formed on the transfer belt through the operations of print system and transfer system, a paper is fed by the paper feed roller and transported to the registration roller. The transported paper is further transported to the transfer, fuser and exit part by the registration roller synchronizing with the rotation of the transfer belt.

(2) Structure of paper transportation system (Refer to Fig.3-25.)

Paper transportation system consists of following parts.

1	Paper Tray PU:	Case to accommodate papers to be automatically fed.
2	Paper Feed Roller PU:	Roller to feed paper one by one, preventing multi-feed.
3	Registration Roller PU:	Roller to transport papers as synchronizing with the transfer belt.
4	Transfer Roller PU:	Component to be built in the paper exit unit, consisting of the paper guide, registration roller and transfer roller.
5	Fusing Unit FU:	Mechanical part to fuse the toner image with the heat roller and fix it on the paper.
6	Back Cover ASSY PU (Paper Exit Unit):	Component to consist of the paper guide and paper exit roller that exits the fusing-completed paper.
7	Exit Roller ASSY PU:	Roller to exit papers from of the machine.

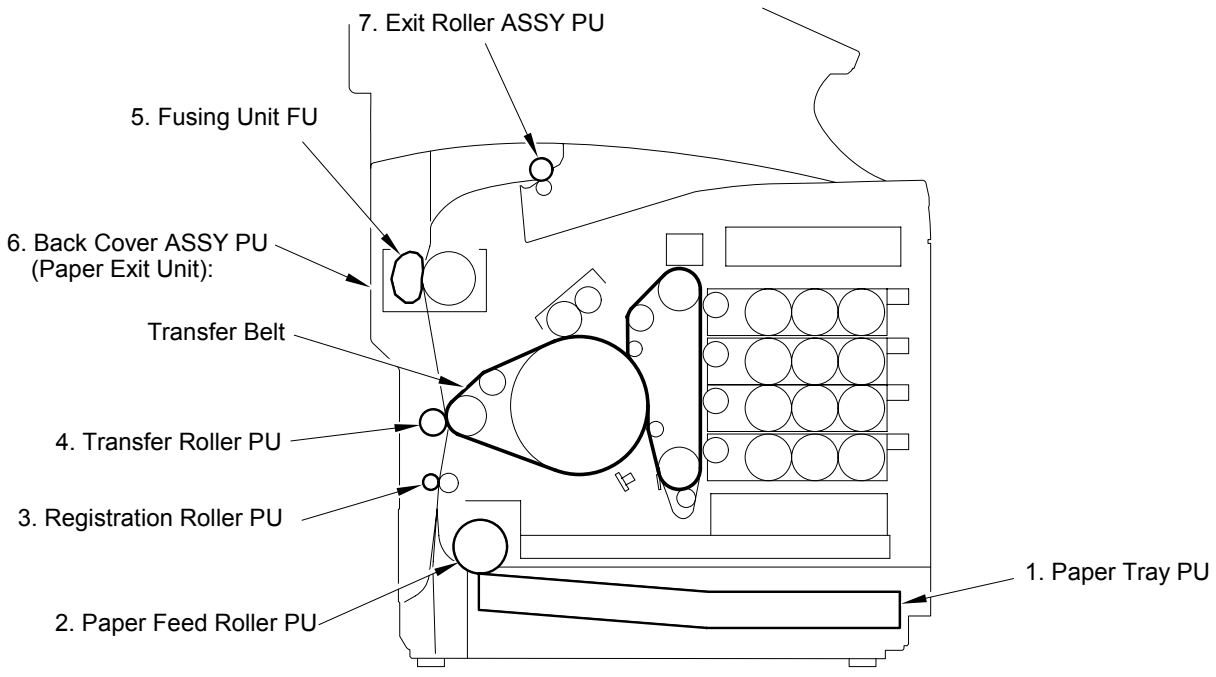


Fig. 3-25

3.2.4 Fusing Unit

Fusing unit employs the thermal fusing system containing the heater in the roller. Papers carrying the toner images pass between the heat rollers. Heat and pressure is applied to the paper when passing between the heat rollers so that the toner image is melted and fused on the paper.

(1) Structure

Fusing unit consists of the following component members; (Refer to Fig.3-26.)

1	Fuser Roller:	Heating roller that incorporates the heater in the roller.
2	Back-Up Roller:	Belt unit that presses the paper against the fuser roller.
3	Fusing Heater:	Halogen lamp.
4	Thermistor:	Sensor that detects temperature of fuser roller's surface.
5	Thermostat:	Device that prevents the fuser roller from being excessively heated up.

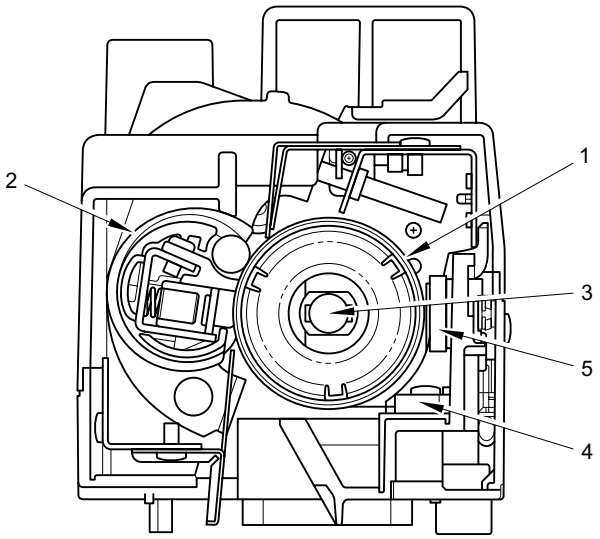


Fig. 3-26

(2) Process of fusing (Refer to Fig.3-27.)

1) The toner image that has been transferred onto the paper is simply adhered on the paper but not fused yet.
2) Transported paper passes between the heater roller and back-up roller.
3) Each roller is heated up to approx. 150°C, and received approx.200N from the opposite heat roller.
4) When the paper carrying the toner images passes between the tow heat rollers, the toner images are melted and fused on the transported paper.
5) The paper carrying the fused image is separated from the heat rollers, and ejected from the machine.

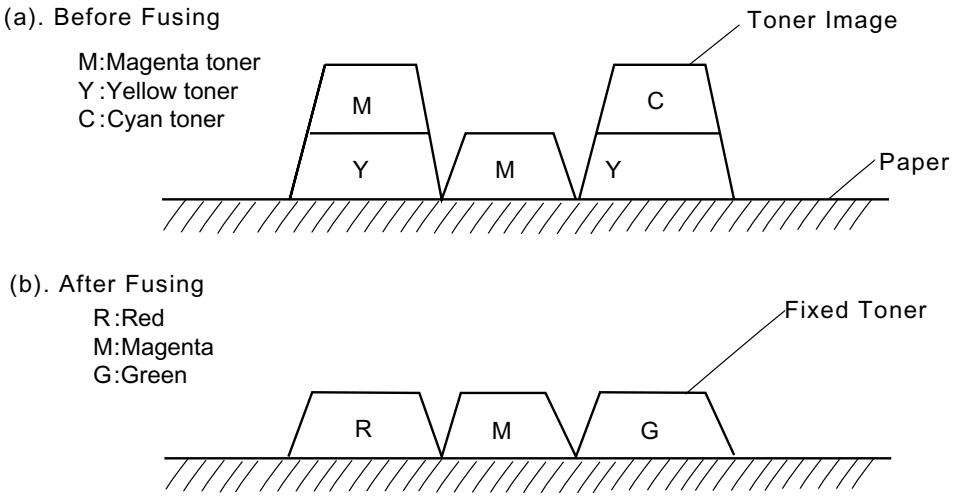


Fig. 3-27

3.3 STRUCTURE OF THE CONTROL SYSTEM

3.3.1 Basic Structure

[1] Electrical system and function

Most of the main electrical parts of this machine are controlled by the MCTL (engine controller) PCB.

<Structure of the Sequence Control>

The basic structure of the sequence control is shown in Fig.3-28.

Print Process Control:	To control the print process from the paper feed through paper exit.
Laser Output Control:	To control automatically the laser output to the default.
Fuser Temperature Control:	To control the fuser heater so that temperature of fuser roller and back-up roller will be the default.
Toner Sensing Control:	To control the sensing procedures of toner empty status.
Interface Control: (Video Signal)	To process the input and output signal with the external controller (host).
Control Panel Indicator:	To display the machine operation status in the operator panel indicator.
Error Control:	To control the safe stop procedures when errors occur in the machine.

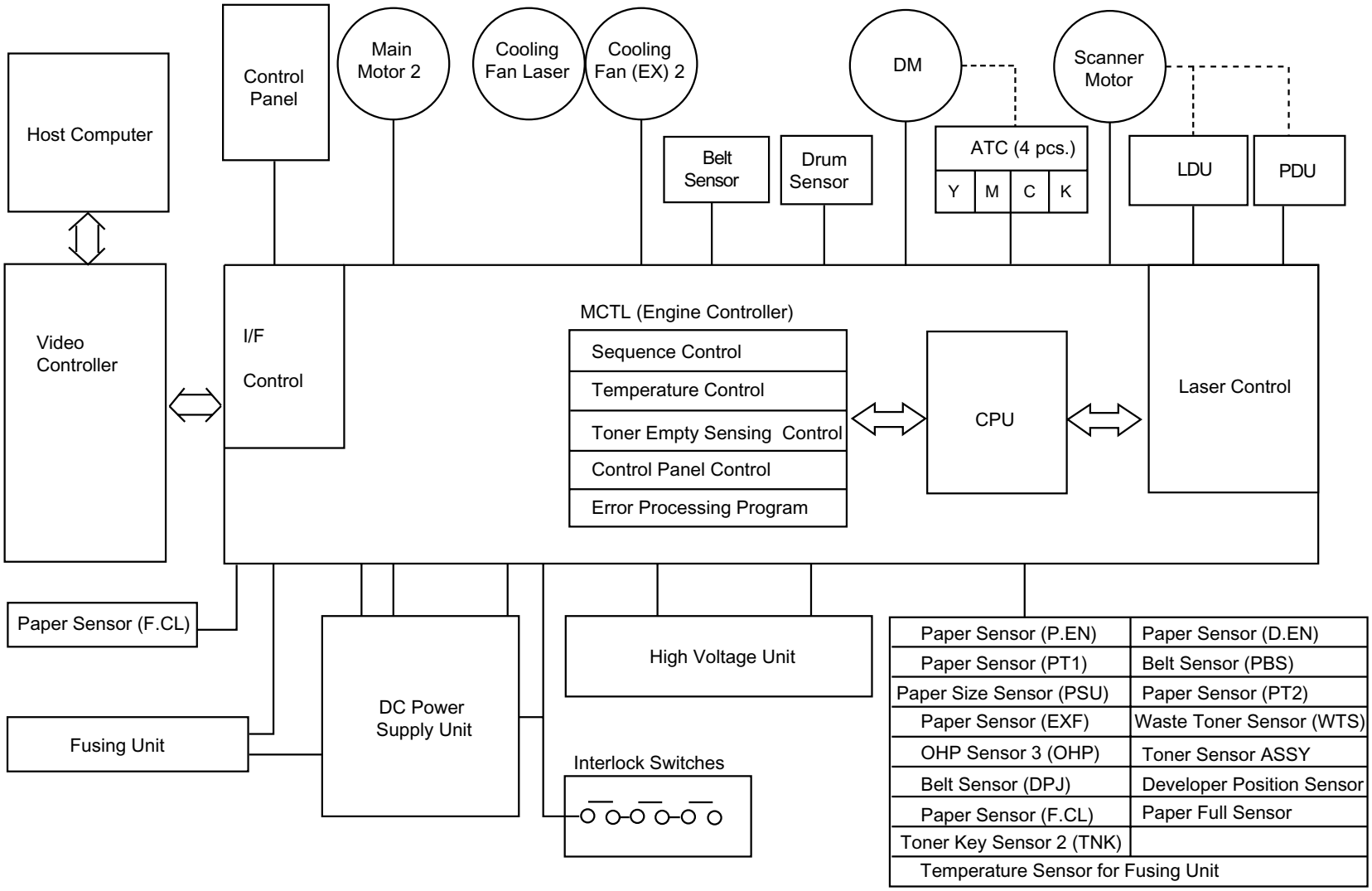

Host Computer
Control Panel
Main Motor 2
Cooling Fan Laser
Cooling Fan (EX) 2
DM
Scanner Motor
Belt Sensor
Drum Sensor
ATC (4 pcs.)
Y
M
C
K
LDU
PDU
Video Controller
I/F Control
MCTL (Engine Controller)
Sequence Control
Temperature Control
Toner Empty Sensing Control
Control Panel Control
Error Processing Program
CPU
Laser Control
Paper Sensor (F.CL)
Fusing Unit
DC Power Supply Unit
High Voltage Unit
Interlock Switches
Paper Sensor (P.EN)
Paper Sensor (D.EN)
Paper Sensor (PT1)
Belt Sensor (PBS)
Paper Size Sensor (PSU)
Paper Sensor (PT2)
Paper Sensor (EXF)
Waste Toner Sensor (WTS)
OHP Sensor 3 (OHP)
Toner Sensor ASSY
Belt Sensor (DPJ)
Developer Position Sensor
Paper Sensor (F.CL)
Paper Full Sensor
Toner Key Sensor 2 (TNK)
Temperature Sensor for Fusing Unit

Fig. 3-28

<Layout & Function of the Electrical Parts>

(1) Print PCB (Refer to Fig. 3-29.)

No.	Name	Function
1	Engine Controller Board PU (MCTL P.W.B.)	To control the series of processes of the Machine: Fuser temperature control, Laser output control, Operator panel indication, Toner empty sensing control, Error processing control, Interface control.
2	Panel ASSY PU	To display the machine's operation status and support the manual input switch.
3	LDU P.W.B.	To control the drive and output of the laser diode to be included in the optical unit.
4	PDU P.W.B.	To sense the emission of laser diode and also the beam position to be included in the optical unit.
5	Erase Lamp PU	To discharge the OPC belt by radiating the LED beam onto the OPC belt to be included in the optical unit.
6	I/O Board PU (IOD P.W.B.)	To relay the signals between the controlled parts and MCTL P.W.B., and to drive the controlled parts.
7	LV Power Supply PU (DC Power Supply Unit) (LVPS)	To provide the Machine with the power supply for the machine control.
8	HV Power Supply PU (High Voltage Power Supply Unit (HVU))	To provide the machine with the high voltage power supply that is necessary for the printing process.
9	Video Controller PCB	To receive the print data from the host computer, convert it into image data and then send the printing image data to the MCTL PWB.
10	NCU PCB	To relay the signals between the telephone line (primary side) and video controller PCB (secondary side).

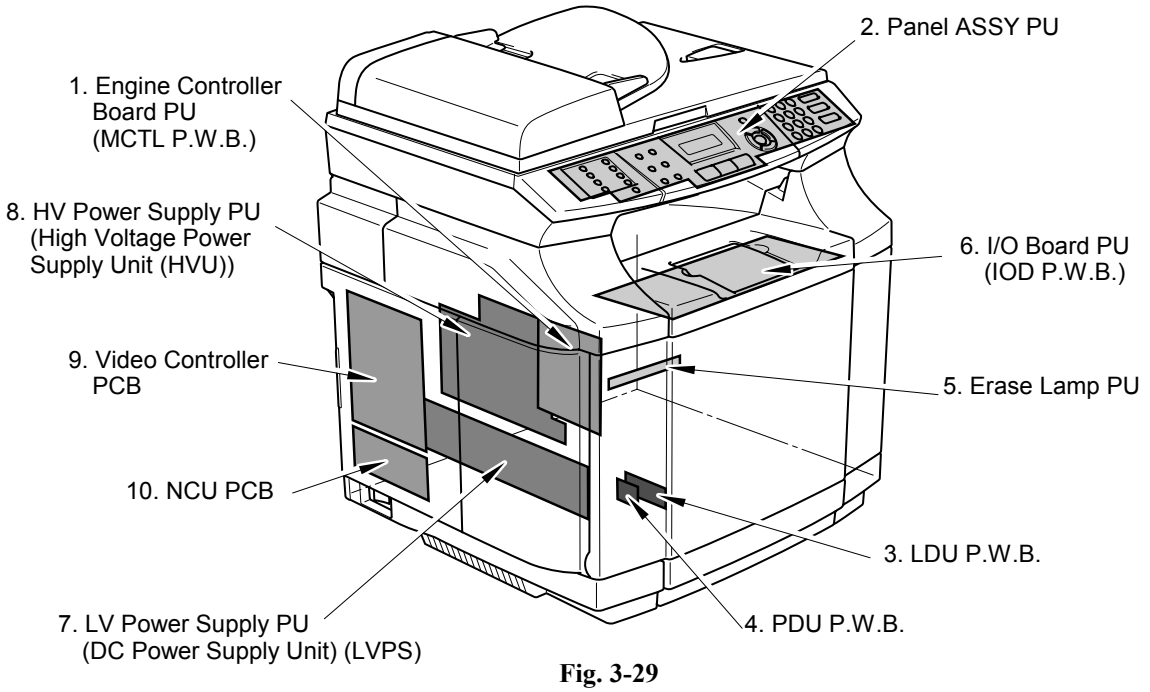


Fig. 3-29

(2) Motors (Refer to Fig. 3-30.)

No.	Name	Code	Function
1	Main Motor PU	MM	To drive the OPC belt and the paper transport system.
2	Developer Motor PU	DM	To drive the toner cartridge and the developing system.
3	Scanner Motor (Laser ASSY)	SCM	To scan the laser beam.
4	Exit Fan PU	EXFAN	To exhaust the heat of fusing unit.
5	Power Supply Fan PU	PSFAN	To exhaust the heat of power supply unit and Interface controller.
6 6-1 6-2 6-3	Interlock Switch PU Front Cover Switch Paper Exit Cover Switch Back Cover Switch	 DSW1 DSW2 DSW3	This the safety interlock switch when opening the cover.
7	Laser Fan PU	LDFAN	To exhaust the heat of laser ASSY.

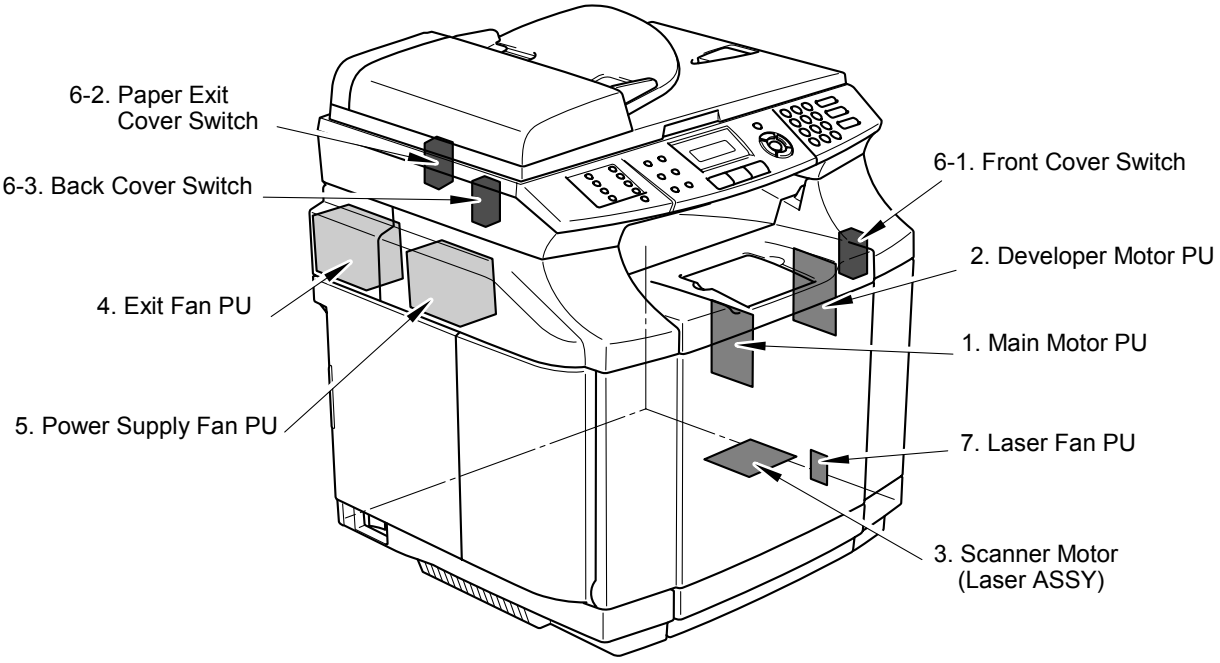


Fig. 3-30

(3) Clutches and Solenoids (Refer to Fig.3-31.)

No.	Name	Code	Function
1	Paper Feed Clutch PU	PCLU	To feed papers by coupling the feeding roller to the main gear unit at timing of the paper feeding.
2	Registration Clutch PU	RECL	To transport papers by coupling the registration roller to main gear unit as synchronized with the rotation of transfer drum.
3	Fuser Clutch PU	FUCL	To drive the fusing roller by coupling the fusing unit to the main gear unit.
4	Cleaning Roller Solenoid PU	FBSOL	To drive the brush of drum cleaner by coupling the cleaner clutch to the main gear unit at timing of the drum cleaning.
5 - 8	Developer Clutch PU	DCL (Y,M,C,K)	To drive the Mg. roller of desired color toner cartridge by coupling said toner cartridge to the developer gear unit at timing of the developing.
9	Toner Retract Solenoid PU	DSL (Y,N,C,K)	To relocate the desired color toner cartridge to developing position at timing of the developing.
10	Transfer Roller Clutch PU	TRCL	To have the transfer roller contact to the transfer roller's surface at timing of the second transfer.

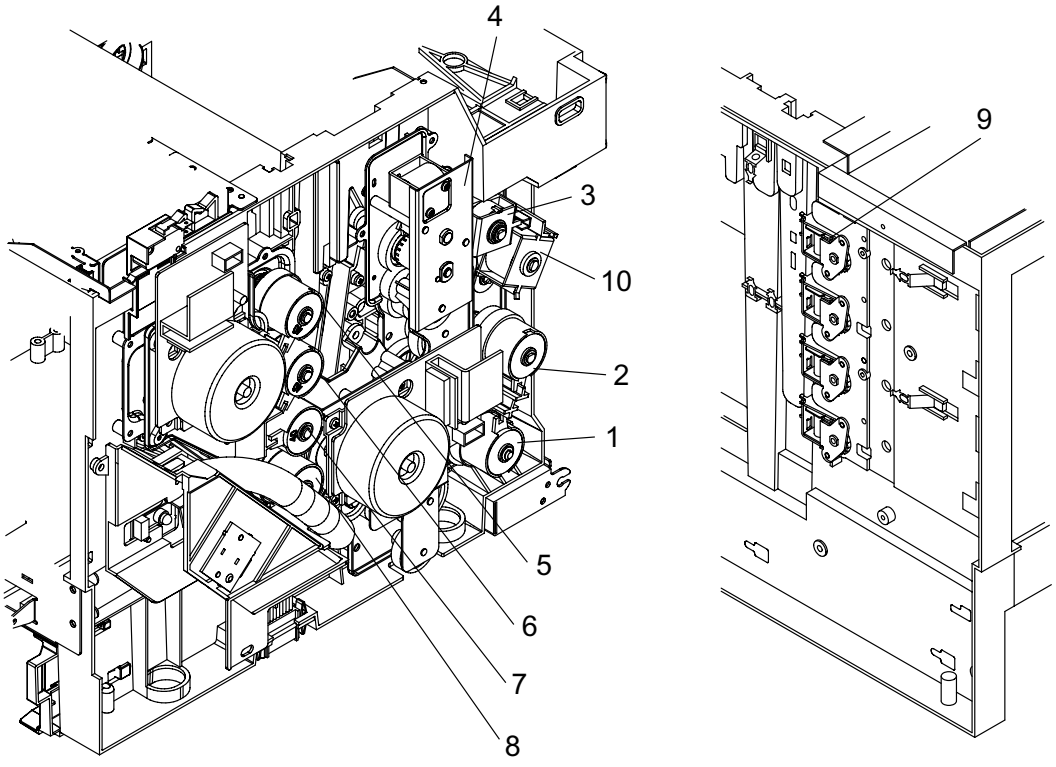


Fig. 3-31

(4) Sensors

No.	Name	Code	Function
1	Paper Size Sensor PU	PSU	Photo sensor to detect the paper size.
2	Registration Sensor PU	PT1	Photo sensor to detect the paper is fed from the paper tray.
3	Fuser Exit Sensor PU	PT2	Photo sensor to detect that paper is exited from the paper exit unit.
4	Tray Empty Sensor PU	PEU	Photo sensor to detect if paper is loaded or empty in the paper tray.
5	OHP Sensor PU	OHP	Photo sensor to detect that material in the paper tray is OHP.
6	Toner Density Sensor PU	TDS	Photo sensor to detect the toner density of images formed on the transfer belt surface.
7	Transfer Unit Sensor PU	TBS	Photo sensor to detect irregular rotation of the transfer belt.
8	OPC Marker Sensor PU	PBS	Photo sensor to detect the connecting position of the OPC belt.
9	Toner Sensor PU	TPD/TTR	Photo sensor to detect if the toner is empty or not for each toner cartridge.
10	Waste Toner Sensor PU	WTS (LED/TR)	Photo sensor to detect that the waste toner bottle is full of waste toner.
11	Temperature Sensor for Fusing unit	TH	Thermistor to detect the fuser temperature.
12	Output Tray Full Sensor PU	PFUL	This is the sensor to detect that the paper exit tray is full of exited papers.
13	Toner Key Sensor PU	TNK	To detect the availability of key to be provided to the toner cartridge.
14	Room Temp. Thermistor Sensor PU	RTS	Sensor to detect the ambient temperature of the machine setting location.
15	ADF Rear Sensor		Sensor to detect the document length, and that the document is sent to the ADF.
16	ADF Front Sensor		Sensor to detect that the document is on the ADF.

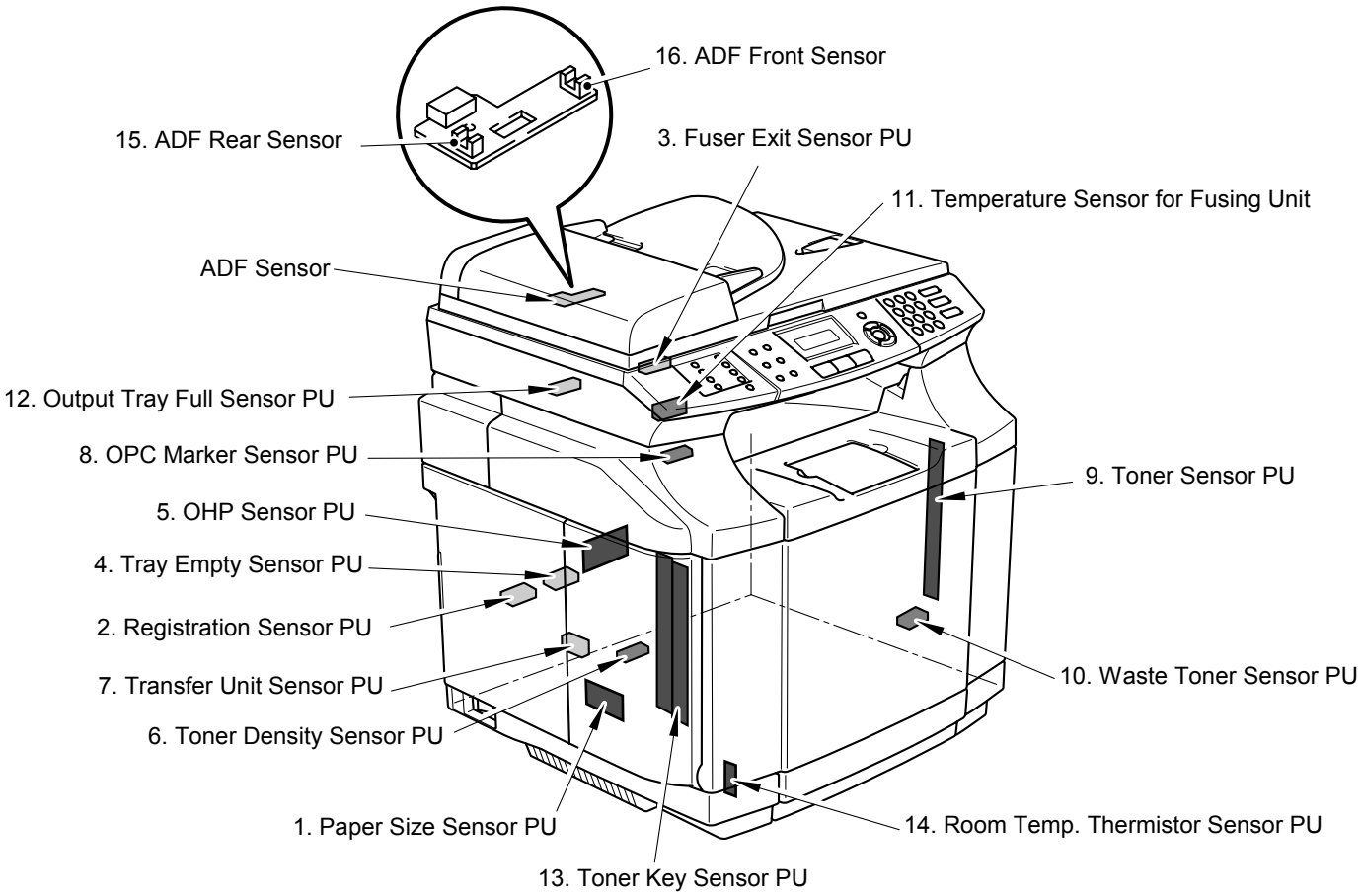

16. ADF Front Sensor
15. ADF Rear Sensor
3. Fuser Exit Sensor PU
11. Temperature Sensor for Fusing Unit
ADF Sensor
12. Output Tray Full Sensor PU
8. OPC Marker Sensor PU
9. Toner Sensor PU
5. OHP Sensor PU
4. Tray Empty Sensor PU
2. Registration Sensor PU
10. Waste Toner Sensor PU
7. Transfer Unit Sensor PU
6. Toner Density Sensor PU
1. Paper Size Sensor PU
14. Room Temp. Thermistor Sensor PU
13. Toner Key Sensor PU

Fig. 3-32

3.3.2 Control System

[1] Control of the print process

A micro CPU mounted on the MCTL PCB controls the print processes.

<Print Sequence Diagram>

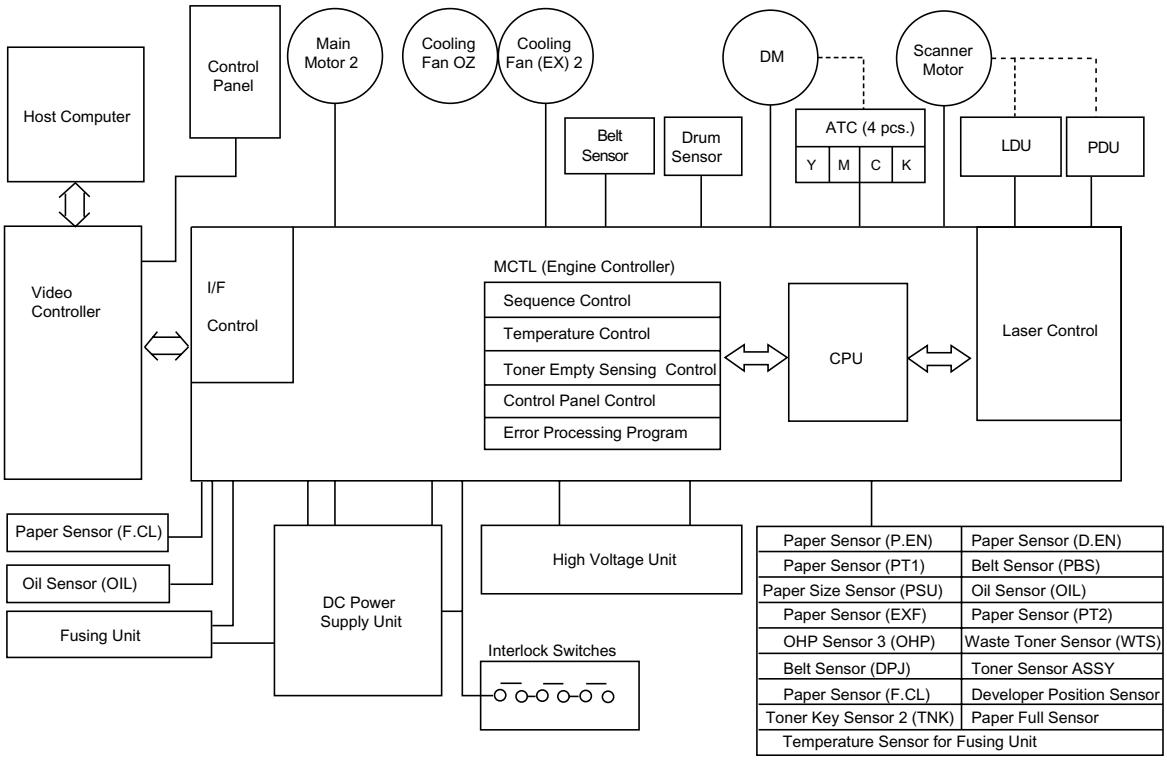


Fig. 3-33

(1) Control Block Diagram (Refer to Fig.3-33.)

No.	Name	Function
1	Sequence Control	To control the print sequence of machine.
2	Temperature Control	To control the temperature of fusing unit.
3	Consumables' Life Control	To control the toner empty status and the life of periodic replacement parts.
4	Operator Panel Control	To control the operator panel indication and the operation signals.
5	Error Processing Control	To sense the errors occurring in the machine and the stop procedures.
6	Interface Control	To control the receipt and transmission of the interface signals from the external controller.
7	Laser Control	To control the laser scanning and laser power.

(2) Laser drive control circuit

Laser drive control circuit (LDC) consists of the video signal input circuit, laser drive circuit, laser diode, output sensing circuit and output control circuit, as shown in Fig.3-34.

<Operation>

1) When the video signal is inputted, the laser drive control circuit has the laser diode switched on and radiated according to the video signal.
2) Radiated laser beam is sensed by the photo detector (PD), and the detecting signal is fed back to the output control circuit.
3) Output control circuit controls the radiation output to be constant, by comparing the laser output default with the feed-back value transmitted from the output sensing circuit.
4) Laser beam scanned by the scanner motor is sensed by the beam detector (PD), and then, the beam detecting timing (BDT) signal will be outputted.

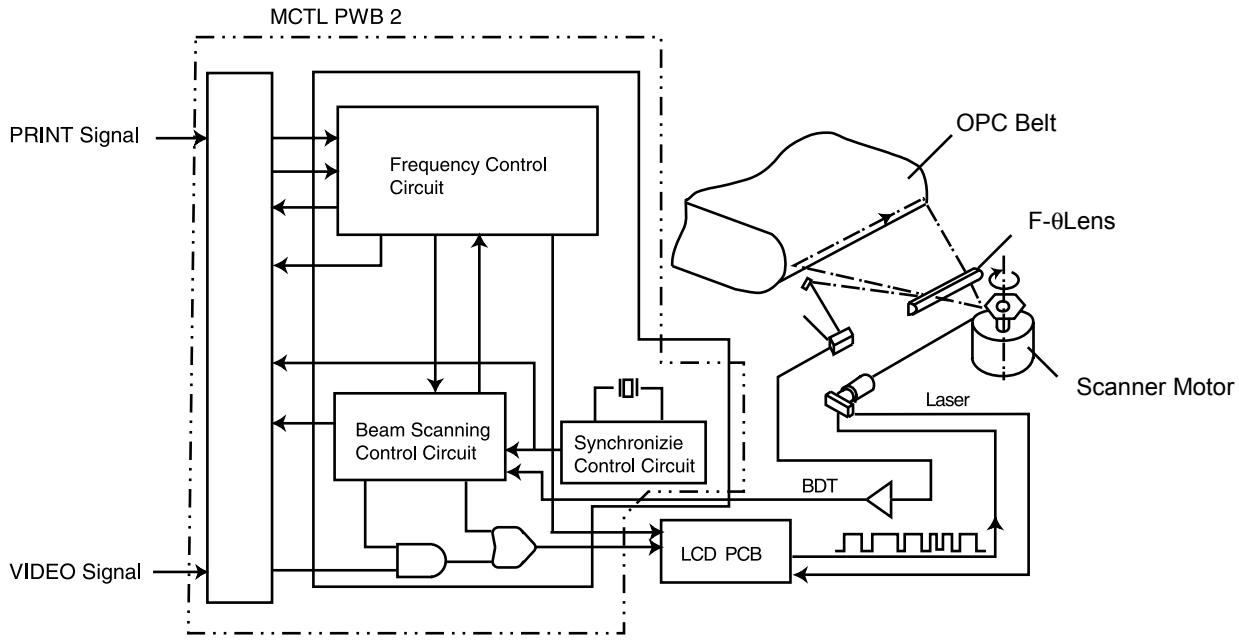


Fig. 3-34

(3) Control of the Fusing Temperature

Each roller of the fusing unit is controlled to maintain the appropriate temperature so that toner will be fixed correctly onto the print paper.

<Basic Structure of Temperature Control (Fig.3-35)>

FLS:	Thyristor to control the on/off operation of power supply to the heat lamp.
THS1 / THS2:	Thermostat to shut down the circuit for safety when it will be too hot within the fusing unit FU.
TH:	Temperature sensor to detect the surface temperature of the heat roller (HR).
RY:	Relay to prevent the further heating when it will be hotter than the set point within the fusing unit FU.
GA/CPU:	Process circuit to process the temperature signal (micro computer).
CM1:	Sensor circuit for temperature signal (for ACOFF signal).
CM2:	Sensor circuit for temperature signal (for HON signal).
CM3:	Sensor circuit for temperature signal (for processing).
Q:	Sensor circuit for shut-down by the thermistor (for THERR signal).
HR:	Back-up roller.

<Signal Functions>

HON-N:	To turn on/off the heater in side the fusing roller.
ACOFF:	To turn off the relay RY1 when it is sensed too hot.
THERR:	To detect the shut-down by the thermistor.
AD:	To convert the temperature sensing signal to AD.

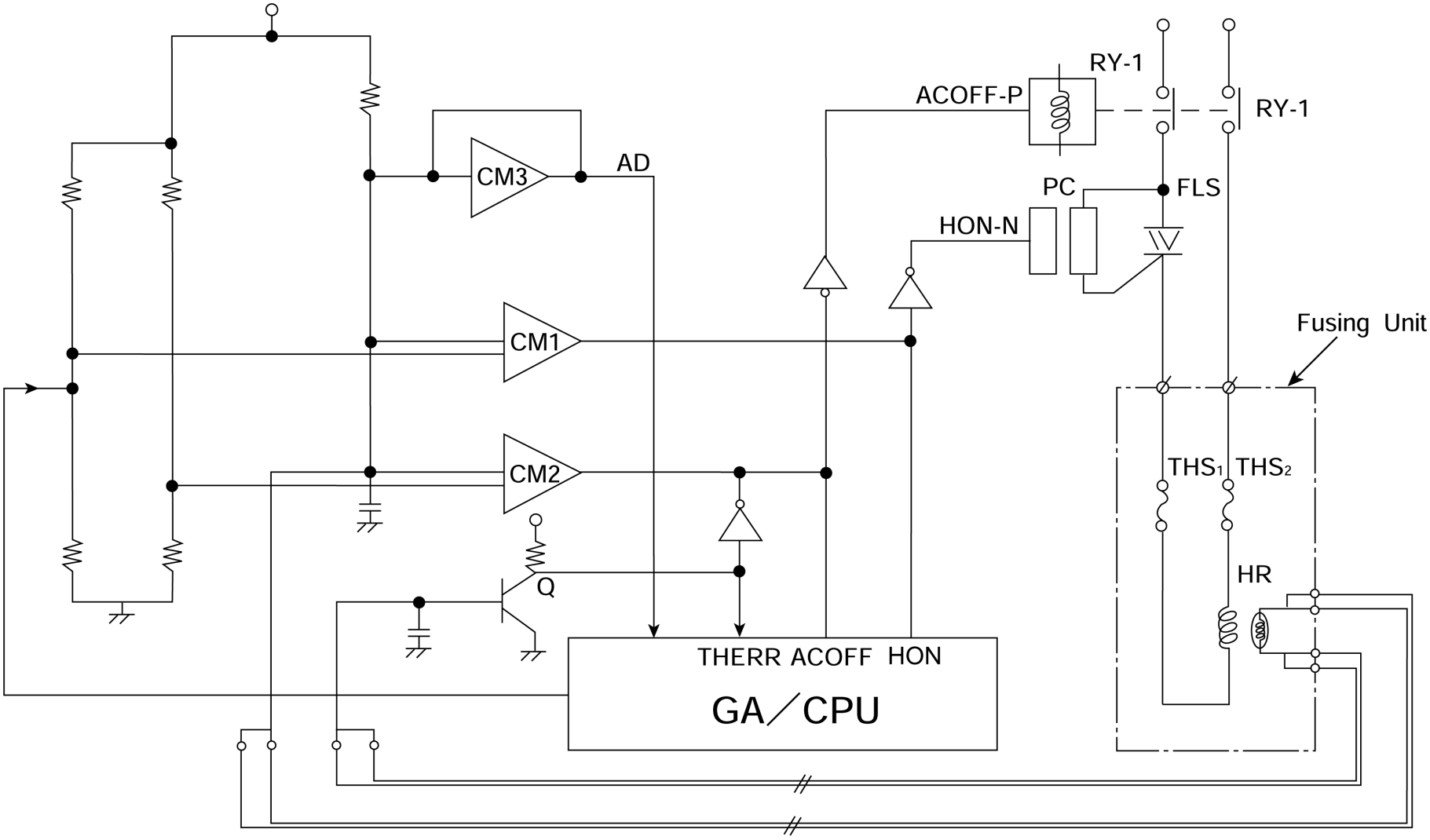


Fig. 3-35

<Controlled Temperature and Safety>

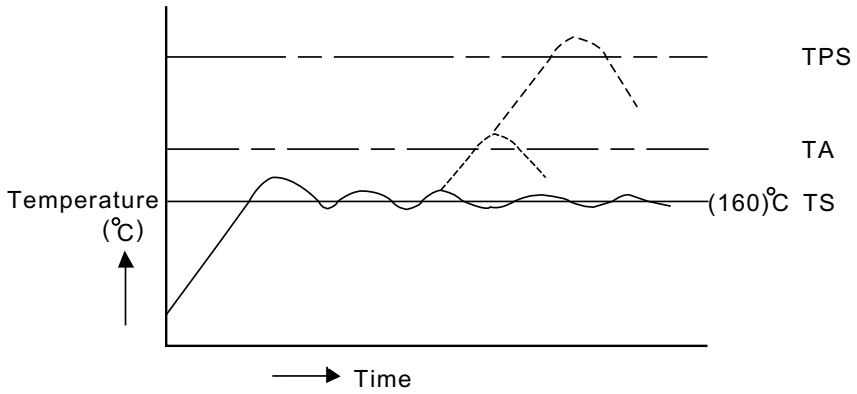


Fig. 3-36

TS: To maintain the set point (temperature) for fusing of toner to be approx. 160°C as appropriate by turning on/off the thyristor.

TA: Reference temperature (approx. 185°C) to identify that it is excessively hot inside the fusing unit. When it reaches to this point, the relay RY turns off, the power supply to the heat lamp is shut down, and the machine stops the operation.

TPS: Limit temperature to have the thermal cut-off start melting and shutting down the power supply to the heat lamp if the temperature control circuit should break down.

<Temperature Control and Safety>

The detection of the fusing temperature is performed by the thermistor and transmitted to the temperature control circuit. The temperature control circuit makes the comparative control with the basic control temperature signal and ON/OFF control over the triac (FLS) so that the temperature of the heat roller will be the preset temperature (PS).
The temperature control is made in terms of the both hardware and software, and detects any error with the following detection meanings. Upon the detection of such error, the machine stops and the error message is displayed on the operator panel.

H0: If the wire-cut occurred in the temperature sensor thermistor (TH) or the breakdown such as wire-cut occurred in the circuit, the wire-cut detection signal (THERR) is outputted. This signal works to turn off the relay (RY-1) and the triac (FLS) and subsequently stops the machine.

H1: If the surface temperature of the heat roller continues to be higher than the preset value of abnormal temperature (TA) for more than the specified time, CPU forces the HON signal and ACOFF signal to turn off according to the timer control so that the machine stops.

H2: If the surface temperature of the heat roller does not reach to the preset temperature (TS) in the specified time after power-on, CPU forces the HON signal and ACOFF signal to turn off according to the timer control so that the machine stops.

H3: If the surface temperature of the heat roller continues to be lower than the preset temperature (TS) for more than the specified time, CPU forces the HON signal and ACOFF signal to turn off according to the timer control so that the machine stops.

H4: If the surface temperature of the heat roller continues to be higher than the preset temperature (TS) for more than the specified time, CPU forces the HON signal and ACOFF signal to turn off according to the timer control so that the machine stops.

HA: If the temperature of the heat roller becomes abnormal due to the break-down of the control circuit etc., the temperature detection circuit (CM2) transmits the ACOFF signal. This signal turns off the relay (RY-1), and simultaneously makes the CPU stop the machine.

(4) Interface Control

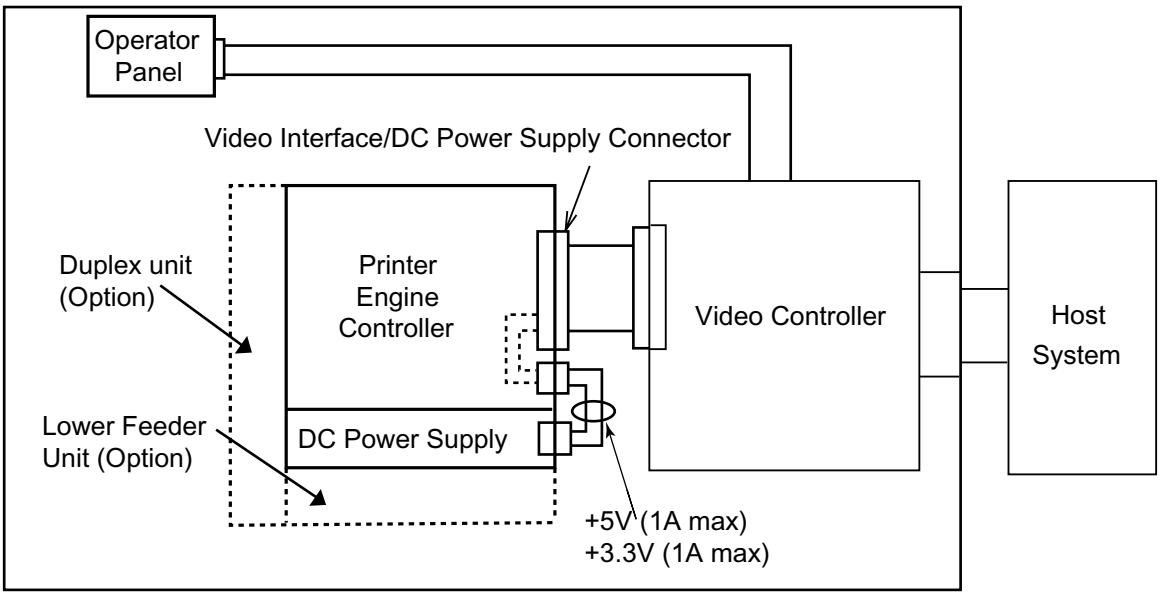
<General>

1) Interface type

This document describes the video and command/status Interface between video controller and engine controller. Printer controller acts as a slave to video controller. Through video interface, video controller controls the printer & operator panel using command/status communication and transmits the synchronized video data to printer laser diode. Operator panel is physically resident on the engine.

2) Interface connection

The interface connector of this machine is connected to the host system as shown in Fig.3-37.



Interface Circuit (Internal Connecting System)

Fig. 3-37

3) Interface Circuit (Printer side)

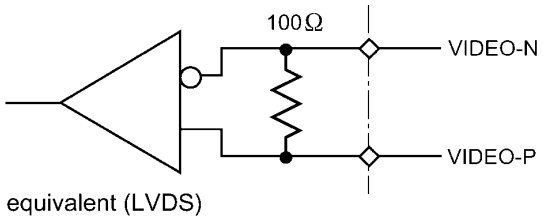
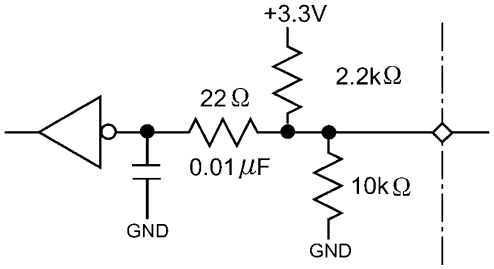
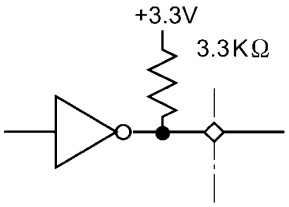
No.	Interface Circuit	Name of Signal
1	 equivalent (LVDS)	• VIDEO-N • VIDEO-P
2	 74LV05A or equivalent (LV-CMOS)	• PRREQ-N • COMMAND • ID2-N
3	 74V06A or equivalent (LV-CMOS)	• HSYNC-N • VSYNC-N • IREADY-N • STATUS • KEY-STATUS-N

Fig. 3-38

4) Connector Pin Assignment

The connector in the machine to connect to the controller board is type 128A-064S2B-:L14A (DDK) or the equivalent.

<Connector pin assignment for video interface signals and DC power supply (Engine side)>

Pin No.	Signal Name	Pin No.	Signal Name
1A	PSGND	1B	+5V
2A	PSGND	2B	+5V
3A	PSGND	3B	+3.3V
4A	PSGND	4B	+3.3V
5A	PSGND	5B	+3.3V
6A	PSGND	6B	+3.3V
7A	PSGND	7B	+3.3V
8A	PSGND	8B	+3.3V
9A	VIDEO-P	9B	VIDEO-N
10A	RET(GND)	10B	Reserve
11A	Reserved	11B	HSYNC-N
12A	ID2-N	12B	Reserve
13A	RET(GND)	13B	VSYNC-N
14A	RET(GND)	14B	Reserve
15A	RET(GND)	15B	STATUS
16A	RET(GND)	16B	IREADY-N
17A	RET(GND)	17B	Reserve
18A	RET(GND)	18B	COMMAND
19A	RET(GND)	19B	PRREQ-N
20A	RET(GND)	20B	Reserve
21A	Reserved	21B	Reserve
22A	RET(GND)	22B	KEY_STATUS-N
23A	Reserved	23B	Reserve
24A	Reserved	24B	Reserve
25A	RET(GND)	25B	Reserve
26A	RET(GND)*	26B	Reserve
27A	RET(GND)	27B	Reserve
28A	RET(GND)*	28B	+24V
29A	RET(GND)	29B	+24V
30A	RET(GND)*	30B	Reserve
31A	RET(GND)	31B	PGND
32A	RET(GND)*	32B	PGND

* Pin No. 26A, 28A, 30A and 32A should be connected to the GND at the LPC side.

3.3.3 Main PCB (Video Controller PCB)

[1] Outline

The main PCB consists of the circuits which perform the following functions;

- Receive the printing data from the computer.
- Convert the received data to the bitmap data such as characters or graphics.
- Control the engine and send the generated bitmap data as a video signal.

The control panel is controlled by communicating with the engine CPU to display LCD messages, light the LEDs and display the button status, etc.

The power for the main PCB is supplied from the engine through the engine interface connector.

[2] Circuit

(1) CPU

- Model name: VR5500, core
  MIPS 64bit RISC CPU manufactured by NEC
- Clock speed: 89MHz (external) / 266MHz (internal)
- Cache memory: 32KB (Command cache) / 32KB (Data cache)
- Bus width: 32bit (external) / 64bit (internal)
  Internal Floating Point Unit (FPU)

(2) ASIC block

- Model name: PD800268F1 manufactured by NEC
- Appearance: 316pin BGA
- Functions:
  * Controls CPU
  * Controls memory
  * Controls interrupts
  * Timer
  * External interfaces (Centronics, PCI, IDE, Compact Flash, USB)
  * Engine interface (Video signal control, LVDS)
  * Supports Software

(3) ROM block

The ROM stores the CPU control program and font data. ROMs used are an 16Mbytes flash ROM, and an 8 Mbytes flash ROM which can be rewritten on the board.

<Masked ROM>

- Model name: S29GL128N90TFIR20H
- Access time: less than 90nsec.
- Appearance: 56pin TSOP

<Flash ROM>

- Model name: S29GL064M90TCIR20 manufactured by SPANSION
- Access time: less than 90nsec.
- Appearance: 48-pin TSOP

(4) SO-DIMM

SO-DIMM allows memory extension by up to 576MB.
1 SO-DIMM socket is available.

The following type of DIMM can be installed into each slot.

- Type: 144 pin and 64 bit output
- Memory type: SDRAM
- Clock frequency: PC100 or PC133
- Parity: Non-parity can be used
- Memory capacity: 64MB, 128MB, 256MB, 512MB
- CAS latency: 2 or 3

<Recommended DIMM type>

<US>

* 64MB: Techworks 12345-0001
* 128MB: Techworks 12462-0002
* 256MB: Techworks 12469-0001

<Europe>

* 64MB: Buffalo Technology VN133-64M
* 128MB: Buffalo Technology VN133-128M
* 256MB: Buffalo Technology VN133-256M
* 512MB: Buffalo Technology VN133-512M

Any combination of DIMM size can be installed into any slot in any order but it is recommended that the larger DIMM is install in Slot 0.
For more information, visit Techworks web site at www.techworks.com

(5) External interface block

- IEEE1284 Interface
- USB (Hi-Speed USB2.0)
- Ethernet (10/100Base TX)

(6) Engine interface block

The engine interface consists of the following signals;

<IREADY>
The signal indicating the engine is ready.

<PRREQ>
Signal requesting printing from the controller.

<KEY_STATUS>
Signal indicating that a key switch status on the control panel has changed.

<VSYNC>
Vertical synchronization signal for printing.

<HSYNC>
Horizontal synchronization signal for printing.

<VIDEO>
Video data signal

<COMMAND>
Command signal sent from the controller to the engine.

<STATUS>
Status signal sent from the engine to the controller.

Fig.3-40 shows the timing of each signal after the power switch is turned on.

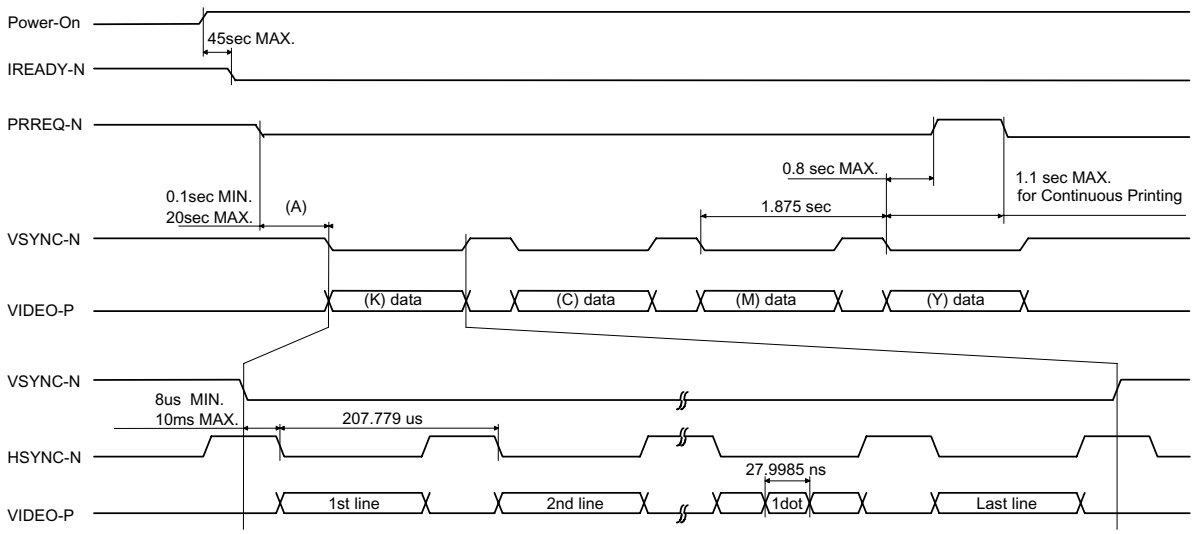


Fig. 3-39

The COMMAND signal and STATUS signal are the signals that are used to transfer the data between the controller and the engine, which perform as a half-duplex asynchronous serial communication. Refer to Fig.3-40.

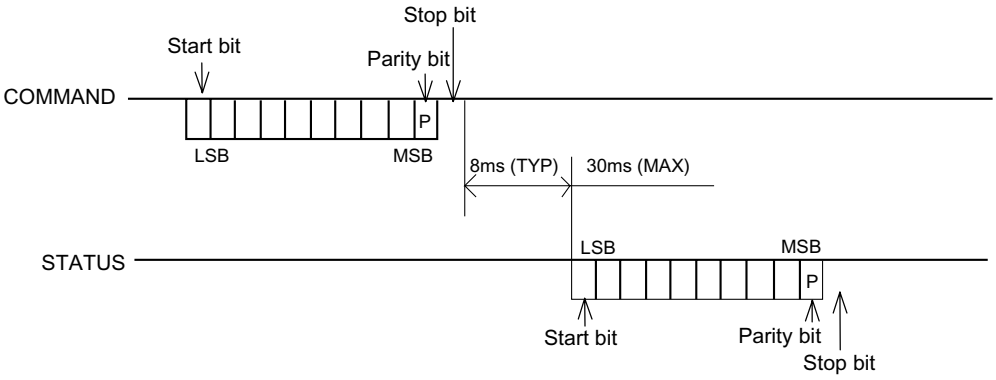


Fig. 3-40

NOTE:

- Based on "Asynchronous communication" method.
- Command/status communication must keep the "Handshake rule".
- Baud rate is 9600 bps.
- Frame format: - one (1) start bit,
  - eight (8) data bits
    (Start bit side is LSB, Parity bit is MSB),
  - one (1) odd parity bit,
  - one (1) stop bit.
- The video controller has to send an "Initialize command" to the engine controller after power on in order to establish communication.

The power for the main PCB is supplied through the engine interface connector.

3.4 SCANNER MECHANISM

This mechanism consists of the document cover, the scanner unit (scanner cover), and the automatic document feeder (ADF).

The scanner unit consists of a scanner top cover, CIS unit, CIS drive assembly, and scanner base.

The detailed illustration on the next page shows the components making up the ADF: document pull-in roller, document separation roller, document feed roller, ADF motor, and document front and rear sensors.

For further details on the sensors, see (4) Sensors.

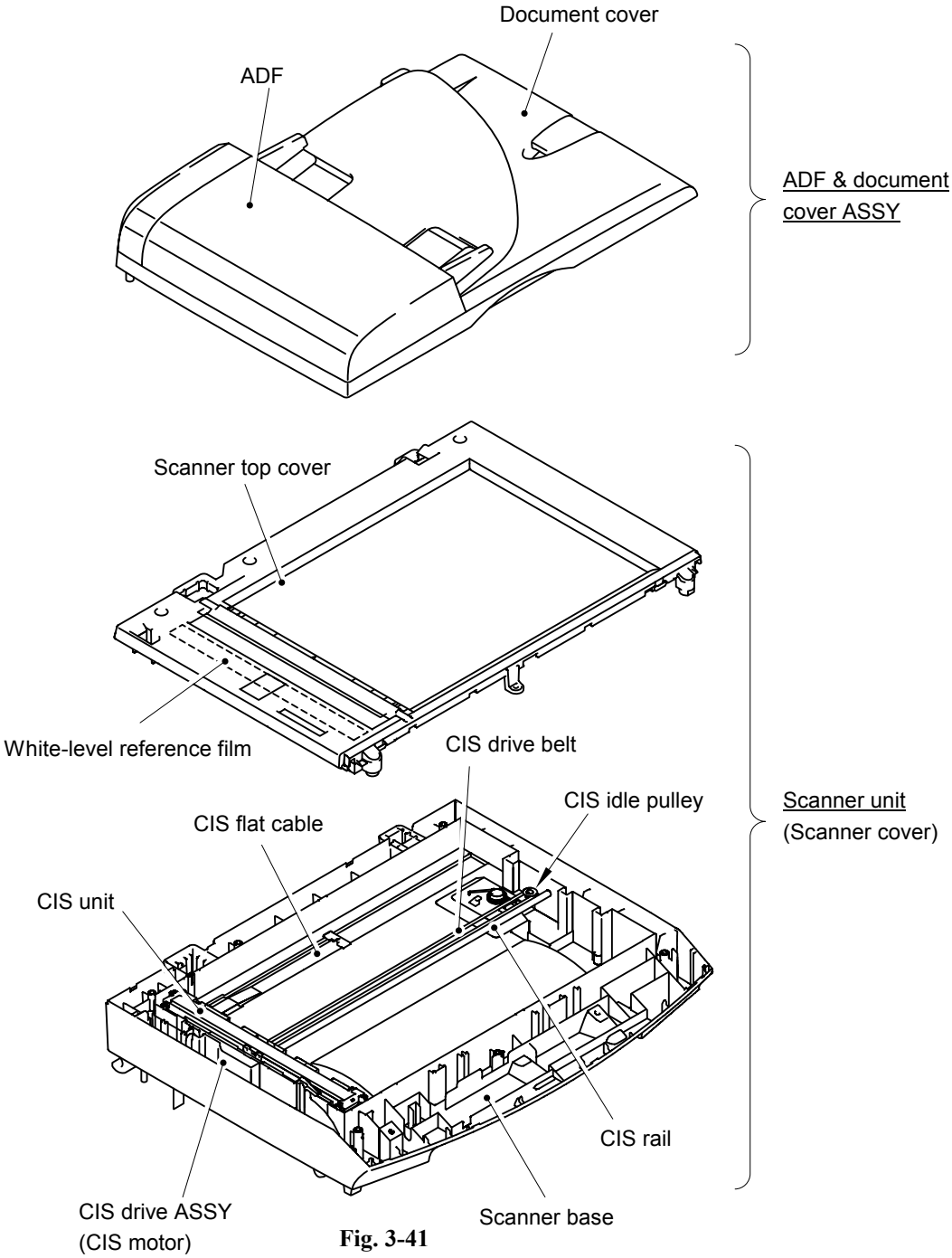


Fig. 3-41

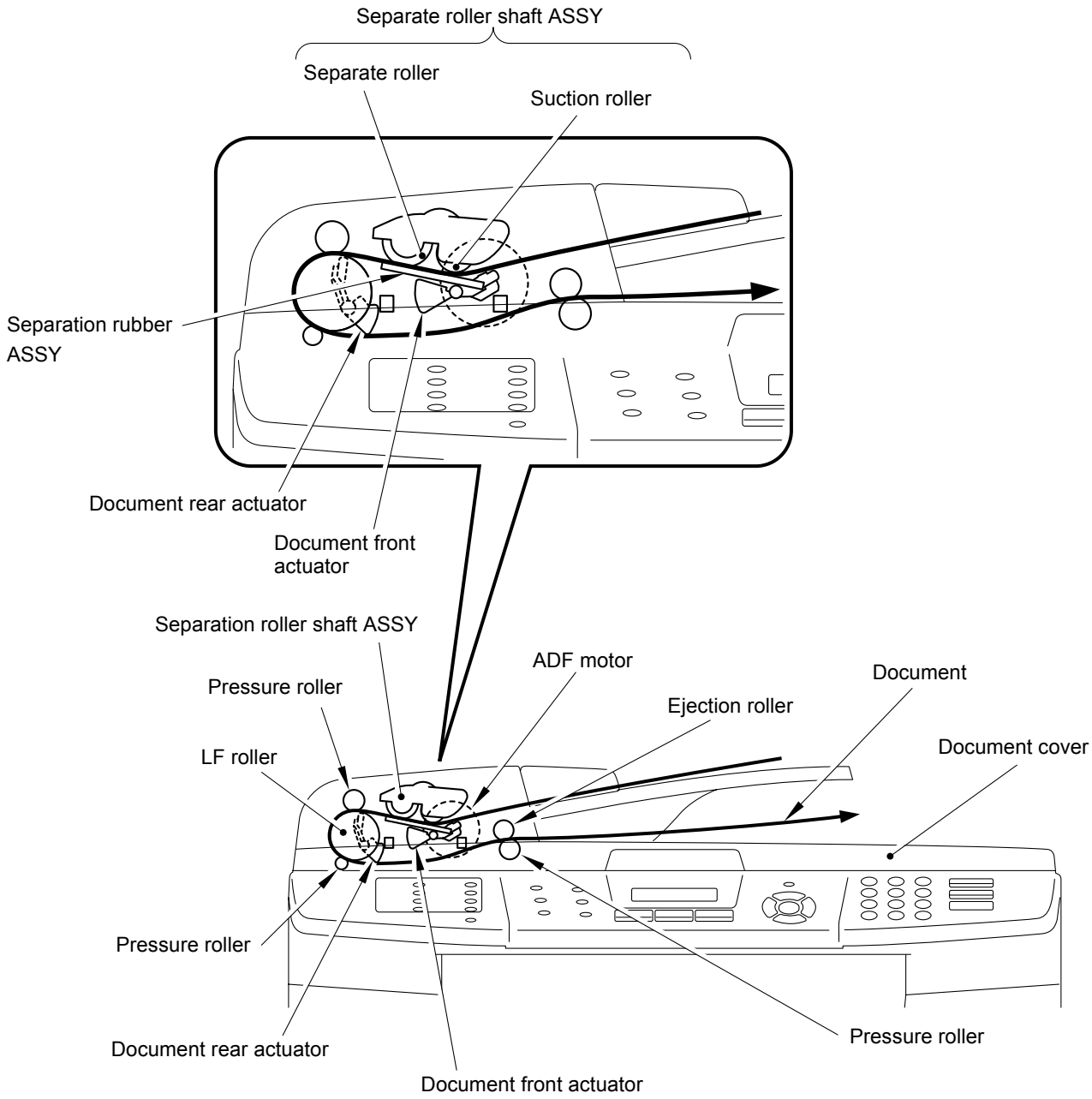


Fig. 3-42

This scanner mechanism supports a dual scanning system: ADF scanning and flat-bed scanning. They automatically switch to the former at the start of a scan operation if the document front sensor inside the ADF detects a document.

(1) ADF scanning: Document moves across stationary CIS unit

Placing a document ***face up*** in the document support activates the document front sensor, switching to ADF scanning.

The CIS drive mechanism (details below) operates for each scanning command executed. The CIS unit first moves to the white-level reference film for white level compensation and then to the ADF scanning position.

The ADF motor then rotates the document pull-in roller to pull the document into the ADF. The document separation roller feeds the pages one at a time, ***starting from the top,*** to the document feed roller, which rotates to move the page in a curve left, down, and right. The page is scanned as it passes over the CIS unit. It then leaves the machine ***face down*** onto the document cover. The machine inserts subsequent pages under this one to preserve the document page order.

(2) Flat-bed scanning: CIS unit moves under stationary document

The user lifts the document cover, places a page (or open book) ***face down*** on the glass plate, and closes the document cover.

The CIS drive mechanism (details below) operates for each scanning command executed. The CIS unit first moves to the white-level reference film for white level compensation. It then moves right, scanning as it goes. It returns to its home position after the scan.

CIS drive mechanism

The contact image sensor (CIS) unit rides along the CIS rail driven by the CIS drive belt. Clockwise motion of the CIS motor moves the unit to the left; counterclockwise motion, to the right. This unit consists of the document illumination LED array, the self-focus lens array gathering the light reflected from the scanned image, the CIS PCB converting the light input to pixel data output, and a glass cover.

The CIS unit can scan the color document. When scanning the color document, the unit turns on the three-color LED lines of red, green and blue (R, G, B) alternately and illuminates the document. When scanning the black/white document, it turns on the green LED line only to scan.

CHAPTER 4

TRANSFER OF DATA LEFT IN THE MACHINE TO BE SENT FOR REPAIR

CHAPTER 4 TRANSFER OF DATA LEFT IN THE MACHINE TO BE SENT FOR REPAIR

This chapter describes how to transfer data left in the machine to be sent for repair. The service personnel should instruct end users to follow the transfer procedure given in this chapter if the machine at the user site cannot print received data due to the printing mechanism defective. End users can transfer received data to another machine to prevent data loss.

CONTENTS

4.1 TRANSFERRING RECEIVED FAX DATA

When the machine at the user site requires to be repaired, unplugging the power cord from the wall socket for sending the machine for repair will lose received FAX data if unprinted and left in the machine.

To prevent such data loss, the service personnel should instruct end users (e.g., by telephone) to transfer data to another facsimile machine using the procedure below.

NOTE: The number of files that can be transferred at a time is 99. To transfer 100 files or more, carry out the following procedure more than one time.

TIP: If there are both color and monochrome data in a file to be transferred, the monochrome data will be transferred first. If the receiver machine does not support the color function, the sender machine cannot transfer color data, resulting in an error.

■ Operating Procedure

(1) Connect the machine to be repaired (that has received data in the memory) to the telephone line.

(2) Switch the machine on.

(2) Press the **Menu/Set**, **Black Start**, **0**, **5** and **3** keys in this order to access user-accessible functions of the maintenance mode.
The "FAX TRANSFER" appears on the LCD.

(4) To check the number of received files, press the **1** key.
The "1.NO. OF JOBS" appears on the LCD.
Press the **Menu/Set** key, and the number of received files appears, just as "NO. OF. JOBS: 10."

(5) To transfer the activity report only, press the **2** key.
The "2.ACTIVITY" appears.
To transfer received files together with the activity report, press the **3** key.
The "3.DOCUMENTS" appears. Note that if there is no received file, the "NO DOCUMENTS" appears.

(6) To transfer the communication list for the latest communication, press the **4** key.
The "4.COM.LIST (NEW)" appears.
To transfer the communication list for last three errors, press the **5** key.
The "5.COM.LIST (ERR3)" appears.

(7) With the "2.ACTIVITY," "3.DOCUMENTS," "4.COM.LIST (NEW)," or "5.COM.LIST (ERR3)" being displayed, press the **Menu/Set** key.
The "ENTER NO. &SET" appears.

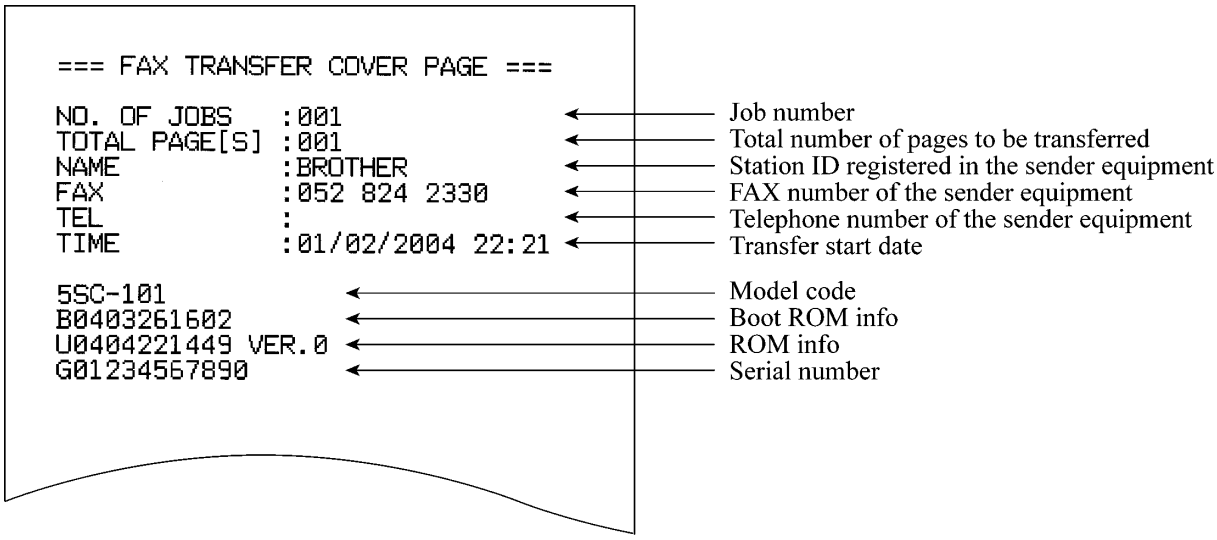
(8) Enter the telephone number of the receiver machine and press the **Menu/Set** key again.

NOTE: Be sure to type the telephone number with the numerical keys. No one-touch dialing is allowed in this procedure.

The machine displays the "ACCEPTED" for approx. two seconds and starts dialing to transfer data.

No station ID will be attached. A cover page and end page as shown on the next page will be automatically attached, instead.

Cover page sample



End page sample

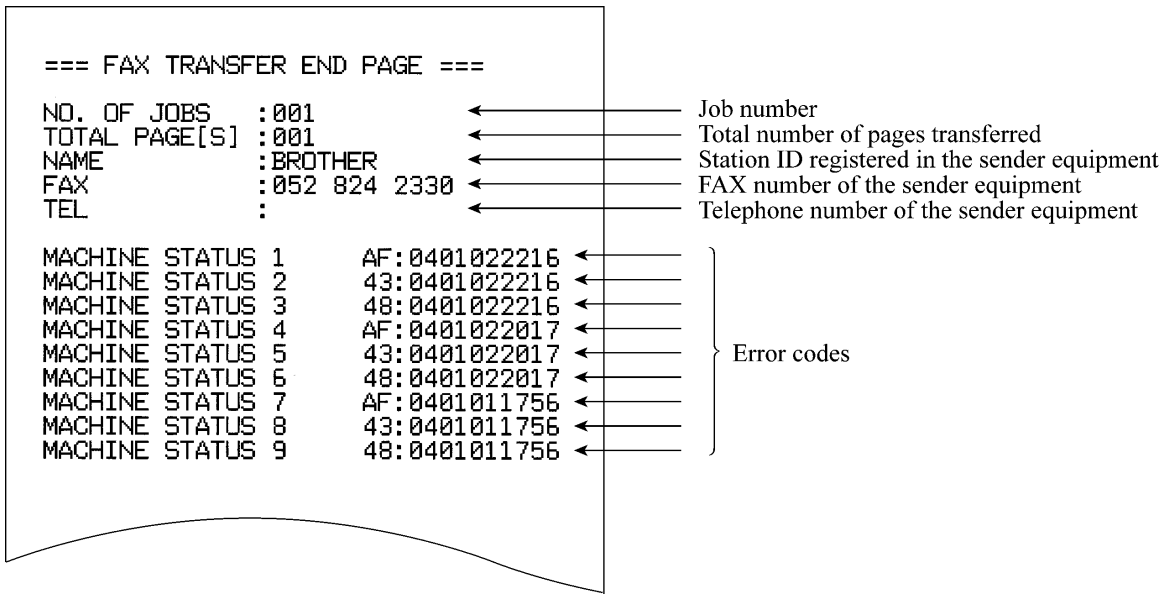


Fig. 4-1

CHAPTER 5

DISASSEMBLY/REASSEMBLY AND LUBRICATION

CHAPTER 5 DISASSEMBLY/REASSEMBLY AND LUBRICATION

This chapter details procedures for disassembling and reassembling the machine together with related notes. The disassembly order flow provided enables you to see at a glance the quickest way to get to component(s) involved.

At the start of a disassembly job, you check the disassembly order flow that guides you through a shortcut to the object components.

This chapter also covers screw tightening torques and lubrication points to which the specified lubricants should be applied during reassembly jobs.

CONTENTS

5.1 DISASSEMBLY/REASSEMBLY

■ Safety Precautions

To prevent the creation of secondary problems by mishandling, observe the following precautions during maintenance work.

(1) Before starting disassembly/reassembly jobs, unplug the power cord and telephone line. In particular, when having access to the power supply inside the machine, make sure that the power cord is unplugged from the electrical outlet; when having access to the main PCB or NCU PCB, make sure that both the power cord and telephone line are unplugged from the machine.

(2) Be careful not to lose screws, washers, or other parts removed for parts replacement.

(3) When using soldering irons and other heat-generating tools, take care not to damage the resin parts such as wires, PCBs, and covers.

(4) Static electricity charged in your body may damage electronic parts. When transporting PCBs, be sure to wrap them in conductive sheets.

(5) When replacing the PCB and all the other related parts, put on a grounding wrist band and perform the job on a static mat. Also take care not to touch the conductor sections on the flat cables or on the wire harness.

(6) Be sure to reinsert self-tapping screws correctly, if removed.

(7) Tighten screws to the torque values listed on the next page.

(8) After disconnecting flat cables, check that each cable is not damaged at its end or short-circuited.

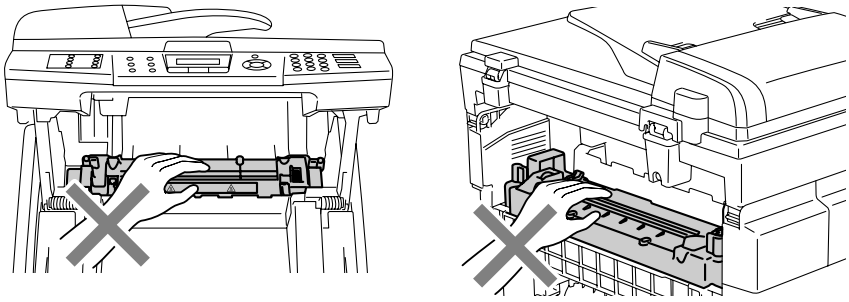
(9) When connecting flat cables, do not insert them at an angle. After insertion, check that the cables are not at an angle.

(10) When connecting or disconnecting cable connectors, hold the connector bodies not the wires. If the connector has a lock, always slide the connector lock to unlock it.

(11) Before reassembly, apply the specified lubricant to the specified points.
(Refer to Section 5.2 in this chapter.)

(12) After repairs, check not only the repaired portion but also that the connectors and other related portions function properly before operation checks.

(13) After you use the machine, some internal parts are extremely HOT! To prevent injuries, be careful not to put your fingers in the areas shown in the illustration.



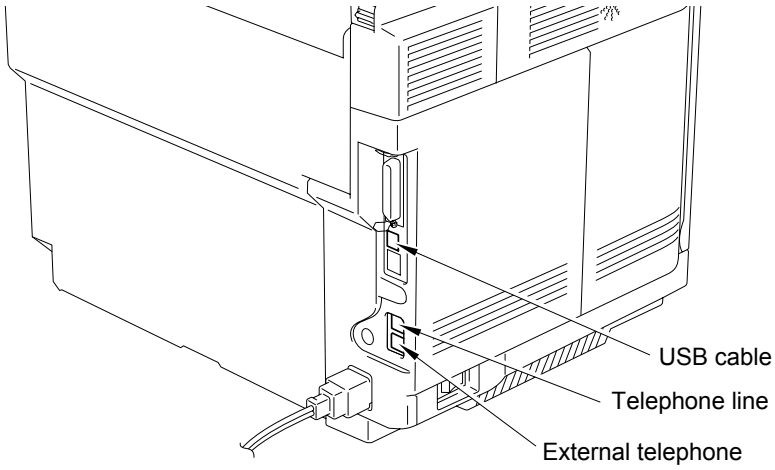
■ Tightening Torque

Location of screw	Screw type	Q'ty	Tightening torque N•m (kgf•cm)
FB motor	Screw, pan (s/p washer) M3x6	2	0.59 ±0.1 (6 ±1)
Gear holder ASSY	Taptite, cup B M3x10	2	0.49 ±0.1 (5 ±1)
Scanner top cover ASSY	Taptite, bind B M4x12	6	0.78 ±0.1 (8 ±1)
Drive frame ASSY	Taptite, cup B M3x10	2	0.49 ±0.1 (5 ±1)
Upper document chute		2	
Lower document chute		4	
Hinge ASSY L		3	
Hinge arm	Taptite, bind B M4x12	1	0.78 ±0.1 (8 ±1)
For preventing the hinge ASSY L from coming out		1	
ADF motor	Taptite, bind S M3x6	1	0.69 ±0.1 (8 ±1)
FG connection	Taptite, cup S M3x6	1	0.78 ±0.1 (8 ±1)
Guide gear	Taptite, B M3x6	1	0.29 ±0.5 (3 ±0.5)

■ Preparation

Prior to proceeding with the disassembly procedure,

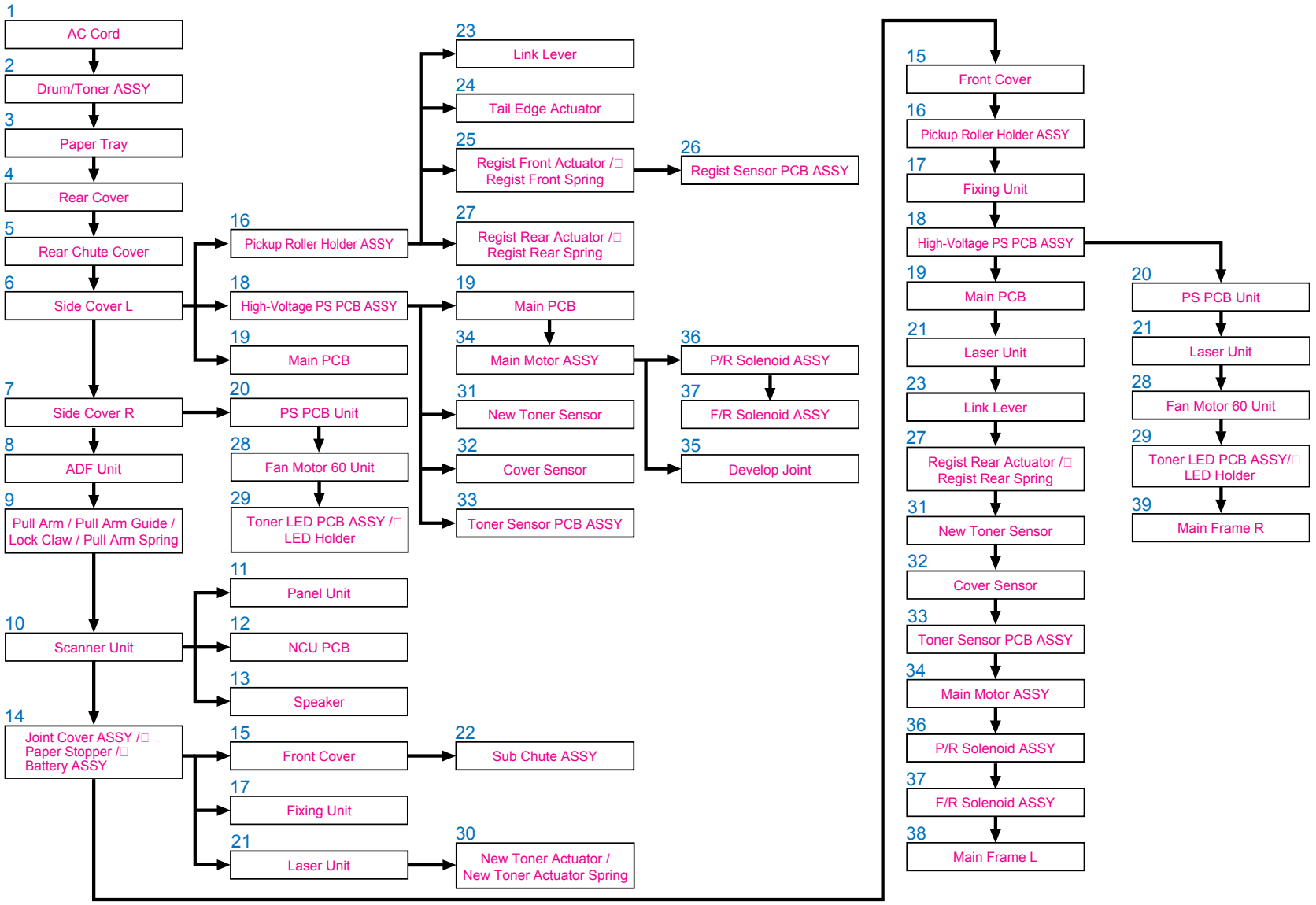
(1) Unplug
- the modular jack of the telephone line,
- the USB cable, if connected (not shown below), and
- the modular jack of the external telephone set if connected (not shown below).



■ How to Access the Object Component

- On the next page is a disassembly flowchart which helps you access the object components. To remove the fusing unit, for example, first find it on the flowchart and note its number (5.1.4 in this case). To access it, you need to remove all the parts above the fusing unit on the flowchart (in this case) before the unit itself can be removed.
- Unless otherwise specified, all parts should be replaced in the reverse order to which they were removed to reassemble the machine.

■ Disassembly Flowchart



5.1.1 AC Cord

(1) Disconnect AC cord from the machine.

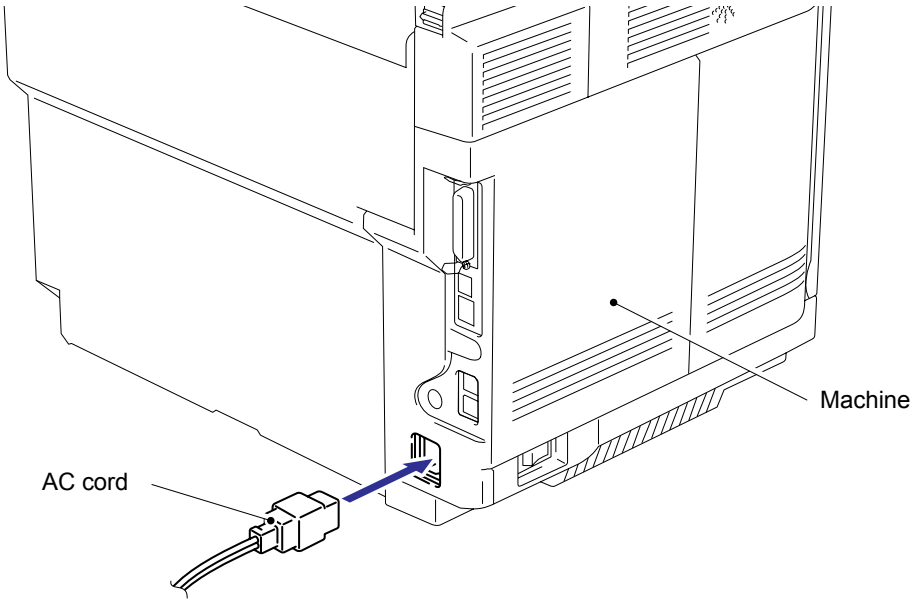


Fig. 5-1

5.1.2 OPC Belt Cartridge

(1) Open the scanner unit and the center cover.

(2) To release the lock, push the green lock lever BC on both sides inwards.

(3) Remove the OPC belt cartridge.

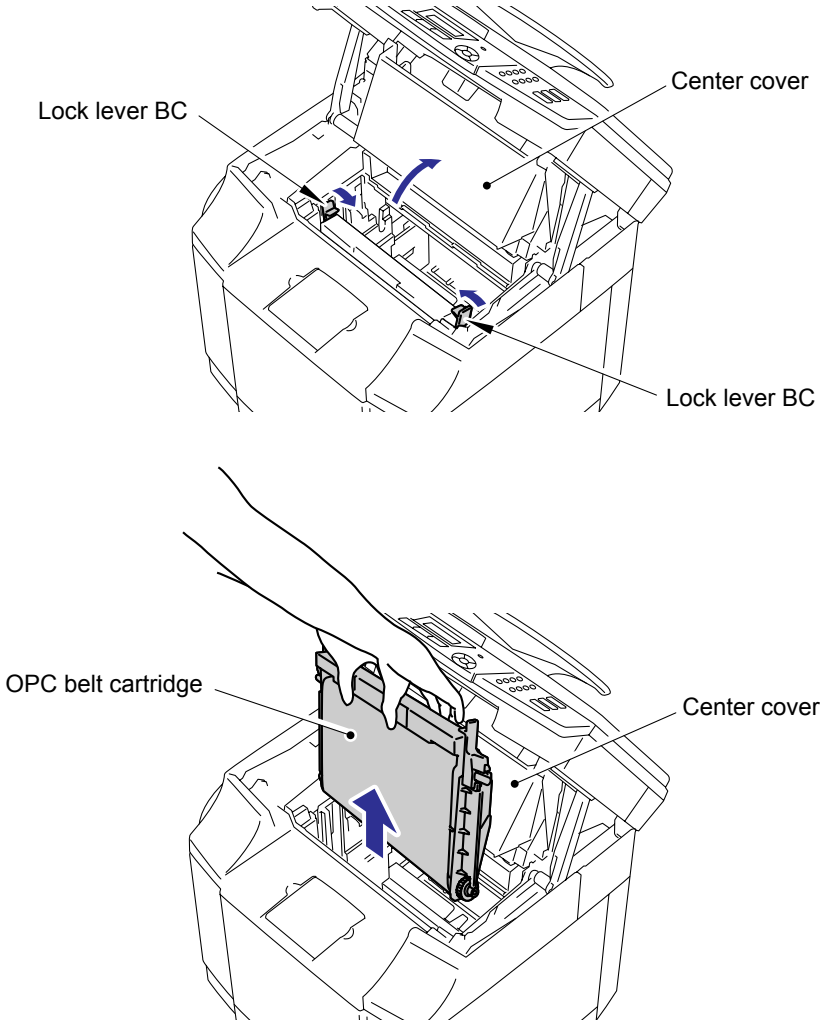


Fig. 5-2

NOTE: When replacing the OPC belt cartridge, reset the OPC belt life counter referring to "IF YOU REPLACE THE OPC BEL CARTRIDGE" in Section 6.4.

5.1.3 Paper Tray

(1) Remove the paper tray.

NOTE: Adjustment is required when the paper tray is changed. Please refer to chapter 6.

5.1.4 Fusing Unit

⚠ Caution

[Caution and Request for Replacement of Maintenance Parts]

(1) The fuser unit is the unit replaceable component and consists of the important parts that are important for the product safety. The disassembly and replacement of the maintenance parts shall be performed by the skillful personnel having completed the appropriate training and at the appropriate location having the test facilities for the product safety test.

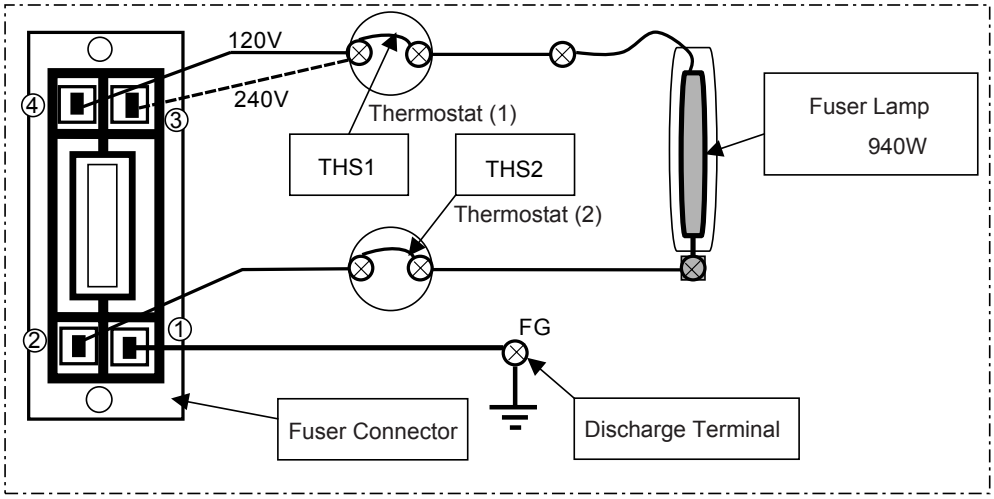
(2) The wiring of the fusing unit is different subject to the voltage specification, and therefore the wrong installation may cause the H2 error.

(3) When replacing the fusing unit, leave the machine for approx. ten minutes while the power supply of the machine is ON. Then, turn it off and replace the unit.

[Description of Applicable Work]

①.Replacement of Fuser Lamp, Installation of Heater, and Internal Wiring:

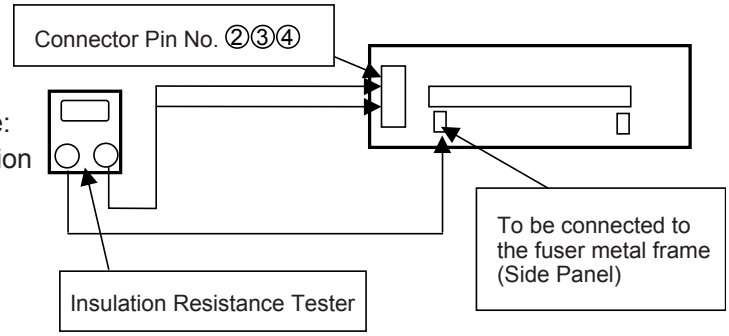
Pin Assignment : 120V ① - ④, 240V ① - ③



[Confirmation of Safety]

① Method of Measurement for Insulation Resistance:
- Connect the insulation resistance tester as shown in the figure above.

② Judgment Criteria:
- The insulation resistance to be 100MΩ or greater.



(1) Open the back cover and scanner unit.
(2) Release the two lock knobs to remove the fusing unit from the machine.

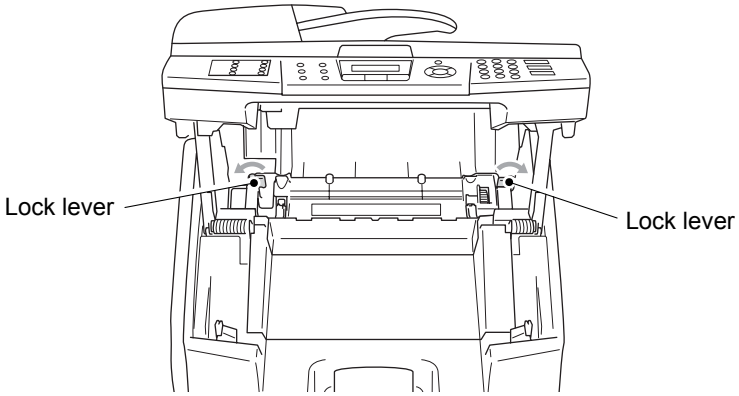


Fig. 5-3

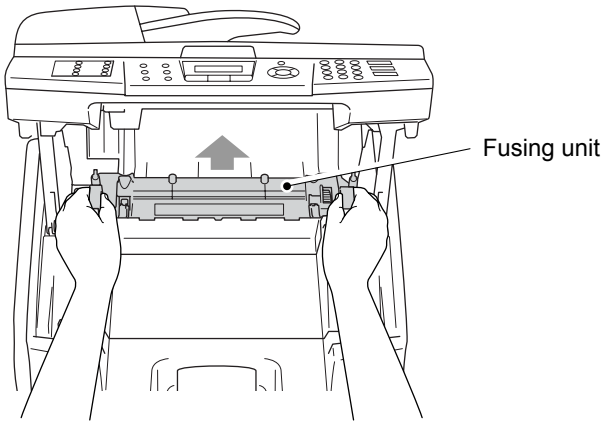


Fig. 5-4

(3) Remove the setscrew (A) (BT3x6, 1 piece), the shoulder screw (A') and pull up the two release levers to remove the top fuser cover FU.
(4) Remove the screw (B) to remove the lock knob KIT FU. (2 places)
(5) Remove the setscrew (C) (BT3x8, 2 pieces) of the front fuser cover FU.
(6) Remove the front fuser cover FU.
(7) Remove the setscrew (D) (ST3x6, 1 piece and FU shoulder screw, 2 pieces) of the bottom fuser cover FU.
(8) Remove the setscrew (E) (SM3x6 with washer, 1 piece) from the bottom fuser cover FU.
(9) Remove the setscrew (F) (ST3x6, 1 piece) to remove the ground wire.
(10) Remove the setscrew (G) (SM3x6 with washer, 1 piece) of the fuser lamp from the terminal; Pull out the tube from the harness.
(11) Remove the bottom fuser cover FU from the fuser roller ASSY FU.
(12) Remove the setscrew (H) (SM3x6 with washer, 1 piece) of the fuser lamp terminal from the terminal.
(13) Remove the setscrew (I) (SM3x6 with washer, 2 pieces) of the lamp holder, and then remove the lamp holder.

(14)Pull out the fuser lamp from the fuser roller (HT).

NOTE: Since the voltage of heater lamp is subject to the destination, confirm the specified rated voltage. (US : 120V 940W, EC : 240V 940W, JP : 100V 940W)

(15)Remove the setscrew (J) (ST3x6 with washer, 2 pieces) to remove the two terminals of the fuser connector harness.

(16)Disconnect the connector connecting to the fuser connector FU.

(17)Remove the FU shoulder screws (K) (2 pieces) to remove the fuser connector FU from the bottom fuser cover FU.

(18)Remove the setscrew (L) (BT3x6, 1 piece and BT3x12, 1 piece) to remove the thermistor ASSY FU from the bottom fuser cover FU.

CAUTION

- This is the replacement work of important part in terms of the product safety. Therefore, this work should be performed by the skillful personnel having the sound knowledge and at the location where the safety is ensured. (Measurement of the insulation resistance needs to be done.)
- The fusing unit and its peripheral parts are very hot (approximately 100°C). Prior to starting the replacement work, confirm that the fusing unit and its peripheral parts are well cooled down.

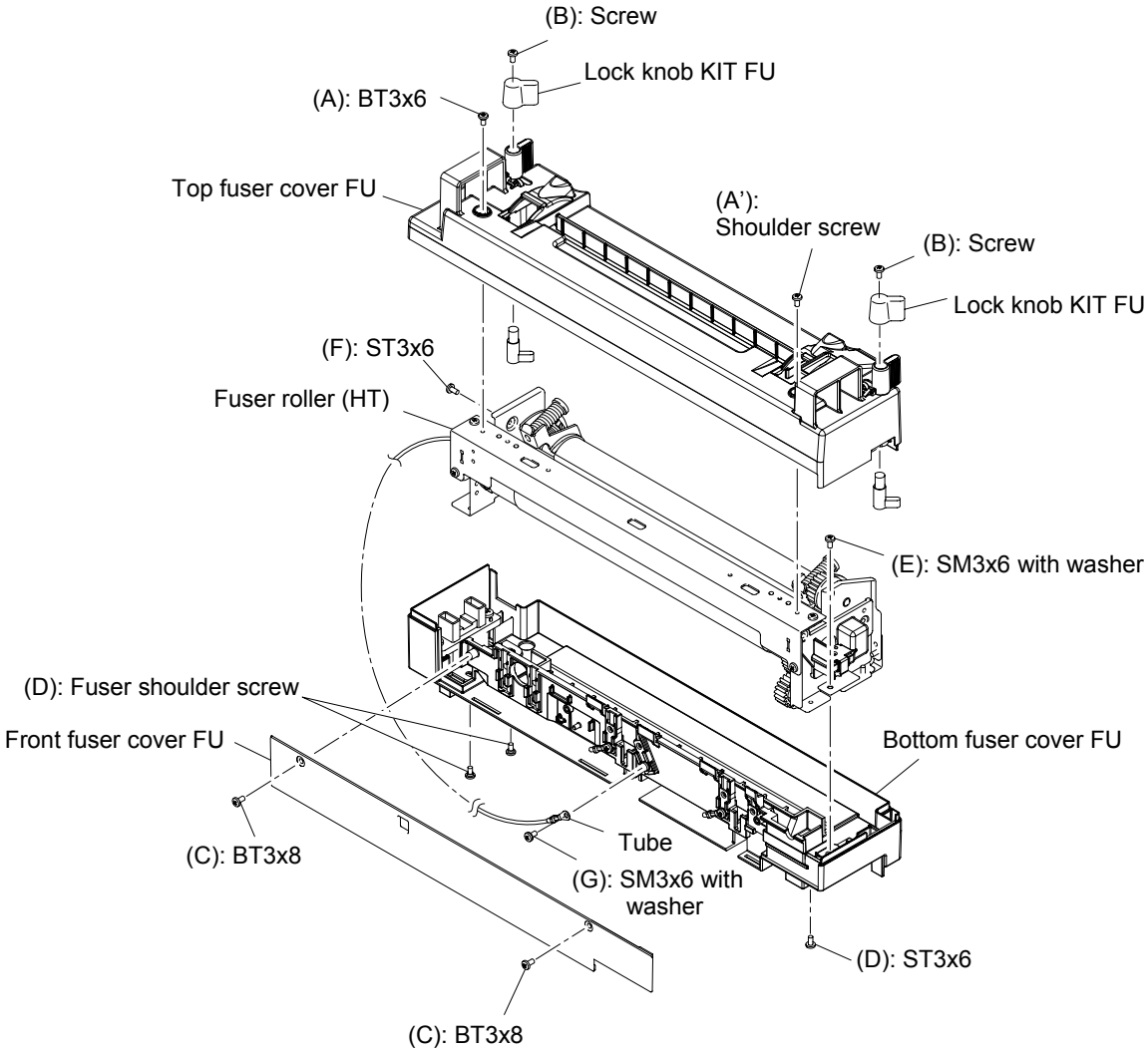


Fig. 5-5

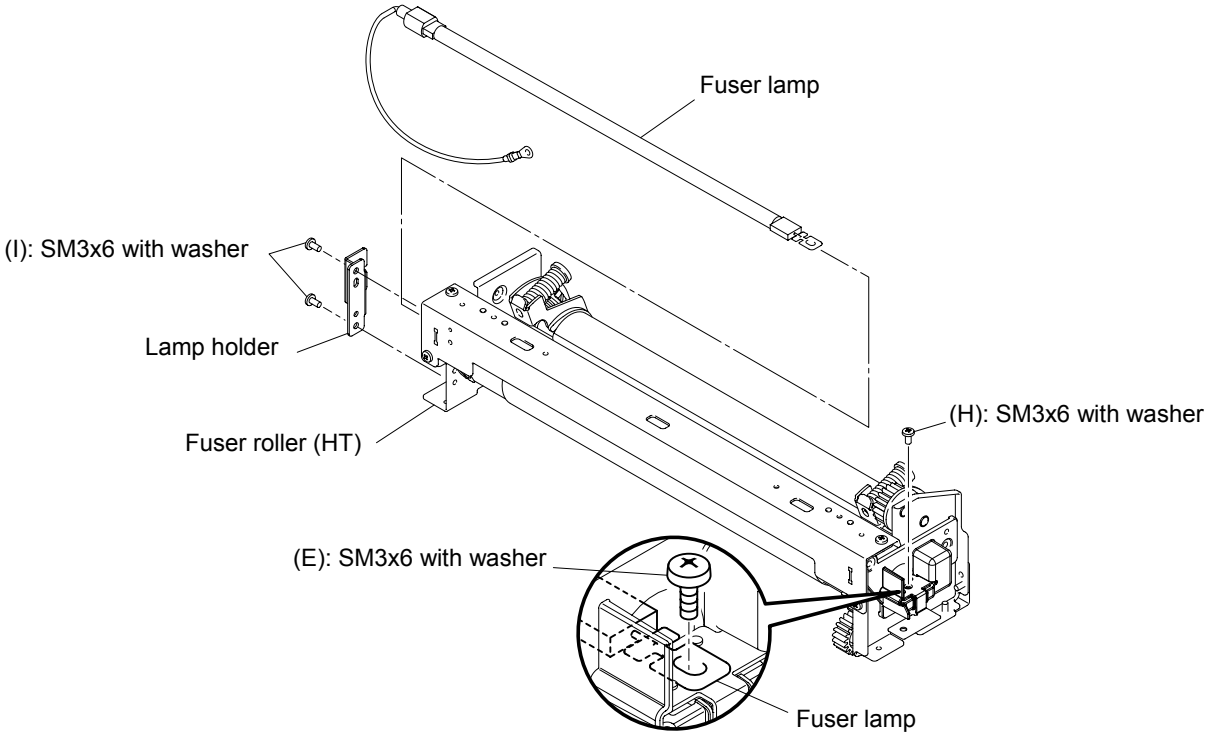

Fuser lamp
(I): SM3x6 with washer
Lamp holder
Fuser roller (HT)
(H): SM3x6 with washer
(E): SM3x6 with washer
Fuser lamp

Fig. 5-6

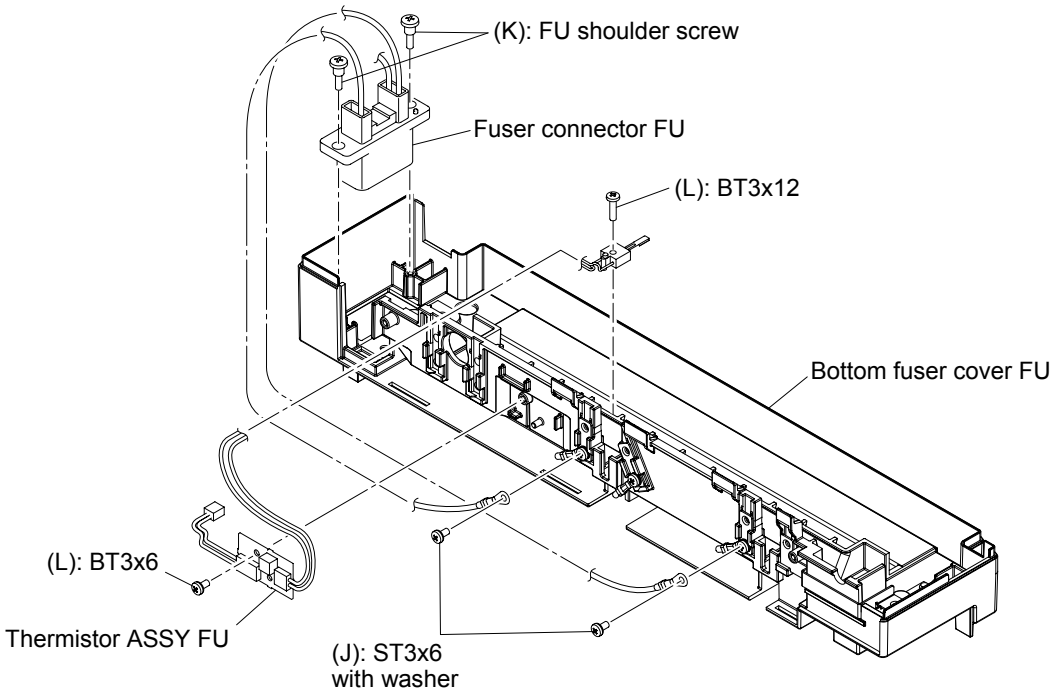

(K): FU shoulder screw
Fuser connector FU
(L): BT3x12
Bottom fuser cover FU
(L): BT3x6
Thermistor ASSY FU
(J): ST3x6
with washer

Fig. 5-7

5.1.5 Side Cover LR

(1) Remove the screw, and then remove the side cover LR.

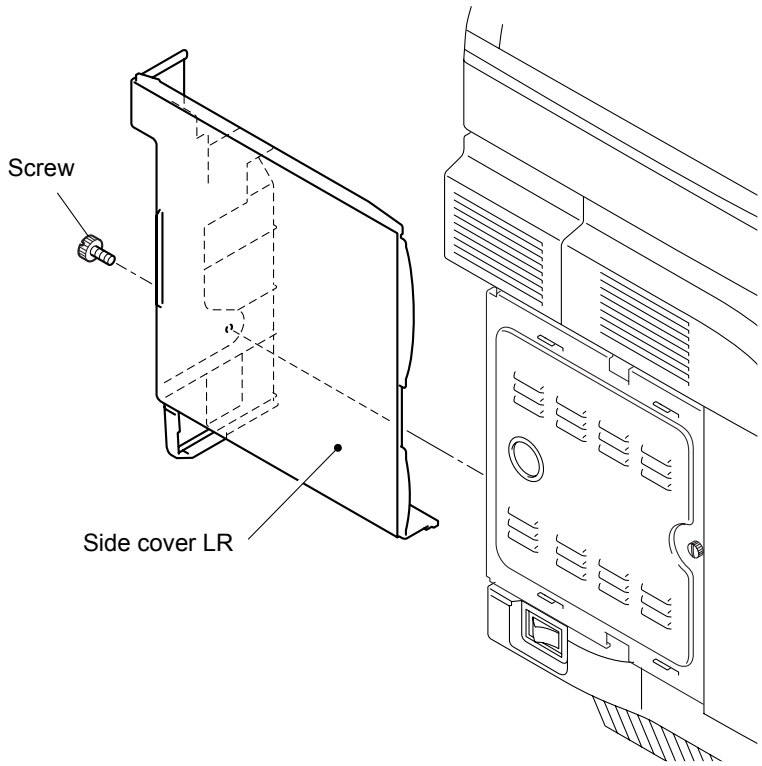


Fig. 5-8

5.1.6 Top Side L

(1) Remove the screw to remove the shield plate.

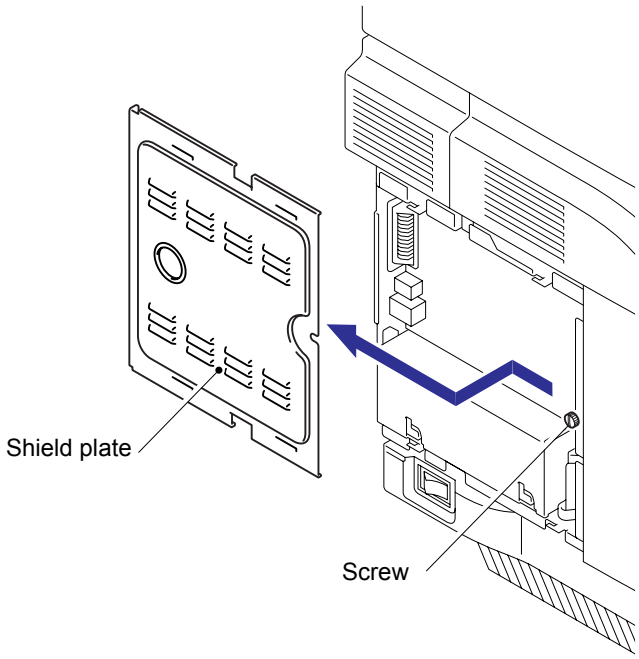


Fig. 5-9

(2) Remove the screw and then remove the top side L.

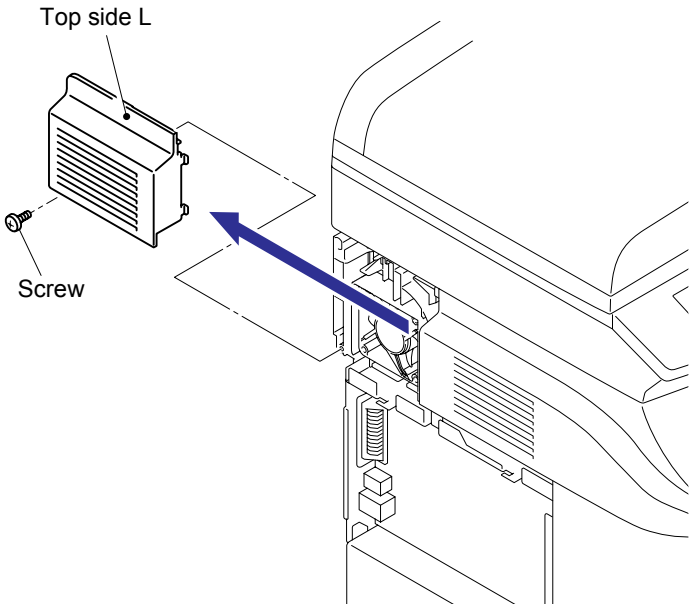


Fig. 5-10

5.1.7 ADF Unit

(1) Remove the harness cover.

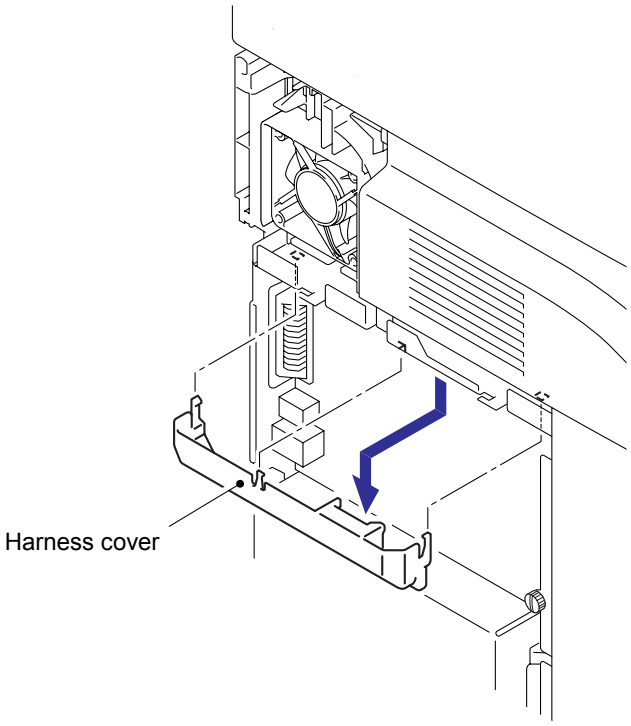


Fig. 5-11

(2) Remove the screw to remove the two ground wires.

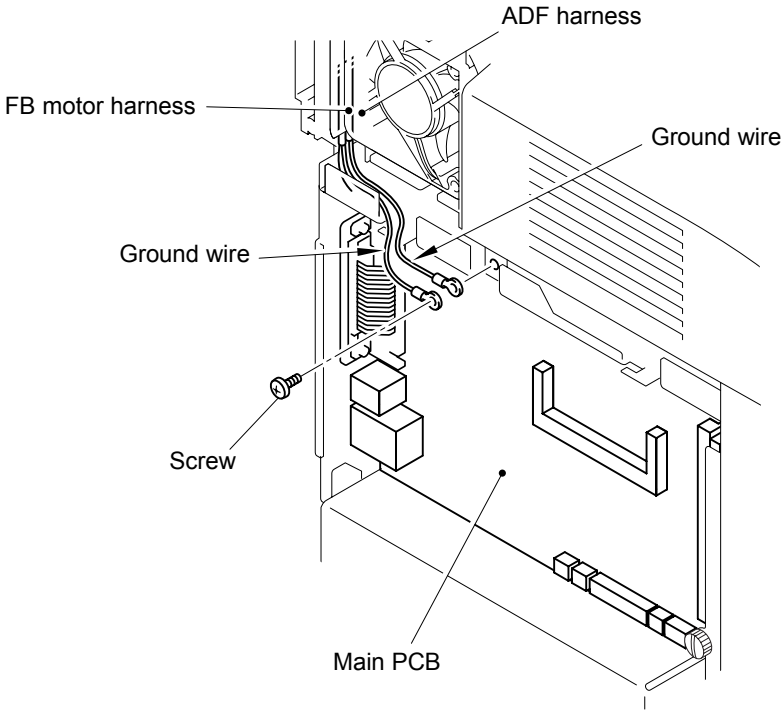


Fig. 5-12

(3) Disconnect the four connectors and one CIS flat cable from the main PCB.

NOTE:

- After disconnecting flat cable(s), check that each cable is not damaged at its end or short-circuited.
- When connecting flat cable(s), do not insert them at an angle. After insertion, check that the cables are not at an angle.

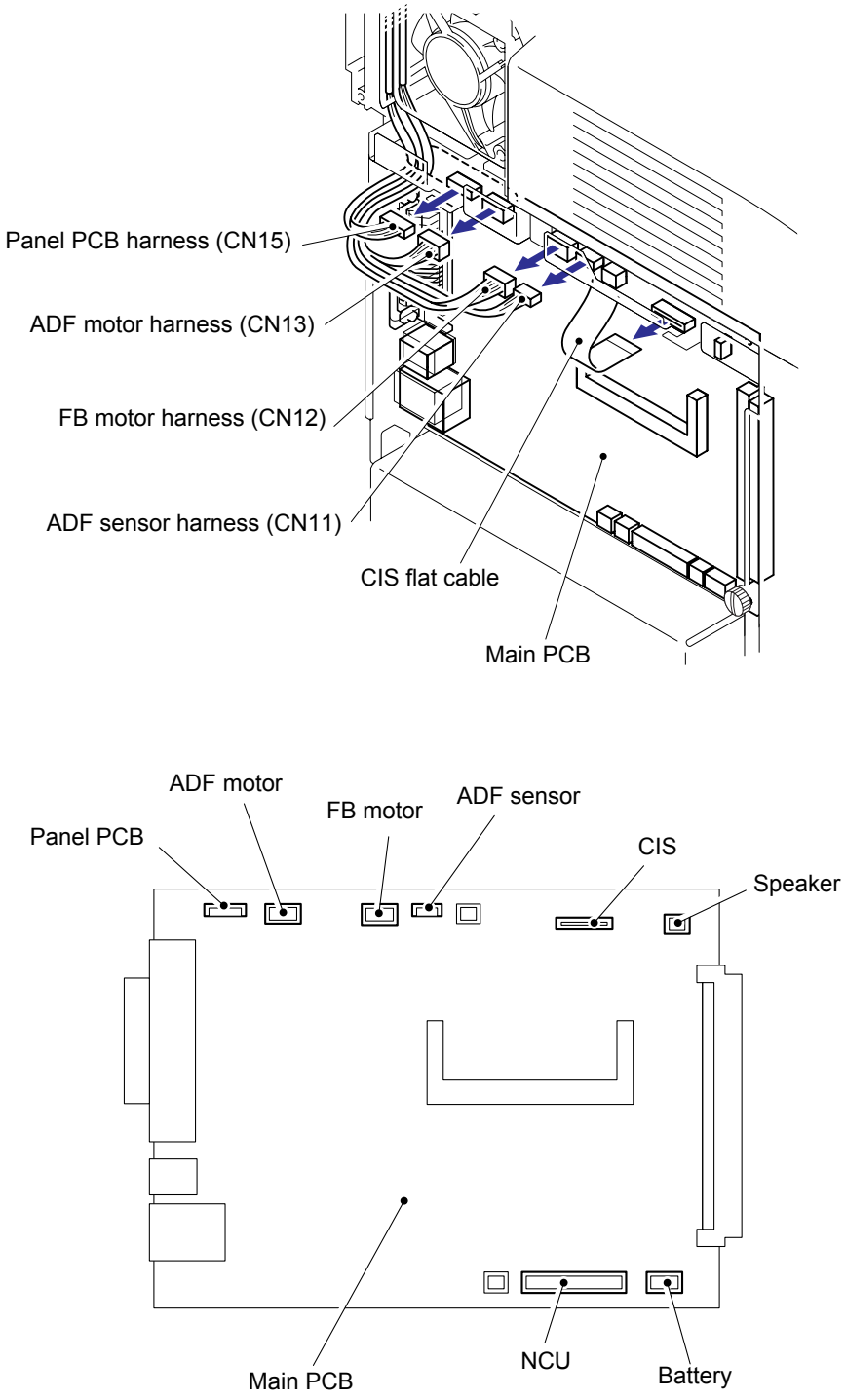


Fig. 5-13

(4) Release the two pins and remove the ADF cover.

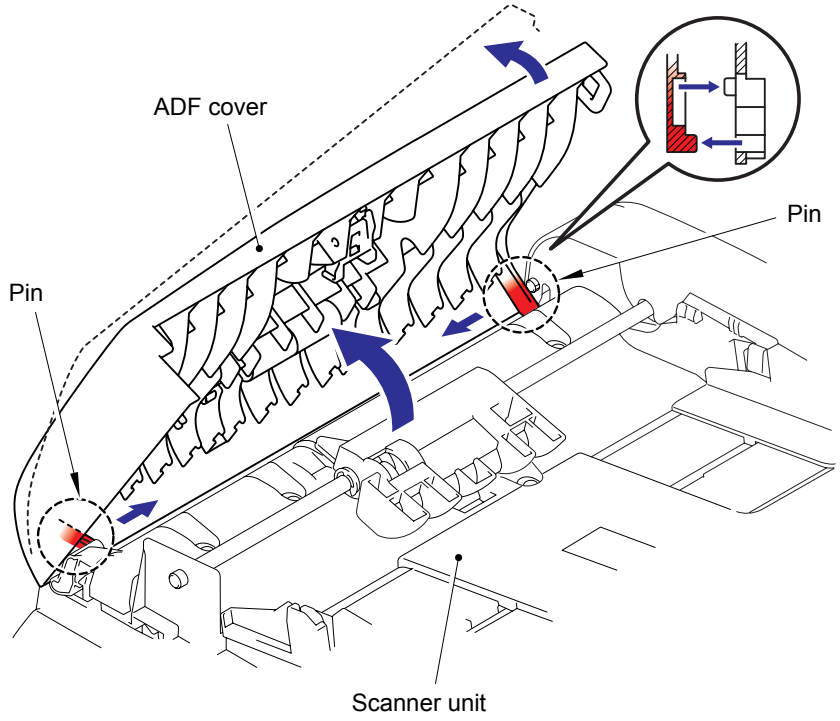


Fig. 5-14

(5) Release the two hooks, and then remove the pressure roller ASSY.

(6) Remove the two LF springs from the ADF cover.

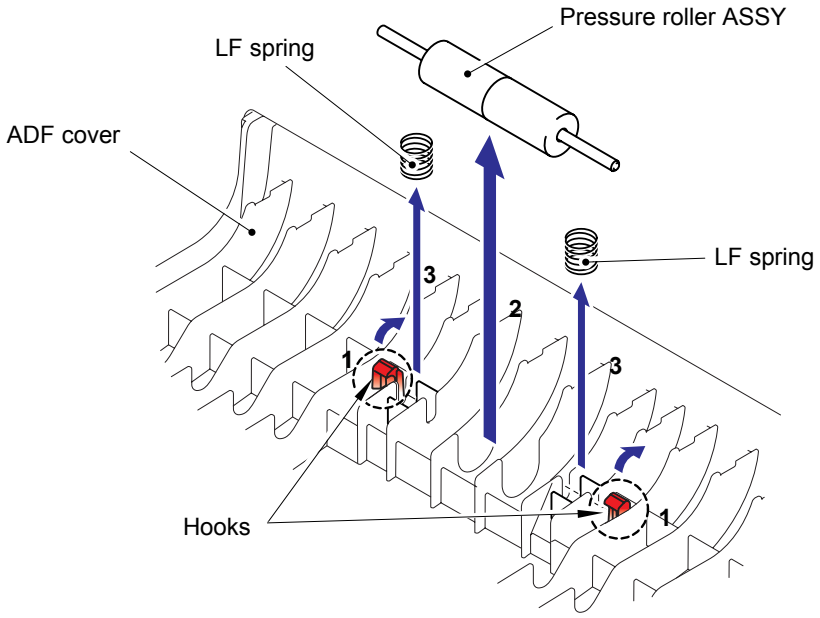


Fig. 5-15

(7) Remove the two pressure rollers from the pressure roller shaft.

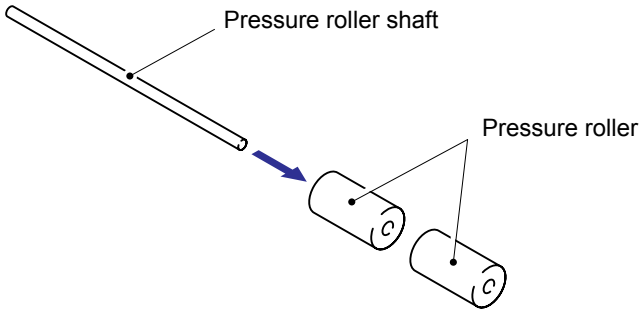


Fig. 5-16

(8) Open the ADF unit.

(9) Release the hook to remove the gear cover from the ADF unit.

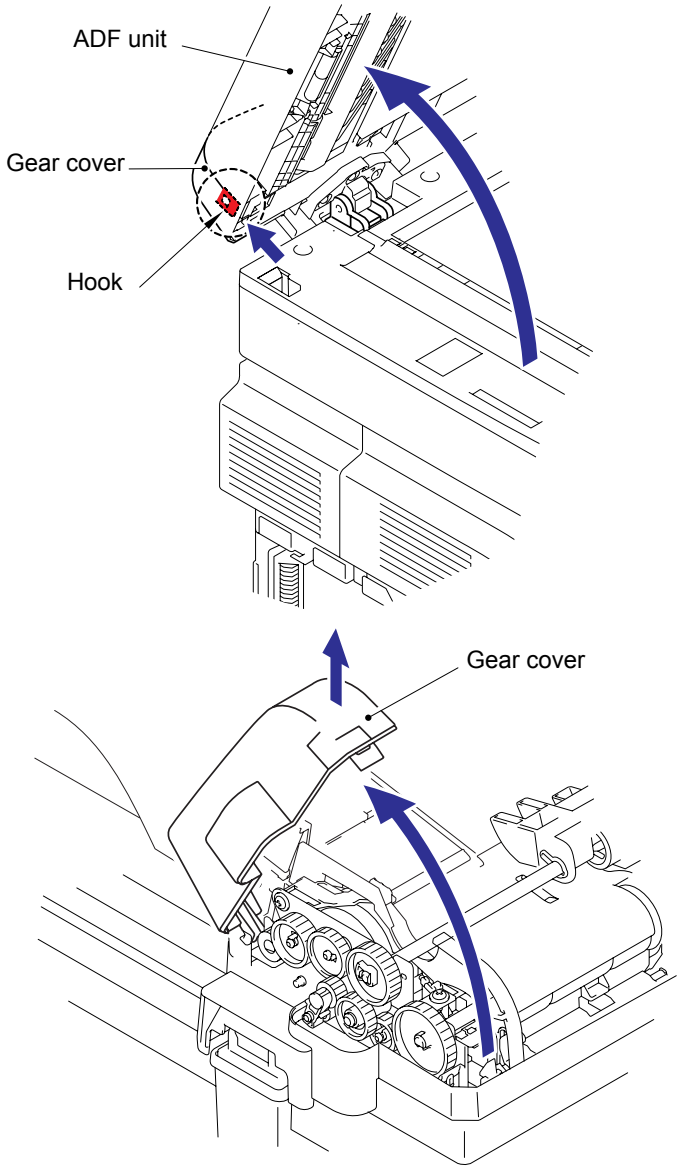


Fig. 5-17

(10)Release the lock lever and then remove the separate roller shaft ASSY and separate roller bushing from the ADF unit.

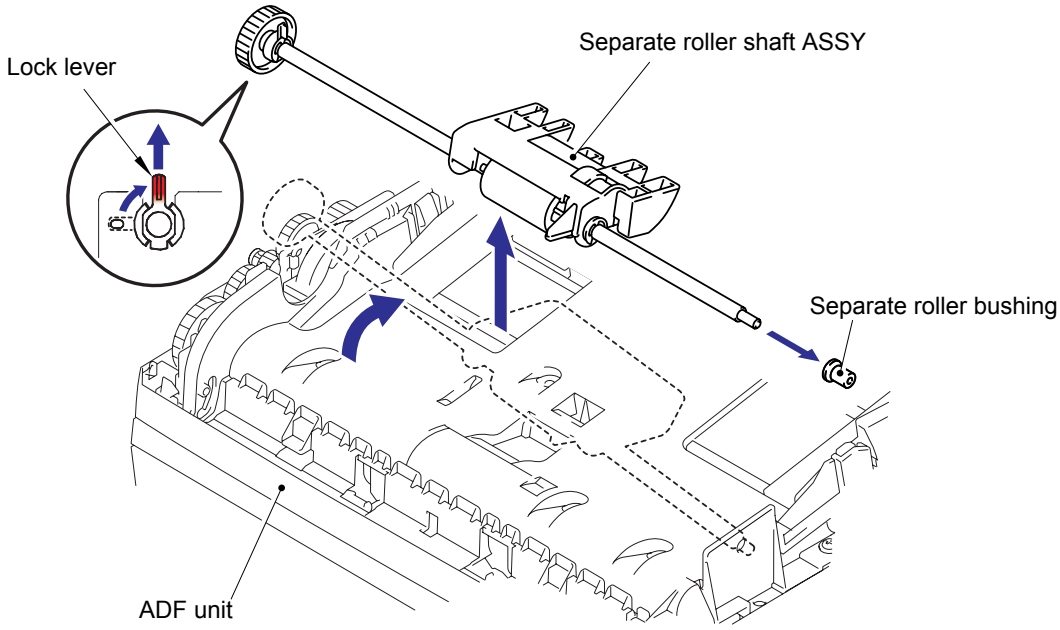


Fig. 5-18

(11)Remove the four cup B M3x10 taptite screws.

(12)Release the hook "A" to remove the upper document chute.

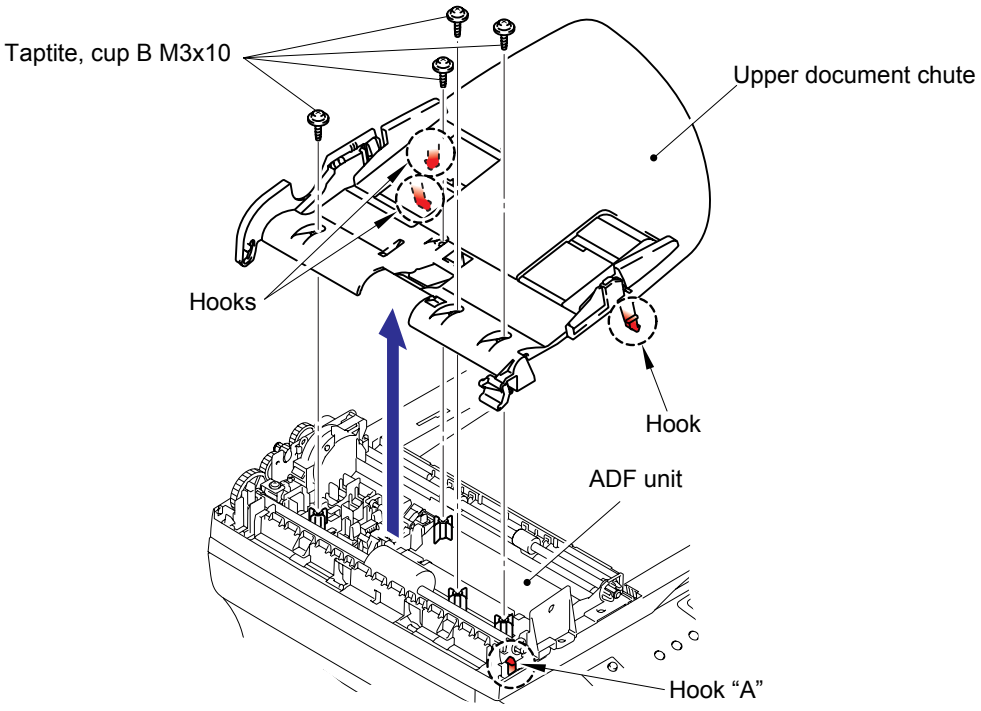


Fig. 5-19

(13)Remove the separation rubber ASSY from the upper document chute.

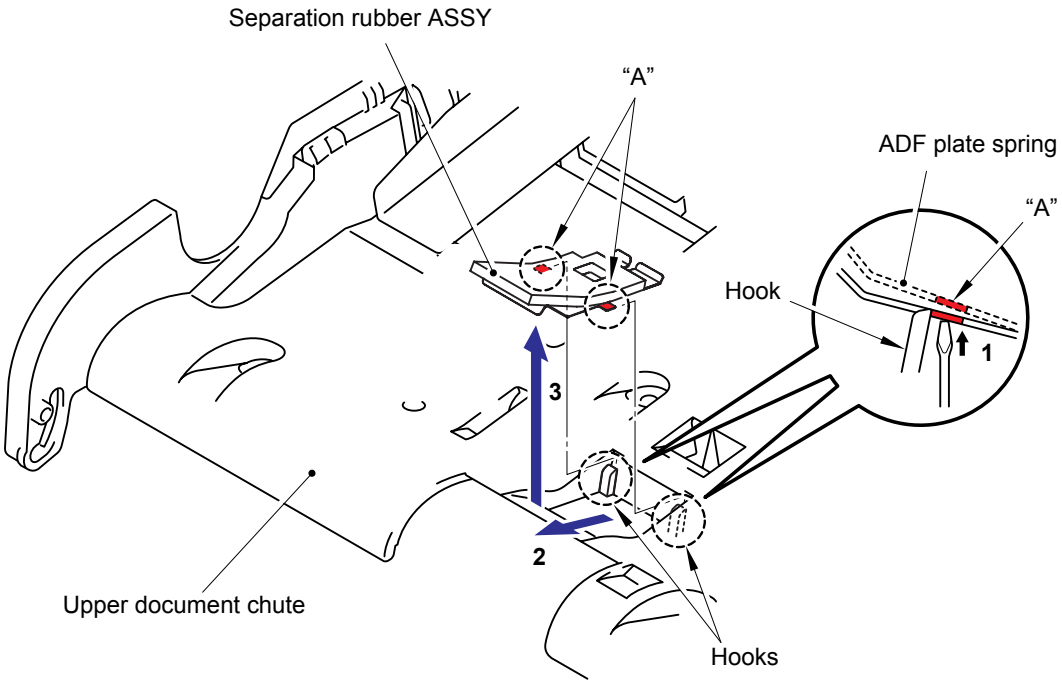


Fig. 5-20

(14)Remove the separation rubber from the ADF plate spring.

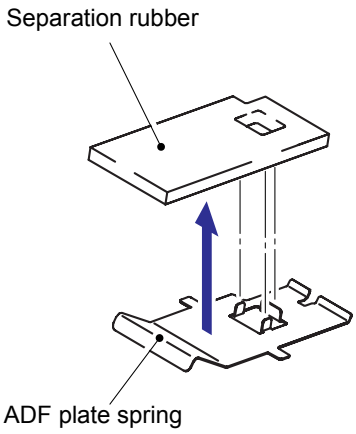


Fig. 5-21

(15)Remove the one cup S M3x6 taptite screw to remove the ADF FG harness.

(16)Remove the ADF motor harness from the ADF motor.

(17)Remove the ADF sensor harness ASSY from the ADF sensor PCB ASSY.

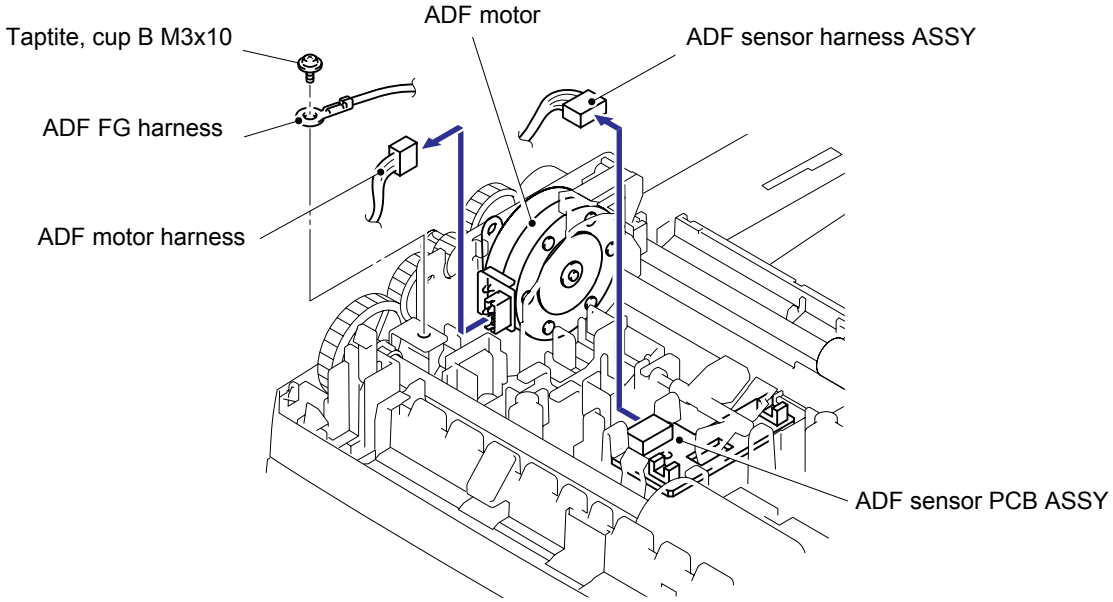


Fig. 5-22

(18)Remove the two cup B M3x10 taptite screws from the lower document chute.

(19)Release the two hooks to remove the lower document chute.

NOTE: When re-connecting the connectors, put them through the holes on the ADF unit before connecting.

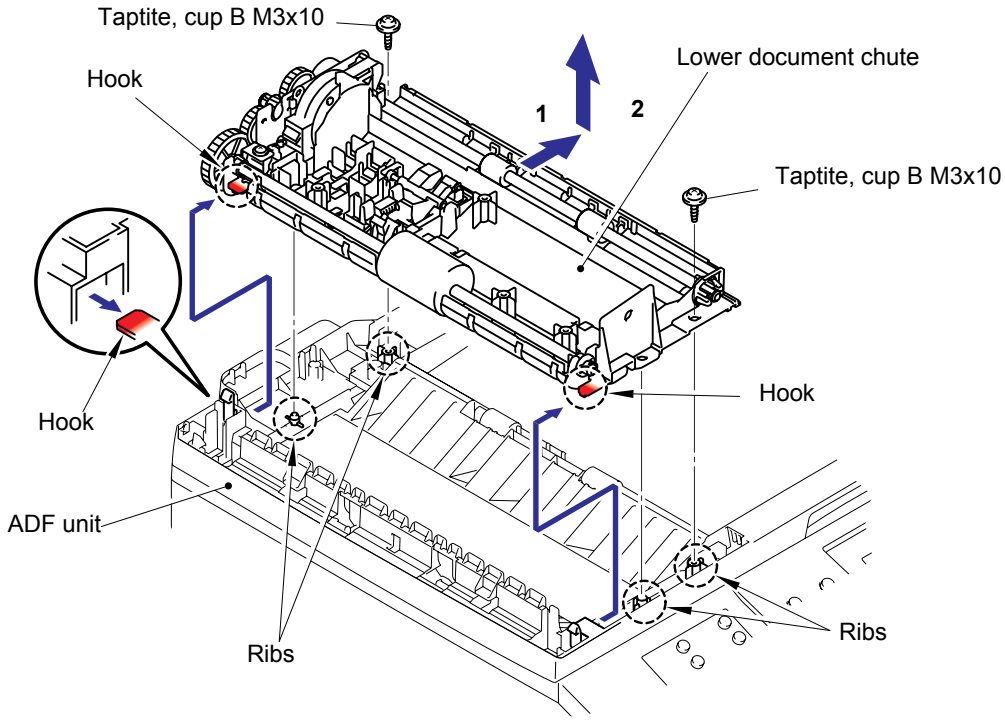


Fig. 5-23

(20)Release the hook on the ADF unit and remove the ejection roller ASSY.

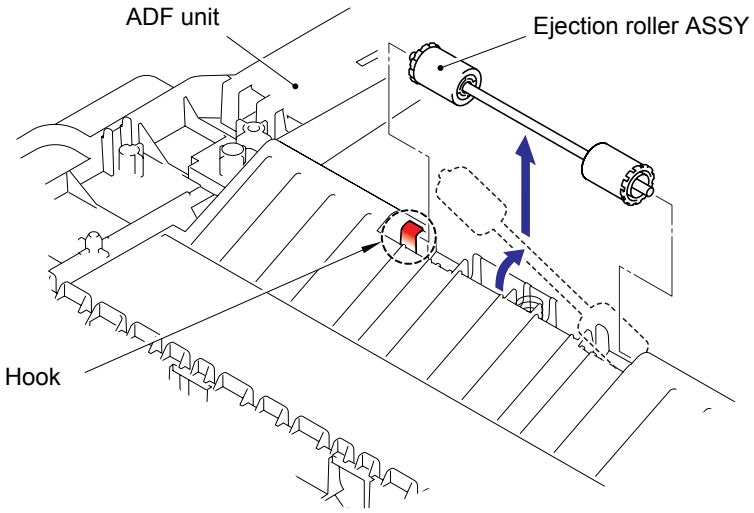


Fig. 5-24

(21)Remove the two ejection rollers from the pressure roller shaft.

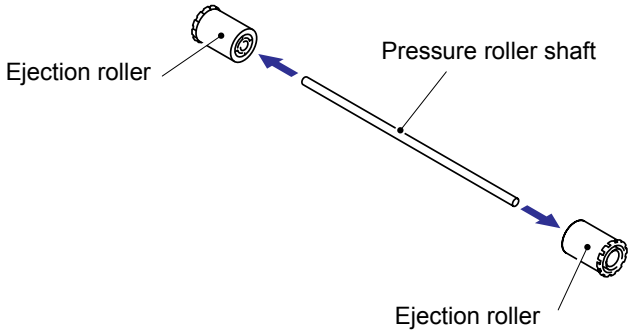


Fig. 5-25

(22)Remove the ADF unit ejection spring from the ADF unit.

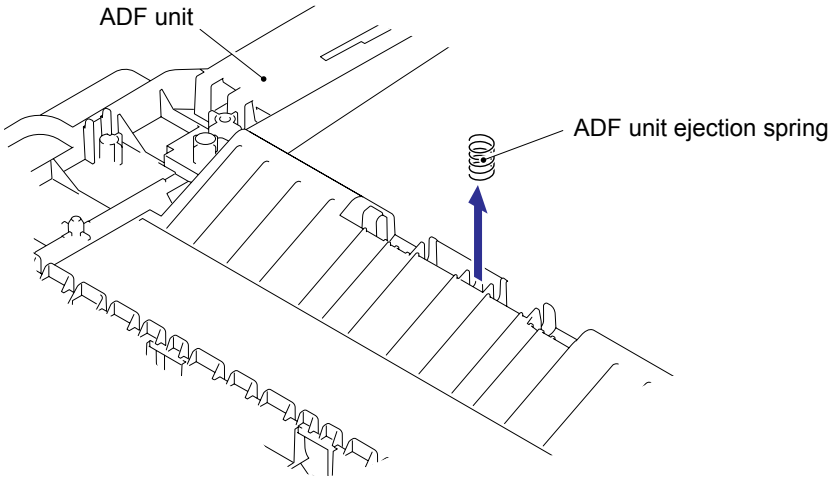


Fig. 5-26

(23)Release the two hooks and remove the resin bearing.

(24)Remove the LF roller ASSY from the lower document chute.

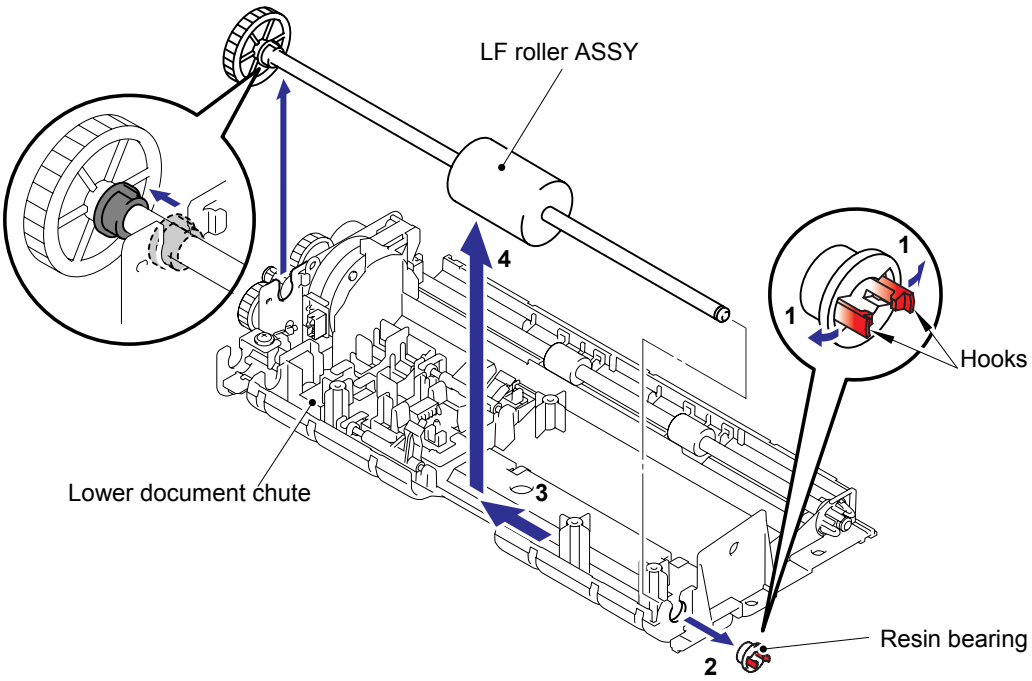


Fig. 5-27

(25)Release the two hooks “A” and remove the ejection roller ASSY from the lower document chute.

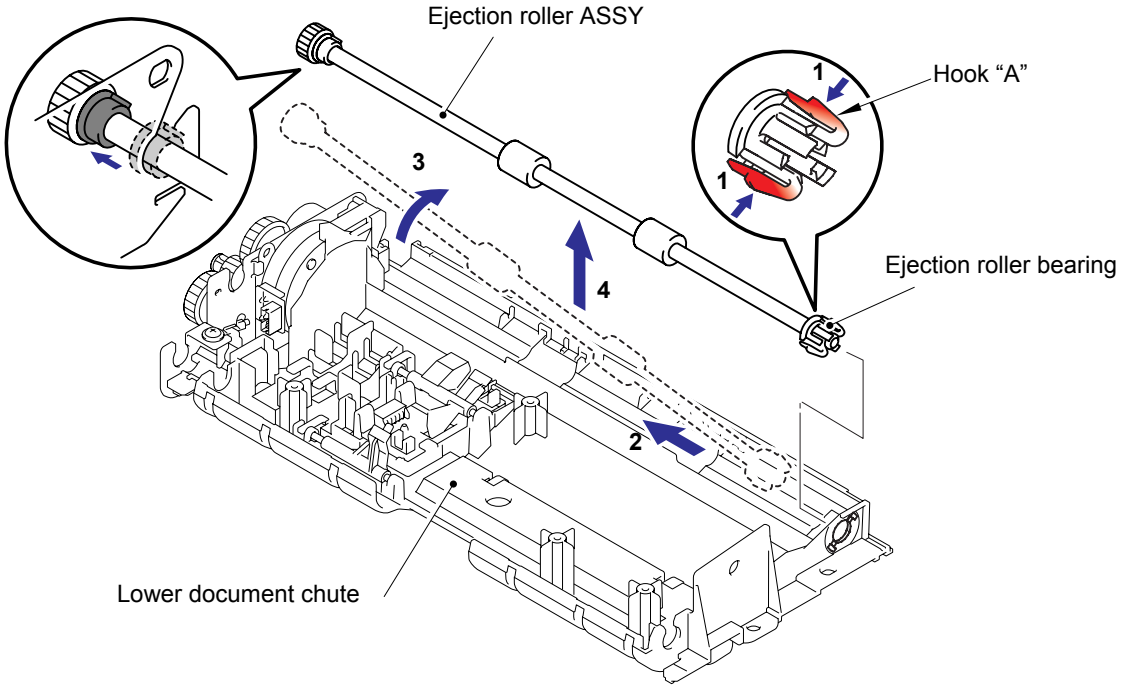


Fig. 5-28

(26)Release the two hooks “B” and remove the ejection roller bearing from the ejection roller ASSY.

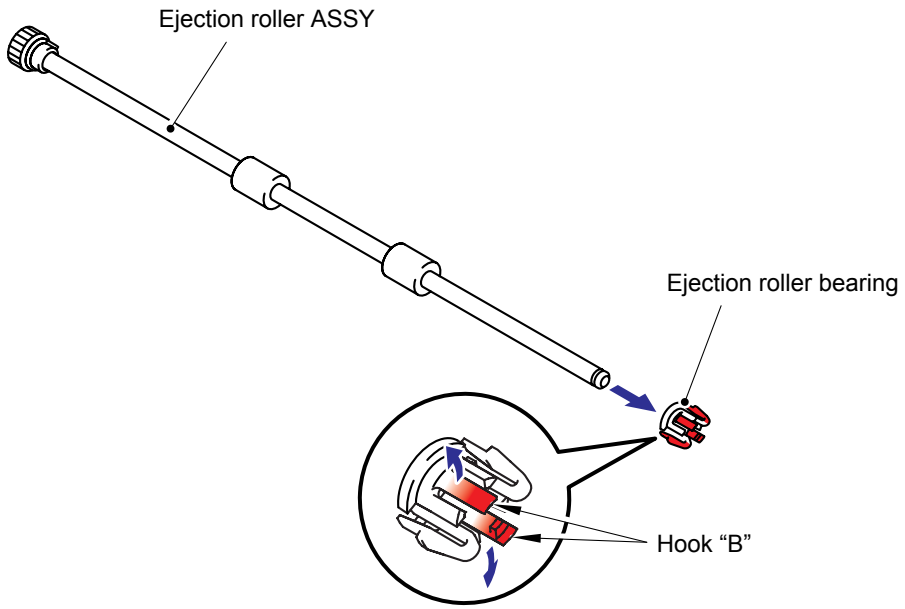


Fig. 5-29

(27)Remove the two cup B M3x10 taptite screws to remove the drive frame ASSY.

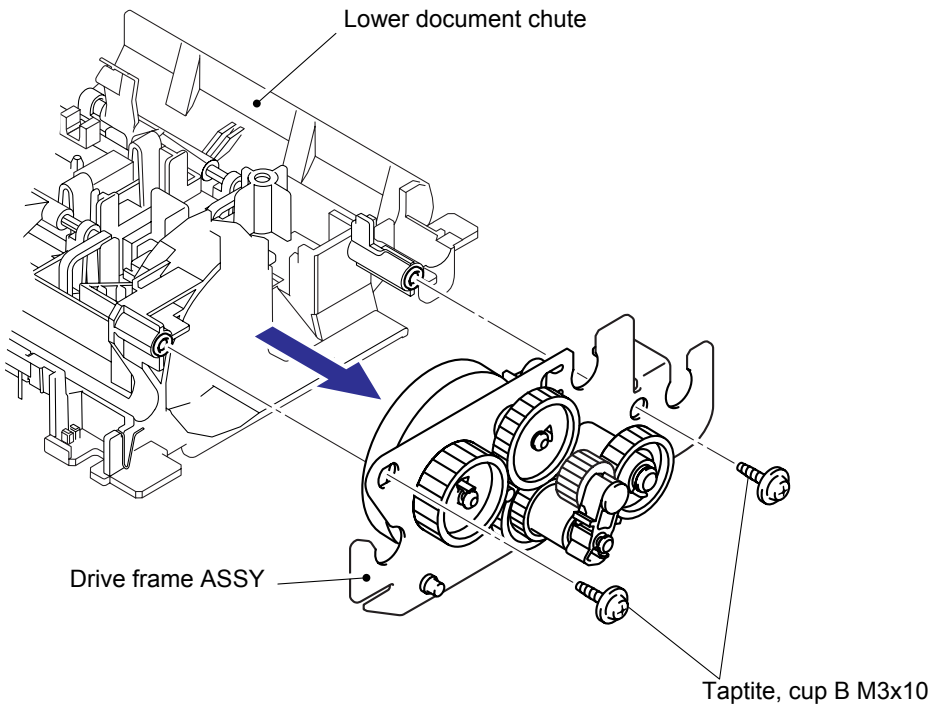


Fig. 5-30

(28)Remove the one bind S M3x6 taptite screw from the drive frame ASSY to remove the ADF motor.

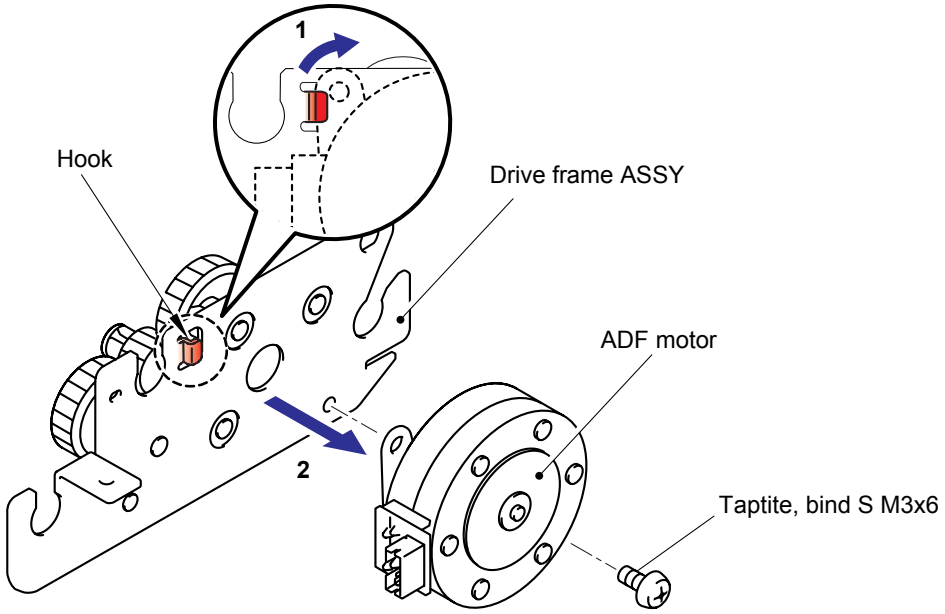


Fig. 5-31

NOTE: When re-assembling drive frame ASSY, assemble it so that the arm ASSY is at the top.

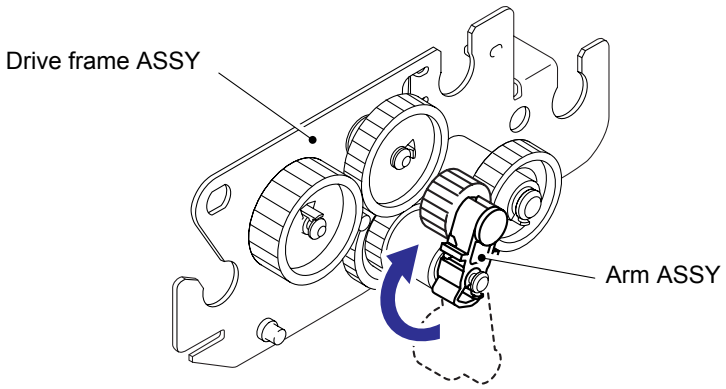


Fig. 5-32

(29)Remove the document rear actuator from the lower document chute.

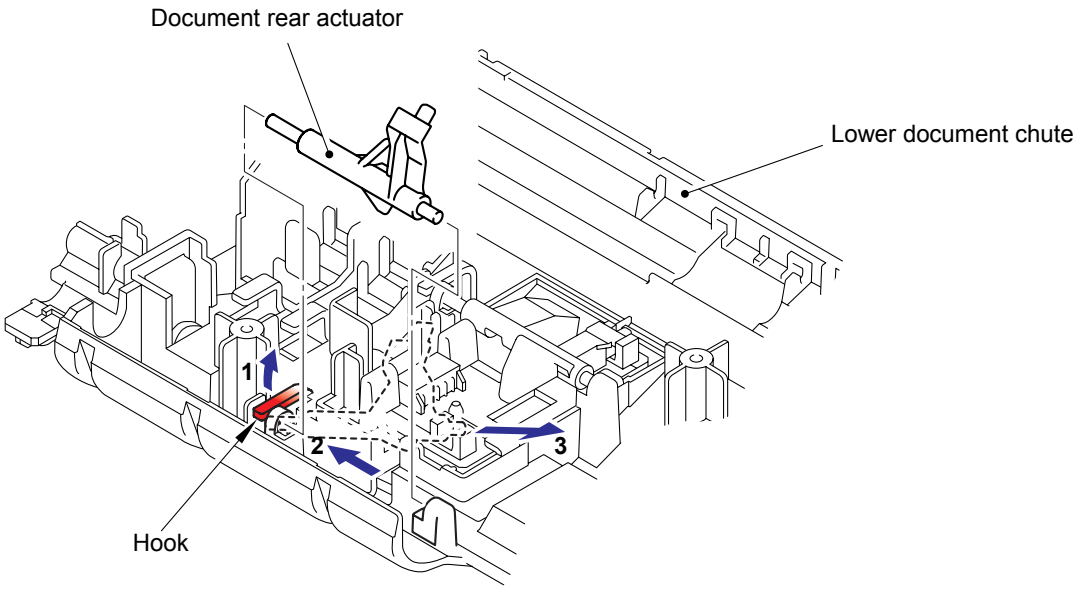


Fig. 5-33

(30)Remove the document front actuator from the lower document chute.

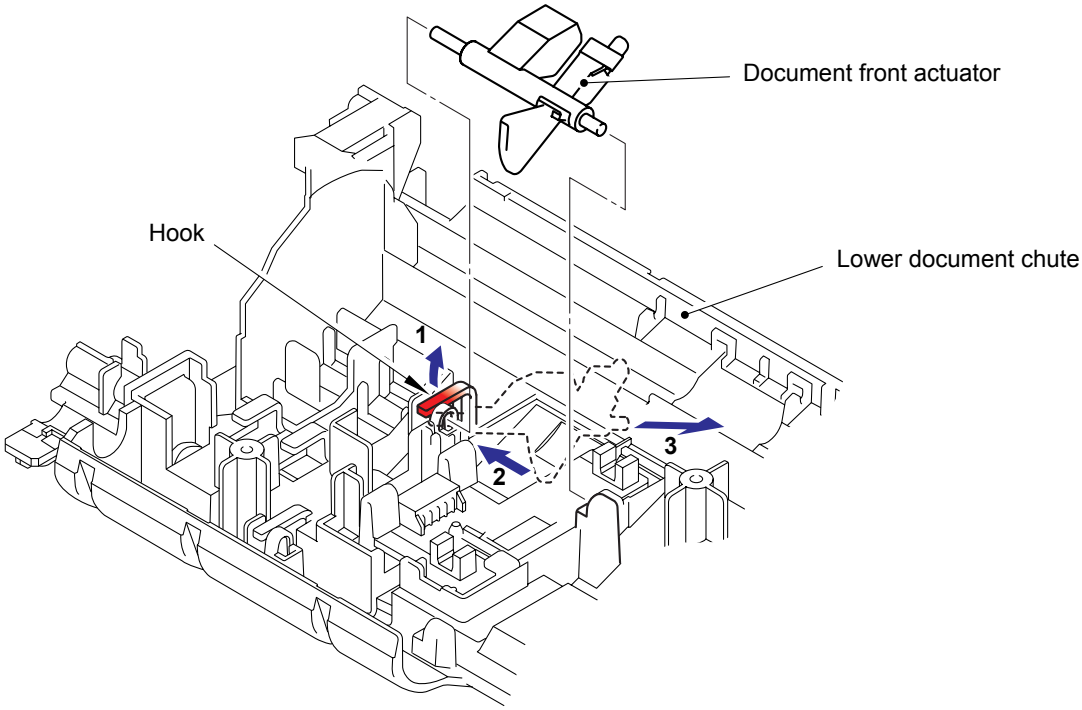


Fig. 5-34

(31)Release the two hooks “A” on the lower document chute to remove the ADF sensor PCB ASSY.

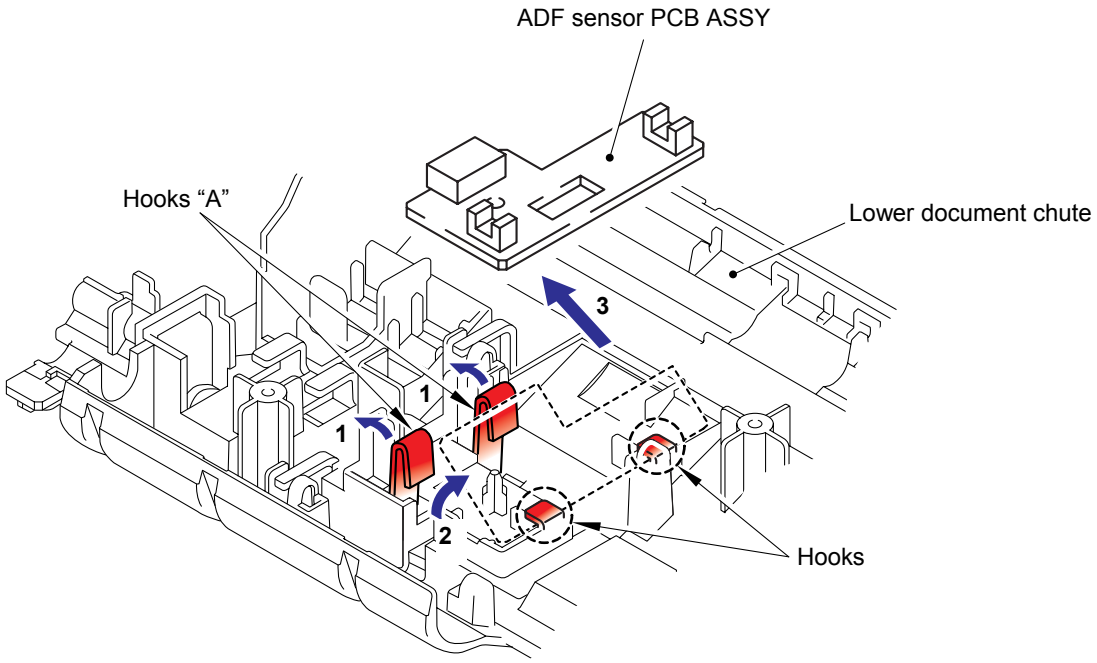


Fig. 5-35

(32)Turn the lower document chute upside down.

(33)Release the pins and remove the document hold.

(34)Remove the document spring from the lower document chute.

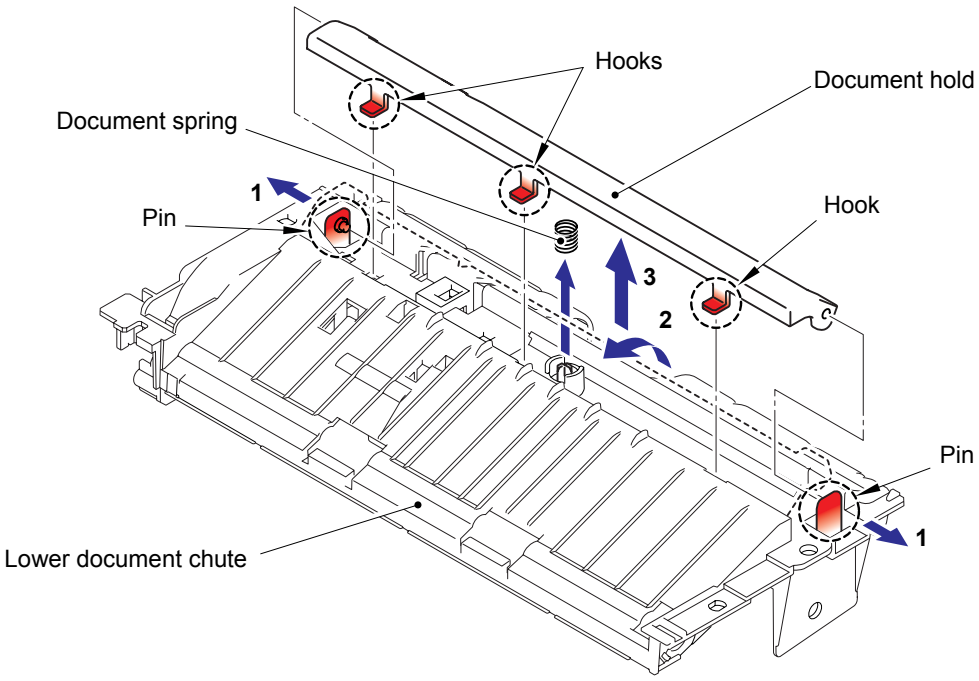


Fig. 5-36

(35)Remove the one bind B M4x12 taptite screw from the document cover sub ASSY.
(36)Open the ADF unit and then release the hook to remove the document cover ASSY.

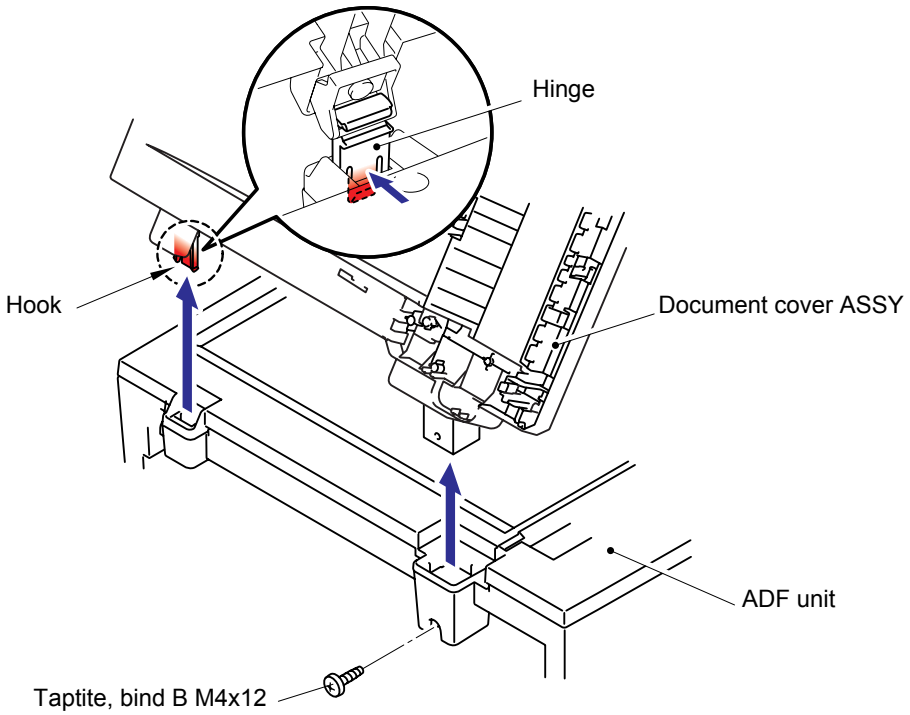


Fig. 5-37

(37)Move the spring as shown in the figure below.
(38)Remove the pressure roller ASSY.

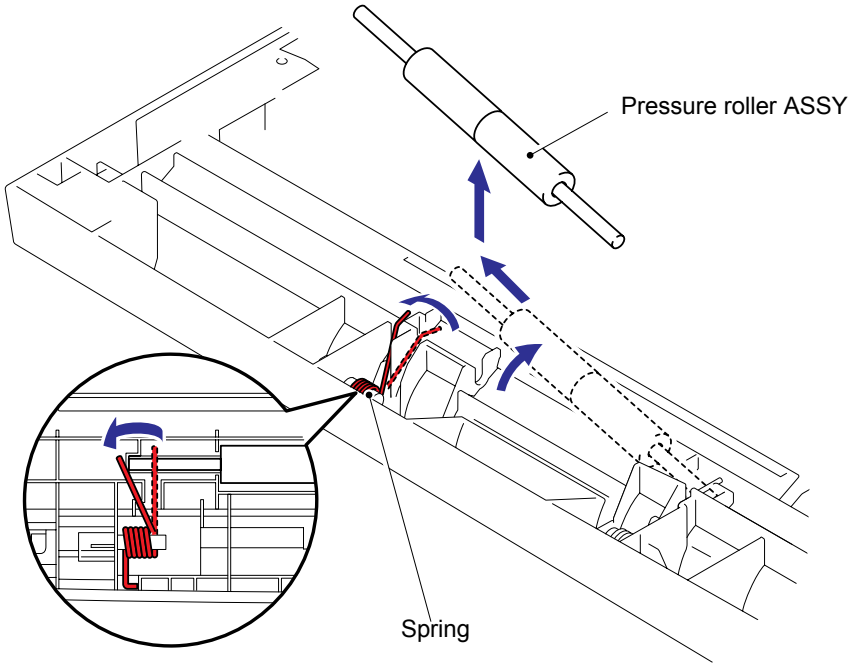


Fig. 5-38

(39)Remove the two pressure rollers from the pressure roller shaft.

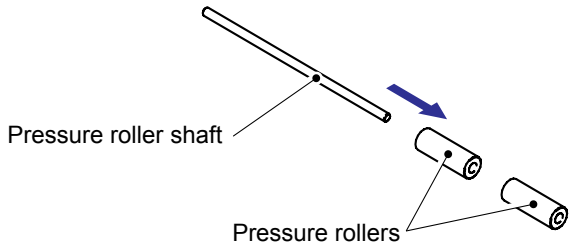


Fig. 5-39

(40)Remove the three cup B M3x10 taptite screws to remove the hinge ASSY L.

(41)Remove the hinge from the hinge arm.

(42)Remove the one bind B M4x12 taptite screw to remove the hinge arm.

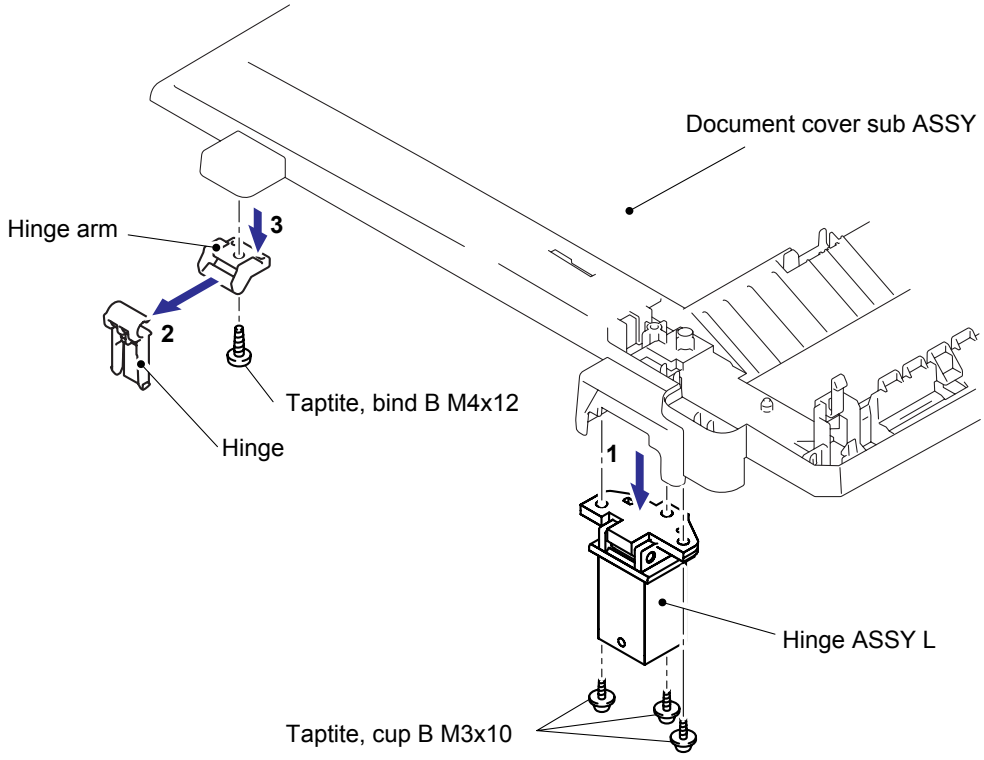


Fig. 5-40

5.1.8 Scanner Unit

(1) Open the scanner unit.

(2) Remove the two screws from the scanner slider L.

(3) Remove the two screws from the scanner slider R.

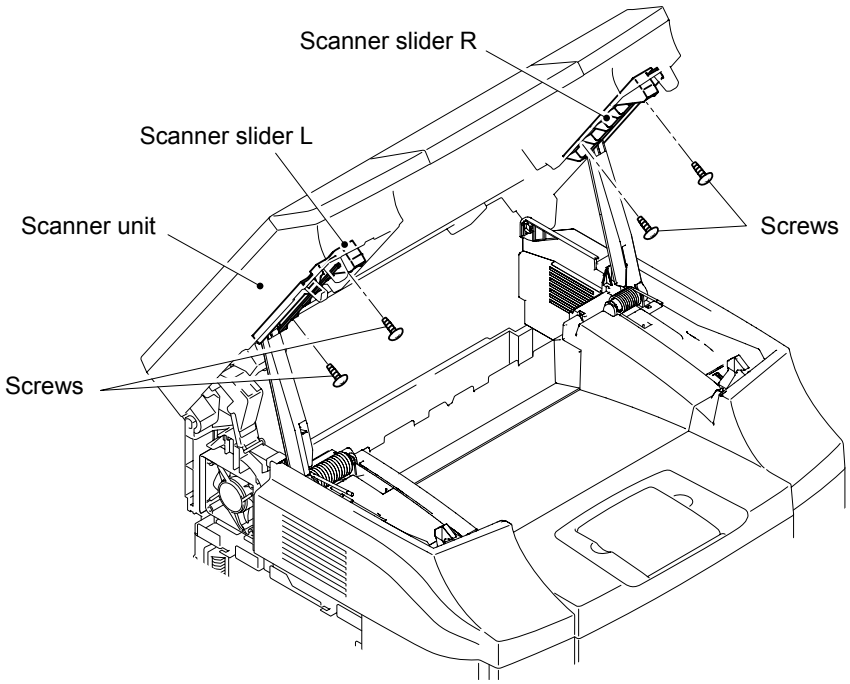


Fig. 5-41

(4) Remove the cable cover to remove the CIS flat cable from the cable cover.

(5) Put up the scanner unit at right angles to remove it.

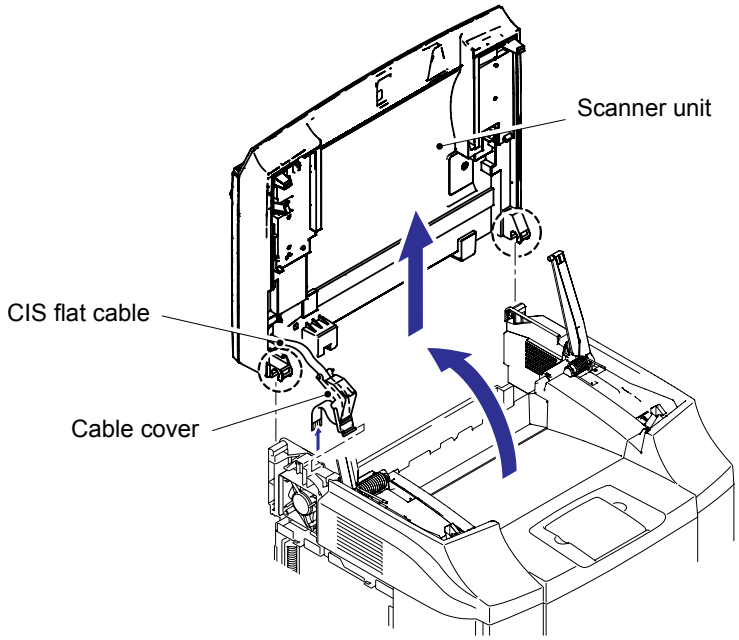


Fig. 5-42

5.1.9 Pull Arm/Scanner Slider L, R

(1) Remove the scanner slider L, R from the pull arm.

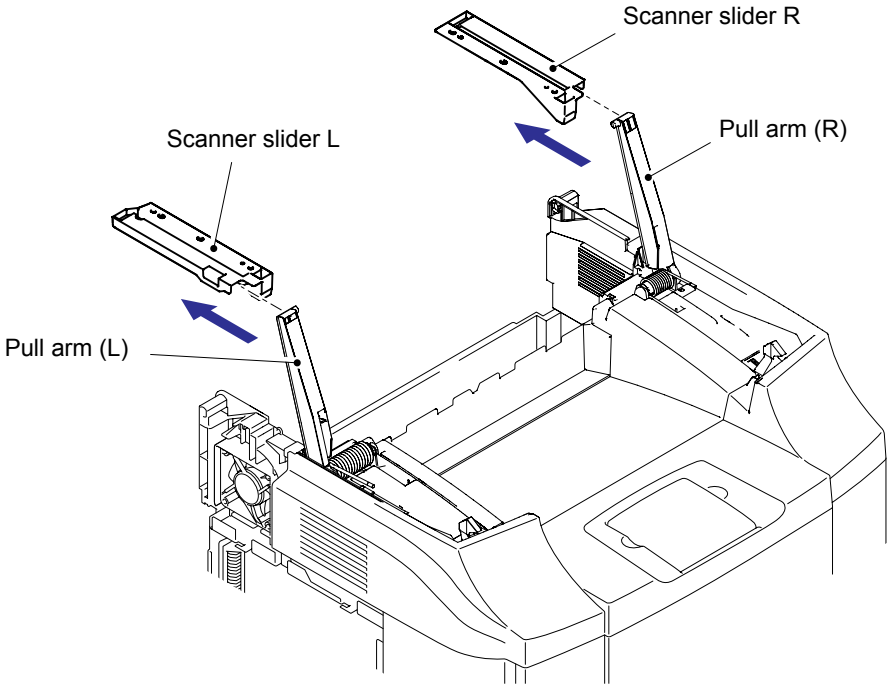


Fig. 5-43

(2) Remove the screw to remove the pull arm (L), pull arm guide (L) and pull arm spring.

(3) Remove the screw to remove the pull arm (R), pull arm guide (R) and pull arm spring.

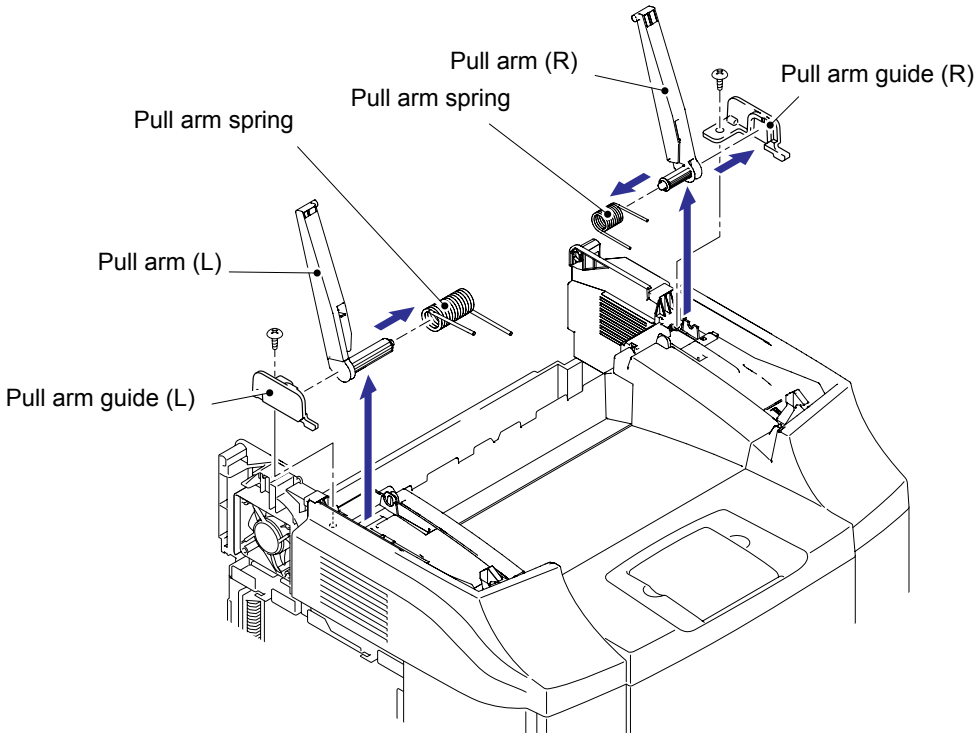


Fig. 5-44

5.1.10 IS Lock Lever ASSY

(1) Remove the IS lock lever ASSY as shown in the figure below.

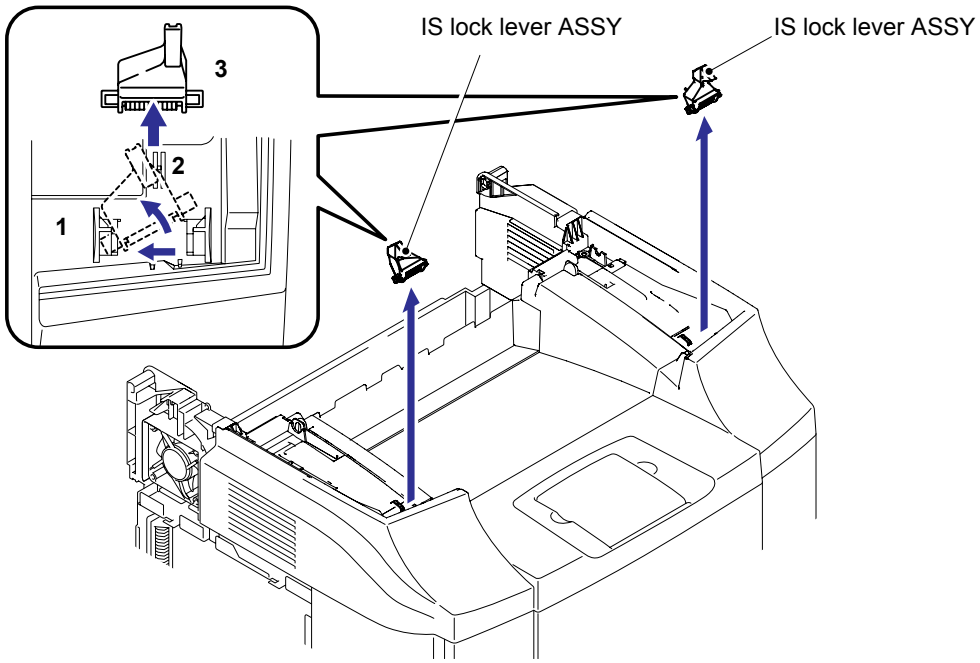


Fig. 5-45

5.1.11 Tray (TP)

(1) Remove the tray (TP) from the top cover.

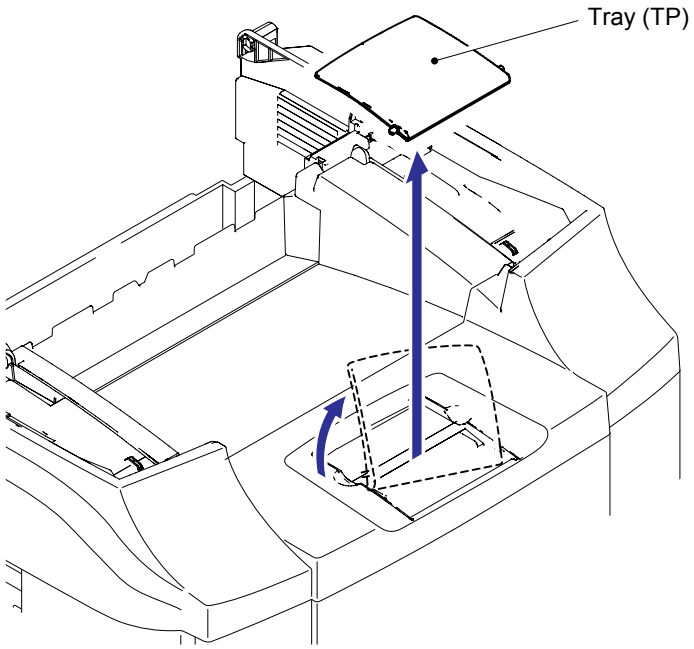


Fig. 5-46

5.1.12 Panel

(1) Lift up the front edge of the panel cover ASSY and release the six hooks “A”.

(2) Release the four hooks “B” to remove the panel cover ASSY.

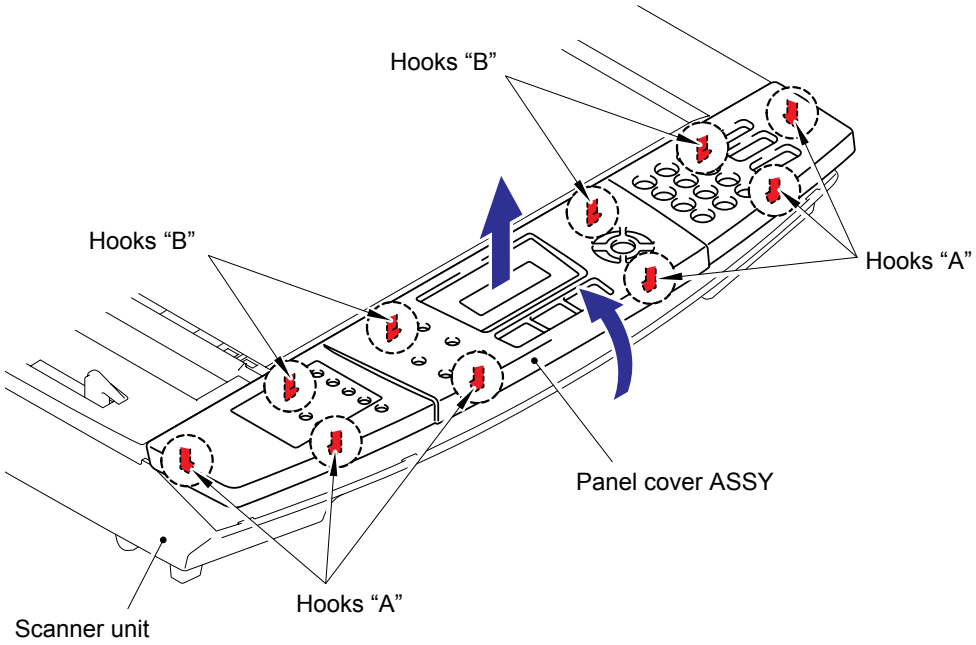


Fig. 5-47

(3) Release the four hooks to float the panel unit.

(4) Remove the panel harness ASSY from the panel cover ASSY assembled on the back of the panel unit.

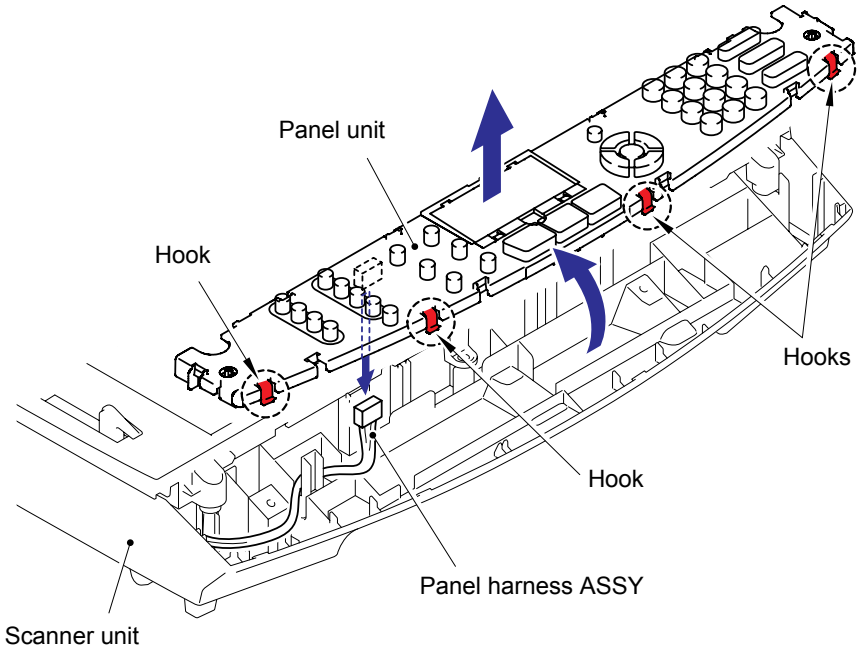


Fig. 5-48

(5) Turn the panel unit upside down.

(6) Disconnect the connector of the backlight.

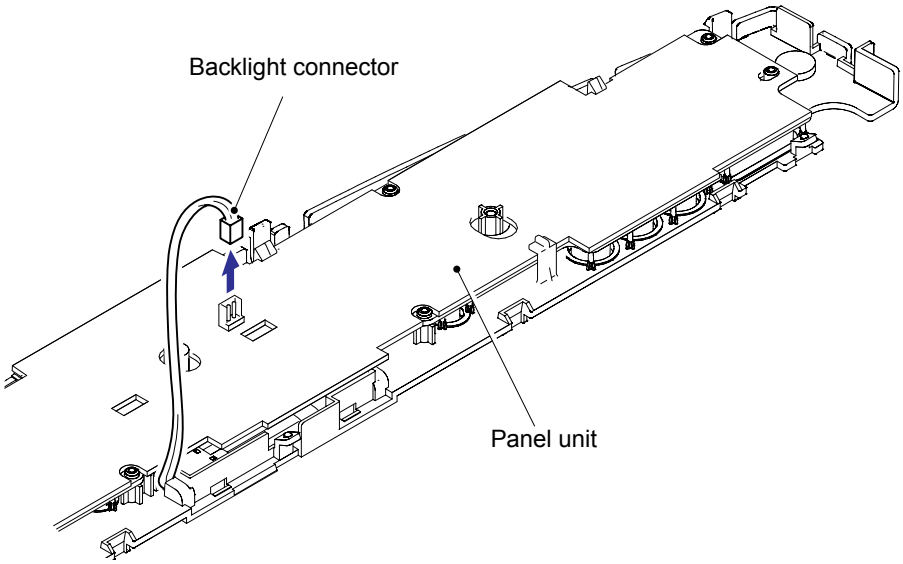


Fig. 5-49

(7) Release the three hooks “C” to remove the panel PCB from the panel unit.

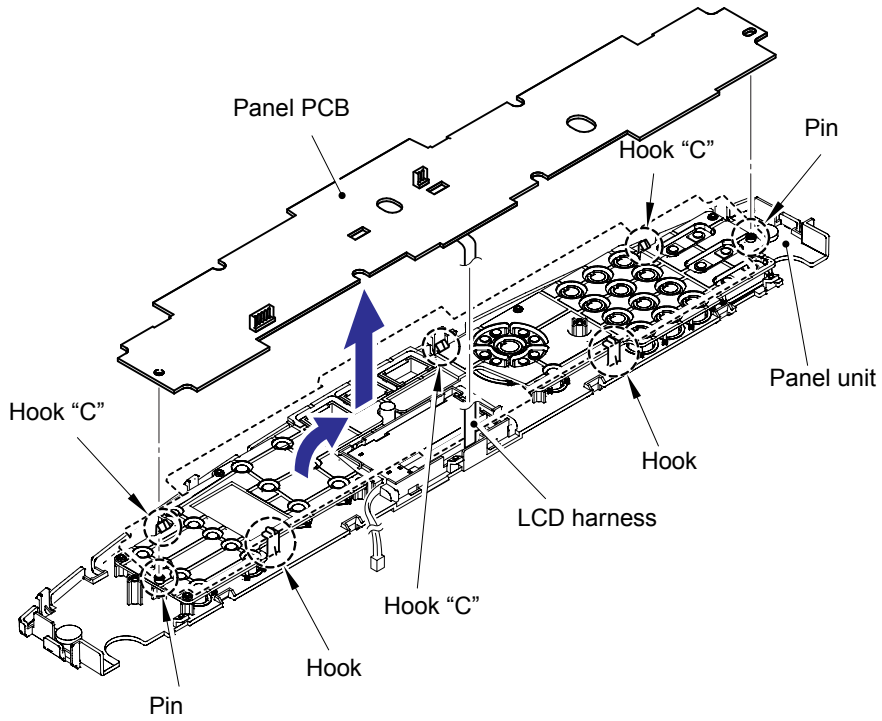


Fig. 5-50

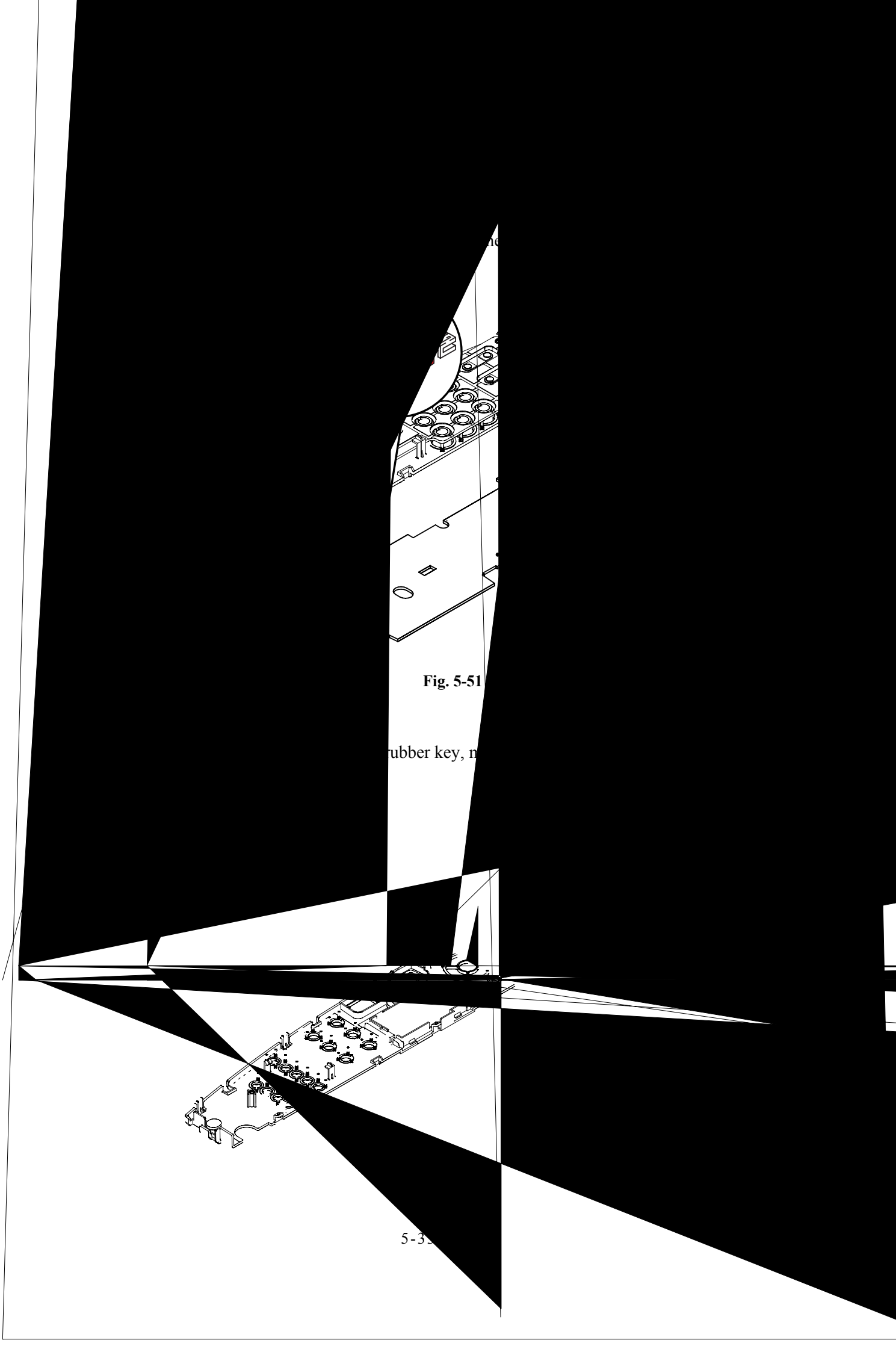


Fig. 5-51

rubber key, n

(10)Release the two hooks “D” to remove the LCD cover and LCD holder backlight module from the panel unit.

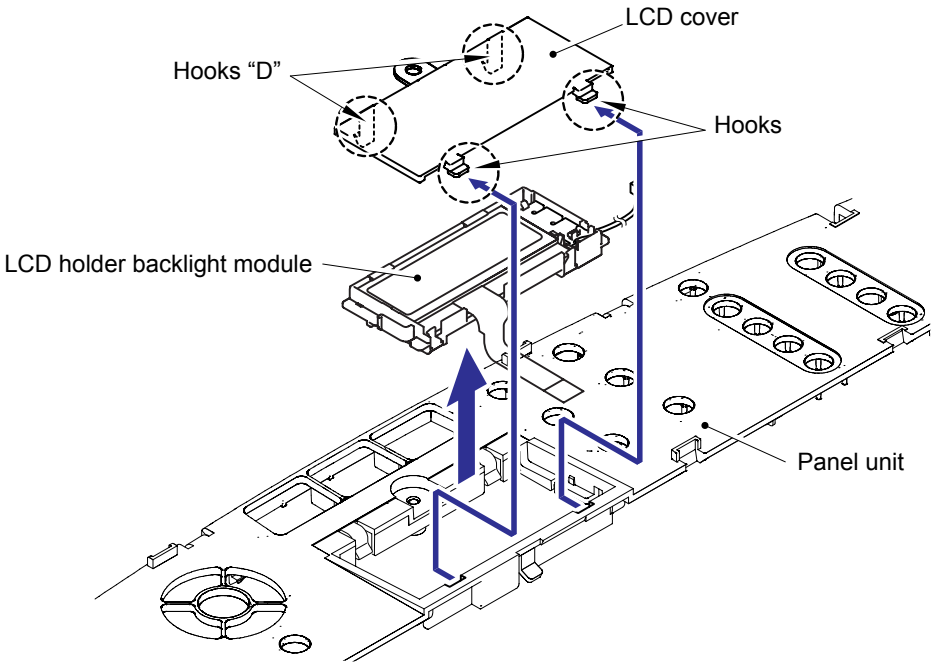


Fig. 5-53

(11)Release the two hooks “E” to remove the LCD from the LCD holder backlight module.

NOTE: When re-assembling the LCD, assemble the LCD holder back light module onto the panel unit first, put the hooks on the LCD cover into the panel unit, and put the hook “E” into the panel unit.

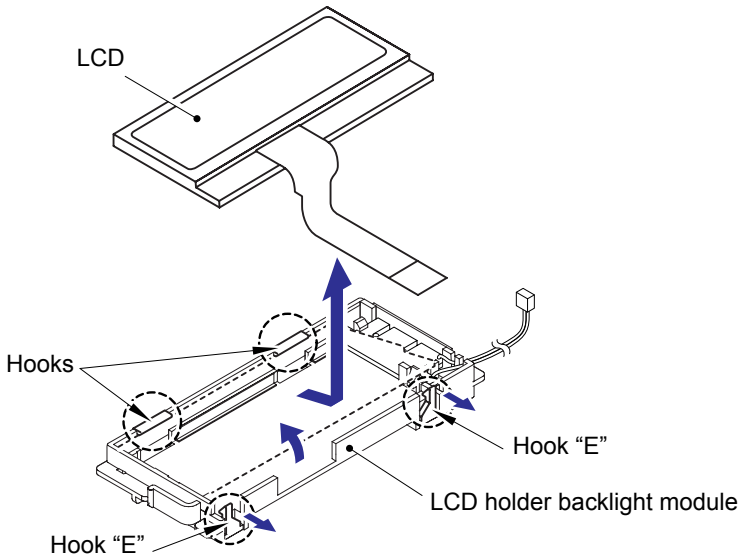


Fig. 5-54

5.1.13 Battery ASSY

(1) Disconnect the connector from the main PCB to remove the battery ASSY.

CAUTION

- There is a danger of explosion if the battery is incorrectly replaced.
- Use Brother genuine spare part when you replace the battery.
- Do not disassemble, recharge or dispose of in fire.
- Used battery should be disposed of according to local regulations.

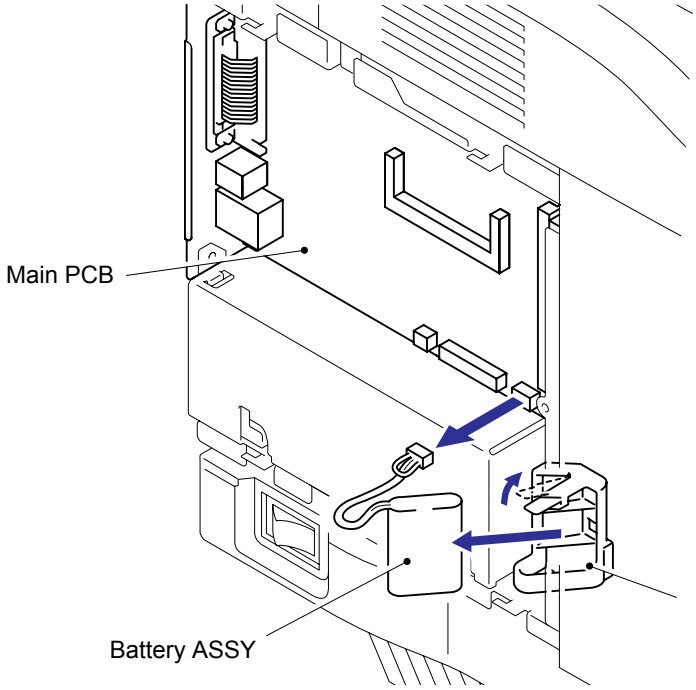


Fig. 5-55

5.1.14 Main PCB

(1) Disconnect the two connectors from the main PCB.

(2) Remove the four screws (A) from the main PCB.

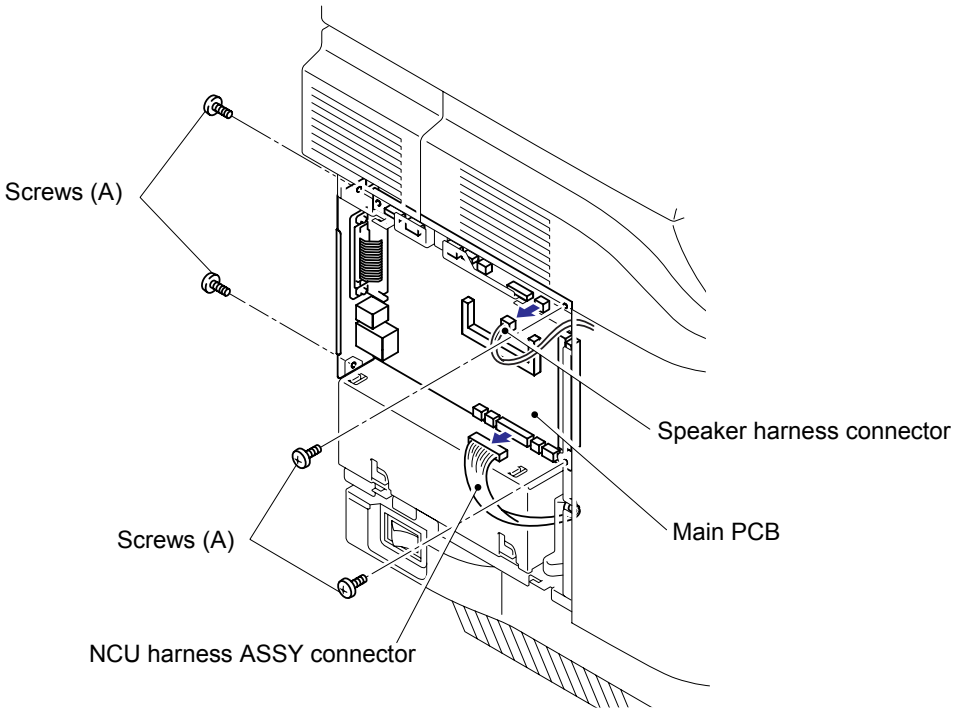


Fig. 5-56

(3) Disconnect the connector of the main PCB from the engine controller board.

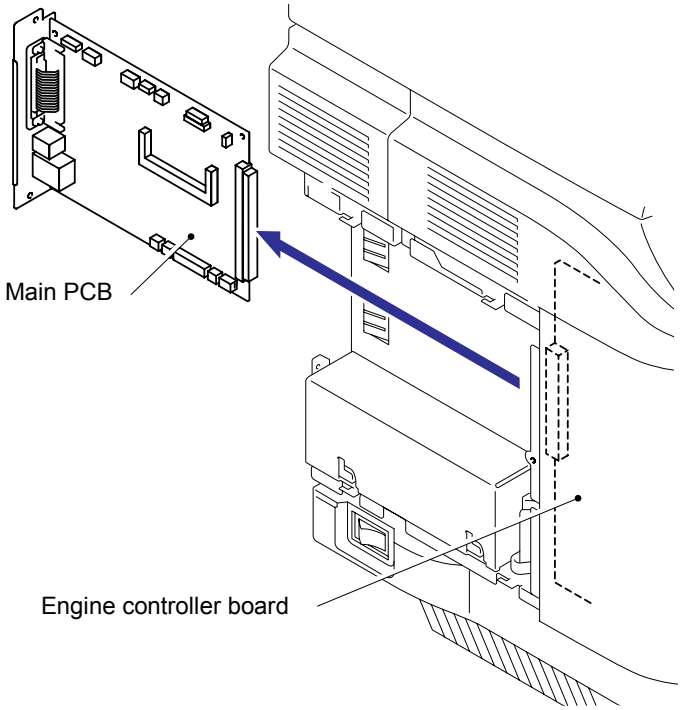


Fig. 5-57

5.1.15 NCU PCB ASSY

(1) Remove the two screws to remove the NCU unit.

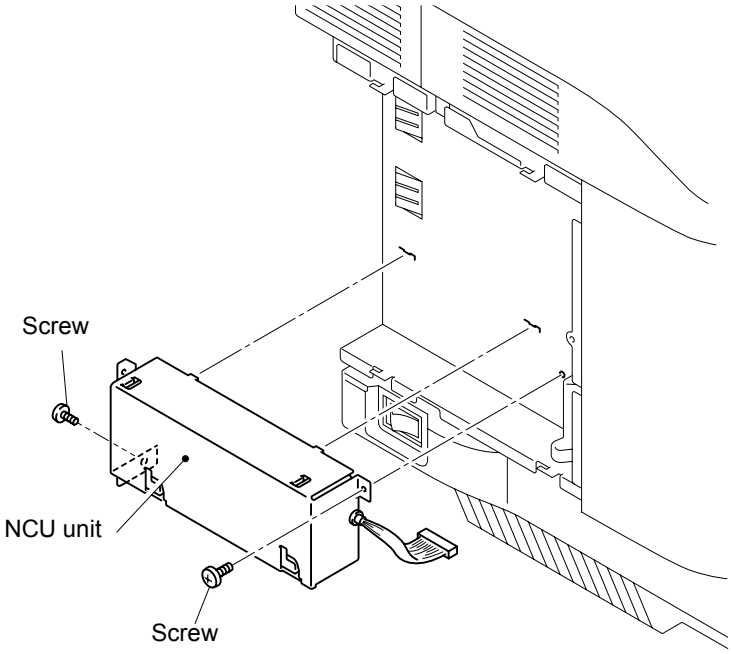


Fig. 5-58

(2) Remove the NCU harness ASSY from the NCU PCB ASSY.

(3) Remove the two screws to remove the NCU PCB ASSY.

NOTE: When re-assembling the NCU PCB ASSY, make sure that the LAN connector is connected and two hooks are caught securely.

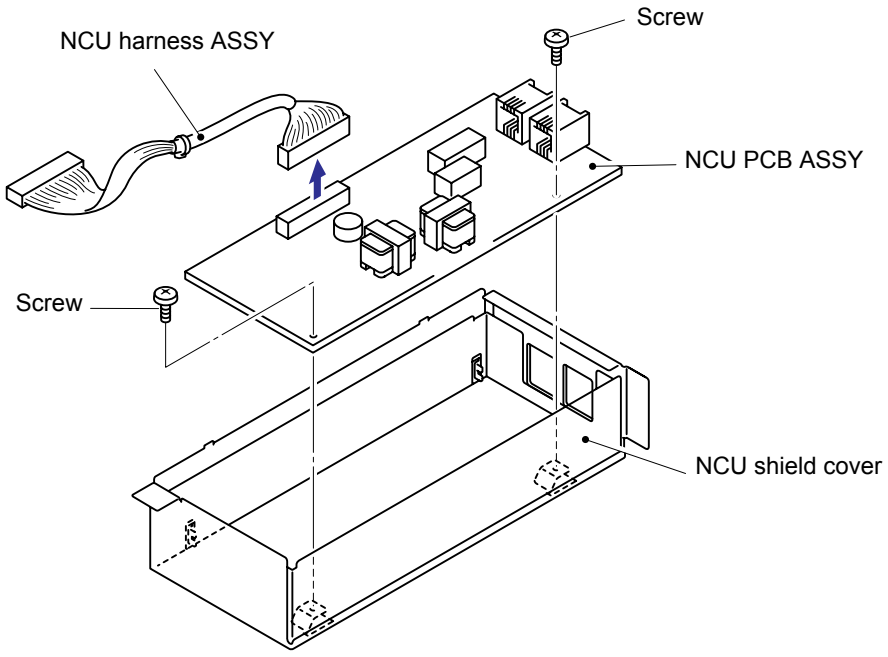


Fig. 5-59

5.1.16 Top Side R

(1) Open the back cover.

(2) Remove the screw to remove the top side R.

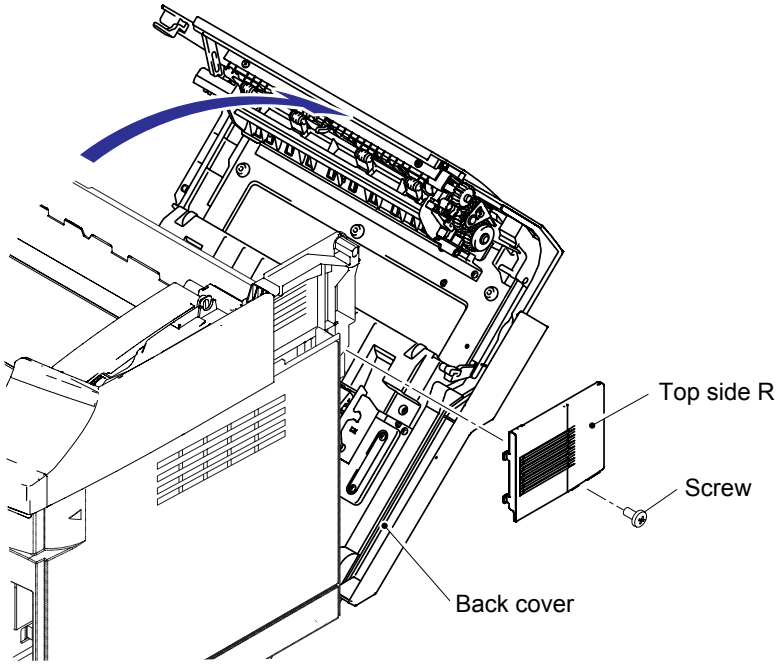


Fig. 5-60

5.1.17 Cleaning Roller Cover PU / Cleaning Roller PU

(1) Open the center cover.

(2) Release the two hooks to remove the cleaning roller cover PU.

(3) Remove the cleaning roller PU.

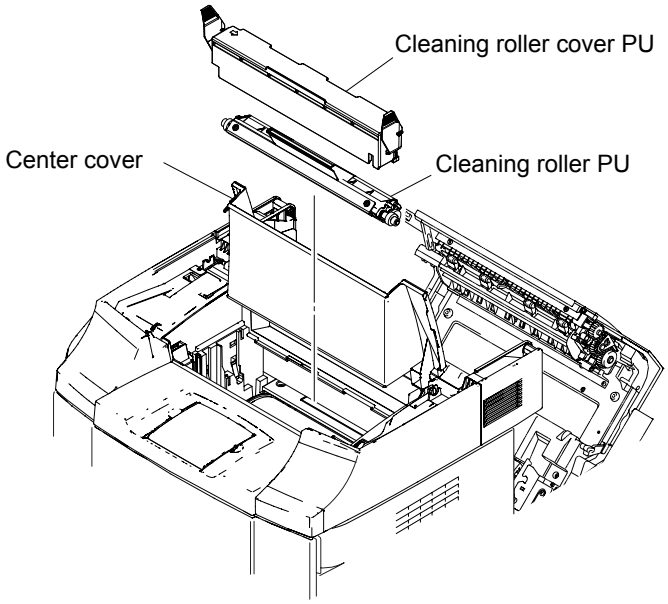
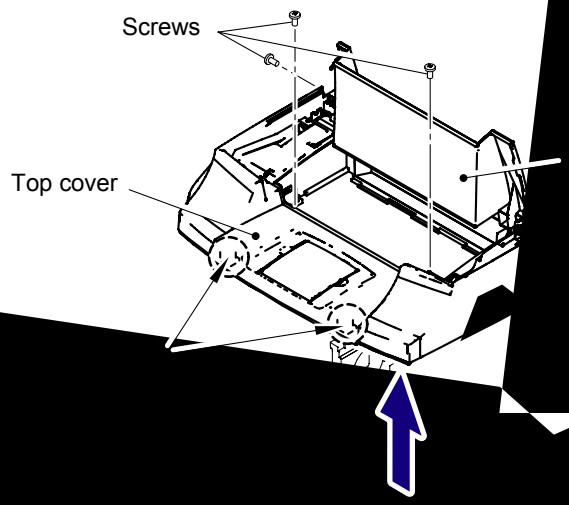


Fig. 5-61

5.1.18 Top Cover

(1) Remove the four screws from the top cover.

(2) Release the two hooks to remove the top cover.



5.1.19 Center Cover

(1) Remove the center cover from the top cover.

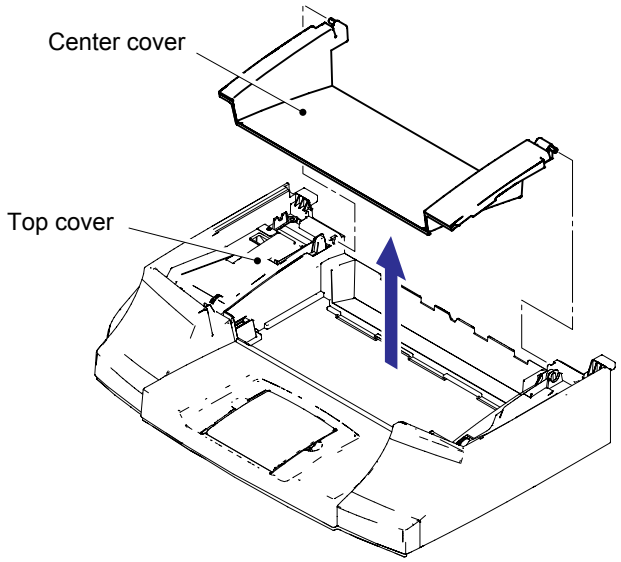


Fig. 5-63

5.1.20 Right Side Cover PU

(1) Remove the waste toner pack PU.

(2) Remove the setscrew (BT4x10, 2 pieces) of right side cover PU.

(3) Remove the right side cover PU from the machine.

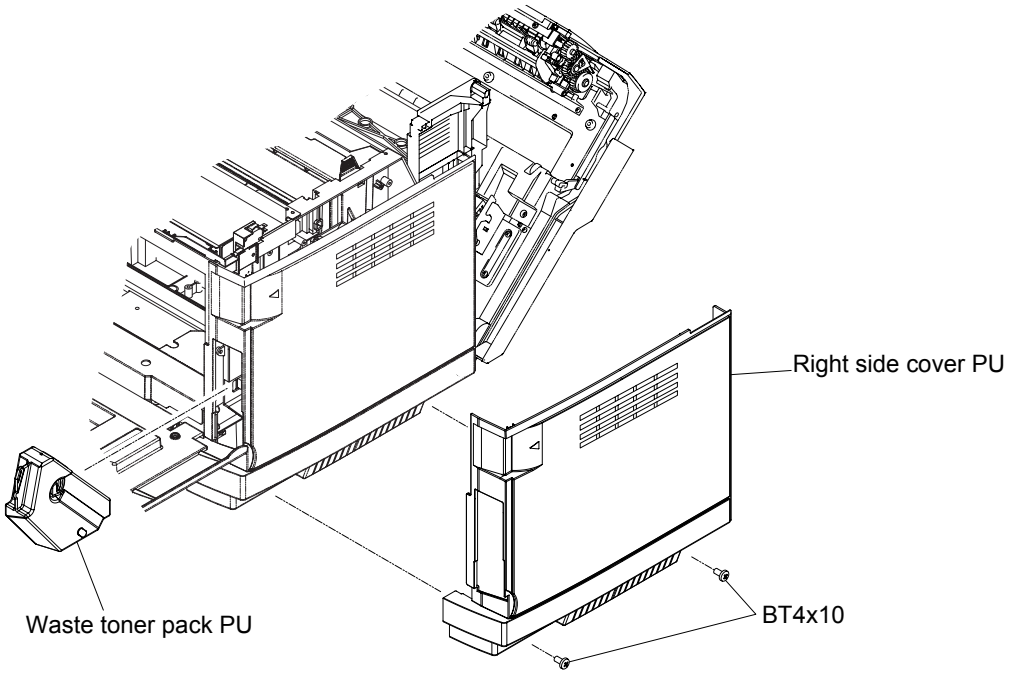
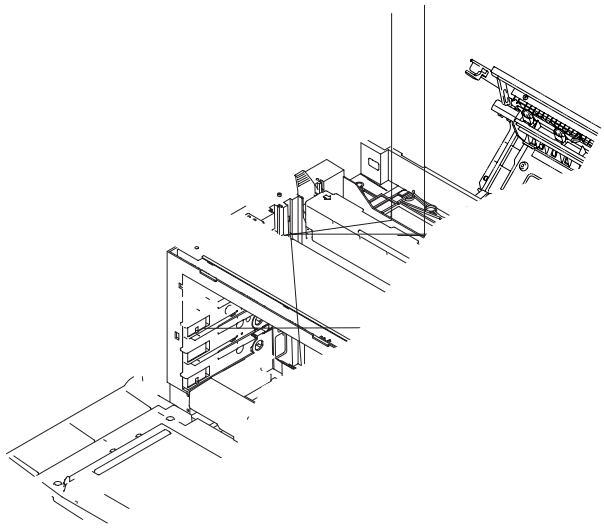


Fig. 5-64

5.1.21 Side Cover LF

(1) Remove the two screws to remove the side cover LF.



5.1.23 Waste Toner Auger PU

(1) Remove the setscrew (BT3x8, 2 pieces) of the waste toner auger PU.

(2) Remove the waste toner auger PU from the frame.

NOTE:

- In this instance, do not cause the waste toner fall on the floor.
- If the installation part is stained, clean it off with the vacuum cleaner that is for the toner only or with cloth.

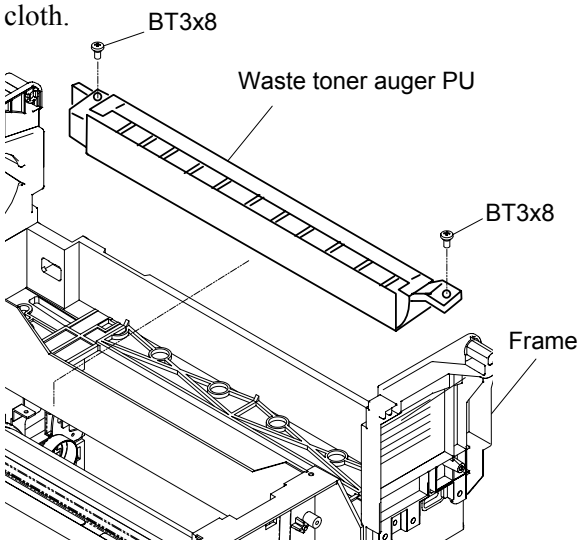


Fig. 5-67

5.1.24 Waste Toner Agitator PU

(1) Remove the coupling gear from the inside of the frame.

(2) Pull out the waste toner agitator PU.

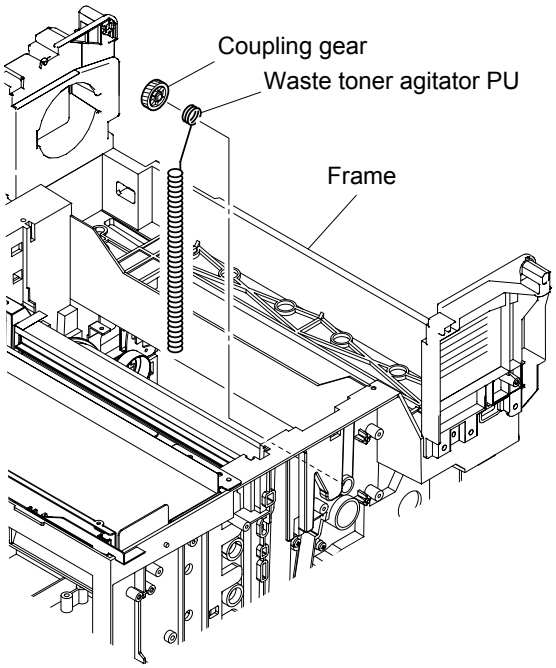


Fig. 5-68

5.1.25 Erase Lamp PU

(1) Remove the knob screw (2 pieces) of the transfer unit PU from rear.

(2) Holding the band provided at the top side of the transfer unit PU, pull out the transfer unit PU from the inside of the frame. In this instance, do not cause the belt surface touch the peripheral parts.

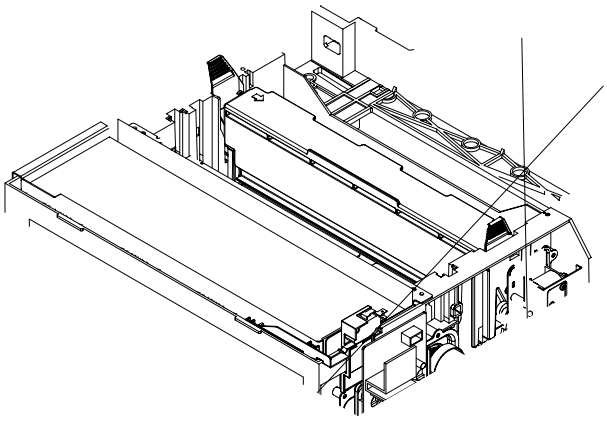
(3) Remove the setscrew (BT3x8, 2 pieces) fixing the erase lamp PU to the sensor base (TB).

(4) Disconnect the harness connector connecting to the erase lamp PU.

(5) Remove the erase lamp PU from the sensor base (TB).

CAUTION

- Do not scratch the belt surface.
- Do not touch the belt surface with bare hands.
- When replacing the erase ramp board, do not touch the transfer belt surface with your bare hands.



5.1.26 Marker Sensor

(1) Disconnect the two connectors connecting to the maker sensor and toner density sensor PU.

(2) Remove the setscrew (BT4x8, 2 pieces), and remove the sensor base (TB) from the frame.

(3) Remove the maker sensor from the sensor base (TB).

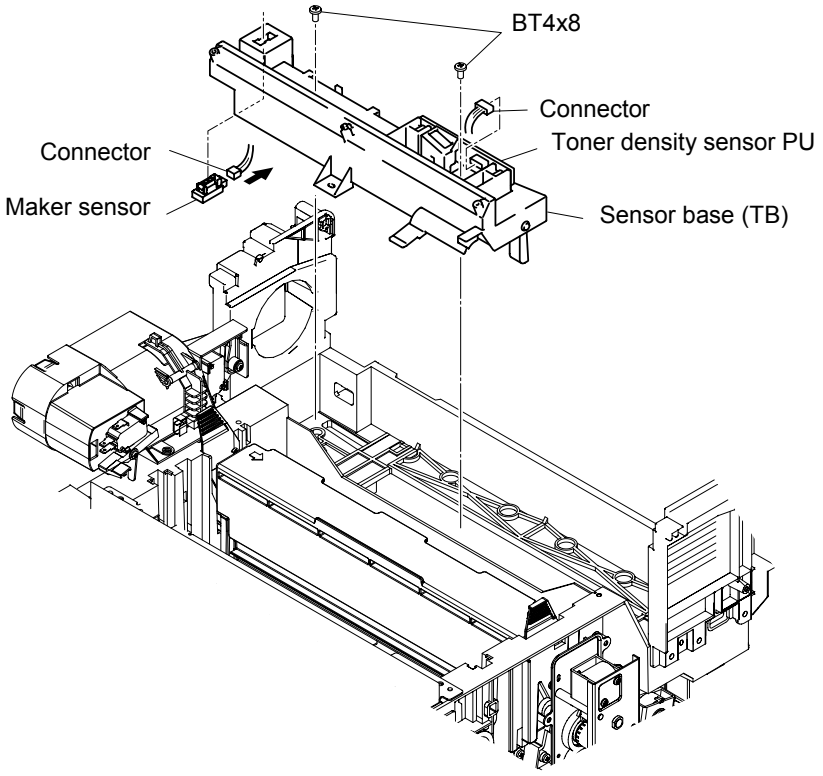


Fig. 5-70

5.1.27 Toner Density Sensor PU

(1) Remove the setscrew (BT3x8, 2 pieces) of the toner density sensor PU from the sensor base (TB).

(2) Remove the toner density sensor PU from the sensor base (TB).

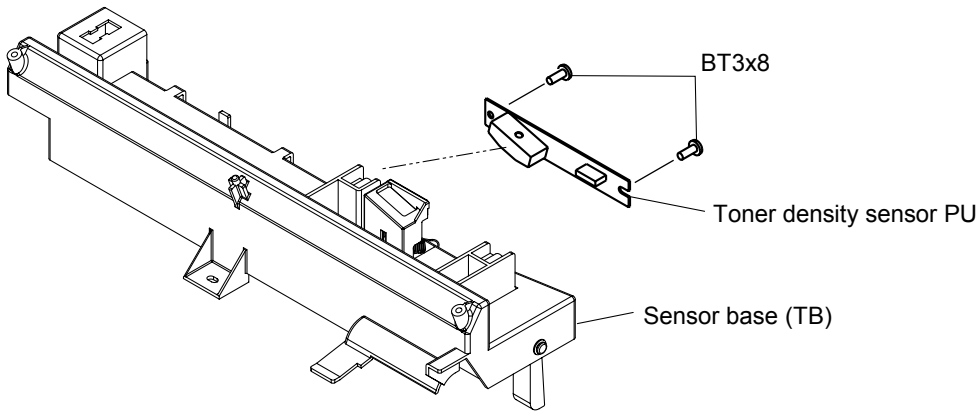


Fig. 5-71

5.1.28 Cleaning Roller Clutch PU

(1) Remove the harness connector of the cleaning roller clutch PU.

(2) Remove the setscrew (TS3x8, 3 pieces) fixing the cleaning roller clutch PU.

(3) Remove the cleaning roller clutch PU from the frame.

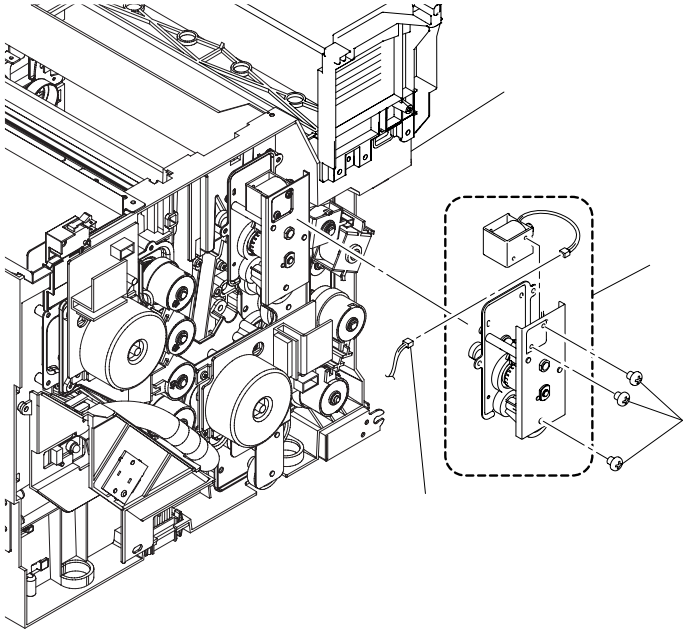


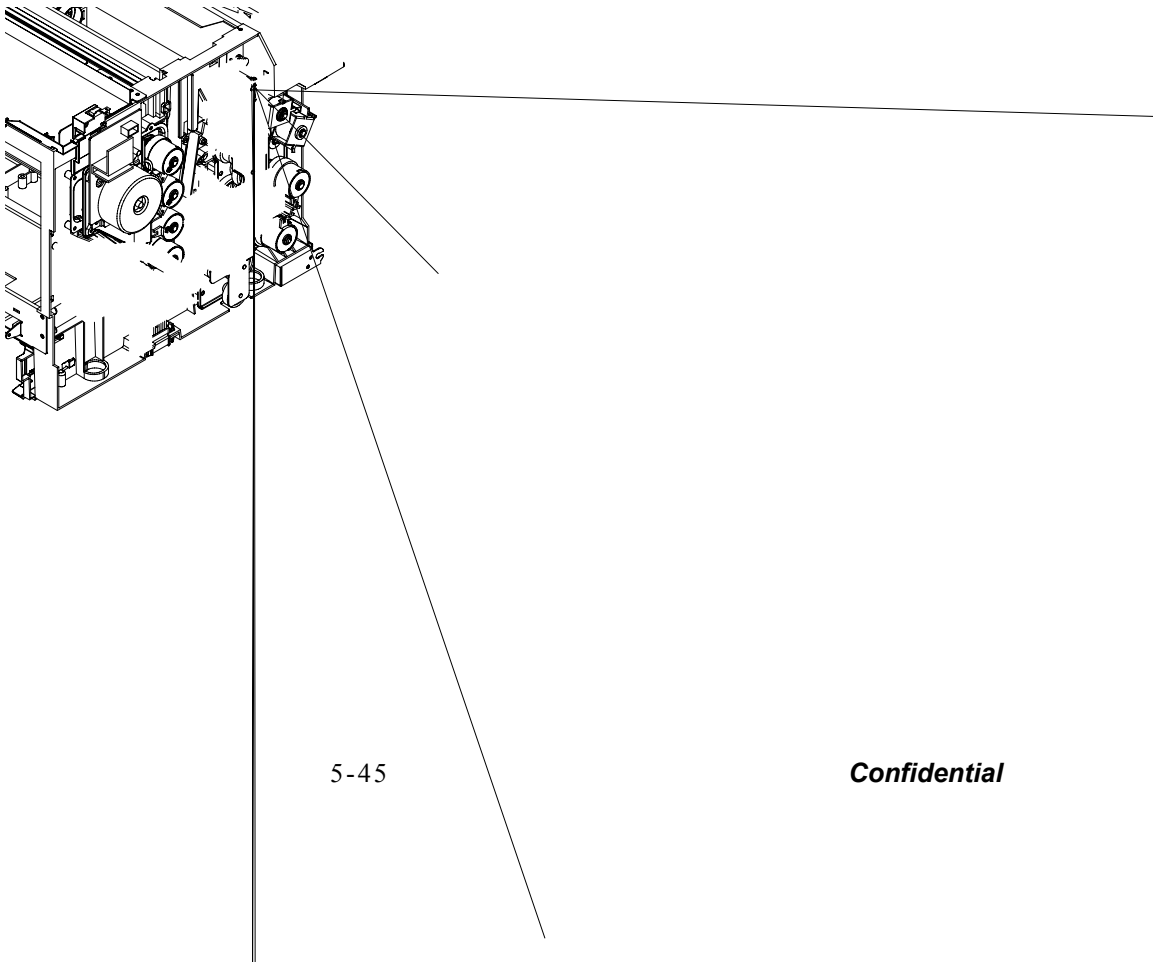
Fig. 5-72

5.1.29 Main Motor PU

(1) Disconnect the connectors of all harnesses connecting to the harness duct.

(2) Release the two hooks of the harness duct and remove the harness duct.

(3) Remove all harnesses from the harness duct.



(4) Remove the setscrew (BT3x12, 4 pieces) of the main motor PU.

(5) Remove the main motor PU from the OPC drive gear ASSY PU.

CAUTION

Do not damage the output shaft, otherwise, it may cause the degradation of print quality.

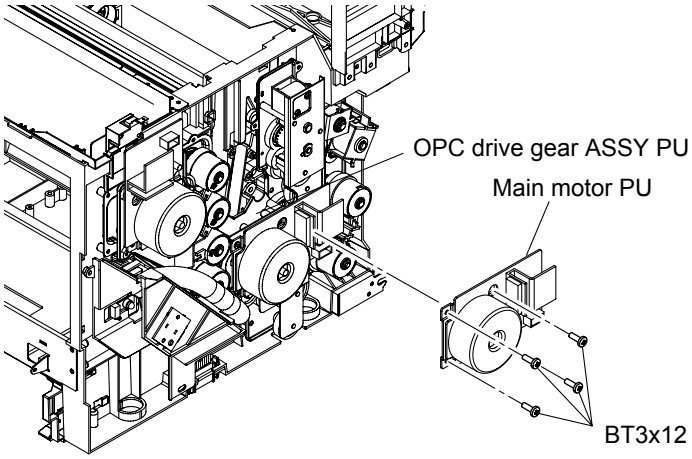


Fig. 5-74

5.1.30 Fuser Clutch PU

(1) Remove the washer fixing the fuser clutch PU to the shaft.

(2) Remove the fuser clutch PU from the shaft.

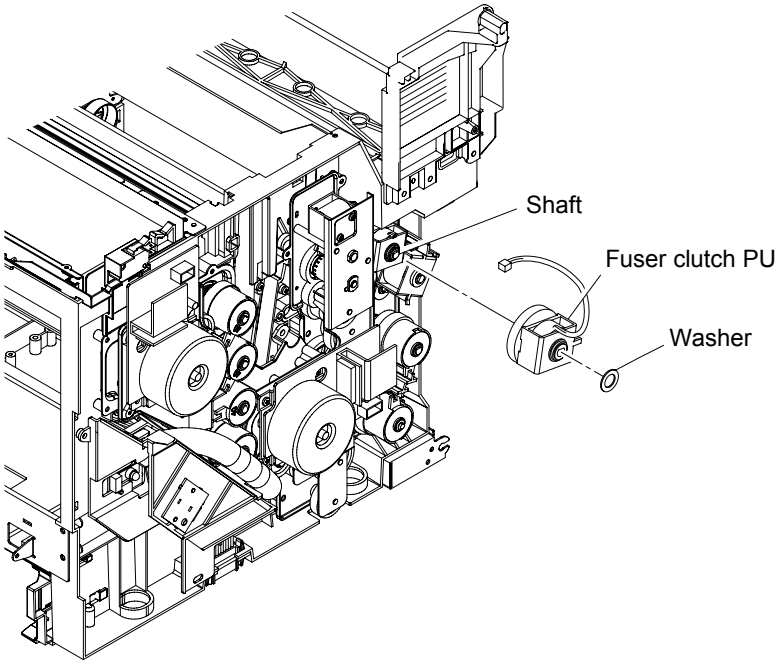


Fig. 5-75

5.1.33 Paper Feed Clutch PU

(1) Remove the washer fixing the paper feed clutch PU to the shaft.

(2) Remove the paper feed clutch PU from the shaft.

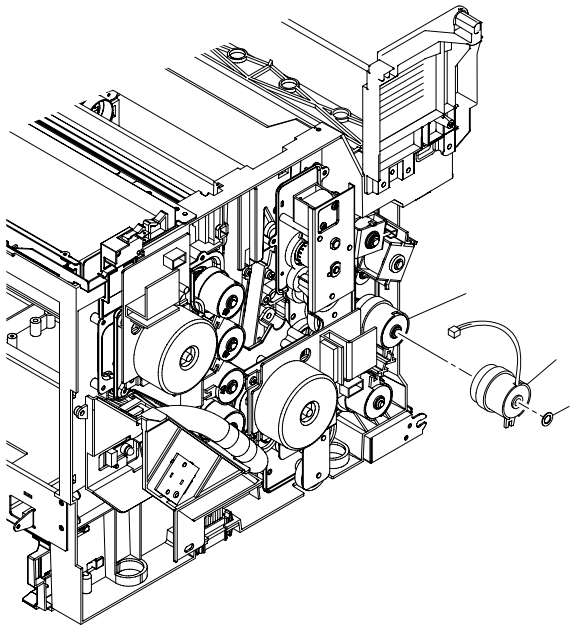


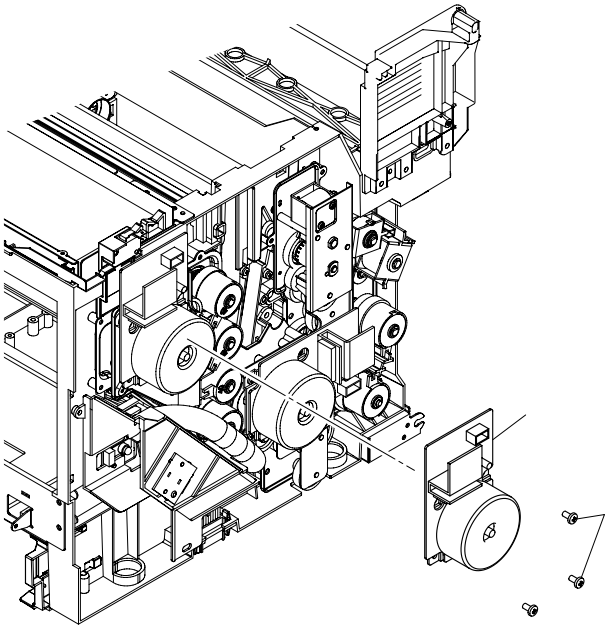
Fig. 5-78

5.1.34 Developer Motor PU

(1) Remove the setscrew (ST3x6, 4 pieces) fixing the developer motor PU.

(2) Remove the developer motor PU from the developer drive ASSY PU.

NOTE: Do not damage the output shaft, otherwise, it may cause the degradation of print quality.



5.1.35 Waste Toner Holder ASSY PU

(1) Loosen the setscrew (BT3x8, 1 piece) of the plate.

(2) Uprear (Do not remove) the waste toner feeder pipe.

(3) Remove the setscrew (BT3x8, 1 piece and BT3x12, 1 piece) of the waste toner holder ASSY PU.

(4) Remove the waste toner holder ASSY PU.
The waste toner sensor PU is built in the holder ASSY PU, and therefore is replaced by a waste toner holder ASSY PU as the module.

(5) Remove the base from the frame.

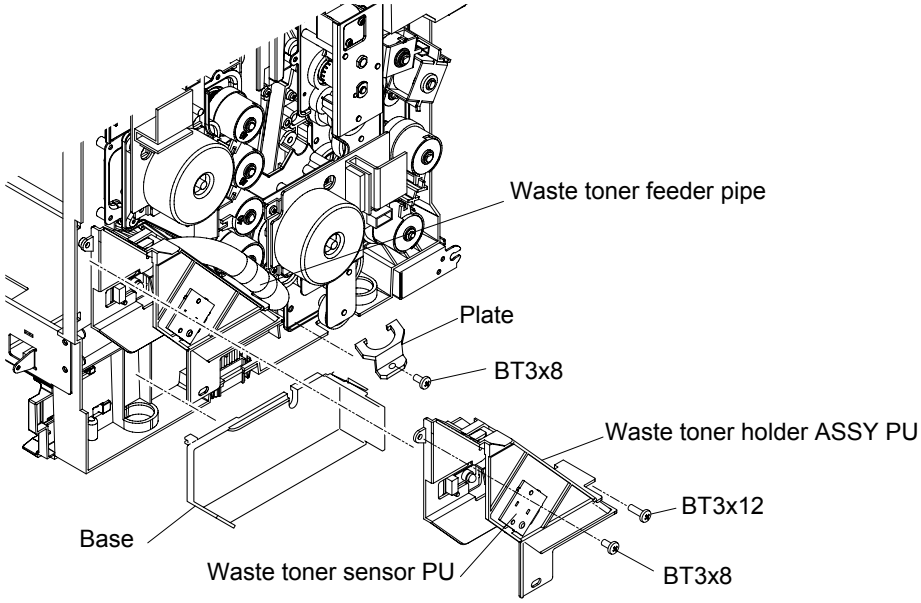


Fig. 5-80

5.1.36 Developer Clutch PU (DCLY/DCLM/DCLC/DCLK)

(1) Remove the washer fixing the developer clutch PU to the shaft.

(2) Remove the developer clutch PU from the shaft.

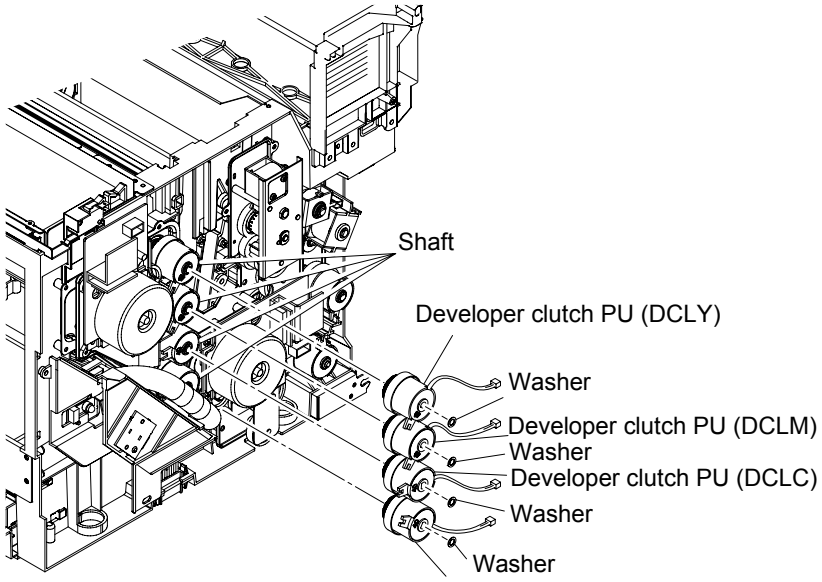


Fig. 5-81

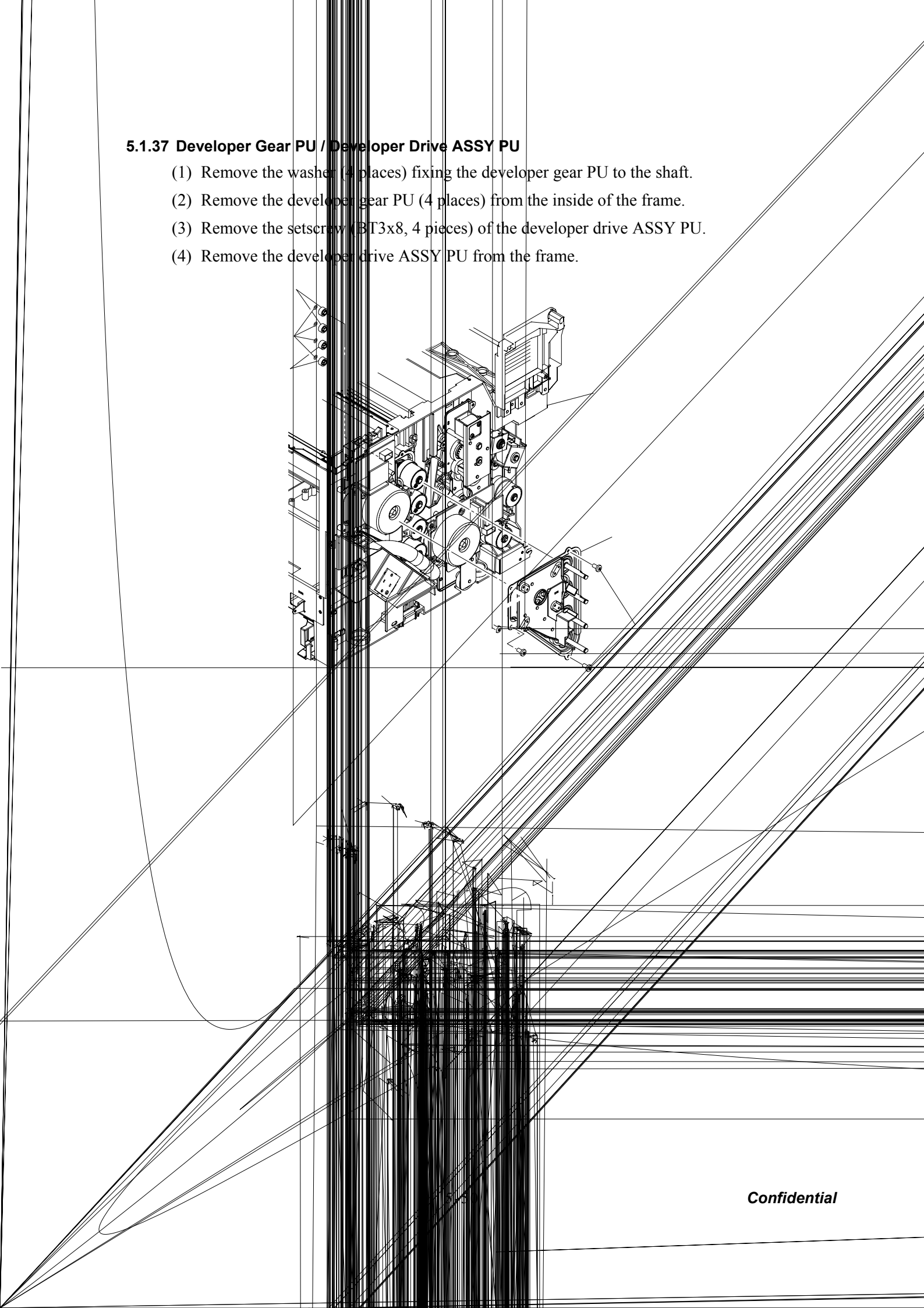
5.1.37 Developer Gear PU / Developer Drive ASSY PU

(1) Remove the washer (4 places) fixing the developer gear PU to the shaft.

(2) Remove the developer gear PU (4 places) from the inside of the frame.

(3) Remove the setscrew (BT3x8, 4 pieces) of the developer drive ASSY PU.

(4) Remove the developer drive ASSY PU from the frame.



5.1.39 Main Drive Gear ASSY PU

(1) Close the back cover.

(2) Remove the setscrew (ST4x6, 1 piece) of the side base stay (R).

(3) Open the back cover.

(4) Remove the setscrew (BT4x10, 3 pieces and ST3x6, 2 pieces) of the side base stay (R) to remove the side base stay.

(5) Remove the setscrew (BT4x10, 4 pieces) fixing the main drive gear ASSY PU.

(6) Pull out the main drive gear ASSY PU from the frame.

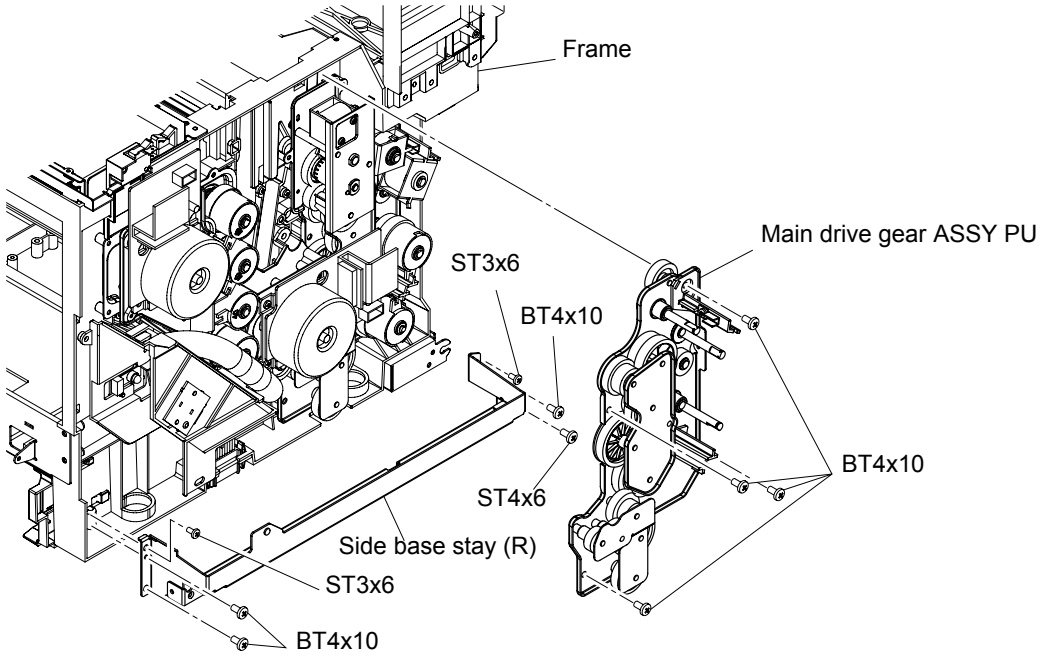


Fig. 5-84

5.1.40 Waste Toner Feeder PU

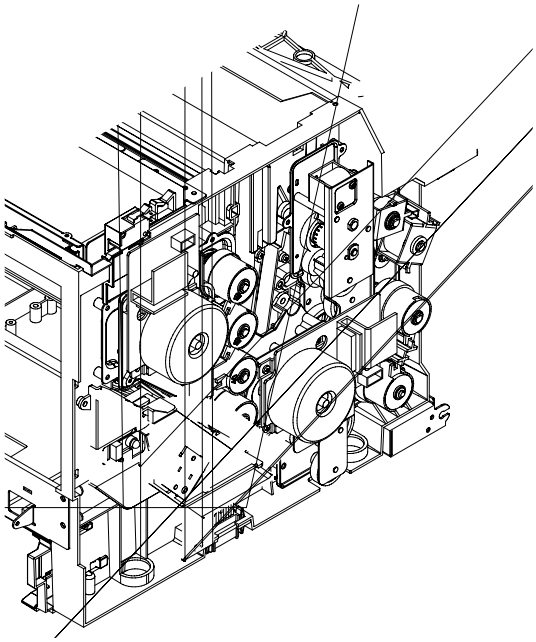
(1) Remove the setscrew (BT3x8, 2 pieces) to remove the cover C.

(2) Remove the setscrew (BT3x8, 1 piece) to remove the plate.

(3) Remove the waste toner feeder PU from the frame.

NOTE:

- One end of waste toner feeder PU is supported by the hole inside the frame.
- In this instance, as the waste toner may leak from the toner feeder part in the pipe, prepare the waste toner tray to prevent the waste toner from falling on the floor.
- Clean the inside of the machine, if any stain, with the vacuum cleaner that is for the toner only.
- It would be better to apply a grounding wire to the vacuum cleaner to prevent static charge.
- Vacuum the toner remained in the waste toner feeder pipe.



5.1.41 Toner Sensor PU (TPD)

(1) Remove the setscrew (BT3x8 and BT3x6, 1each) of the toner sensor PU (TPD).

(2) Remove the connector (inside the frame) connecting to the toner sensor PU (TPD).

(3) Remove the toner sensor PU (TPD) from the frame.

<Confirmation Items>

- Is the grounding wire securely installed to the indicated position?
- Isn't any harness caught?
- Is the appropriate screw used?
- Is each output terminal of the HV power supply PU installed properly?
- After above confirmation, confirm the safety through the withstand voltage test or with the insulation tester.

CAUTION

Replacement of the toner sensor PU (TPD/TTR) requires the substantial disassembly and also reassembly. As the inappropriate assembly procedures and the wrong use of screws affect the product safety and the product performance, the appropriate assembly procedures and the caution items must be respected. (This work requires the insulation withstand voltage test and the measurement of the insulation resistance.)

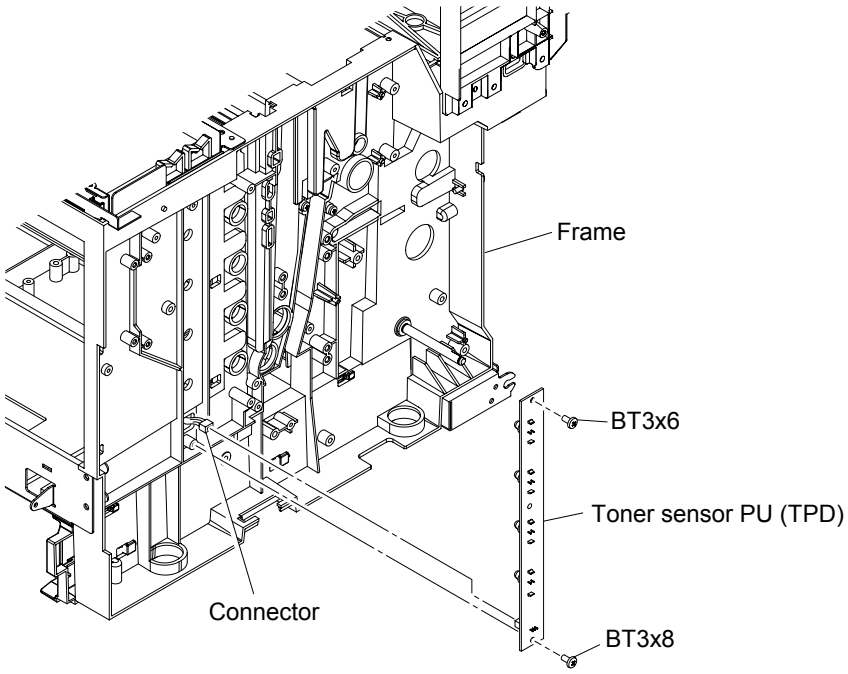


Fig. 5-86

5.1.42 Right Toner Guide PU

(1) Remove the setscrew (BT4x8, 1piece) of the right toner guide PU.

(2) Remove the right toner guide PU from the frame.

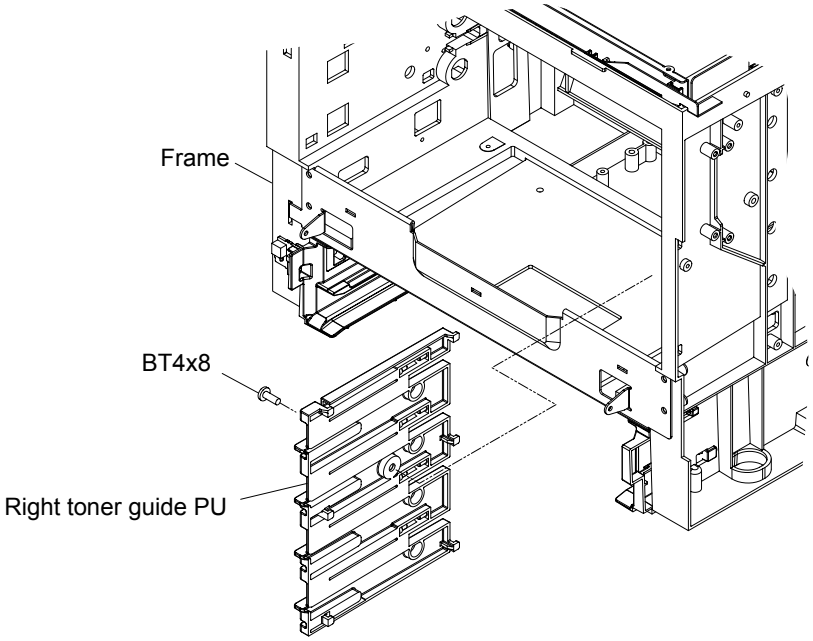


Fig. 5-87

5.1.43 Laser ASSY PU / Laser Unit Fan ASSY PU

(1) Disconnect the connector connecting to the laser unit fan ASSY PU.

(2) Remove the setscrew (BT4x8, 1 piece) of the laser unit fan ASSY PU and remove the laser unit fan ASSY PU.

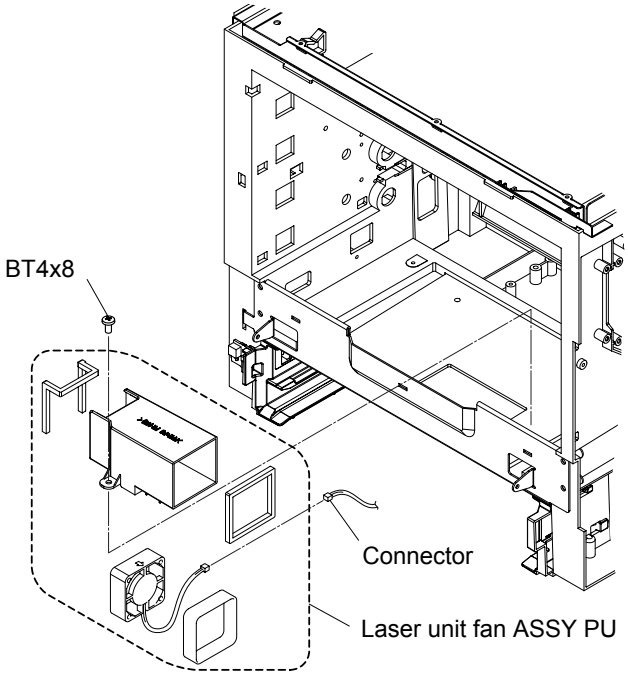


Fig. 5-88

(3) Remove the setscrew (TS3x12, 4 pieces) of the laser ASSY PU.

(4) Disconnect the connector connecting to the laser ASSY PU.

(5) Remove the laser ASSY PU from the frame.

CAUTION

- Laser beam of the class IIIB is scanned in the laser ASSY PU. Do not attempt to disassemble the laser ASSY PU because it is dangerous.
- The laser ASSY PU for maintenance is replaceable by the unit. No internal adjustment is required for the laser ASSY PU.
- Test drive and confirmation of the drive must be done only after installing the cover to prevent the laser beam from being transmitted out of the machine.

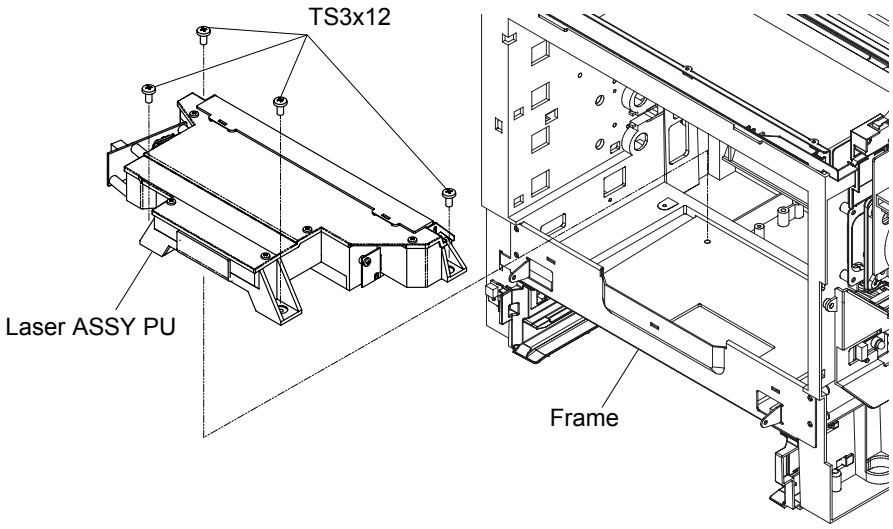


Fig. 5-89

5.1.44 Inner Front Cover PU / Front Cover PU

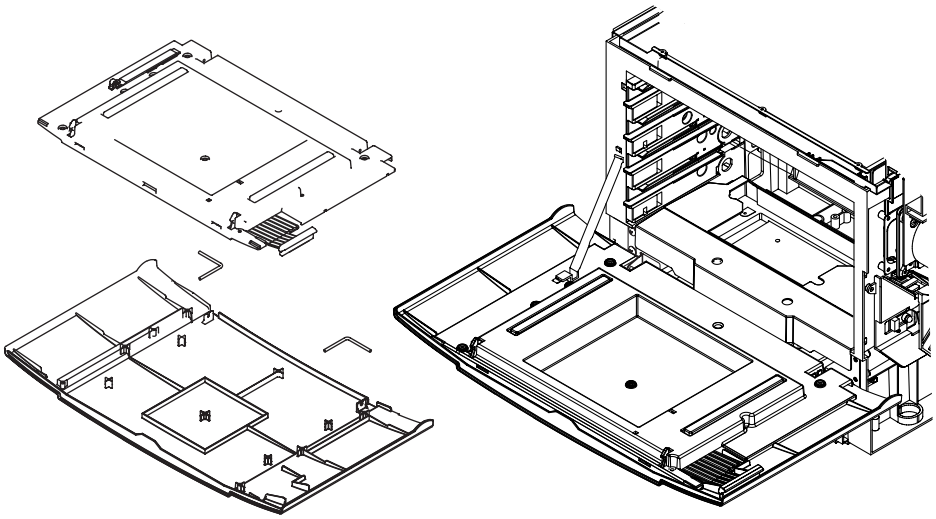
(1) Remove the setscrew (BT3x8, 8 pieces) of the front cover PU.

(2) Remove the front cover PU from the inner front cover PU.

(3) Remove the fixing band from the machine side.

(4) Decline toward you the support pin (left and right) connecting to the frame with the front door unit closed, and then disconnect the connection.

(5) Remove the inner front cover PU from the frame.



5.1.46 Engine Control Board PU

Before disassembling the engine control board PU, read out the information in the NVRAM and record it.
After replacing the engine control board PU, write the value which has been recorded into the NVRAM.
(Refer to "6.2 IF YOU REPLACE THE ENGINE CONTROL BOARD PU".)

(1) Remove the setscrew (ST3x6, 3 pieces) of the shield cover (A).

(2) Remove the shield cover (A).

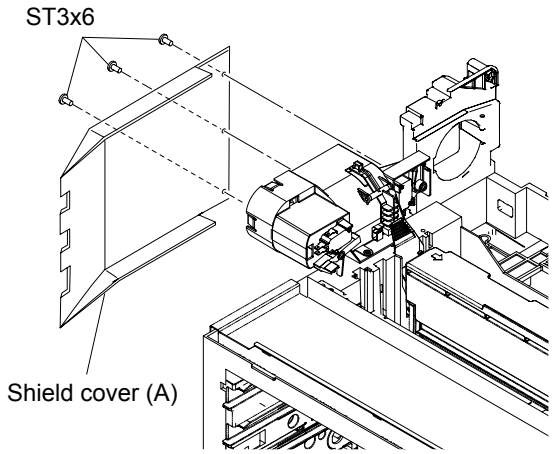


Fig. 5-92

(3) Disconnect all the connectors connecting to the engine controller board PU.

NOTE:
- After disconnecting flat cable(s), check that each cable is not damaged at its end or short-circuited.
- When connecting flat cable(s), do not insert them at an angle. After insertion, check that the cables are not at an angle.

(4) Remove the setscrew (ST3x6, 5 pieces) of the engine controller board PU.

(5) Remove the engine control board PU from the frame.

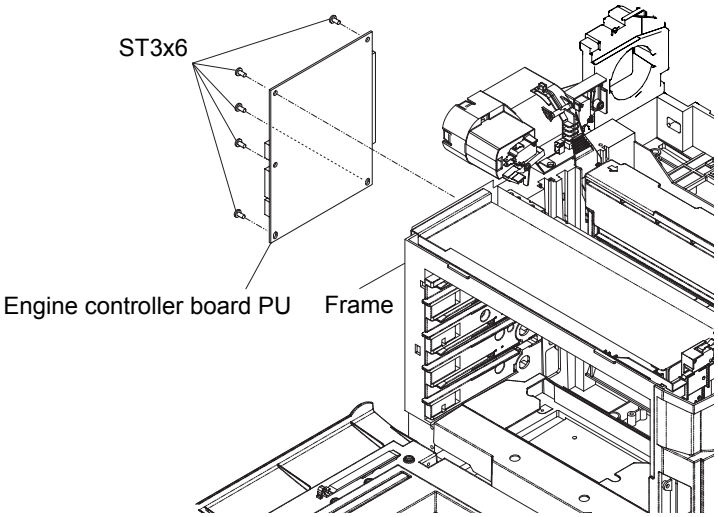


Fig. 5-93

5.1.47 Power Supply Fan PU / Interlock Switch PU (Top, Paper Exit) / Power Supply Fan Duct PU

(1) Remove the setscrew (BT4x10, 1 piece) of the power supply fan ASSY PU.

(2) Remove the power supply fan ASSY PU from the frame.

(3) Disconnect the connector connecting to the power supply fan ASSY PU.
[Interlock switch PU (top, paper exit)]

(4) Remove the power supply fan PU from the power supply fan duct PU.

(5) Remove the interlock switch PU (top) from the power supply fan duct PU.

(6) Remove the interlock switch PU (paper exit) from the power supply fan duct PU.

CAUTION

- Do not have the fan duct ASSY step on the harness.
- Interlock Switch is the important part in terms of the safety. The replacement work of the interlock switch should be done by the skilled personnel having the sound knowledge on the product safety.
- This interlock switch PU is the part of unique specification. Do not use any switch other the specified.
- Each interlock switch PU (3 kinds) at the front, top and paper exit is the same specification.
- After the replacement, confirm the normal operation of the interlock switch.
- Confirm that the message "Door open" is indicated on the operator panel when the front door is open.

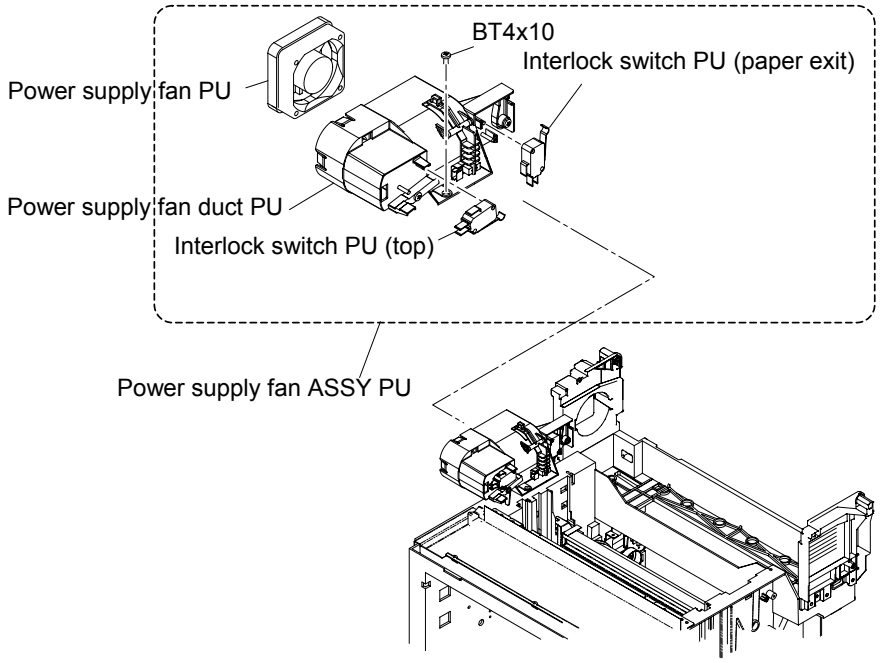


Fig. 5-94

5.1.48 Speaker

(1) Release the four hooks to remove the speaker.

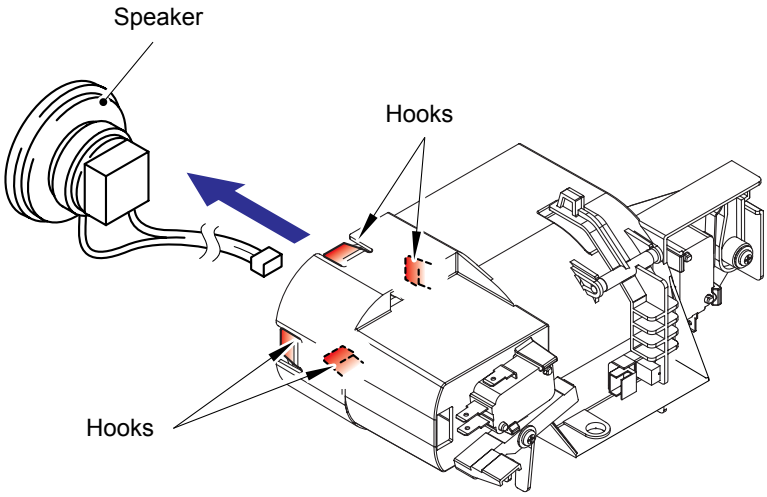


Fig. 5-95

5.1.49 Scanner Door Sensor

(1) Remove the scanner door sensor actuator from the power supply fan duct PU.

(2) Remove the scanner door sensor from the power supply fan duct PU.

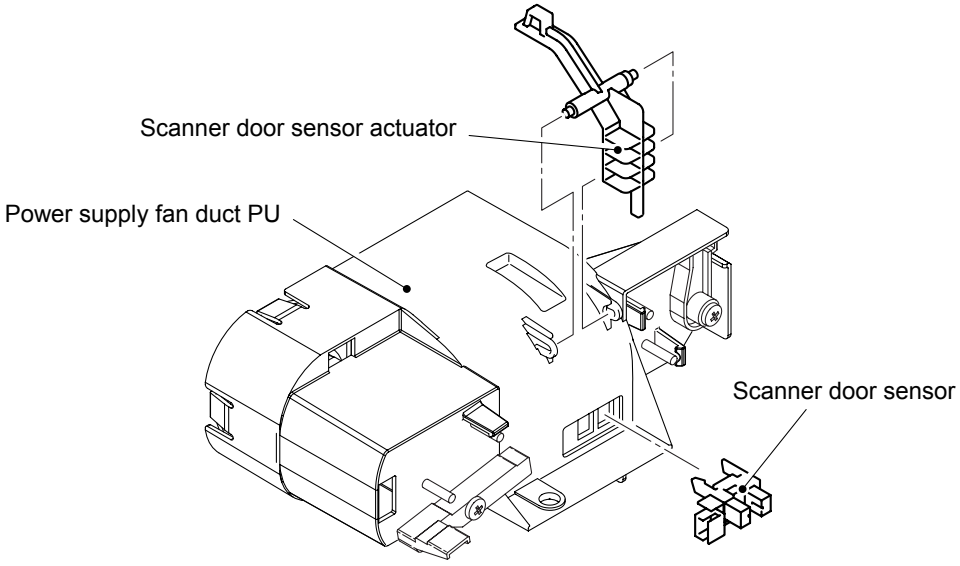


Fig. 5-96

5.1.50 HV Power Supply PU

(1) Remove the setscrew (ST3x6, 3 pieces) of the controller box.

(2) Remove the controller box from the frame.

(3) Remove the flat cable from the HV power supply PU.

NOTE:

- After disconnecting flat cable(s), check that each cable is not damaged at its end or short-circuited.
- When connecting flat cable(s), do not insert them at an angle. After insertion, check that the cables are not at an angle.

(4) Remove the setscrew (ST3x6, 4 pieces and BT3x8, 7 pieces) of the HV power supply PU. (Since 2 kinds of the screw are used, confirm the screw before using.)

(5) Remove the HV power supply PU from the frame.

CAUTION

This is the replacement work of the unit that generates high voltage. Therefore this work should be done by the qualified personnel having the sound knowledge on the product safety.

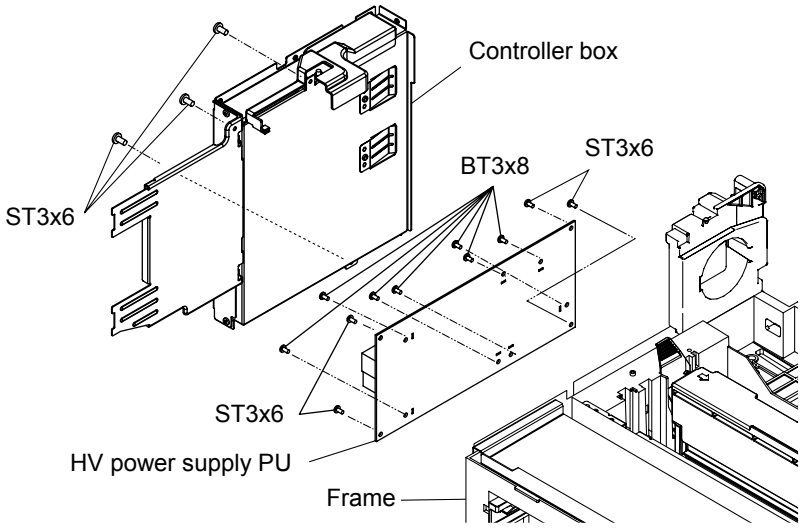


Fig. 5-97

5.1.51 LV Power Supply PU / Power Supply Bracket PU ASSY

(1) Remove the setscrew (M4x6, 1 piece with star washer) of the grounding terminal.

(2) Disconnect the connector of the switch harness from the LV power supply PU.

(3) Remove the setscrew (ST3x6, 3 pieces) of the power supply bracket PU ASSY.

(4) Remove the power supply bracket PU ASSY (with the switch).

(5) Disconnect all the connectors connecting to the LV power supply PU.

(6) Remove the setscrew with washer (7 pieces) of the LV power supply PU.

(7) Remove the LV power supply from the frame.

CAUTION

This is the replacement work of the important parts pertaining to the product safety. This work must be done by the skillful personnel having the sound knowledge on the product safety and in the facility where the safety can be ensured. (This work requires the insulation withstand voltage test and the measurement of the insulation resistance.)

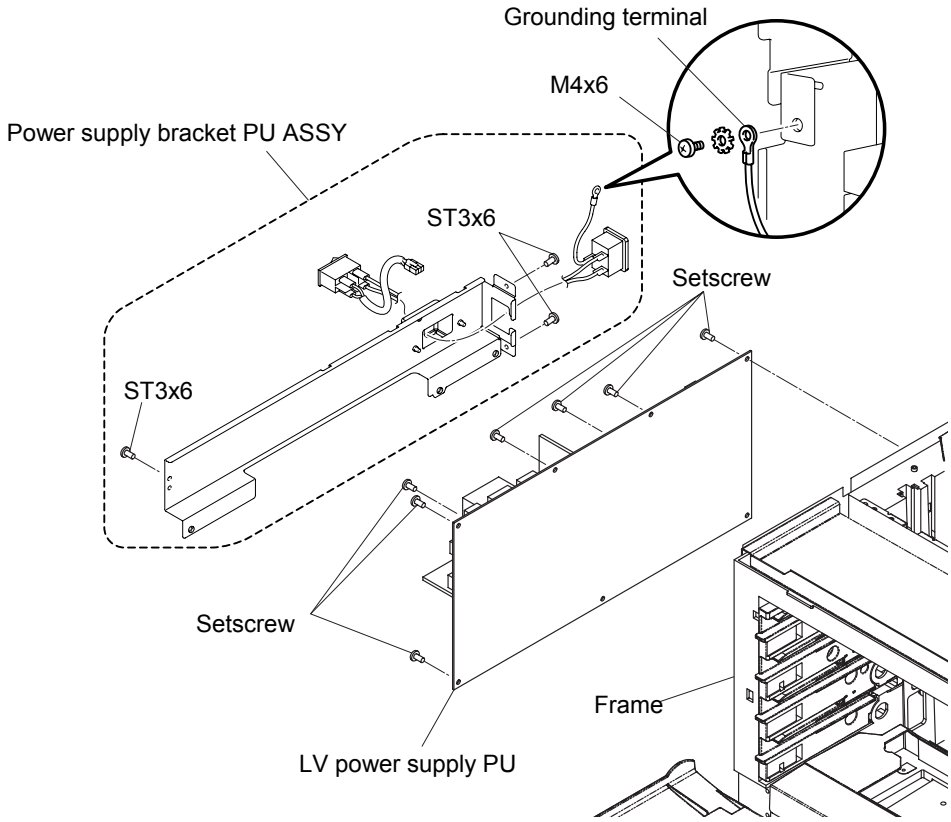


Fig. 5-98

5.1.52 Fuser Connector PU

(1) Remove the setscrew (ST3x6,4 pieces and BT3x8,3 pieces) of the shield base (LV).

(2) Remove the shield base (LV) from the frame.

(3) Remove the setscrew (M4x6, 1 pieces) of the ground wire.

(4) Remove the setscrew (BT3x8 2 pieces and TS3x6, 2 pieces) of the shield base (HV).

(5) Remove the shield base (LV) from the frame.

(6) Disconnect the connector from the fuser connector PU.

(7) Remove the setscrew (FST3x10, 2 pieces) of the fuser connector PU.

(8) Remove the fuser connector PU from the shield base (HV).

CAUTION

This the replacement work of the unit generating high voltage, and therefore must be done by the skill personnel having the sound knowledge on the product safety.

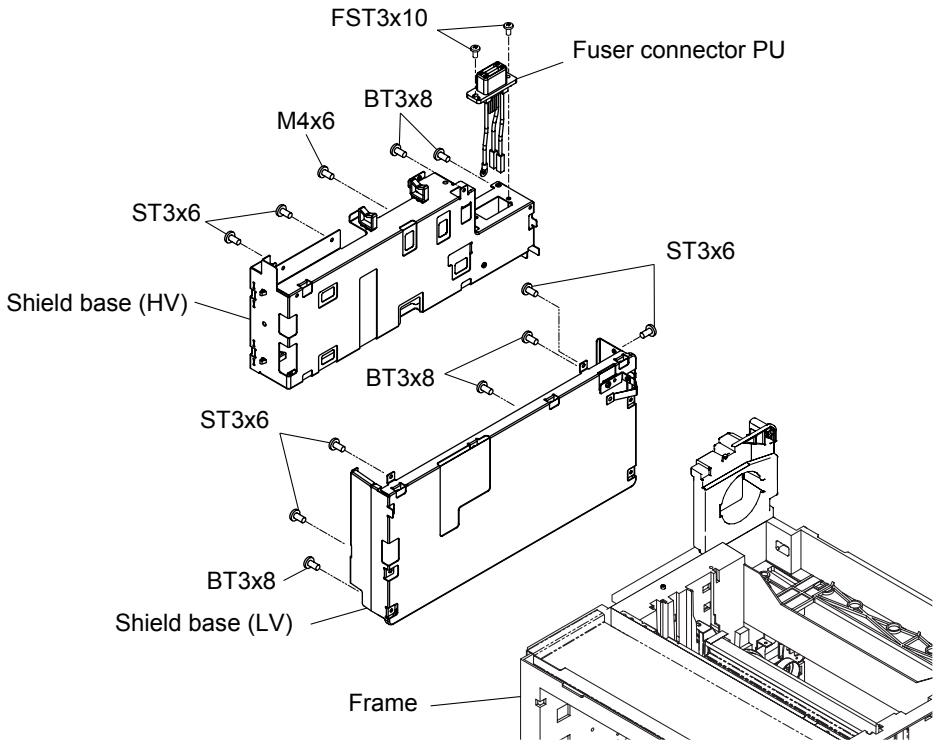


Fig. 5-99

5.1.53 Toner Retract Solenoid PU (DESLY/DESLM/DESLC/DESLK) / Toner Retract Cam PU

(1) Remove the harness connector of the developer retract solenoid PU.

(2) Remove the setscrew (BT3x8, 2 pieces) of the developer retract solenoid PU.

(3) Remove the toner retract solenoid PU and toner retract cam PU from inside of the frame.

(4) Remove the toner retract cam PU from the toner retract solenoid PU (DESLY/DESLM/DESLC/DESLK).

WARNING

Replacement of the developer retract solenoid requires the substantial disassembly and also reassembly. As the inappropriate assembly procedures and the wrong use of screws affect the product safety and the product performance, the appropriate assembly procedures and the caution items must be respected. (This work requires the insulation withstand voltage test and the measurement of the insulation resistance.)

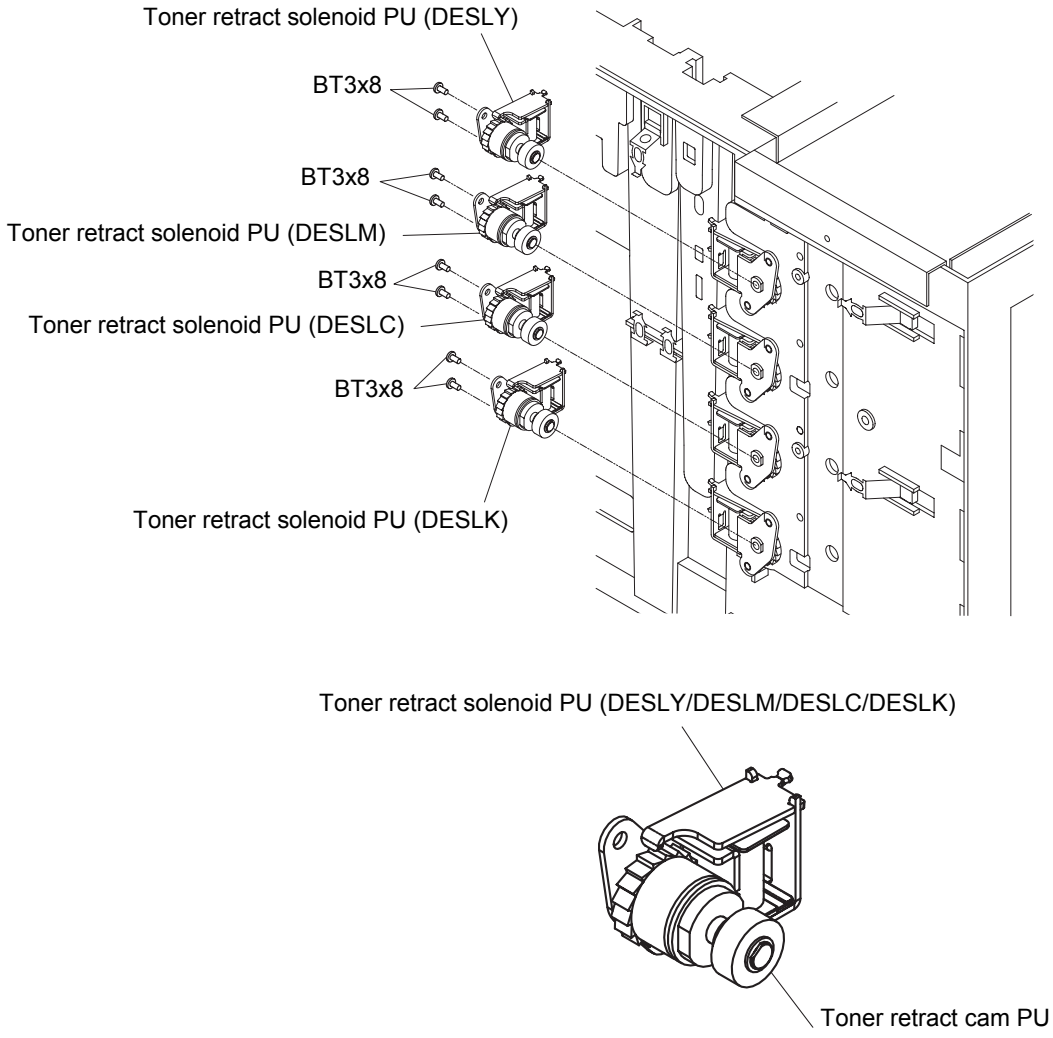


Fig. 5-100

5.1.54 Toner Sensor PU (TTR)

(1) Remove the setscrew (BT3x8 and BT3x6, 1 each) of the toner sensor PU (TTR).

(2) Disconnect the connector connecting to the toner sensor PU (TTR).

(3) Remove the toner sensor PU (TTR) from the frame.

<Confirmation Items>

- Is the grounding wire securely installed to the indicated position?
- Isn't any harness caught?
- Is the appropriate screw used?
- Is each output terminal of the HV power supply PU installed properly?
- After above confirmation, confirm the safety through the withstand voltage test or with the insulation tester.

CAUTION

Replacement of the toner sensor PU (TPD/TTR) requires the substantial disassembly and also reassem-bly. As the inappropriate assembly procedures and the wrong use of screws affect the product safety and the product performance, the appropriate assembly proce-dures and the caution items must be respected. (This work requires the insulation withstand voltage test and the measurement of the insulation resistance.)

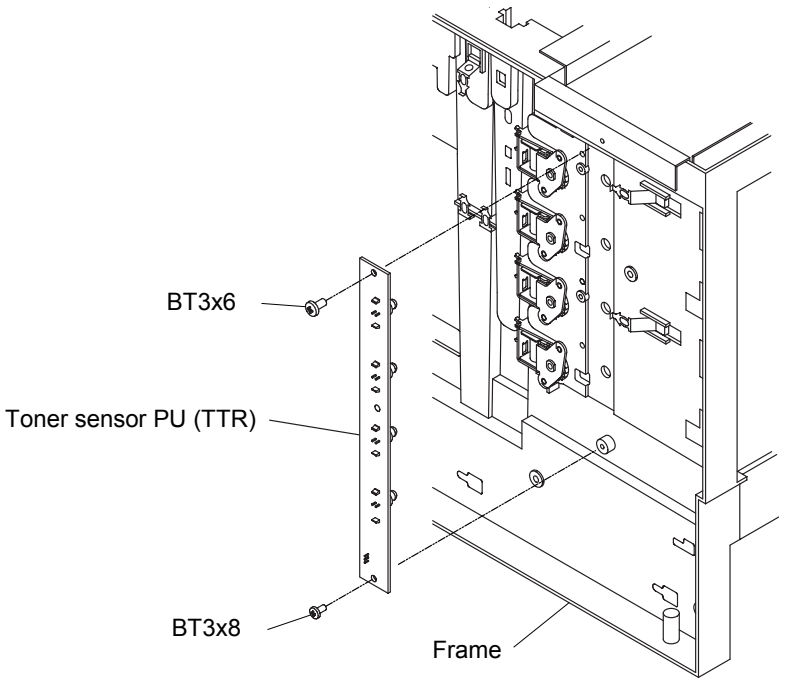


Fig. 5-101

5.1.55 Toner Present Sensor PU

(1) Remove the setscrew (BT3x6, 2 pieces) of the toner present sensor PU.

(2) Remove the toner present sensor PU from the frame.

NOTE: When installing the toner key sensor PU, pushing the sensor to the front side and then tighten the setscrew to fix the sensor.

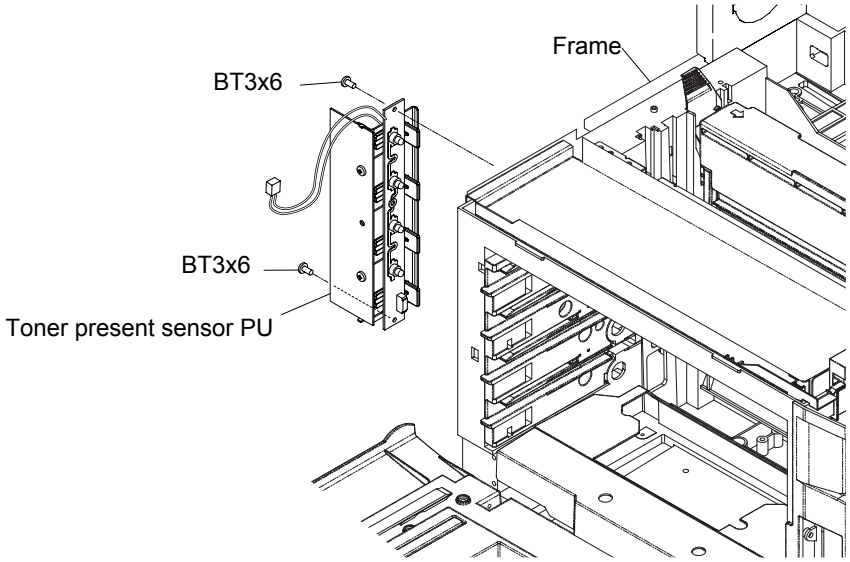


Fig. 5-102

5.1.56 Belt Sensor

(1) Remove the setscrew (ST3x6, 1 piece) of the sensor base (PB).

(2) Remove the sensor base (PB) from the IOD base.

(3) Disconnect the connector connecting to the belt sensor.

(4) Remove the belt sensor from the sensor base (PB).

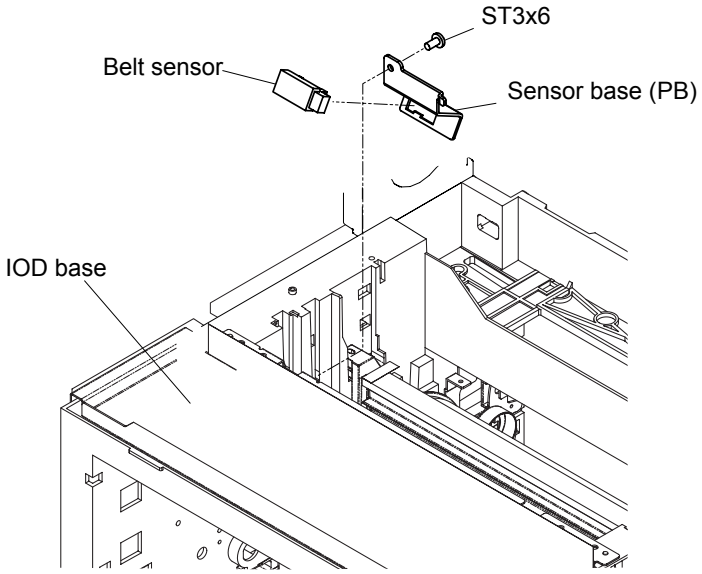


Fig. 5-103

5.1.57 Left Tray Guide PU / Paper Size Sensor PU / Room Temp Thermistor PU

(1) Remove the setscrew (BT3x8, 2 pieces) of the left tray guide PU.

(2) Pull out the left tray guide PU from the cassette side.

(3) Disconnect the connector connecting to the paper size sensor PU.

(4) Remove the connector tape.

(5) Remove the pin to remove the room temp thermistor PU.

(6) Disconnect the connector connecting to the room temp thermistor PU.

(7) Remove the setscrew (BT3x8, 2 pieces) of the paper size sensor PU and then remove the paper size sensor PU from the left tray guide PU.

<Confirmation Items>

- Is the grounding wire securely installed to the indicated position?
- Isn't any harness caught?
- Is the appropriate screw used?
- After above confirmation, confirm the safety through the withstand voltage test or with the insulation tester.

WARNING

Replacement of the paper size sensor PU (PSU) requires the substantial disassembly and also reassembly. As the inappropriate assembly procedures and the wrong use of screws affect the product safety and the product performance, the appropriate assembly procedures and the caution items must be respected. (This work requires the insulation withstand voltage test and the measurement of the insulation resistance.)

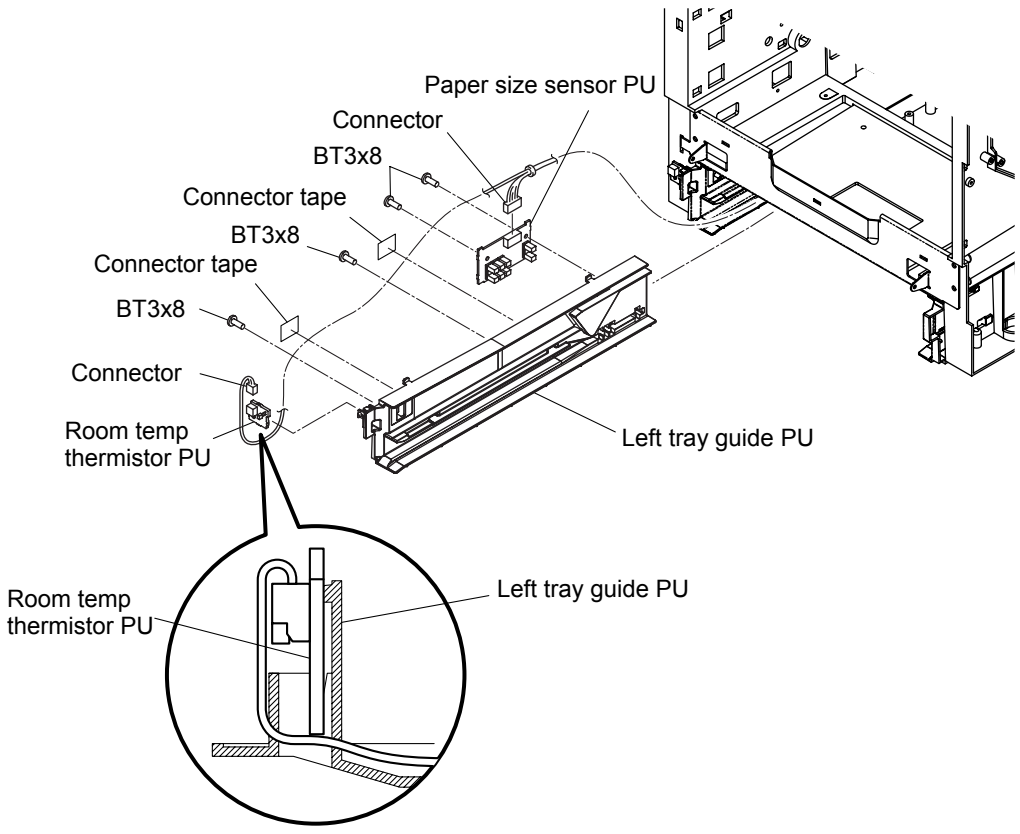


Fig. 5-104

5.1.58 Left Toner Guide PU

(1) Remove the setscrew (BT4x8, 1 piece and BT3x6, 2 pieces) of the left toner guide PU.

(2) Remove the left toner guide PU from the frame.

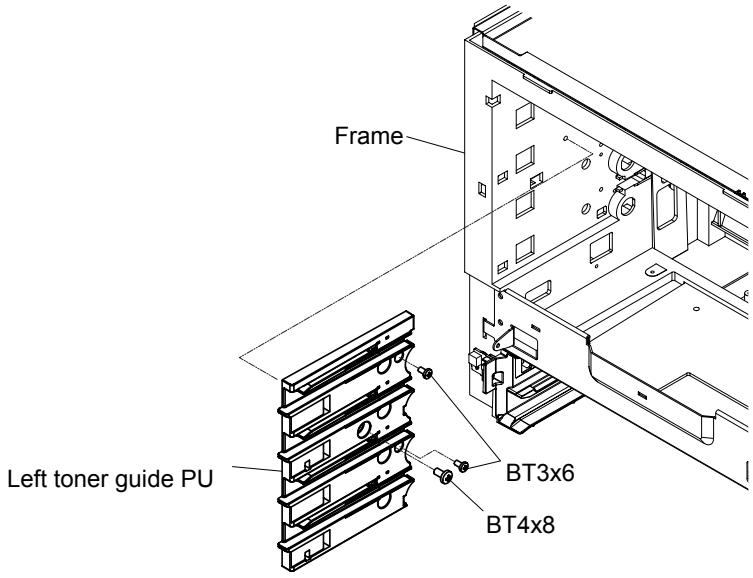


Fig. 5-105

5.1.59 Paper Exit Unit

(1) Open the paper exit unit.

(2) Remove the setscrew (BT4x20, 1 piece and collar) from the support band.

(3) Remove the setscrew (ST4x6, 1 piece) from the support plate. In this instance, maintain the paper exit unit closed.

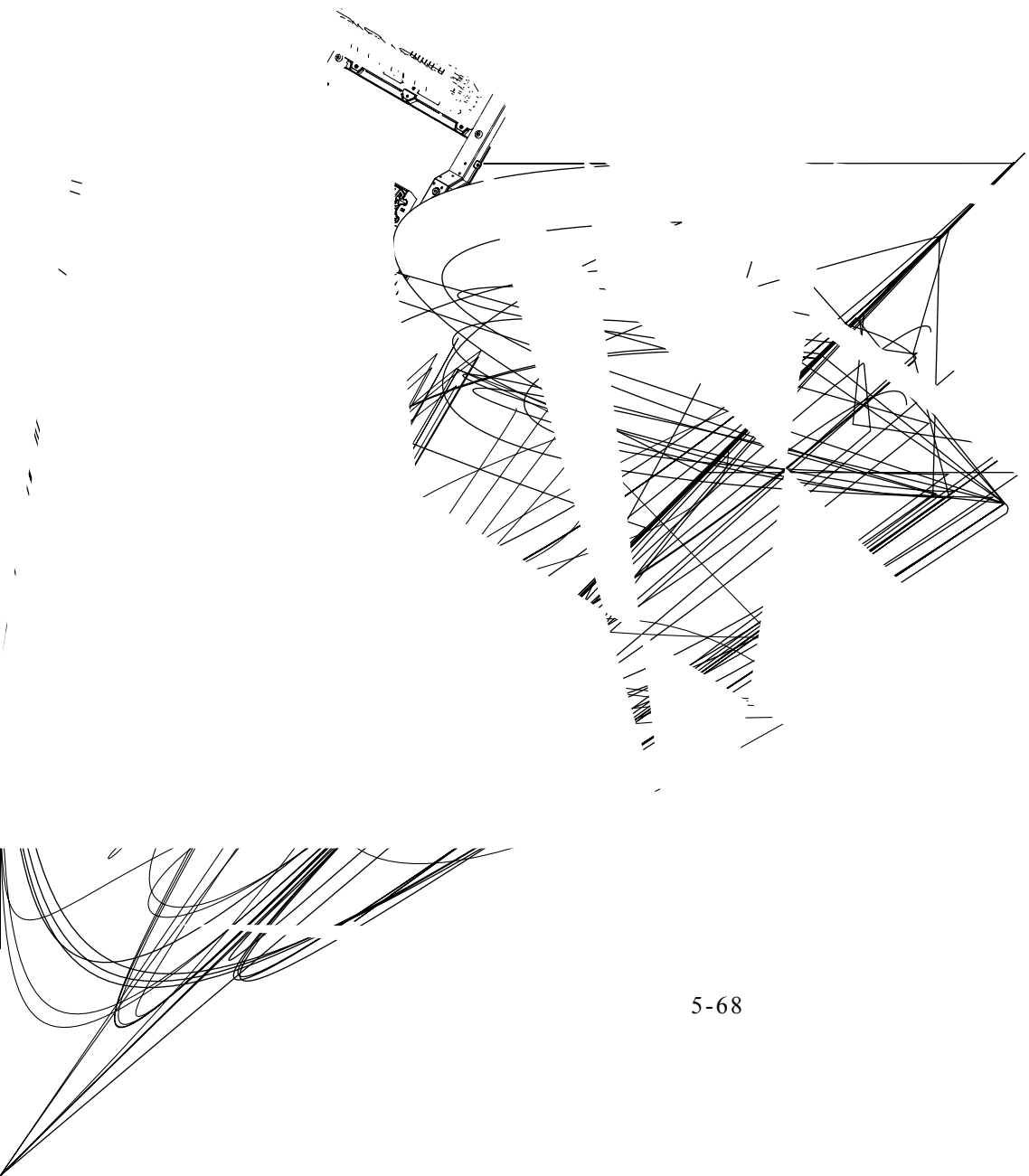
(4) Open the paper exit unit and remove the support plate.

(5) Slide the paper exit unit to the right side, to release the hinge shaft from the frame.

(6) Pull the paper exit unit to the backside, and then remove it.

CAUTION

When pulling the back cover ASSY PU, make it slowly by releasing the tension of the rear unit support. Be careful about the abrupt return of the rear unit support due to the reaction of the spring.



5.1.60 Transfer Roller ASSY PU

(1) Remove the transfer roller ASSY PU.

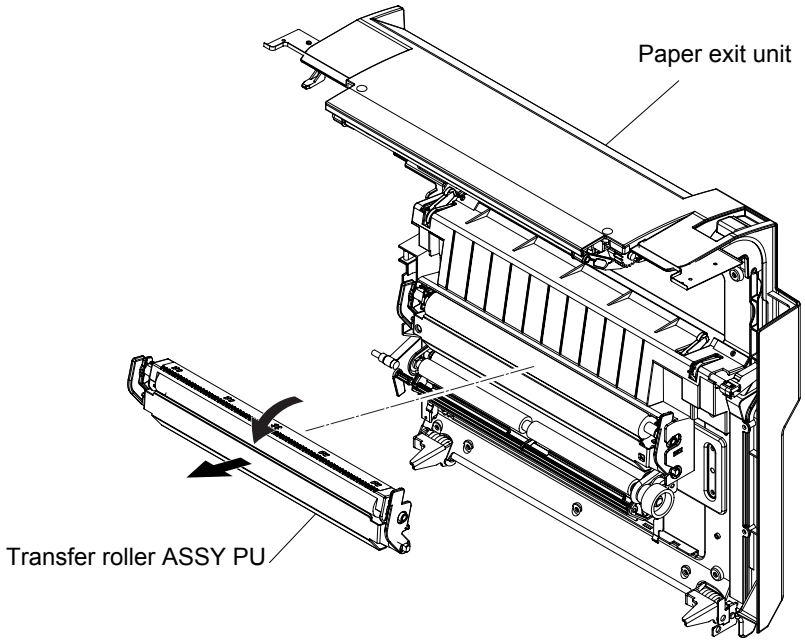


Fig. 5-107

5.1.61 Transfer Base ASSY PU

(1) Remove the setscrew (ST3x6, 3 pieces and BT3x8, 3 pieces) of the transfer base ASSY PU.

(2) Remove the transfer base ASSY PU.

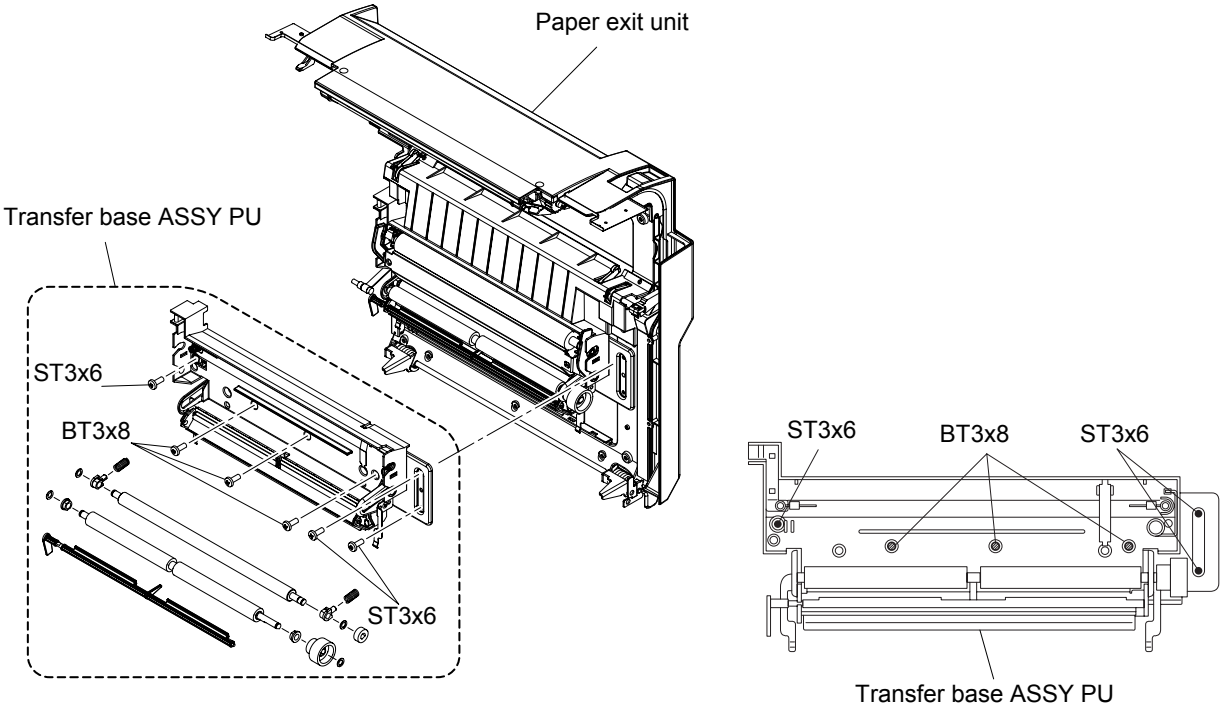


Fig. 5-108

5.1.62 Registration Roller ASSY PU

(1) Remove the washer, coupling gear and bearing from the registration roller ASSY PU.

(2) Remove the washer and bearing of counter-coupling gear side.

(3) Remove the registration roller ASSY PU from the transfer unit base.

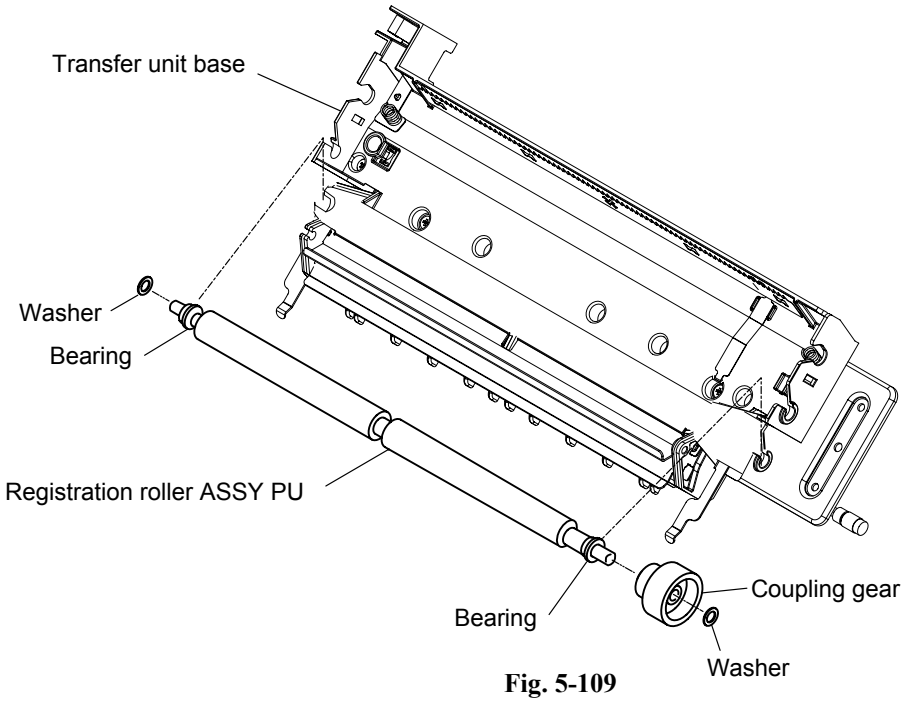


Fig. 5-109

NOTE: Adjustments is required when the Registration Roller is changed. Please refer to chapter 6.

5.1.63 Registration Actuator PU

(1) Remove the registration actuator PU that is installed to the transfer unit base.

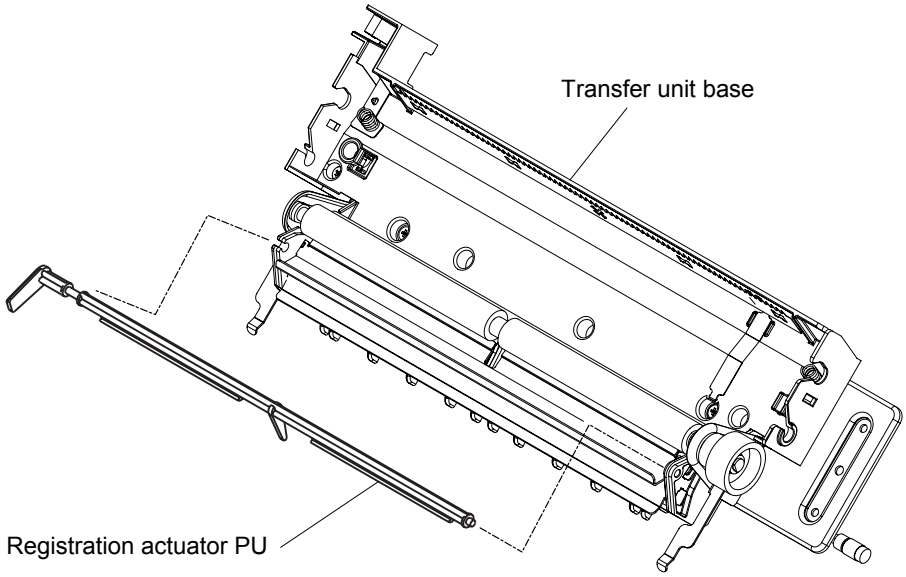


Fig. 5-110

5.1.64 Exit Guide ASSY PU / Exit Drive ASSY PU / Exit Idle Roller ASSY PU

(1) Disconnect the two connectors connecting to the exit guide ASSY PU.

(2) Remove the exit guide ASSY PU by removing the setscrew (ST3x6, 2 pieces and FST3x10, 2 pieces).

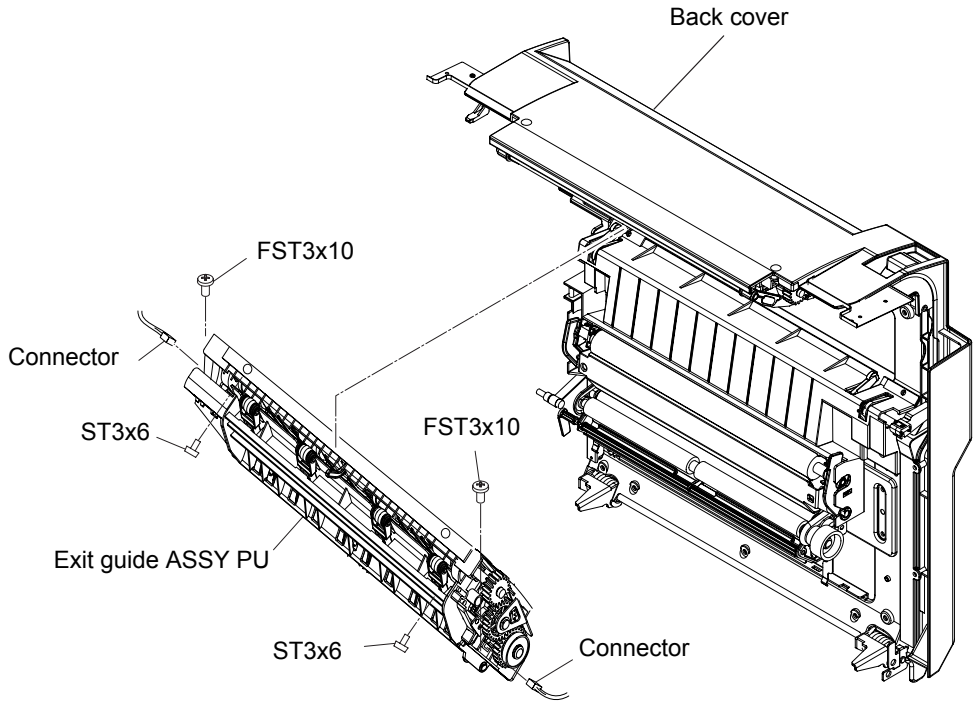


Fig. 5-111

(3) Remove the spring from the exit drive ASSY PU.

(4) Remove the setscrew (A) (BT3x12, 1 piece and BT3x8, 1 piece) and collar of the exit drive ASSY PU. (Remove the setscrew by turning the gear holder.)

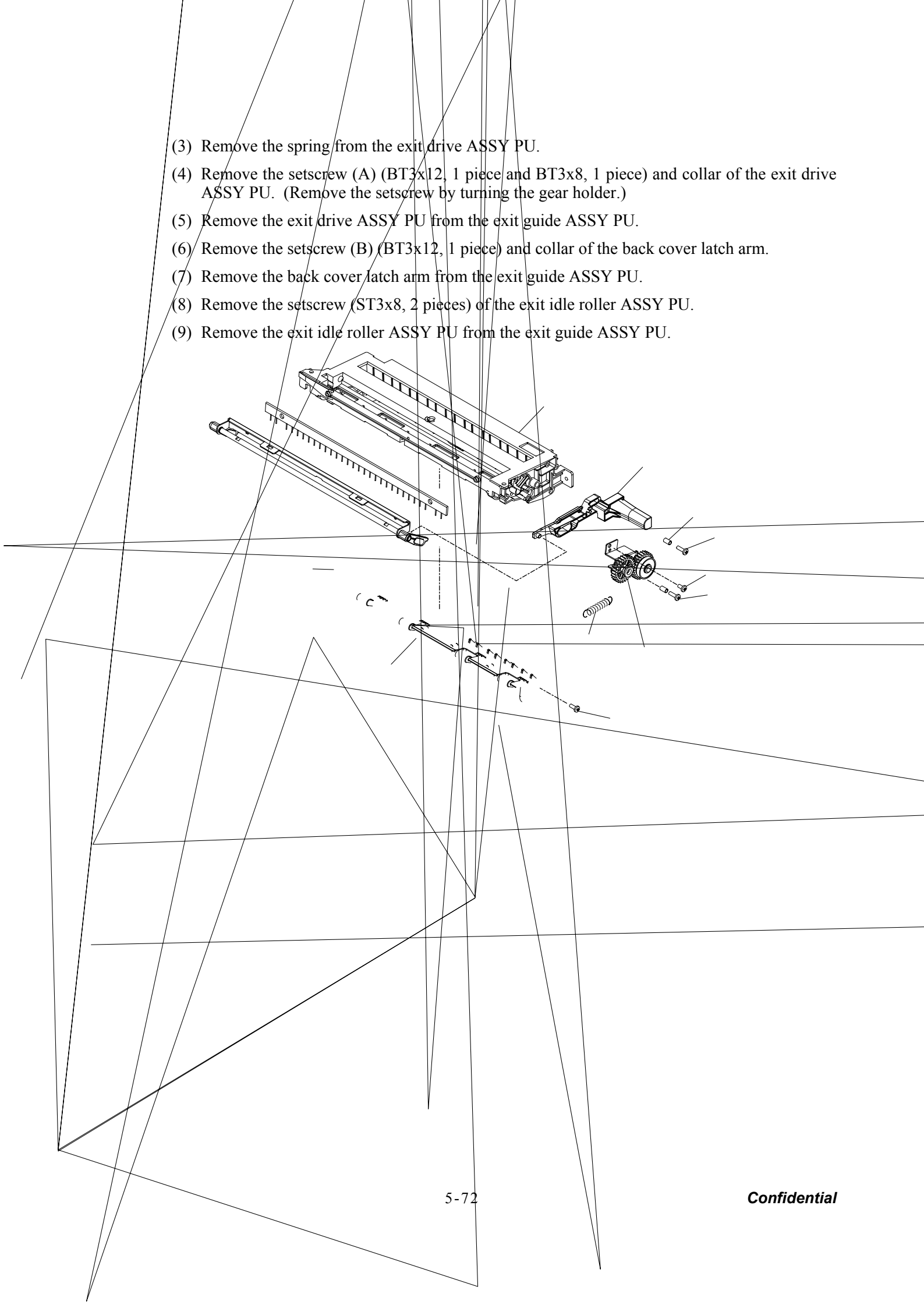
(5) Remove the exit drive ASSY PU from the exit guide ASSY PU.

(6) Remove the setscrew (B) (BT3x12, 1 piece) and collar of the back cover latch arm.

(7) Remove the back cover latch arm from the exit guide ASSY PU.

(8) Remove the setscrew (ST3x8, 2 pieces) of the exit idle roller ASSY PU.

(9) Remove the exit idle roller ASSY PU from the exit guide ASSY PU.



5.1.66 Exit Roller ASSY PU / Paper Exit Actuator PU

(1) Pull out the coupling gear from the exit roller ASSY PU.
(This gear is the snap-in type.)

(2) Remove the actuator from the paper exit actuator PU.

(3) Remove the roller shaft sagging.
(This roller shaft sagging.)

(4) Remove the paper exit actuator PU.

(5) Remove the washer (a) and bearing (a) from the exit roller ASSY PU.

(6) Remove the washer (b) and bearing (b) from the exit roller ASSY PU.

(7) Remove the exit roller ASSY PU from the exit guide ASSY PU.

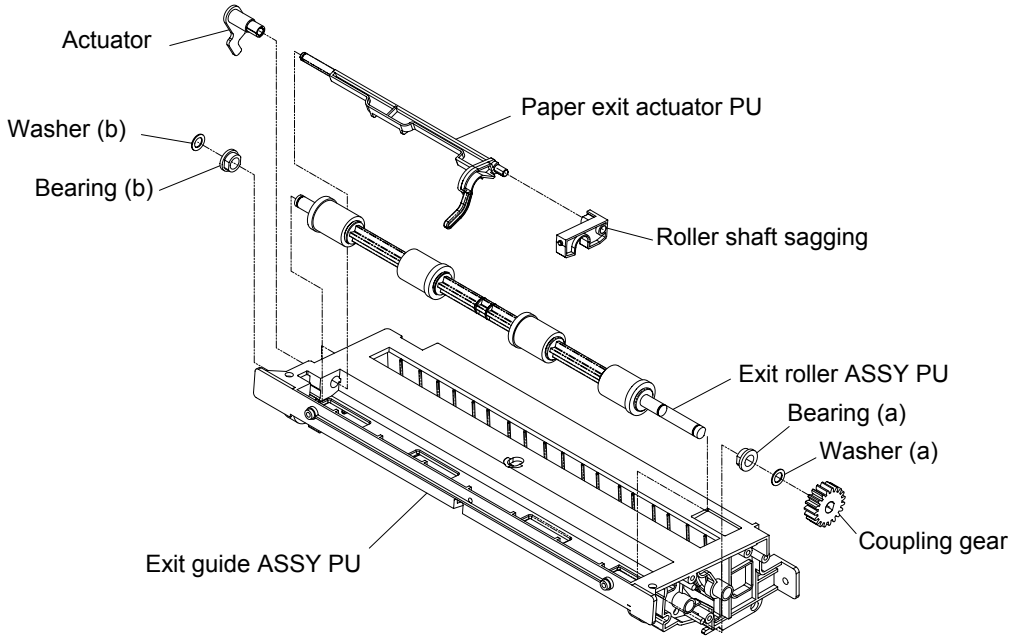


Fig. 5-114

5.1.67 Fuser Exit Actuator PU

(1) Remove the washer.

(2) Slide the fuser exit actuator PU to the arrow direction.

(3) Remove the fuser exit actuator PU from the exit guide ASSY PU.

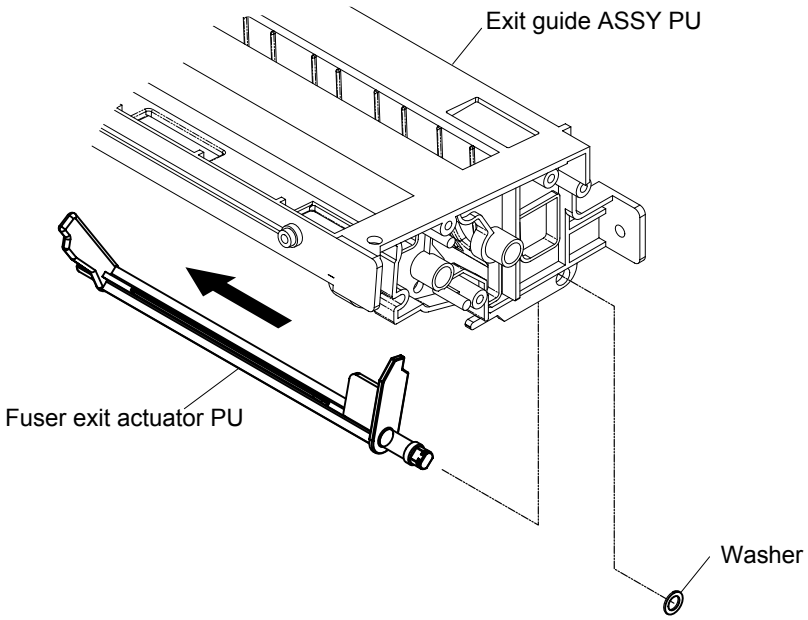


Fig. 5-115

5.1.68 Paper Sensor (PT2)

(1) Remove the paper sensor (PT2) from the exit guide ASSY PU.

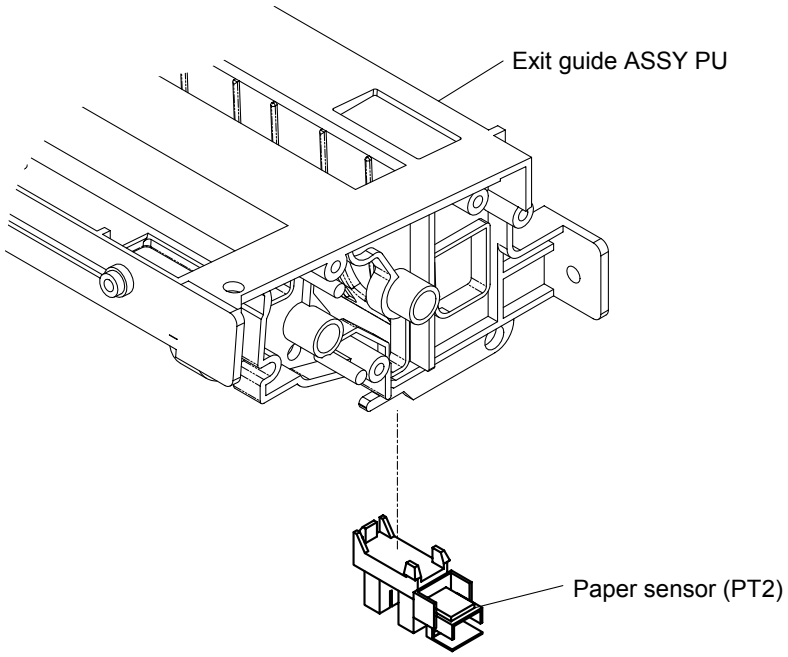


Fig. 5-116

5.1.69 Discharging Brush PU

(1) Remove the hinge cover.

(2) Remove the setscrew (BT3x8, 2 pieces) of the shaft holder.

(3) Remove the shaft holder from the exit guide ASSY PU.

(4) Remove the discharging brush PU from the exit guide ASSY PU.

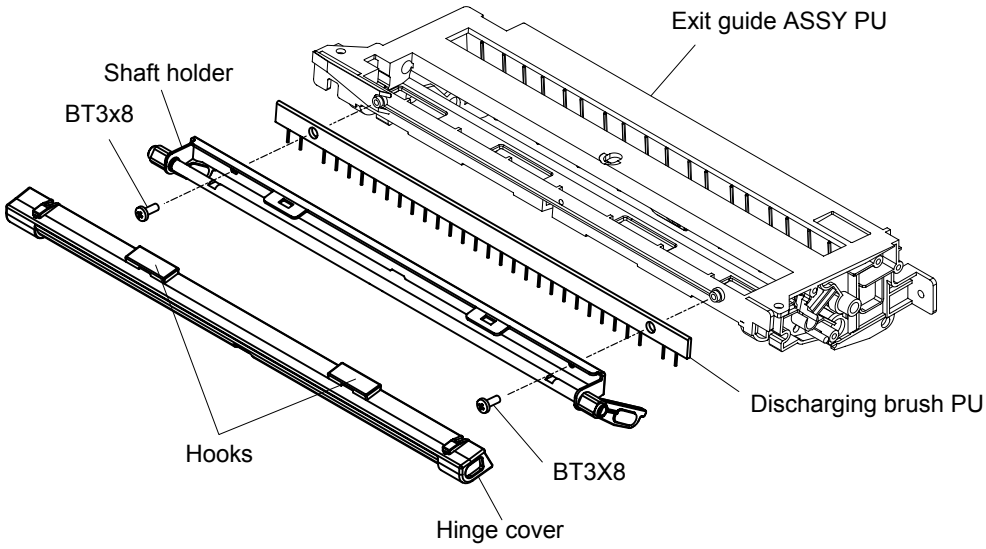


Fig. 5-117

5.1.70 Back cover Latch ASSY PU

(1) Remove the setscrew (BT3x8, 1 piece and ST3x6, 1 piece) of the back cover latch ASSY PU.

(2) Disconnect the connection of the arm ring.

(3) Remove the back cover latch ASSY PU from the back cover.

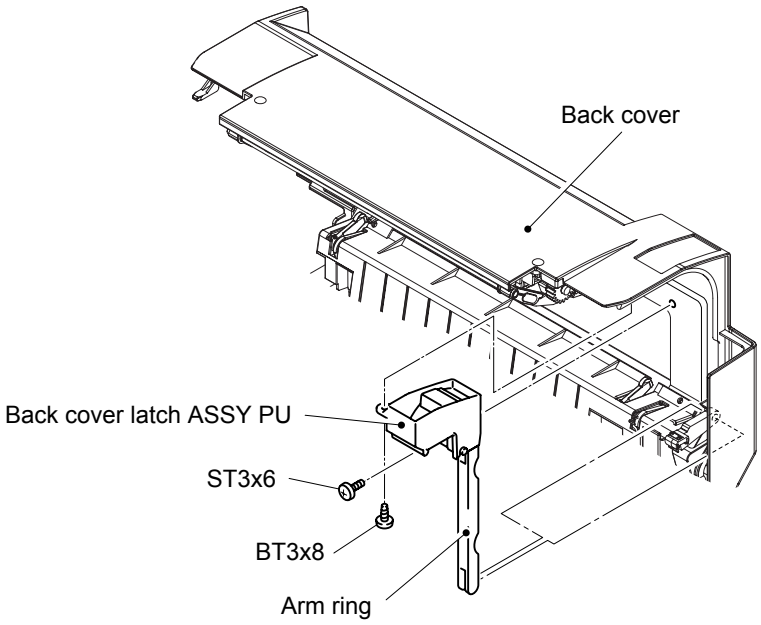


Fig. 5-118

(4) Remove the setscrew (BT3x8, 1 piece) of the back cover latch ASSY PU.

(5) Remove the arm ring lever from the back cover latch ASSY PU.

(6) Remove the arm ring from the arm ring lever.

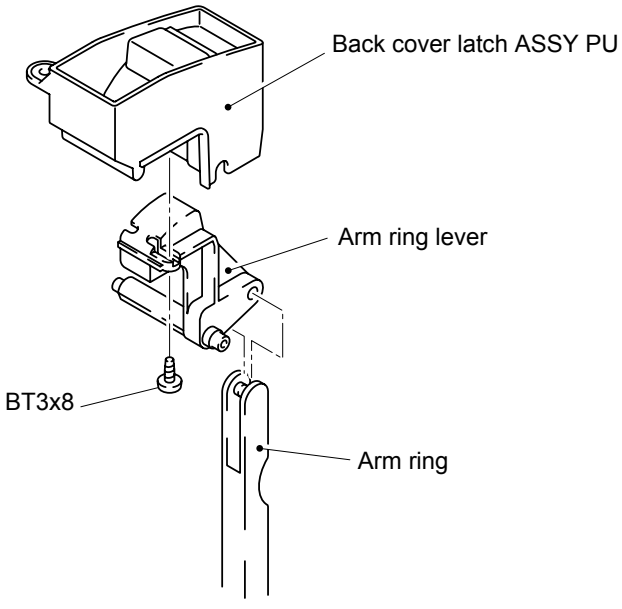


Fig. 5-119

5.1.71 Transfer Roller Guide PU

(1) Remove the setscrew (ST3x6, 4 pieces) of the transfer roller guide PU.

(2) Remove the transfer roller guide PU from the back cover.

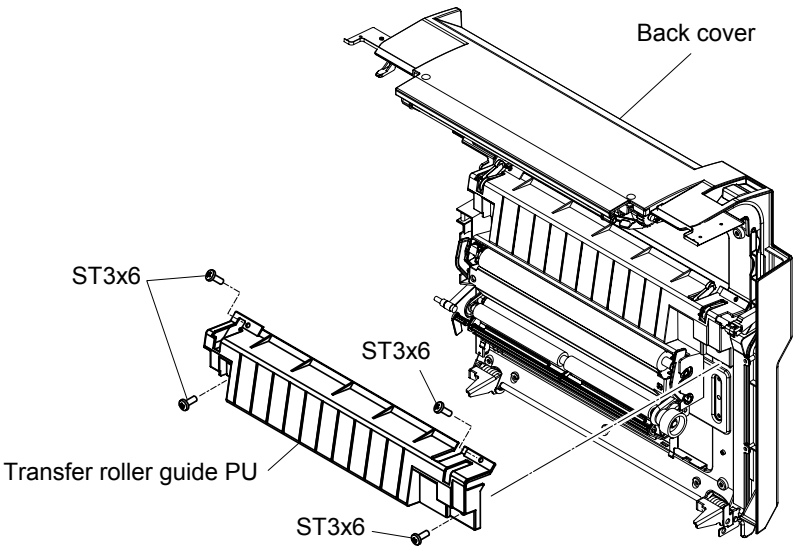
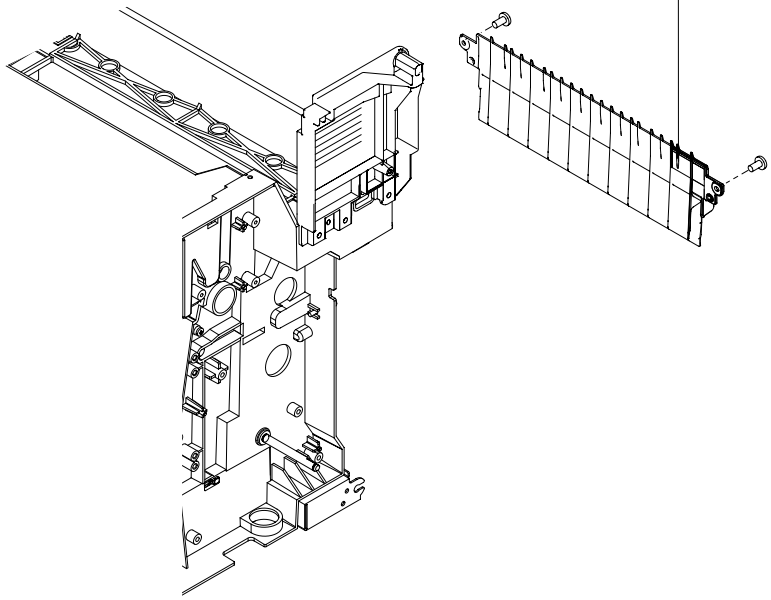


Fig. 5-120

5.1.72 Paper Guide (A) PU

(1) Remove the setscrew (BT3x8, 2 pieces) of the paper guide (A) PU.

(2) Remove the paper guide (A) PU.



5.1.74 Paper Guide (C) PU / Paper Sensor (PT1, PEU) / OHP Sensor PU / Tray Empty Actuator PU

(1) Disconnect the connector connecting to the paper sensor (PT1).
(2) Remove the setscrew (BT3x8, 2 pieces) of the paper guide (C) PU.
(3) Disconnect the connector connecting to each sensor of the paper guide (C) PU.
(4) Remove the paper guide (C) PU from the frame.
(5) Remove the paper sensor (PT1) from the paper guide (C) PU.
(6) Remove the setscrew (BT3x8, 2 pieces) fixing the OHP sensor PU.
(7) Remove the OHP sensor PU (Board) from the paper guide (C) PU.
(8) Remove the tray empty actuator PU from the paper guide (C) PU.
(9) Remove the harness from the paper sensor (PEU).
(10) Remove the paper sensor (PEU) from the paper guide (C) PU.

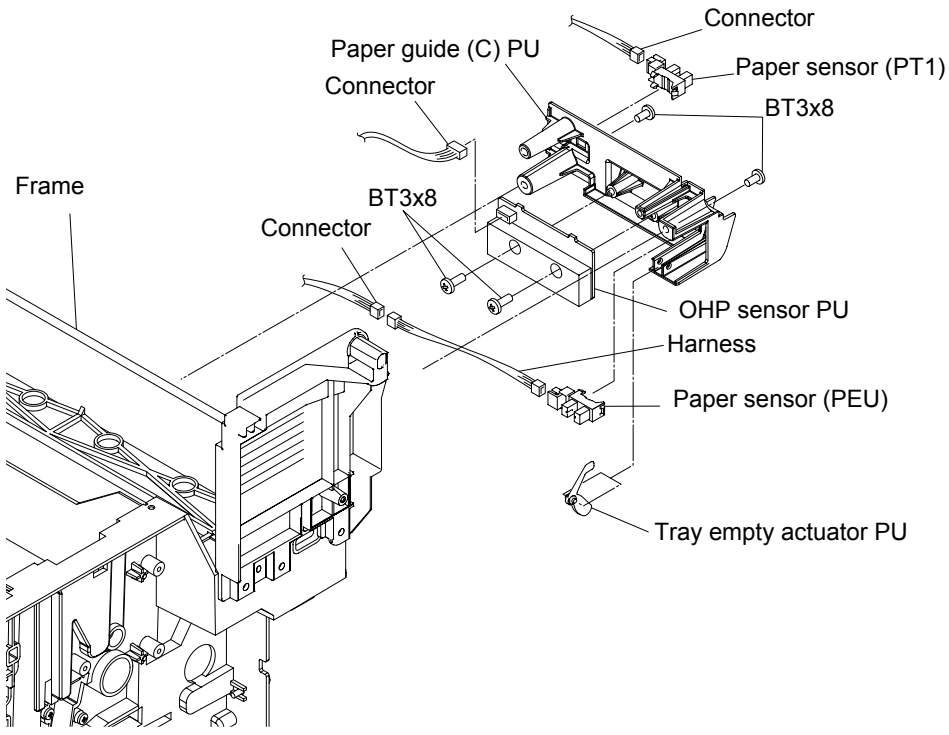


Fig. 5-123

5.1.75 Paper Guide (D) PU

(1) Remove the setscrew (BT3x8, 2 pieces) of the paper guide (D) PU.

(2) Remove the paper guide (D) PU from the frame.

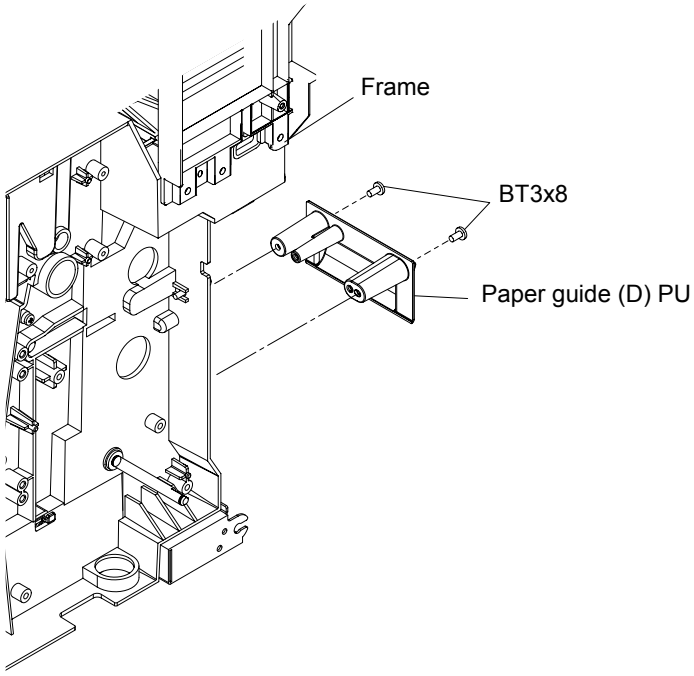


Fig. 5-124

5.1.76 Paper Feed Roller / Separator Pad

(1) Sliding the paper feed roller along the shaft, remove it from the shaft.

(2) Pull out the separator pad from the frame.

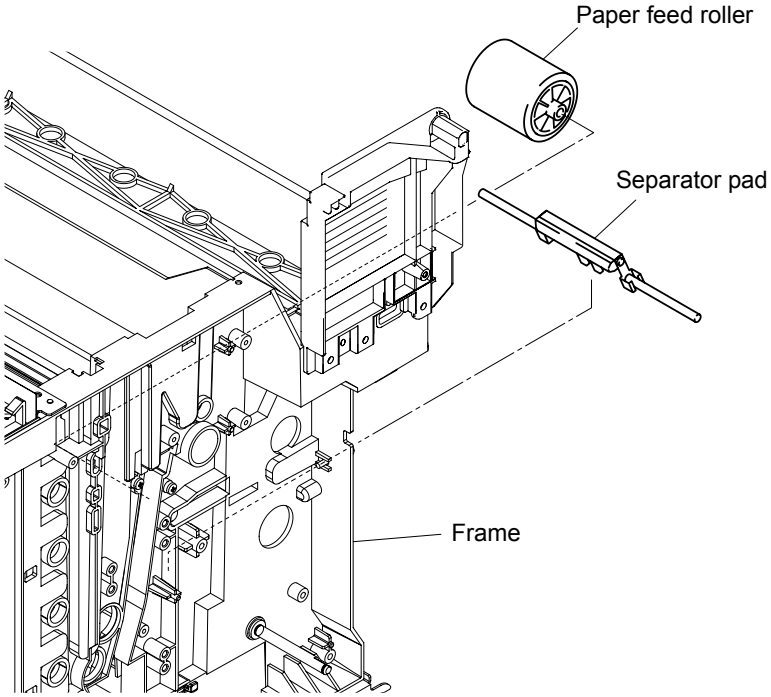


Fig. 5-125

5.2 LUBRICATION

Apply the specified lubricants to the lubrication points as shown below.

Lubricant type (Manufacturer)	Lubrication points	Lubricant amount
Molykote EM-30LG (Dow Corning)	Document pull-in roller Document separation roller	4 mm dia. ball

- Document pull-in roller and Document separation roller

  Apply a 4mm dia. ball of grease (Molykote EM-30LG) to each of the following lubrication points.

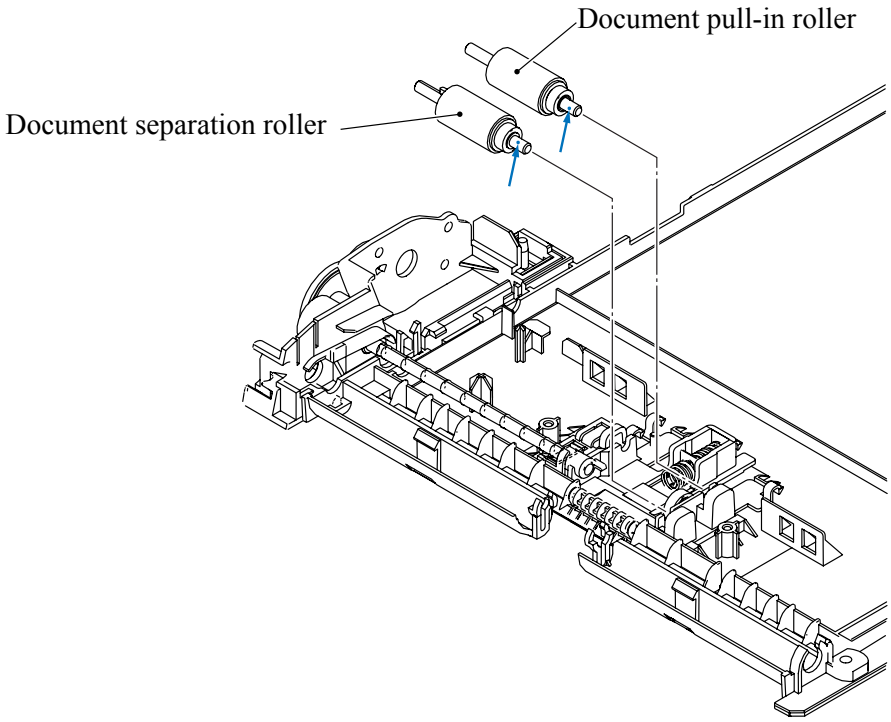
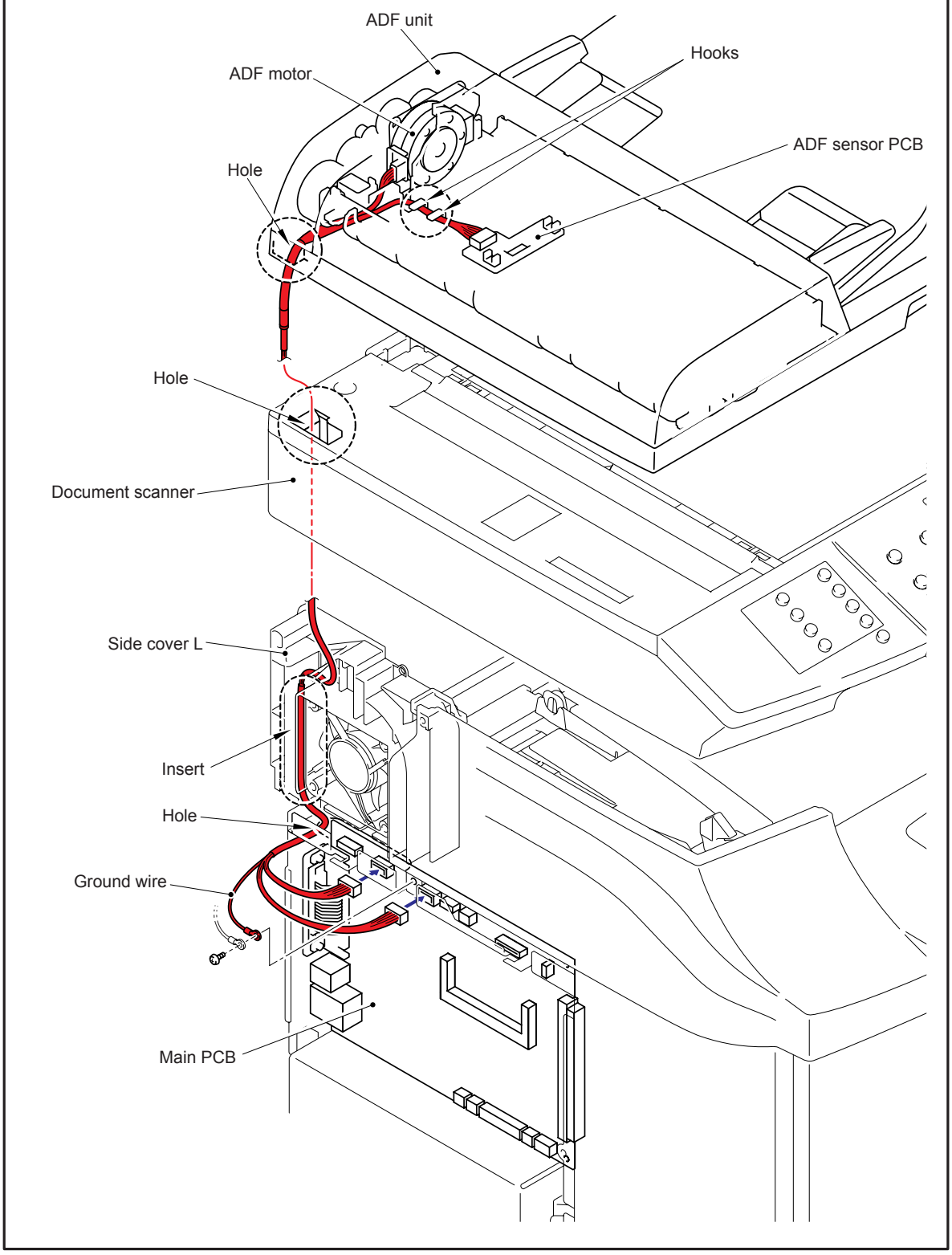


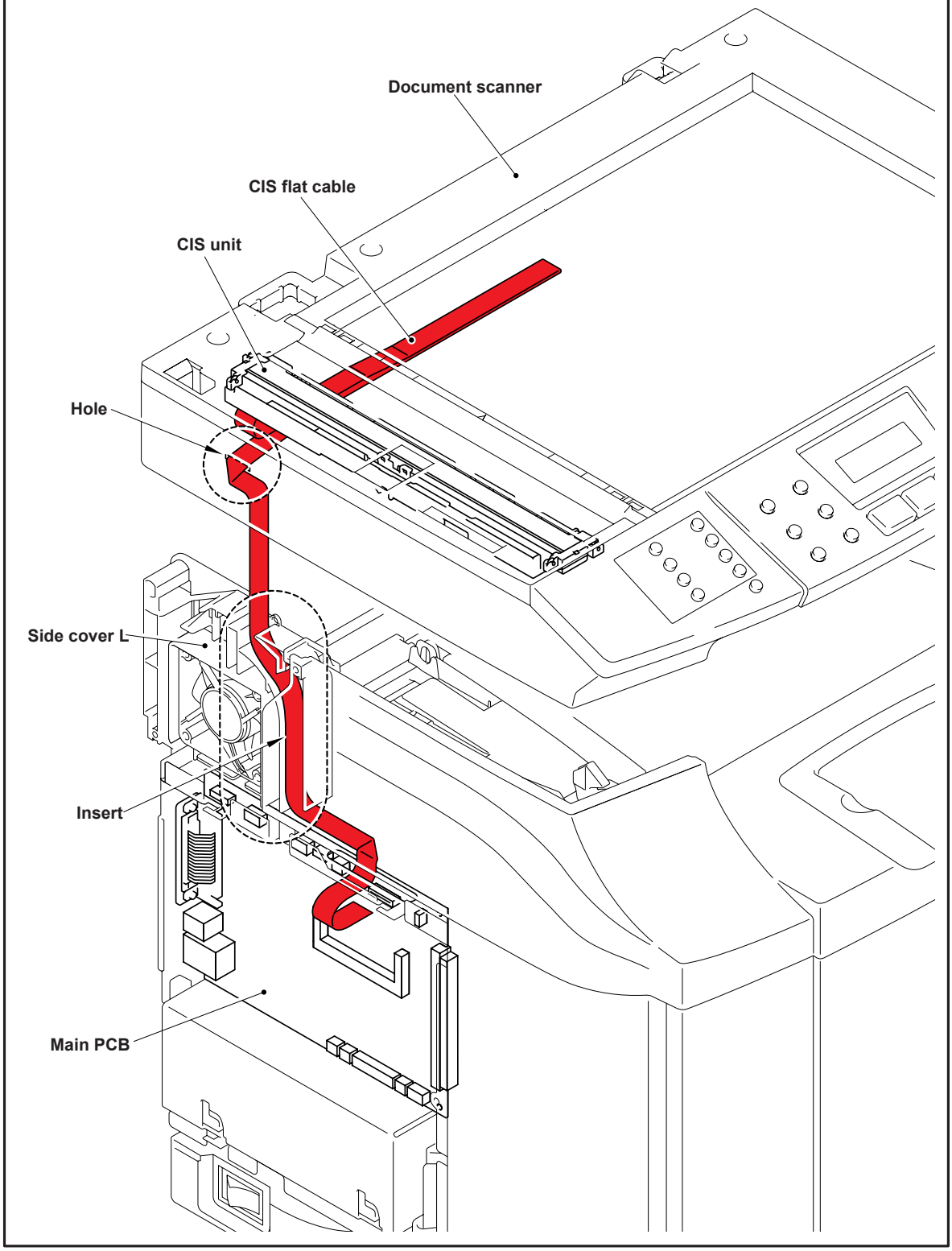
Fig. 5-126

5.3 HARNESS ROUTING

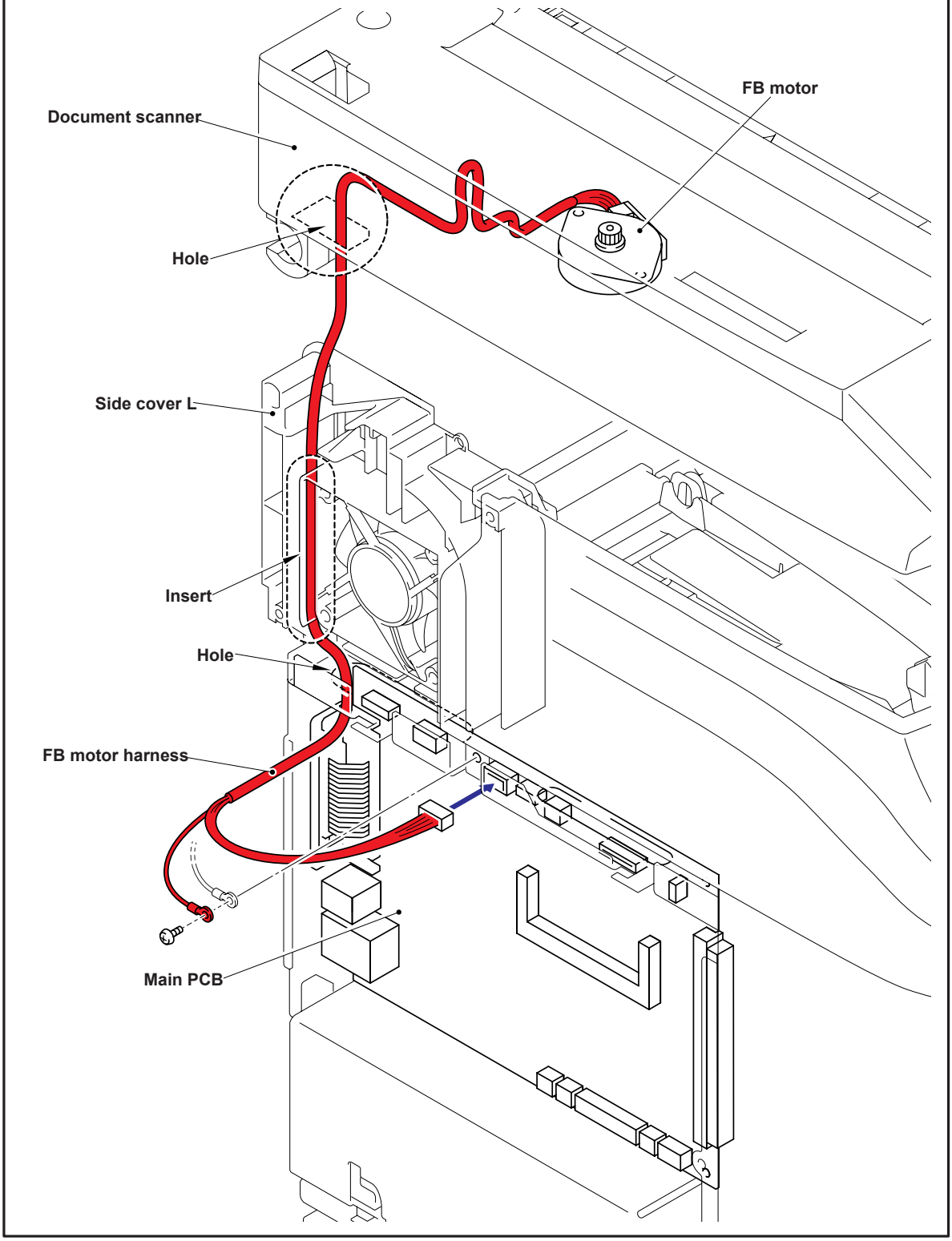
1 · ADF unit

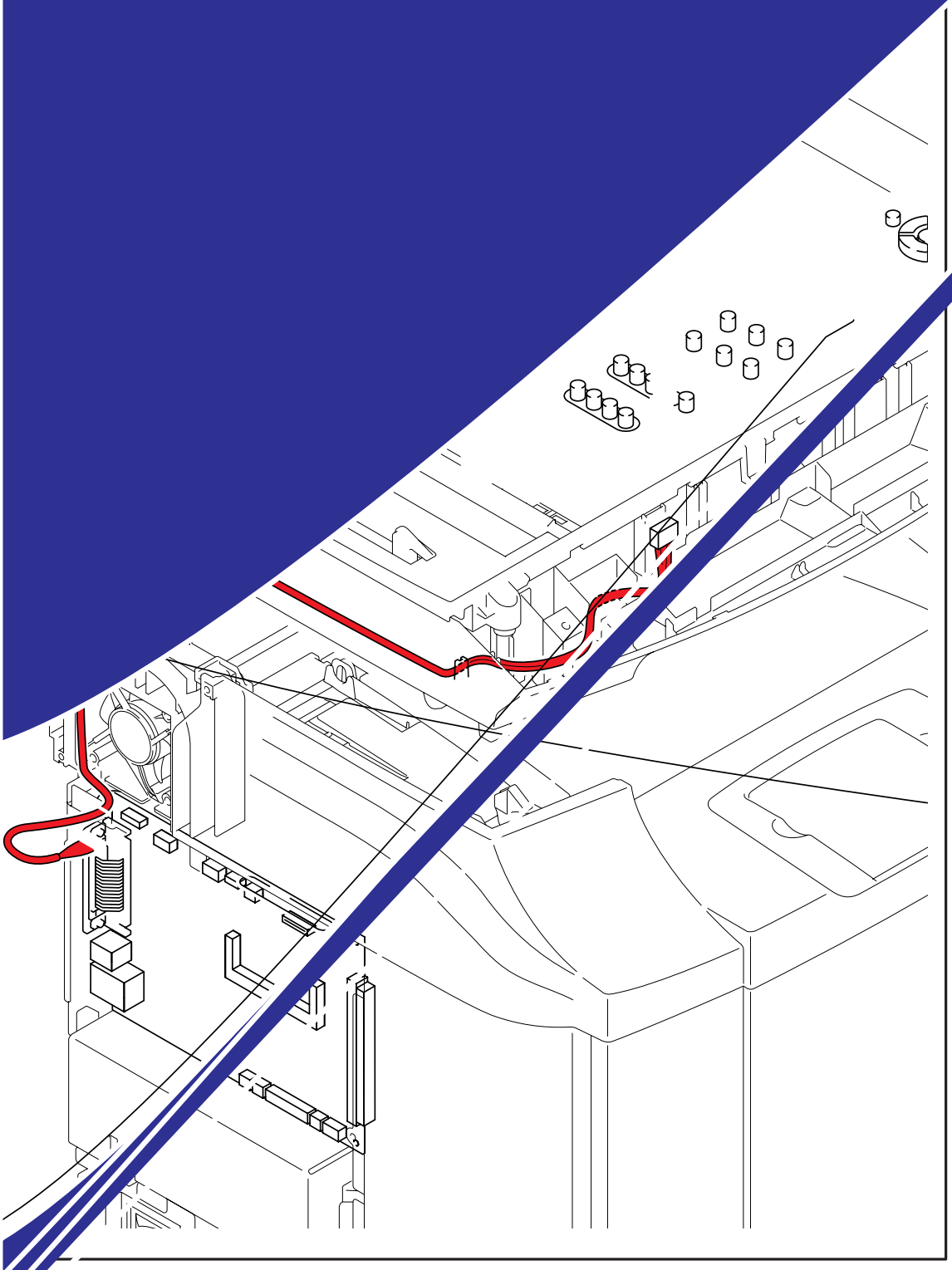


2 · CIS unit



3 · FB motor





CHAPTER 6

ADJUSTMENTS AND UPDATING OF SETTINGS, REQUIRED AFTER PARTS REPLACEMENT

CHAPTER 6 ADJUSTMENTS AND UPDATING OF SETTINGS, REQUIRED AFTER PARTS REPLACEMENT

This chapter details adjustments and updating of settings, which are required if main PCB and some other parts have been replaced.

CONTENTS

6.1 IF YOU REPLACE THE MAIN PCB

6.1.1 EEPROM Customizing

For the OCEANIA (Australia and New Zealand), and EUROPE (United Kingdom, German, France, Norway, Belgium, Netherlands, Switzerland, Finland, Denmark, Spain, Italy, Portugal, Sweden, Austria, Ireland and others) versions *and* replacement with a new main PCB

Refer to Chapter 6, Section 6.1.5.

For other versions or replacement with a used main PCB

(1) Press the **Menu/Set** and **Black Start** keys. Next press the ▲ key four times to make the machine enter the maintenance mode.

(2) Press the **7** and **4** keys in this order in the initial stage of the maintenance mode.
The current customizing code (e.g., 0001 in the case of U.S.A. model) appears.

(3) Enter the desired customizing code (e.g., 0054 in the case of Europe model).
The newly entered code appears.

NOTE: If a wrong 4-digit code is entered, the machine will malfunction.

(4) Press the **Black Start** key.
The machine saves the setting and returns to the initial stage of the maintenance mode.
If you press the **Stop/Exit** key or no keys are pressed for one minute in the above procedure, the machine stops the procedure and returns to the initial stage of the maintenance mode.

6.1.2 EEPROM Parameter Initialization

(1) Press the **0** and **1** keys (or the **9** and **1** keys according to your need) in this order in the initial stage of the maintenance mode.
The "PARAMETER INIT" appears on the LCD.

(2) Upon completion of parameter initialization, the machine returns to the initial stage of the maintenance mode.

6.1.3 ID Code Entry to the EEPROM

(1) Press the **8** and **0** keys in this order in the initial stage of the maintenance mode.
An unspecified code appears on the LCD.

(2) Press the **9**, **4**, **7**, and **5** keys in this order.
The LCD switches to the edit mode, showing a cursor.

(3) Enter the serial number given on the right side of the machine using the ten keys.

(4) Press the **Menu/Set** key.

The machine displays the newly entered ID code on the LCD for 0.5 second and then returns to the initial stage of the maintenance mode.
To cancel the ID code entry, press the **Stop/Exit** key instead of the **Menu/Set** key. The machine beeps for one second and returns to the initial stage of the maintenance mode.

6.1.4 CIS Scanner Area Setting

(1) Press the **5** key twice in the initial stage of the maintenance mode.

The "SCANNER AREA SET" and "WHITE LEVEL INIT" appear on the LCD in this order.
The machine checks and sets the area to be scanned.
If no error is noted, the machine returns to the initial stage of the maintenance mode.
If any error is noted, the "SCANNER ERROR" appears on the LCD. To return the machine to the initial stage of the maintenance mode, press the **Stop/Exit** key.

6.1.5 Setting Wich Allows the User to Select the Country

NOTE: This function is available only for the OCEANIA, EUROPE versions.

This model above are sold in different countries and areas with the same specification, and it is designed to be able to select the performance and languages on the LCD depending on the countries and areas which is used to fit their local specifications.

In this reason, it is possible to set the machine in advance to launch the program automatically to ask the user to select the country when it is turned on for the first time.

In case that the customer is not specified or the setting is uncertain and country setting needs to be done by customers.

(1) Turn the machine on.
The "SET COUNTRY" and "PRESS SET KEY" appear alternately on the LCD.

(2) Press the 1 and 3 keys at the same time.
It skips EEPROM customizing.

NOTE: In this case, the machine will ask EEPROM customizing again when the power is on next time.

In case that customer's specification is obvious and country setting is set in advance as a service.

(1) Turn the machine on.
The "SET COUNTRY" and "PRESS SET KEY" appear alternately on the LCD.

(2) Press the **Menu/Set** key.
OCEANIA version: The "AUSTRALIA" and "SELECT ↑↓ & SET" appear alternately.
EUROPE version: The "U.K." and "SELECT ↑↓ & SET" appear alternately.

(3) Use the ▲ and ▼ keys to select the target country and press the **Menu/Set** key.
The machine displays the "ACCEPTED" on the LCD and switches back to standby.

(4) Before proceeding to "6.1.2 EEPROM Parameter Initialization," press the **Menu/Set** and **Black Start** keys. Next press the ▲ key four times to make the machine enter the maintenance mode.

Even country setting is set already, the customer can change the setting when the machine is turned on. The procedures below

(1) Press the **Menu/Set** and **Black Start** keys. Next press the ▲ key four times to make the machine enter the maintenance mode.

(2) Press the **7** and **4** keys in this order in the initial stage of the maintenance mode.
The current customizing code appears.

(3) Enter the desired customizing code.
OCEANIA version: 2056.
EUROPE version: 2054.
The newly entered code appears.

NOTE: If a wrong 4-digit code is entered, the machine will malfunction.

(4) Press the **Black Start** key.
The machine saves the setting and returns to the initial stage of the maintenance mode.

(5) To exit the maintenance mode, press the **9** key twice in the initial stage of the maintenance mode.

6.2 IF YOU REPLACE THE ENGINE CONTROL BOARD PU

Transfer the data in the NVRAM from the PCB which has been used to the one which is newly assembled.

(1) Prior to replacing the engine control board PU, confirm the contents of NVRAM regarding the following subjects.

For the detail of how to enter the engine service mode, please refer to the description of 8.2.1 Entry into the Engine Service Mode.

For the information of Factory Mode function and operating procedure, please refer to the pages described in the Reference Section below.

< Factory Mode >

Code	Subject	Confirmation Value	Reference Section (Chapter 8)
43	Margin Adjust	Top Margin set value	[1] (Page 8-37)
		Left Margin set value	
45	LP Tune Up	Adjustment value ("0" in ordinary case)	[3]-1 (Page 8-39)
	THV Tune Up	Adjustment value SIMPLEX (PPC/OHP/ENV/MTS/TS1/TS2) "0"	[3]-2 (Page 8-40)
	DBV Tune Up	Adjustment value ("0" in ordinary case)	[3]-3 (Page 8-41)
	CBV Tune Up	Adjustment value ("0" in ordinary case)	[3]-4 (Page 8-42)
	FBV Tune Up	Adjustment value ("0" in ordinary case)	[3]-5 (Page 8-42)
47	Total Page Set	Total print count	[5] (Page 8-43)
48	Each Image Set	Formed image count of 4 colors	[6] (Page 8-44)
49	Next Life Set	Print count for maintenance replacement parts	[7] (Page 8-45)

(2) Execute "46 NVRAM Initial" in the "Factory Mode".

(3) After implementing the NVRAM initial, input the value confirmed in the procedure (1) to the NVRAM for completing the setting.

6.3 ADJUSTMENT OF THE GUIDE B POSITION OF TOP FUSE COVER FU

(1) Install the Top Fuse Cover FU with the setscrews (ST3x6, 2 pieces).

(2) Loosen the Guide B setscrews (BT3x8, 2 pieces) to make the Guide B attached to the Separation Guide.

(3) Tighten the setscrews (BT3x8, 2 pieces) to clamp the Guide B.

(4) Put the protective seal on the head of setscrews.

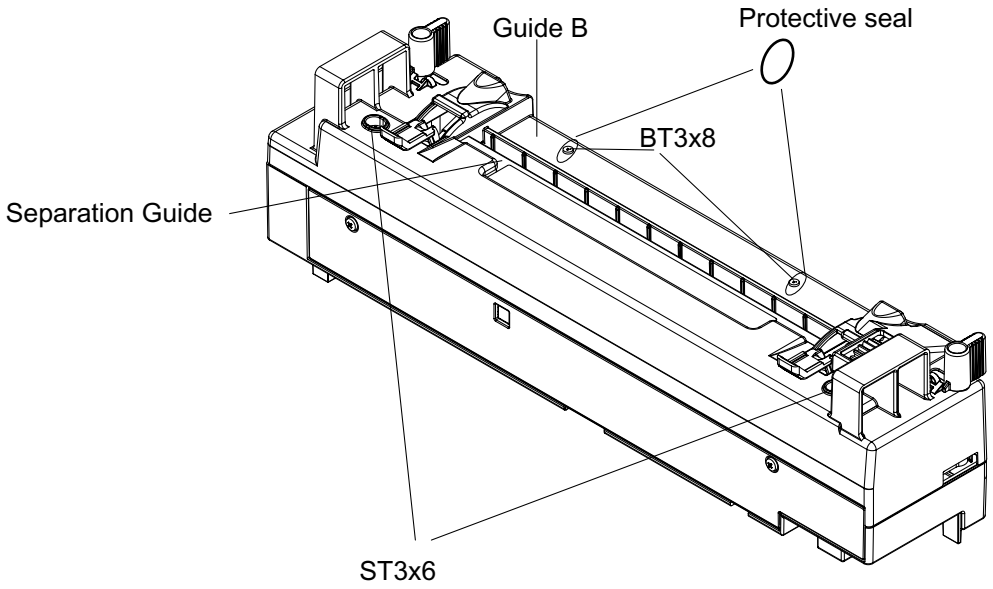


Fig. 6-1

6.4 PERIODIC MAINTENANCE PROCEDURES

Maintenance Work should be implemented according to the “Periodic Maintenance Parts and Maintenance Cycle” set out in Table 6-1.

Table 6-1

No.	Name of Replacement Part	Replacement Cycle	Operator
1	OPC belt cartridge	Every 60,000 images	Serviceperson or Customer
2	Fusing Unit	Every 60,000 pages	Serviceperson or Customer
3	Cleaning Roller PU	Every 120,000 pages	Serviceperson only
4	Transfer Roller ASSY PU	Every 120,000 pages	Serviceperson only
5	Paper Feed Roller	Every 120,000 pages	Serviceperson only
6	Transfer Unit PU	Every 300,000 images	Serviceperson only

6.4.1 Replacement of OPC Belt Cartridge

<Criterion of Replacement>

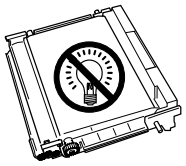
OPC belt cartridge should be replaced with a new cartridge at 60,000 images or 12 months whichever comes earlier.
When time is due for replacement of OPC belt cartridge, the following maintenance message appears on the LCD of the control panel.

```
Replace OPC Belt
```

CAUTION

- Do not directly touch the OPC belt surface with bare hands or gloves.

- If OPC belt is exposed for more than 2 minutes under the light of 800 lux, it may cause the defective image.



<Work Procedure>

Sequence of Disassembling

(1) Turn off the machine’s power switch.
(2) Open the scanner unit.

(3) Open the center cover.

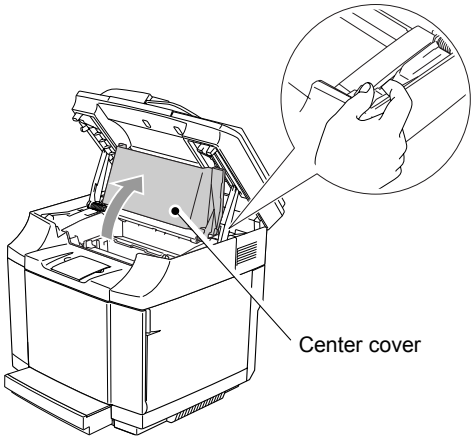


Fig. 6-2

(4) To release the lock, push the green belt cartridge lock levers on both sides inwards.

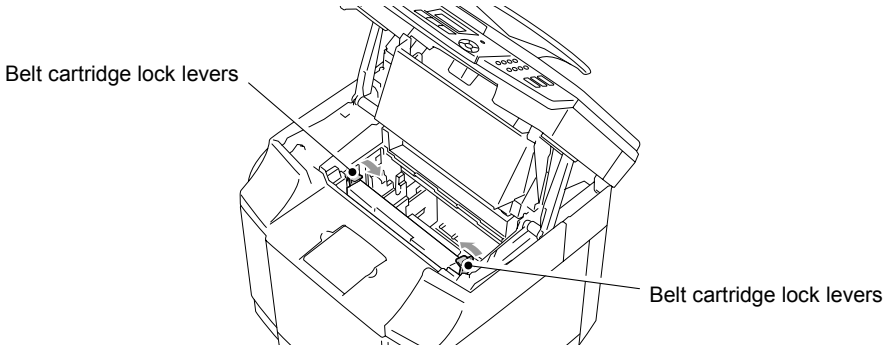


Fig. 6-3

(5) Remove the OPC belt cartridge from the machine.

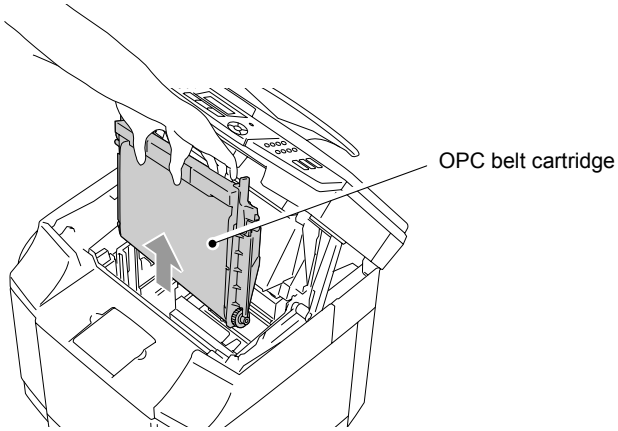


Fig. 6-4

Sequence of Assembling

(1) Remove the tension release pins from both sides of the new OPC belt cartridge.

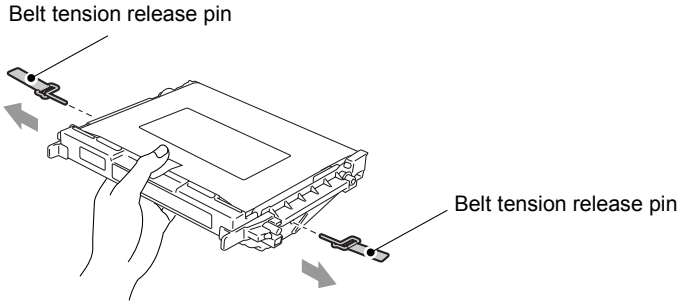


Fig. 6-5

(2) Remove the protective sheet from the new OPC belt cartridge. Do not touch the green part of the OPC belt cartridge.

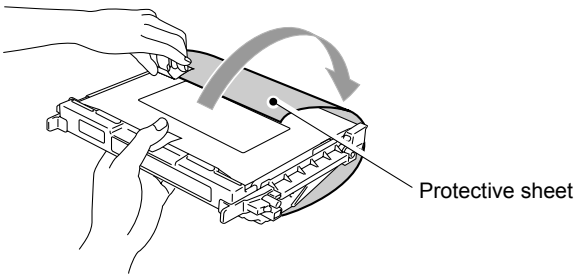


Fig. 6-6

(3) Put the new OPC belt cartridge into the machine guides with the flat side facing you.

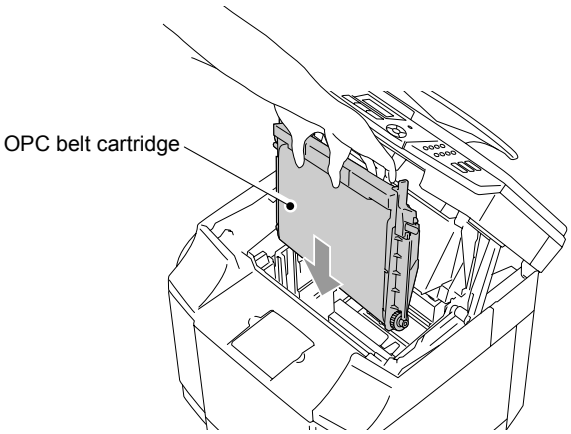


Fig. 6-7

(4) To lock the cartridge into the machine, push the belt cartridge lock levers that are on both sides of the OPC belt cartridge outwards.

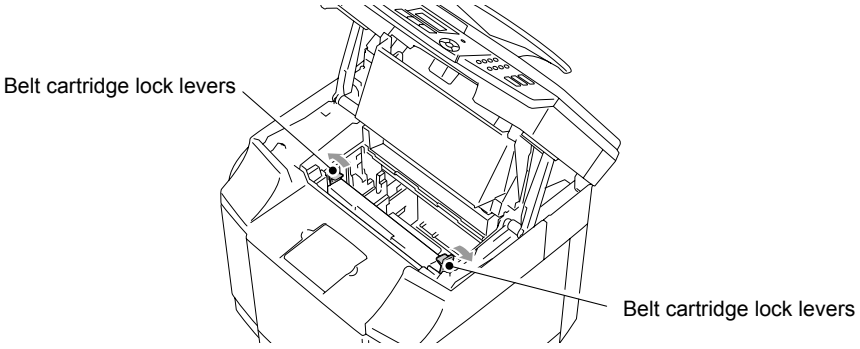


Fig. 6-8

(5) Close the center cover, and then close the scanner unit.

(6) Turn the machine's power switch back on.

< How to reset the OPC Belt life counter >

■ Resetting the OPC belt cartridge life counter from the normal standby status (supporting ver.0.35 or later of the firmware)

(1) Press the **1** and **7** keys at the same time.

The "OPC Belt/1. Reset 2 Exit" message appears on the LCD.

(2) Press the **1** key.

The OPC belt cartridge life counter is reset, and the machine returns to the normal standby status.

■ Resetting the OPC belt cartridge life counter from the maintenance mode (supporting all versions of the firmware)

(1) Press the **Menu/Set** and **Black Start** keys. Next press the ▲ key four times to make the machine enter the maintenance mode.

(2) Press the **8** and **0** keys in this order.

(3) Press the **Black Start** key a few times so that "OPC belt cartridge" appears on the LCD.

(4) Press the **2**, **7**, **8**, **3** keys in this order. Then, the OPC belt cartridge life counter is reset.

(5) Press the **Stop/Exit** key so that the machine returns to the initial status of the maintenance mode.

(6) Press the **9** key twice to exit from the maintenance mode.

6.4.2 Replacement of Fusing Unit

<Criterion of Replacement>

It is recommended to replace with a new fusing unit according to the periodic maintenance cycle listed in the Table 6-1 to maintain the satisfactory print quality.

The suggested replacement timing is indicated on the control paned with the following message, "REPLACE FUSER".

```
Replace Fuser
```

<Purpose of Replacement>

To prevent the decline of fusing strength and print quality due to the deterioration of the fuser roller.

<Tools and Replacement Materials>

Fusing unit (1 unit): Voltage specification to be confirmed.

WARNING

- Fusing unit and its peripheral parts are very hot.
- Prior to starting the replacement work, leave the machine for approx. ten minutes while the power supply of the machine is ON. Then, turn it off and check that the unit and parts are well cooled down.

<Work Procedure>

Sequence of Disassembling

(1) Turn off the machine's power switch. To avoid injury, wait until the machine has cooled down sufficiently before you replace the fusing unit.

(2) Open the back cover and the scanner unit of the machine.

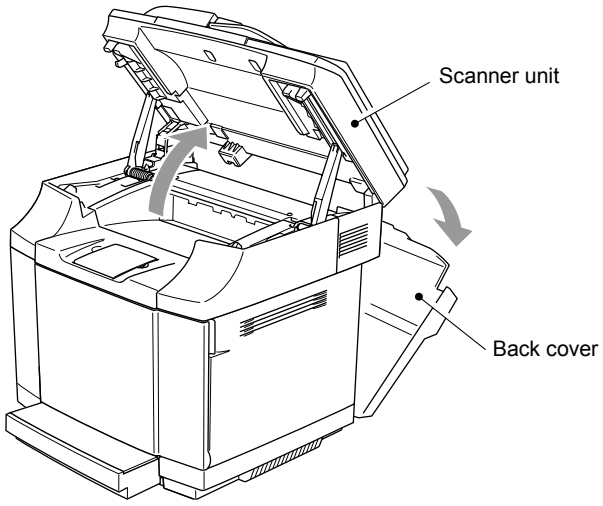


Fig. 6-9

(3) To release the fusing unit from the machine, release the lock levers that are on both sides of the fusing unit.

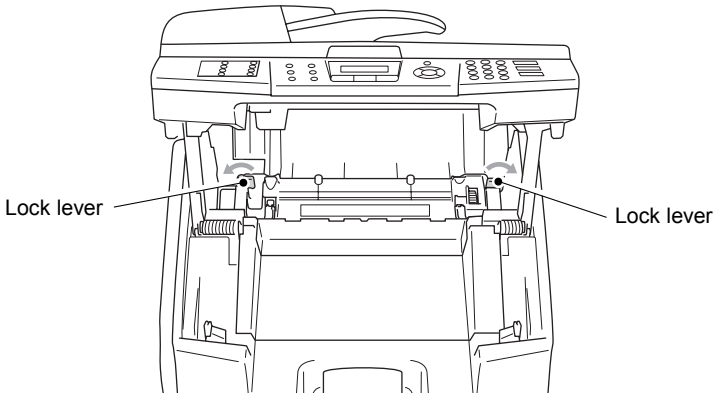


Fig. 6-10

(4) Hold the handles on both sides as you take the fusing unit out of the machine.

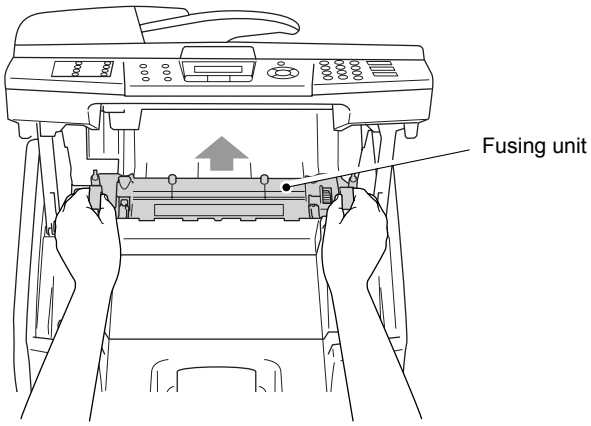


Fig. 6-11

Sequence of Assembling

(1) Put the new fusing unit into the machine. Be sure to insert the fusing unit completely into the machine.

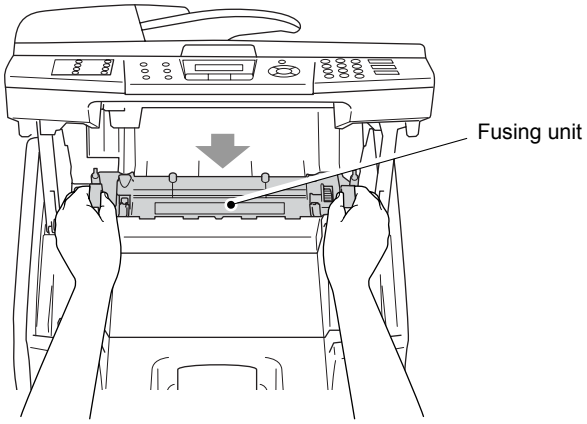


Fig. 6-12

(2) Secure the fusing unit with the two lock levers that are on both sides of the fusing unit.

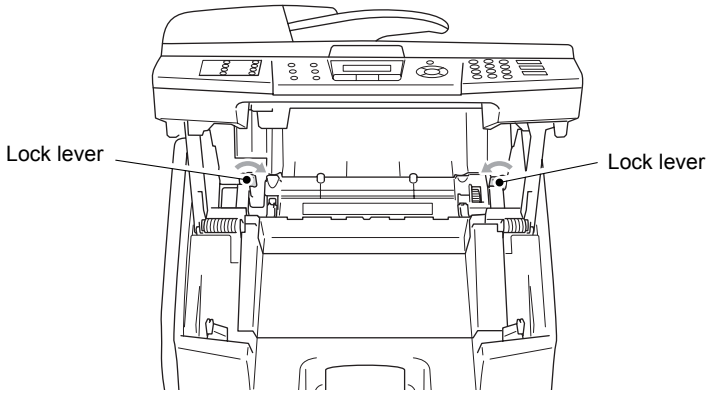


Fig. 6-13

(3) Move the fusing unit pressure release levers to the Set position.

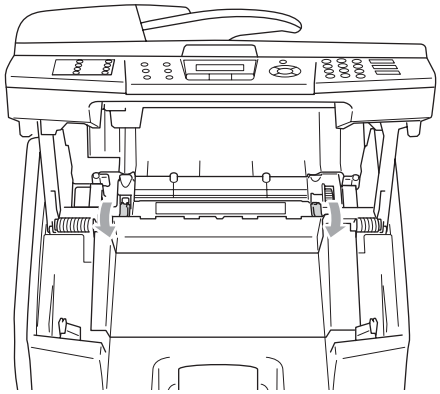


Fig. 6-14

(4) Close the scanner unit and the back cover.
(5) Turn the machine's power switch back on.

< How to reset the fusing unit life counter >

- Resetting the fusing unit life counter from the normal standby status (supporting ver.0.35 or later of the firmware)
  (1) Press the **2** and **8** keys at the same time.
  The "Fusing unit/1. Reset 2 Exit" message appears on the LCD.
  (2) Press the **1** key.
  The fusing unit life counter is reset, and the machine returns to the normal standby status.
- Resetting the fusing unit life counter from the maintenance mode (supporting all versions of the firmware)
  (1) Press the **Menu/Set** and **Black Start** keys. Next press the ▲ key four times to make the machine enter the maintenance mode.
  (2) Press the **8** and **0** keys in this order.
  (3) Press the **Black Start** key a few times so that "Fusing unit" appears on the LCD.
  (4) Press the **2**, **7**, **8**, **3** keys in this order. Then, the fusing unit life counter is reset.
  (5) Press the **Stop/Exit** key so that the machine returns to the initial status of the maintenance mode.
  (6) Press the **9** key twice to exit from the maintenance mode.

6.4.3 Replacement of Transfer Roller ASSY PU (120K KIT)

<Criterion of Replacement>

Transfer roller ASSY PU should be replaced with a new one according to the periodical maintenance cycle set out in the Table 6-1.

When time is due for replacement of transfer roller ASSY PU, the following message appears on the LCD.

```
Replace 120K Kit
```

NOTE: At the same time, replacement of the paper feed roller, the cleaning roller, the separator pad and the transfer unit is strongly recommended.

<Purpose of Replacement>

To prevent the transfer efficiency from declining due to deterioration of the transfer roller ASSY PU.

<Necessary Tools and Replacement Materials>

(1) Two or three pieces of cotton cloth for cleaning.

(2) Transfer roller ASSY PU (one unit)

<Work Procedures>

Sequence of Disassembling

(1) Turn off the machine's power switch.

(2) Open the back cover of the machine.

(3) Release the lock levers on the right and left-hand sides, and then lift the levers to release the transfer roller ASSY PU.

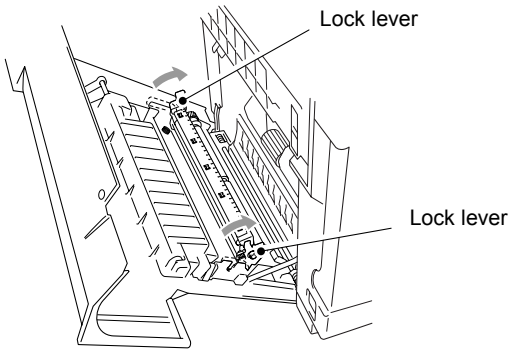


Fig. 6-15

(4) Take out the transfer roller ASSY PU by gently pulling the right-hand side up and sliding the transfer roller to the right.

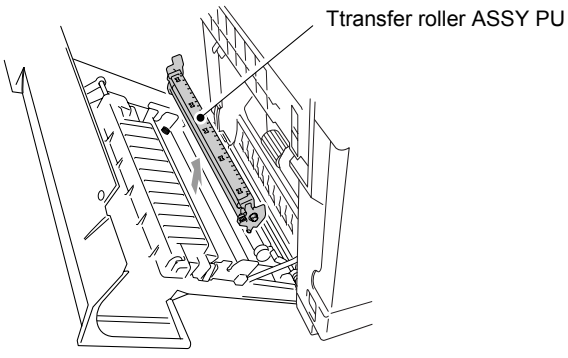


Fig. 6-16

Sequence of Assembling

(1) Put in the new transfer roller ASSY PU by holding the lock levers of the transfer roller ASSY PU and adjusting the angle of the transfer roller lever shafts (both sides) to match the transfer unit grooves. Put the transfer roller ASSY PU onto the shafts and place the roller onto the springs as shown below:

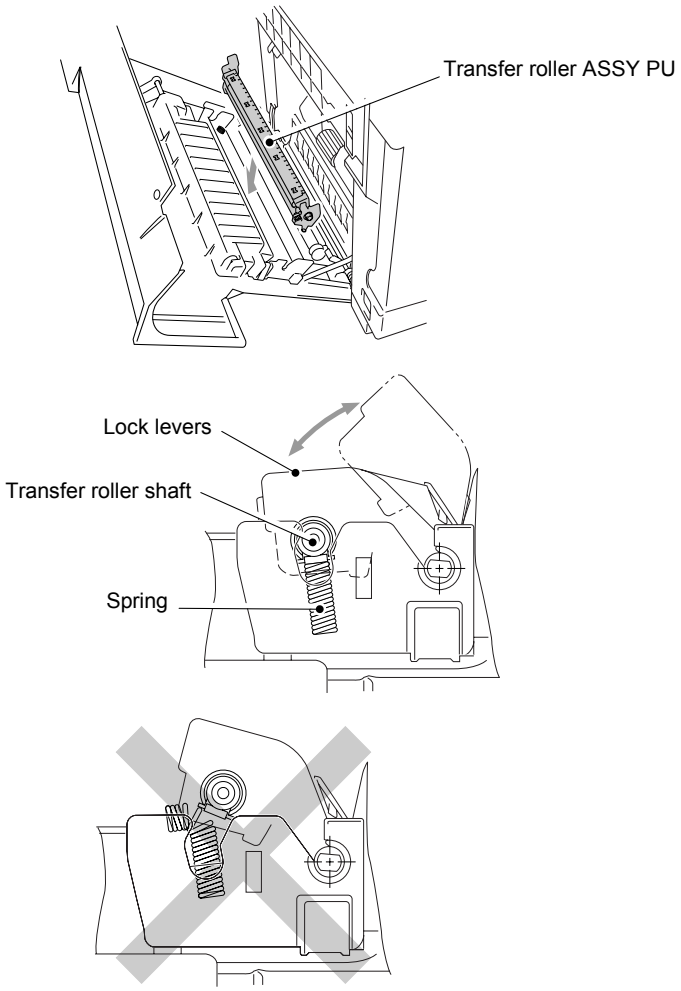


Fig. 6-17

(2) Push the lock levers down to lock the transfer roller ASSY PU into place.

(3) Close the back cover.

(4) Turn the machine's power switch back on.

6.4.4 Replacement of Cleaning Roller PU (120K KIT)

<Criterion of Replacement>

Cleaning roller PU should be replaced with a new one according to the periodical maintenance cycle set out in the Table 6-1.

When time is due for replacement of cleaning roller PU, the following message appears in LCD of the control panel.

```
Replace 120K Kit
```

NOTE: At the same time, replacement of the paper feed roller, the cleaning roller, the separator pad and the transfer unit is strongly recommended.

<Purpose of Replacement>

To prevent the cleaning efficiency from declining due to deterioration of the cleaning roller PU.

CAUTION

- When assembling the cleaning roller PU, firstly connect the bearing and the bias pole.
- Prior to starting above assembling, reconfirm this connection to have been done properly.

<Necessary Tools and Replacement Materials>

(1) Two or three pieces of cotton cloth for cleaning.

(2) Cleaning roller PU (one unit)

<Work Procedures>

Sequence of Disassembling

(1) Turn off the machine's power switch.

(2) Open the scanner unit.

(3) Open the center cover of the machine.

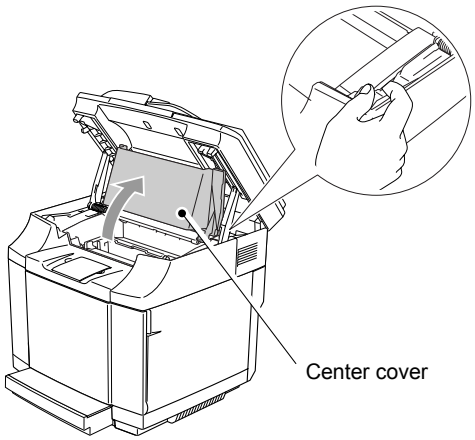


Fig. 6-18

(4) Remove the cleaning roller cover PU.

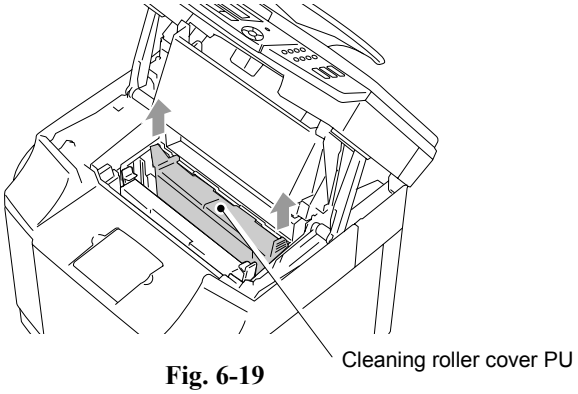


Fig. 6-19

(5) Remove the cleaning roller PU by grasping the handle and lifting it up.

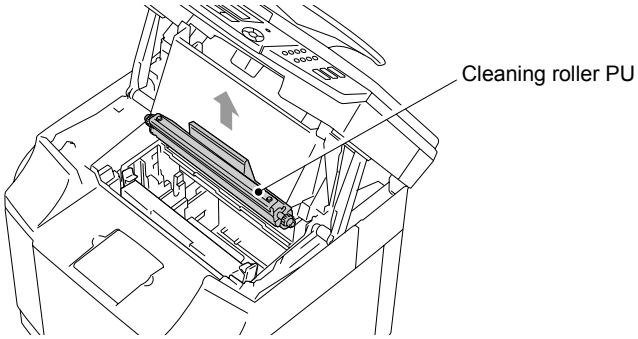


Fig. 6-20

Sequence of Assembling

(1) Clean the area where the new cleaning roller PU is to be installed with a dry cotton cloth.

(2) Put the new cleaning roller PU into the machine by gently placing the brass bearings into the guides, and then pushing the handle down until the bearings click into place. Make sure the cleaning roller PU is free to move slightly upwards (rotating slightly around the bearings) in the housing after you have installed it.

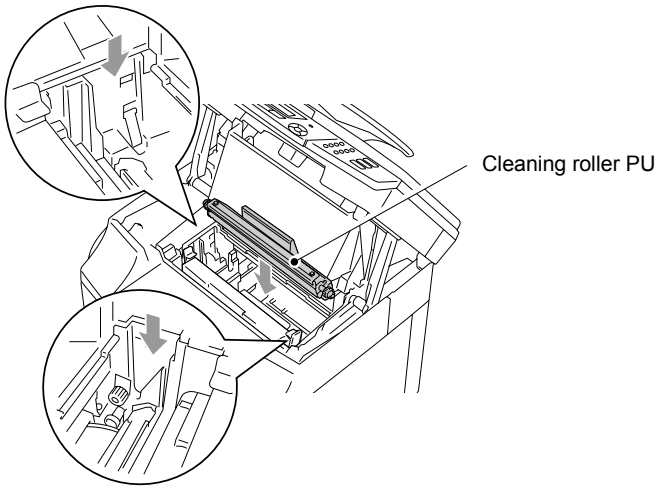


Fig. 6-21

(3) Put the cleaning roller cover PU back in.

(4) Close the center cover, and then close the scanner unit.

(5) Turn the machine's power switch back on.

6.4.5 Replacement of Paper Feed Roller and Separator Pad (120K KIT)

<Criterion of Replacement>

Since the paper feed roller and separator pad are defined as periodic replacement parts as per Table 6-1, they should be replaced when the feeding jam (17. MEDIA JAM FEED) occurs. The following message appears in LCD of the control panel.

```
Replace 120K Kit
```

NOTE: At the same time, replacement of the paper feed roller, the cleaning roller, the separator pad and the transfer unit is strongly recommended.

<Work Procedures>

Sequence of Disassembling

(1) Pull out the paper tray.

(2) Open the front cover and back cover.

(3) Remove the screw to remove the top side R.

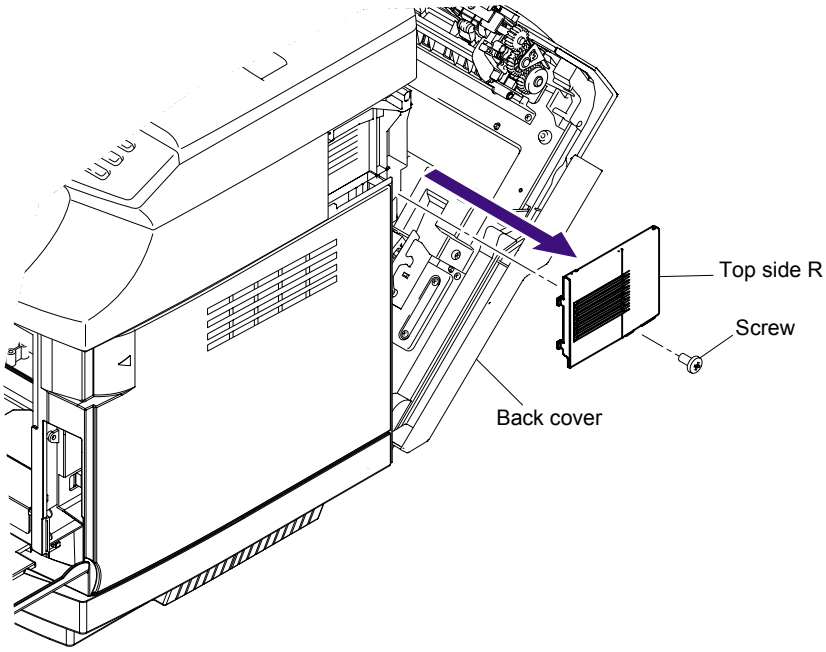


Fig. 6-22

(4) Remove the waste toner pack PU.

(5) Remove the setscrew (BT4x10, 2pieces) of right side cover PU.

(6) Remove the right side cover PU from the machine.

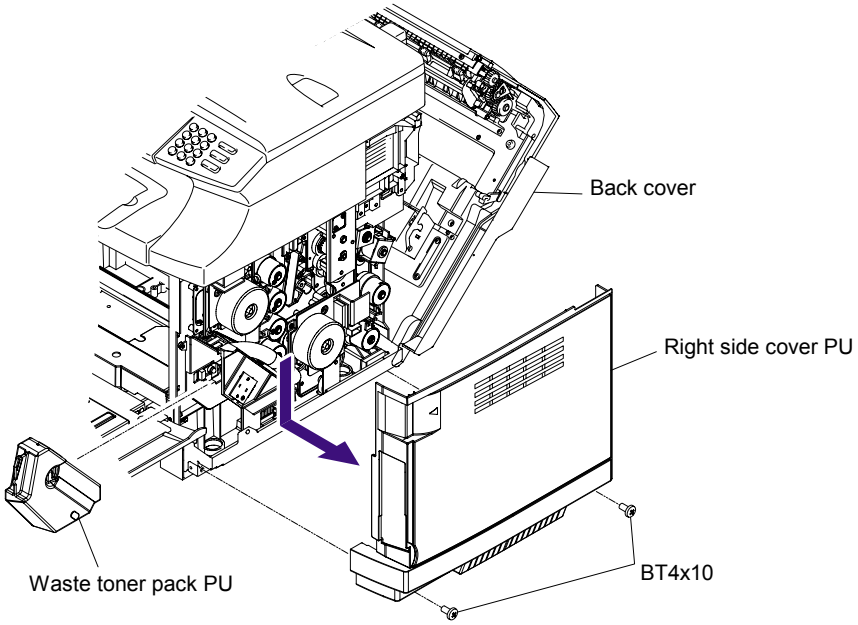


Fig. 6-23

(7) Remove the setscrew (BT4x20, 1piece and collar) from the support band.

(8) Disconnect the connector of paper sensor.

(9) Close the back cover to remove the setscrew (ST4x6, 2pieces).

(10) Open the back cover to remove the support plate.

(11) Remove the back cover.

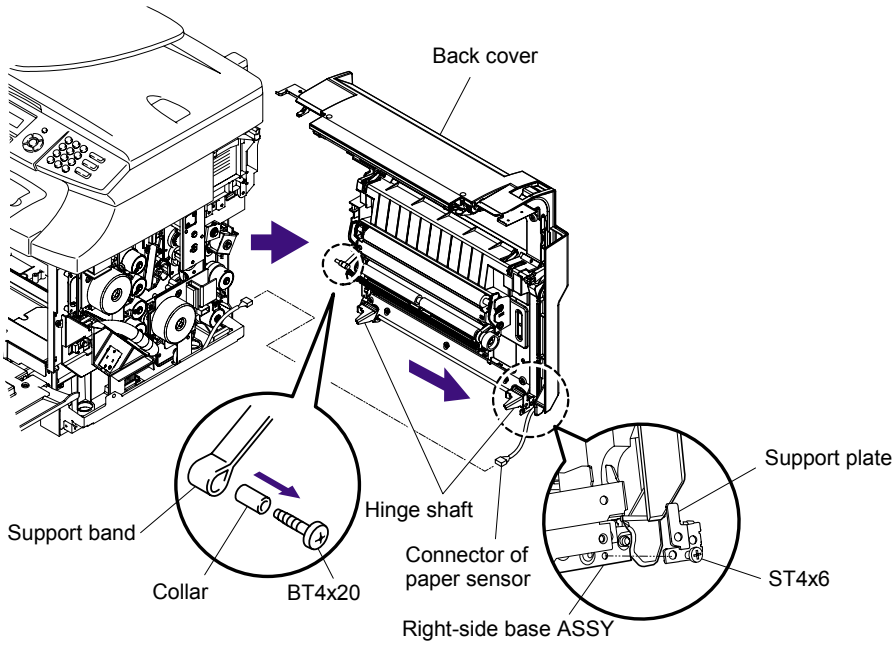
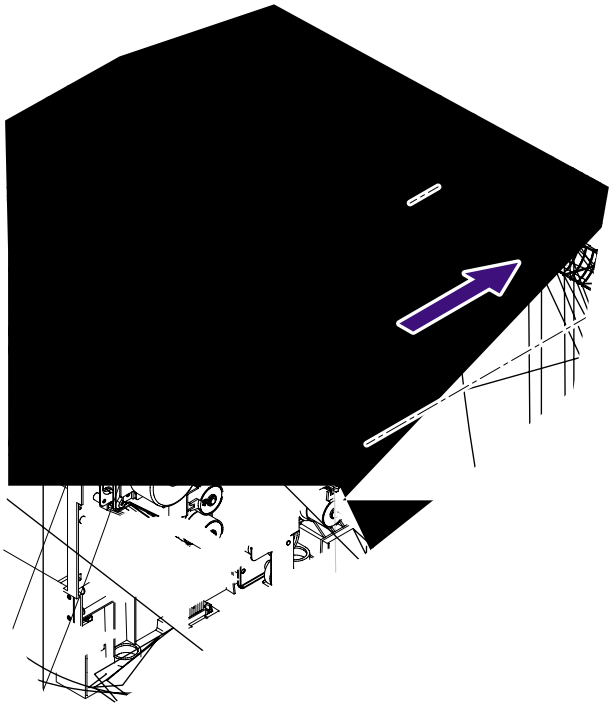


Fig. 6-24

(12) Remove the setscrew (BT3x8, 2 pieces) of the paper guide (B) PU.

(13) Remove the paper guide (B) PU.



Sequence of Assembling

(1) Set the separator pad.
(2) Set the paper feed roller.
(3) Secure the paper guide (C) PU with the setscrew (BT3x8, 2 pieces).

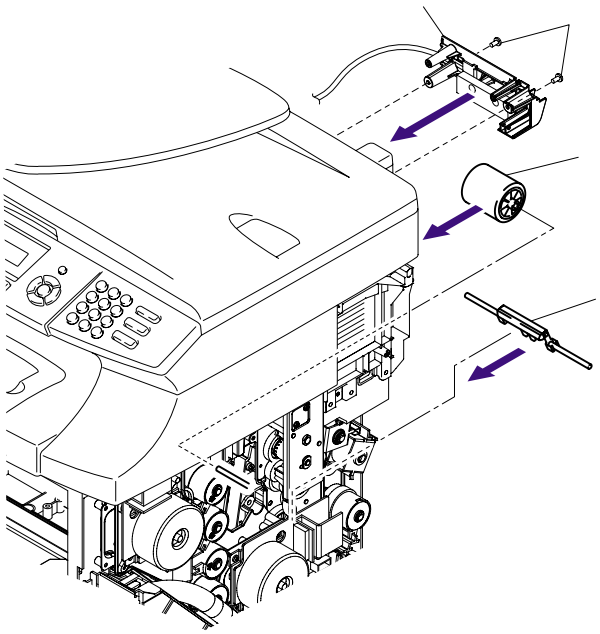
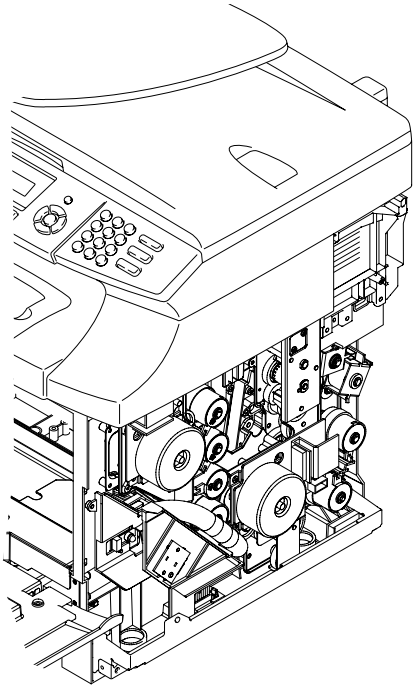


Fig. 6-27

(4) Install the paper guide (B) PU into the machine.
(5) Secure the paper guide (B) PU with the setscrew (BT3x8, 2 pieces).



(6) Set the back cover.
(7) Install the support plate.
(8) Close the back cover and secure the support plate with the setscrew (ST4x6, 2 pieces).
(9) Assemble the support band onto the frame with the setscrew (ST4x6, 1piece and collar).
(10) Connect the connector of the paper sensor.

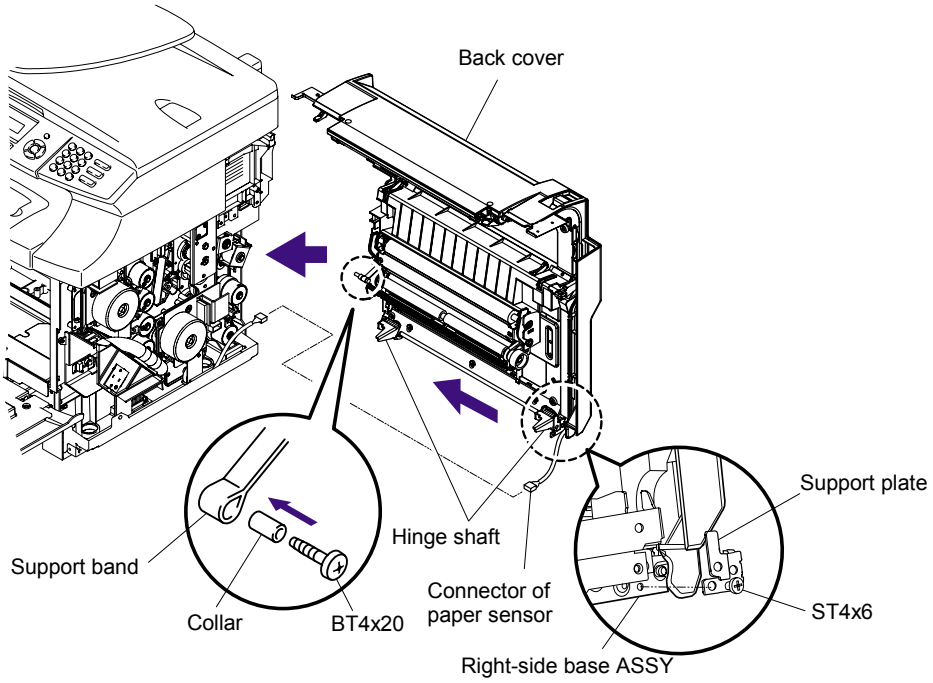


Fig. 6-29

(11) Secure the right side cover R with the setscrew (BT4x10, 2pieces).
(12) Install the waste toner pack PU.

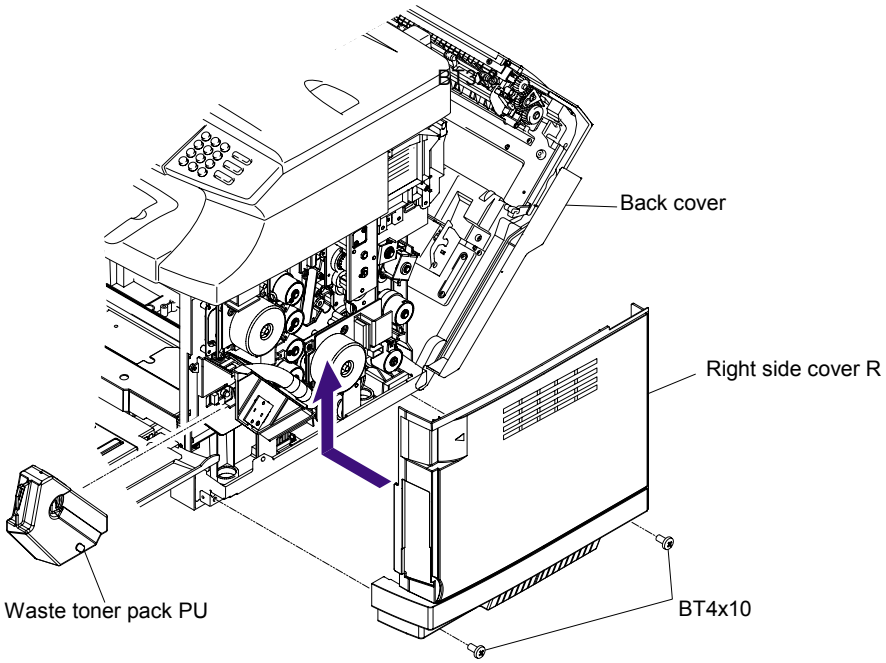


Fig. 6-30

(13) Secure the top side R with the screw (1piece).
(14) Close the front cover and back cover.
(15) Install the paper tray.

6.4.6 Replacement of Transfer Unit PU (120K KIT)

<Criterion of Replacement>

Since the transfer drum is defined as periodic replacement parts as per Table 6-1, it should be replaced when the print quality failure occurs due to failed transfer drum. The following message appears in LCD of the control panel.

```
Replace 120K Kit
```

NOTE: At the same time, replacement of the paper feed roller, the cleaning roller, the separator pad and the transfer unit is strongly recommended.

<Work Procedures>

Sequence of Disassembling

(1) Turn off the printer power switch.

(2) Open the back cover.

(3) Remove the knob screw (2 pieces) of the transfer unit PU from rear.

(4) Holding the band provided at the top side of the transfer unit PU, pull out the transfer unit PU from the inside of the frame. In this instance, do not cause the belt surface touch the peripheral parts.

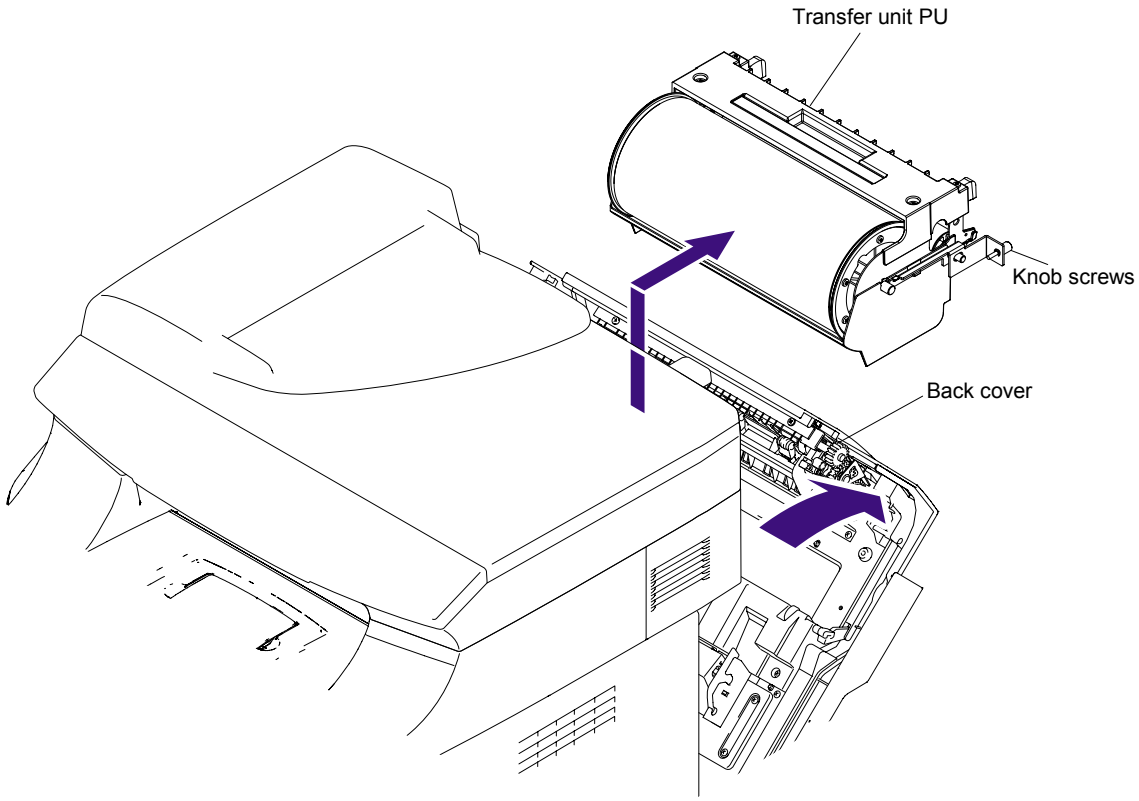


Fig. 6-32

Sequence of Assembling

(1) Install the transfer unit PU into the printer.

(2) Secure the transfer unit PU with the knob screw (2 pieces).

(3) Close the back cover.

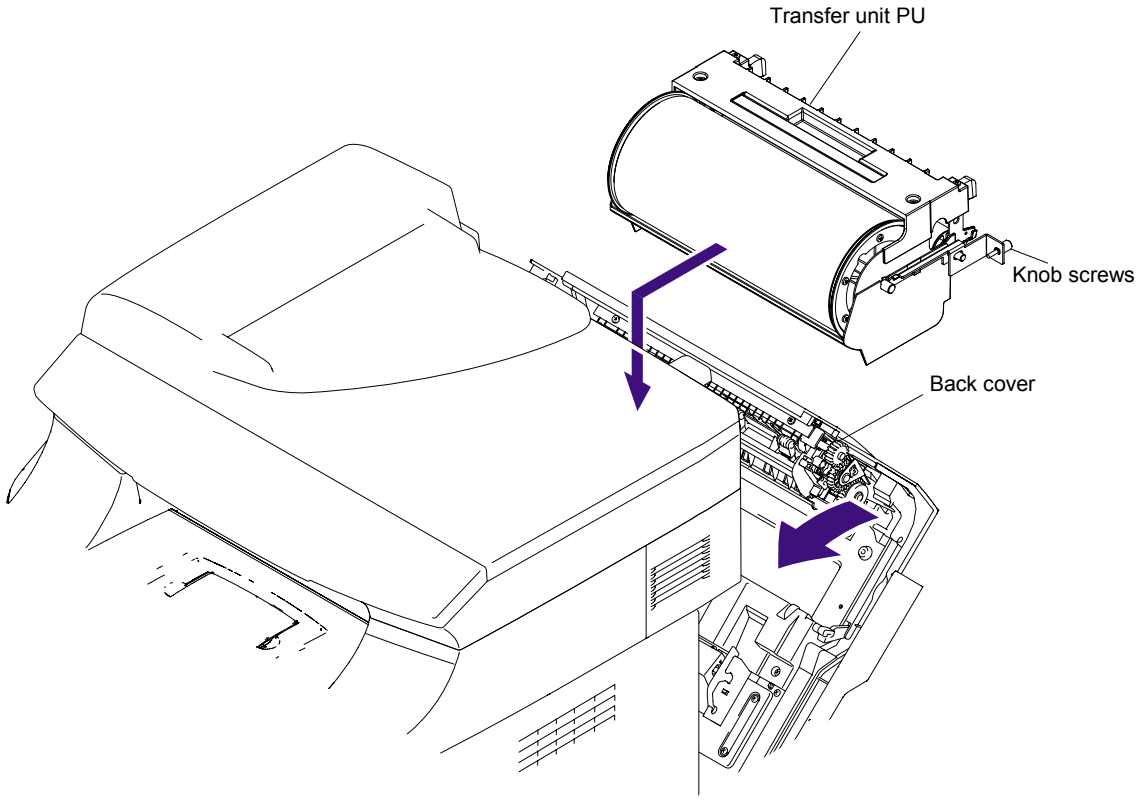


Fig. 6-33

< How to reset the 120K Kit >

(1) Press the **Menu/Set**, **Black Start**, ▲, ▲, ▲ and ▲ keys in this order to enter the maintenance mode.

(2) Press the **8** and **0** keys in this order to indicate the LOG INFO message on the LCD, and press the **Black Start** key several times until the "120K_CH:" message appears.

(3) Press the **2**, **7**, **8** and **3** keys in this order to reset the counter of the 120K Kit.

(4) Press the **9** key twice so that the printer returns to the standby status.

CAUTION

- This work is one of periodic replacement jobs, but cannot be the customer. This should be implemented upon request of customer or at periodic maintenance.
- After the replacement, confirm the improvement of print quality failure by test print.

6.5 IF YOU REPLACE THE OPC BELT CARTRIDGE

Reset the OPC belt cartridge life counter when replacing the OPC belt cartridge.

When replacing the OPC belt cartridge due to repair before its life.

- Resetting the OPC belt cartridge life counter from the normal standby status (supporting ver.0.35 or later of the firmware)

  (1) Press the **1** and **7** keys at the same time.

  The "OPC Belt/1. Reset 2 Exit" message appears on the LCD.

  (2) Press the **1** key.

  The OPC belt cartridge life counter is reset, and the machine returns to the normal standby status.

- Resetting the OPC belt cartridge life counter from the maintenance mode (supporting all versions of the firmware)

  (1) Press the **Menu/Set** and **Black Start** keys. Next press the ▲ key four times to make the machine enter the maintenance mode.

  (2) Press the **8** and **0** keys in this order.

  (3) Press the **Black Start** key a few times so that "OPC belt cartridge" appears on the LCD.

  (4) Press the **2**, **7**, **8**, **3** keys in this order. Then, the OPC belt cartridge life counter is reset.

  (5) Press the **Stop/Exit** key so that the machine returns to the initial status of the maintenance mode.

  (6) Press the **9** key twice to exit from the maintenance mode.

When replacing the OPC belt cartridge due to end of its life. (The steps below are described in the user's guide.)

When "Replace OPC belt" appears on the LCD, you must replace the OPC belt cartridge and reset the OPC belt cartridge life counter.

(1) Press **Menu/Set** key, **7** key and **4** key.

(2) Press ▲ key to select "OPC Belt" and press **Menu/Set** key.

The "OPC Belt/1. Reset 2 Exit" message appears on the LCD.

(3) Press the **1** key.

The OPC belt cartridge life counter is reset, and the machine returns to the normal standby status.

6.6 IF YOU REPLACE THE FUSING UNIT

Reset the fusing unit life counter when replacing the fusing unit.

When replacing the fusing unit due to repair before its life.

- Resetting the fusing unit life counter from the normal standby status (supporting ver.0.35 or later of the firmware)

  (1) Press the **2** and **8** keys at the same time.

  The "Fusing unit/1. Reset 2 Exit" message appears on the LCD.

  (2) Press the **1** key.

  The fusing unit life counter is reset, and the machine returns to the normal standby status.

- Resetting the fusing unit life counter from the maintenance mode (supporting all versions of the firmware)

  (1) Press the **Menu/Set** and **Black Start** keys. Next press the ▲ key four times to make the machine enter the maintenance mode.

  (2) Press the **8** and **0** keys in this order.

  (3) Press the **Black Start** key a few times so that "Fusing unit" appears on the LCD.

  (4) Press the **2**, **7**, **8**, **3** keys in this order. Then, the fusing unit life counter is reset.

  (5) Press the **Stop/Exit** key so that the machine returns to the initial status of the maintenance mode.

  (6) Press the **9** key twice to exit from the maintenance mode.

When replacing the fusing unit due to end of its life. (The steps below are described in the user's guide.)

When "Replace Fuser" appears on the LCD, you must replace the fusing unit and reset the fusing unit life counter.

(1) Press **Menu/Set** key, **7** key and **4** key.

(2) Press ▲ key to select "Fusing Unit" and press **Menu/Set** key.

The "Fusing unit/1. Reset 2 Exit" message appears on the LCD.

(3) Press the **1** key.

The fusing unit life counter is reset, and the machine returns to the normal standby status.

CHAPTER 7

CLEANING

CHAPTER 7 CLEANING

For the cleaning procedures of the drum unit and toner cartridge, refer to the User's Guide.

CHAPTER 8

MAINTENANCE MODE

CHAPTER 8 MAINTENANCE MODE

This chapter describes the maintenance mode which is exclusively designed for the purpose of checks, settings and adjustments using the keys on the control panel.
You can customize the EEPROM according to the shipment destination of the machine concerned. In addition, you can perform operational checks of the LCD, control panel PCB or sensors, perform a print test, display the log information or error codes, and modify firmware switches (WSW).

CONTENTS

8.1 MAINTENANCE MODE FOR THE MACHINE

8.1.1 Entry into the Maintenance Mode

Press the **Menu/Set** and **Black Start** keys. Next press the ▲ key four times to make the machine enter the maintenance mode.

The machine beeps for approx. one second and displays "▮▮ MAINTENANCE ▮▮▮" on the LCD, indicating that it is placed in the initial stage of the maintenance mode, a mode in which the machine is ready to accept entry from the keys.

To select one of the maintenance-mode functions listed in Section 8.1.2, enter the corresponding 2-digit function code with the numerical keys on the control panel. (The details of each maintenance-mode function are described in Section 8.1.4.)

NOTE:

- To exit from the maintenance mode and switch to standby, press the **9** key twice in the initial stage of the maintenance mode.
- Pressing the **Stop/Exit** key after entering only one digit restores the machine to the initial stage of the maintenance mode.
- If an invalid function code is entered, the machine resumes the initial stage of the maintenance mode.

8.1.2 List of Maintenance Mode Functions

Maintenance Mode Functions

Function Mode	Function	Reference Section (Page)
01	EEPROM Parameter Initialization	8.1.4.1 (8-4)
05	Printout of Scanning Compensation Data	8.1.4.2 (8-5)
06	Placement of CIS Unit Position for Transportation	8.1.4.3 (8-7)
08	ADF Performance Test	8.1.4.4 (8-7)
09	Test Pattern 1	8.1.4.5 (8-8)
10	Firmware Switch Setting	[1] (8-9)
11	Printout of Firmware Switch Data	[2] (8-11)
12	Operational Check of LCD	8.1.4.7 (8-12)
13	Operational Check of Control Panel PCB	8.1.4.8 (8-13)
32	Sensor Operational Check	8.1.4.9 (8-14)
52	EEPROM Customizing (Entering of the country code for Europe/Oceania.)	8.1.4.10 (8-15)
53	Received Data Transfer Function	8.1.4.11 (8-16)
54	Fine Adjustment of Scan Start/End Positions	8.1.4.12 (8-18)
55	Acquisition of White Level Data and CIS Scanner Area Setting	8.1.4.13 (8-20)
67	Paper Feeding and Ejecting Test	8.1.4.14 (8-20)
74	EEPROM Customizing (Direct entering of the four-digit code.)	8.1.4.15 (8-21)
80	Display of the Equipment's Log Information	8.1.4.16 (8-22)
82	Machine Error Code Indication	8.1.4.17 (8-25)
87	Output of Transmission Log to the Telephone Line	8.1.4.18 (8-25)
91	EEPROM Parameter Initialization	8.1.4.1 (8-4)
99	Exit from the Maintenance Mode	_____
___	Cancellation of the Memory Security Mode (Not applicable to the Japanese version)	8.1.4.19 (8-25)

8.1.3 User-access to the Maintenance Mode

Basically, the maintenance-mode functions listed on the previous page should be accessed by service personnel only. However, you can allow end users to access some of these under the guidance of service personnel (e.g., by telephone).
The user-accessible functions (modes 06, 09, 10, 11, 12, 52, 53, 54, 80, 82 and 87) are *shaded* in the table given on the previous page. Function code 10 accesses the firmware switches, each of which has eight selectors. You should not allow end users to access all of those selectors, but you can allow them to access user-accessible selectors which are *shaded* in the firmware switch tables in Appendix 4.
The service personnel should instruct end users to follow the procedure given below.

(1) Press the **Menu/Set**, **Black Start**, **Menu/Set**, and ▲ keys in this order.
TIP: For the FAX models equipped with numerical keypads, you may press the **Menu/Set**, **Black Start**, and **0** keys instead in the same way as conventional models.
The "MAINTENANCE 06" appears on the LCD.

(2) Press the ▲ key or ▼ key several times to display the desired maintenance code on the LCD. Then press the **Menu/Set** key.

(3) To switch the machine back to the standby state, press the **Stop/Exit** key. When each of the user-accessible functions is completed, the machine automatically returns to the standby state.

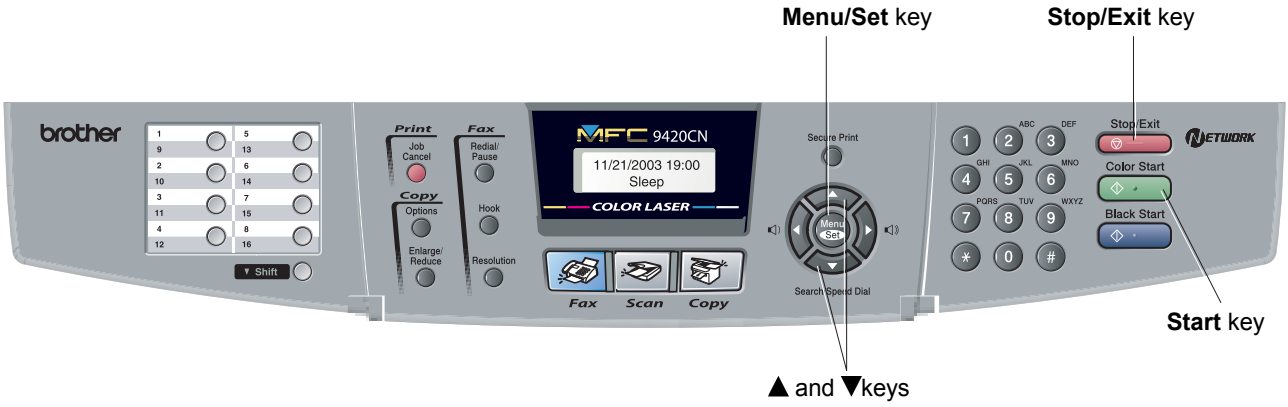


Fig. 8-1

8.1.4 Detailed Descriptions of Maintenance Mode Functions

8.1.4.1 EEPROM Parameter Initialization (Function code 01/91)

■ **Function**

The machine initializes the parameters, user switches, and firmware switches registered in the EEPROM, to the initial values. Entering the function code 01 initializes all of the EEPROM areas, but entering 91 does not initialize some areas, as listed below.

<table>
<tr><th>Data item \ Function code</th><th>01</th><th>91</th></tr>
<tr><td>Maintenance-mode functions
User switches
Firmware switches</td><td rowspan="4">All of these will be initialized.</td><td>These will be initialized.</td></tr>
<tr><td>Remote activation code</td><td>These will not be initialized.</td></tr>
<tr><td>Station ID data
Outside line number
Telephone function registration
One-touch dialing
Speed dialing
Group dialing</td><td rowspan="2">These will not be initialized.</td></tr>
</table>

NOTE: If you replace the main PCB with the one used for any other machine, carry out this procedure and then customize the EEPROM (maintenance-mode function code 74 in Section 8.1.4.15).

■ **Operating Procedure**

(1) Press the **0** and **1** keys (or the **9** and **1** keys according to your need) in this order in the initial stage of the maintenance mode.
The "PARAMETER INIT" will appear on the LCD.

(2) Upon completion of parameter initialization, the machine returns to the initial stage of the maintenance mode.

(3) Be sure to turn the machine power off. If you press the **9** key twice to exit from the maintenance mode without turning the power off, then the machine will not fully initialize the EEPROM.

8.1.4.2 Printout of Scanning Compensation Data (Function code 05)

■ Function

The machine prints out the white and black level data for scanning compensation.

■ Operating Procedure

Do not start this function merely after powering on the equipment but start it after carrying out a sequence of scanning operation. Unless the equipment has carried out any scanning operation, this function cannot print out correct scanning compensation data. This is because at the start of scanning operation, the equipment initializes white and black level data and takes in the scanning compensation reference data.

(1) Press the **0** and **5** keys in this order in the initial stage of the maintenance mode. The "WHITE LEVEL 1" will appear on the LCD.

(2) The equipment prints out the scanning compensation data list containing the following:

a)	Black/white data graph	
b)	Bright output adjustment value (REFH-PWM)	1Byte
c)	Illuminant adjustment value (LED-DATA:R)	1Byte
d)	Illuminant adjustment value (LED-DATA:G)	1Byte
e)	Illuminant adjustment value (LED-DATA:B)	1Byte
f)	Black level MIN data	1Byte
g)	Black level MAX data	1Byte
h)	White level MIN data (R)	1Byte
i)	White level MIN data (G)	1Byte
j)	White level MIN data (B)	1Byte
k)	White level MAX data (R)	1Byte
l)	White level MAX data (G)	1Byte
m)	White level MAX data (B)	1Byte
n)	Background color compensated data	1Byte
o)	Black level data	4960Byte
p)	White level data (R)	4960Byte
q)	White level data (G)	4960Byte
r)	White level data (B)	4960Byte

(3) Upon completion of recording of the compensation data list, the equipment returns to the initial stage of the maintenance mode.

NOTE: If any data is abnormal, its mode will be printed in inline style, as shown on the next page.

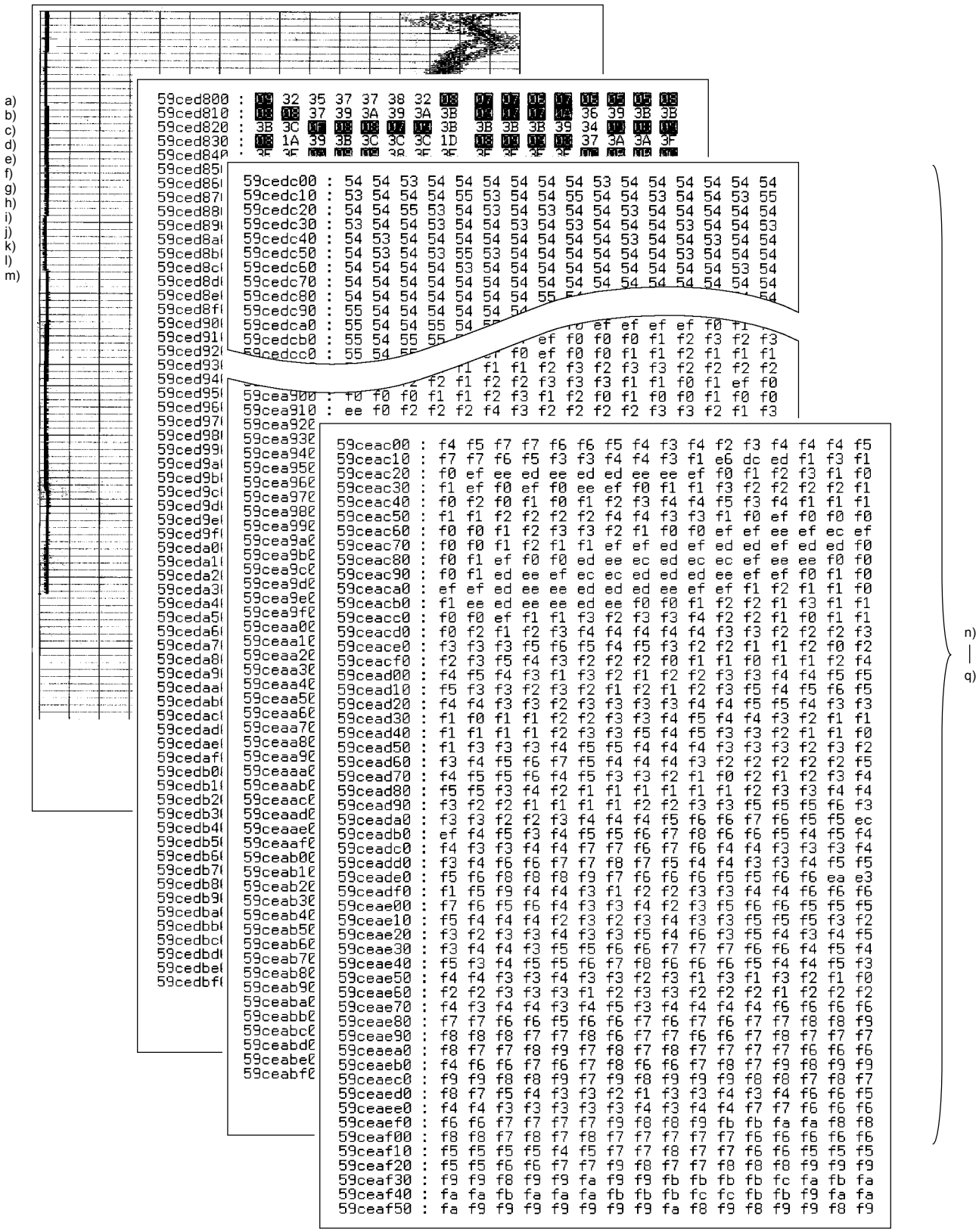


Fig. 8-2 Scanning Compensation Data List

8.1.4.3 Placement of CIS Unit in Position for Transportation (Function code 06)

■ Function

This function is to move the CIS unit in position for transportation located at the right end. When you fix the FAX equipment and check its operation, you need to perform this function right before packing and shipping it.

NOTE: Please instruct end users to perform this function if possible before packing and shipping their FAX equipment to a sales agent or a service dealer for the purpose of repair. (For the procedure to allow users to perform maintenance modes, please see P.8-3.)

■ Operating Procedure

(1) Press the **0** and **6** keys in this order in the initial stage of the maintenance mode.
The CIS unit moves to the designated position for transportation located at the right end. The "MAINTENANCE 06" is displayed until the CIS unit is placed in position. When the CIS unit is placed in the position, the "SCAN LOCKED" appears on the LCD.

(2) Open the document cover, and lock the scanner lock lever at the rear left of the scanner unit. When the scanner lock lever is locked, the "SCAN LOCKED" appears.
To terminate this operation, press the **Stop/Exit** key. The machine returns to the initial stage of the maintenance mode.

8.1.4.4 ADF Performance Test (Function code 08)

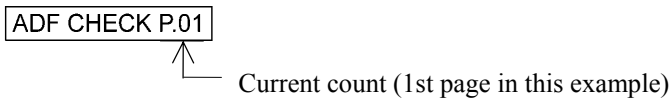
■ Function

The machine counts the documents fed by the automatic document feeder (ADF) and displays the count on the LCD for checking the ADF performance.

■ Operating Procedure

(1) Set documents. (Allowable up to the ADF capacity.)
The "DOC. READY" will appear on the LCD.

(2) Press the **0** and **8** keys in this order.
While counting the documents, the machine feeds them in and out, displaying the current count on the LCD as shown below.



(3) To return the machine to the initial stage of the maintenance mode, press the **Stop/Exit** key.

8.1.4.5 Test Pattern 1 (Function code 09)

■ Function

This function, much like the copying function, prints out test pattern 1 to allow the service personnel to check for record data missing or print quality.

■ Operating Procedure

Press the **0** and **9** keys in this order in the initial stage of the maintenance mode.
The figure below shows test pattern.

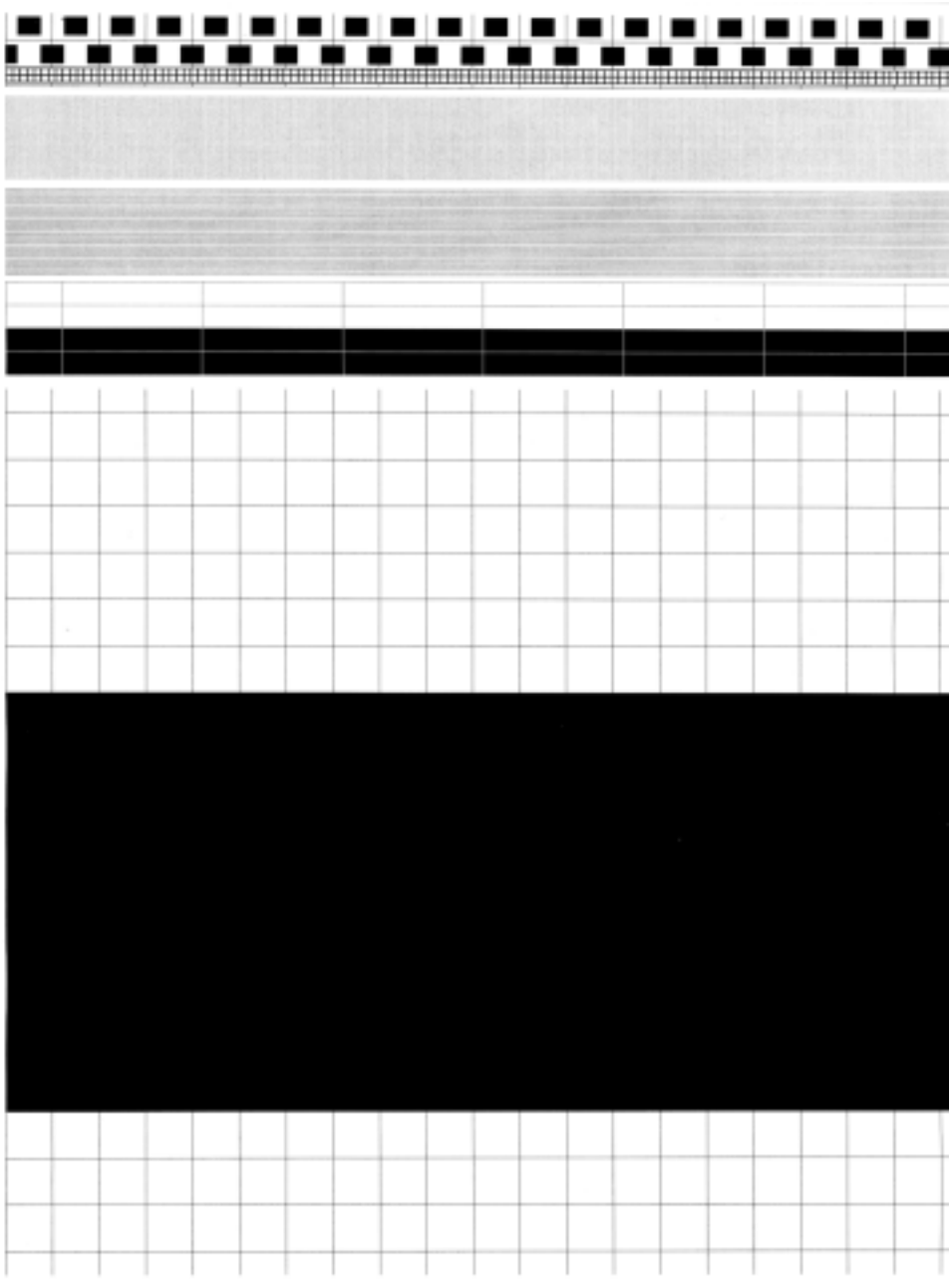


Fig. 8-3 Test Pattern

8.1.4.6 Firmware Switch Setting and Printout

[1] Firmware switch setting (Function code 10)

■ **Function**

The machine incorporates the following firmware switch functions which may be activated with the procedures using the control panel keys and buttons.
The firmware switches have been set at the factory in conformity to the communications standards and modes of each country. Do not disturb them unless necessary.
Some firmware switches may not be applicable in some versions. The firmware switch data list indicates "Not used." for those inapplicable switches.

Firmware Switches (WSW01 through WSW60)

WSW No.	Function
WSW01	Dial pulse setting
WSW02	Tone signal setting
WSW03	PABX mode setting
WSW04	TRANSFER facility setting
WSW05	1st dial tone and busy tone detection
WSW06	**Redial/Pause** key setting and 2nd dial tone detection
WSW07	Dial tone setting 1
WSW08	Dial tone setting 2
WSW09	Protocol definition 1
WSW10	Protocol definition 2
WSW11	Busy tone setting
WSW12	Signal detection condition setting
WSW13	Modem setting
WSW14	AUTO ANS facility setting
WSW15	REDIAL facility setting
WSW16	Function setting 1
WSW17	Function setting 2
WSW18	Function setting 3
WSW19	Transmission speed setting
WSW20	Overseas communications mode setting
WSW21	TAD setting 1
WSW22	ECM and call waiting caller ID
WSW23	Communications setting
WSW24	TAD setting 2
WSW25	TAD setting 3
WSW26	Function setting 4
WSW27	Function setting 5
WSW28	Function setting 6
WSW29	Function setting 7
WSW30	Function setting 8
WSW31	Function setting 9
WSW32	Function setting 10
WSW33	Function setting 11
WSW34	Function setting 12
WSW35	Function setting 13
WSW36	Function setting 14
WSW37	Function setting 15

Firmware Switches (WSW01 through WSW60) ***Continued***

WSW No.	Function
WSW38	V.34 transmission settings
WSW39	V.34 transmission speed
WSW40	V.34 modem settings
WSW41	ON-duration of the scanning light source
WSW42	Internet mail settings
WSW43	Function setting 21
WSW44	Speeding up scanning-1
WSW45	Speeding up scanning-2
WSW46	Monitor of power ON/OFF state and parallel port kept at high
WSW47	Switching between high- and full-speed USB
WSW48	USB setup latency
WSW49	End-of-copying beep and print in black
WSW50	SDAA settings
WSW51	Function setting 16
WSW52	Not used
WSW53	Function setting 17
WSW54-60	Not used

■ Operating Procedure

(1) Press the **1** and **0** keys in this order in the initial stage of the maintenance mode. The machine displays the "WSW00" on the LCD and becomes ready to accept a firmware switch number.

(2) Enter the desired number from the firmware switch numbers (01 through 51). The following appears on the LCD:

```
                Selector 1      Selector 8
                    ↓               ↓
WSWXX = 0 0 0 0 0 0 0 0
```

(3) Use the ◄ and ► keys to move the cursor to the selector position to be modified.

(4) Enter a value to be set (0 or 1) using the **0** and **1** keys.

(5) Press the **Menu/Set** key. This operation saves the newly entered selector values onto the EEPROM and readies the machine for accepting a firmware switch number.

(6) Repeat steps (2) through (5) until the modification for the desired firmware switches is completed.

(7) Press the **Stop/Exit** key to return the machine to the initial stage of the maintenance mode.

NOTE:

- To cancel this operation and return the machine to the initial stage of the maintenance mode during the above procedure, press the **Stop/Exit** key.
- If there is a pause of more than one minute after a single-digit number is entered for double-digit firmware switch numbers, the machine will automatically return to the initial stage of the maintenance mode.

■ Details of Firmware Switches

- The details of the firmware switches are described in Appendix 4 in which the user-accessible selectors of the firmware switches are shaded.
- Machine w/o fax support some selectors of firmware switches. Those selector numbers are circled.

[2] Printout of firmware switch data (Function code 11)

■ Function

The machine prints out the setting items and contents specified by the firmware switches.

■ Operating Procedure

(1) Press the **1** key twice in the initial stage of the maintenance mode.
The "PRINTING" will appear on the LCD.

(2) The machine prints out the configuration list as shown in the figure below.

(3) Upon completion of printing, the machine returns to the initial stage of the maintenance mode.

CONFIGURATION LIST

```
MODEL : 5CS-101
TIME  : 01/15/2006 19:33
REV.  : U0504141114VER.T
PCI   : 5.00
SUM   : 5243
SER.# : G01234567890

WSW01 = 00000000
  1-2. DIAL FORMAT                              : NORMAL
  3-4. BREAK TIME                               : 60 MS
  5-6. INTERDIGIT PAUSE                         : 800 MS
  7.   DP/PB CHANGE IN USER SW                  : YES
  8.   DP/PB FIXING SELECTION                   : PB
WSW02 = 11111010
  1-2. ON TIME                                  : 100 MS
  3-4. OFF TIME                                 : 140 MS
  5-8. LINE BEEP ATTENUATOR                     : 10 DB
WSW03 = 10000000
  1.   PARA. CNG DETECTION1                     : B
  2-4. NOT USED
  5.   PARA. CNG DETECTION2                     : A
  6-8. NOT USED
WSW04 = 00010111
  1-6. NOT USED
  7-8. FLASHING TIME                            : 500 MS
WSW05 = 00000110
  1-3. DIAL TONE DETECTION                      : 3.5 SEC WAITING
  4.   REMOTE ID DETECTION TIMEOUT              : 2 SEC
  5-6. BUSY TONE DETECTION (CALLING)            : AFTER DIALING
  7.   BUSY TONE DETECTION (CALLED)             : OFF
  8.   NOT USED
WSW06 = 00101100
  1-3. PAUSE KEY                                : 3.5 SEC WAITING
  4-6. 2ND DT DETECTION TIME                    : 800 MS
  7.   2ND DT DETECTION CYCLE                   : 1 CYCLE
  8.   2ND DT INTERRUPT DETECTION TIME          : 30 MS
WSW07 = 01001100
  1-2. FREQUENCY RANGE                          : INITIAL DATA
  3.   NOT USED
  4-6. 2ND DT DETECTION LEVEL                   : -30 DBM
  7.   1ST DT INTERRUPT DETECTION TIME          : 30 MS
  8.   NOT USED
WSW08 = 01100100
  1-3. 1ST DT DETECTION TIME                    : 800 MS
  4-5. 1ST/2ND DT TIME OUT                      : 10 SEC
  6-8. 1ST DT DETECTION LEVEL                   : -33 DBM
WSW09 = 00000000
  1.   ECM FRAME                                : 256 OCTET
  2.   NON STANDARD FACILITIES                  : ON
  3-4. TIMES OF FALL BACK                       : 4
  5.   T5 TIMER                                 : 300 SEC
  6.   T1 TIMER                                 : 35 SEC
  7-8. CALLING TIMEOUT                          : 55 SEC
WSW10 = 00010100
  1.   NOT USED
  2.   TIMING OF LAST DIGIT-MODEM CHANGE        : 100 MS
  3.   TIMING OF CML ON CNG TRANSMISSION        : 2 SEC
  4.   TIMING OF CML ON CED TRANSMISSION        : 2 SEC
  5-6. TRAINING RETRIES                         : 2
  7.   CODING METHOD MR                         : ON
  8.   CODING METHOD MMR                        : ON
WSW11 = 01011000
  1-2. FREQUENCY RANGE                          : INITIAL DATA
  3-8. ON/OFF TIME                              : 175 - 600 / 175 - 600 MS
WSW12 = 10011011
  1-2. OFF DETECTION TIME                       : 700 MS
  3-4. AUTO ANS OFF DETECTION TIME              : 7 SEC
  5-6. ON DETECTION TIME                        : 250 MS
  7-8. NOT USED
```

Fig. 8-4 Configuration List

8.1.4.7 Operation Check of LCD (Function code 12)

■ Function

This function allows you to check whether the LCD on the control panel works normally.

■ Operating Procedure

(1) Press the **1** and **2** keys in this order in the initial stage of the maintenance mode. The LCD shows.

(2) Press the **Black Start** key. Each time you press the **Black Start** key, the LCD cycles through the displays shown at right. The Status lamp also changes from orange, red, to green each time you press the **Black Start** key.

(3) Press the **Stop/Exit** key in any process of the above display cycle. The machine beeps for one second and returns to the initial stage of the maintenance mode.

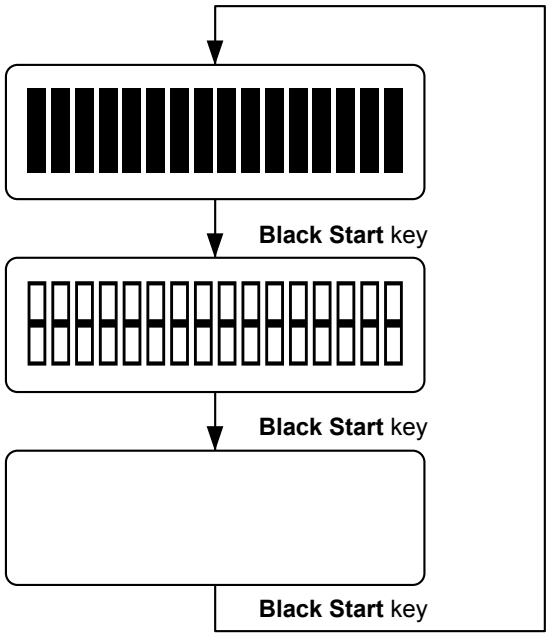


Fig. 8-5

8.1.4.8 Operational Check of Control Panel PCB (Function code 13)

■ Function

This function allows you to check the control panel PCB for normal operation.

■ Operating Procedure

(1) Press the **1** and **3** keys in this order in the initial stage of the maintenance mode. The "00 " will appear on the LCD.

(2) Press the keys and buttons in the order designated in the illustration shown below. The LCD shows the corresponding number in decimal notation each time a key or button is pressed. Check that the displayed number is correct by referring to the illustration below.
If a key or button is pressed out of order, the machine beeps and displays the "INVALID OPERATE" on the LCD. To return to the status ready to accept key & button entry for operational check, press the **Stop/Exit** key.

(3) After the last number key or button is pressed, the machine beeps for one second and returns to the initial stage of the maintenance mode.
To terminate this operation, press the **Stop/Exit** key. The machine returns to the initial stage of the maintenance mode.

Fig. 8-6

8.1.4.9 Sensor Operational Check (Function code 32)

■ **Function**

This function allows you to check whether the 9 sensors.

■ **Operating Procedure**

(1) Press the **3** and **2** keys in this order in the initial stage of the maintenance mode. The machine beeps 1100 Hz and 400 Hz tones cyclically through the following volumes for testing the speaker. To stop beeping, press the **Menu/Set** key.

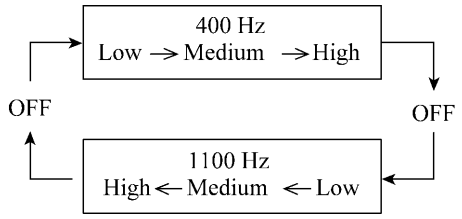


Fig. 8-7

If the sensing status are as listed below, the LCD will show the following:
"DFDRFCCVTORC", "C1P1C2P2RMRAPO" and "CCMCYCKCFUOBORTR" (which can be switched by pressing the **Black Start** key for machines.)
Given below is the relationship between the LCD indication, sensor names and sensor status.

LCD	Sensors	Sensing status
DF	Document front sensor	No document detected.
DR	Document rear sensor	No document detected.
FC	Document cover open sensor	Document cover closed.
CV	Front cover open sensor	Front cover closed.
TC	Top cover open sensor	Top cover closed.
RC	Back cover open sensor	Back cover closed.
C1	Tray1 cassette open sensor	Tray1 closed.
P1	Tray1 recording paper sensor	Recording paper detected.
C2	Tray2 cassette open sensor	Tray2 closed.
P2	Tray2 recording paper sensor	Recording paper detected.
RM	Registration front sensor	No recording paper detected.
RA	Registration rear sensor	No recording paper detected.
PO	Paper ejection sensor	No paper jam.
CC*	Cyan cartridge sensor	Cyan cartridge loaded.
MC*	Magenta cartridge sensor	Magenta cartridge loaded.
YC*	Yellow cartridge sensor	Yellow cartridge loaded.
KC*	Black cartridge sensor	Black cartridge loaded.

LCD	Sensors	Sensing status
FU*	Fusing unit sensor	No fusing unit detected.
OB*	OPC belt sensor	No OPC belt detected.
OR*	OPC roller sensor	No OPC roller detected.
TR*	Transfer roller sensor	No transfer roller detected.

(2) Change the detecting conditions to check that the indication on the LCD changes according to the sensor states. For instance, insert paper through the document front (or rear) sensor or the registration sensor (s), open the front cover or the document cover, remove the toner cartridge, jam paper at the paper outlet, insert paper from the manual feeder, and load a recording paper tray, etc.

(3) Press the **Stop/Exit** key. The machine beeps for one second and return to the initial stage of the maintenance mode.

NOTE: If you have opened and closed the front cover during the above procedure, you need to open and close the front cover again upon completion of the procedure.

8.1.4.10 EEPROM Customizing (Entering of the country code for Europe/Oceania.) (Function code 52)

NOTE: This function is available only for the OCEANIA, EUROPE version

(The function is enabled only when the country code for Europe or Oceania is entered in Function code 74.)

■ Function

This function allows the user to change the country code in the state that the country code for Europe or Oceania is entered.

■ Operating Procedure

(1) Press the **5** and **2** keys in this order in the initial stage of the maintenance mode.
The "SET COUNTRY" and "PRESS SET KEY" appear alternately on the LCD.

(2) Press the **Menu/Set** key.
OCEANIA version: The "AUSTRALIA" and "SELECT ↑↓ & SET" appear alternately.
EUROPE version: The "U.K" and "SELECT ↑↓ & SET" appear alternately.

(3) Use the ▲ and ▼ keys to select the target country and press the **Menu/Set** key.
The machine displays the "ACCEPTED" on the LCD and switches back to standby.

8.1.4.11 Received Data Transfer Function (Function code 53)

■ Function

This function transfers received FAX data to another machine. It is useful when the machine cannot print received data due to the printing mechanism defective.

NOTE: The number of files that can be transferred at a time is 99. To transfer 100 files or more, carry out the following procedure more than one time.

TIP: If there are both color and monochrome data in a file to be transferred, the monochrome data will be transferred first. If the receiver machine does not support the color function, the sender machine cannot transfer color data, resulting in an error.

■ Operating Procedure

(1) Press the **5** and **3** keys in this order in the initial stage of the maintenance mode.
The "FAX TRANSFER" appears on the LCD.

(2) To check the number of received files, press the **1** key.
The "1.NO. OF JOBS" appears on the LCD.
Press the **Menu/Set** key, and the number of received files appears, just as "NO. OF. JOBS: 10."

(3) To transfer the activity report only, press the **2** key.
The "2.ACTIVITY" appears.
To transfer received files (together with the activity report), press the **3** key.
The "3.DOCUMENTS" appears. Note that if there is no received file, the "NO DOCUMENTS" appears.

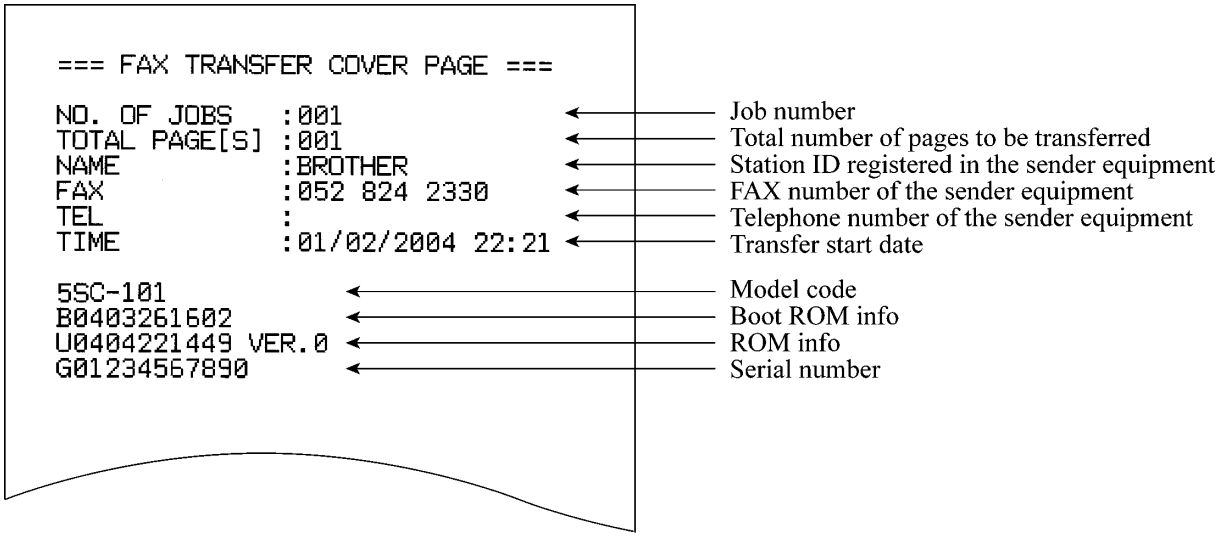
(4) To transfer the communication list for the latest communication, press the **4** key.
The "4.COM.LIST (NEW)" appears.
To transfer the communication list for last three errors, press the **5** key.
The "5.COM.LIST (ERR3)" appears.

(5) With the "2.ACTIVITY," "3.DOCUMENTS," "4.COM.LIST (NEW)," or "5.COM.LIST (ERR3)" being displayed, press the **Menu/Set** key.
The "ENTER NO. &SET" appears.

(6) Enter the telephone number of the receiver machine and press the **Menu/Set** key again.

NOTE: Be sure to type the telephone number with the numerical keys. No one-touch dialing is allowed in this procedure.
The machine displays the "ACCEPTED" for approx. two seconds and starts dialing to transfer data.
No station ID will be attached. A cover page and end page as shown on the next page will be automatically attached, instead.

Cover page sample



End page sample

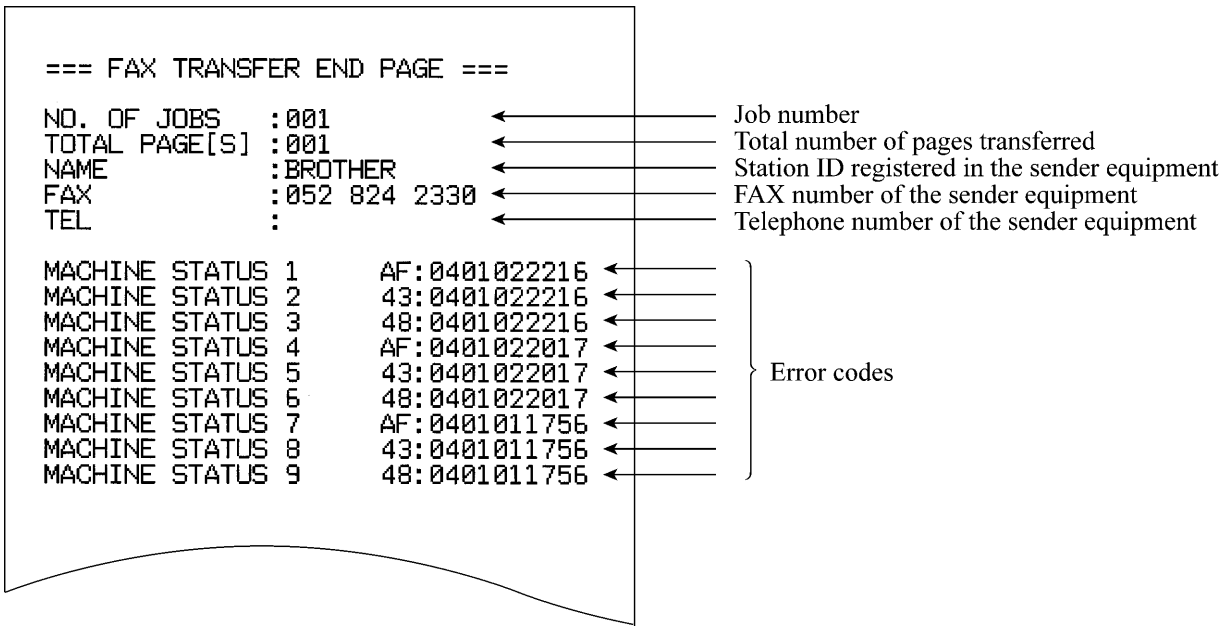


Fig. 8-8

8.1.4.12 Fine Adjustment of Scan Start/End Positions (Function code 54)

■ Function

This function is to adjust the scan start/end positions.

■ Operating Procedure

(1) Press the **5** and **4** keys in this order in the initial stage of the maintenance mode.
The "SCAN START ADJ." will appear on the LCD.

(2) The "1. ADF 2. FB" will appear.
Select one of them that you want to adjust the start position. If you want to adjust the start position of the ADF, press **1** key, and if you want to adjust that of the FB unit, press **2** key.

(3) Press the **1** or **2** key to display the present compensation level for the start position.
Compensation levels can be adjusted in 11 steps from +5 to –5 (mm).

(4) Press the ◄ key to increase compensation levels, and the ► key to lower them.
Press the **Stop/Exit** key, and the machine returns to the initial state of the maintenance mode without adjusting compensation levels.

(5) Press the **Menu/Set** key.
The "ACCEPTED" will appear on the LCD. One second later, the machine indicates "1. ADF 2. FB" on the LCD.

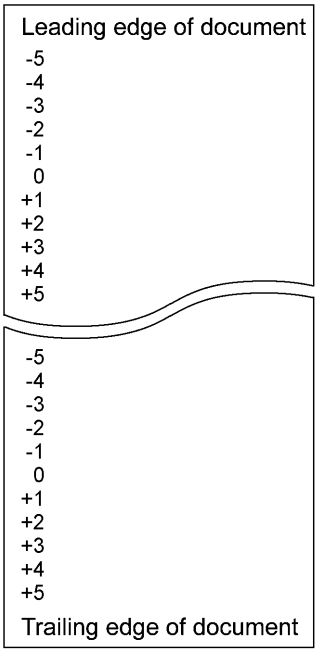
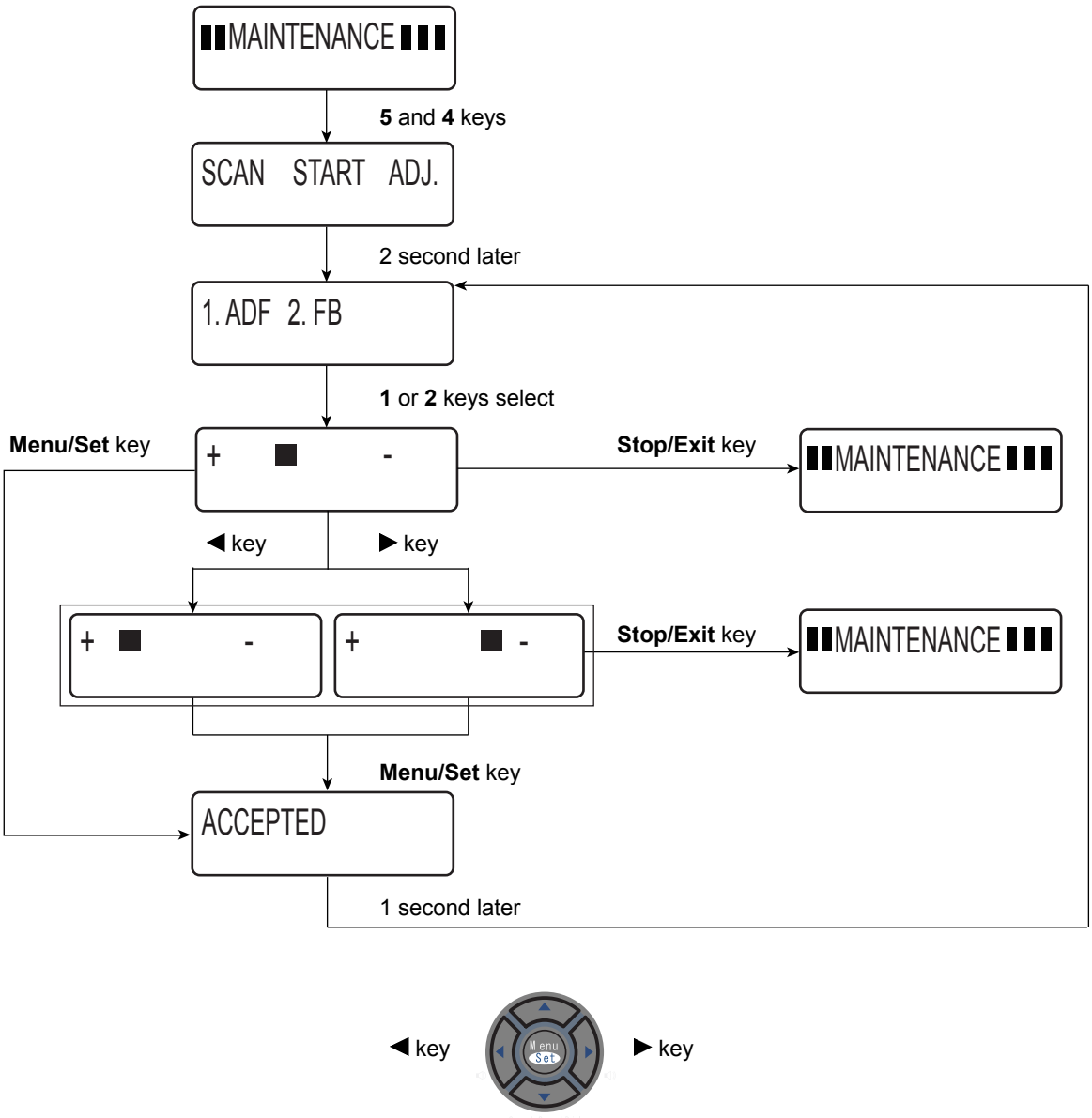


Fig. 8-9


MAINTENANCE
5 and 4 keys
SCAN START ADJ.
2 second later
1. ADF 2. FB
1 or 2 keys select
Menu/Set key
+ ■ -
Stop/Exit key
MAINTENANCE
◀ key
▶ key
+ ■ -
+ ■ -
Stop/Exit key
MAINTENANCE
Menu/Set key
ACCEPTED
1 second later

◀ key
Menu
Set
▶ key

Fig. 8-10

8.1.4.13 Acquisition of White Level Data and CIS Scanner Area Setting (Function code 55)

■ Function

This function allows the machine to obtain white level data for the CIS scanner and save it together with the CIS scanner area into the EEPROM on the main PCB.

■ Operating Procedure

(1) Press the **5** key twice in the initial stage of the maintenance mode.
The "SCANNER AREA SET" will appear on the LCD.
The machine automatically obtains white level data.

(2) If this operation completes normally, the machine returns to the initial stage of the maintenance mode.
If any error is noted, the "SCANNER ERROR" appears on the LCD. To return the machine to the initial stage of the maintenance mode, press the **Stop/Exit** key.

8.1.4.14 Paper Feeding and Ejecting Test (Function code 67)

■ Function

This function allows you to check that a sheet of paper is fed and ejected correctly by printing the grid pattern on a page, whose interval is 1cm.

■ Operating Procedure

(1) Press the **6** and **7** keys in this order in the initial stage of the maintenance mode.
The "SELECT TRAY1" will appear on the LCD.
Choose " Tray1" or " Tray2" by pressing ◄ or ► key.
The test printing is started, and the grid pattern is printed.

(2) To return the machine to the initial stage of the maintenance mode, press the **Stop/Exit** key.

NOTE: In the case that the front cover is opened, or that there is no paper in the tray during test printing, the test printing is stopped.

8.1.4.15 EEPROM Customizing (Function code 74)

■ Function

This function allows you to customize the EEPROM according to language, function settings, and firmware switch settings. The customizing codes list is given in Appendix 3.

NOTE: If you replace the main PCB, be sure to carry out this procedure.

■ Operating Procedure

(1) Press the **7** and **4** keys in this order in the initial stage of the maintenance mode.
The current customizing code (e.g., 0001 in the case of U.S.A model) appears.

(2) Enter the desired customizing code (e.g., 0054 in the case of Europe model). The newly entered code appears.

NOTE: The machine does not work properly when an incorrect code is entered.

(3) Press the **Black Start** key.
The machine saves the setting and appears the "PARAMETER INIT" on the LCD.
The machine returns to the initial stage of the maintenance mode.
If you press the **Stop/Exit** key or no keys are pressed for one minute in the above procedure, the machine stops the procedure and returns to the initial stage of the maintenance mode.

8.1.4.16 Display of the Equipment's Log Information (Function code 80)

■ Function

The equipment may display its log information on the LCD.

■ Operating Procedure

(1) Press the **8** and **0** keys in this order in the initial stage of the maintenance mode. The USB serial number appears on the LCD.

(2) Press the **Black Start** key. Each time the **Black Start** key is pressed, one of the following log information items appears on the LCD in the order given below.

1) USB serial number
2) Page count, indicating how many pages the photosensitive drum has been printed
3) Total page count, indicating how many pages the equipment has been printed since produced
4) Toner change count, indicating how many times toner replacement has been made
5) Copy page count, indicating how many copies have been made
6) PC print page count, indicating how many pages the equipment has been printed as an output device of the connected PC
7) FAX page count, indicating how many received FAX pages have been printed
8) ADF jam count, indicating how many times a document jam has been occurred
9) ADF page count, indicating how many documents have been fed
10) Error code of the most recent machine error *1
11) Error code of the most recent communications error *2

(3) To stop this operation and return to the equipment to the initial stage of the maintenance mode, press the **Stop/Exit** key.

*1 When you press the **Menu/Set** key while the MACHINE ERR error code is displayed, the last error code is displayed. Each time the **Menu/Set** key is pressed, up to the ten error codes are displayed one by one in reverse order.

*2 When you press the **Menu/Set** key while the COMEER1 error is displayed, the last error, the previous error, and the second previous error are displayed in turn. The indication changes from COMEER1, COMEER2, to COMEER3.

USB:	USB Serial No.
CCOVERAGE:	Average cyan color coverage
MCOVERAGE:	Average magenta color coverage
YCOVERAGE:	Average yellow color coverage
KCOVERAGE:	Average black color coverage
TTL_PG:	Total number of pages printed
TTL_CI:	Total number of cyan color pages printed
TTL_MI:	Total number of magenta color pages printed
TTL_YI:	Total number of yellow color pages printed
TTL_KI:	Total number of black color pages printed
TR1_PG:	Number of pages picked up from the paper tray1
TR2_PG	Number of pages picked up from the paper tray2
COPY:	Number of copies made
PC PRINT:	Number of PC prints made
FAX:	Number of FAX outputs made
A4:	Number of A4 size sheets picked up
LTR:	Number of letter size sheets picked up
LG:	Number of Legal size sheets picked up
B5:	Number of B5 size sheets picked up
JISB5:	Number of B5 size sheets picked up
EXE:	Number of Executive size sheets picked up
COM10:	Number of B5 size sheets picked up
DL:	Number of B5 size sheets picked up
PCARD:	Number of B5 size sheets picked up
OTHER:	Number of other-size sheets picked up
CTNR_CH:	Number of times the cyan color toner cartridge has been replaced
CTNR_IMG1:	Number of pages printed with the current cyan color toner cartridge
CTNR_IMG2:	Number of pages printed with the previous cyan color toner cartridge
MTNR_CH:	Number of times the magenta color toner cartridge has been replaced
MTNR_IMG1:	Number of pages printed with the current magenta color toner cartridge
MTNR_IMG2:	Number of pages printed with the previous magenta color toner cartridge

YTNR_CH:	Number of times the toner yellow color cartridge has been replaced
YTNR_IMG1:	Number of pages printed with the current yellow color toner cartridge
YTNR_IMG2:	Number of pages printed with the previous yellow color toner cartridge
KTNR_CH:	Number of times the toner black color cartridge has been replaced
KTNR_IMG1:	Number of pages printed with the current black color toner cartridge
KTNR_IMG2:	Number of pages printed with the previous black color toner cartridge
OPCB_CH:	Number of times the OPC belt has been replaced
FSRU_CH:	Number of times the Fusing unit has been replaced
120K_CH:	Number of times the 120K kit has been replaced
PFK2_CH:	Number of times the PF kit2 has been replaced
WTNR_CH:	Number of times the Waste toner cartridge has been replaced
WTNR_PG:	
TTL_JAM:	Total number of jams
POSA1_JAM:	
POSA2_JAM:	
POSB_JAM:	
POSC_JAM:	
ADF_JAM:	Number of document jams that occurred at the ADF
ADF_PG:	Number of scanned pages from the ADF
FB_PG:	Number of scanned pages from the FB
MACHINEERR_ 01 to 10:	Last machine error code 01 to 10
COMERR1 to 3:	Last communication error code 1 to 3

8.1.4.17 Machine Error Code Indication (Function code 82)

■ Function

This function displays an error code of the last error on the LCD.

■ Operating Procedure

(1) Press the **8** and **2** keys in this order in the initial stage of the maintenance mode. The LCD shows the "MACHINE ERROR X X".

(2) Press the **Stop/Exit** key. Return to the initial stage of the maintenance mode.

8.1.4.18 Output of Transmission Log to the Telephone Line (Function code 87)

■ Function

This function outputs the transmission log (that the machine has stored about the latest transmission) to the telephone line. It allows the service personnel to receive the transmission log of the user's machine at a remote location and use it for analyzing problems arising in the user's machine.

■ Operating Procedure

(1) If the user's machine has a transmission-related problem, call the user's machine at a remote location from your machine.

(2) If the line is connected, have the user perform the following:
   1) Hook up to the external phone.
   2) Press the **Menu/Set**, **Black Start, Menu/Set** keys in this order.
   3) Press the **8** and **7** keys.
      The above operation makes the user's machine send CNG to your machine for sending the transmission log.

(3) If you hear the CNG sent from the user's machine, press the **Black Start** key of your machine. Your machine will start to receive the transmission log from the user's machine.

8.1.4.19 Cancellation of the Memory Security Mode (Not applicable to the Japanese model)

■ Function

This procedure can cancel the memory security mode. Use this procedure if the user forgets his/her password entered when setting the memory security mode so as not to exit from the memory security mode.

NOTE: Carrying out this procedure will lose passwords previously entered but retain FAX messages received in the memory security mode.

■ Operating Procedure

(1) When the SECURE MODE is displayed on the LCD, press the **Menu/Set** key and # key together. Within two seconds, start to press the **2**, **7**, **9**, **0** and **0** keys.
The memory security mode will be canceled and the machine returns to the calendar clock screen.

8.1.4.20 Hex Dump Mode

■ Function

This function is to print the data in hex and check the descriptions of the data or error.

■ How to enter the Hex dump mode

Turn the power supply of the machine ON while holding down the **Job Cancel** key. Keep pressing the **Job Cancel** key until "Hex dump mode" appears on the LCD.

■ Exiting from the Hex dump mode

Turn the power supply of the machine OFF/ON.

8.1.4.21 Indication of the Firmware Version

■ Function

This function is to indicate the firmware version or checksum of the machine.

■ How to indicate the firmware version

Press the * and # keys at the same time. The firmware version and checksum are indicated on the LCD.

The machine returns to the normal standby status after 10 seconds.

8.2 ENGINE SERVICE MODE

The machine provides the functions described in the following sections so that the operation status of the printer itself is easily obtained in maintenance work.
They are the dedicated maintenance modes for service, and two types of the function are provided, which enables to check the operation status (code 31 to 38) and enables to check and set the performance of the main components in maintenance work.

8.2.1 Entry into the Engine Service Mode

■ Operating Procedure

(1) Turn the power switch ON while holding down the ***** and **1** keys or ***** and **2** keys.

NOTE: The contents of the test print vary depending on pressing the ***** and **1** keys or ***** and **2** keys. Press either of them according as the pattern you want to print.
(For other functions, the contents are the same.)

(2) The machine displays "SERVICE MODE / ► TEST PRINT" on the LCD.

■ Operation key position

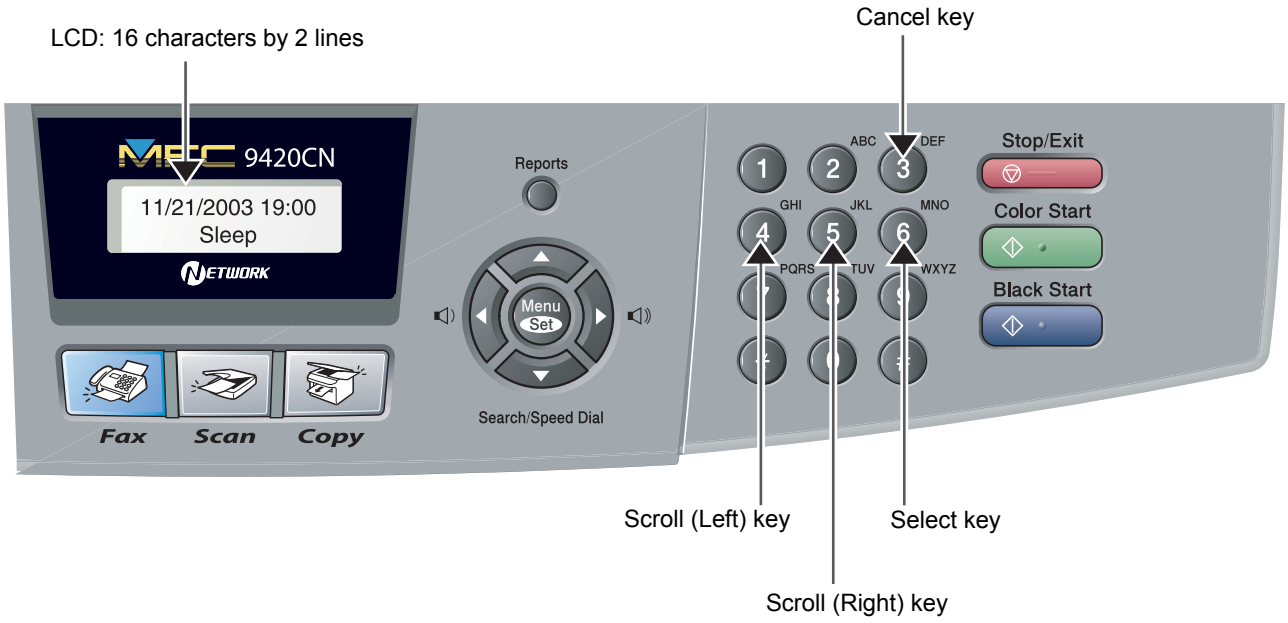


Fig. 8-11

8.2.2 List of Engine Service Mode Functions

Engine Service Mode Functions

Code	Function		Reference Section (Page)
31	Test Print		8.2.3.1 (8-29)
32	Next Care Infomation		8.2.3.2 (8-32)
33	Tray Type		8.2.3.3 (8-35)
34	Total Page		8.2.3.4 (8-35)
35	Each Image		8.2.3.5 (8-36)
36	Clear Care		8.2.3.6 (8-37)
37	Media Manage		8.2.3.7 (8-37)
38	Extend Media		8.2.3.8 (8-38)
39	Factory Mode		8.2.3.9 (8-38)
		Margin Adjust (Code 43)	[1] (8-39)
		Life Period Set (Code 44)	[2] (8-40)
		NVRAM Tune Up (Code 45)	[3] (8-41)
		NVRAM Initial (Code 46)	[4] (8-45)
		Total Page Set (Code 47)	[5] (8-45)
		Each Image Set (Code 48)	[6] (8-46)
		Next Life Set (Code 49)	[7] (8-47)

8.2.3 Detailed Descriptions of Engine Service Mode Functions

8.2.3.1 Test Print (Code 31)

< When turning the power switch ON while holding down the * and 1 keys >

■ Function

This function is to print the test print including the grid pattern of one or two colors (R, G, B) and stripe pattern of the full colors.

■ Operating Procedure

(1) Press the **6** key in the initial stage of the engine service mode.
The "31 GRID PRINT / <▲ 2>" message appears on the LCD.

(2) Select the pattern you want to print with the **4** or **5** key.
Pattern 1: Grid pattern
Pattern 2: Full color stripe pattern
(Refer to the sample as shown in Fig. 8-12.)
After selecting the pattern, press the **6** key.

(3) When selecting Pattern 1, select the color you want to print with using the **4** or **5** key and press the **6** key.
When selecting Pattern 2, proceed to Step (4).

(4) The machine prints the pattern of the selected color(s) continuously after warming-up.

(5) Press the **3** key so that the machine stops printing.

(6) Press the **3** key again, and the machine returns to the initial stage of the engine service mode.

<When turning the power switch ON while holding down the * and 2 keys>

■ Function

This function is to print the test print including the grid pattern of one or two colors (R, G, B), full color stripe pattern, white pattern, 100% duty pattern, 50% duty pattern, 25% duty pattern and 6% duty pattern.

■ Operating Procedure

(1) Press the **6** key in the initial stage of the engine service mode.
The "31 GRID PRINT / <▲ 2 3 4 5 6 7>" appears on the LCD.

(2) Select the pattern you want to print with using the **4** or **5** key.
(Refer to the sample as shown in the next page.)

Pattern 1: Grid pattern
Pattern 2: Full color stripe pattern
Pattern 3: White pattern
Pattern 4: 100% duty pattern
Pattern 5: 50% duty pattern
Pattern 6: 25% duty pattern
Pattern 7: 6% duty pattern

After selecting the pattern, press the **6** key.

(3) When selecting Pattern 1, 3, 4, 5, 6 or 7, select the color you want to print with using the **4** or **5** key and press the **6** key.
When selecting Pattern 2, proceed to Step (4).

(4) The machine prints the selected pattern continuously after warming-up.

(5) Press the **3** key so that the machine stops printing.

(6) Press the **3** key again, and the machine returns to the initial stage of the engine service mode.

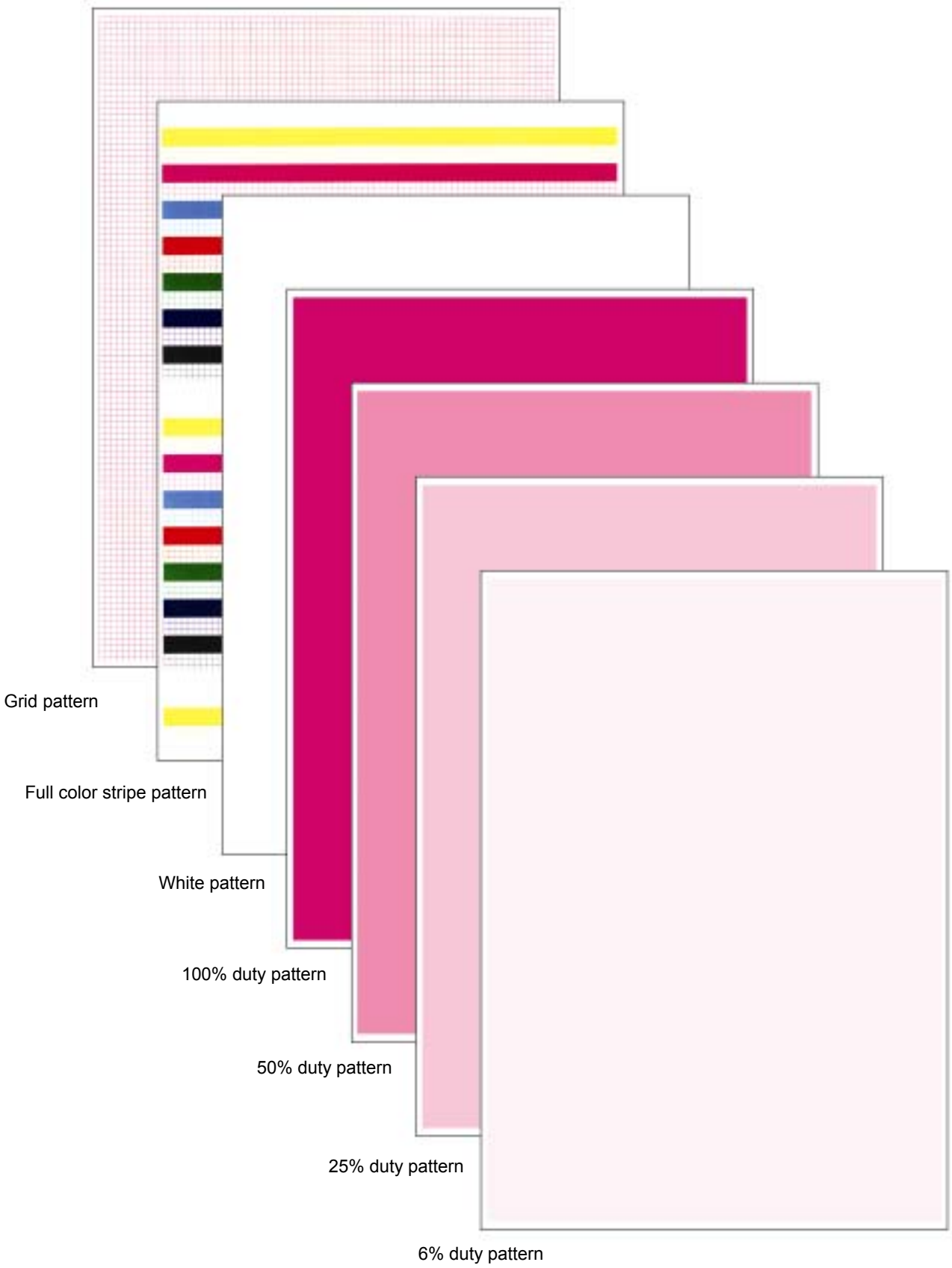

Grid pattern
Full color stripe pattern
White pattern
100% duty pattern
50% duty pattern
25% duty pattern
6% duty pattern

Fig. 8-12

8.2.3.2 Next Care Information (Code 32)

■ Function

This function is to get the information on the replacement timing of the periodical replacement parts.
The information includes the number of images and print pages.

■ Operating Procedure

(1) Select Next Care with using the **4** or **5** key in the initial stage of the engine service mode.
After selecting, press the **6** key.
The "32 NEXT CARE / ▲ 2 3 4 5 6 7 8 9 A B C D E F G" appears on the LCD.

(2) Select the periodical replacement part whose information you want to get with using the **4** or **5** key.
7: Belt cartridge (BC)
8: Fusing unit (FU)
9: Transfer belt (TB)
A: 120K KIT (OW)
D: Pick-up roller (machine) (PK)
E: Pick-up roller (LFU) (Option tray) (PL)

(3) After selecting, press the **6** key.
The machine displays the replacement timing of the selected periodical replacement parts.

(4) Press the **3** key so that the "32 NEXT CARE / ▲ 2 3 4 5 6 7 8 9 A B C D E F G" appears on the LCD. When you want to get the information on other periodical replacement parts, repeat Step (2) to (4).

(5) Press the **3** key again, and the machine returns to the initial stage of the engine service mode.

NOTE: The replacement timing indication of the periodical replacement parts can be changed in the Next Life Set mode (Code 49). It is also changed as follows whenever the total number of print pages is increased during normal usage.

- OPC belt cartridge: Life 60,000 images
  If the coverage on a page is large, the load for the OPC belt cartridge gets high, and its life is shorter than the actual number of images. Therefore, the indication may be decreased depending on the coverage of each print page. (For details, refer to the following page.)
- Fusing unit: Life 60,000 pages
  For example, the lamp of the fusing unit is turned ON and OFF 10 times if one page is printed per print job, and 10 pages are printed totally. On the other hand, the lamp is turned ON and OFF once if 10 pages are printed per print job. The load for the fusing unit is widely different even though the same number of pages is printed, and the life of the fusing unit is also different. Therefore, the indication may be decreased more than the number of print pages when few pages are printed per print job. (For details, refer to the following page.)
- Transfer belt: Life 120,000 pages
  It is not changed.

- 120K KIT: Life 120,000 pages
  It is not changed.
- Pick-up roller (machine / LFU): Life 120,000 pages
  Although the indication of the pick-up roller which is used in printing is not changed, the indication of the other one which is not used is increased in accordance with the number of print pages.

1) OPC Belt Cartridge
   Life: 60,000 images
   Condition: Above figure varies depending on pages/job. Refer to the list below.

Pages per job	1 page	2 page	3 page	4 page	5 page	6 page
	24,000	30,000	35,000	39,000	43,000	46,000

Pages per job	7 page	8 page	9 page	10 page	11 page	12 page
	49,000	51,000	53,000	54,000	56,000	57,000

Pages per job	13 page	14 page	15 page ~
	58,000	59,000	60,000

2) Fusing Unit
   Life: 60,000 images
   Condition: Above figure varies depending on coverage. Refer to the list below.

Coverage	~ 12.5%	12.5% ~ 20%	20% ~ 40%	40% ~ 60%	60% ~
Additional life deleted	0	0.2	0.5	1	2
Life (pages)	60,000	50,000	40,000	30,000	20,000

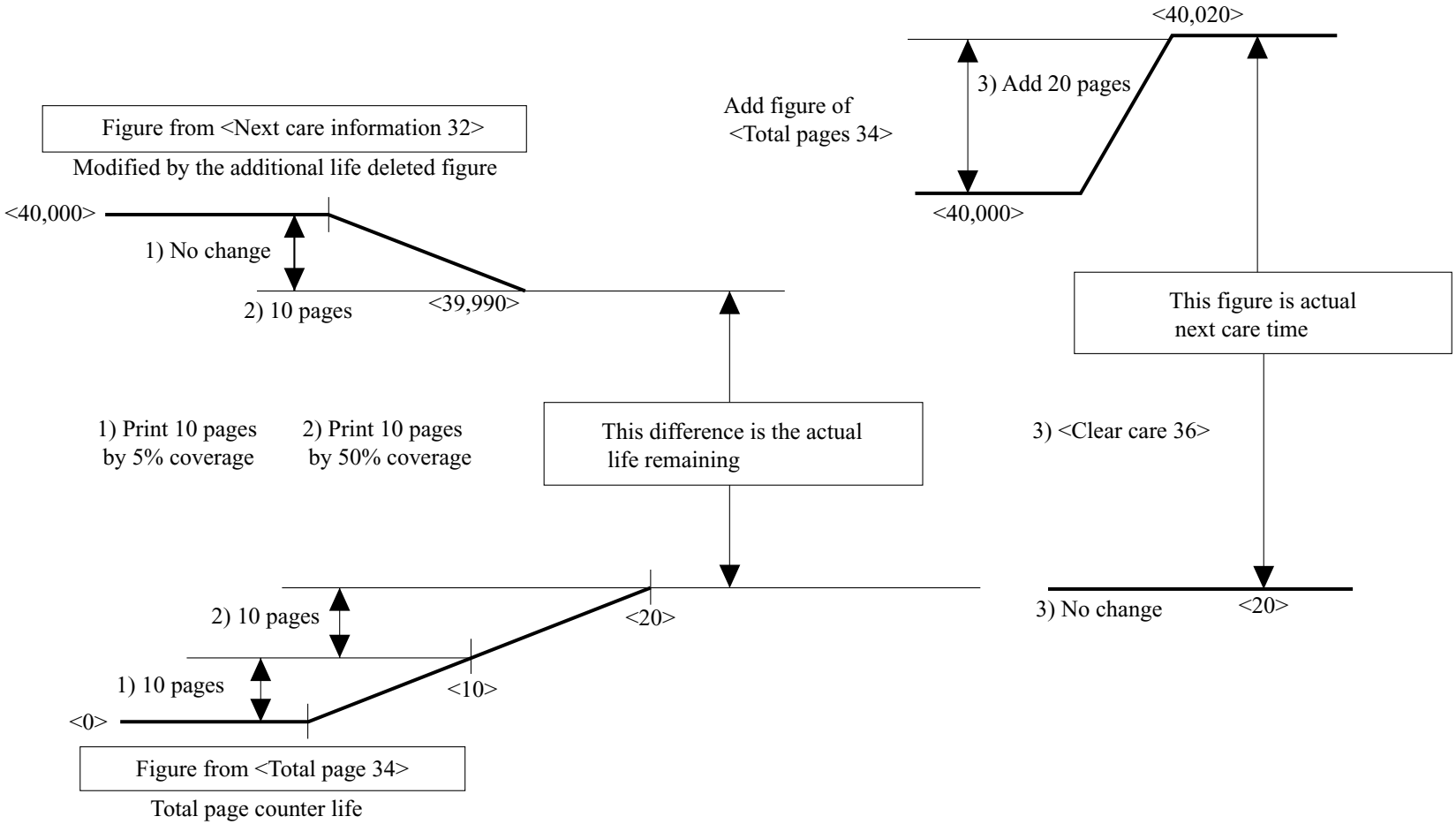


Fig. 8-13

8.2.3.3 Tray Type (Code 33)

■ **Function**

This function is to select the tray type of the recording paper to be fed.

■ **Operating Procedure**

(1) Select the Tray Type mode with using the **4** or **5** key in the initial stage of the engine service mode.
After selecting, press the **6** key.
The "33 CASSETTE TYPE / <A / B / C / D / E / F>" appears on the LCD.

(2) Select the recording paper tray A, B, C, D, E or F to be set with using the **4** or **5** key and press the **6** key.
The type of the recording paper tray is set.
A: US
B: EC
C: JPN
D, E, F: Free size

(3) Press the **3** key, and the machine returns to the initial stage of the engine service mode.

8.2.3.4 Total Page (Code 34)

■ **Function**

This function is to check the total number of pages the machine has printed.

■ **Operating Procedure**

(1) Select the Total Page mode with using the **4** or **5** key in the initial stage of the engine service mode.
After selecting, press the **6** key.
The "34 TOTAL PAGE / ■ ■ ■ ■ ■ ■ P" appears on the LCD.
The six-digit indication in the lower line shows the total print pages.

(2) Press the **3** key, and the machine returns to the initial stage of the engine service mode.

8.2.3.5 Each Image (Code 35)

■ **Function**

This function is to check the image counter of each color to be used in printing.

■ **Operating Procedure**

(1) Select the Each Image mode with using the **4** or **5** key in the initial stage of the engine service mode.
After selecting, press the **6** key.
The "35 IMAGE OF / ► Y / M / C / K" appears on the LCD.

(2) Select the color you want to check with using the **4** or **5** key and press the **6** key.
The image counter such as "35 IMAGE OF Y / 0 0 0 0 9 8 P" appears on the LCD.

(3) Press the **3** key so that the display is returned to the message described in Step (1).

(4) When checking the image counter of other colors, repeat Step (2) and (3).

(5) Press the **3** key, and the machine returns to the initial stage of the engine service mode.

8.2.3.6 Clear Care (Code 36)

■ **Function**

This function is to reset the counter of the periodical replacement parts.
Always implement the operation when replacing the periodical replacement parts.

■ **Operating Procedure**

(1) Select the Clear Care mode with using the **4** or **5** key in the initial stage of the engine service mode.
After selecting, press the **6** key.
The "36 CLEAR CARE / ▲ 2 3 4 5 6 7 8 9 A B C D E F G" appears on the LCD.

(2) Place the cursor onto the applicable periodical replacement part with using the **4** or **5** key and press the **6** key.

(3)

No.	Periodical replacement parts	Maintenance code
7:	Belt cartridge	BU
8:	Fusing unit	FU
9:	Transfer belt	TB
A:	120K KIT	OW
D:	Pick-up roller	PK
E:	Pick-up roller (LFU)	PL

Place the cursor onto YES with using the **4** or **5** key and press the **6** key.
The message such as "CARED BL ROLL ? / ► YES / NO" appears on the LCD.
The counter of the periodical replacement part to be selected is reset.
The display on the LCD is returned to the message described in Step (1)

(4) Press the **3** key, and the machine returns to the initial stage of the engine service mode.

8.2.3.7 Media Manage (Code 37)

■ **Function**

This function is to ignore the signal from the OHP sensor. It is not used normally.

■ **Operating Procedure**

(1) Select the Media Manage mode with using the **4** or **5** key in the initial stage of the engine service mode.
After selecting, press the **6** key.
The "37 MEDIA MANAGE / ► MANAGE / DEFIANCE" appears on the LCD.

(2) Place the cursor onto DEFIANCE with using the **4** or **5** key and press the **6** key.
The detection signal from the OHP sensor is ignored.
It is set to MANAGE in the normal operating.

(3) Press the **3** key, and the machine returns to the initial stage of the engine service mode.

8.2.3.8 Extend Media (Code 38)

■ Function

This function is to set the details on the recording paper type.

- Two types of normal and thin paper are provided for the plain paper.
- Two types of normal and extreme thick paper are provided for the label.

■ Operating Procedure

(1) Select the Extend Media mode with using the **4** or **5** key in the initial stage of the engine service mode.
After selecting, press the **6** key.
The "38 EXTEND MEDIA / ► PPC / MTS / TS" appears on the LCD.

(2) Select the recording paper you want to set with using the **4** or **5** key and press the **6** key.
PPC: Plain paper
MTS: Label
TS: Thick paper

(3) Select the detailed type of the selected recording paper with using the **4** or **5** key and press the **6** key.
Setting type
PPC: Normal / Thin
MTS: Normal / Glossy
TS: TS1 (Thick paper) / TS2 (extreme thick paper)

(4) Press the **3** key, and the machine returns to the initial stage of the engine service mode.

8.2.3.9 Factory Mode (Code 39)

■ Function

It is composed of the nine modes including the functions to check the performance and to set the required items in maintenance work.

[1] Margin Adjust

[2] Life Period Set

[3] NVRAM Tune Up

[4] NVRAM Initial

[5] Total Page Set

[6] Each Image Set

[7] Next Life Set

[1] Margin Adjust (Code 43)

■ Function

This function is to check and adjust the top margin and left margin.
The adjustment range is from –4.9mm max to +4.9mm max.
Always implement the operation when replacing the engine control board.

■ Operating Procedure

(1) Select Margin Adjust with using the **4** or **5** key in the initial stage of the factory mode. After selecting, press the **6** key.
The "43 MARGIN ADJUST / ► TOP / LEFT / LEFT1" appears on the LCD.

(2) Select the top margin (TOP) or left margin (LEFT or LEFT1) with using the **4** or **5** key. After selecting, press the **6** key.

LEFT: For adjusting the left margin on the paper in the upper tray
LEFT1: For adjusting the left margin on the paper in the lower tray

<Example of LCD indication>

"43 TOP +2.5mm / - 1 0 1 2 3 4 ▲6 7 +"

- The margin can be adjusted up to 4.9mm max. in the right and left sides from the standard value "0" by 0.7mm pitch.
- Select the value according as the adjusted amount with using the **4** or **5** key. The selected amount is displayed at the upper right side.
- Press the **6** key to set the adjustment value.

(3) Press the **3** key so that the display is returned to the message described in Step (1).

(4) Press the **3** key again, and the machine returns to the initial stage of the factory mode.

<How to measure>

1) Implement "GRID PRINT" in the service mode.
2) Measure A and B of the top margin.
(Leading Edge) (A+B) / 2 ≦ Default Value 4.2±1.5mm
3) Measure C and D of the left margin.
(Left Margin) (C+D) / 2 ≦ Default Value 4.2±1.5mm

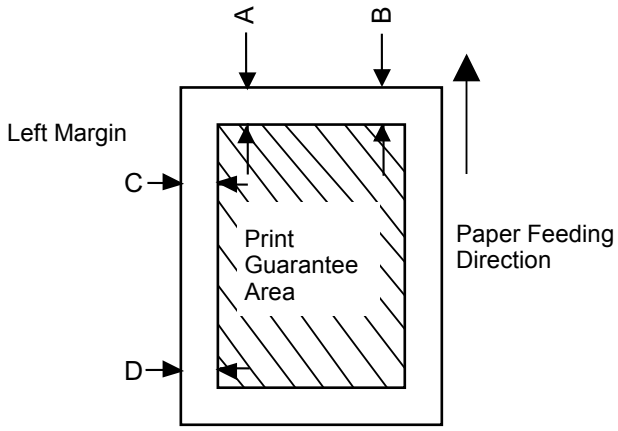


Fig. 8-14

[2] Life Period Set (Code 44)

■ Function

This function is to set the life counter of the periodical replacement parts.

■ Operating Procedure

(1) Select Life Period Set with using the **4** or **5** key in the initial stage of the factory mode.
After selecting, press the **6** key.
The "44 LIFE PERIOD / ▲ 2 3 4 5 6 7 8 9 A B C D E F G" appears on the LCD.

(2) Select the periodical replacement part to be set with using the **4** or **5** key.
After selecting, press the **6** key.

7: Belt cartridge (BC)
8: Fusing unit (FU)
9: Transfer belt (TB)
A: 120K KIT (OW)
D: Pick-up roller (PK) (Machine)
E: Pick-up roller (PL) (LFU)

If selecting other figure than the above ones and pressing the **6** key, it is invalid, and the display is not changed.

- Enter the value onto the blinking digit.
- Move the cursor onto the digit to be entered with using the **4** or **5** key.
- Enter the value with using the **6** key.
- After entering the set value, move the cursor onto SET with using the **4** or **5** key and press the **6** key to register the set value.

<Example of LCD indication>

" PERIOD 120K KIT / 1 2 0 0 0 0 P ▶ SET "

(3) Press the **3** key so that the display is returned to the message described in Step (1).

(4) Press the **3** key again, and the machine returns to the initial stage of the factory mode.

[3] NVRAM Tune Up (Code 45)

■ Although this mode is not used normally, it consists of the five modes which allow you to adjust the value of each section exactly.
Always implement the operations of all these modes when replacing the engine control board.

[3]-1 LP Tune Up

[3]-2 THV Tune Up

[3]-3 DBV Tune Up

[3]-4 CBV Tune Up

[3]-5 FBV Tune Up

[3]-6 Factory Use

[3]-1 LP Tune Up (Code 45-1)

■ Function

This function is used when it is required to adjust the print density, line thickness, hue or the like. The adjustment is implemented by changing the laser power, and it is changeable by ±7 steps from the standard value "0".
Always implement the operation when replacing the engine control board.

■ Operating Procedure

(1) Select NVM Tune UP with using the **4** or **5** key in the initial stage of the factory mode. After selecting, press the **6** key.
The "45 NVM TUNE UP / ▲ 2 3 4 5 6 7 8 9 A B C D E F G" appears on the LCD.

(2) Select "1" with using the **4** or **5** key and press the **6** key.

(3) Select the color to be adjusted with using the **4** or **5** key and press the **6** key.

(4) Select the optional number with using the **4** or **5** key and press the **6** key.
The data is written into the NVRAM.
The value can be adjusted by ±7 steps.

(5) Press the **3** key so that the display is returned to the message described in Step (1).
When adjusting other colors, repeat Step (2) to (5).

(6) Press the **3** key again, and the machine returns to the initial stage of the factory mode.

[3]-2 THV Tune Up (Code 45-2)

■ Function

This function is used when it is required to adjust the transfer voltage because a transfer failure problem or the like is occurred on the recording paper. The adjustment is implemented by changing the transfer voltage depending on the recording paper, and it is changeable by ±4 steps from the standard value "0".

Always implement the operation when replacing the engine control board.

■ Operating Procedure

(1) Select NVM Tune UP with using the **4** or **5** key in the initial stage of the factory mode. After selecting, press the **6** key.
The "45 NVM TUNE UP / ▲ 2 3 4 5 6 7 8 9 A B C D E F G" appears on the LCD.

(2) Select "2" with using the **4** or **5** key and press the **6** key.

(3) Select SIMPLEX with using the **4** or **5** key and press the **6** key.
The "45 THV TUNE UP / ► PPC / OHP / ENV" appears on the LCD.

PPC: for setting the plain paper
OHP: for setting the transparencies
LENV: for setting the envelopes
MTS: for setting the labels and thick paper
TS1: for setting print speed 1 (1/3 speed) with the thick paper
TS2: for setting print speed 2 (1/4 speed) with the thick paper

(4) Select the recording paper to be adjusted with using the **4** or **5** key and press the **6** key.

(5) Select the optional number with using the **4** or **5** key and press the **6** key.
The adjusted value is written into the NVRAM.
The value can be adjusted by ±4 steps.

(6) Press the **3** key so that the display is returned to the message described in Step (3).
When adjusting other recording paper, repeat Step (3) to (56).

(7) Press the **3** key again, and the machine returns to the initial stage of the factory mode.

[3]-3 DBV Tune Up (Code 45-3)

■ Function

This function is used when it is required to adjust the image density. The adjustment is implemented by changing the developing bias voltage of each color, and it is changeable by ±7 steps from the standard value "0".

Always implement the operation when replacing the engine control board.

■ Operating Procedure

(1) Select NVM Tune UP with using the **4** or **5** key in the initial stage of the factory mode. After selecting, press the **6** key.
The "45 NVM TUNE UP / ▲ 2 3 4 5 6 7 8 9 A B C D E F G" appears on the LCD.

(2) Select "3" with using the **4** or **5** key and press the **6** key.
The "45 DBV TUNE UP / ► Y / M / C / K" appears on the LCD.

(3) Select the color to be adjusted with using the **4** or **5** key and press the **6** key.

(4) Select the optional number with using the **4** or **5** key and press the **6** key.
The adjusted value is written into the NVRAM.
The value can be adjusted by ±7 steps.

(5) Press the **3** key so that the display is returned to the message described in Step (12).
When adjusting other colors, repeat Step (3) to (5).

(6) Press the **3** key again, and the machine returns to the initial stage of the factory mode.

[3]-4 CBV Tune Up (Code 45-4)

■ Function

This function is used when it is required to improve the image defect which is caused by the OPC belt. The adjustment is implemented by changing the OPC belt bias voltage, and it is changeable by ±4 steps from the standard value "0".

Always implement the operation when replacing the engine control board.

■ Operating Procedure

(1) Select NVM Tune UP with using the **4** or **5** key in the initial stage of the factory mode. After selecting, press the **6** key.
The "45 NVM TUNE UP / ▲ 2 3 4 5 6 7 8 9 A B C D E F G" appears on the LCD.

(2) Select "5" with using the **4** or **5** key and press the **6** key.

(3) Select the optional number with using the **4** or **5** key and press the **6** key.
The adjusted value is written into the NVRAM.
The value can be adjusted by ±4 steps.

(4) Press the **3** key again, and the machine returns to the initial stage of the factory mode.

[3]-5 FBV Tune Up (Code 45-5)

■ Function

This function is used when it is required to improve the image defect which is caused by the transfer drum. The adjustment is implemented by changing the drum cleaner bias voltage, and it is changeable by ±4 steps from the standard value "0".

Always implement the operation when replacing the engine control board.

■ Operating Procedure

(1) Select NVM Tune UP with using the **4** or **5** key in the initial stage of the factory mode. After selecting, press the **6** key.
The "45 NVM TUNE UP / ▲ 2 3 4 5 6 7 8 9 A B C D E F G" appears on the LCD.

(2) Select "6" with using the **4** or **5** key and press the **6** key.

(3) Select the optional number with using the **4** or **5** key and press the **6** key.
The adjusted value is written into the NVRAM.
The value can be adjusted by ±4 steps.

(4) Press the **3** key again, and the machine returns to the initial stage of the factory mode.

[3]-6 Factory Use (Code 45-6 to 45-G)

Although it is possible to enter the modes from code 45-6 to 45-G, do not use them because they are for adjusting in the factory.

[4] NVRAM Initial (Code 46)

■ Function

This function is to initialize all data in the NVRAM on the engine control board.

CAUTION

- This function is not used normally. If implementing it, be sure that all data in the NVRAM is cleared.
- Before implementing this function, read out and record the data in the RAM.

■ Operating Procedure

(1) Select NVRAM Initial with using the **4** or **5** key in the initial stage of the factory mode. After selecting, press the **6** key.
The "46 NVRAM INITIAL / ► YES / NO" appears on the LCD.

(2) If implementing the NVRAM Initial function, select YES with using the **4** or **5** key. Press the **6** key so that all data in the NVRAM is cleared.

- For the RAM data, set the six items below.
  43: Margin Adjust
  44: Life Period Set
  45: NVRAM Tune Up
  47: Total Page Set
  48: Each Image Set
  49: Next Life Set

[5] Total Page Set (Code 47)

■ Function

This function is to set the total number of pages in the NVRAM.
Always implement the operation when replacing the engine control board.

■ Operating Procedure

(1) Select Total Page Set with using the **4** or **5** key in the initial stage of the factory mode. After selecting, press the **6** key.
The "47 TOTAL PAGE / ■ ■ ■ ■ ■ ■ P SET" appears on the LCD.
The total number of print pages is indicated, and the machine is ready to enter the setting value.

Enter the value onto the blinking digit.

- Move the cursor onto the digit to be entered with using the **4** or **5** key.
- Enter the value with using the **6** key.
- After entering the setting value, move the cursor onto SET with using the **4** or **5** key.
- Press the **6** key to register the setting value.

(2) Press the **3** key, and the machine returns to the initial stage of the factory mode.

[6] Each Image Set (Code 48)

■ Function

This function is to re-set the total number of images of each color in the NVRAM.
Always implement the operation when replacing the engine control board.

■ Operating Procedure

(1) Select Each Image Set with using the **4** or **5** key in the initial stage of the factory mode.
After selecting, press the **6** key.
The "48 IMAGE OF / ► Y / M / C / K" appears on the LCD.

(2) Select the color to be set and press the **6** key.
Enter the value onto the blinking digit.

- Move the cursor onto the digit to be entered with using the **4** or **5** key.
- Enter the value with using the **6** key.
- After entering the setting value, move the cursor onto SET with using the **4** or **5** key.
- Press the **6** key to register the setting value.

(3) Press the **3** key, and the machine returns to the initial stage of the factory mode.

[7] Next Life Set (Code 49)

■ Function

This function is to set the replacement timing (print pages) of the periodical replacement parts.
Always implement the operation when replacing the engine control board.

■ Operating Procedure

(1) Select Next Life Set with using the **4** or **5** key in the initial stage of the factory mode.
After selecting, press the **6** key.
The "49 NEXT LIFE SET / 1 2 3 4 5 6 ▲ 8 9 A B C D E F G" appears on the LCD.

(2) Select the periodical replacement part to be set and press the **6** key.

7: Belt cartridge (BC)
8: Fusing unit (FU)
9: Transfer belt (TB)
A: 120K KIT (OW)
D: Pick-up roller (PK) (Machine)
E: Pick-up roller (PL) (LFU)

Enter the value onto the blinking digit.

- Move the cursor onto the digit to be entered with using the **4** or **5** key.
- Enter the value with using the **6** key.
- After entering the setting value, move the cursor onto SET with using the **4** or **5** key.
- Press the **6** key to register the setting value.

Press the **6** key so that the display is returned to the message described in Step (1).

(3) When setting other periodical replacement parts, repeat Step (2).

(4) Press the **3** key, and the machine returns to the initial stage of the factory mode.

CHAPTER 9

ERROR INDICATION AND TROUBLESHOOTING

CHAPTER 9 ERROR INDICATION AND TROUBLESHOOTING

This chapter details error messages and codes that the incorporated self-diagnostic functions display if any error or malfunction occurs. If any error message appears, refer to this chapter to find which components should be checked or replaced.

The latter half of this chapter provides sample problems that could occur in the main sections of the machine and related troubleshooting procedures. This will help service personnel pinpoint and repair defective components.

CONTENTS

9.1 ERROR INDICATION

To help the user or the service personnel promptly locate the cause of a problem (if any), the facsimile equipment incorporates the self-diagnostic functions which display error messages for equipment errors and communications errors.
For the communications errors, the equipment also prints out the transmission verification report and the communications list.

9.1.1 Equipment Errors

If an equipment error occurs, the facsimile equipment emits an audible alarm (continuous beeping) for approximately 4 seconds and shows the error message on the LCD. For the error messages, see [1] below.

To display detailed error information, use maintenance-mode function code 82 described in Chapter 8, Section 8.1.4.17 (that is, make the equipment enter the maintenance mode and then press the **8** and **2** keys). Following the MACHINE ERROR, one of the error codes listed in [2] will appear on the LCD.

[1] Error messages appearing on the LCD

ERROR MESSAGE	CAUSE	ACTION
Check Paper Size	Paper is not the correct size.	Load the correct size of paper (Letter, Legal or A4) and then press **Black Start** or **Color Start**.
Check Tray #1 Check Tray #2	The indicated tray is not completely closed.	Close the indicated tray properly.
Comm.Error	Poor phone line quality caused a communication error.	Send the fax again or connect the machine to another telephone line. If the problem continues, call the telephone company and ask them to check your phone line.
Connection Fail	You tried to poll a fax machine that is not in polled waiting mode.	Check the other fax machine's polling setup.
Cover Open Close the back cover (3)	The back cover is not completely closed.	Close the back cover of the machine.
Cover Open Close the front cover (2)	The front cover is not completely closed.	Close the front cover of the machine.
Cover Open Close the inside cover (1)	The inside cover is not completely closed.	Close the inside cover of the machine.
Data Remaining	Print data is left in the machine's memory.	Re-start printing from your computer.
	Print data is left in the machine's memory. The interface cable was unplugged while the computer was sending the data to the machine.	Press **Job Cancel**. The machine will cancel the job and clear it from the memory. Try to print again.

ERROR MESSAGE	CAUSE	ACTION
Disconnected	The other person or other person's fax machine stopped the call.	Try to send or receive again.
Document Jam	The document was not inserted or fed properly, or the document scanned from the ADF was too long.	Remove the jammed document paper.
DR Mode in Use	The machine is set to distinctive ring mode. You can not change the receive mode from manual to another mode.	Set distinctive ring to off.
Near Waste Toner	The waste toner pack is nearly full.	Replace the waste toner pack.
No Fusing Unit	The fusing unit was not detected.	Please install one.
No OPC Belt	The OPC belt cartridge is not installed.	Install the OPC belt cartridge. Check that the charging roller (on the bottom of the OPC belt cartridge) is locked in place and the levers are closed.
No Paper Fed #1 No Paper Fed #2	The machine is out of paper or paper is not properly loaded in the indicated paper tray.	Refill the paper in the paper tray, and then press **Black Start** or **Color Start**. - OR - Remove the paper and load it again, and then press **Black Start** or **Color Start**.
No Response/Busy	The number you dialed does not answer or is busy.	Verify the number and try again.
No Toner X X = C, M, Y, BK	The toner cartridge is not installed properly.	Reinstall the X toner cartridge.
No TR Roller	The transfer roller is not installed.	Install the transfer roller.
Not Registered	You tried to access a one-touch or speed dial number that is not programmed.	Set up the one-touch or speed dial number.
Paper Jam X X = A1, A2, B or C	Remove the jammed paper. See the alphanumerical diagram to check on the location.	Remove the jammed paper.
Paper Type Error	The wrong media type is set in the paper tray.	Specify the correct media type in the paper tray.
Replace 120K Kit	It is time to replace the 120K kit.	Call Brother customer service to replace the 120K kit.
Replace Fuser	It is time to replace the fusing unit.	Replace the fusing unit.
Replace OPC Belt	It is time to replace the OPC belt cartridge.	Replace the OPC belt cartridge.

ERROR MESSAGE	CAUSE	ACTION
Replace PF Kit2	It is time to replace the PF kit2.	Call Brother customer service to replace the PF kit2.
Size Error Tray2	The wrong size of paper is set in the printer driver for tray2.	In the printer driver, specify the correct paper size for Tray2.
Stacker Full	The output tray is full of paper.	Remove the paper from the output tray.
Toner Empty X X = C, M, Y, BK,	The toner is used up and printing is not possible.	Replace the used toner cartridge with a new one.
Toner Error	The machine has detected an incompatible toner cartridge.	Use only Brother genuine toner cartridges.
Toner Low X X = C, M, Y, BK (K: Black, C: Cyan, M: Magenta, Y: Yellow)	The indicated color toner is nearly empty.	Order a new toner cartridge now.
Unable to Init. (Initialize) Unable to Print Unable to Scan	The machine has a mechanical problem.	Turn off the machine's power switch and then on again. If the error message continues leave the machine for several minutes and then try it again. (The machine can be turned off for up to 60 hours without losing faxes stored in the memory. If the machine will be off longer than 60 hours, you can save the faxes in your PC.
Waste Toner Full	The waste toner pack is full.	Replace the waste toner pack.
Check Paper Type	Paper type mismatch between the machine and the printer driver setting.	Put the correct paper type in Tray #1 (or Tray #2 if you have the optional lower tray) and set it using the machine's control panel **(Menu/Set, 1, 2**). Paper type = Plain paper, Transparencies, Thick paper, Thicker paper, Thin paper Recycled paper
Calibrate Calibration Failed	Toner is getting low.	Check that the toner cartridges are not low and try again.

ERROR MESSAGE	CAUSE	ACTION
Out of Memory	The machine's memory is full.	(Fax sending or copy operation in progress) Press **Black Start** or **Color Start** to send or copy the scanned pages. -OR- Press **Stop/Exit** and wait until the other operations in progress have finished and then try again. -OR- Clear the faxes from the memory. (Printing operation in progress) Reduce print resolution. (See Advanced tad in the Software User's Guide on the CD-ROM.) -OR- Clear the faxes from the memory. -OR- Add more memory.

[2] Error codes shown in the "MACHINE ERROR X X" message

Error Code (Hex)	Symptom	Probable Cause	Solution
20	Laser power error	Connector LCN does not properly connected	Connect the connector properly.
		Laser unit defective	Replace the laser unit
		Engine controller board defective	Replace the engine controller board
21	Beam detector error.	Connector LCN does not properly connected	Connect the connector properly.
		Laser unit defective	Replace the laser unit
		Engine controller board defective	Replace the engine controller board
22	NVRAM error	Main PCB defective	Replace the main PCB
23	Engine controller hardware error	Control error	Try the Power Switch Off/On
		Engine controller board defective	Replace the engine controller board
24	Process timing clock error.	Main motor defective	Replace the main motor
		Engine controller board defective	Replace the Engine controller board
25	Developing motor error	Toner cartridge gear defective	Replace the toner cartridge.
		Developer gear unit defective	Replace developer gear unit
		Developer motor defective	Replace the developer motor
		Engine controller board defective	Replace the engine controller board.
26	Main motor error.	Main motor defective	Replace the main motor
		Engine controller board defective	Replace the engine controller board.
27	Scanner motor error	Connector LCN does not properly connected	Connect the connector properly.
		Laser unit defective	Replace the laser unit
		Engine controller board defective	Replace the engine controller board.

Error Code (Hex)	Symptom	Probable Cause	Solution
28	Charge HV unit error	HV Power Supply defective	Replace the HV Power Supply PCB
29	LVPS error.	LV Power Supply defective	Replace the LV Power Supply PCB
2A	Fuser thermistor error	Fuser thermistor defective	Replace the fuser unit
		Engine controller board defective	Replace the engine controller board.
2B	Fuser heater error.	Breakdown of Heater On/Off Circuit	Replace the LV Power Supply PCB
		Breakdown of Temp Control Circuit	Replace the engine controller board
2C	Fuser temperature low error at warming-up.	Contact Failure of Harness Connector	Confirm the connection of Harness Connector
		Low Input Voltage	Connect the printer with the rated voltage source.
2D	Fuser temperature low error	Low Input Voltage	Connect the printer with the rated voltage source.
2E	Fuser temperature high error	Breakdown of Heater On/Off Circuit	Replace the LV Power Supply PCB
		Breakdown of Temp Control Circuit	Replace the engine controller board
2F	Fuser ACOFF error.	Breakdown of Heater On/Off Circuit	Replace the LV Power Supply PCB
		Breakdown of Temp Control Circuit	Replace the engine controller board
30	Erase LED error	Erase lamp defective	Replace the erase lamp
		Engine controller board defective	Replace the engine controller board.
31	Power supply fan error	Power supply fan defective	Replace the power supply fan
		Engine controller board defective	Replace the engine controller board.
32	Exit fan error	Exit fan defective	Replace the exit fan
		Engine controller board defective	Replace the engine controller board.
33	Laser unit fan ASSY error	Laser unit fan ASSY defective	Replace the Laser unit fan ASSY
		Engine controller board defective	Replace the engine controller board.

Error Code (Hex)	Symptom	Probable Cause	Solution
34	Yellow switching clutch error	Yellow switching clutch defective	Replace the yellow switching clutch
		Engine controller board defective	Replace the engine controller board.
35	Magenta switching clutch error	Magenta switching clutch defective	Replace the magenta switching clutch
		Engine controller board defective	Replace the engine controller board.
36	Cyan switching clutch error	Cyan switching clutch defective	Replace the cyan switching clutch
		Engine controller board defective	Replace the engine controller board.
37	Black switching clutch error	Black switching clutch defective	Replace the black switching clutch
		Engine controller board defective	Replace the engine controller board.
38	Yellow switching solenoid error	Toner cartridge defective	Replace the toner cartridge
		Toner retract solenoid assy defective	Replace the toner retract solenoid assy
		Engine controller board defective	Replace the engine controller board.
39	Magenta switching solenoid error	Toner cartridge defective	Replace the toner cartridge
		Toner retract solenoid assy defective	Replace the toner retract solenoid assy
		Engine controller board defective	Replace the engine controller board.
3A	Cyan switching solenoid error	Toner cartridge defective	Replace the toner cartridge
		Toner retract solenoid assy defective	Replace the toner retract solenoid assy
		Engine controller board defective	Replace the engine controller board.

Error Code (Hex)	Symptom	Probable Cause	Solution
3B	Black switching solenoid error	Toner cartridge defective	Replace the toner cartridge
		Toner retract solenoid assy defective	Replace the toner retract solenoid assy
		Engine controller board defective	Replace the engine controller board.
3C	Transfer belt error	Transfer unit defective	Replace the transfer unit
		Marker sensor defective	Replace the marker sensor
		Engine controller board defective	Replace the engine controller board.
3D	Transfer roller solenoid error.	Transfer roller solenoid defective	Replace the transfer roller solenoid
		Engine controller board defective	Replace the engine controller board.
3E	Transfer belt cleaning solenoid error.	Transfer belt cleaning solenoid defective	Replace the transfer belt cleaning solenoid
		Engine controller board defective	Replace the engine controller board.
3F	Fuser unit clutch error.	Fuser unit clutch defective	Replace the fuser unit clutch
		Engine controller board defective	Replace the engine controller board.
40	Belt marker sense error	Belt marker sensor defective	Replace the belt marker sensor
		Engine controller board defective	Replace the engine controller board.
41	HVU connection error	LV Power Supply PCB defective	Replace the LV Power Supply PCB
		Engine controller board defective	Replace the engine controller board.
42 43	Toner empty sensor connection error 1, 2	Toner sensor defective	Replace the toner sensor
		Engine controller board defective	Replace the engine controller board.
44	Lower feeder unit connection error	Lower feeder unit connector damaged	Replace the lower feeder unit
		Engine controller board defective	Replace the engine controller board.

Error Code (Hex)	Symptom	Probable Cause	Solution
50	Cyan toner empty	The cyan toner cartridge is empty.	Replace the cyan toner cartridge with a new one.
51	Magenta toner empty	The magenta toner cartridge is empty.	Replace the magenta toner cartridge with a new one.
52	Yellow toner empty	The yellow toner cartridge is empty.	Replace the yellow toner cartridge with a new one.
53	Black toner empty	The black toner cartridge is empty.	Replace the black toner cartridge with a new one.
54	Cyan cartridge run out	No cyan toner cartridge is installed.	Install the cyan toner cartridge.
55	Magenta cartridge run out	No magenta toner cartridge is installed.	Install the magenta toner cartridge.
56	Yellow cartridge run out	No yellow toner cartridge is installed.	Install the yellow toner cartridge.
57	Black cartridge run out	No black toner cartridge is installed.	Install the black toner cartridge.
58	Illegal toner cartridge	The substandard toner cartridge is installed.	Install the standard toner cartridge.
59	Cyan toner near-empty	The cyan toner cartridge is nearly empty.	---
5A	Magenta toner near-empty	The magenta toner cartridge is nearly empty.	---
5B	Yellow toner near-empty	The yellow toner cartridge is nearly empty.	---
5C	Black toner near-empty	The black toner cartridge is nearly empty.	---
5D-5F	Not used		
60	Stacker full	The output tray is full of the recording paper.	Remove the recording paper from the output tray.
61	TMA&TMAM control	The automatic color calibration is failed.	Press the Stop key to clear the error.
62-6F	Not used		
70	OPC belt un-device	The OPC belt is removed.	Assemble the OPC belt.
71	Fuser unit un-device	The fuser unit is not assembled.	Assemble the fuser unit.
72	Transfer roller un- device	The transfer roller is not assembled.	Assemble the transfer roller.

Error Code (Hex)	Symptom	Probable Cause	Solution
73	Waste toner box full or un-device	The waste toner box is not assembled.	Assemble the waste toner box.
		The waste toner box is full.	Replace the waste toner box with a new one.
74	OPC belt exchange	Replacement timing of the OPC belt.	Replace the OPC belt with a new one.
75	Fuser unit exchange	Replacement timing of the fuser unit.	Replace the fuser unit with a new one.
76	Transfer roller	Replacement timing of the transfer roller.	Replace the transfer roller with a new one.
77	120K Kit exchange	Replacement timing of the 120K kit.	Replace the 120K kit with a new one.
78	PF Kit2 exchange	Replacement timing of the PF Kit2.	Replace the PF Kit2 with a new one.
79	Wasted toner box near-full (exchange)	The waste toner box is nearly full.	Replace the waste toner box with a new one.
7A	Top cover open error	The top cover is opened.	Close the top cover.
7B	Back cover open	The back cover is opened.	Close the back cover.
7C-7F	Not used		
80	AT the start of FAX message printing, the controller detects that paper is smaller than A4 size in length.	Paper smaller than the specified size loaded in the paper tray	Load the correct size of paper.
		Main PCB defective	Replace the main PCB.
81	Recording paper jam. (The paper width sensor stays ON even after completion of paper ejection operation.) (Not used.)	---	---
82	Recording paper jam in paper pull-in operation (The paper width sensor fails to detect the leading edge of paper.) (Not used.)	---	---
83	Recording paper jam. (The registration sensor comes ON too early in the paper feeding operation.)	Paper is not correctly set in the paper tray	Reload paper.
		Separation pad damaged	Replace the paper tray.
		Registration sensor actuator unhooked	Set the registration sensor actuator into place.
		Main PCB defective	Replace the main PCB.

Error Code (Hex)	Symptom	Probable Cause	Solution
84	Recording paper jam. (The registration sensor stays ON after completion of paper ejection operation.)	The paper ejection roller does not rotate correctly	Replace the paper ejection roller.
		Foreign materials in the paper path.	Remove foreign materials.
		Registration sensor actuator caught on the surrounding parts	Correct the surrounding parts on which the actuator caught.
		Registration sensor broken	Replace the sensor PCB.
		Main PCB defective	Replace the main PCB.
85	No paper tray loaded.	---	---
86	Tray2 Open		
87	Paper Type Error	---	---
88	Recording paper jam. (Even after paper pulling-in operation, the registration sensor is still OFF.)	Recording paper not loaded correctly	Instruct the user to load the recording
		Registration sensor broken	Replace the registration sensor.
		Separation pad damaged	Replace the paper tray.
		Objects, such as bits of paper or chips, are in the paper tray or paper tray	Remove the objects from the paper tray.
		Paper pick up roller defective	Replace the paper pick up roller.
		Paper feed motor broken	Replace the paper feed motor ASSY.
		Main PCB defective	Replace the main PCB.
89	Not used.		
8A	The paper feed motor does not rotate. (Not used.)	---	---
8B	The paper feed motor stops suddenly. (Not used.)	---	---
8C	Not used.		
8D-A0	Not used.		

Error Code (Hex)	Symptom	Probable Cause	Solution
A1	Front cover (scanner unit) opened.	Hook of the front open switch on the front cover broken	Replace the front cover.
		Front open switch broken	Replace the front open switch.
A2	Document length exceeding the scan limitation. During scanning, 90 cm or longer of a document is detected. During document feeding or ejecting, 400 cm or longer of a document is detected.	Document jam	Remove the jammed document.
		Document rear sensor actuator caught on the surrounding parts	Correct the surrounding parts on which the actuator caught.
		Document rear sensor broken	Replace the document rear sensor.
A3	The document rear sensor does not come ON during document pull-in operation.	Document jam	Remove the jammed document.
		Document rear sensor actuator caught on the surrounding parts	Correct the surrounding parts on which the actuator caught.
		Document rear sensor broken	Replace the document rear sensor.
A4	50% or more faulty of white level data. (Not used.)	---	---
A5	FAX scanning failure. (1st time)	CIS defective White-level reference film stained in the scanner cover	Replace the scanner cover (scanner unit).
A6	FAX scanning failure. (retry)		
		Main PCB defective	Replace the main PCB.
A7-AA	Not used.		
AB	CIS Resolution failure.	CIS defective.	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.
AC	Less than 50% faulty of white level data. (Not used.)	---	---
AD-AE	Not used.		

Error Code (Hex)	Symptom	Probable Cause	Solution
AF	CIS positioning error.	CIS flat cable broken or not connected	Correct the cable connection. Replace the scanner cover (scanner unit).
		CIS motor harness not connected properly	Correct the harness connection.
		CIS defective	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.
B0	Not used.		
B1	Dark level offset data level error for scanning. (Not used.)	---	---
B2	Gain control data level error for scanning. (Not used.)	---	---
B3	Scan area left edge detection error. (Not used.)	---	---
B4	Scan area right edge detection error. (Not used.)	---	---
B5	Horizontal scanning edge reduction detection error in scanning area setting (Not used.)	---	---
B6	Horizontal scanning edge enlargement detection error in scanning area setting (Not used.)	---	---
B7	A/D converter reference voltage error (at High level).	Main PCB defective	Replace the main PCB.
B8	A/D converter reference voltage error (at Low level). (Not used.)	---	---
B9	Light emission intensity error of the LED array (Exceeding the upper limit).	CIS defective	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.
BA	Not used.		
BB	White level data error.	CIS defective	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.
BC	Not used.		
BD	Black level data error.	CIS defective	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.
BE	Scan starting edge detection error. (Not used.)	---	---
BF-CF	Not used.		

Error Code (Hex)	Symptom	Probable Cause	Solution
D0-DF	Modem error.	Main PCB defective	Replace the main PCB.
E0-E3	Not used.		
E4	Out of recording paper. (Not used.)	---	---
E5	Not used.		
E6	Write error in EEPROM.	Main PCB defective	Replace the main PCB.
E7	Not used.		
E8	Data scanning error during transmission.	CIS defective	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.
E9	Not used.		
EA	Document removed at phase B.	Document front sensor actuator caught on the surrounding parts	Correct the surrounding parts on which the actuator caught.
		Sensor PCB defective	Replace the sensor PCB.
		Main PCB defective	Replace the main PCB.
EB-ED	Not used.		
EE-F2	Not used.		
F3, F5	Internal software error. (Not used.)	---	---
F4	Not used.		
F6	PC interface error. (Not used.)	---	---
F7	Not used.		
F8	Battery connection error	Disconnection	Connect the battery
F9-FE	Not used.		
FF	Memory management error. (Not used.)	---	---

9.1.2 Communications Errors

If a communications error occurs, the facsimile equipment

(1) emits an audible alarm (intermittent beeping) for approximately 4 seconds,

(2) displays the corresponding error message, and

(3) prints out the transmission verification report if the equipment is in sending operation.

■ **Definition of error codes on the communications list**

(1) Calling

Code 1	Code 2	Causes
10	08	Wrong number called.
11	01	No dial tone detected before start of dialing.
11	02	Busy tone detected before dialing.
11	03	2nd dial tone not detected.
11	05	No loop current detected. *
11	06	Busy tone detected after dialing or called.
11	07	No response from the remote station in sending.
11	10	Unobtainable tone detected after dialing.
17	07	No response from the calling station in receiving.

* Available in German models only.

(2) Command reception

Code 1	Code 2	Causes
20	01	Unable to detect a flag field.
20	02	Carrier was OFF for 200 ms or longer.
20	03	Abort detected ("1" in succession for 7 bits or more).
20	04	Overrun detected.
20	05	A frame for 3 seconds or more received.
20	06	CRC error in answerback.
20	07	Error command received.
20	08	Invalid command received.
20	09	Command ignored once for document setting or for dumping-out at turn-around transmission.
20	0A	T5 time-out error
20	0B	CRP received.
20	0C	EOR and NULL received.

(3) Compatibility [checking the NSF and DIS]

Code 1	Code 2	Causes
32	01	Remote terminal only with V.29 capability in 2400 or 4800 bps transmission.
32	02	Remote terminal not ready for polling.
32	10	Remote terminal not equipped with password function or its password switch OFF.
32	11	Remote terminal not equipped with or not ready for confidential mailbox function.
32	12	Remote terminal not equipped with or not ready for relay broadcasting function.
32	13	No confidential mail in the remote terminal.
32	14	The available memory space of the remote terminal is less than that required for reception of the confidential or relay broadcasting instruction.
32	18	Remote terminal not equipped with color function.

(4) Instructions received from the remote terminal [checking the NSC, DTC, NSS, and DCS]

Code 1	Code 2	Causes
40	02	Illegal coding system requested.
40	03	Illegal recording width requested.
40	05	ECM requested although not allowed.
40	06	Polled while not ready.
40	07	No document to send when polled.
40	10	Nation code or manufacturer code not coincident.
40	13	Polled by any other manufacturers' terminal while waiting for secure polling.
40	17	Invalid resolution selected.
40	20	Invalid full-color mode requested.

(5) Command reception [checking the NSF and DIS after transmission of NSS and DCS]

Code 1	Code 2	Causes
50	01	Vertical resolution capability changed after compensation of background color.

(6) ID checking

Code 1	Code 2	Causes
63	01	Password plus "lower 4 digits of telephone number" not coincident.
63	02	Password not coincident.
63	03	Polling ID not coincident.

(7) DCN reception

Code 1	Code 2	Causes
74		DCN received.

(8) TCF transmission/reception

Code 1	Code 2	Causes
80	01	Fallback impossible.

(9) Signal isolation

Code 1	Code 2	Causes
90	01	Unable to detect video signals and commands within 6 seconds after CFR is transmitted.
90	02	Received PPS containing invalid page count or block count.

(10) Video signal reception

Code 1	Code 2	Causes
A0	03	Error correction sequence not terminated even at the final transmission speed for fallback.
A0	11	Receive buffer empty. (5-second time-out)
A0	12	Receive buffer full during operation except receiving into memory.
A0	13	Decoding error continued on 500 lines.
A0	14	Decoding error continued for 10 seconds.
A0	15	Time-out: 13 seconds or more for one-line transmission.
A0	16	RTC not found and carrier OFF signal detected for 6 seconds.
A0	17	RTC found but no command detected for 60 seconds.
A0	18	Receive buffer full during receiving into memory.
A0	19	No video data to be sent
A0	20	Unable to continue to receive color FAX (Remaining ink insufficient)
A8	01	RTN, PIN, or ERR received at the calling terminal. *
A9	01	RTN, PIN, or ERR received at the called terminal. *

* Available in German models only

(11) General communications-related

Code 1	Code 2	Causes
B0	02	Unable to receive the next-page data.
B0	03	Unable to receive polling even during turn-around transmission due to call reservation.
B0	04	PC interface error.

(12) Maintenance mode

Code 1	Code 2	Causes
E0	01	Failed to detect 1300 Hz signal in burn-in operation.
E0	02	Failed to detect PB signals in burn-in operation.

(13) Equipment error

Code 1	Code 2	Causes
FF	X X	Equipment error (For X X, refer to Section 9.1.1 [2].)

9.2 TROUBLESHOOTING

9.2.1 Introduction

This section gives the service personnel some of the troubleshooting procedures to be followed if an error or malfunction occurs with the facsimile equipment. It is impossible to anticipate all of the possible problems which may occur in future and determine the troubleshooting procedures, so this section covers some sample problems. However, those samples will help service personnel pinpoint and repair other defective elements if he/she analyzes and examines them well.

9.2.2 Precautions

Be sure to observe the following to prevent the secondary troubles from happening:

(1) Always unplug the AC power cord from the outlet when removing the covers and PCBs, adjusting the mechanisms, or conducting continuity testing with a circuit tester.

(2) When disconnecting the connectors, do not pull the lead wires but hold the connector housings.

(3) Before handling the PCBs, touch a metal portion of the machine to discharge static electricity charged in your body.
When repairing the PCBs, handle them with extra care.

After repairing the defective section, be sure to check again if the repaired section works correctly. Also record the troubleshooting procedure so that it would be of use for future trouble occurrence.

9.2.3 Checking Prior to Troubleshooting

Prior to proceeding to the troubleshooting procedures given in Section 9.2.4, make the following initial checks:

Environmental conditions

Check that:

(1) The machine is placed on a flat, firm surface.

(2) The machine is used in a clean environment at or near normal room temperature (10°C to 35°C) with normal relative humidity (20 to 80%).

(3) The machine is not exposed to direct sunlight or harmful gases.

Power requirements

Check that:

(1) The power supply specified on the rating plate on the machine is used. The supply voltage stays within the rating ±10%.

(2) Each voltage level on AC input lines and DC lines are correct.

(3) All cables and harnesses are firmly connected.

(4) None of the fuses are blown.

Recording paper

Check that:

(1) A recommended type of recording paper is used.

(2) The recording paper is not dampened.

Drum unit

(1) The drum unit (including the toner cartridge) is installed correctly.

9.2.4 Troubleshooting Based on Problem Type

[1] Software setting problems

The machine may not print the data correctly if there are incorrect software settings.

S-1	"There was an error writing to LPT1: (or BRUSB) for the machine" error message appears.

User Check

(1) Check that the machine cable is not damaged or broken. Check also that the cable is connected to the correct interface connectors of both the machine and PC.

(2) Check that the correct machine is selected if you have an interface switching device.

(3) Check that the appropriate printer driver is selected as 'Set as Default'. Check also that the correct print port is set for the selected printer driver.

(4) Check that the machine is not connected to the same port which is also connected to a mass storage device or scanner. Remove all other devices and connect the port to the machine only. Turn off the machine status monitor in the device options tab in the printer driver.

(5) If the print port is set as an ECP port, change it to a normal port.

(6) Try printing the test page.

(7) Try resetting the factory settings.

Possible cause	Step	Check	Result	Remedy
Failure inside the machine	1	Is it possible to print the test page with the method?	No	Identify the error type, then refer to the specified section of this chapter.
Main PCB failure	2	Is it possible to print with another PC and printer cable?	No	Replace the main PCB.
			Yes	This problem may appear under the specified system environment. Check the environment which the user used.

S-2	Although the USB driver is installed, it is unable to find the BRUSB: port. (Windows98/Me only)

User Check

(1) Re-install the USB driver by following the steps below;

i) Turn the machine off.

ii) Double-click the file "Deins USB.exe" in the USB directory of the CD-ROM.

iii) Re-boot the PC.

iv) Turn the machine on.

v) "Add New Hardware Wizard" is launched again, follow the instructions in the Wizard tore-install the driver.

(2) Try to connect the machine directly to the computer if it is connected through a USB hub.

Possible cause	Step	Check	Result	Remedy
Computer Operating System	1	Windows 95 or Windows NT4.0?	Yes	The operating system does not support USB.
Computer settings	2	Does 'Universal Serial Bus Controllers' appear in the Device Manager tab of 'System Properties' in Control Panel?	No	This problem can be caused by your computer settings. See the computer manual.
USB cable/ machine damage	3	Does "Add New Hardware Wizard" appear on the screen or Does test print complete?	No	The USB cable is damaged. Replace the cable. If the same problem appears, the machine will be damaged.

S-3	This machine does not appear in Chooser (Mac OS ® 9.1 to 9.2) or Print center (MacOS ® X 10.2.4 or greater).w

User Check

(1) Check the machine is turned on.

(2) Check the USB cable is connected correctly.

(3) Check the printer driver is installed correctly.

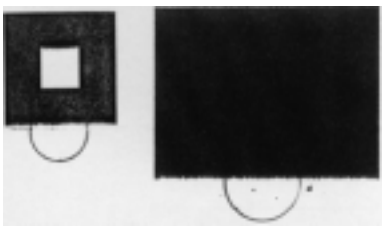
Possible cause	Step	Check	Result	Remedy
Machine connection	1	Select 'Apple System Profiler' in Apple Menu. Are the following items indicated in the USB box of the Device and Volumes tab? • Product ID: 018Ah Vender: Brother International Corporation (or 0x4f9)	No	Check the machine is turned on and the USB cable is connected correctly. Check that the USB cable used is the shielded twisted pair type and 5 m or less. Try to connect the machine and PC with the USB cable directly.
Driver installation	2	Are there the following files in the Extensions Folder of System Folder? <For System 9.1 – 9.2> • BR_PrintMoniter (laser) • Brother Laser	No	Try to re-install the printer driver.
			Yes	Turn off the machine and PC power switch, and check all connections between them. Then, turn them on again.

S-4	Make sure that the supplied Macintosh® printer driver is installed in the hard disk and that it is selected with chooser (Mac OS® 9.1 to 9.2) or print center (Mac OS® X 10.2.4 or greater).

[2] Image failure

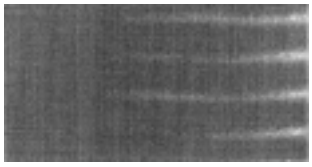
[1]

[2]

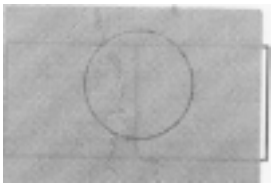


[3]

[4]

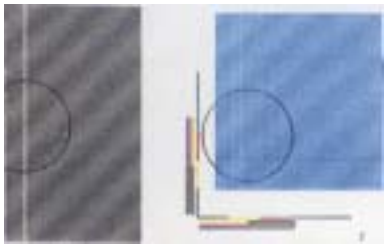


[5]



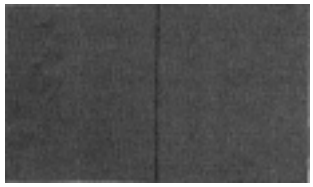
[6]

[7]



[8]

[9]



[10]

[11]

[12]

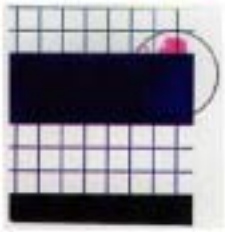
[13]

[14]

[15]-a

[15]-b

[16]



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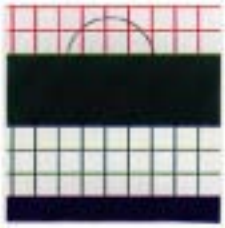
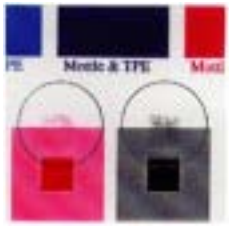


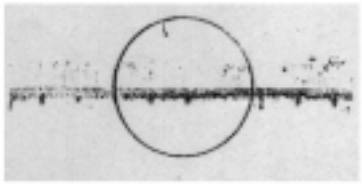
[18]

[19]

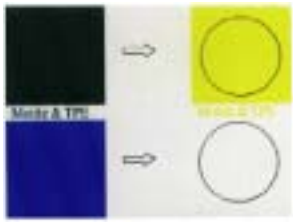


[20]

[21]



[22]



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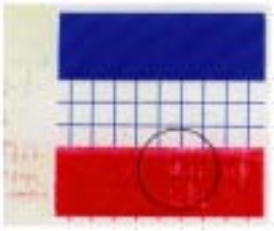
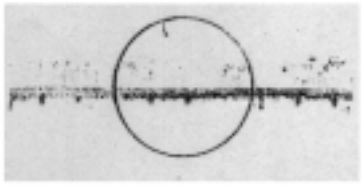


[24]



[25]

Fig. 9-1

I-1	Background

Phenomenon

Background is smeared due to toner spread as shown in print sample [1] of Fig.9-1.

Main Causes

(1) Too small charging amount in the development process.
(2) Insufficient contact of the developer roller's bias pole.
(3) Life or failure of the belt cartridge PU.
(4) Failure of the HV power supply unit PU (HVU).

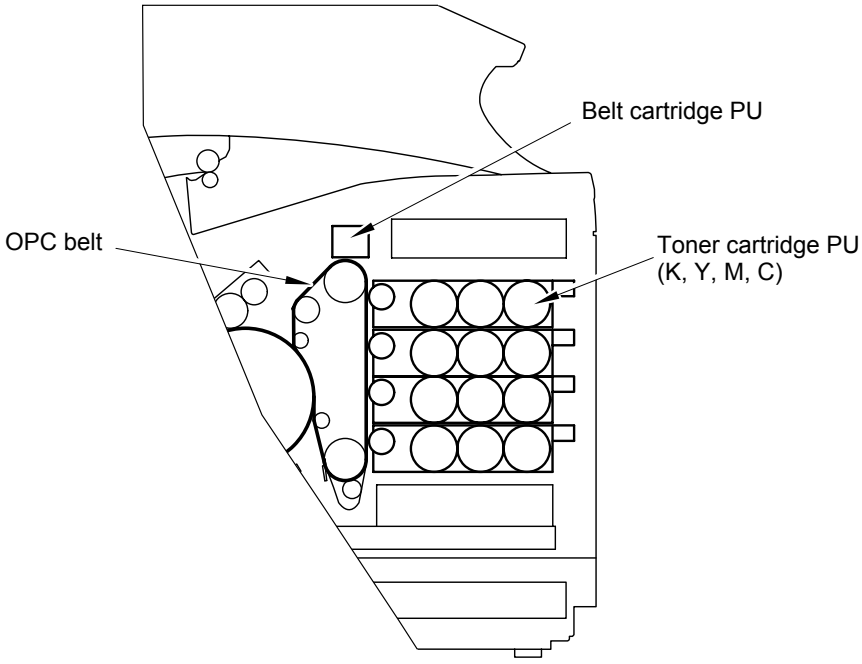


Fig. 9-2

Countermeasures

(1) Replace the toner cartridge PU.
(2) Confirm if the developer bias pole is deformed or not.
(3) Replace the belt cartridge PU.
(4) Replace the HV power supply unit (HVU).

I-2	Missing Image at Edge

Phenomenon

There is missing or peeling toner found in the image at the edge as shown in the print sample [2] of Fig.9-1.

Main Causes

(1) Too small toner mass amount and charging amount in the development process.

(2) The OPC belt is deformed as waving.

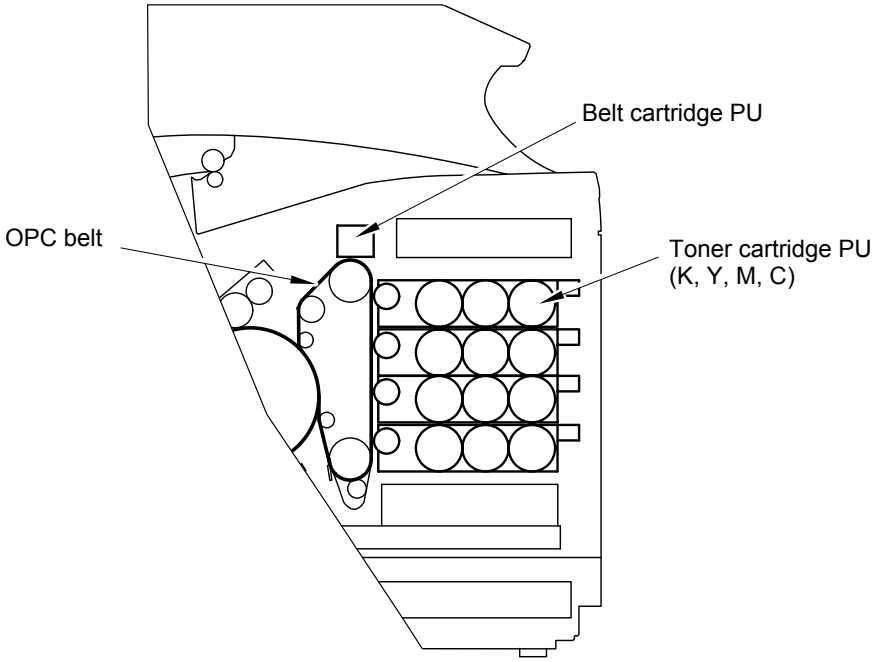


Fig. 9-3

Countermeasures

(1) Replace the toner cartridge PU with a brand new toner cartridge PU.

(2) Replace the belt cartridge PU with a brand new belt cartridge PU.

I-3	Jitter

Phenomenon

Uneven optical density appears periodically in the horizontal direction on the printed image as shown in print sample [3] of Fig.9-1.

Main Causes

(1) Failure of main motor.
   1) Irregular rotation of the drive motor.
   2) Failure of the OPC drive gear ASSY PU.
   3) Variation of OPC belt running speed due to above reasons.

(2) Failure of the belt cartridge PU.

(3) Failure of the main drive gear ASSY PU.

(4) Failure of the developer drive ASSY PU.

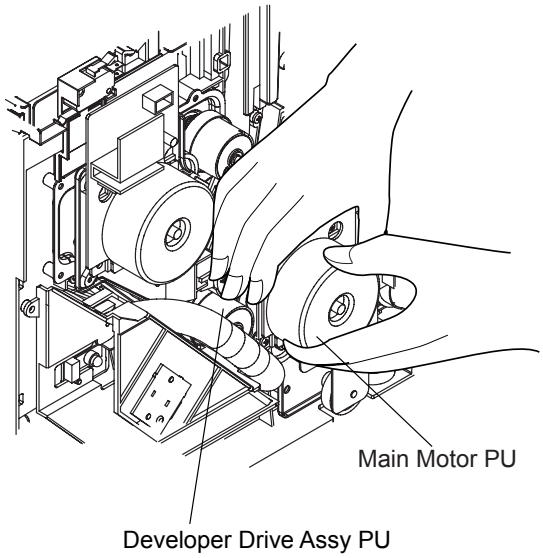


Fig. 9-4

Countermeasures

(1) Replace the OPC drive gear ASSY PU with a new OPC drive gear ASSY PU

(2) Replace the belt cartridge PU with a new belt cartridge PU.

(3) Replace the main drive gear ASSY PU with a new main drive gear ASSY PU.

(4) Replace the developer drive ASSY PU with a new developer drive ASSY PU.

I-4	Ribbing

Phenomenon

Light print occurs on the right or left hand side of the image as shown in print sample [4] of Fig.9-1.

Main Causes

(1) Slight tilt on the surface of machine installation table.
(Tilt should be less than 1°.)

(2) Toner amount in the toner cartridge PU is insufficient.

(3) Toner cartridge PU is not laid as level, and as the result, toner concentrates to one side.

(4) The back cover ASSY is not properly closed.

(5) The OPC belt is off the truck and gets deformed.

(6) Retract failure of the toner cartridge PU.

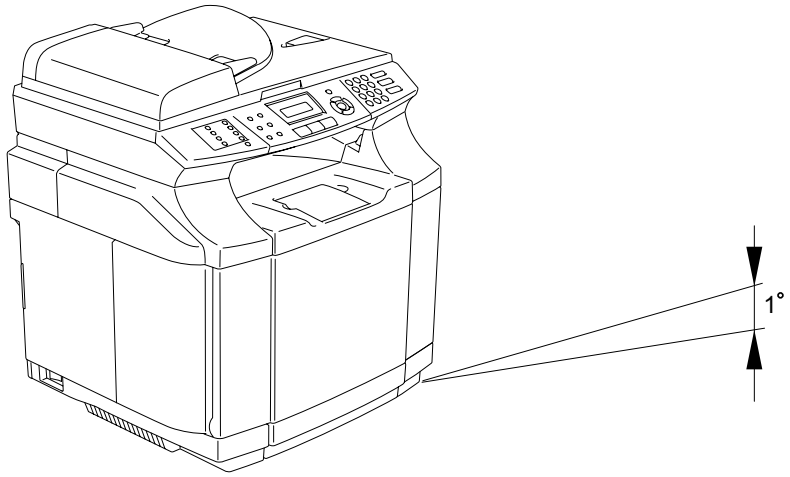


Fig. 9-5

Countermeasures

(1) Confirm the machine installation table to be flat and appropriate.

(2) Shake the toner cartridge horizontally for several times to remedy the concentration.

(3) Replace the toner cartridge PU with a new cartridge PU.

(4) Close the back cover ASSY properly.

(5) Replace the belt cartridge PU with a new belt cartridge PU.

(6) Replace the developer retract solenoid PU with a new developer retract solenoid PU.

I-5	Wrinkle / Image Migration

Phenomenon

Banding shadows of different optical density appear due to the wrinkle, image migration and color misregistration occurring on the print paper as shown in print sample [5] of Fig.9-1.

Main Causes

(1) Paper in use is not a recommended paper, or is an abandoned paper.

(2) The back cover ASSY PU is not locked properly.

(3) Fuser roller is deformed or reaches to the end of life.

(4) One side of fusing unit FU is lifted when installed.

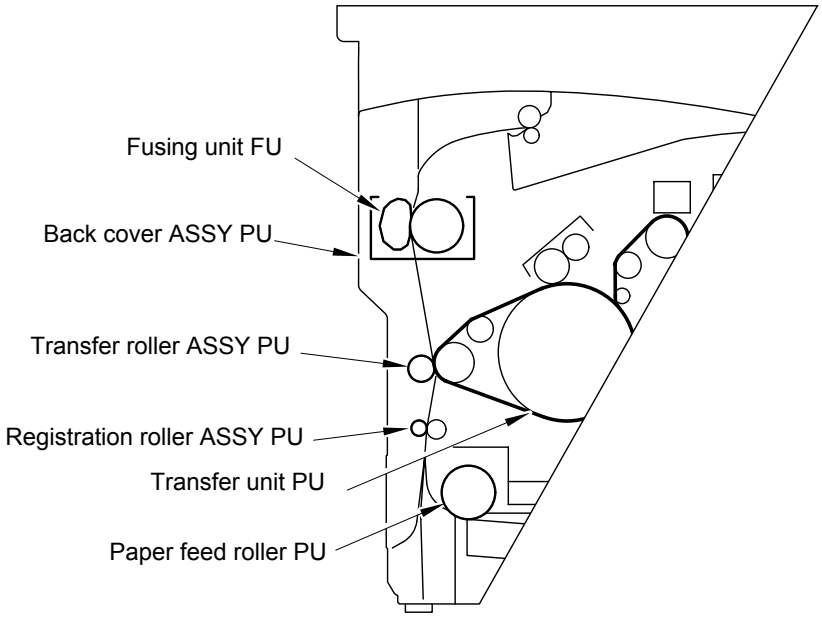


Fig. 9-6

Countermeasures

(1) Use a recommended paper or fresh paper from a paper bag.

(2) Push the back cover ASSY PU and ensure the locking at the both sides (left and right).

(3) Confirm that the fusing unit FU is installed properly and fixed with the lock lever lock lever of the left and right.

(4) Replace the fusing unit FU with a new unit FU.

I-6	White Line (1)

Phenomenon

Vertical white line appears in the specific color area when test-printed in the four color mode (Stripe Mode), as shown in print sample [6] of Fig.9-1.

Main Causes

(1) Foreign particles adhere to developer roller of specific color in question.

(2) Developer roller's surface is damaged.

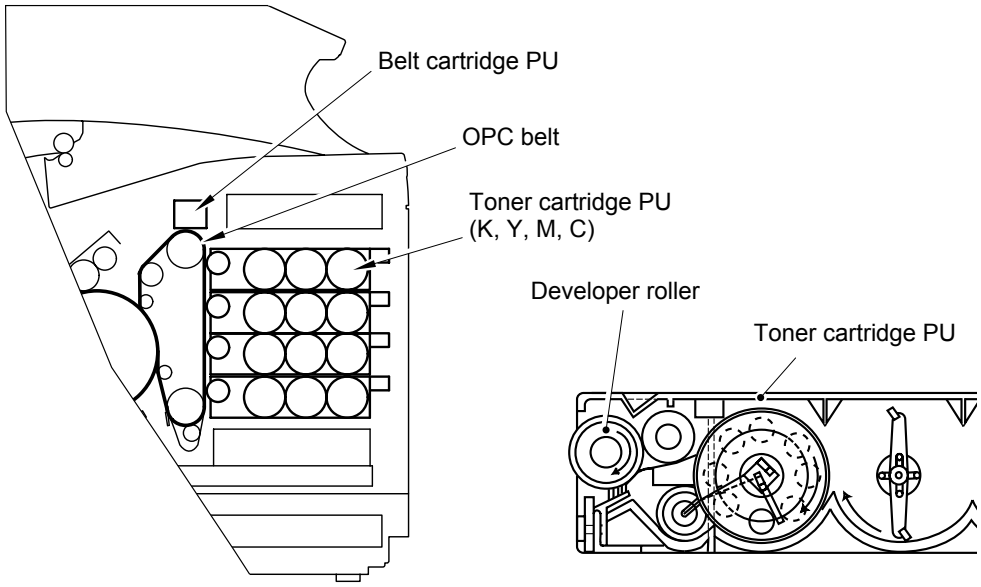


Fig. 9-7

Countermeasures

(1) Implement the test print.

(2) Confirm the toner cartridge PU of specific color in question that has caused the white line.

(3) Remove the foreign particles adhering to the developer roller.

I-7	White Line (2)

Phenomenon

Vertical white line appears from the leading edge to the trailing edge of printed image as shown in print sample [7] of Fig.9-1.

Main Causes

(1) Dustproof glass of laser ASSY PU is smeared with toner or foreign particles.

(2) Hairy foreign particles adhere to the laser beam opening of laser ASSY PU.

(3) There are foreign particles mixed in the toner cartridge PU.

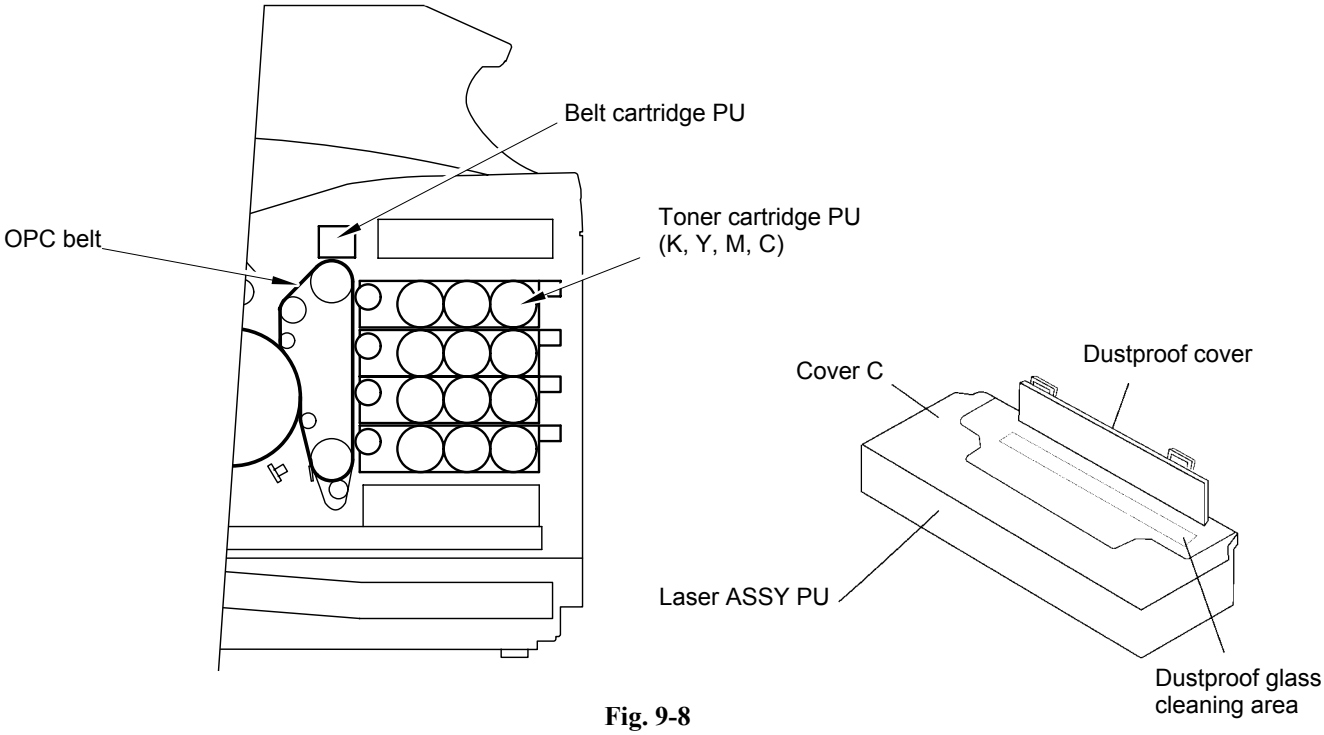


Fig. 9-8

Countermeasures

(1) Clean the dustproof glass.

1) Remove the belt cartridge PU and toner cartridge PU.

2) Open the developer cover.

3) Clean the dustproof glass.

(2) Clean the laser beam opening of laser ASSY PU.

(3) If white line II failure is attributed to toner cartridge PU, replace it with a new cartridge PU.

I-8	Vertical White Band

Phenomenon

White band appears in the vertical direction of printed image as shown in print sample [8] of Fig.9-1.

Main Causes

(1) Failure of the toner cartridge PU (blade).
(2) Stain of the OPC charger roller PU.
(3) Stain of the OPC belt.
(4) Stain of the transfer belt.

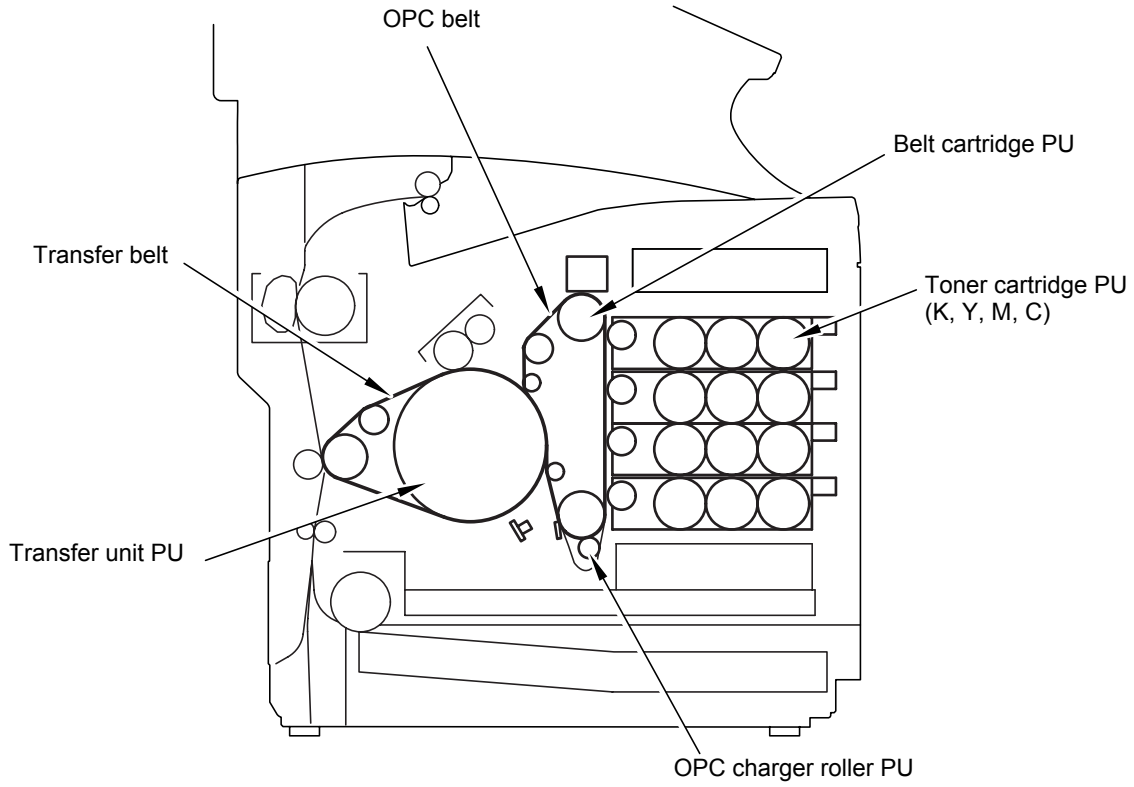


Fig. 9-9

Countermeasures

(1) Replace the toner cartridge PU with a new toner cartridge PU.
(2) Replace the belt cartridge PU with a new belt cartridge PU.
(3) Replace the transfer unit PU with a new transfer unit PU.

I-9	Black Line

Phenomenon

Fine black line appears in the printed image as shown in print sample [9] of Fig.9-1.

Main Causes

(1) The toner cartridge PU blade is deformed.

(2) The OPC belt surface is damaged.

(3) Foreign particles (paper dust, etc.) are stuck in between the cleaning blade and the OPC belt.

(4) Foreign particles adhere to the perimeter parts of the OPC belt and the transfer belt, and consequently contact the toner image formed on the belt.

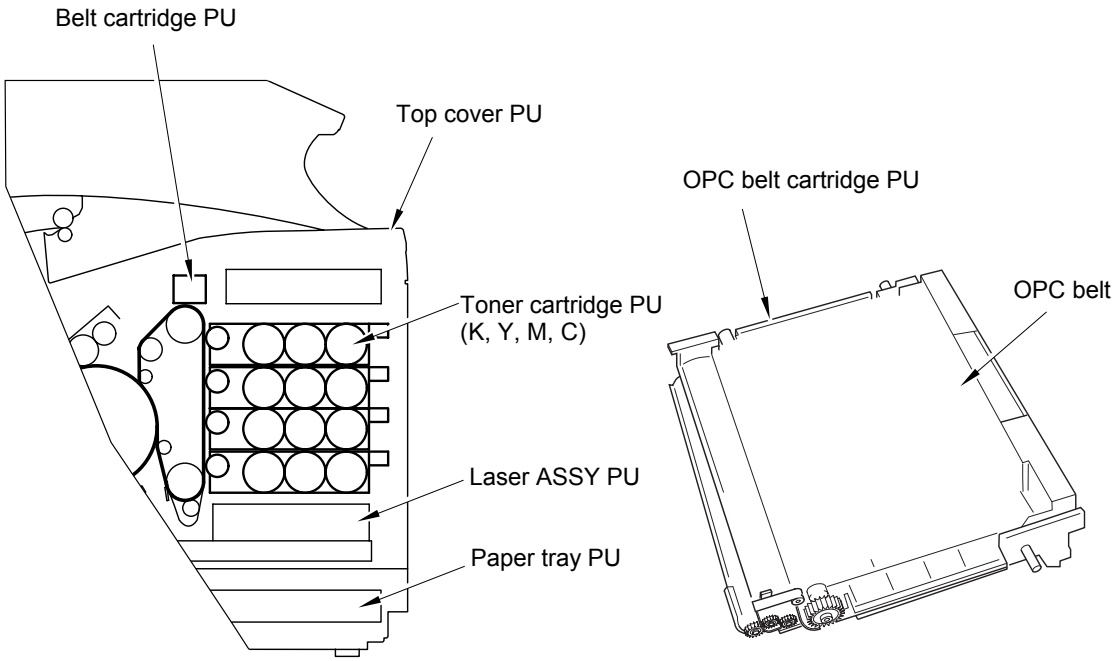


Fig. 9-10

Countermeasures

(1) Replace the toner cartridge PU with a new toner cartridge PU.

(2) Replace the belt cartridge PU with a new belt cartridge PU.

(3) Clean the perimeter of the mounting area of the OPC belt and transfer belt.

I-10	Vertical Line

Phenomenon

Vertical line appears in the printed image as shown in print sample [10] of Fig.9-1.

Main Causes

(1) Foreign particles (dust, etc.) adhere to the parts located around the OPC belt and the transfer belt, and consequently contact the toner image formed on the belt surface.

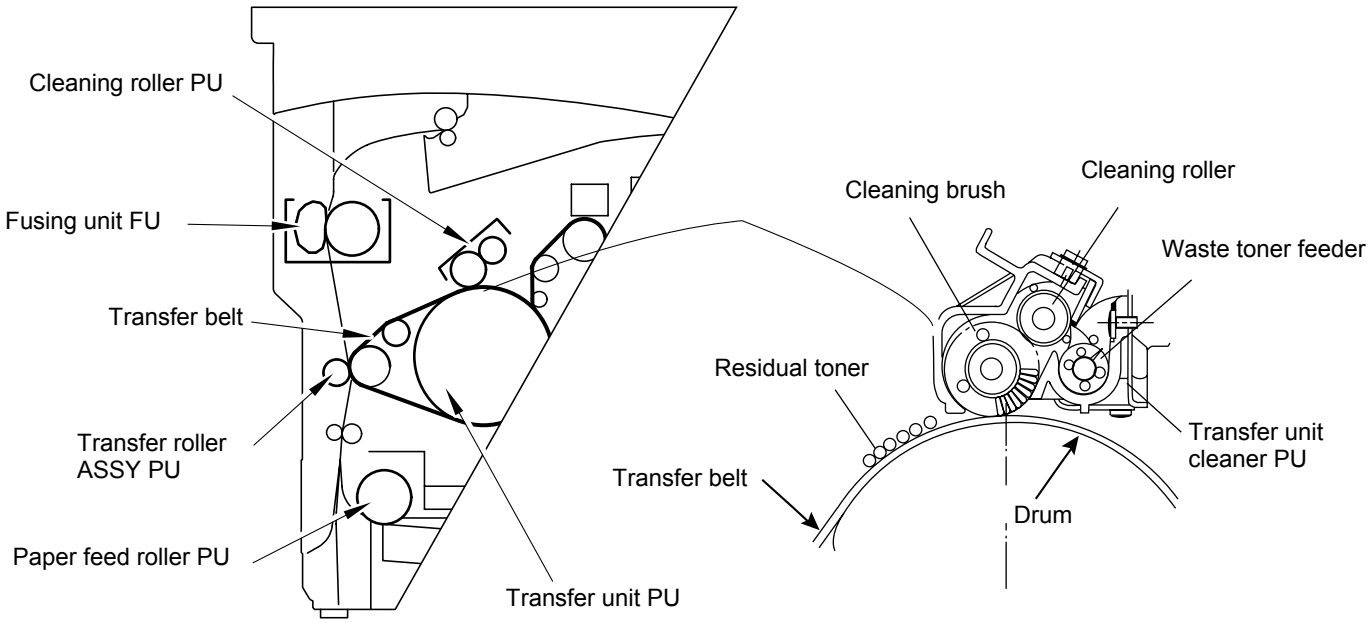


Fig. 9-11

Countermeasures

(1) Clean the stain of the belt cartridge PU.

(2) Clean the stain of the transfer belt.

(3) Remove the cleaning roller PU, and then clean the inside and outside of the waste toner feeder.

I-11	Vertically Staggered Image

Phenomenon

Printed image staggered in the vertical direction as shown in print sample [11] of Fig.9-1.

Main Causes

(1) Shock or vibration is applied to the machine.

(2) Failure of the laser ASSY PU : Vibration from the rotation of scanner motor.

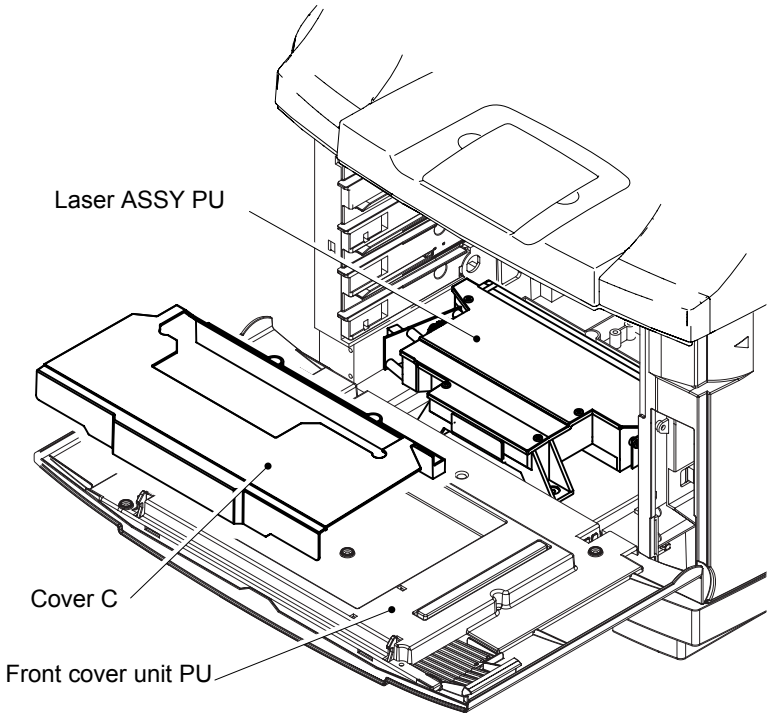


Fig. 9-12

Countermeasures

(1) Do not apply shock or vibration to the machine body.

(2) Replace the laser ASSY PU with a new laser ASSY PU.

I-12	Banding

Phenomenon

Banding line appears in the horizontal direction as shown in print sample [12] of Fig.9-1.

Main Causes

(1) This is a transfer failure due to the uneven rotational speed caused by the shock which occurs when the seam of OPC belt passes over the cleaning blade.

(2) The OPC belt and the transfer belt fail to maintain the regular and proper rotation due to the impact caused during the retract of the toner cartridge.

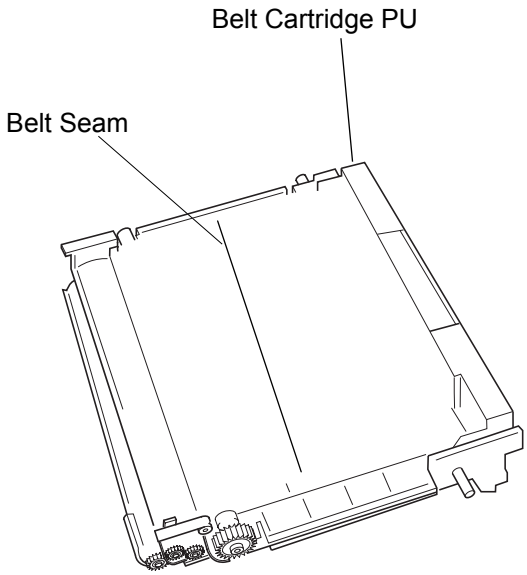


Fig. 9-13

Countermeasures

(1) Replace the belt cartridge PU with a new belt cartridge PU.

(2) Replace the toner cartridge PU with a new toner cartridge PU.

I-13	White Band

Phenomenon

White banding line appears in the horizontal direction, and consequently causes a missing image as shown in print sample [13] of Fig.9-1.

Main Causes

(1) Deformation of the transfer roller.

(2) Contact failure of the transfer roller's bias terminal.

(3) Failure of the transfer roller clutch PU.

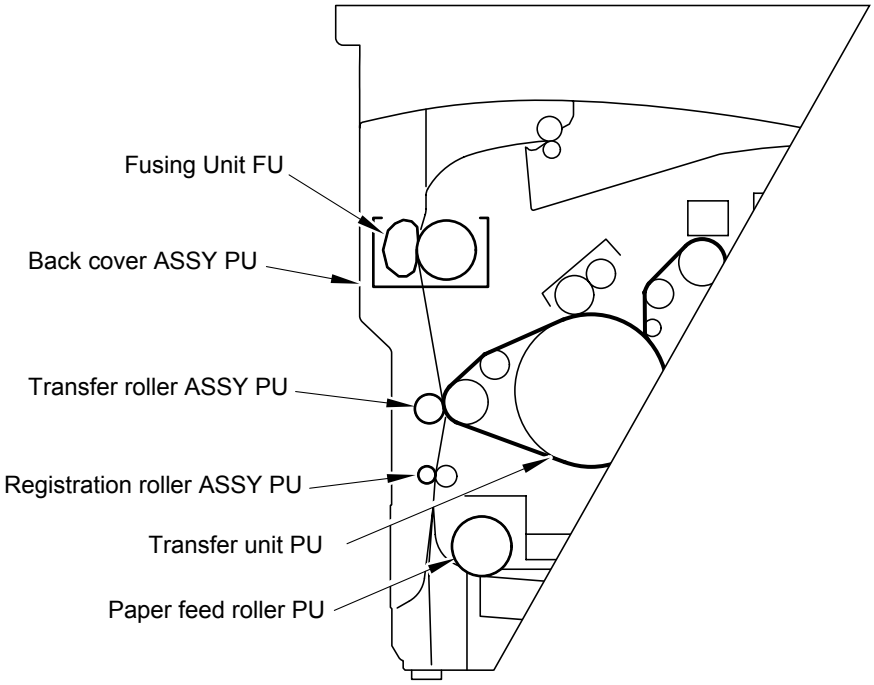


Fig. 9-14

Countermeasures

(1) Replace the transfer roller ASSY PU with a new transfer roller ASSY PU.

(2) Check up the transfer roller's bias terminal.

(3) Check up the transfer roller clutch and cam structure.

I-14	Toner Drop

Phenomenon

Toner spot stain is caused on the print by toner dropping within the machine engine as shown in print sample [14] of Fig.9-1.

Main Causes

(1) Toner drops on the transfer belt due to the breakdown of the waste toner auger.
   1) Mylar of the waste toner auger is deformed.
   2) Waste toner is not properly collected by the waste toner auger.

(2) Toner adhering to the developer roller drops on the OPC belt.

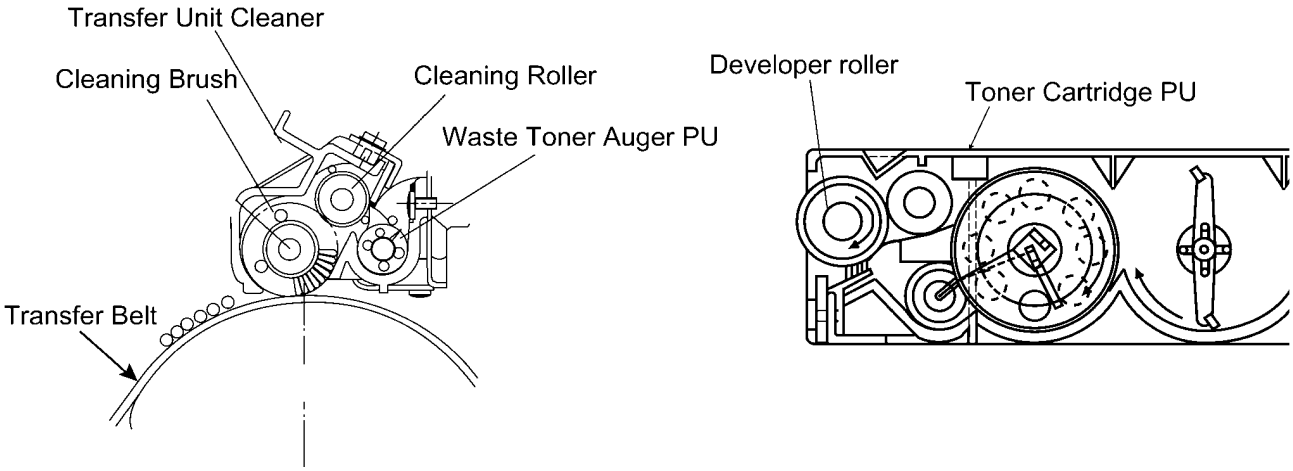


Fig. 9-15

Countermeasures

(1) Check up the cleaning brush and the waste toner auger PU.
   1) Clean the perimeter of the transfer unit cleaner installation location.
   2) Check if the seal is deformed or damaged. If any deformation or damage, replace the transfer unit cleaner with a new transfer unit cleaner PU.
   3) Check if the waste toner is stuck in the machine engine. If stuck, absorb and remove the waste toner with the vacuum cleaner.

(2) Remove the toner cartridge PU.
   1) Clean the toner cartridge PU.
   2) Replace the toner cartridge PU with a new cartridge PU.

I-15	White Spot / Black Spot

Phenomenon

White spots and black spots appear on the print as shown in print sample [15] of Fig.9-1.

Main Causes

(1) Foreign particles adhere to the OPC belt or the transfer belt.

(2) The OPC belt or the transfer belt is damaged.

(3) Foreign particles mixed in the toner.

(4) Foreign particles adhering to the transfer roller PU, or local deformation of transfer roller PU.

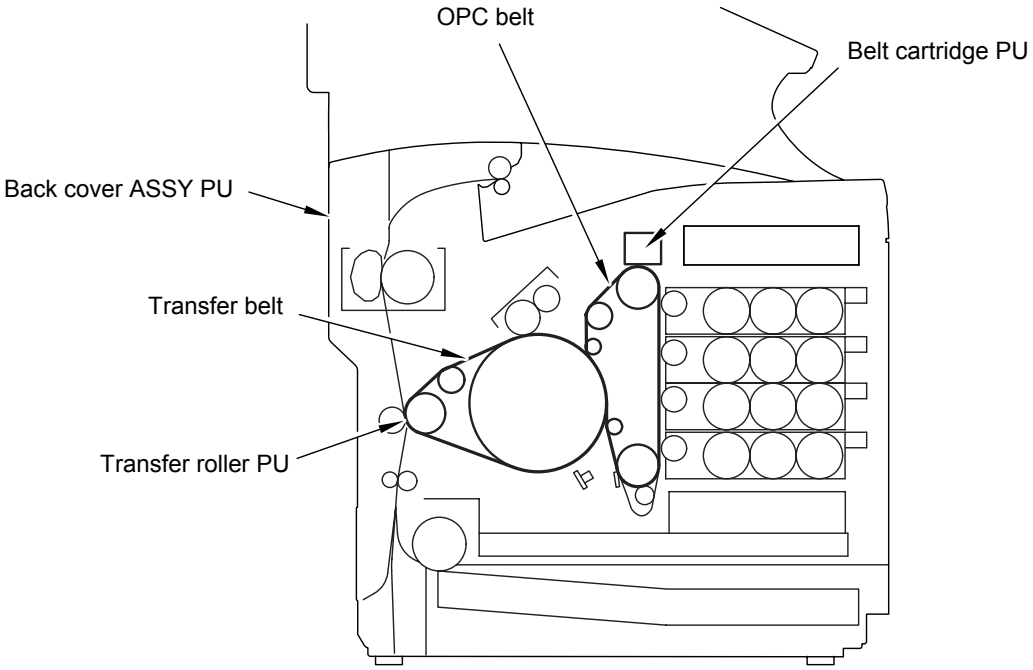


Fig. 9-16

Countermeasures

(1) Remove the belt cartridge PU.

1) Lightly wipe off the foreign particles adhering to OPC belt, using cotton cloth.

2) Replace the damaged belt cartridge with a new cartridge.

(2) Open the back cover ASSY PU, and check the transfer belt surface.

1) With the cotton cloth, lightly wipe off the foreign particles adhering to the transfer belt.

2) Replace the damaged back cover ASSY PU with a new back cover ASSY PU.

(3) Remove the toner cartridge PU.

1) Replace the toner cartridge PU with a new cartridge PU.

(4) Replace the transfer roller ASSY PU with a new transfer roller ASSY PU.

I-16	Mixed Color Image

Phenomenon

Mixed color image appears in the print as shown in print sample [16] of Fig.9-1.

Main Causes

(1) Retract error of the toner cartridge PU.

(2) Retract error of the transfer roller ASSY PU.

(3) Retract error of the transfer belt cleaning roller PU.

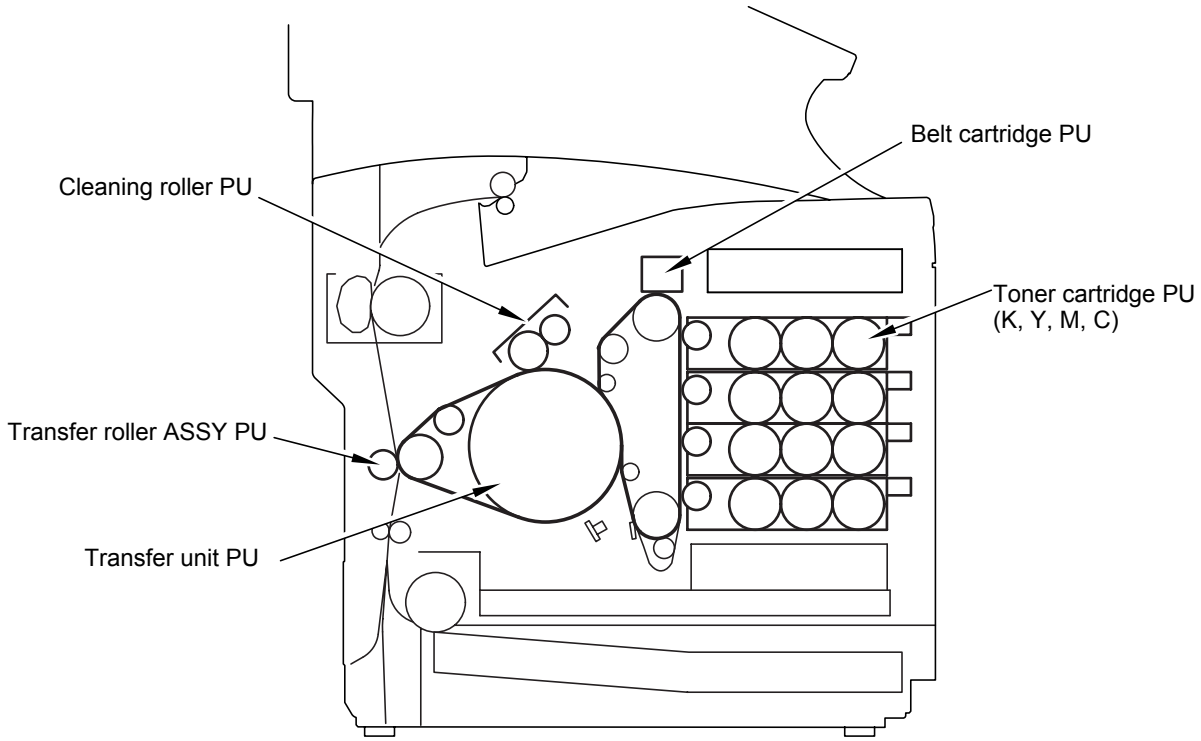


Fig. 9-17

Countermeasures

(1) Confirm where the mixed color image is caused.

1) If it is on the OPC belt, the cause is the retract error of the toner cartridge.

2) If it is on the transfer belt, the cause is the retract error of the transfer belt or cleaning roller.

(2) Replace the toner cartridge retract gear PU or the retract solenoid PU with a new one.

(3) Replace the transfer roller clutch PU with a new transfer roller clutch PU.

(4) Replace the belt cleaning roller solenoid PU with a new belt cleaning roller solenoid PU.

I-17	Color Misregistration

Phenomenon

Color misregistration is caused between two colors as shown in print sample [17] of Fig.9-1.

Main Causes

(1) The OPC belt off-track error.

(2) The OPC belt fails to maintain the regular and proper rotation due to the impact caused when the toner cartridge contacts the OPC belt.

(3) The transfer belt off-track error.

(4) The transfer belt fails to maintain the regular and proper rotation due to the impact caused when the transfer roller contacts the transfer belt.

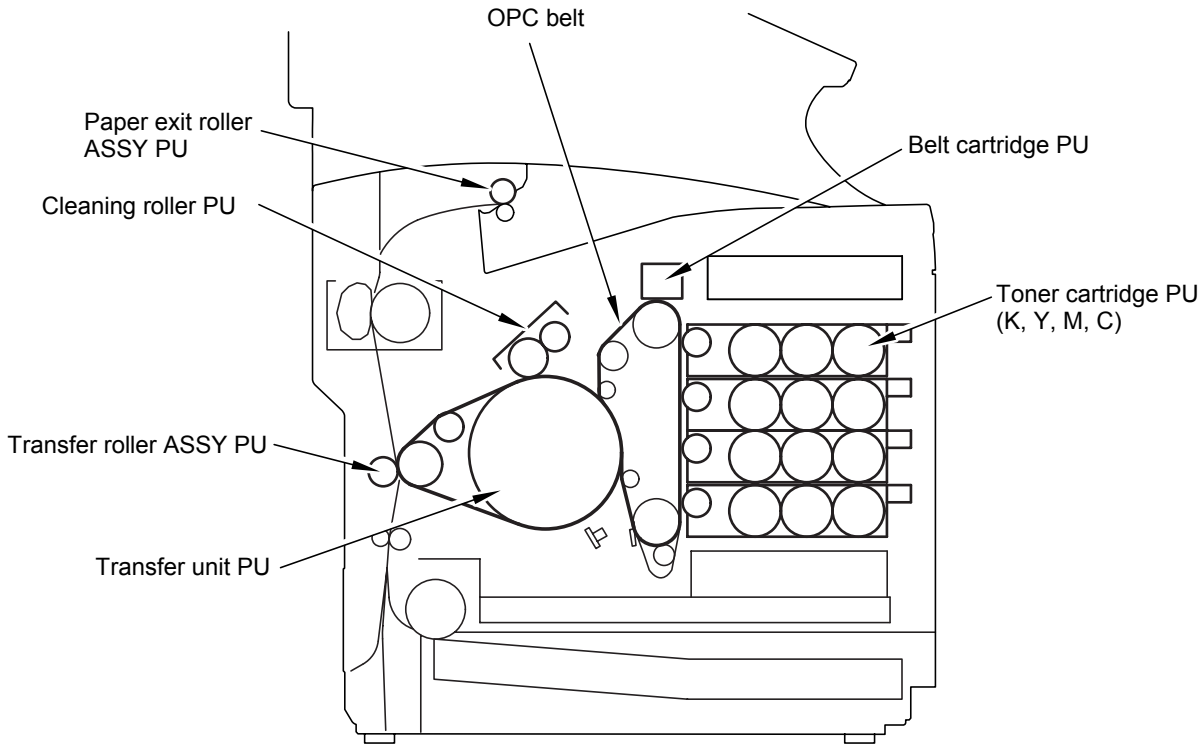


Fig. 9-18

Countermeasures

(1) Confirm that the transfer roller ASSY PU is properly installed.

(2) Confirm that the cleaning roller PU is properly installed.

(3) Replace the belt cartridge PU with a new belt cartridge PU.

(4) Replace the transfer unit PU with a new transfer unit PU.

I-18	Mottle

Phenomenon

Variation of the optical density is found in the image as shown in print sample [18] of Fig.9-1.

Main Causes

(1) The back cover ASSY is not fixed in place.
(2) Installation of the transfer roller is not accurate.
(3) THV output of DC high voltage unit is not normal.
(4) Failure of the toner cartridge PU.
(5) Deformation of the print paper.

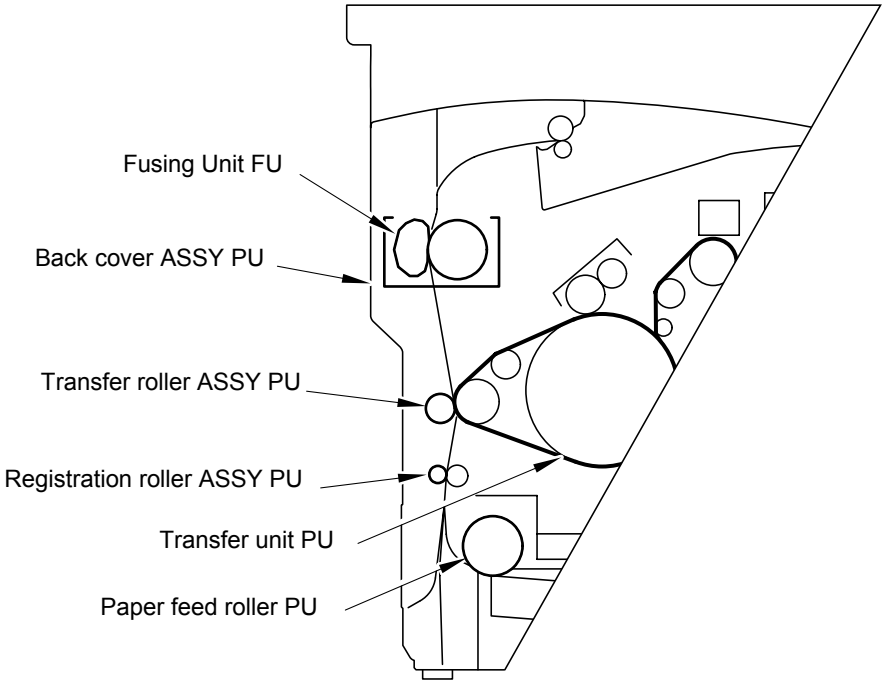


Fig. 9-19

Countermeasures

(1) Confirm if the back cover ASSY PU is firmly locked or not.
(2) Replace the papers with new papers.
(3) Replace the toner cartridge PU with a new toner cartridge PU.
(4) Confirm if the transfer roller ASSY PU is properly installed or not.
(5) Replace the HV power supply unit PU with a new HV power supply unit PU.

I-19	Residual Image

Phenomenon

Image of the preceding page appears on every other page as shown in print sample [20] of Fig.9-1.

Main Causes

(1) Cleaning failure due to the lifted cleaning brush of the transfer unit cleaner.
(2) Contact failure of the belt cleaner's bias terminal.
(3) Failure of HV power supply unit PU.

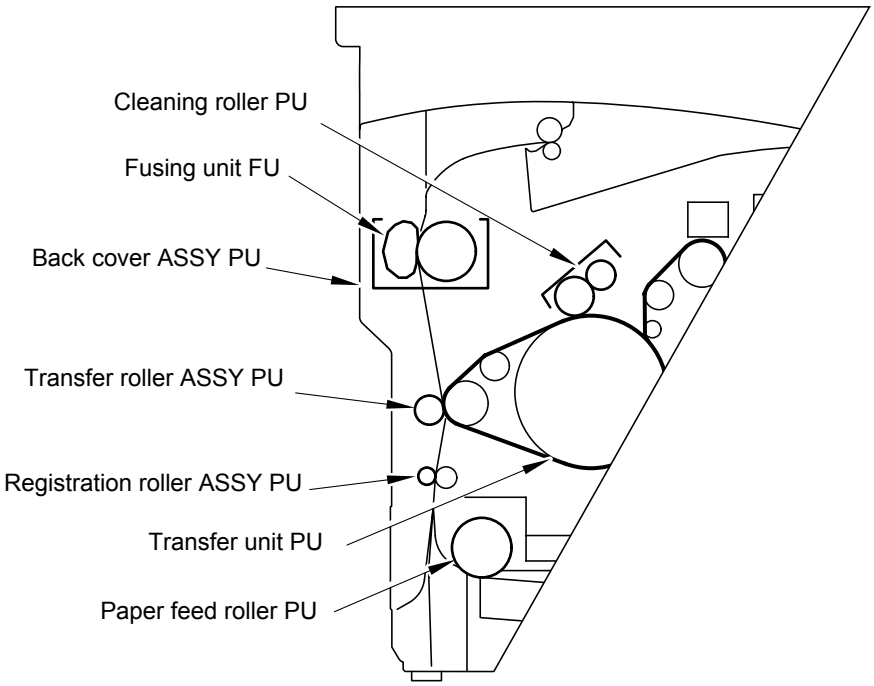


Fig. 9-20

Countermeasures

(1) Check if the cleaning roller PU is properly installed or not.
(2) Replace the HV power supply unit PU with a new HV power supply unit PU.

I-20	Insufficient Gloss

Phenomenon

Gloss of the print is not sufficient as shown in print sample [20] of Fig.9-1.

Main Causes

(1) The fuser roller is deteriorated.

(2) The fusing temperature is not properly controlled.

(3) The mode setting of the paper is not correct.

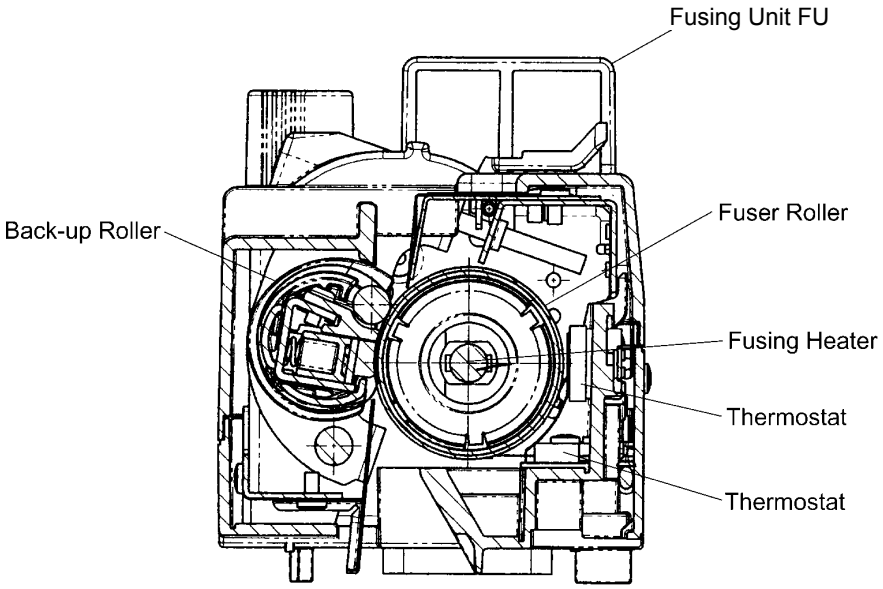


Fig. 9-21

Countermeasures

(1) Replace the fusing unit FU with a new fusing unit FU.

(2) Confirm the mode setting (ordinary paper or thick stock) of the paper.

I-21	Back Stain

Phenomenon

Back side of the print paper is stained as shown in print sample [21] of Fig.9-1.

Main Causes

(1) Fusing unit:

1) The fuser roller and the back-up roller is stained.
(Print immediately after the inner jam occurred.)

2) Fusing off-set error occurred. (Fusing temperature is not correct.)

3) The fuser roller and the back-up roller are deteriorated.

(2) The transfer roller is stained.

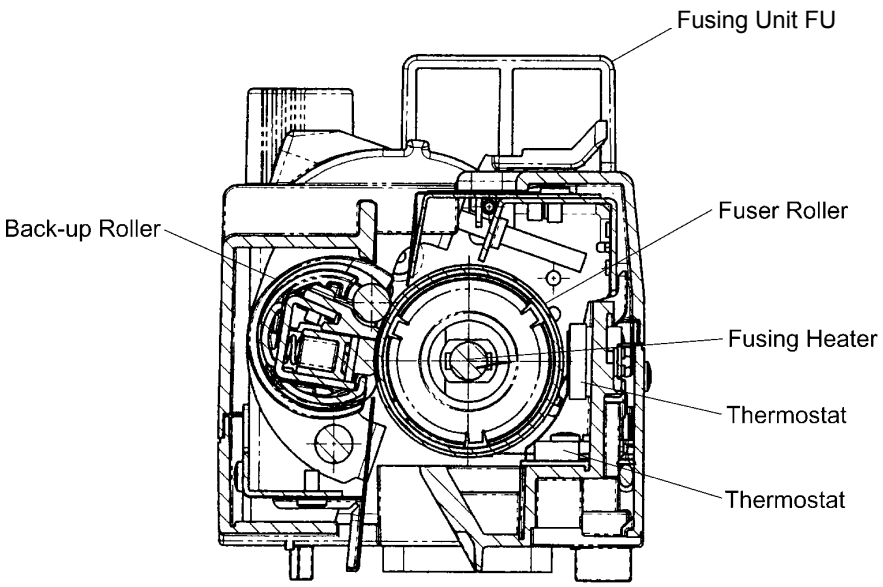


Fig. 9-22

Countermeasures

(1) Clean off the stain of the fuser roller by carrying out the blank printing for couple of pages.

(2) Replace the fusing unit FU with a new fusing unit FU.

(3) Replace the transfer roller ASSY PU with a new transfer roller ASSY PU.

I-22	White Print

Phenomenon

A blank page (no print at all) is output or a specific color is missing (not printed) as shown in print sample [22] of Fig.9-1.

Main Causes

(1) The laser beam path is shielded by the paper.

(2) The toner cartridge is not sufficiently pressed in.

(3) The bias voltage of the transfer roller is not enough.
(Contact failure of the bias terminal of the HV power supply unit PU.)

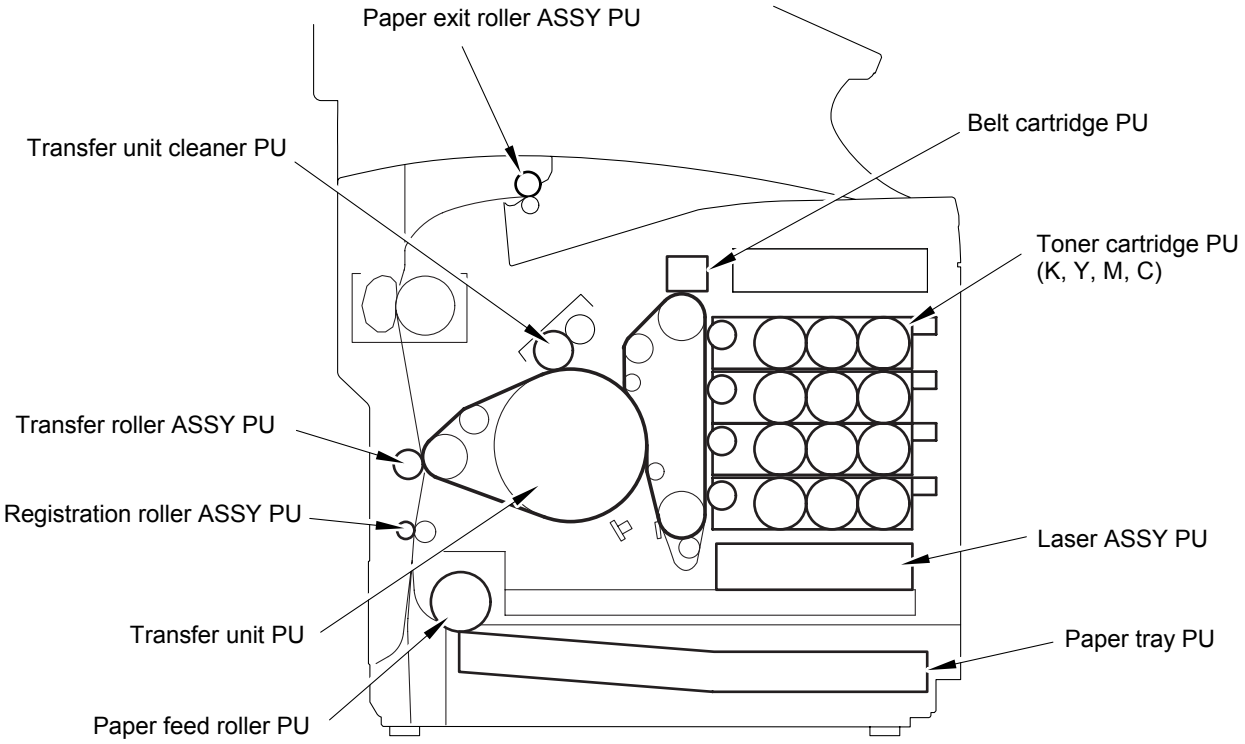


Fig. 9-23

Countermeasures

(1) Check any paper or other foreign particles to lie in the laser beam path.

(2) Replace the toner cartridge PU with a new toner cartridge PU.

(3) Check the retract solenoid structure.

(4) Check if the transfer roller ASSY PU is installed properly or not.

(5) Replace the HV power supply unit PU with a new HV power supply unit PU.

I-23	Insufficient Fusing

Phenomenon

Printed image is partially missing as shown in print sample [23] of Fig.9-1. This proves that the fusing is insufficient.

Main Causes

(1) The fuser tension-release lever is open. The shipping pieces are not removed.

(2) Wrong selection of print media (label or envelope, etc.) at the host (driver) side.

(3) Recommended paper is not being used.

(4) Failure of the fusing unit.

Countermeasures

(1) Return the fuser tension-release lever. Remove the shipping pieces.

(2) Adjust the mode of host side to suit the print media in use.

(3) Use the recommended paper.

(4) Replace the failed fusing unit with a new one.

I-24	Uneven Density (Right & Left)

Phenomenon

The optical density is different between the right and left side of the printed image.

Main Causes

(1) The amount of toner in the toner cartridge PU is short.
(2) The retract operation of the toner cartridge PU is not properly done.
(3) The belt of the toner cartridge PU is deformed.
(4) The belt of the transfer unit is deformed.
(5) The transfer roller ASSY PU is not properly installed.
(6) The back cover ASSY PU is deformed.
(7) The back cover ASSY PU is not locked sufficiently
(8) The dustproof glass of laser ASSY PU is stained.

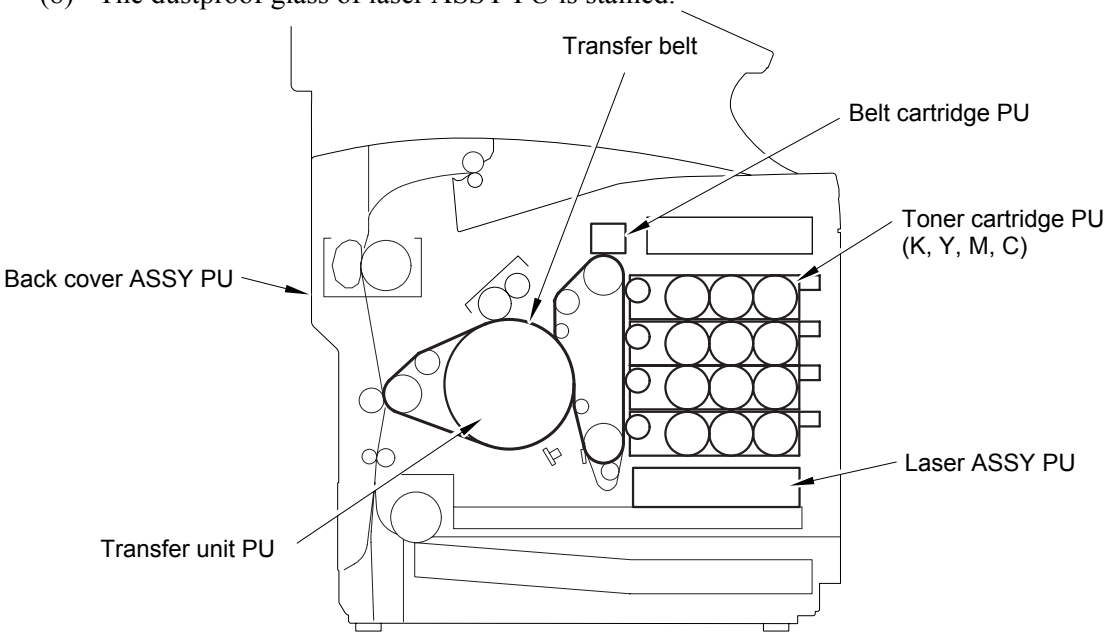


Fig. 9-24

Countermeasures

(1) Replace the toner cartridge PU.
(2) Check the toner retract clutch PU.
(3) Replace the belt cartridge PU.
(4) Confirm the proper installation of the transfer roller ASSY PU.
(5) Replace the transfer roller ASSY PU.
(6) Ensure to lock the back cover ASSY PU.
(7) Replace the back cover ASSY PU.
(8) Clean the laser ASSY PU.
(9) Replace the laser ASSY PU.

I-25	Horizontal white line

Phenomenon

White line appears in the horizontal direction, as shown in print sample [25] of Fig.9-1.

Main Causes

(1) There is a crack at the end of the OPC belt.

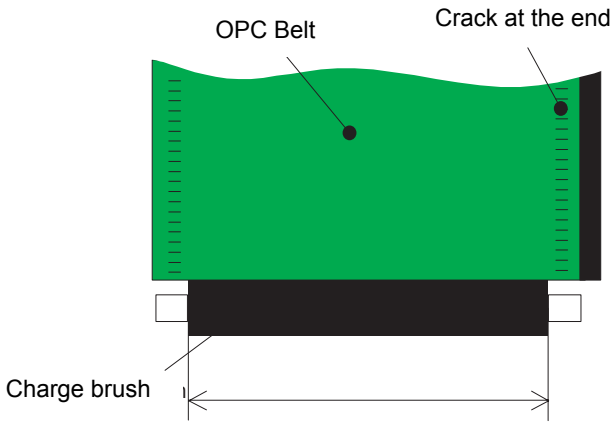


Fig. 9-25

Countermeasures

(1) Replace the OPC belt with the one supplied as an accessory, which has a barcode label on the bottom of its packaging.

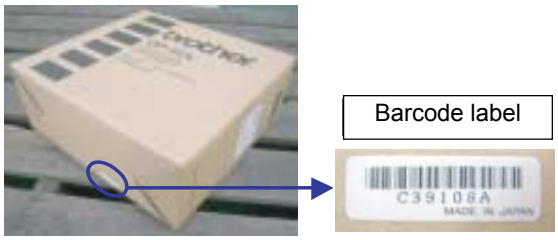


Fig. 9-26

[3] Paper transport error

Paper is transported through the path shown in Fig.9-27. Paper jams at the following locations are easily cleared.

- Paper Feeding Part
- Fuser Part
- Transfer Part
- Paper Exiting Part

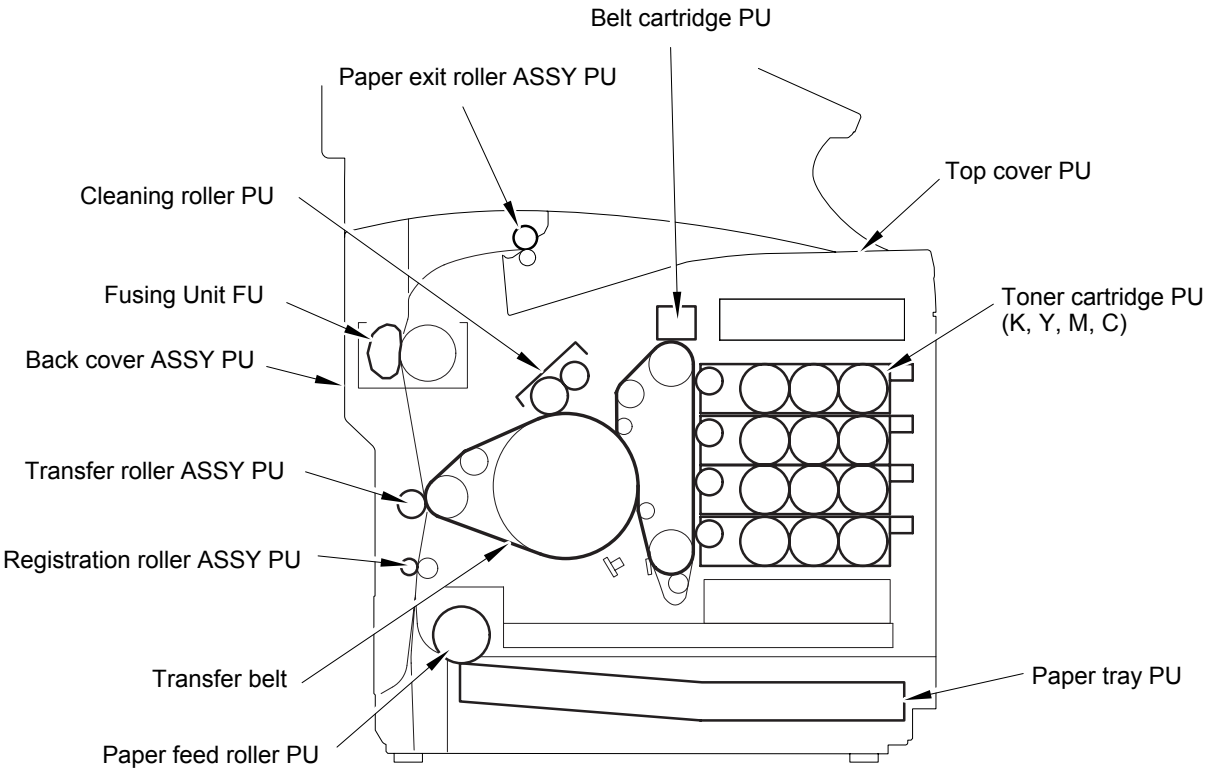


Fig. 9-27

(1) Feed Jam

Problem item	P#	Check item	Result	Corrective action
Print Paper	1	Is the print paper the recommended paper?	NO	Use the recommended paper.
	2	Is the print paper humid? (Has the paper been abandoned?)	YES	Replace the existing papers with new papers.
Paper Cassette PU	3	Is the print paper set in place?	NO	Set the paper in the proper place.
	4	Is the end plate properly set up?	NO	Set the end plate to meet the paper size.
Pick-up Roller PU	5	Is the print paper caught in the paper feeder part?	YES	Remove the paper being caught.
	6	Is the paper feed roller damaged?	NO	Replace the damaged paper feed roller.

(2) Inner Jam

Problem item	P#	Check item	Result	Corrective action
Transportation Part		Open the back cover assy PU for check.		
	1	Is there any paper inside the unit?	YES	Remove the paper inside.
	2	Is the transfer roller firmly locked by the lock lever?	NO	Fix the transfer roller with the lock lever.
Fusing unit	3	Is the fusing unit properly locked?	NO	Fix the fusing unit with the FU lock lever.
	4	Is there any paper caught between the rollers?	YES	Remove the caught paper.

[4] Incorrect printout

When the data is not printed correctly as it is seen on the PC screen, follow the procedures below in the event of a specific error.

P-1	The machine prints unexpectedly or it prints garbage.

User Check

(1) Check if the printer cable is not too long. It is recommended to use a parallel cable of less than 2 meters (6.6 feet) in length.
(2) Check that the printer cable is not damaged or broken. Check also that the printer cable is connected to the correct interface connectors of both the machine and PC.
(3) If an interface switching device is used, remove it and connect the computer directly to the machine and try again.
(4) Check that the appropriate printer driver is selected as 'Set as Default'. Check also that the correct print port is set for the selected printer driver.
(5) Check that the machine is not connected to the same port which is also connected to a mass storage device or scanner. Remove all other devices and connect the port to the machine only. Turn off the machine status monitor in the device options tab in the printer driver.
(6) If the print port is set as an ECP port, change it to a normal port.
(7) Try printing the test page.
(8) Try resetting the factory settings.

Possible cause	Step	Check	Result	Remedy
Failure inside the machine	1	Is it possible to print the test?	No	Identify the error type, and then refer to the specified section of this chapter.

NOTE: If the machine prints garbage or incorrect fonts, instruct the user to use the 'Troubleshooting for machine won't print' tool of the self-diagnostics tools. If the problem cannot be solved, instruct user to use the 'Diagnostics' tool described in the Chapter 7 so that you can get a log file to investigate the cause of the problem.

P-2	Unable to print full pages of a document with the "PRINT OVERRUN" message.

User Check

(1) Press the **Black Start** key on the control panel to print the data remaining in the machine.
(2) If this does not clear the error, reduce the complexity of your document or reduce the machine resolution.
(3) Change the following setting in the machine driver and try again. The best combination of settings below will vary depending on your document.
Graphic Mode / TrueType™ mode

NOTE: This problem may appear if the data is too complex. If it is not cleared by taking the actions above, it will be impossible to print such data under the machine specifications.

P-3	Unable to print full pages of a document with the “MEMORY FULL” message.

User Check

(1) Press the **Start** key on the control panel to print the data remaining in the machine.

(2) Reduce the complexity of your document or reduce the machine resolution.

NOTE: This problem may appear if the data is too complex.

Possible cause	Step	Check	Result	Remedy
Main PCB failure	1	Is it possible to print after reducing the data of a document?	Yes	Replace the main PCB.

P-4	Headers or footers are not printed out even though they are viewed on PC screen.

User Check

Most laser printers have a restricted area that cannot be printed on. Usually the first two lines and last two lines of text cannot print (leaving 62 printable lines). Adjust the top and bottom margins in your document to allow for this.

P-5	The machine sometimes prints a couple of characters and then ejects the page.

User Check

(For DOS environment only)

The application machine emulation setting and the machine’s emulation do not match. Check in the application software which machine you have selected to make sure the machine is set up correctly. Remember that the machine emulates widely used machine selections:

HP Laser Jet 6P, HP Laser Jet 6P, Epson FX-850, IBM proprinter XL

Try setting the machine into HP emulation and then select the HP LaserJet 6P printer in the application software.

[5] Network problem

If the error related to network occurs, refer to the following sections;

□ Installation problem

The Brother print server is not found during setup of the network print software installation or from the printer driver of the Brother printer in Windows®.

The Brother print server is not found using the Simple Network Configuration capabilities of Mac OS® X.

Make sure you have completed the IP address setting of the Brother print server according to Chapter 2 of this User's Guide before installing the network print software or printer driver. Check the following:

1. Make sure that the machine is powered on, is on-line and ready to print.
2. Check to see if there is any LED activity. Brother print servers have two LEDs on the back panel of the machine. The upper side LED shows link status. The lower side LED shows activity (Receive/Transmit) status.
   No light: If both LEDs are off, then the print server is not connected to the network.
   Link LED is green: The link LED indicates green if the print server is connected to a Ethernet network.
3. Print the printer settings page and check if the settings such as IP address settings are correct for your network. The problem may be the result of mismatched or duplicate IP address. Verify that the IP address is correctly loaded into the print server. And make sure that no other nodes on the network have this IP address.
4. Verify that the print server is on your network as follows:

For Windows®

Try pinging the print server from the host operating system command prompt with the command:

ping ipaddress

Where ipaddress is the print server IP address (note that in some instances it can take up to two minutes for the print server to load its IP address after setting the IP address).

For Macintosh®

For Mac OS® 9.1 to 9.2

(1) From the **Apple** menu, open the **Chooser**.

(2) Click the **Brother Laser (IP)** icon, and make sure that your print server name appears in the right frame. If it is visible, then the connection is good. Otherwise, go to Step 5.

For Mac OS® X 10.2.4 or greater

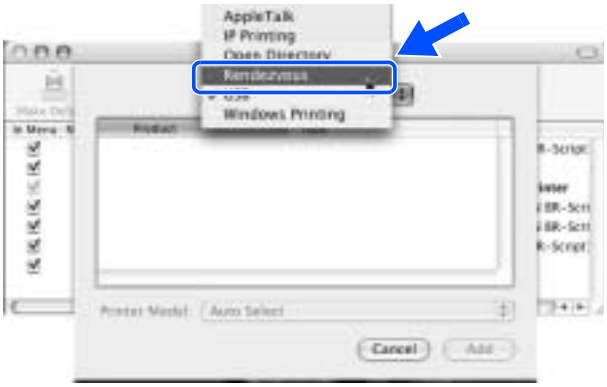
(1) From the **Go** menu, select **Applications**.

(2) Open the **Utilities** folder.

(3) Double-click the **Printer Setup Utility** icon.

(4) Click **Add**.

(5) Make the following selection. Make sure that your print server appears. If it is visible, then the connection is good. Otherwise, go to Step 5.



5. If you have tried 1 to 4 above and it does not work, then reset the print server back to the default factory settings and try from the initial setup again. For information how to reset to the default factory settings.
6. Check if a personal firewall such as ICF (Internet connecting firewall) for Windows XP is running on your computer. If it is running, temporarily turn it off and try again.

NOTE: If none of the above steps are successful, there is almost certainly a hardware or network problem.

□ Printing problem

<Print job is not printed>

Make sure the status and configuration of the print server. Check following:

1. Make sure that the machine is powered on, is on-line and ready to print.
2. Print the Printer Settings Page of the machine and check if the settings such as IP address settings are correct for your network. The problem may be the result of mismatched or duplicate IP address. Verify that the IP address is correctly loaded into the print server. And make sure that no other nodes on the network have this IP address.
3. Verify that the print server is on your network as follows:

For Windows®

(1) Try pinging the print server from the host operating system command prompt with the command:

ping ipaddress

Where ipaddress is the print server IP address (note that in some instances it can take up to two minutes for the print server to load its IP address after setting the IP address).

(2) If a successful response is received, then proceed to Windows® 95/98/Me and Windows NT® 4.0 Peer-to-Peer print (LPR) troubleshooting, and Windows® 2000/XP IPP troubleshooting. Otherwise, proceed to Step 4.

For Macintosh®

For Mac OS® 9.1 to 9.2

(1) From the **Apple** menu, open the **Chooser**.

(2) Click the **Brother Laser (IP)** icon, and make sure that your print server name appears in the right frame. If it is visible, then the connection is good. Otherwise, go to Step (4).

For Mac OS® X 10.2.4 or greater

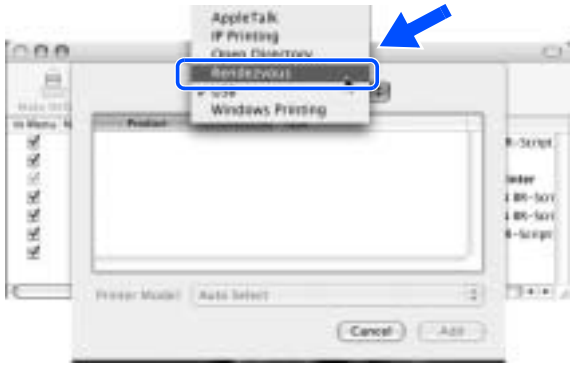
(1) From the **Go** menu, select **Applications**.

(2) Open the **Utilities** folder.

(3) Double-click the **Printer Setup Utility** icon.

(4) Click **Add**.

(5) Make the following selection. Make sure that your print server appears. If it is visible, then the connection is good.



4. If you have tried 1 to 4 above and it does not work, then reset the print server back to the default factory settings and try from the initial setup again.

<Error during printing>

If you try to print while other users are printing large amounts of data (e.g. many pages or color pages with high resolution), the machine is unable to accept your print job until the ongoing printing is finished. If the waiting time of your print job exceeds a certain limit, a time out situation occurs, which causes the error message. In such situations, execute the print job again after the other jobs are completed.

□ Protocol-specific troubleshooting

<Windows® 95/98/Me and Windows NT® 4.0 Peer-to-Peer print (LPR) troubleshooting>

If you are having trouble printing on a Windows® 95/98/Me, Windows NT® 4.0 or later Peer-to-Peer network (LPR method), check the following:

1. Make sure that the Brother LPR Port driver is correctly installed and configured according to the Windows® 95/98/Me or Windows NT® 4.0 Peer-to-Peer chapters.

2. Try to turn the **Byte Count** on in the **Configure port** area of printer driver properties.

You may find that during the installation of BLP software, the screen that prompts you for a Port name is not displayed. This may happen on some Windows® 95/98/Me and Windows NT® 4.0 computers. Press the ALT and TAB keys to make it appear.

<Windows® 95/98/Me and Windows NT® 4.0 Peer-to-Peer print (NetBIOS) troubleshooting>

If you are having trouble printing on a Windows® 95/98/Me, Windows NT® 4.0 or later Peer-to-Peer network (NetBIOS), check the following:

1. Make sure that the Brother NetBIOS Port driver is correctly installed and configured according to the Windows® 95/98/Me or Windows NT® 4.0 Peer-to-Peer (NetBIOS) chapters. You may find that during the installation of the port driver, the screen that prompts you for a Port name is not displayed. This happens on some Windows® 95/98/Me and Windows NT® 4.0 computers. Press the ALT and TAB keys to make it appear.
2. Make sure that the print server is configured to be in the same workgroup or domain as the rest of your computers. It may take several minutes for the print server to appear in the network neighborhood.

<Windows® 2000/XP IPP troubleshooting>

Want to use a different Port number other than 631.

If you are using Port 631 for IPP printing, you may find that your firewall may not let the print data through. If this is the case, use a different port number (port 80), or configure your firewall to allow Port 631 data through.

To send a print job using IPP to a machine using port 80 (the standard HTTP port) enter the following when configuring your Windows® 2000/XP system.

http://ip_address/ipp

Get More Info option in Windows® 2000 not working

If you are using a URL of:

http://ip_address:631 or http://ip_address:631/ipp ,

the **Get More Info** option in Windows® 2000 will not function. If you wish to use the **Get More Info** option, use the following URL:

http://ip_address

<Web browser troubleshooting (TCP/IP)>

1. If you can not connect to the print server using your web browser it may be worth checking the proxy settings of your browser. Look in the exceptions setting and if necessary, type in the IP address of the print server. This will stop your PC from trying to connect to your ISP or proxy server every time you wish to look at the printer server.
2. Make sure that you are using the proper web browser, we recommend Netscape Navigator® version 4.0 or later/ Microsoft Internet Explorer® version 5.0 or later.

[6] Troubleshooting of the control panel

L-1	Nothing is displayed on the LCD.

User Check

(1) Verify if the power switch is turned off.

Possible cause	Step	Check	Result	Remedy
Connection between main PCB and control panel PCB	1	Main PCB and control panel PCB are properly connected	No	Fix the connector properly.
Harness between main PCB and control panel PCB	2	Harness is damaged.	Yes	Replace the harness with a normal part.
Connection between main PCB and low-voltage power supply PCB	3	Main PCB and low-voltage power supply PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and low-voltage power supply PCB LCD	4	Harness is damaged.	Yes	Replace the harness with a normal part.
LCD	5	Replacement of LCD solves the problem.	Yes	Replace the LCD with a normal part.
Control panel PCB	6	Replacement of control panel PCB solves the problem.	Yes	Replace the control panel PCB with a normal part.
Low-voltage power supply PCB	7	Replacement of low-voltage power supply PCB solves the problem.	Yes	Replace the low-voltage power supply PCB with a normal part.
Main PCB	8	Replacement of main PCB solves the problem.	Yes	Replace the main PCB with a normal part.

L-2	The control panel does not work.

User Check

(1) No

Possible cause	Step	Check	Result	Remedy
Key sticking	1	Any key on control panel is stuck.	Yes	Clean up the panel cover, or remove the burrs from panel cover and panel keys.
Connection between main PCB and control panel PCB	2	Main PCB and control panel PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and control panel PCB	3	Harness is damaged.	Yes	Replace the harness with a normal part.
Rubber key	4	Replacement of rubber key solves the problem	Yes	Replace the rubber key with a normal part.
Control panel PCB	5	Replacement of control panel PCB solves the problem.	Yes	Replace the control panel PCB with a normal part.
Main PCB	6	Replacement of main PCB solves the problem.	Yes	Replace the main PCB with a normal part.

L-3	Printing from Macintosh applications fails.

User Check

(1) Verify that the printer driver supplied with the machine has been installed in the system folder and selected in the selector.

(2) Check the port selected in the selector. The selected port has to match the actual port to which the printer cable is connected.

Possible cause	Step	Check	Result	Remedy
Fault in machine	1	Test page can be printed using the method described in 8.1.4.5 'Test Pattern 1' in Chapter 8.	No	Check the symptom of the problem and refer to an appropriate section in this Chapter to solve the problem.
Breakage of main PCB	2	Printing can be made using an appropriate PC, printer cable, and RS-100M?	No	Replace the main PCB.

[7] Troubleshooting of fax functions

F-1	FAX can't send it.

User Check

(1) Verify that the telephone cord is securely inserted.

Possible cause	Step	Check	Result	Remedy
Dialing mode setting	1	Dialing signal (PB or DP) comes out normally in each mode. (Use telephone line emulator.)	Yes	Check the dialing mode setting at customer's again. Check the telephone line cord between machine and socket.
Connection between main PCB and NCU PCB	2	Main PCB and NCU PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and NCU PCB	3	Harness is damaged.	Yes	Replace the harness with a normal part.
Connection between main PCB and control panel PCB	4	Main PCB and control panel PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and control panel PCB	5	Harness is damaged.	Yes	Replace the harness with a normal part.
Contact of rubber key	6	The rubber key works correctly.	No	Replace the rubber key with a normal part.
NCU PCB	7	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB with a normal part.
Control panel PCB	8	Replacement of control panel PCB solves the problem.	Yes	Replace the control panel PCB with a normal part.
Main PCB	9	Replacement of main PCB solves the problem.	Yes	Replace the main PCB with a normal part.

F-2	Speed dialing and One-touch dialing can't be used.

Possible cause	Step	Check	Result	Remedy
Speed dialing, One-touch dialing	1	A fax transmission can be made using the key, ten?	Yes	Replace the main PCB.
Dialing mode setting	2	Dialing signal (PB or DP) comes out normally in each mode. (Use telephone line emulator.)	Yes	Check the dialing mode setting at customer's again. Check the telephone line cord between machine and socket.
Connection between main PCB and NCU PCB	3	Main PCB and NCU PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and NCU PCB	4	Harness is damaged.	Yes	Replace the harness with a normal part.
Connection between main PCB and control panel PCB	5	Main PCB and control panel PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and control panel PCB	6	Harness is damaged.	Yes	Replace the harness with a normal part.
Rubber key	7	Replacement of rubber key solves the problem.	Yes	Replace the rubber key with a normal part.
NCU PCB	8	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB with a normal part.
Control panel PCB	9	Replacement of control panel PCB solves the problem.	Yes	Replace the control panel PCB with a normal part.

F-3	FAX can't be received.

User Check

(1) Verify that the telephone cord is securely inserted.

Possible cause	Step	Check	Result	Remedy
Receive mode setting	1	Receive mode is set to automatic receive mode.	No	Set the receive mode to automatic receive mode.
NCU PCB	2	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB with a normal part.
Main PCB	3	Replacement of main PCB solves the problem.	Yes	Replace the main PCB with a normal part.

F-4	No bell ring.

Possible cause	Step	Check	Result	Remedy
Ring delay	1	Ring delay is set to "0".	Yes	Set the ring delay to other than "0".
Ring volume	2	Ring volume is set to "OFF".	Yes	Set the ring volume to other than "OFF".
Connection between main PCB and scanner unit	3	Main PCB and scanner unit are properly connected.	No	Fix the connection properly.
Harness between main PCB and scanner unit	4	Harness is damaged.	Yes	Replace the harness with a normal part.
Connection between main PCB and NCU PCB	5	Main PCB and NCU PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and NCU PCB	6	Harness is damaged.	Yes	Replace the harness with a normal part.
Speaker	7	Replacement of speaker solves the problem.	Yes	Replace the speaker with a normal part.
NCU PCB	8	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB with a normal part.
Main PCB	9	Replacement of main PCB solves the problem.	Yes	Replace the main PCB with a normal part.

F-5	Speaker is silent during on-hook dialing.

Possible cause	Step	Check	Result	Remedy
Connection between main PCB and speaker	1	Main PCB and speaker are properly connected.	No	Fix the connection properly.
Speaker	2	Replacement of speaker solves the problem.	Yes	Replace the speaker with a normal part.
Connection between main PCB and NCU PCB	3	Main PCB and NCU PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and NCU PCB	4	Harness is damaged.	Yes	Replace the harness with a normal part.
Connection between main PCB and control panel PCB	5	Main PCB and control panel PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and control panel PCB	6	Harness is damaged.	Yes	Replace the harness with a normal part.
NCU PCB	7	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB with a normal part.
Main PCB	8	Replacement of main PCB solves the problem.	Yes	Replace the main PCB with a normal part.

F-6	Dialing function does not switch between "tone" and "pulse".

Possible cause	Step	Check	Result	Remedy
Connection between main PCB and NCU PCB	1	Main PCB and NCU PCB are properly connected.	No	Fix the connection properly.
Harness between main PCB and NCU PCB	2	Harness is damaged.	Yes	Replace the harness with a normal part.
NCU PCB	3	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB with a normal part.
Main PCB	4	Replacement of main PCB solves the problem.	Yes	Replace the main PCB with a normal part

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APPENDIX 1. SERIAL NUMBERING SYSTEM

This appendix shows the location of serial number labels put on some parts and lists the coding information pertaining to the serial numbers.

SERIAL NUMBERING SYSTEM

Individual machines have a serial number label for the machine itself and a property label for the head/carriage unit.

This section lists the coding information for those serial numbers and property codes.

[1] Serial No. Descriptions

The descriptions as below show how to read labels on each place.

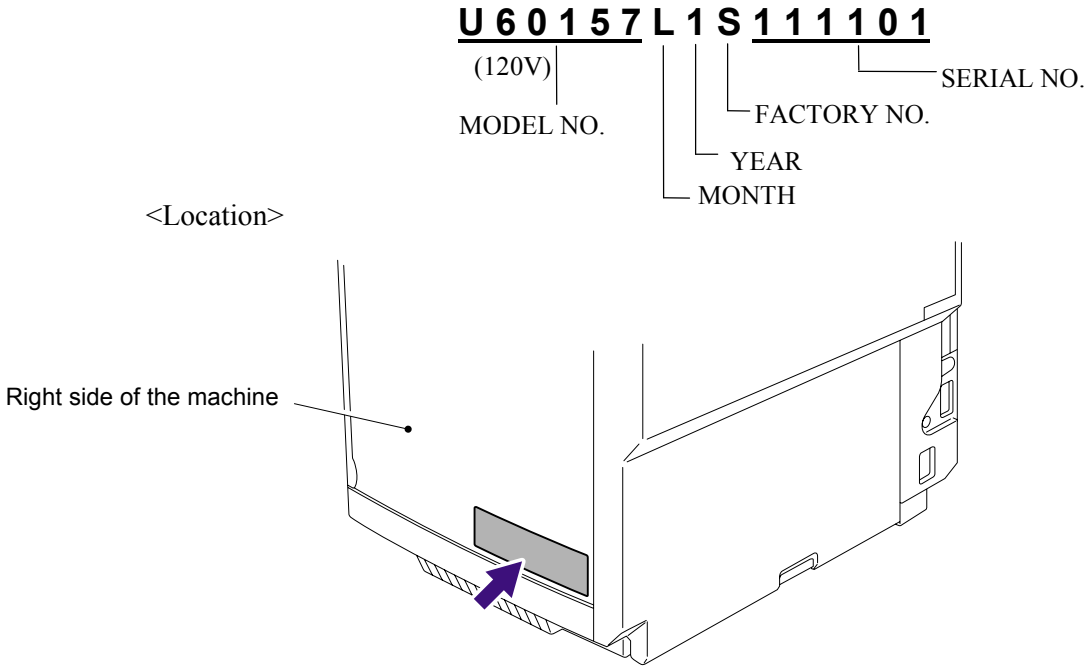
< ID for production month of Machine >

A: January	E: May	J: September
B: February	F: June	K: October
C: March	G: July	L: November
D: April	H: August	M: December

< ID for production month of other parts than the machine >

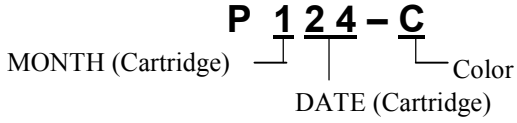
1: January	5:	May	9:	September
2: February	6:	June	X:	October
3: March	7:	July	Y:	November
4: April	8:	August	Z:	December

(1) Machine

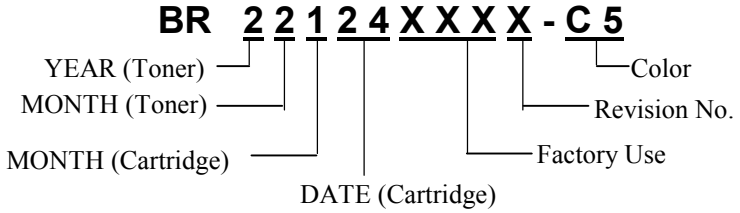


(2) Toner Cartridge

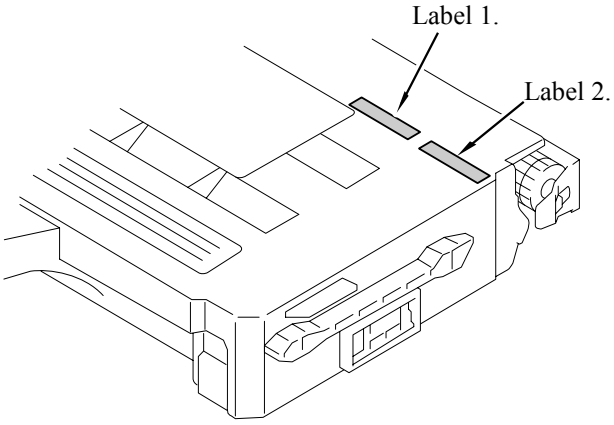
[Label 1]



[Label 2]



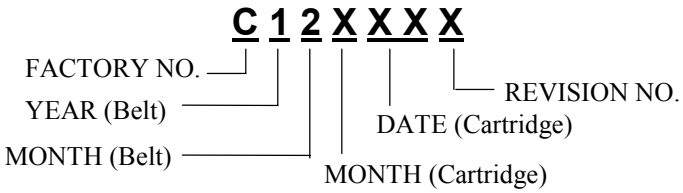
<Location>



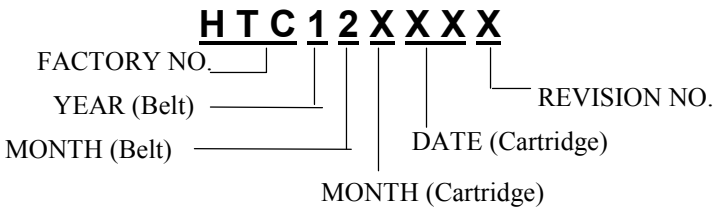
NOTE: There are two labels on each toner cartridge. There is a "P" mark with the starter toner on the label 1. There is "BR" written as noted above on the label 2.

(3) OPC Belt Cartridge

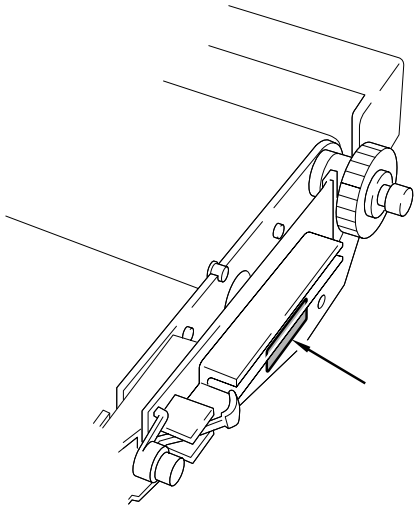
[Until the 30th of August, 2004]



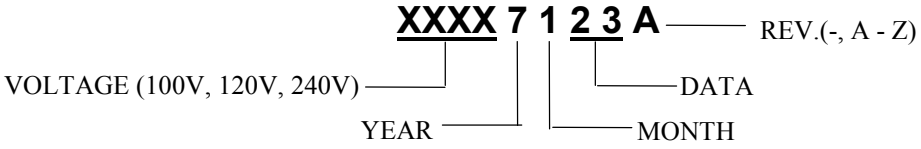
[From the 31st of August, 2004]



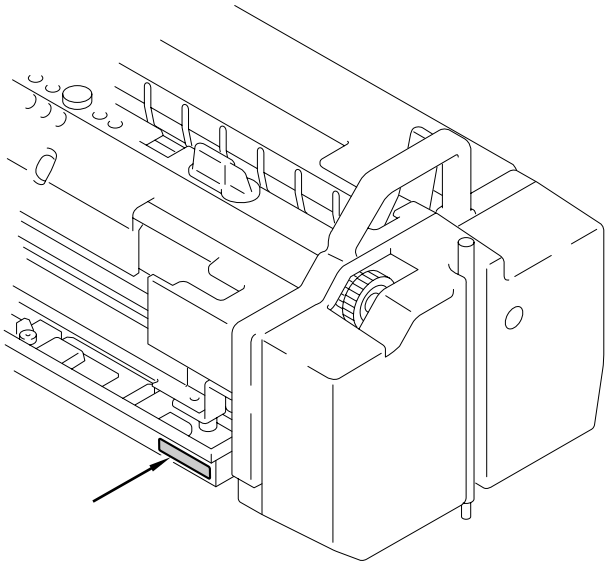
<Location>



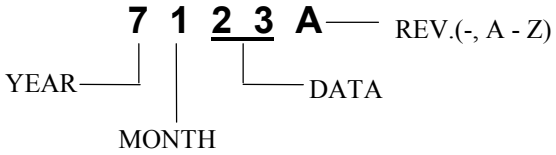
(4) Fusing Unit



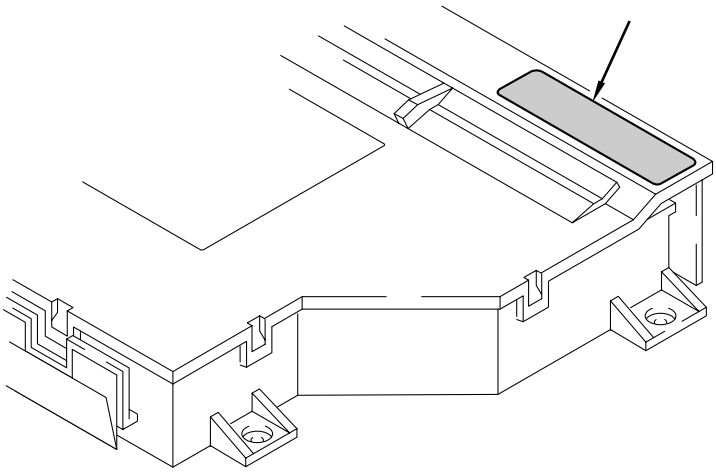
<Location>



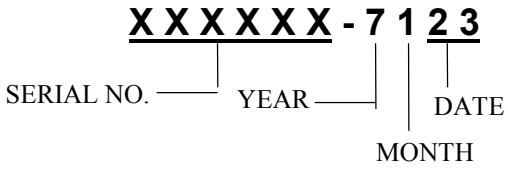
(5) Scanner Unit



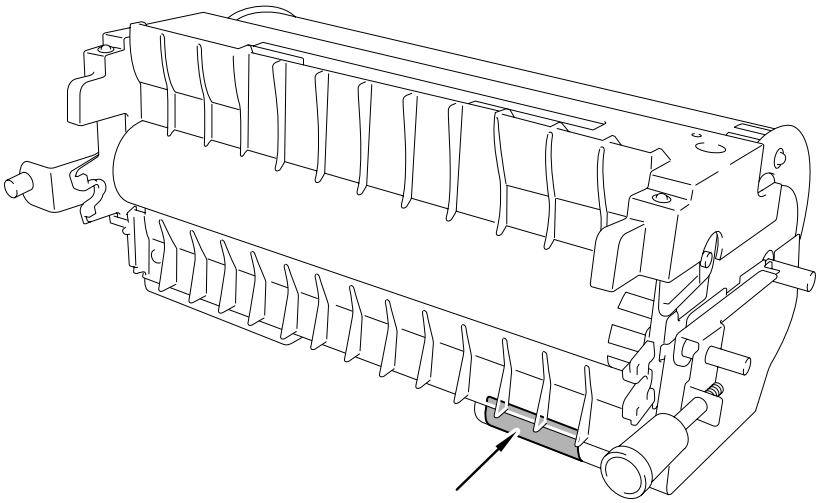
<Location>



(6) Transfer Unit



<Location>



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APPENDIX 2. FIRMWARE INSTALLATION

This appendix provides instructions on how to update firmware stored in the flash ROM on the main PCB or load firmware to a new main PCB from the host PC.
No hardware replacement is required for updating.

A2.1 INSTALLING THE UPDATE DATA TO THE MACHINE

If you want to update the current program stored in the flash ROM of the main PCB to the newer version or after you replace the main PCB, install the update program onto the flash ROM.

The program installation requires a PC/AT-compatible computer (which is capable of running MS-DOS or its compatible OS).

■ If you use parallel interface

Connecting the Machine to Your PC

(1) Make sure that your PC is turned off.

(2) Make sure that the power cord of the machine is unplugged from a wall socket or other power source.

(3) Connect the parallel interface cable to the parallel port on the back of the machine and secure it with the lock wires.

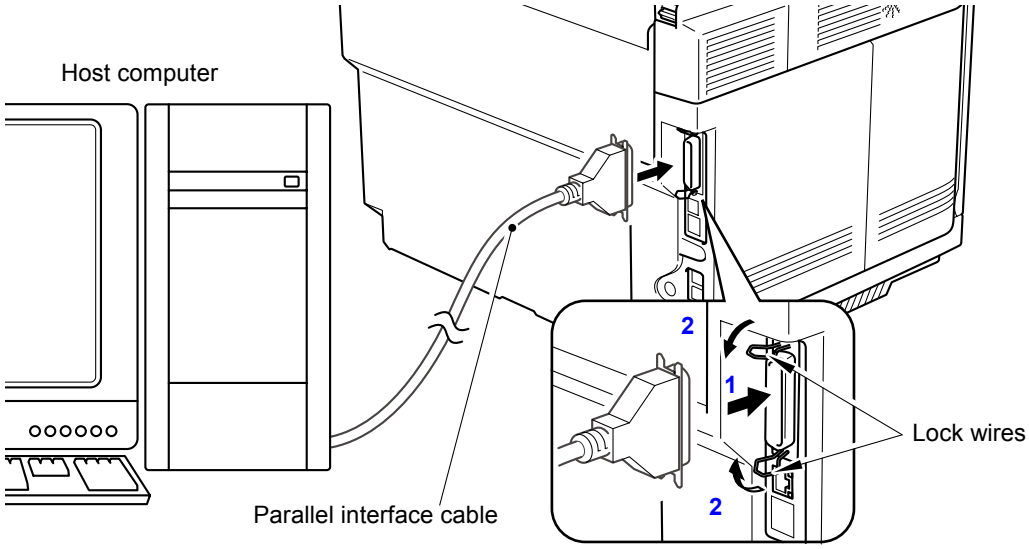
(4) Connect the other end of the interface cable to the machine port of your PC and secure it with the two screws.

Setting up the Machine and Your PC

(1) Plug the power cord of the machine into a wall socket, and turn on the power switch while pressing the **5** key on the machine's control panel.

(2) Check to see that the following pattern displays on the LCD. If it does not display, go back to step (2) above.

(3) Turn on your PC.



Installing the Update Data onto the Flash ROM of the Machine

■ On a PC running Windows 95

(1) Copy the update data and transfer utility onto the desired same directory of the hard disk. e.g., C:\UPDATE

(2) Click the **Black Start** button, point to Programs, and then click MS-DOS Prompt to open an MS-DOS window.

(3) Type the drive letter where the update data and transfer utility are located. In the above example, type C:\ from the command line and press the **Enter** key.
Then type CD UPDATE and press the **Enter** key.

(4) To start the transfer utility transmitting the update data to the flash ROM of the machine, type the following:

ICEN *filename* /b
Where *filename* is an update data file, e.g., 7820xxxx.dat.
Then press the **Enter** key.
During downloading, the machine beeps *intermittentl*y.
Upon completion of the downloading, the machine beeps *continuousl*y.

NOTE: If the machine cannot return to the standby state after completion of downloading, turn the power off and on.

■ On a PC running Windows 98/Me/2000

(1) Install the printer driver for the parallel port to your PC. (Once installed, no more printer driver is required for your PC.)

(2) Copy the update data onto the desired directory of the hard disk.
e.g., C:\UPDATE

(3) Copy the transfer utility "Filedg32.exe" onto the desired directory of the hard disk.

(4) Run "Filedg32.exe".
The Filedrgs window will appear as shown below.

(5) Drag and drop the update data onto the icon of the model being used in the Filedrgs windows.
During downloading, the machine beeps *intermittentl*y.
Upon completion of the downloading, the machine beeps *continuousl*y.

NOTE: If the machine cannot return to the standby state after completion of downloading, turn the power off and on.

■ If you use USB cable

Preparation

You need to have the BHL2-Maintenance Printer driver and FILEDG32.exe (provided by Brother Industries) on hand. Save them in an arbitrary folder in your PC.

Installing the BHL2-Maintenance Printer driver

To identify terminals connected via USB interface, a PC requires the corresponding virtual USB devices to be implemented by driver/software. If you connect any number of machines to your PC, therefore, the same number of virtual USB devices will be automatically configured on your PC. To prevent virtual USB devices from being configured limitlessly, use the unique driver installation procedure described below that enables your PC to identify terminals via a single virtual USB device.

NOTE: Once this installation procedure is carried out for a PC, no more driver/software installation will be required for that PC to identify machines. If the BHL2-Maintenance Printer driver has been already installed to your PC according to this procedure, skip this section.

NOTE: Before proceeding to the procedure given below, make sure that the BHL2-Maintenance Printer driver is stored in your PC.

(1) Make sure that the power cord of the machine is unplugged from the electrical outlet. If the machine is connected to a PC, unplug the USB cable.

(2) Switch on your PC.

(3) Plug the power cord of the machine into an electrical outlet.

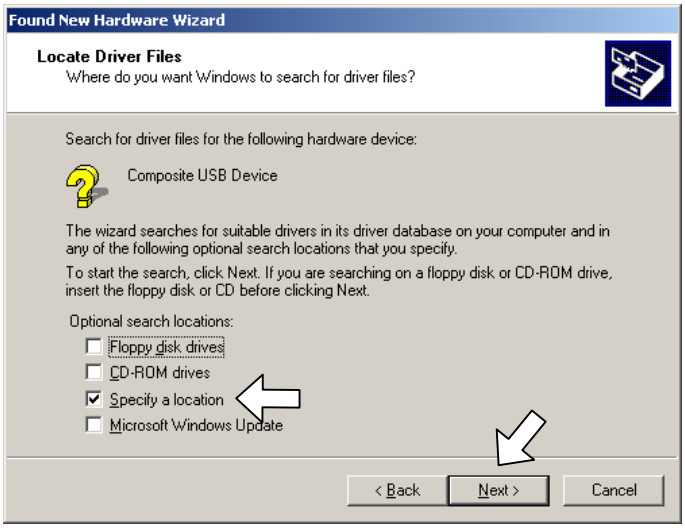
(4) Press the **Menu/Set** and **Black Start** keys. Next press the ▲ key four times to make the machine enter the maintenance mode. (Refer to Chapter 8.)

(5) Connect the machine to your PC using the USB cable.
The following window appears.

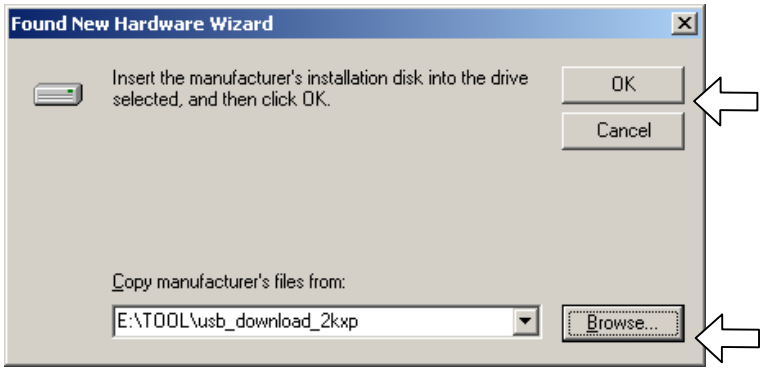
(6) The following screen appears, indicating the detection of new hardware device by the system. Click **Next** to proceed.

(7) Select "Search for a suitable driver for my device (recommended)" and click **Next**.

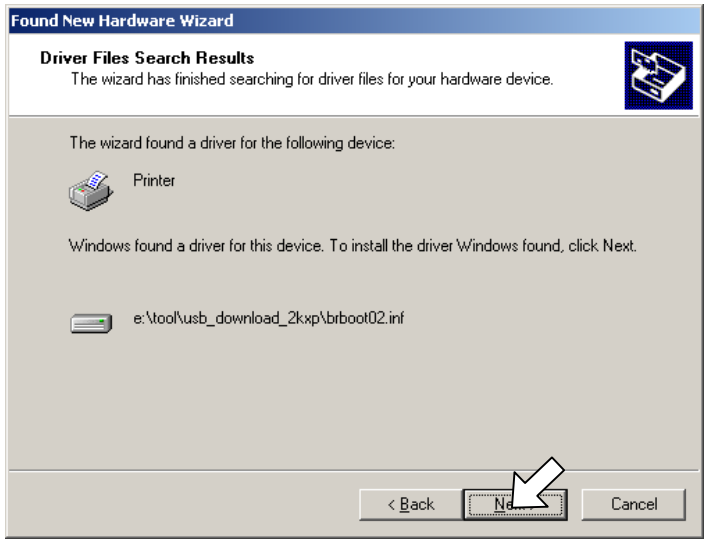
(8) Select "Specify a location" and click **Next**.



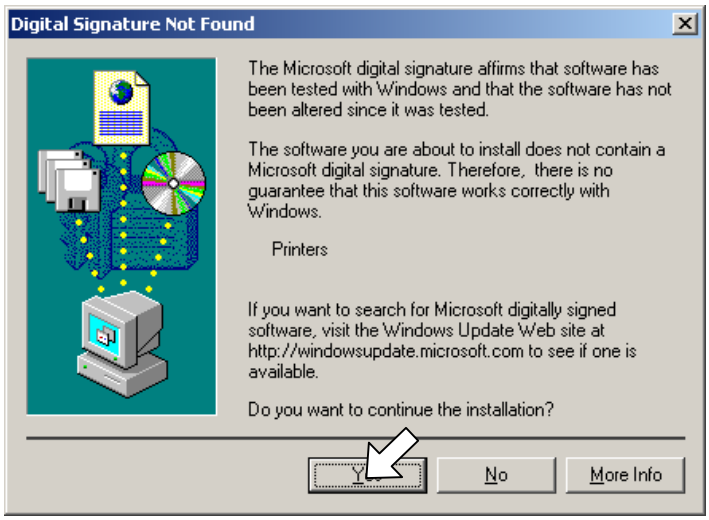
(9) Select the folder where the copy of the BHL2-Maintenance Printer driver is located (or click **Browse** to specify it), then click **OK**.
(This sample screen is captured on the Windows 2000 desktop.)



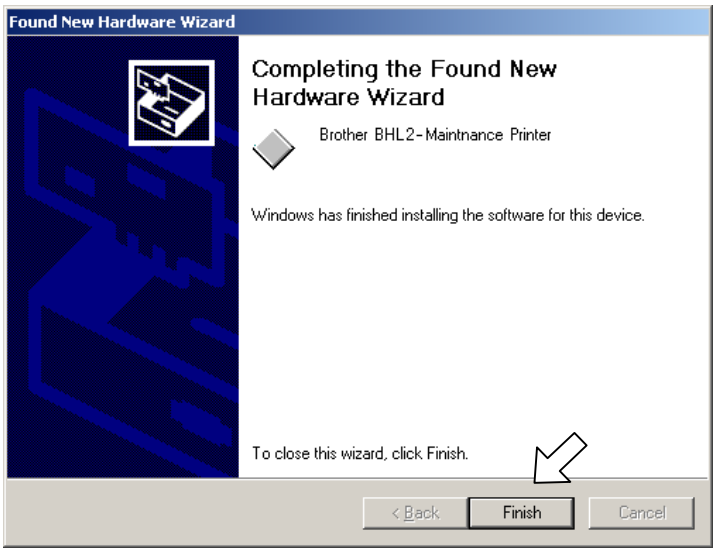
(10) Click **Next**.



(11) To proceed, click **Yes**.

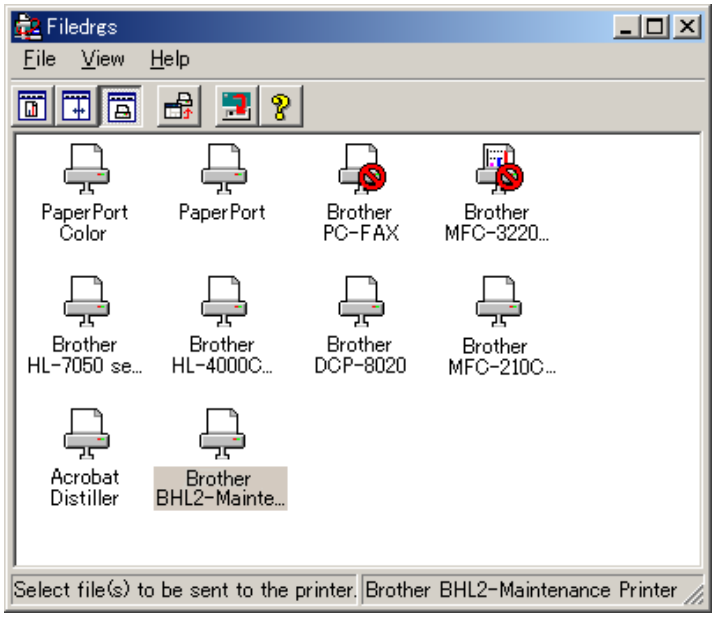


(12) If the driver is successfully installed, the following message window appears. Click **Finish** to return to Windows.



NOTE: After completion of the driver installation, if the machine exits the maintenance mode, the "Found New Hardware Wizard" screen in step (6) appears again. Click **Cancel**.

NOTE: To check that the printer driver is successfully installed, click **Start|Settings|Printers** to call up the Printers window as shown below and confirm that the Brother BHL2-Maintenance Printer icon is displayed.



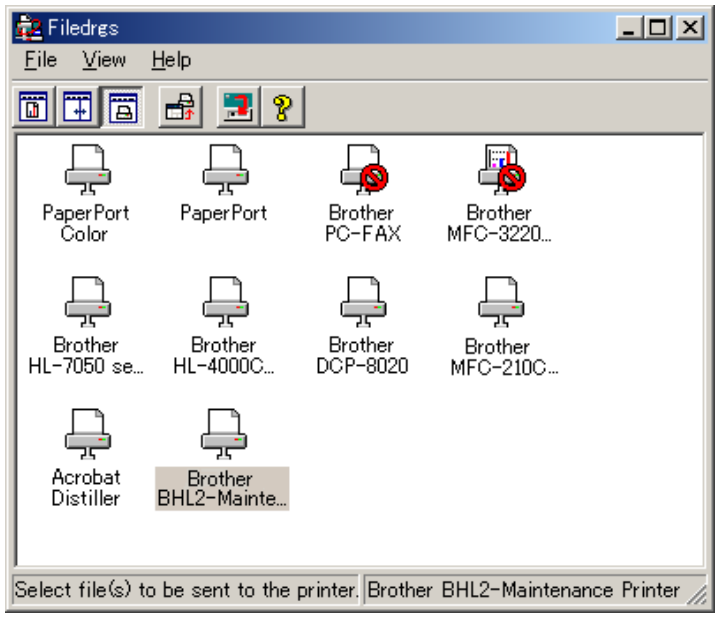
Writing the update programs/data onto the flash ROM of the machine

After the installation procedure of the printer driver, proceed to the firmware writing operation. If the printer driver has been installed so that you start from writing firmware, unplug the power cord from the electrical outlet.

While holding down the **5** key, plug the power cord into an electrical outlet.

NOTE: Never unplug the machine's or PC's power cord or the USB cable during writing.

(1) Run "FILEDG32.exe."
The Filedrgs window will appear as shown below.



(2) Drag and drop the firmware (e.g., LZ0023_A.upd) onto the BHL2-Maintenance Printer icon in the Filedrgs window shown above.

NOTE: Use a firmware file after extracting. It is a self-extracting file having the extension .exe. Double-click the exe file to extract it.

When writing operation starts, the machine beeps intermittently. After approx. 2 to 5 minutes, the writing operation is complete and the machine automatically reboots and returns to the standby state.

(3) Press the * and # keys at the same time when the machine is on standby. The firmware version appears on the LCD.

NOTE: The latest firmware will display its version on the LCD by pressing the **Stop** and ▲ key at the same time.

(4) If downloading finishes abnormally, turn the machine off and on. The machine automatically enters the write mode and emits a large beep. Perform the writing procedure above again.

A2.2 SETTING ID CODES TO MACHINES

Brother driver machines are assigned unique ID codes (character strings) at the factory. If you replace the main PCB of the machine, the machine will lose its assigned ID code so that it will not be identified by the connected PC*.

You need to assign a unique ID code (character string) to the machine according to the procedure given here. For models covered by this manual, set serial numbers given to individual machines as ID codes.

(* ID codes are essential when more than one machine is connected to a single PC via USB.)

Please check the printer driver of MFC-9420CN is installed in a host computer before working. When not installed. Please install a printer driver in a host computer before working.

(1) Double-click the brmainte.EXE file (maintenance utility).

(2) Select Input Information from Menu. Select the applicable model name.

(3) Check the port (USB) which the machine is connected through and click “Serial No.” in the lower box. Enter the serial number (the last nine digits) of the machine into the box at the right hand side and click the **OK** button. The serial number is shown in the window, and check that it is correct. The setting of the serial number is completed.

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APPENDIX 3. CUSTOMIZING CODES ACCORDING TO SHIPPING DESTINATION

This appendix lists the customizing codes for the various preferences exclusively designed for each destination (e.g. language). Those codes are stored in the memory (EEPROM) mounted on the main PCB. If the main PCB is replaced with a new one, therefore, you will need to set the proper customizing codes with the machine in the maintenance mode.

EEPROM CUSTOMIZING CODES

This function allows you to customize the EEPROM according to language, function settings, and firmware switch settings.

■ Operating Procedure

(1) Press the **Menu/Set** and **Black Start** keys. Next press the ▲ key four times to make the machine
enter the maintenance mode.

The machine beeps for approx. one second and displays "▮▮ MAINTENANCE ▮▮▮" on the LCD.

(2) Press the **7** and **4** keys in this order in the initial stage of the maintenance mode.
The current customizing code appears (e.g., 0001 in the case of U.S.A. model).

(3) Enter the desired customizing code (e.g., 0054 in the case of Europe model).
The newly entered code appears.

To enter letters "A" through "F", press the **1** through **6** keys while holding down the **#** key, respectively.

NOTE: If a wrong 4-digit code is entered, the machine will malfunction.

(4) Press the **Black Start** key.
The machine saves the setting and returns to the initial stage of the maintenance mode.
If you press the **Stop/Exit** key or no keys are pressed for one minute in the above procedure, the machine stops the procedure and returns to the initial stage of the maintenance mode.

MFC-9420CN

APPENDIX 4. FIRMWARE SWITCHES (WSW)

This appendix describes the functions of the firmware switches, which can be divided into two groups: one is for customizing preferences designed for the shipping destination (as described in Appendix 3) and the other is for modifying preferences that match the machine to the environmental conditions. Use the latter group if the machine malfunctions due to mismatching.

WSW No.	Function	Refer to:
WSW01	Dial pulse setting	App. 4-3
WSW02	Tone signal setting	App. 4-4
WSW03	PABX mode setting	App. 4-5
WSW04	TRANSFER facility setting	App. 4-6
WSW05	1st dial tone and busy tone detection	App. 4-7
WSW06	**Redial/Pause** key setting and 2nd dial tone detection	App. 4-9
WSW07	Dial tone setting 1	App. 4-11
WSW08	Dial tone setting 2	App. 4-12
WSW09	Protocol definition 1	App. 4-13
WSW10	Protocol definition 2	App. 4-14
WSW11	Busy tone setting	App. 4-15
WSW12	Signal detection condition setting	App. 4-16
WSW13	Modem setting	App. 4-17
WSW14	AUTO ANS facility setting	App. 4-18
WSW15	REDIAL facility setting	App. 4-19
WSW16	Function setting 1	App. 4-20
WSW17	Function setting 2	App. 4-21
WSW18	Function setting 3	App. 4-22
WSW19	Transmission speed setting	App. 4-23
WSW20	Overseas communications mode setting	App. 4-24
WSW21	TAD setting 1	App. 4-25
WSW22	ECM and call waiting caller ID	App. 4-26
WSW23	Communications setting	App. 4-27
WSW24	TAD setting 2	App. 4-28
WSW25	TAD setting 3	App. 4-29
WSW26	Function setting 4	App. 4-30
WSW27	Function setting 5	App. 4-31
WSW28	Function setting 6	App. 4-32
WSW29	Function setting 7	App. 4-33
WSW30	Function setting 8	App. 4-34
WSW31	Function setting 9	App. 4-35
WSW32	Function setting 10	App. 4-36
WSW33	Function setting 11	App. 4-37
WSW34	Function setting 12	App. 4-38
WSW35	Function setting 13	App. 4-39
WSW36	Function setting 14	App. 4-40
WSW37	Function setting 15	App. 4-41

WSW No.	Function	Refer to:
WSW38	V.34 transmission settings	App. 4-42
WSW39	V.34 transmission speed	App. 4-43
WSW40	V.34 modem settings	App. 4-44
WSW41	ON-duration of the scanning light source	App. 4-46
WSW42	Internet mail settings	App. 4-47
WSW43	Function setting 21	App. 4-47
WSW44	Speeding up scanning-1	App. 4-48
WSW45	Speeding up scanning-2	App. 4-49
WSW46	Monitor of power ON/OFF state and parallel port kept at high	App. 4-50
WSW47	Switching between high- and full-speed USB	App. 4-51
WSW48	USB setup latency	App. 4-52
WSW49	End-of-copying beep and print in black	App. 4-52
WSW50	SDAA settings	App. 4-53
WSW51	Function setting 16	App. 4-53
WSW52	Not used	App. 4-53
WSW53	Function setting 17	App. 4-54
WSW54-60	Not used	App. 4-54

WSW01 (Dial pulse setting)

Selector No.	Function	Setting and Specifications
1 2	Dial pulse generation mode	No. 1 2 0 0 : N 0 1 : N+1 1 0 : 10-N 1 1 : N
3 4	Break time length in pulse dialing	No. 3 4 0 0 : 60 ms 0 1 : 67 ms 1 0 : 40 ms (for 16 PPS) 1 1 : 64 ms (at 106-ms intervals)
5 6	Inter-digit pause	No. 5 6 0 0 : 800 ms 0 1 : 850 ms 1 0 : 950 ms 1 1 : 600 ms
7	Switching between pulse (DP) and tone (PB) dialing, by the function switch	0: Yes 1: No
8	Default dialing mode, pulse (DP) or tone (PB) dialing	0: PB 1: DP

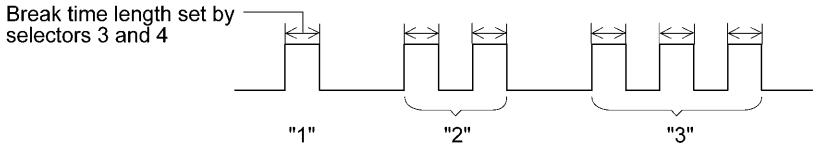
- **Selectors 1 and 2: Dial pulse generation mode**

  These selectors set the number of pulses to be generated in pulse dialing.

  N: Dialing "N" generates "N" pulses. (Dialing "0" generates 10 pulses.)
  N + 1: Dialing "N" generates "N + 1" pulses.
  10 - N: Dialing "N" generates "10 - N" pulses.

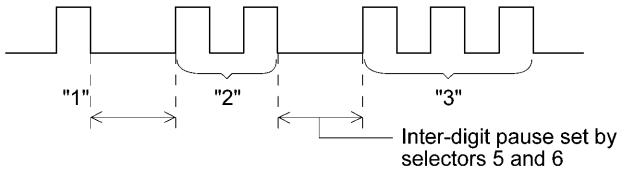
- **Selectors 3 and 4: Break time length in pulse dialing**

  These selectors set the break time length in pulse dialing.
  (Example: If "1," "2," and "3" are dialed when N is set by selectors 1 and 2.)



- **Selectors 5 and 6: Inter-digit pause**

  These selectors set the inter-digit pause in pulse dialing.
  (Example: If "1," "2," and "3" are dialed when N is set by selectors 1 and 2.)



- **Selector 7: Switching between pulse (DP) and tone (PB) dialing, by the function switch**

  This selector determines whether or not the dialing mode can be switched between the pulse (DP) and tone (PB) dialing by using the function switch.

- **Selector 8: Default dialing mode, pulse (DP) or tone (PB) dialing**

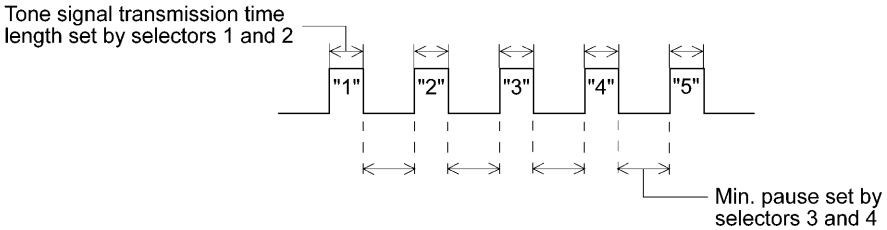
  This selector sets the default dialing mode (pulse dialing or tone dialing) which can be changed by the function switch. If the user switches it with the function switch when selector 7 is set to "0," the setting specified by this selector will also be switched automatically.

WSW02 (Tone signal setting)

Selector No.	Function	Setting and Specifications
1 2	Tone signal transmission time length	No. 1 2 0 0 : 70 ms 0 1 : 80 ms 1 0 : 90 ms 1 1 : 100 ms
3 4	Min. pause in tone dialing	No. 3 4 0 0 : 70 ms 0 1 : 80 ms 1 0 : 90 ms 1 1 : 140 ms
5 | 8	Attenuator for pseudo ring backtone to the line (selectable in the range of 0-15 dB, in 1 dB increments)	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

- **Selectors 1 through 4: Tone signal transmission time length and Min. pause in tone dialing**

  These selectors set the tone signal transmission time length and minimum pause in tone dialing. (Example: If "1," "2," "3," "4," and "5" are dialed.)



- **Selectors 5 through 8: Attenuator for pseudo ring backtone to the line**

  These selectors are used to adjust the sound volume of a ring backtone in the F/T mode, an on-hold sound, or a beep generated as a signal during remote control operation or at the start of ICM recording.
  The larger the value specified by these selectors, the greater the attenuation.

WSW03 (PABX* mode setting)

Selector No.	Function	Setting and Specifications
1	CNG detection when sharing a modular wall socket with a telephone	0: A 1: B
2 | 4	Detection time length of PABX* dial tone, required for starting dialing (Not used.)	No. 2 3 4 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
5	CNG detection when sharing a modular wall socket with a telephone	0: A 1: B
6 7	Dial tone detection in PABX* (Not used.)	No. 6 7 0 0 : No detection (3.5 sec. WAIT) 0 1 : No detection (5 sec. WAIT) 1 0 : No detection (7 sec. WAIT) 1 1 : Detection (Frequency only)
8	Not used.	

* PABX: Private automatic branch exchange

NOTE: Selectors 2 through 4, 6 and 7 are not applicable where no PABX is installed.

- **Selectors 1 and 5: CNG detection when sharing a modular wall socket with a telephone**

  These selectors determine whether or not the machine detects a CNG signal when a line is connected to a telephone sharing a modular wall socket with the machine. Upon detection of CNG signals by the number of cycles specified by these selectors, the machine interprets CNG as an effective signal and then starts FAX reception.

Selector No. 1	Selector No. 5	Cycle
0 (A)	0 (A)	0.5 cycle
0 (A)	1 (B)	1.0 cycle
1 (B)	0 (A)	1.5 cycles
1 (B)	1 (B)	2.0 cycles

- **Selectors 2 through 4: Detection time length of PABX dial tone, required for starting dialing (Not used.)**

  Upon detection of the PABX dial tone for the time length set by these selectors, the machine starts dialing.

  These selectors are effective only when both selectors 6 and 7 are set to "1" (Detection).

- **Selectors 6 and 7: Dial tone detection in PABX (Not used.)**

  These selectors activate or deactivate the dial tone detection function which detects a dial tone when a line is connected to the PABX.
  Setting both of these selectors to "1" activates the dial tone detection function so that the machine starts dialing upon detection of a dial tone when a line is connected.
  Other setting combinations deactivate the dial tone detection function so that the machine starts dialing after the specified WAIT (3.5, 5.0, or 7.0 sec.) without detection of a dial tone when a line is connected.

WSW04 (TRANSFER facility setting)

Selector No.	Function	Setting and Specifications
1	Earth function in transfer facility (Not used.)	0: Provided 1: Not provided
2 3	Dual tone detection frequency in ICM recording	No. 2 3 0 0 : 350 and 440 Hz (A) 0 1 : 440 and 480 Hz (B) 1 0 : 1 1 : } 480 and 620 Hz (C)
4	Dual tone detection sensitivity in ICM recording	0: Normal 1: High
5 6	Earth time length for earth function	No. 5 6 0 0 : 200 ms 0 1 : 300 ms 1 0 : 500 ms 1 1 : 700 ms
7 8	Break time length for flash function	No. 7 8 0 0 : 80 ms 0 1 : 110 ms 1 0 : 250 ms 1 1 : 500 ms

NOTE: Selectors 1 and 5 through 8 are not applicable in those countries where no transfer facility is supported.

NOTE: Selectors 2 through 4 are applicable to models equipped with built-in TADs.

- **Selector 1: Earth function in transfer facility (Not used.)**

  This selector determines whether or not the earth function is added to the transfer setting menu to be accessed by the function switch.

- **Selectors 2 and 3: Dual tone detection frequency in ICM recording**

  If the machine detects either of the frequencies set by these selectors in ICM recording, it disconnects the line. For example, if these selectors are set to “0, 0,” the machine disconnects the line upon detection of 350 Hz or 440 Hz.

- **Selector 4: Dual tone detection sensitivity in ICM recording**

  Setting this selector to "1" increases the tone detection sensitivity in ICM recording.

- **Selectors 5 and 6: Earth time length for earth function (Not used.)**

  These selectors set the short-circuiting time length of the telephone line (La or Lb) to ground.
  This setting is effective only when the earth function is selected for the **R** key by using the function switch.

- **Selectors 7 and 8: Break time length for flash function**

  These selectors set the break time length.
  This setting is effective only when the flash function is selected for the **Search/Speed Dial** key by using the function switch.

WSW05 (1st dial tone and busy tone detection)

Selector No.	Function	Setting and Specifications
1 | 3	1st dial tone detection	No. 1 2 3 0 0 0 : 3.5 sec. WAIT 0 0 1 : 7.0 sec. WAIT 0 1 0 : 10.5 sec. WAIT 0 1 1 : 14.0 sec. WAIT 1 0 0 : 17.5 sec. WAIT 1 0 1 : 21.0 sec. WAIT 1 1 0 : 24.5 sec. WAIT 1 1 1 : Detection (Without WAIT)
4	Max. pause time allowable for remote ID code detection	0 : 2 seconds 1: 1 second
5 6	Busy tone detection in automatic sending mode	No. 5 6 0 0 : No detection 0 1 : Detection only after dialing 1 0 : No detection 1 1 : Detection before and after dialing
7	Busy tone detection in automatic receiving mode	0 : Yes 1: No
8	Not used.	

NOTE: Selectors 5 through 7 are not applicable in those countries where no busy tone detection is supported.

- **Selectors 1 through 3: 1st dial tone detection**

  These selectors activate or deactivate the 1st dial tone detection function which detects the 1st dial tone issued from the PSTN when a line is connected to the PSTN.
  Setting all of these selectors to "1" activates the dial tone detection function so that the machine starts dialing upon detection of a dial tone when a line is connected. (However, in those countries which support no dial tone detection function, e.g., in the U.S.A., setting these selectors to "1" makes the machine start dialing after a WAIT of 3.5 seconds.) For the detecting conditions of the 1st dial tone, refer to WSW07 and WSW08.
  Other setting combinations deactivate the dial tone detection function so that the machine starts dialing after the specified WAIT (3.5, 7.0, 10.5, 14.0, 17.5, 21.0, or 24.5 seconds) without detection of a dial tone when a line is connected to the PSTN.

- **Selector 4: Max. pause time allowable for remote ID code detection**

  This selector sets the maximum pause time allowable for detecting the second digit of a remote ID code after detection of the first digit in remote reception.
  If selector 4 is set to "0" (2 seconds), for instance, only a remote ID code whose second digit is detected within 2 seconds after detection of the first digit will become effective so as to activate the remote function.

- **Selectors 5 and 6: Busy tone detection in automatic sending mode**

  These selectors determine whether or not the machine automatically disconnects a line upon detection of a busy tone in automatic sending mode.
  Setting selector 6 to "0" ignores a busy tone so that the machine does not disconnect the line.
  Setting selectors 5 and 6 to "0" and "1," respectively, makes the machine detect a busy tone only after dialing and disconnect the line.
  Setting both of selectors 5 and 6 to "1" makes the machine detect a busy tone before and after dialing and then disconnect the line.

- **Selector 7: Busy tone detection in automatic receiving mode**

  This selector determines whether or not the machine automatically disconnects the line upon detection of a busy tone in automatic receiving mode.

WSW06 (Redial/Pause key setting and 2nd dial tone detection)

Selector No.	Function	Setting and Specifications
1 | 3	**Redial/Pause** key setting and 2nd dial tone detection	No. 1 2 3 0 0 0 : No pause 0 0 1 : 3.5 sec. WAIT 0 1 0 : 7 sec. WAIT 0 1 1 : 10.5 sec. WAIT 1 0 0 : 14 sec. WAIT 1 1 0 : 2nd dial tone detection only in pulse dialing (DP) system 1 0 1 : } 2nd dial tone detection 1 1 1 : } both in DP and push-button (PB) dialing system
4 | 6	Detection of international tone	No. 4 5 6 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
7	No. of 2nd dial tone detection cycles	0: 1 cycle 1: 2 cycles
8	Allowable instantaneous interrupt during reception of 2nd dial tone	0: 30 ms 1: 50 ms

NOTE: Selectors 4 through 8 are not applicable in those countries where no dial tone detection is supported, e.g., U.S.A.

- **Selectors 1 through 3: Redial/Pause key setting and 2nd dial tone detection**

Selectors 1	2	3	
0	0	0	No WAIT is inserted even if the **Redial/Pause** key is pressed.
0	0	1	If you press the **Redial/Pause** key during dialing, the machine will insert WAIT as defined in the above table. If the **Redial/Pause** key is pressed repeatedly, the machine inserts the specified WAIT multiplied by the number of depressions. It applies also in hook-up dialing.
0	1	0	
0	1	1	
1	0	0	
1	0	1	When these selectors are set to "1, 0, 1": Each time you press the **Redial/Pause** key in dialing, the machine will wait for the 2nd dial tone to be sent via the communications line regardless of pulse dialing or tone dialing. When these selectors are set to "1, 1, 0": If you press the **Redial/Pause** key in pulse dialing, the machine will first wait for the 2nd dial tone to be sent via the communications line. After that, pressing the **Redial/Pause** key will cause the machine to insert a WAIT of 3.5 seconds. In tone dialing, the machine will insert a WAIT of 3.5 seconds. When these selectors are set to "1, 1, 1": If you press the **Redial/Pause** key, the machine will first wait for the 2nd dial tone to be sent via the communications line regardless of pulse dialing or tone dialing. After that, pressing the **Redial/Pause** key will cause the machine to insert a WAIT of 3.5 seconds. (In those countries where no dial tone detection function is supported, setting these selectors to "1, 0, 1," "1, 1, 0," or "1, 1, 1" inserts a WAIT of 3.5 seconds.)
1	1	0	
1	1	1	

- **Selectors 4 through 6: Detection of international tone**

  Upon detection of the 2nd dial tone for the time length specified by these selectors, the machine starts dialing.
  This setting is effective only when the 2nd dial tone detection function is activated by selectors 1 through 3 (Setting 101, 110, or 111).
  This function does not apply in those countries where no dial tone detection function is supported.

- **Selector 7: No. of 2nd dial tone detection cycles**

  This selector sets the number of dial tone detection cycles required for starting dialing.

- **Selector 8: Allowable instantaneous interrupt during reception of 2nd dial tone**

  This selector sets the allowable instantaneous interrupt period that should be ignored during reception of the 2nd dial tone.

WSW07 (Dial tone setting 1)

Selector No.	Function	Setting and Specifications
1 2	Dial tone frequency band control	No. 1 2 0 0 : Narrows by 10 Hz 0 1 : Initial value 1 X : Widens by 10 Hz
3	Line current detection (Not used.)	0: No 1: Yes
4 | 6	2nd dial tone detection level (Z = 600 Ω)	No. 4 5 6 0 0 0 : -21 dBm 0 0 1 : -24 dBm 0 1 0 : -27 dBm 0 1 1 : -30 dBm 1 0 0 : -33 dBm 1 0 1 : -36 dBm 1 1 0 : -39 dBm 1 1 1 : -42 dBm
7	Allowable instantaneous interrupt during reception of 1st dial tone	0: 30 ms 1: 50 ms
8	Not used.	

NOTE: Selectors 1, 2, 4 through 7 are not applicable in those countries where no dial tone or line current detection is supported, e.g., U.S.A.

NOTE: Selector 3 is not applicable to those models having no loop current detection function.

- **Selectors 1 and 2: Dial tone frequency band control**

  These selectors set the frequency band for the 1st dial tone and busy tone (before dialing) to be detected.
  This setting is effective only when selectors 1 through 3 on WSW05 are set to "1,1,1."

- **Selector 3: Line current detection (Not used.)**

  This selector determines whether or not to detect a line current before starting dialing.

- **Selectors 4 through 6: 2nd dial tone detection level**

  These selectors set the detection level of the 2nd dial tone.

- **Selector 7: Allowable instantaneous interrupt during reception of 1st dial tone**

  This selector sets the allowable instantaneous interrupt period that should be ignored during reception of the 1st dial tone.

WSW08 (Dial tone setting 2)

Selector No.	Function	Setting and Specifications
1 | 3	1st dial tone detection time length	No. 1 2 3 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
4 5	Time-out length for 1st and 2nd dial tone detection	No. 4 5 0 0 : 10 sec. 0 1 : 20 sec. 1 0 : 15 sec. 1 1 : 30 sec.
6 | 8	Detection level of 1st dial tone and busy tone before dialing	No. 6 7 8 0 0 0 : -21 dBm 0 0 1 : -24 dBm 0 1 0 : -27 dBm 0 1 1 : -30 dBm 1 0 0 : -33 dBm 1 0 1 : -36 dBm 1 1 0 : -39 dBm 1 1 1 : -42 dBm

NOTE: The WSW08 is not applicable in those countries where no dial tone detection is supported, e.g., U.S.A.

- **Selectors 1 through 3: 1st dial tone detection time length**

  Upon detection of the 1st dial tone for the time length set by these selectors, the machine starts dialing.
  This setting is effective only when selectors 1 through 3 on WSW05 are set to "1,1,1."

- **Selectors 4 and 5: Time-out length for 1st and 2nd dial tone detection**

  These selectors set the time-out length for the 1st and 2nd dial tone detection so that the machine waits dial tone input for the specified time length and disconnects itself from the line when no dial tone is inputted.

WSW09 (Protocol definition 1)

Selector No.	Function	Setting and Specifications
1	Frame length selection	0: 256 octets 1: 64 octets
2	Use of non-standard commands	0: Allowed 1: Prohibited
3 4	No. of retries	No. 3 4 0 0 : 4 times 0 1 : 3 times 1 0 : 2 times 1 1 : 1 time
5	T5 timer	0: 300 sec. 1: 60 sec.
6	T1 timer	0: 35 sec. 1: 40 sec.
7 8	Timeout for response from the called station in automatic sending mode	No. 7 8 0 0 : 55 sec. (in U.S.A. and Canadian models) 60 sec. (in other models) 0 1 : 140 sec. 1 0 : 90 sec. 1 1 : 35 sec.

NOTE: Selectors 1 through 5 are not applicable in those models which do not support ECM.

- **Selector 1: Frame length selection**

  Usually a single frame consists of 256 octets (1 octet = 8 bits). For communications lines with higher bit error rate, however, set selector 1 to "1" so that the machine can divide a message into 64-octet frames.

  Remarks: The error correction mode (ECM) is a facsimile transmission manner in which the machine divides a message into frames for transmission so that if any data error occurs on the transmission line, the machine retransmits only those frames containing the error data.

- **Selector 2: Use of non-standard commands**

  If this selector is set to "0," the machine can use non-standard commands (the machine's native-mode commands, e.g., NSF, NSC, and NSS) for communications. If it is set to "1," the machine will use standard commands only.

- **Selectors 3 and 4: No. of retries**

  These selectors set the number of retries in each specified modem transmission speed.

- **Selector 5: T5 timer**

  This selector sets the time length for the T5 timer.

- **Selector 6: T1 timer**

  This selector sets the time length for the T1 timer.

- **Selectors 7 and 8: Timeout for response from the called station in automatic sending mode**

  If the machine (calling station) receives no response (no G3 command) from the called terminal in automatic sending mode for the period specified by these selectors, it disconnects the line.

WSW10 (Protocol definition 2)

Selector No.	Function		Setting and Specifications
1	Not used.		
2	Time length from transmission of the last dial digit to CML ON		0: 100 ms 1: 50 ms
3	Time length from CML ON to CNG transmission		0: 2 sec. 1: 4 sec.
4	Time length from CML ON to CED transmission (except for facsimile-to-telephone switching)		0: 0.5 sec. 1: 2 sec.
5 6	No. of training retries		No. 5 6 0 0 : 1 time 0 1 : 2 times 1 0 : 3 times 1 1 : 4 times
7	Encoding system (Compression)	MR	0: Allowed 1: Not allowed
8		MMR	0: Allowed 1: Not allowed

- **Selector 2: Time length from transmission of the last dial digit to CML ON**

  This selector sets the time length from when the machine transmits the last dial digit until the CML relay comes on.

- **Selector 3: Time length from CML ON to CNG transmission**

  This selector sets the time length until the machine transmits a CNG after it turns on the CML relay.

- **Selector 4: Time length from CML ON to CED transmission**

  This selector sets the time length until the machine transmits a CED after it turns on the CML relay. This setting does not apply to switching between facsimile and telephone.

- **Selectors 5 and 6: No. of training retries**

  These selectors set the number of training retries to be repeated before automatic fallback.

- **Selectors 7 and 8: Encoding system (Compression)**

  This selector determines whether or not to allow the use of the MR/MMR coding system.

WSW11 (Busy tone setting)

Selector No.	Function	Setting and Specifications
1 2	Busy tone frequency band control	No. 1 2 0 0 : Narrows by 10 Hz 0 1 : Initial value 1 x : Widens by 10 Hz
3	ON/OFF time length ranges for busy tone (More than one setting allowed)	1: 250-750/250-750 ms
4		1: 400-600/400-600 ms
5		1: 175-440/175-440 ms
6		1: 100-1000 ms/17-660 ms
7		1: 110-410/320-550 ms
8		1: 100-660/100-660 ms

NOTE: WSW11 is not applicable in those countries where no busy tone detection is supported.

NOTE: The setting of WSW11 is effective only when selectors 5 and 6 on WSW05 are set to "0, 1" or "1, 1" (Busy tone detection).

- **Selectors 1 and 2: Busy tone frequency band control**

  These selectors set the frequency band for busy tone to be detected.

- **Selectors 3 through 8: ON/OFF time length ranges for busy tone**

  These selectors set the ON and OFF time length ranges for busy tone to be detected. If more than one selector is set to "1," the ranges become wider. For example, if selectors 4 and 5 are set to "1," the ON and OFF time length ranges are from 175 to 600 ms.

WSW12 (Signal detection condition setting)

Selector No.	Function	Setting and Specifications
1 2	Min. detection period required for interpreting incoming calling signal (CI) as OFF	No. 1 2 0 0 : 1500 ms 0 1 : 500 ms 1 0 : 700 ms 1 1 : 900 ms
3 4	Max. detection period for incoming calling signal (CI) being OFF	No. 3 4 0 0 : 6 sec. 0 1 : 7 sec. 1 0 : 9 sec. 1 1 : 11 sec.
5 6	Min. detection period required for acknowledging incoming calling signal (CI) as ON	No. 5 6 0 0 : 800 ms (1000 ms*) 0 1 : 200 ms 1 0 : 250 ms 1 1 : 150 ms
7	Line connection timing (Not used.)	0: Ringer-OFF period (default) 1: Ringer-ON period
8	Not used.	

*1000 ms in Chinese models.

- **Selectors 1 through 4: Min. detection period required for interpreting incoming calling signal (CI) as OFF**
  Max. detection period for incoming calling signal (CI) being OFF

  If the machine detects the OFF state of a CI signal for the period greater than the value set by selectors 1 and 2 and less than the value set by selectors 3 and 4, it interprets the CI signal as OFF.

- **Selectors 5 and 6: Min. detection period required for acknowledging incoming calling signal (CI) as ON**

  These selectors set the period required to make the machine acknowledge itself to be called. That is, if the machine continuously detects a CI signal with the frequency set by selectors 1 through 4 on WSW14 during the period set by these selectors 5 and 6, then it acknowledges the call.

WSW13 (Modem setting)

Selector No.	Function	Setting and Specifications
1 2	Cable equalizer	No. 1 2 0 0 : 0 km 0 1 : 1.8 km 1 0 : 3.6 km 1 1 : 5.6 km
3 4	Reception level	No. 3 4 0 0 : -43 dBm 0 1 : -47 dBm 1 0 : -49 dBm 1 1 : -51 dBm
5 | 8	Modem attenuator	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

The modem should be adjusted according to the user's line conditions.

- **Selectors 1 and 2: Cable equalizer**

  These selectors are used to improve the pass-band characteristics of analogue signals on a line. (Attenuation in the high-band frequency is greater than in the low-band frequency.)
  Set these selectors according to the distance from the telephone switchboard to the machine.

- **Selectors 3 and 4: Reception level**

  These selectors set the optimum receive signal level.

- **Selectors 5 through 8: Modem attenuator**

  These selectors are used to adjust the transmitting level attenuation of the modem when the reception level at the remote station is improper due to line loss. This function applies for G3 protocol signals.
  Setting two or more selectors to "1" produces addition of attenuation assigned to each selector. If selector 8 on WSW23 is set to "0," this setting is so limited that 10 dB (1 dB in France) or higher setting only is effective. Note that in Japan and China, 9 dB or higher and 2 dB or higher settings only are effective, respectively, regardless of whether selector 8 on WSW23 is set to "0."

WSW14 (AUTO ANS facility setting)

Selector No.	Function	Setting and Specifications
1 2	Frequency band selection (lower limit) for incoming calling signal (CI)	No. 1 2 0 0 : 13 Hz 0 1 : 15 Hz 1 0 : 23 Hz 1 1 : 20 Hz
3 4	Frequency band selection (upper limit) for incoming calling signal (CI)	No. 3 4 0 0 : 30 Hz 0 1 : 55 Hz 1 0 : 70 Hz 1 1 : 200 Hz
5 | 8	No. of rings in AUTO ANS mode	No. 5 6 7 8 0 0 0 0 : Fixed to once 0 0 0 1 : Fixed to 2 times 0 0 1 0 : Fixed to 3 times 0 0 1 1 : Fixed to 4 times 0 1 0 0 : 1 to 2 times 0 1 0 1 : 1 to 3 times 0 1 1 0 : 1 to 4 times 0 1 1 1 : 1 to 5 times 1 0 0 0 : 2 to 3 times 1 0 0 1 : 2 to 4 times 1 0 1 0 : 2 to 5 times 1 0 1 1 : 2 to 6 times 1 1 0 0 : 1 to 10 times 1 1 0 1 : 2 to 10 times 1 1 1 0 : 3 to 5 times 1 1 1 1 : 4 to 10 times

- **Selectors 1 through 4: Frequency band selection for incoming calling signal (CI)**

  These selectors are used to select the frequency band of CI for activating the AUTO ANS facility. In the French models, if the user sets the PBX to OFF from the control panel, the setting made by selectors 1 and 2 will take no effect and the frequency's lower limit will be fixed to 32 Hz. (Even if the setting made by these selectors does not apply, it will be printed on the configuration list.)

- **Selectors 5 through 8: No. of rings in AUTO ANS mode**

  These selectors set the number of rings to initiate the AUTO ANS facility.

WSW15 (REDIAL facility setting)

Selector No.	Function	Setting and Specifications
1 2	Redial interval	No. 1 2 0 0 : 5 minutes 0 1 : 1 minute 1 0 : 2 minutes 1 1 : 3 minutes
3 | 6	No. of redialings	No. 3 4 5 6 0 0 0 0 : 16 times 0 0 0 1 : 1 times 0 0 1 0 : 2 times 0 0 1 1 : 3 times | | 1 1 1 1 : 15 times
7	Not used.	
8	CRP option	0: Disable 1: Enable

- **Selectors 1 through 6: Redial interval and No. of redialings**

  The machine redials by the number of times set by selectors 3 through 6 at intervals set by selectors 1 and 2.

- **Selector 8: CRP option**

  If a command error occurs in the machine (calling station), the machine usually waits for three seconds and then makes a retry three times. This CRP option is a request command that can be sent from the called station for requesting the calling station to retry the failed command immediately.

WSW16 (Function setting 1)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	ITU-T (CCITT) superfine recommendation	0: OFF 1: ON
3 | 6	Not used.	
7	Max. document length limitation	0: 400 cm 1: 90 cm
8	**Stop/Exit** key pressed during reception	0: Not functional 1: Functional

NOTE: Selector 7 is applicable to models equipped with ADF units.

- **Selector 2: ITU-T (CCITT) superfine recommendation**

  If this selector is set to "1," the machine communicates in ITU-T (CCITT) recommended superfine mode (15.4 lines/mm). If it is set to "0," it communicates in native superfine mode.

- **Selector 7: Max. document length limitation**

  This selector is used to select the maximum length of a document to be sent.

- **Selector 8: Stop key pressed during reception**

  If this selector is set to "1," pressing the **Stop/Exit** key can stop the current receiving operation. The received data will be lost.

WSW17 (Function setting 2)

Selector No.	Function	Setting and Specifications
1 2	Off-hook alarm	No. 1 2 0 0 : No alarm 0 1 : Always valid 1 X : Valid except when 'call reservation' is selected.
3 4	Not used.	
5	Calendar clock type	0: U.S.A. type 1: European type
6	Not used.	
7	Non-ring reception	0: OFF 1: ON
8	Not used.	

- **Selectors 1 and 2: Off-hook alarm**

  These selectors activate or deactivate the alarm function which sounds an alarm when the communication is completed with the handset being off the hook.

- **Selector 5: Calendar clock type**

  If this selector is set to "0" (USA), the MM/DD/YY hh:mm format applies; if it is set to "1" (Europe), the DD/MM/YY hh:mm format applies: DD is the day, MM is the month, YY is the last two digits of the year, hh is the hour, and mm is the minute.

- **Selector 7: Non-ring reception**

  Setting this selector to "1" makes the machine receive calls without ringer sound if the Ring Delay is set to 0.

WSW18 (Function setting 3)

Selector No.	Function	Setting and Specifications
1	Not used.	
2 3	Detection enabled time for CNG and no tone	No. 2 3 0 0 : 40 sec. 0 1 : 0 sec. (No detection) 1 0 : 5 sec. 1 1 : 80 sec.
4 5	Not used.	
6	Registration of station ID	0: Permitted 1: Prohibited
7 8	Tone sound monitoring	No. 7 8 0 X : No monitoring 1 0 : Up to phase B at the calling station only 1 1 : All transmission phases both at the calling and called stations

- **Selectors 2 and 3: Detection enabled time for CNG and no tone**

  After the line is connected via the external telephone or by picking up the handset of the machine, the machine can detect a CNG signal or no tone for the time length specified by these selectors. The setting specified by these selectors becomes effective only when selector 8 on WSW20 is set to "1."

- **Selector 6: Registration of station ID**

  Setting this selector to "0" permits the registration of station ID for Austrian and Czech models.

- **Selectors 7 and 8: Tone sound monitoring**

  These selectors set monitoring specifications of the tone sound inputted from the line.

WSW19 (Transmission speed setting)

Selector No.	Function	Setting and Specifications
1 | 3	First transmission speed choice for fallback	No. 1 2 3 / No. 4 5 6 0 0 0 : 2,400 bps 0 0 1 : 4,800 bps 0 1 0 : 7,200 bps 0 1 1 : 9,600 bps 1 0 0 : 12,000 bps 1 0 1 : 14,400 bps 1 1 0 : 14,400 bps 1 1 1 : 14,400 bps
4 | 6	Last transmission speed choice for fallback	
7	V.34 mode	0: Permitted 1: Prohibited
8	V.17 mode	0: Permitted 1: Prohibited

NOTE: Selector 7 takes effect only in models supporting V.34 mode.

- **Selectors 1 through 6: First and last choices of transmission speed for fallback**

  These selectors are used to set the MODEM speed range. With the first transmission speed choice specified by selectors 1 through 3, the machine attempts to establish the transmission link via the MODEM. If the establishment fails, the machine automatically steps down to the next lowest speed and attempts to establish the transmission link again. The machine repeats this sequence while stepping down the transmission speed to the last choice specified by selectors 4 through 6. If the MODEM always falls back to a low transmission speed (e.g., 4,800 bps), set the first transmission speed choice to the lower one (e.g., modify it from 12,000 bps to 7,200 bps) in order to deactivate the high-speed MODEM function and reduce the training time for shorter transmission time.
  Generally, to save the transmission time, set the last transmission speed choice to a higher one.

WSW20 (Overseas communications mode setting)

Selector No.	Function	Setting and Specifications
1	EP* tone prefix	0: OFF 1: ON
2	Overseas communications mode (Reception)	0: 2100 Hz 1: 1100 Hz
3	Overseas communications mode (Transmission)	0: OFF 1: Ignores DIS once.
4 5	Min. time length from reception of CFR to start of transmission of video signals	No. 4 5 0 0 : 100 ms 0 1 : 200 ms 1 0 : 300 ms 1 1 : 400 ms
6 7	At CNG detection, elimination of chattering noise (Not used.)	No. 6 7 0 0 : Yes, at both ON/OFF timings 0 1 : Yes, at OFF timing 1 X : No
8	Limitation on CNG detection	0: OFF 1: ON

* EP: Echo protection

NOTE: Selectors 6 and 7 are applicable to models equipped with SDAA circuits.

- **Selector 1: EP tone prefix**

  Setting this selector to "1" makes the machine transmit a 1700 Hz echo protection (EP) tone immediately preceding training in V.29 modulation system to prevent omission of training signals. Prefixing an EP tone is useful when the machine fails to transmit at the V.29 modem speed and always has to fall back to 4800 bps transmission.
  The setting made by this selector takes effect only when the Overseas Mode is set to ON.

- **Selectors 2 and 3: Overseas communications mode**

  These selectors should be used if the machine malfunctions in overseas communications. According to the communications error state, select the signal specifications.
  Setting selector 2 to "1" allows the machine to use 1100 Hz CED signal instead of 2100 Hz in receiving operation. This prevents malfunctions resulting from echoes, since the 1100 Hz signal does not disable the echo suppressor (ES) while the 2100 Hz signal does.
  Setting selector 3 to "1" allows the machine to ignore a DIS signal sent from the called station once in sending operation. This operation suppresses echoes since the first DIS signal immediately follows a 2100 Hz CED (which disables the ES) so that it is likely to be affected by echoes in the disabled ES state. However, such a disabled ES state will be removed soon so that the second and the following DIS signals are not susceptible to data distortion due to echoes. Note that some models when called may cause error by receiving a self-outputted DIS.
  The setting made by selector 3 takes effect only when the Overseas Communications Mode is set to ON. (The setting made by selector 2 is always effective.)

- **Selectors 8: Limitation on CNG detection**

  If this selector is set to "1," the machine detects a CNG signal according to the condition preset by selectors 2 and 3 on WSW18 after a line is connected. If it is set to "0," the machine detects a CNG signal as long as the line is connected.

WSW21 (TAD setting 1)

Selector No.	Function	Setting and Specifications
1 | 5	Max. waiting time for voice signal	No. 1 2 3 4 5 0 0 0 0 0 : No detection 0 0 0 0 1 : 1 sec. 0 0 0 1 0 : 2 sec. 0 0 0 1 1 : 3 sec. | | 0 1 0 0 0 : 8 sec. | | 1 1 1 1 1 : 31 sec.
6 7	Taping the call	No. 6 7 0 0 : Enable (signaling for U.S.A.) 0 1 : Enable (signaling for countries except U.S.A.) 1 0 : Enable (without signaling) 1 1 : Disable
8	Erasure of message stored in the memory after the message transfer	0: Yes 1: No

NOTE: Selectors 1 through 5 are applicable to models equipped with ICM recorders.

NOTE: Selectors 6 and 7 are applicable to models with internal TADs.

NOTE: Selector 8 is applicable to models equipped with TADs.

- **Selectors 1 through 5: Max. waiting time for voice signal**

  In the TAD mode, the machine waits for voice signal for the time length specified by these selectors before it automatically shifts to the facsimile message receive mode or disconnects the line.

- **Selectors 6 and 7: Taping the call**

  These selectors select whether or not to tape the call. Setting them to "1, 0" enables taping the call without signaling to the calling station that the call is being taped.

- **Selector 8: Erasure of message stored in the memory after the message transfer**

  Setting this selector to "0" will erase the message recorded in the memory after the document retrieval feature transfers the message.

WSW22 (ECM and call waiting caller ID)

Selector No.	Function	Setting and Specifications	
1	ECM* in sending	0: ON	1: OFF
2	ECM* in receiving	0: ON	1: OFF
3	Call Waiting Caller ID	0: ON	1: OFF
4	Not used.		
5	Acceptable TCF bit error rate (%)	0: 0%	1: 8%
|	(Only at 4800 bps)	0: 0%	1: 4%
8	(Not used.)	0: 0%	1: 2%
		0: 0%	1: 1%

* ECM: Error correction mode

NOTE: Selector 3 is applicable to the American models only.

NOTE: Selectors 5 through 8 are applicable to the Chinese, Taiwanese and Asian models only.

- **Selector 3: Call Waiting Caller ID**

  Setting this selector to "0" allows the user to decide whether or not to interrupt the current call when a new call comes in. If Call Waiting Caller ID service is available in the area and the user subscribes to it, he/she can see information about his/her incoming call on the LCD.

- **Selectors 5 through 8: Acceptable TCF bit error rate (%) (Not used.)**

  Setting two or more selectors to "1" produces addition of percent assigned to each selector. If you set selectors 7 and 8 to "1," the acceptable TCF bit error rate will be 3%.

WSW23 (Communications setting)

Selector No.	Function	Setting and Specifications
1	Starting point of training check (TCF)	0: From the head of a series of zeros 1: From any arbitrary point
2 3	Allowable training error rate	No. 2 3 0 0 : 0% 0 1 : 0.5% 1 0 : 1% 1 1 : 2%
4 5	Decoding error rate for transmission of RTN	No. 4 5 0 0 : 16% 0 1 : 14% 1 0 : 10% 1 1 : 8%
6 7	Not used.	
8	Limitation of attenuation level	0: Yes 1: No

NOTE: Selector 8 is not applicable to the French models.

- **Selector 1: Starting point of training check (TCF)**

  At the training phase of receiving operation, the called station detects for 1.0 second a training check (TCF) command, a series of zeros which is sent from the calling station for 1.5 seconds to verify training and give the first indication of the acceptability of the line.
  This selector sets the starting point from which the called station should start counting those zeros. If this selector is set to "0," the called station starts counting zeros 100 ms after the head of a series of zeros is detected.
  If it is set to "1," the called station starts counting zeros upon detection of 10-ms successive zeros 50 ms after the head of a series of zeros is detected. In this case, if the detection of 10-ms successive zeros is too late, the data counting period will become less than 1.0 second, making the called station judge the line condition unacceptable.

- **Selectors 2 and 3: Allowable training error rate**

  The called station checks a series of zeros gathered in training (as described in Selector 1) according to the allowable training error rate set by these selectors. If the called station judges the line condition to be accepted, it responds with CFR; if not, it responds with FTT.

- **Selectors 4 and 5: Decoding error rate for transmission of RTN**

  The machine checks the actual decoding errors and then transmits an RTN according to the decoding error rate (Number of lines containing an error per page ÷ Total number of lines per page) set by these selectors.

- **Selector 8: Limitation of attenuation level**

  Setting this selector to "0" limits the transmitting level of the modem to 10 dB (1 dB in France).
  This setting has priority over the settings selected by WSW02 (selectors 5 through 8) and WSW13 (selectors 5 through 8).

WSW24 (TAD setting 2)

Selector No.	Function	Setting and Specifications
1 2	Maximum OGM recording time	No. 1 2 0 0 : 15 sec. 0 1 : 20 sec. 1 0 : 30 sec. 1 1 : 50 sec.
3 4	Time length from CML ON to start of pseudo ring backtone transmission	No. 3 4 0 0 : 4 sec. 0 1 : 3 sec. 1 0 : 2 sec. 1 1 : 1 sec.
5 | 8	Attenuator for playback of ICM/OGM to the line (Selectable from the range of 0-15 dB)	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

- **Selectors 1 and 2: Maximum OGM recording time**

  These selectors set the allowable maximum recording time for an OGM.

- **Selectors 3 and 4: Time length from CML ON to start of pseudo ring backtone transmission**

  These selectors set the length of time from CML-ON up to the start of pseudo ring backtone transmission.
  In models with OGM facilities, the settings made by these selectors also apply to the length of time from CML-ON up to the start of OGM transmission.

- **Selectors 5 through 8: Attenuator for playback of ICM/OGM to the line**

  Setting two or more selectors to "1" produces addition of attenuation assigned to each selector.
  This setting is not limited by selector 8 on WSW23.

WSW25 (TAD setting 3)

Selector No.	Function	Setting and Specifications
1 | 4	Not used.	
5 | 7	Pause between paging number and PIN	No. 5 6 7 0 0 0 : 2 sec. 0 0 1 : 4 sec. 0 1 0 : 6 sec. 0 1 1 : 8 sec. 1 0 0 : 10 sec. 1 0 1 : 12 sec. 1 1 0 : 14 sec. 1 1 1 : 16 sec.
8	Not used.	

NOTE: Selectors 5 through 7 are applicable to the U.S.A. models only.

- **Selectors 5 through 7: Pause between paging number and PIN**

  These selectors set the pause time between a telephone number being paged and PIN (personal identification number) for the paging feature.

WSW26 (Function setting 4)

Selector No.	Function	Setting and Specifications
1 2	Not used.	
3	Dialing during document reading into the temporary memory in in-memory message transmission	0: Disable 1: Enable
4 5	No. of CNG cycles to be detected (when the line is connected via the external telephone except in the external TAD mode or via the built-in telephone)	No. 4 5 0 0 : 0.5 (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
6 7	No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode, via the built-in telephone in the TAD mode, or via the machine in the automatic reception of the F/T mode)	No. 6 7 0 0 : 0.5 (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
8	Not used.	

- **Selector 3: Dialing during document reading into the temporary memory in in-memory message transmission**

  If this selector is set to "0," the machine waits for document reading into the memory to complete and then starts dialing. This enables the machine to list the total number of pages in the header of the facsimile message.

- **Selectors 4 and 5: No. of CNG cycles to be detected (when the line is connected via the external telephone except in the external TAD mode or via the built-in telephone)**

  The machine interprets a CNG as an effective signal if it detects the CNG by the number of cycles specified by these selectors when the line is connected via the external telephone except in the external TAD mode or via the built-in telephone.

- **Selectors 6 and 7: No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode, via the built-in telephone in the TAD mode, or via the machine in the automatic reception of the F/T mode)**

  The machine interprets a CNG as an effective signal if it detects the CNG by the number of cycles specified by these selectors when the line is connected via the external telephone in the external TAD mode, via the built-in telephone in the TAD mode, or via the machine in the automatic reception of the F/T mode.

WSW27 (Function setting 5)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	Ringer OFF setting	0: Yes 1: No
3	Automatic playback of OGM when switched to the TAD mode	0: No 1: Yes
4 5	Detection of distinctive ringing pattern (Not used.)	0: Yes 1: No
6	Recording quality	0: Normal 1: High
7	Recording time for high recording quality	0: Short (9.6 kbps) 1: Long (8.8 kbps)
8	Not used.	

NOTE: Selectors 4 and 5 are applicable to the U.S.A. models only.

- **Selector 2: Ringer OFF setting**

  This selector determines whether or not the ringer can be set to OFF.

- **Selector 3: Automatic playback of OGM when switched to the TAD mode**

  This selector determines whether or not to automatically play back an OGM the moment the machine switches to the TAD mode.

- **Selectors 4 and 5: Detection of distinctive ringing pattern (Not used.)**

  If this selector is set to "1," the machine detects only the number of rings; if it is set to "0," the machine detects the number of rings and the ringing time length to compare the detected ringing pattern with the registered distinctive one.

- **Selector 6: Recording quality**

  This selector determines the recording quality for the OGM and ICM. Selecting "1" (High) increases the quality, sacrificing the recording time.

- **Selector 7: Recording time for high recording quality**

  This setting takes effect when selector 6 is set to "1" (High). Setting this selector to "0" (Short) further increases the recording quality, sacrificing the recording time.
  The recording quality and time to be applied when this selector is set to "1" (Long) are higher and shorter than the ones to be applied when selector 6 is set to "0" (Normal).
  The recording quality and time determined by this selector being set to "1" (Long) are higher and shorter than the ones determined by selector 6 being set to "0" (Normal).

WSW28 (Function setting 6)

Selector No.	Function	Setting and Specifications
1 | 3	Transmission level of DTMF high-band frequency signal	No. 1 2 3 0 0 0 : 0 dB 0 0 1 : +1 dB 0 1 0 : +2 dB 0 1 1 : +3 dB 1 0 0 : 0 dB 1 0 1 : -1 dB 1 1 0 : -2 dB 1 1 1 : -3 dB
4 | 6	Transmission level of DTMF low-band frequency signal	No. 4 5 6 0 0 0 : 0 dB 0 0 1 : +1 dB 0 1 0 : +2 dB 0 1 1 : +3 dB 1 0 0 : 0 dB 1 0 1 : -1 dB 1 1 0 : -2 dB 1 1 1 : -3 dB
7 8	Not used.	

- **Selectors 1 through 6: Transmission level of DTMF high-/low-band frequency signal**

  These selectors are intended for the manufacturer who tests the machine for the Standard. Never access them.

WSW29 (Function setting 7)

Selector No.	Function	Setting and Specifications
1 | 3	Compression threshold level for voice signals inputted via the telephone line in the built-in TAD operation	No. 1 2 3 0 0 0 : -47.0 dBm (A) 0 0 1 : -48.5 dBm (B) 0 1 0 : -50.0 dBm (C) 0 1 1 : -51.5 dBm (D) 1 0 0 : -53.0 dBm (E) 1 0 1 : -54.5 dBm (F) 1 1 0 : -56.0 dBm (G) 1 1 1 : OFF (H)
4 | 6	Compression threshold level for voice signals inputted via the handset in the built-in TAD operation	No. 4 5 6 0 0 0 : -44.0 dBm (A) 0 0 1 : -45.5 dBm (B) 0 1 0 : -47.0 dBm (C) 0 1 1 : -48.5 dBm (D) 1 0 0 : -50.0 dBm (E) 1 0 1 : -51.5 dBm (F) 1 1 0 : -53.0 dBm (G) 1 1 1 : OFF (H)
7	Impedance switching control in pulse dialing	0: OFF 1: ON
8	Prompt beep when the memory area for the activity report becomes full	0: No 1: Yes

NOTE: Selectors 1 through 6 are applicable to models equipped with built-in TADs.

NOTE: Selectors 7 and 8 are applicable only to the European versions.

- **Selectors 1 through 6: Compression threshold level for voice signals inputted via the telephone line in the built-in TAD operation**

  If voice signals inputted via the telephone line are below the level specified by these selectors, the TAD interprets those received voice signals as no signal, compressing the recording time.

- **Selector 8: Prompt beep for activity report**

  This selector determines whether or not to beep if the memory area for the activity report becomes full, for prompting you to print out the report. (Printing it out will clear the memory area.)

WSW30 (Function setting 8)

Selector No.	Function	Setting and Specifications
1 | 3	Dial tone/busy tone detection level during recording of ICM (Not used.)	No. 1 2 3 0 0 0 : -38.0 dBm (A) 0 0 1 : -39.5 dBm (B) 0 1 0 : -41.0 dBm (C) 0 1 1 : -42.5 dBm (D) 1 0 0 : -44.0 dBm (E) 1 0 1 : -45.5 dBm (F) 1 1 0 : -47.0 dBm (G) 1 1 1 : -48.5 dBm (H)
4 | 7	Not used.	
8	Text copy density adjustment	0: Normal 1: Dark

NOTE: Selectors 1 through 3 are applicable to models equipped with internal TADs.

- **Selectors 1 through 3: Dial tone/busy tone detection level during recording of ICM (Not used.)**

  If the machine (called station) detects dial tone (400 Hz continuously) or busy tone (400 Hz intermittently) exceeding the detection level specified by these selectors for the period specified by selectors 1 through 4 on WSW35, then it interprets the calling station as being disconnected. The machine stops TAD recording and disconnects the line.

- **Selectors 8: Text copy density adjustment**

  This function is used when a copied image of a dark document is still light even if adjusting using the contrast adjustment for the user operation.

WSW31 (Function setting 9)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	Default reduction rate for failure of automatic reduction during recording	0: 100% 1: 70%
3	Not used.	
4	(Do not disturb this selector.)	
5	Minimum ON and OFF duration of ringer signals effective in distinctive ringing	0: 130 ms 1: 90 ms
6 | 8	Not used.	

NOTE: Selector 5 is applicable only to the U.S.A. models.

- **Selector 2: Default reduction rate for failure of automatic reduction during recording**

  This selector sets the default reduction rate to be applied if the automatic reduction function fails to record one-page data sent from the calling station in a single page of the current recording paper. If it is set to "0," the machine records one-page data at full size (100%) without reduction; if it is set to "1," the machine records it at 70% size.

- **Selector 5: Minimum ON and OFF duration of ringer signals effective in distinctive ringing**

  The ringer pattern consists of short and long rings, e.g., short-short-long rings. This selector sets the minimum ON and OFF duration of ringer signals that are required for the machine to interpret ringer signals as being ON or OFF. This is to prevent components of a ringer pattern from being misinterpreted due to chattering in distinctive ringing.
  The machine monitors ringer signals at 10-ms intervals. If the signal is ON, the machine counts +1; if it is OFF, it counts -1. If the counter increments up to +5 or +13 when this selector is set to "1" (50 ms) or "0" (130 ms), respectively, the machine interprets the current signal as being ON. If the counter returns to zero, the machine interprets the signal as being OFF.
  If the Distinctive Ring is set to OFF, this selector is not effective.

WSW32 (Function setting 10)

Selector No.	Function	Setting and Specifications
1 | 4	Not used.	
5 6	Default resolution	No. 5 6 0 0 : Standard 0 1 : Fine 1 0 : Super fine 1 1 : Photo
7 8	Default contrast	No. 7 8 0 X : Automatic 1 0 : Super light 1 1 : Super dark

- **Selectors 5 and 6: Default resolution**

  These selectors set the default resolution which applies when the machine is turned on or completes a transaction.

- **Selectors 7 and 8: Default contrast**

  These selectors set the default contrast which applies when the machine is turned on or completes a transaction.

WSW33 (Function setting 11)

Selector No.	Function	Setting and Specifications
1 | 3	Detection threshold level of "no tone" during recording of ICM	No. 1 2 3 0 0 0 : -42.5 dBm (A) 0 0 1 : -44.0 dBm (B) 0 1 0 : -45.5 dBm (C) 0 1 1 : -47.0 dBm (D) 1 0 0 : -48.5 dBm (E) 1 0 1 : -50.0 dBm (F) 1 1 0 : -51.5 dBm (G) 1 1 1 : -53.0 dBm (H)
4 5	FAX receiving speed to be kept within the transmission speed limit to the PC	No. 4 5 0 0 : 14,400 bps 0 1 : 12,000 bps 1 0 : 9,600 bps 1 1 : 7,200 bps
6	Report output of polled transmission requests	0: Yes 1: No
7 8	Comfortable noise level (Not used.)	No. 7 8 0 0 : OFF 0 1 : Low (A) 1 0 : Medium (B) 1 1 : High (C)

NOTE: Selectors 1 through 3 are applicable to models equipped with internal TADs.

- **Selectors 1 through 3: Detection threshold level of "no tone" during recording of ICM**

  If the tone level during recording of ICM is less than the threshold setting made by these selectors, the tone is interpreted as "no tone. " When the "no tone" state is kept for the period specified by selectors 1 through 5 on WSW21, the machine disconnects the line.

- **Selectors 4 and 5: FAX receiving speed to be kept within the transmission speed limit to the PC**

  To transmit FAX data being received from other machine to the connected PC, you may need to keep the FAX receiving speed within the transmission speed limit specified for the PC. In an initial negotiation sequence for transmission, the machine responds to the calling station with the allowable FAX receiving speed specified by these selectors.

- **Selectors 7 and 8: Comfortable noise level (Not used.)**

  These selectors set the level of noise to be added during playing-back of voice signals recorded with no-signal compression.
  If they are set to "0, 0," no noise will be added.

WSW34 (Function setting 12)

Selector No.	Function	Setting and Specifications
1 | 3	Erasing time length of ICM tone recorded preceding the tone detection starting point in the case of automatic line disconnection due to no voice signal received	No. 1 2 3 0 0 0 : 0 sec. 0 0 1 : 1 sec. 0 1 0 : 2 sec. 0 1 1 : 3 sec. 1 0 0 : 4 sec. 1 0 1 : 5 sec. 1 1 0 : 6 sec. 1 1 1 : 7 sec.
4 5	No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode or via the machine in F/T mode)	No. 4 5 0 0 : 0.5 (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
6 7	Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation	No. 6 7 0 0 : 3 0 1 : 2 1 0 : 1 1 1 : OFF
8	Not used.	

NOTE: Selectors 1 through 5 are applicable to models equipped with built-in TADs.

- **Selectors 1 through 3: Erasing time length of ICM tone recorded preceding the tone detection starting point in the case of automatic line disconnection due to no voice signal received**

  If the machine has disconnected the line after detection of disconnection tone in ICM recording, it erases tone recorded preceding the tone detection starting point for the time length set by these selectors.

- **Selectors 4 and 5: No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode or via the machine in F/T mode)**

  The machine interprets a CNG as an effective signal if it detects a CNG signal by the number of cycles specified by these selectors when the line is connected via the external telephone in the external TAD mode or via the machine in F/T mode.

- **Selectors 6 and 7: Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation**

  If the machine receives this specified number of DTMF tone signals during external TAD operation, it will not detect CNG afterwards.
  If these selectors are set to "1, 1," the CNG detection will not be inhibited.

WSW35 (Function setting 13)

Selector No.	Function	Setting and Specifications
1 | 4	Max. detection period of dial tone/busy tone during recording of ICM	No. 1 2 3 4 0 0 0 0 : No detection 0 0 0 1 : 1 sec. 0 0 1 0 : 2 sec. 0 1 0 0 : 4 sec. | | 1 1 1 1 : 15 sec.
5 | 8	Not used.	

NOTE: Selectors 1 through 4 are applicable to models equipped with internal TADs.

- **Selectors 1 through 4: Max. detection period of dial tone/busy tone during recording of ICM**

  If the machine (called station) detects dial tone or busy tone exceeding the detection level specified by selectors 1 through 3 on WSW30 for the period specified by these selectors, then it disconnects the line.

WSW36 (Function setting 14)

Selector No.	Function	Setting and Specifications
1	ECP mode* (Not used.)	0: ON 1: OFF
2	Recovery from Inactive PC Interface (Not used.)	0: Disable 1: Enable
3	PC Power-off Recognition Time (Not used.)	0: Normal 1: Long
4	Not used.	
5	Escape from phase C	0: Yes 1: No
6 | 8	Extension of incoming calling signal (CI) frequency band specified by selectors 1 through 4 on WSW14	No. 6 7 8 0 0 0 : 0 (Ignored) 0 0 1 : 4 (448 Hz) 0 1 0 : 8 (244 Hz) 0 1 1 : 12 (162 Hz) 1 0 0 : 16 (122 Hz) 1 0 1 : 20 (97 Hz) 1 1 0 : 24 (81 Hz) 1 1 1 : 28 (69 Hz)

*ECP (Enhanced Capabilities Port)

- **Selector 1: ECP mode (Not used.)**

  The ECP mode enhances the normal bidirectional communications between the machine and the connected PC for higher transmission speed.

- **Selector 2: Recovery from Inactive PC Interface (Not used.)**

  If the machine recognizes via the STB signal line that the connected PC is powered off, it will turn the PC interface outputs Low to protect the PC from hazards that could be caused by weak electric current accidentally flown from the machine.
  This selector determines whether or not the machine should recover from the inactive PC interface to normal interfacing state upon receipt of data from the PC.

- **Selector 3: PC Power-off Recognition Time (Not used.)**

  This selector sets the time length from when the machine detects the PC powered off until it recognizes the detected state as power-off.
  If selector 2 is set to "0," it is recommended that selector 3 be set to "1"; otherwise, the machine may mistakenly detect PC powered off.

- **Selector 5: Escape from phase C**

  This selector determines whether or not the machine will escape from phase C when it detects an RTC (Return to Control) in non-ECM mode or an RCP (Return to Control Partial page) in ECM mode.

- **Selectors 6 through 8: Extension of incoming calling signal (CI) frequency band specified by selectors 1 through 4 on WSW14**

  At the start of reception, if the machine detects the frequency of a CI signal specified by selectors 1 through 4 on WSW14, it starts the ringer sounding. However, the machine may fail to detect the CI signal normally due to noise superimposed at the time of reception. To prevent it, use selectors 6 through 8 on WSW36.

  If the machine detects higher frequencies than the setting made here, it regards them as noise and interprets the detecting state as being normal, allowing the ringer to keep sounding according to the preset number of ringers (until it starts automatic reception of FAX data in the FAX mode or enters the TAD mode in the TEL mode).

WSW37 (Function setting 15)

Selector No.	Function	Setting and Specifications
1	Printout of the stored image data of an unsent document onto an error report	0: No 1: Yes
2	Erasure of the stored image data of an unsent document at the time of the subsequent in-memory message transmission	0: No 1: Yes
3 | 8	Not used.	

- **Selector 1: Printout of the stored image data of an unsent document onto an error report**

  This selector determines whether or not to print out the 1st-page image data of a document onto the error report if the document image data stored in the temporary memory cannot be transmitted normally.

- **Selector 2: Erasure of the stored image data of an unsent document at the time of the subsequent in-memory message transmission**

  If in-memory message transmission fails repeatedly when selector 1 is set to "1," the temporary memory will be occupied with image data. Setting selector 2 to "1" will automatically erase the stored 1st-page image data of an unsent document at the time of the subsequent in-memory message transmission only when recording paper or toner runs out.

WSW38 (V.34 transmission settings)

Selector No.	Function	Setting and Specifications
1 2	Setting of the equalizer	No. 1 2 0 X : Automatic 1 0 : Fixed to 4 points 1 1 : Fixed to 16 points
3	Sending level of guard tone at phase 2	0: Normal - 7 db 1: Normal
4	Stepping down the transmission speed at fallback each	0: 2400 bps 1: 4800 bps
5 6	Automatic control of modem's EQM gain for proper transmission speed choice	No. 5 6 0 0 : For higher transmission speed than the current setting 0 1 : No change from the current setting 1 0 : For lower transmission speed than the current setting 1 1 : For further lower transmission than the setting made by 1, 0
7	Redialing when a communications error occurs	0: ON 1: OFF
8	Detection of CED for stopping CNG	0: ON 1: OFF

NOTE: WSW38 takes effect only when the V.34 mode is permitted (WSW19, selector 7) in models supporting V.34 mode.

- **Selectors 1 and 2: Setting of the equalizer**

  These selectors set the equalizer's training level to be applied if the machine fails to send training due to weak line connection. If these selectors are set to "0, X," the modem will automatically set the appropriate training level.

- **Selector 3: Sending level of guard tone at phase 2**

  This selector sets the sending level of guard tone for 1800 Hz to be sent at Phase 2 in the V. 34 mode.

- **Selector 4: Stepping down the transmission speed at fallback each**

  This selector determines how much the modem steps down the transmission speed at fallback when called by the remote station. If this selector is set to "1," the modem may step down the transmission speed from 33600 bps to 28800 bps by one-time fallback.

- **Selectors 5 and 6: Automatic control of modem's EQM gain for proper transmission speed choice**

  These selectors determine how the modem controls the EQM (Eye Quality Monitor) gain for proper choice of the transmission speed, which applies if the modem selects higher transmission speed than the possible speed so that it always repeats falling back.

- **Selector 8: Detection of CED for stopping CNG**

  If this selector is set to "0," the detection time of CED specified by WSW43, selectors 4 and 5 will apply.

WSW39 (V.34 transmission speed)

Selector No.	Function	Setting and Specifications
1 | 4	First transmission speed choice for fallback	No. 1 2 3 4 / No. 5 6 7 8 0 0 0 0 : 2400 bps 0 0 0 1 : 4800 bps 0 0 1 0 : 7200 bps 0 0 1 1 : 9600 bps 0 1 0 0 : 12000 bps 0 1 0 1 : 14400 bps 0 1 1 0 : 16800 bps 0 1 1 1 : 19200 bps
5 | 8	Last transmission speed choice for fallback	1 0 0 0 : 21600 bps 1 0 0 1 : 24000 bps 1 0 1 0 : 26400 bps 1 0 1 1 : 28800 bps 1 1 0 0 : 31200 bps 1 1 0 1 : 33600 bps 1 1 1 0 : 33600 bps 1 1 1 1 : 33600 bps

NOTE: WSW39 takes effect only when the V.34 mode is permitted (WSW19, selector 7) in models supporting V.34 mode. For the transmission speed setting in other modes, refer to WSW19.

- **Selectors 1 through 8: First and last choices of transmission speed for fallback**

  These selectors are used to set the modem speed range. With the first transmission speed choice specified by selectors 1 through 4, the machine attempts to establish the transmission link via the modem. If the establishment fails, the machine automatically steps down to the next highest speed and attempts to establish the transmission link again. The machine repeats this sequence while stepping down the transmission speed to the last choice specified by selectors 5 through 8.
  If the modem always falls back to a low transmission speed (e.g., 24,000 bps), set the first transmission speed choice to the lower one (e.g., modify it from 31,200 bps to 26,400 bps) in order to deactivate the high-speed modem function and reduce the training time for shorter transmission time.
  WSW39 will be limited by selectors 3 through 8 on WSW40.

WSW40 (V.34 modem settings)

Selector No.	Function	Setting and Specifications
1 2	Not used.	
3 | 8	Masking of symbol rate(s)	Not masking / Masking No. 3 0 1 3429 symbols/sec No. 4 0 1 3200 symbols/sec No. 5 0 1 3000 symbols/sec No. 6 0 1 2800 symbols/sec No. 7 - - Not used. No. 8 0 1 2400 symbols/sec

NOTE: WSW40 takes effect only when the V.34 mode is permitted (WSW19, selector 7) in models supporting V.34 mode.

- **Selectors 3 through 8: Masking of symbol rate(s)**

  These selectors allow you to limit the transmission speed range in V.34 mode by masking the desired symbol rate(s). Transmission speeds assigned to the symbol rates are listed on the next page. The setting made by these selectors will limit the setting made by selectors 1 through 4 on WSW39.
  If selector 3 is set to "1" to mask the 3429 symbols/second when the first transmission speed choice is 33600 bps (specified by selectors 1 through 4 of WSW39), for example, then the allowable maximum transmission speed will be limited to 31200 bps. If selector 8 is set to "1" to mask the 2400 symbols/second when the first transmission speed choice is 33600 bps, then the allowable maximum transmission speed remains 33600 bps.
  If selector 8 is set to "1" to mask the 2400 symbols/second when the first transmission speed choice is 21600 bps (specified by selectors 1 through 4 on WSW39), then the allowable maximum transmission speed remains 21600 bps but the minimum transmission speed will be limited to 4800 bps.

Symbol rate	Transmission speed (bps)	Symbol rate	Transmission speed (bps)	Symbol rate	Transmission speed (bps)
2400	2400	3000	4800	3429	4800
	4800		7200		7200
	7200		9600		9600
	9600		12000		12000
	12000		14400		14400
	14400		16800		16800
	16800		19200		19200
	19200		21600		21600
	21600		24000		24000
2800	4800		26400		28800
	7200		28800		31200
	9600	3200	4800		33600
	12000		7200		
	14400		9600		
	16800		12000		
	19200		14400		
	21600		16800		
	24000		19200		
	26400		21600		
			24000		
			26400		
			28800		
			31200		

WSW41 (ON-duration of the scanning light source)

Selector No.	Function	Setting and Specifications
1 | 3	ON-duration of the scanning light source at room temperature (Not used.)	No. 1 2 3 0 0 0 : 16 hours 0 0 1 : 24 hours 0 1 0 : 12 hours 0 1 1 : 8 hours 1 0 0 : 4 hours 1 0 1 : 2 hours 1 1 0 : 10 minutes 1 1 1 : 0 minute
4	Not used.	
5 | 8	Modem attenuator	No. 5 6 7 8 0 0 0 0 : -10 dBm 0 0 0 1 : -11 dBm 0 0 1 0 : -12 dBm 0 0 1 1 : -13 dBm 0 1 0 0 : -14 dBm | | 1 1 1 1 : -25 dBm

- **Selectors 1 through 3: ON-duration of the scanning light source at room temperature (Not used.)**

  If the scanning operation is started when the scanning light source is off, then it will come on for scanning. These selectors determine how long the light source is ON after scanning.
  If these selectors are set to "1, 1, 1," the light source goes off immediately after the scanning sequence.

- **Selectors 5 through 8: Modem attenuator**

  These selectors are used to adjust the transmitting level of the modem when the reception level at the remote station is improper due to line loss. This function applies to super G3 protocol signals.

WSW42 (Internet mail settings)

Selector No.	Function	Setting and Specifications
1	Access to the incoming mail (POP3) server (Periodical or on-demand)	0: Disable 1: Enable
2	Access to the outgoing mail (SMTP) server	0: Disable 1: Enable
3	I-FAX relay	0: Disable 1: Enable
4 | 8	Not used.	

NOTE: WSW42 is applicable to models equipped with LAN interface.

WSW43 (Function setting 21)

Selector No.	Function	Setting and Specifications
1	Not used.	
2 3	Wait time for PC-Fax reception (Class 2) and FPTS command transmission	No. 2 3 0 0 : 50 ms 0 1 : 100 ms 1 0 : 150 ms 1 1 : 0 ms
4 5	Detection time of 2100 Hz CED or ANSam	No. 4 5 0 0 : 200 ms 0 1 : 300 ms 1 0 : 400 ms 1 1 : 500 ms
6	Not used.	
7	Automatic start of remote maintenance	0: No 1: Yes
8	JPEG coding	0: Disable 1: Enable

- **Selector 8: JPEG coding**

  Setting this selector to "0" disables the machine from sending/receiving JPEG color images and from receiving JPEG monochrome images.

WSW44 (Speeding up scanning-1)

Selector No.	Function	Setting and Specifications
1 | 5	Not used.	
6 | 8	Effective time length of the white level compensation data obtained beforehand (Not used.)	No. 6 7 8 0 0 0 : Obtained compensation data ineffective 0 0 1 : 1 min. 0 1 0 : 3 min. 0 1 1 : 5 min. 1 0 0 : 10 min. 1 0 1 : 15 min. 1 1 0 : 20 min. 1 1 1 : 30 min.

NOTE: Selectors 6 through 8 are applicable only to models equipped with ADF units.

- **Selectors 6 through 8: Effective time length of the white level compensation data obtained beforehand (Not used.)**

  If you set documents in the ADF and the document front sensor detects them, the controller will make correction of the reference voltage to be applied to white level compensation for document scanning before the **Copy** key is pressed.
  These selectors determine how long compensation data obtained beforehand will keep effective.

WSW45 (Speeding up scanning-2)

Selector No.	Function	Setting and Specifications
1 | 3	Delay time from when documents are set until the ADF starts drawing them in (Not used.)	No. 1 2 3 0 0 0 : No automatic drawing-in 0 0 1 : 1 sec. 0 1 0 : 2 sec. 0 1 1 : 3 sec. 1 0 0 : 4 sec. 1 0 1 : 5 sec. 1 1 0 : 6 sec. 1 1 1 : 7 sec.
4 | 6	Periodical correction intervals of the reference voltage to be applied to white level compensation for document scanning, during standby (Not used.)	No. 4 5 6 0 0 0 : No correction of reference voltage during standby 0 0 1 : 10 sec. 0 1 0 : 30 sec. 0 1 1 : 1 min. 1 0 0 : 3 min. 1 0 1 : 5 min. 1 1 0 : 10 min. 1 1 1 : 30 min.
7	Standby position of the CIS unit (Not used.)	0: CIS home position 1: Location of the white-level reference film
8	Not used.	

NOTE: WSW45 is applicable only to models equipped with ADF units.

- **Selectors 1 through 3: Delay time from when documents are set until the ADF starts drawing them in (Not used.)**

  These selectors determine how long the ADF will delay automatic drawing-in of documents (to the scanning standby position) after you set them in the ADF, as well as determining whether or not the ADF automatically draws in documents.

- **Selectors 4 through 6: Periodical correction intervals of the reference voltage applied to white level compensation for document scanning, during standby (Not used.)**

  These selectors set the correction intervals (in seconds) of the reference voltage to be applied to white level compensation for document scanning during standby, as well as determining whether or not the controller makes the reference voltage correction during standby. (Conventionally, the correction has been made immediately before the start of actual scanning)
  This function takes effect in copying. Making the correction during standby may shorten the preparation time for copying.

  NOTE: Do not access these selectors.

- **Selector 7: Standby position of the CIS unit (Not used.)**

  This selector determines whether the standby position of the CIS unit should be the home position or the location of the white-level reference film (attached to the inside of the scanner top cover). If the location of the reference film is selected, the CIS unit will not return to the home position so as to shorten the travel time, decreasing the preparation time for copying.

WSW46 (Monitor of power ON/OFF state and parallel port kept at high)

Selector No.	Function	Setting and Specifications
1 2	Monitoring the PC ON/OFF state (Not used.)	No. 1 2 0 0 : Disable 0 1 : Monitor SELECT IN 1 0 : Monitor STROBE 1 1 : Monitor both SELECT IN and STROBE
3	Parallel port output pins kept at high level (Not used.)	0: Enable 1: Disable
4	Previous filtering parameters for white level compensation (Not used.)	0: Enable 1: Disable
5 | 8	Not used.	

NOTE: Selector 4 is not applicable to models equipped with flat-bed scanners.

- **Selectors 1 and 2: Monitoring the PC ON/OFF state (Not used.)**

  For the related functions, refer to WSW36, selectors 2 and 3.

- **Selector 3: Parallel port output pins kept at high level (Not used.)**

  Setting this selector to "0" will keep all parallel output pins of the machine at high level. Use this setting if Resource Manager (bundled with MFC models) installed to WindowsNT running on the connected PC fails to monitor the power ON/OFF state of the machine.

- **Selector 4: Previous filtering parameters for white level compensation (Not used.)**

  At the start of scanning operation, the machine usually initializes white and black level data stored in the EEPROM by scanning the while-level reference film attached to the inside of the scanner top cover. After long use of the machine, however, the film may be contaminated with dust or dirt. Accordingly, incorrect white level data will be set up so that white vertical streaks will be brought on the scanning result.
  Setting this selector to "0" (Enabled) will apply previously saved white level data instead of new incorrect compensation.

WSW47 (Switching between high- and full-speed USB)

Selector No.	Function	Setting and Specifications
1	Handling paper at the occurrence of a paper feed timing error	0: Eject paper w/o print 1: Print on the current paper
2	Not used.	
3 4	Delay of FAX line disconnection when switching to the pseudo-ringing external telephone	No. 3 4 0 0 : 200 ms 0 1 : 400 ms 1 0 : 700 ms 1 1 : 1000 ms
5	Disable the ringer of external telephone at non-ring reception	0: No 1: Yes
6	Not used.	
7	Disable the ringer of external telephone with CAR signal when caller ID service is available	0: No 1: Yes
8	Switching between high-speed USB and full-speed USB	0: Auto switching between high-speed USB (ver. 2.0) and full-speed USB (ver. 1.1) 1: Fixed to full-speed USB (ver. 1.1)

NOTE: Selector 1 is applicable only to models equipped with flat-bed scanners.

NOTE: Selectors 3 and 4 are applicable only to models supporting pseudo-ringing of a connected external telephone.

- **Selector 1: Handling paper at the occurrence of a paper feed timing error**

  When feeding paper to the print start position, the machine might cause a feed timing error so that the registration sensor goes ON signaling the presence of paper. This selector determines whether the machine prints on the current paper or ejects the current paper without printing and prints on the next paper.

- **Selectors 3 and 4: Delay of FAX line disconnection when switching to the pseudo-ringing external telephone**

  When the machine receives a phone call, it can make the connected external telephone ring (so called pseudo-ringing). During pseudo-ringing, if you pick up the handset of the external telephone, the line might be disconnected due to cut-off of the line current.
  To hold the line, the machine may supply line current by making use of the pulse generator circuit that forms a parallel loop. This way the FAX line disconnection may be delayed. These selectors determine the delay period.

WSW48 (USB setup latency)

Selector No.	Function	Setting and Specifications
1 | 5	Not used.	
6 | 8	USB setup latency	No. 6 7 8 0 0 0 : Default period 0 0 1 : Shorter 1 0 1 0 : Longer 1 0 1 1 : Longer 2 1 0 0 : Longer 3 1 0 1 : Longer 4 1 0 0 : Shorter 2 1 1 1 : Shorter 3

- **Selectors 6 through 8: USB setup latency**

  These selectors should not be disturbed.

WSW49 (End-of-copying beep and print in black)

Selector No.	Function	Setting and Specifications
1 2	Not used.	
3	End-of-copying beep	0: Yes 1: No
4 5	Command flag detection time	No. 4 5 0 0 : 150 ms 0 1 : 350 ms 1 0 : 550 ms 1 1 : 750 ms
6 7 8	Not used.	

- **Selectors 4 and 5: Command flag detection time**

  After receiving a command flag, the machine will wait for the command that should follow for the time length specified by these selectors.

WSW50 (SDAA settings)

Selector No.	Function	Setting and Specifications
1 2	Percentage voltage for interpreting the external telephone as being hooked up (based on the network's standard voltage) (Not used.)	No. 1 2 0 0 : 80% 0 1 : 90% 1 0 : 70% 1 1 : No detection
3	DC mask curve table to be applied when the line is connected (Not used.)	0: Apply the initial value specified by local regulations 1: Apply table DC5 prepared specially
4	AC impedance to be applied when the line is connected (Not used.)	0: 600Ω termination 1: ZR termination
5 6	Current control to be applied immediately after connection of the line (Not used.)	No. 5 6 0 0 : Standard 0 1 : Increase start-up current for termination 1 0 : Fine current control for termination 1 1 : Not used. (equal to "0, 0")
7 8	AC voltage threshold for detection of ring (Not used.)	No. 7 8 0 0 : 19 V 0 1 : 11 V 1 0 : 25 V 1 1 : 31 V

NOTE: WSW50 is applicable to models equipped with SDAA circuits.

WSW51 (Function setting 16)

Selector No.	Function	Setting and Specifications
1	Output of communications error report when transmission verification report is disabled	0: Enable 1: Disable
2 | 8	Not used.	

WSW52

Selector No.	Function	Setting and Specifications
1 | 8	Not used.	

WSW53 (Function setting 17)

Selector No.	Function	Setting and Specifications	
1 | 4	Interval setting of engine calibration execution (The 'engine calibration' is that the engine controls measuring the toner adhering amount periodically according to the number of the printed pages or time.)	No.1234 0001: 100, 200, 300, 300 0010: 100, 200, 200, 200 0011: 100, 100, 100, 100 0100: 50, 200, 300, 300 0101: 50, 200, 200, 200 0110: 50, 100, 300, 300 0111: 50, 100, 200, 200 1000: 30, 60, 150, 250, 1001: 30, 60, 100, 200 1010: 30, 60, 100, 100 1011: 30, 60, 60, 200 1100: 30, 60, 60, 100 1101: 50, 50, 50, 50 1110: The engine calibration is disabled. 1111: All calibrations (engine and software) are disabled.	
5	Idling mode setting when recording the fax message	0: OFF	1: ON
6 | 8	Not used.		

- **Selectors 5: Idling mode setting when recording the fax message**

  The idling mode is to print the fax message by reducing the recording speed (spacing) in order to prevent waste recording when a paper length error is occurred while recording the fax message.
  When the idling mode is turned on, the recording speed is approximately half. (monochrome: 16ppm, color: 6.5ppm)

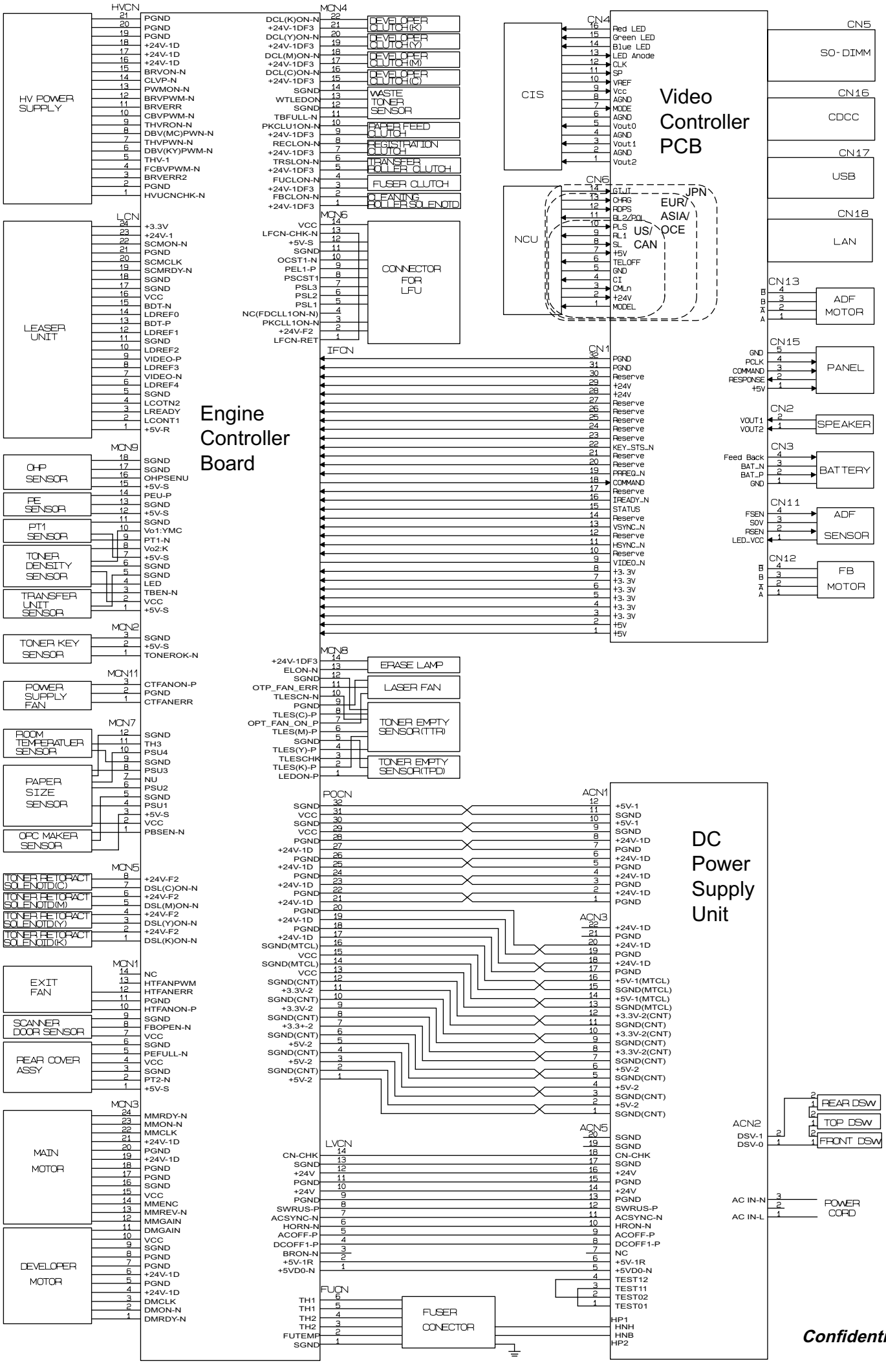
WSW54-60

Selector No.	Function	Setting and Specifications
1 | 8	Not used.	

MFC-9420CN

APPENDIX 5. WIRING DIAGRAM

This appendix provides the wiring diagram that helps you understand the connections between PCBs.

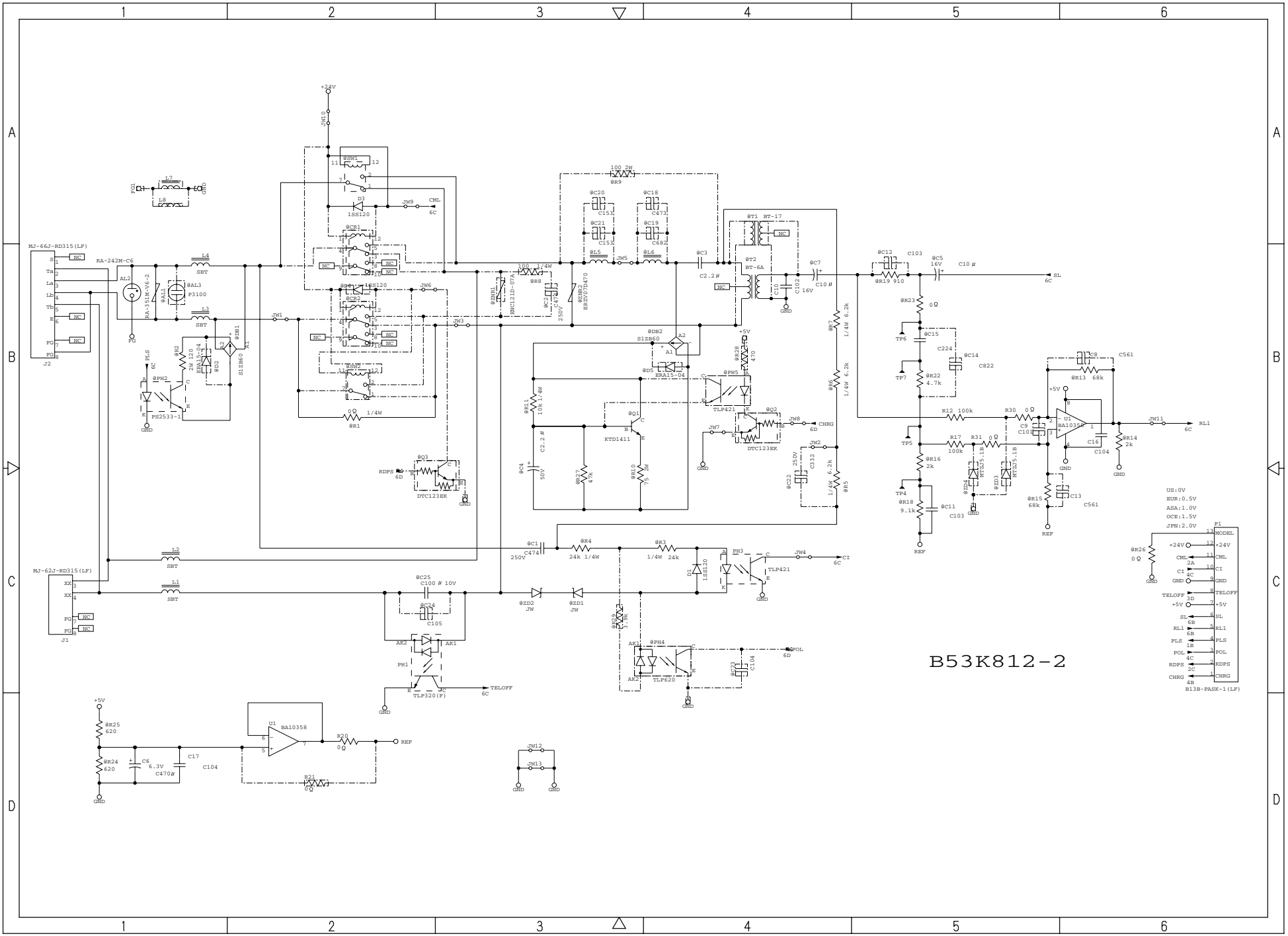

Engine Controller Board
Video Controller PCB
DC Power Supply Unit
HV POWER SUPPLY
LEASER UNIT
OHP SENSOR
PE SENSOR
PT1 SENSOR
TONER DENSITY SENSOR
TRANSFER UNIT SENSOR
TONER KEY SENSOR
POWER SUPPLY FAN
ROOM TEMPERATUER SENSOR
PAPER SIZE SENSOR
OPC MAKER SENSOR
TONER RETRACT SOLENOID(C)
TONER RETRACT SOLENOID(M)
TONER RETRACT SOLENOID(Y)
TONER RETRACT SOLENOID(K)
EXIT FAN
SCANNER DOOR SENSOR
REAR COVER ASSY
MAIN MOTOR
DEVELOPER MOTOR
DEVELOPER CLUTCH(K)
DEVELOPER CLUTCH(Y)
DEVELOPER CLUTCH(M)
DEVELOPER CLUTCH(C)
WASTE TONER SENSOR
PAPER FEED CLUTCH
REGISTRATION CLUTCH
TRANSFER ROLLER CLUTCH
FUSER CLUTCH
CLEANING ROLLER SOLENOID
CONNECTOR FOR LFU
ERASE LAMP
LASER FAN
TONER EMPTY SENSOR(TTR)
TONER EMPTY SENSOR(TPD)
FUSER CONECTOR
CIS
NCU
JPN
EUR/ ASIA/ OCE
US/ CAN
SO-DIMM
CDCC
USB
LAN
ADF MOTOR
PANEL
SPEAKER
BATTERY
ADF SENSOR
FB MOTOR
REAR DSW
TOP DSW
FRONT DSW
POWER CORD
Confidential

MFC-9420CN

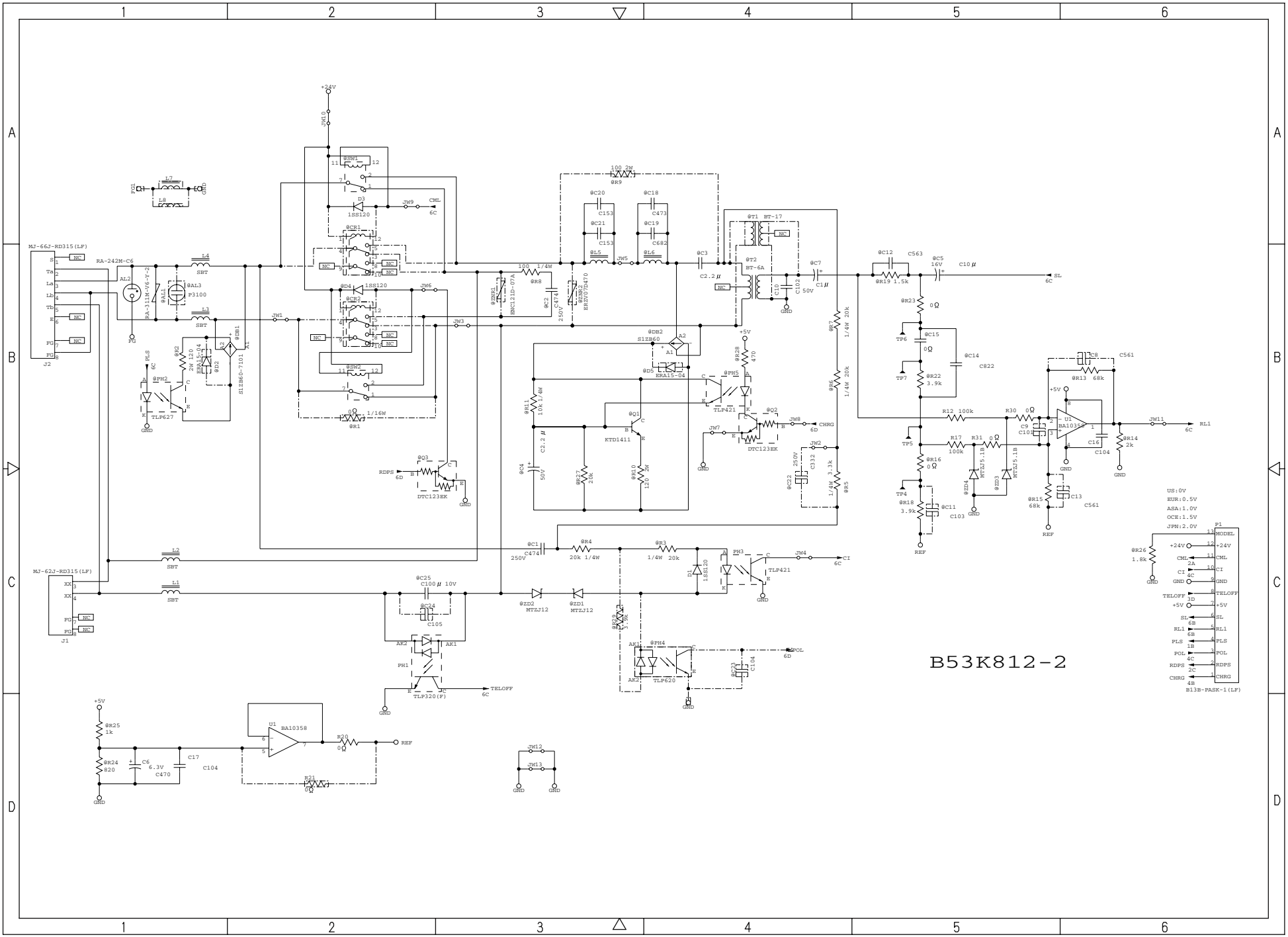
APPENDIX 6. CIRCUIT DIAGRAMS

This appendix provides the circuit diagrams of the NCU PCB and power supply PCB.

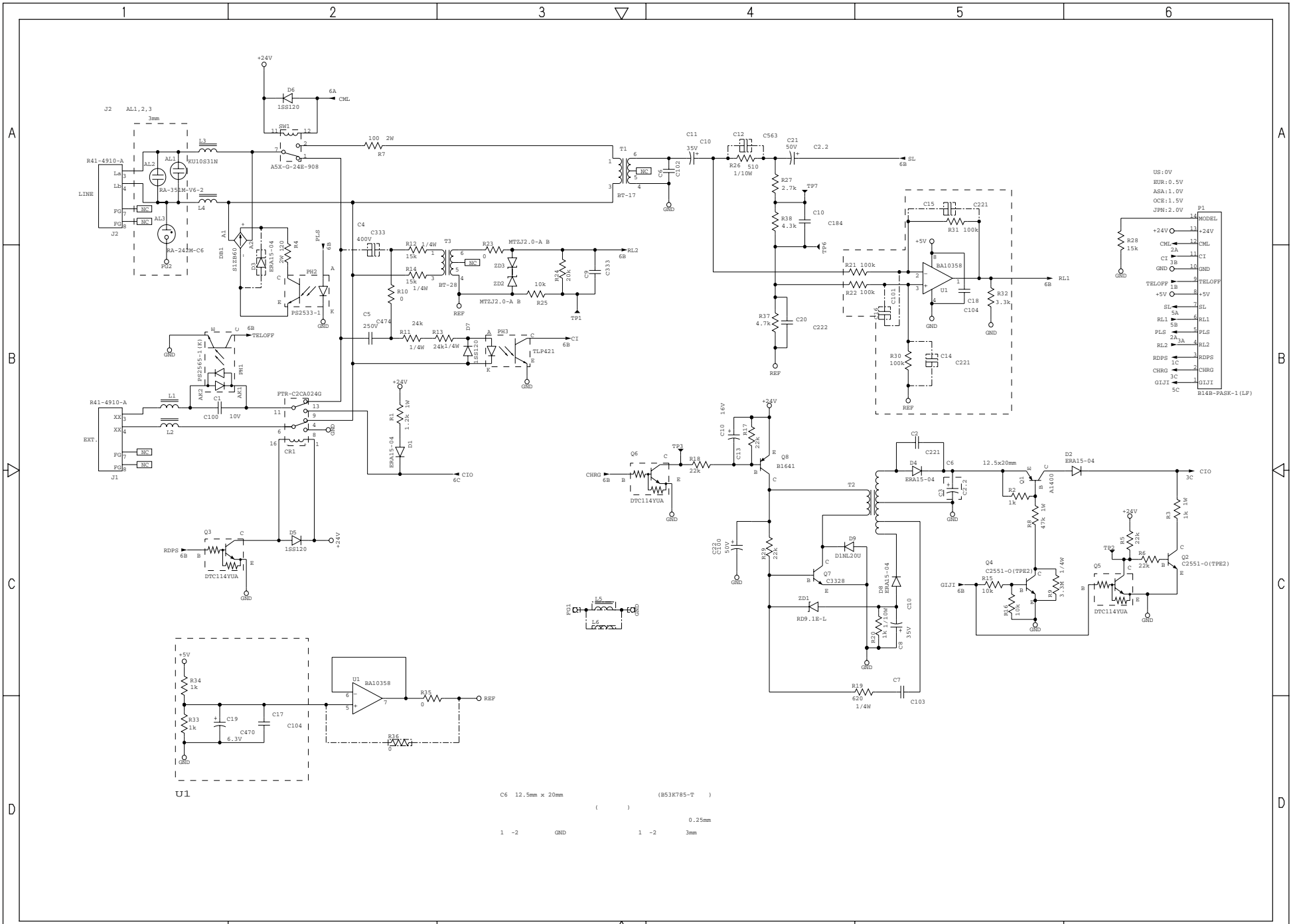
A. NCU PCB: MFC-9420CN (U.S.A. model)



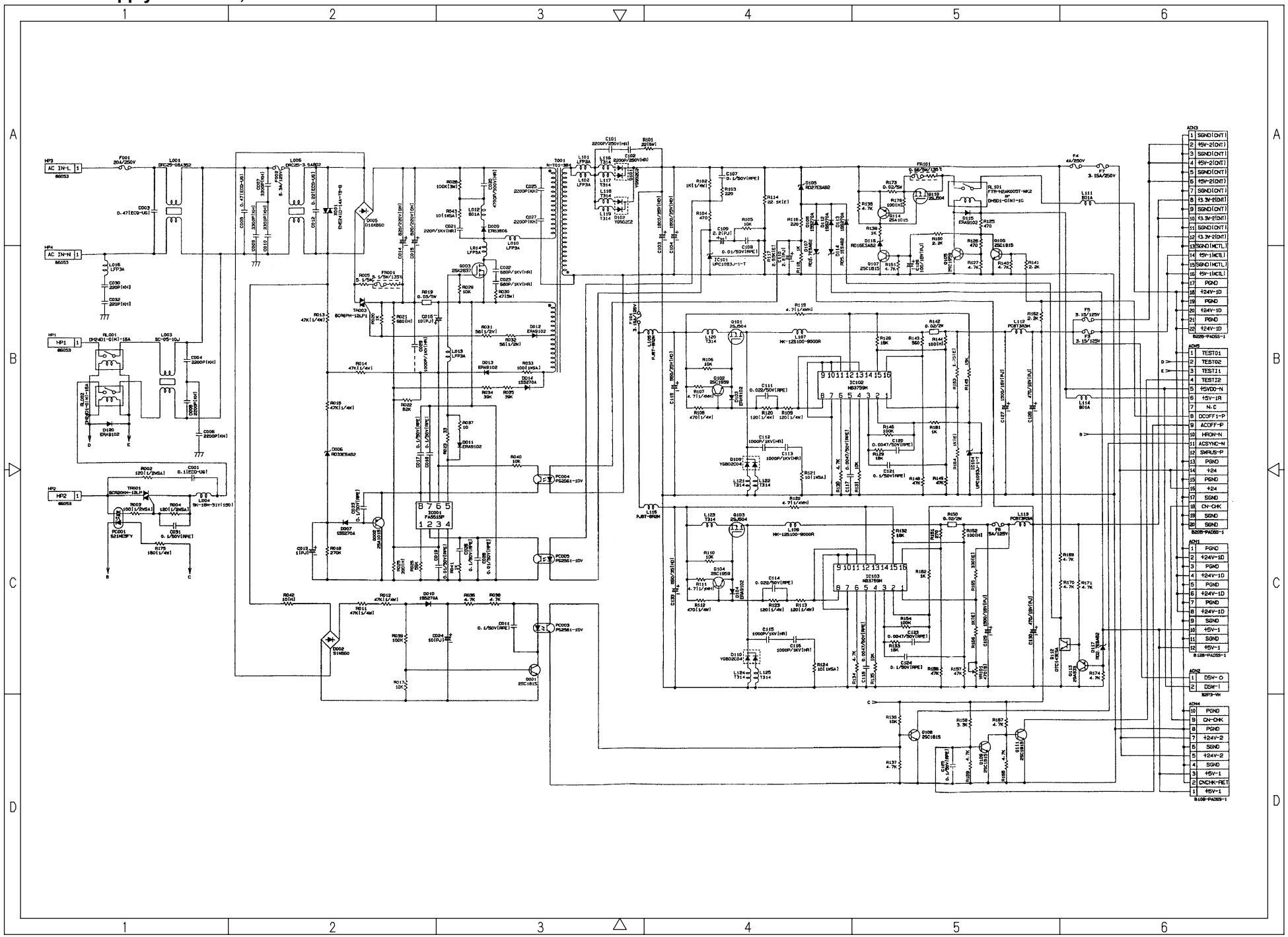
A. NCU PCB: MFC-9420CN (Europe, Oceania, Asia model)



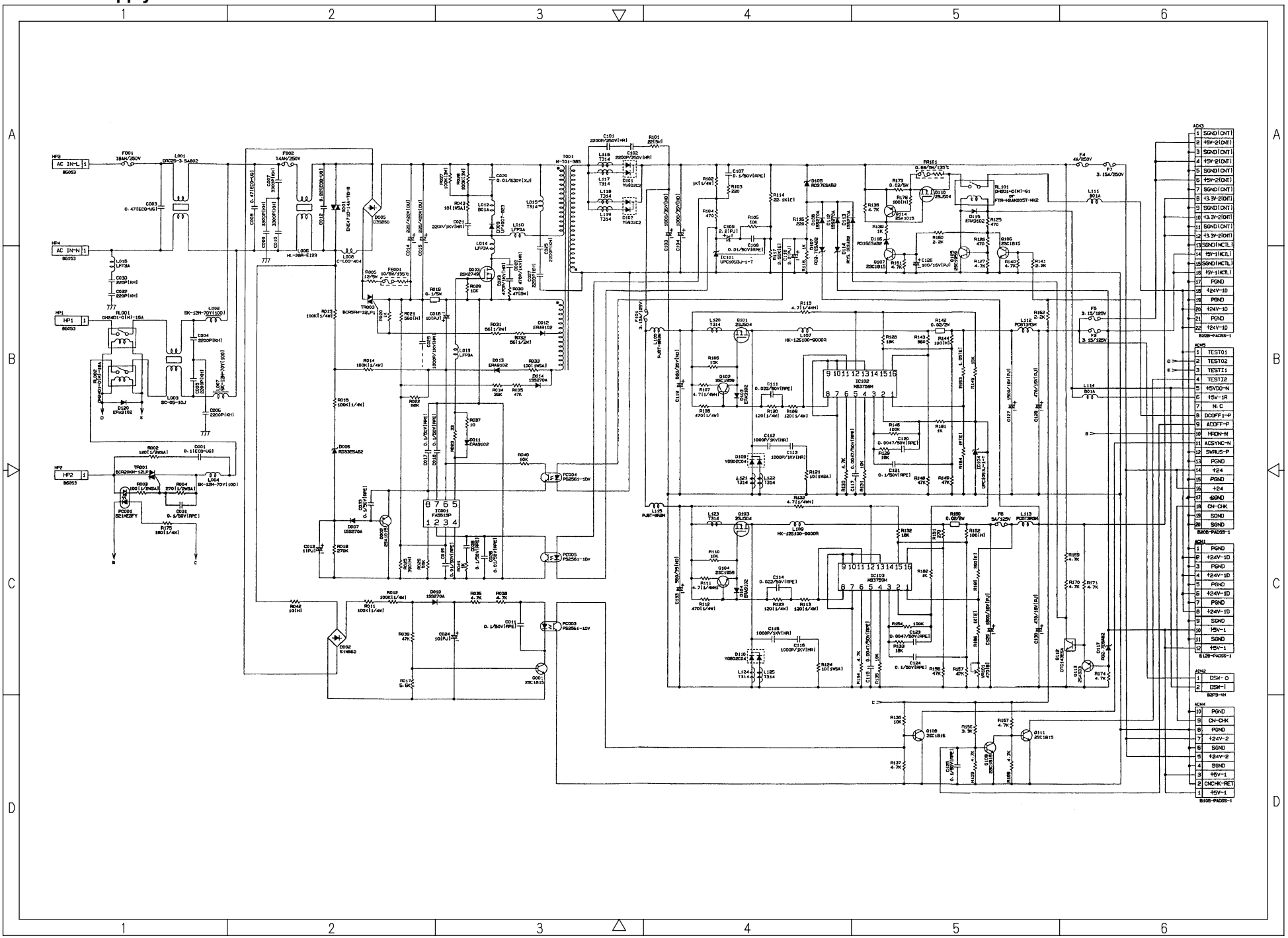
A. NCU PCB: MFC-9420CN (Japanese model)



B. Power Supply PCB 100V, 127V



B. Power Supply PCB 240V



MFC-9420CN

APPENDIX 7. VIEWING THE EVENT LOG FILE

When installing the printer driver, the installer logs events that occur during the installation process in the event log file. This appendix views a sample of the event log file. Selecting Start | Program | Brother | MFL-Pro Suite *model name* | Installation Diagnostics reads out the event log file.

The attachment LOG FILE on the next pages is an example of the MFC5840CN

BH3 installation log file
C:\Documents and Settings\All Users\Application Data\Brother\BrLog\BrtINSTL.log

```
**********Debug Write Start 2004/07/25 19:28:44**********
Brother(R) Debug Output DLL Version 1.1
Copyright(c) 2004 Brother Industries, Ltd. All Rights Reserved.

********** SYSTEM INFORMATION **********
Function Name: INSTL
CPU Vender: GenuineIntel
Cpu Name: Intel Pentium III
FPU: Suppprted
TSC: Suppprted
MSR: Suppprted
CMOV: Suppprted
MMX: Suppprted
3DNow!: Not Suppprted
SSE_INT: Suppprted
SSE_FP: Suppprted
3DNow! Ext: Not Suppprted
FCMOV: Suppprted
OS Informations:
  Windows 2000 Professional Service Pack 2  OS version 5.0.2195
Memory Informations:
  Current memory load 28%  Total physical memory     = 255MB
  Available physical memory = 181MB
  Total pagefile            = 618MB
  Available pagefile        = 553MB
  Total virtual memory      = 2047MB
  Available virtual memory  = 2022MB
********** SYSTEM INFORMATION **********
[00325207] 040000 INF: InstallationIniFilePath = C:\Program Files\Brother\Brmfl04b\Brmfinfo.ini
[00325207] 040000 INF: Function Data ----------------------------------------------------------
[00325207] 040000 INF: INIDATA  PRT      = 1
[00325207] 040000 INF: INIDATA  SCN      = 1
[00325207] 040000 INF: INIDATA  FAXTX    = 1
[00325207] 040000 INF: INIDATA  FAXRX    = 1
[00325207] 040000 INF: INIDATA  RSP      = 1
[00325217] 040000 INF: INIDATA  MEDIA    = 0
[00325217] 040000 INF: INIDATA  COM      = 0
[00325217] 040000 INF: INIDATA  USBID    = USB\VID_04F9&PID_016E
[00325217] 040000 INF: INIDATA  LPTID    = LPTENUM\BrotherMFC-5840__85F4
[00325217] 040000 INF: INIDATA  PRTNAME  = Brother MFC-5840CN USB P  r
[00325217] 040000 INF: INIDATA  SCNNAME  = Brother MFC-5840CN USB
[00325217] 040000 INF: INIDATA  FAXNAME  = Brother PC-FAX #2
[00325217] 040000 INF: INIDATA  INSTPATH  = C:\Program Files\Brother\  fl04b
[00325217] 040000 INF: INIDATA  PORTNAME  = USB006
[00325217] 040000 INF: INIDATA  MODELNAME = MFC-5840CN
[00325217] 040000 INF: INIDATA  INTERFACE = U
[00325217] 040000 INF: ------------------------------------------------------------------------
```

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

*1 Header Information
Each start-up creates a new set of information

*2 PC System Information

*3 OS Start-up Time
*4 Error Level
*5 INF: Information / ERR: Error

*6 Information to be checked
(Functions set up by integrated installer)
PRT: Printer driver
SCN: Scanner driver
FAXTX: FAX sending driver
FAXRX: FAX receiving software
RSP: Remote Setup software
MEDIA: Media Drive driver

*7 All models indicate "0" because BH3 doesn't check Media Drive
*8 COM Port Number
*9 Brother ID
*10 MODEL ID (! Machine ID is serial number, not obtained here)
*11 USB connection also requires LPTID
*12 Printer Driver Name
*13 Scanner Driver Name
*14 PC-FAX Sending Driver Name
*15 Folder Name to be installed
*16 USB Port Number
*17 Model Name
*18 Connection Mode (USB / LPT / LAN)

```
[00325217] 040000 INF: Win2K
[00325217] 040000 INF: ----- Printer Driver Check Start -----
[00325217] 040000 INF: PARAM MODEL NAME        MFC-5840CN
[00325217] 040000 INF: PARAM CMP PRINTER NAME   Brother MFC-5840CN USB Printer
[00325217] 040000 INF: PARAM INTERFACE         USB
[00325217] 040000 INF: PARAM PRINTER ID
[00325217] 040000 INF: PARAM MODE              0
[00325227] 040000 INF: PARAM CMP NAME CHANGE      Brother MFC-5840CN USB Printer
[00325227] 040000 INF: PARAM CMP NAME CHANGE      Brother MFC-5840CN USB Printer
[00325227] 040000 INF: PARAM CMP NAME CHANGE      Brother MFC-5840CN USB Printer
[00325227] 040000 INF: EXIST DRIVER NAME        = Brother MFC-5840CN USB Printer
[00325227] 040000 INF: LOCAL PORT NAME          = USB006
[00325227] 040000 INF: ----- Printer Driver Check End   -----

[00325227] 040000 INF: ----- Scanner Driver Check Start -----
[00325497] 040000 INF: Initialize() Result = 0
[00325497] 040000 INF: Scanner Install         = OK
[00325497] 040000 INF: ----- Scanner Driver Check End   -----

[00325497] 040000 INF: ----- FAXTX Driver Check Start -----
[00325497] 040000 INF: PARAM MODEL NAME        PC-FAX
[00325497] 040000 INF: PARAM CMP PRINTER NAME   Brother PC-FAX #2
[00325497] 040000 INF: PARAM INTERFACE         USB
[00325497] 040000 INF: PARAM PRINTER ID
[00325497] 040000 INF: PARAM MODE              0
[00325507] 040000 INF: EXIST DRIVER NAME        = Brother PC-FAX #2
[00325507] 040000 INF: PC-FAX PORT NAME      = USB006
[00325507] 040000 INF: ----- FAXTX Driver Check End   -----

[00325507] 040000 INF: ----- FAXRX Check Start -----
[00325507] 040000 INF: FAXRX FILE CHECK        = OK
[00325507] 040000 INF: ----- FAXRX Check End   -----

[00325507] 040000 INF: ----- RSP Check Start   -----
[00325507] 040000 INF: RSP FILE CHECK          = OK
[00325507] 040000 INF: ----- RSP Check End     -----

[00325507] 040000 INF: ----- Serial Port Check Start -----
[00326508] 040000 INF: FAXRX Connect OK
[00326508] 040000 INF: RSP   Connect OK
[00326528] 040000 INF: ----- Serial Port Check End   -----
```

*19 Installation Check Detail
*20 Printer Driver Installation Check
*21 If there is EXIST DRIVER NAME, the printer driver is properly installed.
*22 Scanner Driver Installation Check
*23 Scanner Error Code
*24 If Scanner Install =OK, Scanner Driver is properly installed.
*25 FAX(Tx) Driver Installation Check
*26 If there is EXIST DRIVER NAME, PC-FAX sending driver is properly installed.
*27 FAX(Rx) File Check
*28 If FAXRX FILE CHECK =OK, FAX receiving file is properly copied.
*29 Remote Setup File Check
*30 If RSP FILE CHECK =OK, RSP file is properly copied.
*31 Serial Port (COM Port Driver Check)
*32 FAX receiving and RSP are communicating properly with COM port.

```
[00326528] 040000 INF: ----- Enumerate Host Controllers Check Start -----
[00326649] 040000 INF: USB Host Controler:      \\.\HCD0    = Intel 82371AB/EB PCI to USB Universal Host Controller

[00327280] 040000 INF: ----- Connect Device Information Start -----
[00327280] 040000 INF: Port1:  Dev1 = USB Composite Device
[00327280] 040000 INF: ----- Connect Device Information End   -----

[00328181] 040000 INF: ----- Printer Connect Check Start -----
[00328181] 040000 INF: PARAM MODEL NAME        MFC-5840CN
[00328181] 040000 INF: PARAM CMP PRINTER NAME   Brother MFC-5840CN USB Printer
[00328181] 040000 INF: PARAM INTERFACE         USB
[00328181] 040000 INF: PARAM PRINTER ID        7&19fa3abd&0&USB006
[00328181] 040000 INF: PARAM MODE              1
[00328191] 040000 INF: Get Printer ID  = USBPRINT\BROTHERMFC-5840CN\7&19FA3ABD&0&USB006
[00328191] 040000 INF: Printer ID is agreement!
[00328191] 040000 INF: REAL PORT    = USB006
[00328191] 040000 INF: ----- Printer Port Check Start -----
[00328191] 040000 INF: PRINTER PORT CHECK      = USB
[00328191] 040000 INF: INTERFACE    = USB
[00328191] 040000 INF: PORT CHECK          = OK
[00328191] 040000 INF: ----- Printer Port Check End   -----
[00328191] 040000 INF: PARAM MODEL NAME        PC-FAX
[00328191] 040000 INF: PARAM CMP PRINTER NAME   Brother PC-FAX #2
[00328191] 040000 INF: PARAM INTERFACE         USB
[00328191] 040000 INF: PARAM PRINTER ID        7&19FA3ABD&0&USB006
[00328191] 040000 INF: PARAM MODE              1
[00328191] 040000 INF: ----- Fax Port Check Start -----
[00328191] 040000 INF: FAX PORT CHECK          = USB006
[00328191] 040000 INF: INTERFACE    = USB
[00328191] 040000 INF: PORT CHECK          = OK
[00328191] 040000 INF: ----- Fax Port Check End   -----
[00328191] 040000 INF: ----- Printer Connect Check End   -----

[00328191] 040000 INF: ----- Connect Device Information Start -----
[00328191] 040000 INF: Port1:  Dev1 = Brother MFC-5840CN USB Printer
[00328191] 040000 INF: ----- Connect Device Information End   -----

[00328621] 040000 INF: ----- Scanner Connect Check Start -----
[00328872] 040000 INF: Initialize() Result = 0
[00329302] 040000 INF: ChkStiDevice() Result = 0
[00329302] 040000 INF: ChkWiaDevice() Result = 3
[00331215] 040000 INF: ChkTwainDs() Result = 0
[00331215] 040000 INF: Get ScannerName = Brother MFC-5840CN USB
[00331656] 040000 INF: GetDefaultTwds() Result = 0
[00331656] 040000 INF: Get DefaultDS = TWAIN_32 Brother MFL Pro Scanner
[00332177] 040000 INF: GetPortName() Result = 0
[00332177] 040000 INF: Get PortName = \\.\BrUsca
[00332617] 040000 INF: ChkDevCommunication() Result
[00332617] 040000 INF: Scanner Connect         = OK
[00332617] 040000 INF: ----- Scanner Connect Check End   -----
```

33 *33 Communication Check

34 *34 USB device is connected to USB Port1.
If other USB devices are connected to USB Port2, it will be also indicated.
! If no device is recognized, HUB might be connected to the port. In this case, displace it.

35 *35 Printer Driver Communication Check

36 *36 Port Name created by installer

37 *37 Communication Check to this port

38 *38 Port Type (USB/LPT/LAN)

39 *39 Communication Check Result

40 *40 PC-FAX Sending Driver Check

41 *41 Communication Check to this port

42 *42 Port Type (USB/LPT/LAN)

43 *43 Communication Check Result

44 *44 No meaning (Ignore)

45 *45 Scanner Driver Communication Check

46 *46 Scanner Error Code (Refer to the Scanner Error Code List

47 *47 Port Name the scanner is using

48 *48 ! If USB ID is not correct, it indicates "6"

```
[00334049] 040000 INF: ----- Media Connect Check Start -----
[00334049] 040000 INF: ----- Media Connect Check End   -----

[00334049] 040000 INF: ----- Connect Device Information Start -----
[00334049] 040000 INF: Port1:  Dev1 = Brother MFC-5840CN USB D      e
[00334049] 040000 INF: ----- Connect Device Information End   -----

[00334049] 040000 INF: ----- Connect Device Information Start -----
[00334049] 040000 INF: Port1:  Dev1 = USB Printing Support
[00334049] 040000 INF: Port1:  Dev2 = Brother MFC-5840CN USB
[00334049] 040000 INF: Port1:  Dev3 = Brother MFC-5840CN USB Remote Setup Po     :OM5)
[00334049] 040000 INF: Port1:  Dev4 = USB Mass Storage Device
[00334049] 040000 INF: ----- Connect Device Information End   -----

[00334049] 040000 INF: USB Hub Information:     [Port1] DeviceConnected    = USB Composite Device
[00334049] 040000 INF: USB Hub Information:     [Port2] NoDeviceConnected    = NoDeviceConnected

[00334049] 040000 INF: ----- Enumerate Host Controllers Check End   -----

[00334510] 040000 INF: ----- USB Chip information Check Start -----
[00334510] 040000 INF: USB Chip0(Device25)      = Intel 82371AB/EB PCI to ISA bridge (ISA mode)
[00334510] 040000 INF: USB Chip1(Device26)      = Intel(r) 82371AB/EB PCI Bus Master IDE Controller
[00334510] 040000 INF: USB Chip2(Device27)      = Intel 82371AB/EB PCI to USB Universal Host C     oller
[00334510] 040000 INF: USB Chip3(Device28)      = Intel 82443BX Pentium(r) II Processor to PCI Bridge
[00334510] 040000 INF: USB Chip4(Device29)      = Intel 82443BX Pentium(r) II Processor to AGP Controller
[00334510] 040000 INF: ----- USB Chip information Check End   -----

[00334510] 040000 INF: ----- ADD/REMOVE APPLICATION Check Start -----
[00334510] 040000 INF: AddRemove Display Name:     DisplayName1    = Brother HL-5070
[00334510] 040000 INF: AddRemove Display Name:     DisplayName2    = NVIDIA Windows 2000 Display Drivers
[00334510] 040000 INF: AddRemove Display Name:     DisplayName3    = Microsoft Visual Studio 6.0 Enterprise Edition
[00334510] 040000 INF: AddRemove Display Name:     DisplayName4    = Microsoft Web Publishing Wizard 1.53
[00334510] 040000 INF: AddRemove Display Name:     DisplayName5    = Microsoft Office 2000 Premium
[00334510] 040000 INF: AddRemove Display Name:     DisplayName6    = Brother MFL-Pro Suite
[00334510] 040000 INF: AddRemove Display Name:     DisplayName7    = Brother Drivers
[00334510] 040000 INF: AddRemove Display Name:     DisplayName8    = WebFldrs
[00334510] 040000 INF: AddRemove Display Name:     DisplayName9    = Brother Drivers
[00334510] 040000 INF: ----- ADD/REMOVE APPLICATION Check End   -----
```

49 50 51 52 53 54 55

*49 BH3 doesn't check the media drive driver.

*50 No meaning (Ignore)

*51 It indicates connected devices
(A connected device can be indicated including other company's products)
*52 If another device is connected to USB Port2, it is also indicated.

*53 It indicates that each port is connected to devices or not.

*54 USB Chip Information

*55 Add/Remove Application Information

```
[00341109] 040000 57: ----- Process Information Start -----
[00341109] 010000 ERR: Process1=
[00341109] 010000 ERR: Process2=
[00341109] 010000 ERR: Process3=\SystemRoot\System32\smss.exe
[00341109] 010000 ERR: Process4=
[00341109] 010000 ERR: Process5=\??\C:\WINNT\system32\winlogon.exe
[00341109] 010000 ERR: Process6=C:\WINNT\system32\services.exe
[00341109] 010000 ERR: Process7=C:\WINNT\system32\lsass.exe
[00341109] 010000 ERR: Process8=C:\WINNT\system32\svchost.exe
[00341109] 010000 ERR: Process9=C:\WINNT\system32\spoolsv.exe
[00341109] 010000 ERR: Process10=C:\WINNT\System32\svchost.exe
[00341109] 010000 ERR: Process11=C:\WINNT\system32\regsvc.exe
[00341109] 010000 ERR: Process12=C:\WINNT\system32\MSTask.exe
[00341109] 010000 ERR: Process13=C:\WINNT\System32\WBEM\WinMgmt.exe
[00341109] 010000 ERR: Process14=C:\WINNT\Explorer.EXE
[00341109] 010000 ERR: Process15=C:\Program Files\Brownie\brstswnd.exe
[00341109] 010000 ERR: Process16=C:\Program Files\Brownie\Brcdcmon.exe
[00341109] 010000 ERR: Process17=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[00341109] 010000 ERR: Process18=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[00341109] 010000 ERR: Process19=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Diagnosis\BR_collect.exe
[00341109] 040000 INF: ----- Process Information End   -----
```

56 *56 Process Information which is running
! If you failed to install and virus checker was running, displace it.

*57 ERRs are just a bug. Fix with ALL

```
[00341109] 040000 INF: ----- Startup Information Start -----
[00341109] 040000 INF: STARTUP:  = Microsoft Office.lnk
[00341109] 040000 INF: STARTUP:  = Status Monitor.lnk
[00341109] 040000 INF: ----- Startup Information End   -----
```

58

*58 Startup Registration
! If you failed to install and virus checker was running, displace it.

```
[00347739] 040000 INF: ----- Installation Diagnostics Result Start -----
[00347739] 040000 INF: PRT          = OK
[00347739] 040000 INF: PRT_INST     = OK
[00347739] 040000 INF: PRT_PORT     = USB006

[00347739] 040000 INF: SCN          = OK
[00347739] 040000 INF: SCN_INST     = OK
[00347739] 040000 INF: SCN_PORT     = \\.\BrUscan0

[00347739] 040000 INF: FAXTX        = OK
[00347739] 040000 INF: FAXTX_INST   = OK
[00347739] 040000 INF: FAXTX_PORT   = USB006

[00347739] 040000 INF: FAXRX        = OK
[00347739] 040000 INF: FAXRX_INST   = OK
[00347739] 040000 INF: FAXRX_PORT   = COM5:

[00347739] 040000 INF: RSP          = OK
[00347739] 040000 INF: RSP_INST     = OK
[00347739] 040000 INF: RSP_PORT     = COM5:

[00347739] 040000 INF: ----- Installation Diagnostics Result End   -----
**********Debug Write End 2004/07/25 19:29:10**********
```

59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74

*59 Installation Diagnostics Result (OK / NG(Installation) / NG(Communication)
*60 Printer Driver Integrated Diagnostic Result
*61 Printer Driver Installation Result
*62 Printer Driver Port

*63 Scanner Driver Integrated Diagnostic Result
*64 Scanner Driver Installation Result
*65 Scanner Driver Port

*66 PC-FAX Sending Driver Integrated Diagnostic Result
*67 PC-FAX Sending Driver Installation Result
*68 PC-FAX Sending Driver Port

*69 PC-FAX Receiving Driver Integrated Diagnostic Result
*70 PC-FAX Receiving Driver Installation Result
*71 PC-FAX Receiving Driver Port

*72 RSP Software Integrated Diagnostic Result
*73 RSP Software Installation Result
*74 RSP Software Port

BH3 installation log file
C:\Documents and Settings\All Users\Application Data\Brother\BrLog\BrtINSTL.log

```
**********Debug Write Start 2004/07/25 19:26:59**********
Brother(R) Debug Output DLL Version 1.1
Copyright(c) 2004 Brother Industries, Ltd. All Rights Reserved.

********** SYSTEM INFORMATION **********
Function Name: INSTL
CPU Vender: GenuineIntel
Cpu Name: Intel Pentium III
FPU: Supppрted
TSC: Supppрted
MSR: Supppрted
CMOV: Supppрted
MMX: Supppрted
3DNow!: Not Supppрted
SSE_INT: Supppрted
SSE_FP: Supppрted
3DNow! Ext: Not Supppрted
FCMOV: Supppрted
OS Informations:
  Windows 2000 Professional Service Pack 2  OS version 5.0.2195
Memory Informations:
  Current memory load 28%  Total physical memory     = 255MB
  Available physical memory = 183MB
  Total pagefile            = 618MB
  Available pagefile        = 557MB
  Total virtual memory      = 2047MB
  Available virtual memory  = 2022MB
********** SYSTEM INFORMATION **********
[00220757] 040000 INF: InstallationIniFilePath = C:\Program Files\Brother\Brmfl04b\Brmfinfo.ini
[00220787] 040000 INF: Function Data ----------------------------------------------------------
[00220787] 040000 INF: INIDATA  PRT      = 1
[00220787] 040000 INF: INIDATA  SCN      = 1
[00220787] 040000 INF: INIDATA  FAXTX    = 1
[00220787] 040000 INF: INIDATA  FAXRX    = 1
[00220787] 040000 INF: INIDATA  RSP      = 1
[00220787] 040000 INF: INIDATA  MEDIA    = 0
[00220787] 040000 INF: INIDATA  COM      = 0
[00220787] 040000 INF: INIDATA  USBID    = USB\VID_04F9&PID_016E
[00220787] 040000 INF: INIDATA  LPTID    = LPTENUM\BrotherMFC-5840 35F4
[00220787] 040000 INF: INIDATA  PRTNAME  = Brother MFC-5840CN USB Pr
[00220787] 040000 INF: INIDATA  SCNNAME  = Brother MFC-5840CN USB
[00220787] 040000 INF: INIDATA  FAXNAME  = Brother PC-FAX #2
[00220787] 040000 INF: INIDATA  INSTPATH  = C:\Program Files\Brother\B l04b
[00220787] 040000 INF: INIDATA  PORTNAME  = USB006
[00220787] 040000 INF: INIDATA  MODELNAME = MFC-5840CN
[00220787] 040000 INF: INIDATA  INTERFACE = U
[00220787] 040000 INF: ------------------------------------------------------------------------
```

1 *1 Header Information
Each start-up creates a new set of information

2 *2 PC System Information

*3 OS Start-up Time
*4 Error Level
*5 INF: Information / ERR: Error

6 *6 Information to be checked
(Functions set up by integrated installer)
PRT: Printer driver
SCN: Scanner driver
FAXTX: FAX sending driver
FAXRX: FAX receiving software
RSP: Remote Setup software
MEDIA: Media Drive driver

*7 All models indicate "0" because BH3 doesn't check Media Drive
*8 COM Port Number
*9 Brother ID
*10 MODEL ID (! Machine ID is serial number, not obtained here)
*11 USB connection also requires LPTID
*12 Printer Driver Name
*13 Scanner Driver Name
*14 PC-FAX Sending Driver Name
*15 Folder Name to be installed
*16 USB Port Number
*17 Model Name
*18 Connection Mode (USB / LPT / LAN)

```
[00220787] 040000 INF: Win2K
[00220837] 040000 INF: ----- Printer Driver Check Start -----
[00220847] 040000 INF: PARAM MODEL NAME        MFC-5840CN
[00220847] 040000 INF: PARAM CMP PRINTER NAME  Brother MFC-5840CN USB Printer
[00220847] 040000 INF: PARAM INTERFACE         USB
[00220847] 040000 INF: PARAM PRINTER ID
[00220847] 040000 INF: PARAM MODE              0
[00220857] 040000 INF: PARAM CMP NAME CHANGE   Brother MFC-5840CN USB Printer
[00220857] 040000 INF: PARAM CMP NAME CHANGE   Brother MFC-5840CN USB Printer
[00220857] 040000 INF: PARAM CMP NAME CHANGE   Brother MFC-5840CN USB Printer
[00220857] 040000 INF: EXIST DRIVER NAME       = Brother MFC-5840CN USB Printer
[00220857] 040000 INF: LOCAL PORT NAME         = USB006
[00220857] 040000 INF: ----- Printer Driver Check End   -----

[00220857] 040000 INF: ----- Scanner Driver Check Start -----
[00221158] 040000 INF: Initialize() Result = 5
[00221158] 040000 INF: Scanner Install     = OK
[00221158] 040000 INF: ----- Scanner Driver Check End   -----

[00221158] 040000 INF: ----- FAXTX Driver Check Start -----
[00221158] 040000 INF: PARAM MODEL NAME        PC-FAX
[00221158] 040000 INF: PARAM CMP PRINTER NAME  Brother PC-FAX #2
[00221158] 040000 INF: PARAM INTERFACE         USB
[00221158] 040000 INF: PARAM PRINTER ID
[00221158] 040000 INF: PARAM MODE              0
[00221158] 040000 INF: EXIST DRIVER NAME       = Brother PC-FAX #2
[00221158] 040000 INF: PC-FAX PORT NAME        = USB006
[00221158] 040000 INF: ----- FAXTX Driver Check End   -----

[00221168] 040000 INF: ----- FAXRX Check Start -----
[00221168] 040000 INF: FAXRX FILE CHECK        = OK
[00221168] 040000 INF: ----- FAXRX Check End   -----

[00221168] 040000 INF: ----- RSP Check Start   -----
[00221168] 040000 INF: RSP FILE CHECK          = OK
[00221168] 040000 INF: ----- RSP Check End     -----

[00221168] 040000 INF: ----- Serial Port Check Start -----
[00221168] 010000 ERR: Open Serial Port Failure
[00221168] 010000 ERR: Port Name               = \\.\COM5
[00221168] 040000 INF: ----- Serial Port Check End   -----

[00221168] 040000 INF: ----- Enumerate Host Controllers Check Start -----
[00221288] 040000 INF: USB Host Controler:     \\.\HCD0    = Intel 82371AB/EB PCI to USB Universal Host Controller

[00221288] 040000 INF: USB Hub Information:    [Port1] NoDeviceConnected    = NoDeviceConnected

[00221288] 040000 INF: USB Hub Information:    [Port2] NoDeviceConnected    = NoDeviceConnected

[00221288] 040000 INF: ----- Enumerate Host Controllers Check End   -----
```

*19 Installation Check Detail
*20 Printer Driver Installation Check

*22 Scanner Driver Installation Check
*23 Scanner Error Code:5 = The specified device is not connected (only USB connection).
*24 If Scanner Install =OK, Scanner Driver is properly installed.

*25 FAX(Tx) Driver Installation Check

*26 If there is EXIST DRIVER NAME, PC-FAX sending driver is properly installed.

*27 FAX(Rx) File Check
*28 If FAXRX FILE CHECK =OK, FAX receiving file is properly copied.

*29 Remote Setup File Check
*30 If RSP FILE CHECK =OK, RSP file is properly copied.

*31 Serial Port (COM Port Driver Check)
*32 PC-FAXRX is not available due to serial port failure. .

*33 Communication Check
*34 No device is connected to USB or no device is recognized because of HUB.
Communication check is not attempted because the connection is not recognizable.

```
[00221669] 040000 INF: ----- USB Chip information Check Start -----
[00221669] 040000 INF: USB Chip0(Device25)      = Intel 82371AB/EB PCI to ISA bridge (ISA mode)
[00221669] 040000 INF: USB Chip1(Device26)      = Intel(r) 82371AB/EB PCI Bus Master IDE Controller
[00221669] 040000 INF: USB Chip2(Device27)      = Intel 82371AB/EB PCI to USB Universal Host C 54 oller
[00221669] 040000 INF: USB Chip3(Device28)      = Intel 82443BX Pentium(r) II Processor to PCI Bridge
[00221669] 040000 INF: USB Chip4(Device29)      = Intel 82443BX Pentium(r) II Processor to AGP Controller
[00221669] 040000 INF: ----- USB Chip information Check End   -----

[00221669] 040000 INF: ----- ADD/REMOVE APPLICATION Check Start -----
[00221669] 040000 INF: AddRemove Display Name:     DisplayName1   = Brother HL-5070
[00221669] 040000 INF: AddRemove Display Name:     DisplayName2   = NVIDIA Windows 2000 Display Drivers
[00221669] 040000 INF: AddRemove Display Name:     DisplayName3   = Microsoft Visual Studio 6.0 Enterprise Edition
[00221669] 040000 INF: AddRemove Display Name:     DisplayName4   = Microsoft Web Publishing Wizard 1.53
[00221679] 040000 INF: AddRemove Display Name:     DisplayName5   = Microsoft Office 2000 Premium 55
[00221679] 040000 INF: AddRemove Display Name:     DisplayName6   = Brother MFL-Pro Suite
[00221679] 040000 INF: AddRemove Display Name:     DisplayName7   = Brother Drivers
[00221679] 040000 INF: AddRemove Display Name:     DisplayName8   = WebFldrs
[00221679] 040000 INF: AddRemove Display Name:     DisplayName9   = Brother Drivers
[00221679] 040000 INF: ----- ADD/REMOVE APPLICATION Check End   -----

[00235399] 040000 57 ----- Process Information Start -----
[00235429] 010000 ERR: Process1=
[00235429] 010000 ERR: Process2=
[00235429] 010000 ERR: Process3=\SystemRoot\System32\smss.exe
[00235429] 010000 ERR: Process4=
[00235429] 010000 ERR: Process5=\??\C:\WINNT\system32\winlogon.exe
[00235429] 010000 ERR: Process6=C:\WINNT\system32\services.exe
[00235429] 010000 ERR: Process7=C:\WINNT\system32\lsass.exe
[00235429] 010000 ERR: Process8=C:\WINNT\system32\svchost.exe
[00235429] 010000 ERR: Process9=C:\WINNT\system32\spoolsv.exe
[00235429] 010000 ERR: Process10=C:\WINNT\System32\svchost.exe
[00235429] 010000 ERR: Process11=C:\WINNT\system32\regsvc.exe
[00235429] 010000 ERR: Process12=C:\WINNT\system32\MSTask.exe
[00235429] 010000 ERR: Process13=C:\WINNT\System32\WBEM\WinMgmt.exe
[00235429] 010000 ERR: Process14=C:\WINNT\Explorer.EXE
[00235429] 010000 ERR: Process15=C:\Program Files\Brownie\brstswnd.exe
[00235429] 010000 ERR: Process16=C:\Program Files\Brownie\Brcdcmon.exe
[00235429] 010000 ERR: Process17=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[00235429] 010000 ERR: Process18=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[00235429] 010000 ERR: Process19=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Diagnosis\BR_collect.exe
[00235459] 040000 INF: ----- Process Information End   -----

[00235459] 040000 INF: ----- Startup Information Start -----
[00235459] 040000 INF: STARTUP:  = Microsoft Office.lnk 58
[00235459] 040000 INF: STARTUP:  = Status Monitor.lnk
[00235459] 040000 INF: ----- Startup Information End   -----
```

56

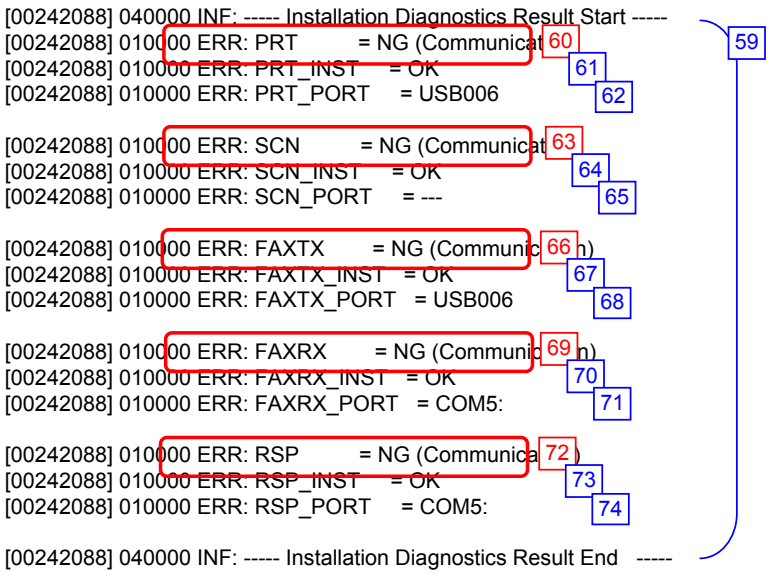
*54 USB Chip Information

*55 Add/Remove Application Information

*56 Process Information running now

*57 ERRs are just a bug. Fix with ALL

*58 Startup Registration



**********Debug Write End 2004/07/25 19:27:25**********

*59 Installation Diagnostics Result (OK / NG(Installation) / NG(Communication)
*60 Printer Driver Installation Failure (CANNOT Communicate)
*61 Printer Driver Installation Result
*62 Printer Driver Port

*63 Scanner Driver Installation Failure (CANNOT Communicate)
*64 Scanner Driver Installation Result
*65 Scanner Driver Port

*66 PC-FAX Sending Driver Installation Failure(CANNOT Communicate)
*67 PC-FAX Sending Driver Installation Result
*68 PC-FAX Sending Driver Port

*69 PC-FAX Receiving Software Installation Failure(CANNOT Communicate)
*70 PC-FAX Receiving Software Installation Result
*71 PC-FAX Receiving Software Port

*72 RSP Software Installation Failure (CANNOT Communicate)
*73 RSP Software Installation Result
*74 RSP Software Port

BH3 installation log file
C:\Documents and Settings\All Users\Application Data\Brother\BrLog\BrtINSTL.log

```
**********Debug Write Start 2004/07/25 19:33:41**********
Brother(R) Debug Output DLL Version 1.1
Copyright(c) 2004 Brother Industries, Ltd. All Rights Reserved.

********** SYSTEM INFORMATION **********
Function Name: INSTL
CPU Vender: GenuineIntel
Cpu Name: Intel Pentium III
FPU: Supppрted
TSC: Supppрted
MSR: Supppрted
CMOV: Supppрted
MMX: Supppрted
3DNow!: Not Supppрted
SSE_INT: Supppрted
SSE_FP: Supppрted
3DNow! Ext: Not Supppрted
FCMOV: Supppрted
OS Informations:
  Windows 2000 Professional Service Pack 2  OS version 5.0.2195
Memory Informations:
  Current memory load 28%  Total physical memory     = 255MB
  Available physical memory = 181MB
  Total pagefile            = 618MB
  Available pagefile        = 554MB
  Total virtual memory      = 2047MB
  Available virtual memory  = 2022MB
********** SYSTEM INFORMATION **********
[00622414] 040000 INF: InstallationIniFilePath = C:\Program Files\Brother\Brmfl04b\Brmfinfo.ini
[00622414] 040000 INF: Function Data ----------------------------------------------------------
[00622414] 040000 INF: INIDATA  PRT      = 1
[00622414] 040000 INF: INIDATA  SCN      = 1
[00622414] 040000 INF: INIDATA  FAXTX    = 1
[00622414] 040000 INF: INIDATA  FAXRX    = 1
[00622414] 040000 INF: INIDATA  RSP      = 1
[00622414] 040000 INF: INIDATA  MEDIA    =
[00622414] 040000 INF: INIDATA  COM      =
[00622414] 040000 INF: INIDATA  USBID    = USB\VID_04F9&PID_016F
[00622414] 040000 INF: INIDATA  LPTID    = LPTENUM\BrotherMFC-5840
[00622414] 040000 INF: INIDATA  PRTNAME  = Brother MFC-5555840CN USB
[00622414] 040000 INF: INIDATA  SCNNAME  = Brother MFC-5555840CN USB
[00622424] 040000 INF: INIDATA  FAXNAME  = Brother PC-FAX #3
[00622424] 040000 INF: INIDATA  INSTPATH  = C:\Program Files\Brother\B
[00622424] 040000 INF: INIDATA  PORTNAME  = USB006
[00622424] 040000 INF: INIDATA  MODELNAME = MFC-5850CN
[00622424] 040000 INF: INIDATA  INTERFACE = U
[00622424] 040000 INF: ------------------------------------------------------------------------
```

*1 Header Information
Each start-up creates a new set of information

*2 PC System Information

*3 OS Start-up Time
*4 Error Level
*5 INF: Information / ERR: Error

*6 Information to be checked
(Functions set up by integrated installer)
PRT: Printer driver
SCN: Scanner driver
FAXTX: FAX sending driver
FAXRX: FAX receiving software
RSP: Remote Setup software
MEDIA: Media Drive driver

*7 All models indicate "0" because BH3 doesn't check Media Drive
*8 COM Port Number
*9 Brother ID
*10 MODEL ID (! Machine ID is serial number, not obtained here)
*11 USB connection also requires LPTID
*12 Printer Driver Name
*13 Scanner Driver Name
*14 PC-FAX Sending Driver Name
*15 Folder Name to be installed
*16 USB Port Number
*17 Model Name
*18 Connection Mode (USB / LPT / LAN)

```
[00622424] 040000 INF: Win2K
[00622424] 040000 INF: ----- Printer Driver Check Start -----
[00622424] 040000 INF: PARAM MODEL NAME        MFC-5850CN
[00622424] 040000 INF: PARAM CMP PRINTER NAME   Brother MFC-5555840CN USB Printer
[00622424] 040000 INF: PARAM INTERFACE         USB
[00622424] 040000 INF: PARAM PRINTER ID
[00622424] 040000 INF: PARAM MODE              0
[00622434] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5555840CN USB Printer
[00622434] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5555840CN USB Printer
[00622434] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5555840CN USB Printer
[00622434] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5555840CN USB Printer
[00622434] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5555840CN USB Printer
[00622434] 040000 INF: ----- Printer Driver Check End   -----

[00622434] 040000 INF: ----- Scanner Driver Check Start -----
[00622454] 040000 INF: Initialize() Result = 4
[00622454] 010000 ERR: Scanner Install         = NG
[00622454] 040000 INF: ----- Scanner Driver Check End   -----

[00622454] 040000 INF: ----- FAXTX Driver Check Start -----
[00622454] 040000 INF: PARAM MODEL NAME        PC-FAX
[00622454] 040000 INF: PARAM CMP PRINTER NAME   Brother PC-FAX #3
[00622454] 040000 INF: PARAM INTERFACE         USB
[00622454] 040000 INF: PARAM PRINTER ID
[00622454] 040000 INF: PARAM MODE              0
[00622454] 040000 INF: ----- FAXTX Driver Check End   -----

[00622454] 040000 INF: ----- FAXRX Check Start -----
[00622454] 040000 INF: FAXRX FILE CHECK        = NG
[00622454] 040000 INF: ----- FAXRX Check End   -----

[00622454] 040000 INF: ----- RSP Check Start -----
[00622454] 040000 INF: RSP FILE CHECK          = NG
[00622454] 040000 INF: ----- RSP Check End   -----

[00622454] 040000 INF: ----- Serial Port Check Start -----
[00623465] 040000 INF: FAXRX Connect OK
[00623465] 040000 INF: RSP   Connect OK
[00623485] 040000 INF: ----- Serial Port Check End   -----

[00623485] 040000 INF: ----- Enumerate Host Controllers Check Start -----
[00623605] 040000 INF: USB Host Controler:     \\.\HCD0    = Intel 82371AB/EB PCI to USB Universal Host Cor

[00623766] 040000 INF: USB Hub Information:    [Port1] DeviceConnected    = USB Composite Device

[00623766] 040000 INF: USB Hub Information:    [Port2] NoDeviceConnected    = NoDeviceConnected

[00623766] 040000 INF: ----- Enumerate Host Controllers Check End   -----
```

19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34

*19 Installation Check Detail
*20 Printer Driver Installation Check
*21 If there is no EXIST DRIVER NAME, Driver is not properly installed.
*22 Scanner Driver Installation Check
*23 Scanner Error (4= The specified device is not installed)
*24 Scanner Driver is not properly installed.
*25 FAX(Tx) Driver Installation Check
*26 If there is no EXIST DRIVER NAME, PC-FAX sending driver is not properly installed.
*27 FAX(Rx) File Check
*28 If FAXRX FILE CHECK =NG, FAX sending driver is not properly installed.
*29 Remote Setup File Check
*30 If RSP FILE CHECK =NG, Remote Setup is not properly installed.
*31 Serial Port (COM Port Driver Check)
*32 FAX sending and RSP are not properly installed, but communication is available.
FAX receiving and RSP can be used properly, if file exists
*33 Communication Check
*34 The installation was not successful, and failed to check USB device.

```
[00624216] 040000 INF: ----- USB Chip information Check Start -----
[00624216] 040000 INF: USB Chip0(Device25)      = Intel 82371AB/EB PCI to ISA bridge (ISA mode)
[00624216] 040000 INF: USB Chip1(Device26)      = Intel(r) 82371AB/EB PCI Bus Master IDE Controller
[00624216] 040000 INF: USB Chip2(Device27)      = Intel 82371AB/EB PCI to USB Universal Host Co 54 ller    *54 USB Chip Information
[00624216] 040000 INF: USB Chip3(Device28)      = Intel 82443BX Pentium(r) II Processor to PCI Bridge
[00624216] 040000 INF: USB Chip4(Device29)      = Intel 82443BX Pentium(r) II Processor to AGP Controller
[00624216] 040000 INF: ----- USB Chip information Check End   -----

[00624216] 040000 INF: ----- ADD/REMOVE APPLICATION Check Start -----
[00624216] 040000 INF: AddRemove Display Name:     DisplayName1   = Brother HL-5070
[00624216] 040000 INF: AddRemove Display Name:     DisplayName2   = NVIDIA Windows 2000 Display Drivers
[00624216] 040000 INF: AddRemove Display Name:     DisplayName3   = Microsoft Visual Studio 6.0 Enterprise Edition
[00624216] 040000 INF: AddRemove Display Name:     DisplayName4   = Microsoft Web Publishing Wizard 1.53
[00624216] 040000 INF: AddRemove Display Name:     DisplayName5   = Microsoft Office 2000 Premium 55  *55 Add/Remove Application Information
[00624216] 040000 INF: AddRemove Display Name:     DisplayName6   = Brother MFL-Pro Suite
[00624216] 040000 INF: AddRemove Display Name:     DisplayName7   = Brother Drivers
[00624216] 040000 INF: AddRemove Display Name:     DisplayName8   = WebFldrs
[00624216] 040000 INF: AddRemove Display Name:     DisplayName9   = Brother Drivers
[00624216] 040000 INF: ----- ADD/REMOVE APPLICATION Check End   -----

[00625218] 040000 INF: ----- Installation Diagnostics Result Start -----     *59 Installation Diagnostics Result (OK / NG(Installation) / NG(Communication)
[00625218] 010000 ERR: PRT         = NG (Insta 60                    59     *60 Printer Driver Installation Failure ( Failure to install file )
[00625218] 010000 ERR: PRT_INST    = NG          61                         *61 Scanner Driver Installation Result
[00625218] 010000 ERR: PRT_PORT    = ---           62                       *62 Printer Driver Port

[00625218] 010000 ERR: SCN         = NG (Insta 63                          *63 Scanner Driver Installation Failure ( Failure to install file )
[00625218] 010000 ERR: SCN_INST    = NG          64                        *64 Scanner Driver Installation Result
[00625218] 010000 ERR: SCN_PORT    = ---           65                      *65 Scanner Driver Port

[00625218] 010000 ERR: FAXTX       = NG (Ins 66                            *66 PC-FAX Sending Driver Installation Failure ( Failure to install file )
[00625218] 010000 ERR: FAXTX_INST  = NG          67                        *67 PC-FAX sending Driver Installation Result
[00625218] 010000 ERR: FAXTX_PORT  = ---           68                      *68 PC-FAX Sending Driver Port

[00625218] 010000 ERR: FAXRX       = NG (Ins 69                            *69 PC-FAX Receiving Driver Installation Failure ( Failure to install file )
[00625218] 010000 ERR: FAXRX_INST  = NG          70                        *70 PC-FAX receiving Software Installation Result
[00625218] 010000 ERR: FAXRX_PORT  = COM5:       71                        *71 PC-FAX Receiving Software Port

[00625218] 010000 ERR: RSP         = NG (Insta 72                          *72 RSP Software Installation Failure ( Failure to install file )
[00625218] 010000 ERR: RSP_INST    = NG          73                        *73 RSP Software Installation Result
[00625218] 010000 ERR: RSP_PORT    = COM5:         74                      *74 RSP Software Port

[00625218] 040000 INF: ----- Installation Diagnostics Result End -----

**********Debug Write End 2004/07/25 19:33:50**********
```

BH3 installation log file
C:\Documents and Settings\All Users\Application Data\Brother\BrLog\BrtINSTL.log

```
**********Debug Write Start 2004/07/25 19:49:04**********
Brother(R) Debug Output DLL Version 1.1
Copyright(c) 2004 Brother Industries, Ltd. All Rights Reserved.

********** SYSTEM INFORMATION **********
Function Name: INSTL
CPU Vender: GenuineIntel
Cpu Name: Intel Pentium III
FPU: Supppрted
TSC: Supppрted
MSR: Supppрted
CMOV: Supppрted
MMX: Supppрted
3DNow!: Not Supppрted
SSE_INT: Supppрted
SSE_FP: Supppрted
3DNow! Ext: Not Supppрted
FCMOV: Supppрted
OS Informations:
  Windows 2000 Professional Service Pack 2  OS version 5.0.2195
Memory Informations:
  Current memory load 34%  Total physical memory     = 255MB
  Available physical memory = 167MB
  Total pagefile            = 618MB
  Available pagefile        = 538MB
  Total virtual memory      = 2047MB
  Available virtual memory  = 2022MB
********** SYSTEM INFORMATION **********
[00318407] 040000 INF: InstallationIniFilePath = C:\Program Files\Brother\Brmfl04b\Brmfinfo.ini
[00318407] 040000 INF: Function Data ----------------------------------------------------------
[00318407] 040000 INF: INIDATA  PRT      = 1
[00318407] 040000 INF: INIDATA  SCN      = 1
[00318407] 040000 INF: INIDATA  FAXTX    = 1
[00318407] 040000 INF: INIDATA  FAXRX    = 0
[00318407] 040000 INF: INIDATA  RSP      = 0
[00318407] 040000 INF: INIDATA  MEDIA    = 0
[00318407] 040000 INF: INIDATA  COM      = 0
[00318407] 040000 INF: INIDATA  USBID    =
[00318407] 040000 INF: INIDATA  LPTID    =
[00318407] 040000 INF: INIDATA  PRTNAME   = Brother MFC-5840CN Printer
[00318407] 040000 INF: INIDATA  SCNNAME   = Brother MFC-5840CN LAN
[00318407] 040000 INF: INIDATA  FAXNAME   = Brother PC-FAX #4
[00318407] 040000 INF: INIDATA  INSTPATH  = C:\Program Files\Brother\Brmfl04b
[00318407] 040000 INF: INIDATA  PORTNAME  = BRN_600300
[00318407] 040000 INF: INIDATA  MODELNAME = MFC-5840CN
[00318407] 040000 INF: INIDATA  INTERFACE = LAN
[00318407] 040000 INF: ----------------------------------------------------------------------
```

*1 Header Information
Each start-up creates a new set of information

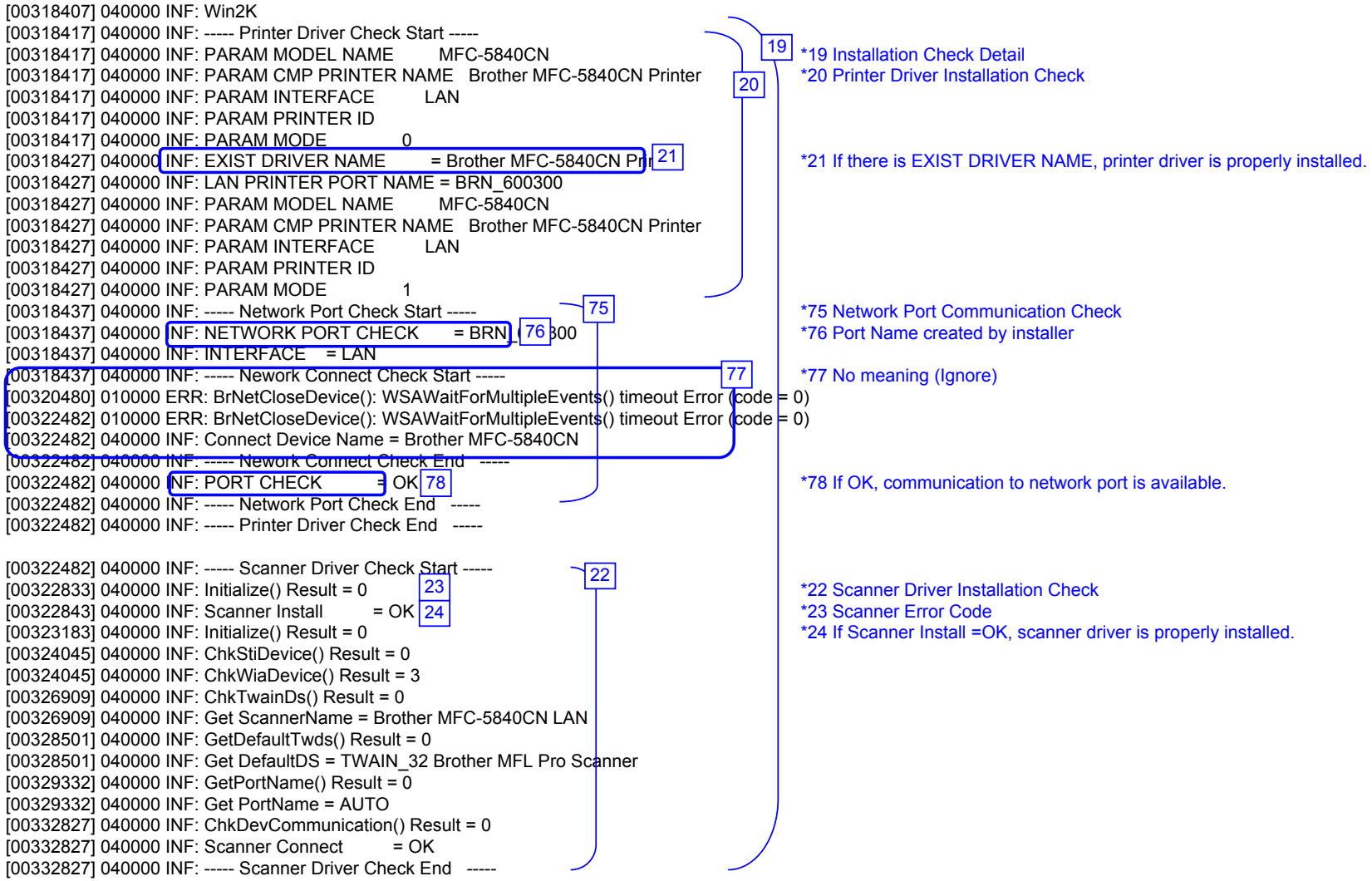
*2 PC System Information

*3 OS Start-up Time
*4 Error Level
*5 INF: Information / ERR: Error

*6 Information to be checked
(Functions set up by integrated installer)
PRT: Printer driver
SCN: Scanner driver
FAXTX: FAX sending driver
FAXRX: FAX receiving software
RSP: Remote Setup software
MEDIA: Media Drive driver

*7 All models indicate "0" because BH3 doesn't check Media Drive

*11 USB connection also requires LPTID
*12 Printer Driver Name
*13 Scanner Driver Name
*14 PC-FAX Sending Driver Name
*15 Folder Name to be installed (04a: BHmini2 / 04b: BHL3)
*16 USB Port Number
*17 Model Name
*18 Connection Mode (USB / LPT / LAN)



*19 Installation Check Detail
*20 Printer Driver Installation Check

*21 If there is EXIST DRIVER NAME, printer driver is properly installed.

*75 Network Port Communication Check
*76 Port Name created by installer

*77 No meaning (Ignore)

*78 If OK, communication to network port is available.

*22 Scanner Driver Installation Check
*23 Scanner Error Code
*24 If Scanner Install =OK, scanner driver is properly installed.

```
[00332827] 040000 INF: ----- FAXTX Driver Check Start -----
[00332827] 040000 INF: PARAM MODEL NAME        PC-FAX
[00332827] 040000 INF: PARAM CMP PRINTER NAME   Brother PC-FAX #4
[00332827] 040000 INF: PARAM INTERFACE         LAN
[00332827] 040000 INF: PARAM PRINTER ID
[00332827] 040000 INF: PARAM MODE              0
[00332827] 040000 INF: EXIST DRIVER NAME       = Brother PC-FAX #4
[00332827] 040000 INF: PC-FAX PORT NAME      = BRN_600300
[00332827] 040000 INF: PARAM MODEL NAME        PC-FAX
[00332827] 040000 INF: PARAM CMP PRINTER NAME   Brother PC-FAX #4
[00332827] 040000 INF: PARAM INTERFACE         LAN
[00332827] 040000 INF: PARAM PRINTER ID
[00332827] 040000 INF: PARAM MODE              1
[00332827] 040000 INF: ----- Fax Port Check Start -----
[00332827] 040000 INF: FAX PORT CHECK          = BRN_600300
[00332827] 040000 INF: INTERFACE    = LAN
[00332827] 040000 INF: ----- Nework Connect Check Start -----
[00334850] 010000 ERR: BrNetCloseDevice(): WSAWaitForMultipleEvents() timeout Error (code = 0)
[00336853] 010000 ERR: BrNetCloseDevice(): WSAWaitForMultipleEvents() timeout Error (code = 0)
[00336853] 040000 INF: Connect Device Name = Brother MFC-5840CN
[00336853] 040000 INF: ----- Nework Connect Check End   -----
[00336853] 040000 INF: PORT CHECK          = OK
[00336853] 040000 INF: ----- Fax Port Check End   -----
[00336853] 040000 INF: ----- FAXTX Driver Check End   -----

[00336853] 040000 INF: ----- FAXRX Check Start -----
[00336853] 040000 INF: FAXRX FILE CHECK      = NG
[00336853] 040000 INF: ----- FAXRX Check End   -----

[00336853] 040000 INF: ----- RSP Check Start   -----
[00336853] 040000 INF: RSP FILE CHECK        = NG
[00336853] 040000 INF: ----- RSP Check End     -----

[00336853] 040000 INF: ----- Serial Port Check Start -----
[00336853] 040000 INF: ----- Serial Port Check End   -----
```

*25 FAX(Tx) Driver Installation Check

*26 If there is EXIST DRIVER NAME, PC-FAX sending driver is properly installed.

*27 FAX(Rx) File Check

*28 If installation was done by network connection, it indicates NG.
In this example, installation is done by local connection in advance.

*29 Remote Setup File Check

*30 If installation was done by network connection, it indicates NG
In this example, installation is done by local connection in advance.

*31 Serial Port (COM Port Driver Check)

*32 Network connection doesn't support RSP, PC-FAXRx(COM Port Driver) and doesn't indicate.

```
[00336853] 040000 INF: ----- Enumerate Host Controllers Check Start -----
[00336983] 040000 INF: USB Host Controler:      \\.\HCD0    = Intel 82371AB/EB PCI to USB Universal Host Controller

[00337604] 040000 INF: ----- Connect Device Information Start -----
[00337604] 040000 INF: Port1:  Dev1 = USB Composite Device
[00337604] 040000 INF: ----- Connect Device Information End   -----

[00338095] 040000 INF: ----- Connect Device Information Start -----
[00338095] 040000 INF: ----- Connect Device Information End   -----

[00338586] 040000 INF: ----- Connect Device Information Start -----
[00338586] 040000 INF: ----- Connect Device Information End   -----

[00338586] 040000 INF: ----- Connect Device Information Start -----
[00338586] 040000 INF: Port1:  Dev1 = USB Printing Support
[00338586] 040000 INF: Port1:  Dev2 = USB Mass Storage Device
[00338586] 040000 INF: ----- Connect Device Information End   -----

[00338586] 040000 INF: USB Hub Information:     [Port1] DeviceConnected    = USB Composite Device
[00338586] 040000 INF: USB Hub Information:     [Port2] NoDeviceConnected    = NoDeviceConnected

[00338586] 040000 INF: ----- Enumerate Host Controllers Check End   -----

[00339036] 040000 INF: ----- USB Chip information Check Start -----
[00339036] 040000 INF: USB Chip0(Device25)      = Intel 82371AB/EB PCI to ISA bridge (ISA mode)
[00339036] 040000 INF: USB Chip1(Device26)      = Intel(r) 82371AB/EB PCI Bus Master IDE Controller
[00339036] 040000 INF: USB Chip2(Device27)      = Intel 82371AB/EB PCI to USB Universal Host Controller
[00339036] 040000 INF: USB Chip3(Device28)      = Intel 82443BX Pentium(r) II Processor to PCI Bridge
[00339036] 040000 INF: USB Chip4(Device29)      = Intel 82443BX Pentium(r) II Processor to AGP Controller
[00339036] 040000 INF: ----- USB Chip information Check End   -----

[00339036] 040000 INF: ----- ADD/REMOVE APPLICATION Check Start -----
[00339036] 040000 INF: AddRemove Display Name:      DisplayName1    = Brother HL-5070
[00339036] 040000 INF: AddRemove Display Name:      DisplayName2    = NVIDIA Windows 2000 Display Drivers
[00339036] 040000 INF: AddRemove Display Name:      DisplayName3    = Microsoft Visual Studio 6.0 Enterprise Edition
[00339036] 040000 INF: AddRemove Display Name:      DisplayName4    = Microsoft Web Publishing Wizard 1.53
[00339036] 040000 INF: AddRemove Display Name:      DisplayName5    = Microsoft Office 2000 Premium
[00339036] 040000 INF: AddRemove Display Name:      DisplayName6    = Brother MFL-Pro Suite
[00339036] 040000 INF: AddRemove Display Name:      DisplayName7    = Brother Drivers
[00339036] 040000 INF: AddRemove Display Name:      DisplayName8    = WebFldrs
[00339036] 040000 INF: AddRemove Display Name:      DisplayName9    = Brother Drivers
[00339036] 040000 INF: ----- ADD/REMOVE APPLICATION Check End   -----
```

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*33 Communication Check
(When connecting network, obtains local network connection)
*34 USB device is connected to USB Port1
If other USB devices are connected to USB Port2, it will be also indicated.
! If no device is recognized, HUB might be connected to the port. In this case, displace it.

*79 No meaning (Ignore)

*51 It indicates connected devices
(A connected device can be indicated including other company's products)
*52 If another device is connected to USB Port2, it is also indicated.

*53 It indicates that each port is connected to devices or not.

*54 USB Chip Information

*55 Add/Remove Application Information

```
[00345566] 040000 INF: ----- Process Information Start -----
[00345566] 010000 ERR: Process1=
[00345566] 010000 ERR: Process2=
[00345566] 010000 ERR: Process3=\SystemRoot\System32\smss.exe
[00345566] 010000 ERR: Process4=
[00345566] 010000 ERR: Process5=\??\C:\WINNT\system32\winlogon.exe
[00345566] 010000 ERR: Process6=C:\WINNT\system32\services.exe
[00345566] 010000 ERR: Process7=C:\WINNT\system32\lsass.exe
[00345566] 010000 ERR: Process8=C:\WINNT\system32\svchost.exe
[00345566] 010000 ERR: Process9=C:\WINNT\system32\spoolsv.exe
[00345566] 010000 ERR: Process10=C:\WINNT\System32\svchost.exe
[00345566] 010000 ERR: Process11=C:\WINNT\system32\regsvc.exe
[00345566] 010000 ERR: Process12=C:\WINNT\system32\MSTask.exe
[00345566] 010000 ERR: Process13=C:\WINNT\System32\WBEM\WinMgmt.exe
[00345566] 010000 ERR: Process14=C:\WINNT\Explorer.EXE
[00345566] 010000 ERR: Process15=C:\Program Files\Brownie\brstswnd.exe
[00345566] 010000 ERR: Process16=C:\Program Files\Brownie\Brcdcmon.exe
[00345566] 010000 ERR: Process17=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[00345566] 010000 ERR: Process18=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[00345566] 010000 ERR: Process19=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Diagnosis\BR_collect.exe
[00345566] 040000 INF: ----- Process Information End   -----

[00345566] 040000 INF: ----- Startup Information Start -----
[00345566] 040000 INF: STARTUP:  = Microsoft Office.lnk
[00345566] 040000 INF: STARTUP:  = Status Monitor.lnk
[00345566] 040000 INF: ----- Startup Information End   -----

[00352175] 040000 INF: ----- Installation Diagnostics Result Start -----
[00352175] 040000 INF: PRT         = OK
[00352175] 040000 INF: PRT_INST    = OK
[00352175] 040000 INF: PRT_PORT    = BRN_600300

[00352175] 040000 INF: SCN         = OK
[00352175] 040000 INF: SCN_INST    = OK
[00352175] 040000 INF: SCN_PORT    = AUTO

[00352175] 040000 INF: FAXTX       = OK
[00352175] 040000 INF: FAXTX_INST  = OK
[00352175] 040000 INF: FAXTX_PORT  = BRN_600300

[00352175] 040000 INF: ----- Installation Diagnostics Result End   -----

**********Debug Write End 2004/07/25 19:49:44**********
```

57 56 58 59 60 61 62 63 64 65 66 67 68

*56 Process Information which is running
! If you failed to install and virus checker was running, quit the software.

*57 ERRs are just a bug. Fix with ALL

*58 Startup Registration
! If you failed to install and virus checker was running, quit the software.

*59 Installation Diagnostics Result (OK / NG(Installation) / NG(Communication)
*60 Printer Driver Integrated Diagnostic Result
*61 Printer Driver Installation Result
*62 Printer Driver Port

*63 Scanner Driver Integrated Diagnostic Result
*64 Scanner Driver Installation Result
*65 Scanner Driver Port

*66 PC-FAX Sending Driver Integrated Diagnostic Result
*67 PC-FAX Sending Driver Installation Result
*68 PC-FAX Sending Driver Port

BH3 installation log file
C:\Documents and Settings\All Users\Application Data\Brother\BrLog\BrtINSTL.log

```
**********Debug Write Start 2004/07/25 20:44:21**********
Brother(R) Debug Output DLL Version 1.1
Copyright(c) 2004 Brother Industries, Ltd. All Rights Reserved.

********** SYSTEM INFORMATION **********
Function Name: INSTL
CPU Vender: GenuineIntel
Cpu Name: Intel Pentium III
FPU: Supppрted
TSC: Supppрted
MSR: Supppрted
CMOV: Supppрted
MMX: Supppрted
3DNow!: Not Supppрted
SSE_INT: Supppрted
SSE_FP: Supppрted
3DNow! Ext: Not Supppрted
FCMOV: Supppрted
OS Informations:
  Windows 2000 Professional Service Pack 2  OS version 5.0.2195
Memory Informations:
  Current memory load 34%  Total physical memory     = 255MB
  Available physical memory = 167MB
  Total pagefile            = 618MB
  Available pagefile        = 539MB
  Total virtual memory      = 2047MB
  Available virtual memory  = 2022MB
********** SYSTEM INFORMATION **********
[03635316] 040000 INF: InstallationIniFilePath = C:\Program Files\Brother\Brmfl04b\BrmfInfo.ini
[03635316] 040000 INF: Function Data ----------------------------------------------------------
[03635316] 040000 INF: INIDATA  PRT      = 1
[03635316] 040000 INF: INIDATA  SCN      = 1
[03635316] 040000 INF: INIDATA  FAXTX    = 1
[03635316] 040000 INF: INIDATA  FAXRX    = 0
[03635316] 040000 INF: INIDATA  RSP      = 0
[03635316] 040000 INF: INIDATA  MEDIA    = 0
[03635316] 040000 INF: INIDATA  COM      = 0
[03635316] 040000 INF: INIDATA  USBID    =
[03635316] 040000 INF: INIDATA  LPTID    =
[03635316] 040000 INF: INIDATA  PRTNAME   = Brother MFC-5840CN Printer
[03635316] 040000 INF: INIDATA  SCNNAME   = Brother MFC-5840CN LAN
[03635316] 040000 INF: INIDATA  FAXNAME   = Brother PC-FAX #5
[03635316] 040000 INF: INIDATA  INSTPATH  = C:\Program Files\Brother\Brmfl04b
[03635316] 040000 INF: INIDATA  PORTNAME  = BRN_6007C0
[03635316] 040000 INF: INIDATA  MODELNAME = MFC-5840CN
[03635316] 040000 INF: INIDATA  INTERFACE = LAN
[03635316] 040000 INF: ------------------------------------------------------------------------
```

1 2 3 4 5 6 7 11 12 13 14 15 16 17 18

*1 Header Information
Each start-up creates a new set of information

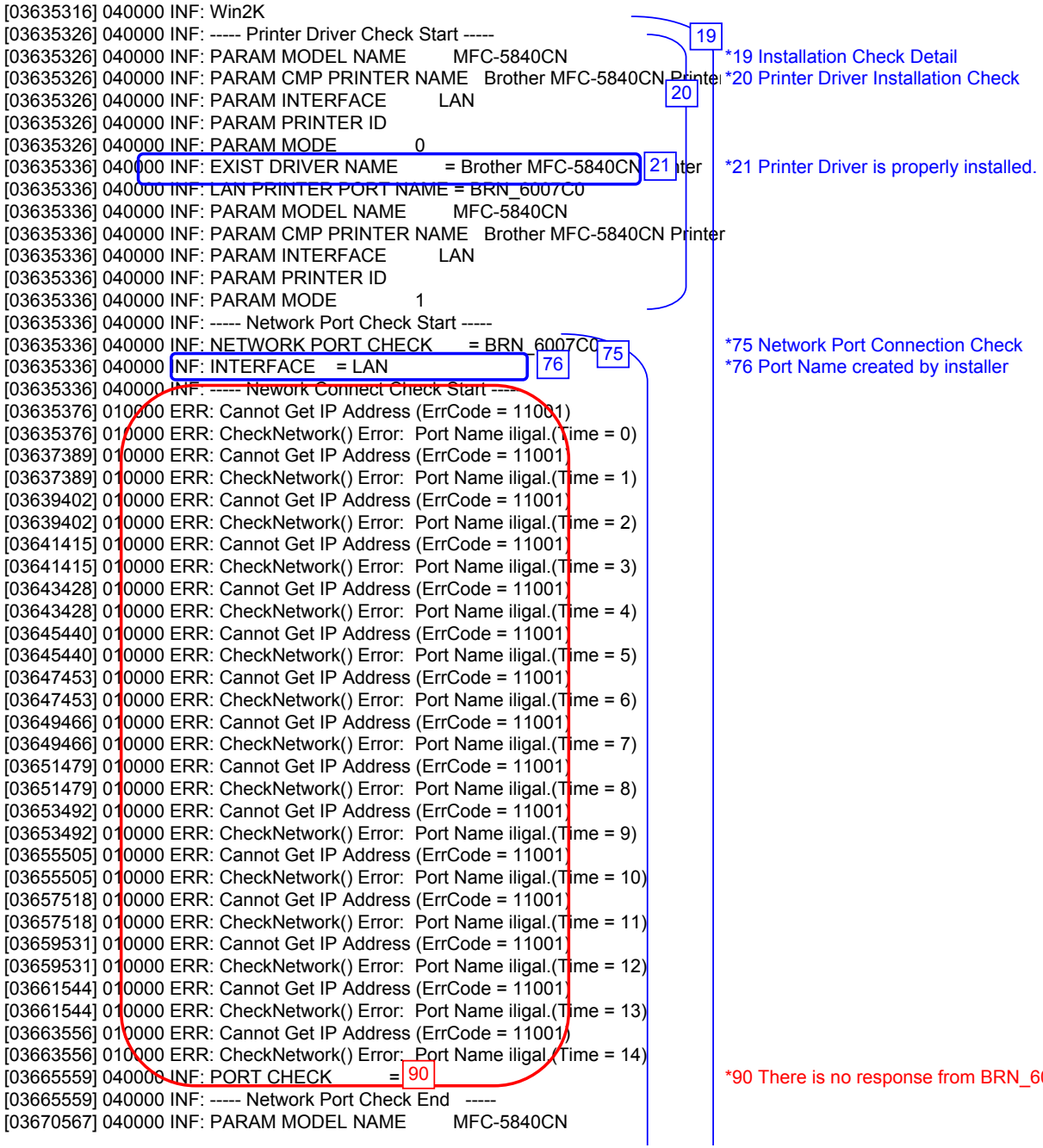
*2 PC System Information

*3 OS Start-up Time
*4 Error Level
*5 INF: Information / ERR: Error

*6 Information to be checked
(Functions set up by integrated installer)
PRT: Printer driver
SCN: Scanner driver
FAXTX: FAX sending driver
FAXRX: FAX receiving software
RSP: Remote Setup software
MEDIA: Media Drive driver

*7 All models indicate "0" because BH3 doesn't check Media Drive.

*11 USB connection also requires LPTID
*12 Printer Driver Name
*13 Scanner Driver Name
*14 PC-FAX Sending Driver Name
*15 Folder Name to be installed (04a: BHmini2 / 04b: BHL3)
*16 USB Port Number
*17 Model Name
*18 Connection Mode (USB / LPT / LAN)



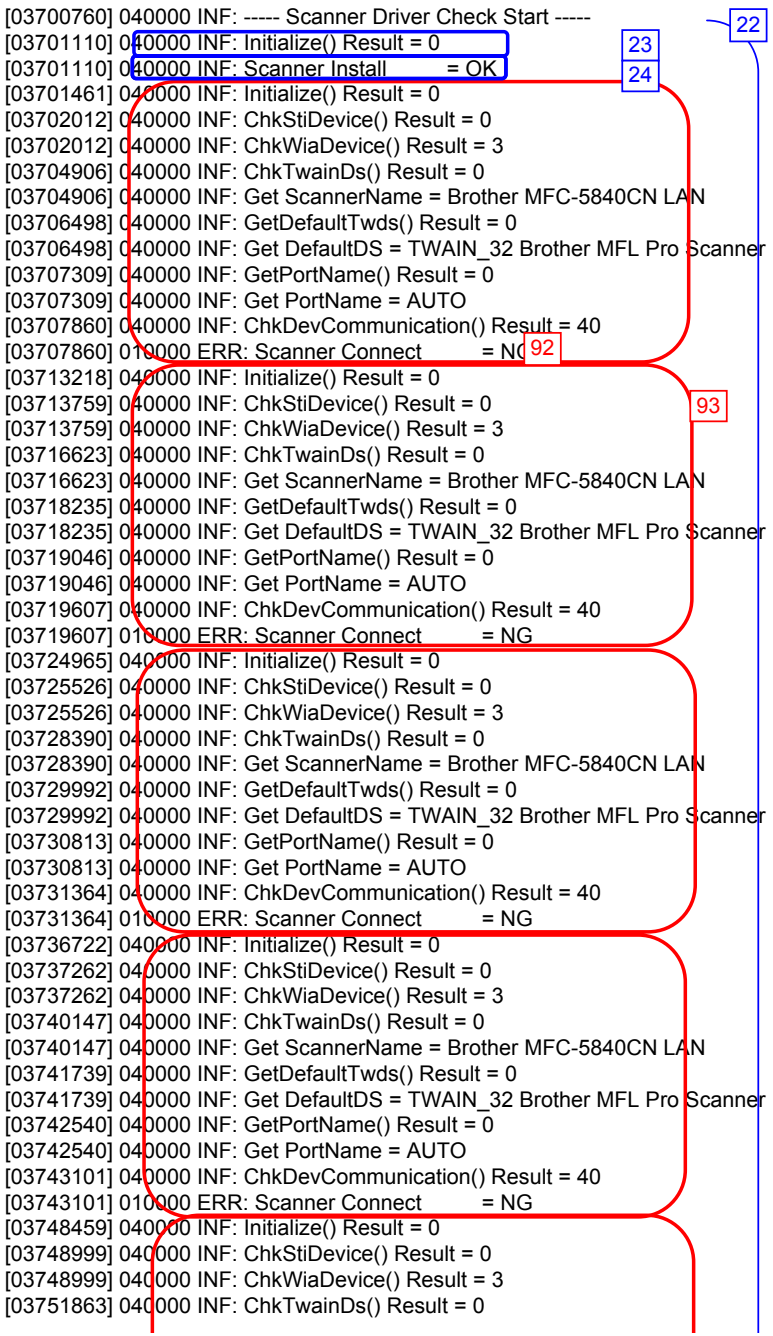
Net Cable Disconnected

```
[03670567] 040000 INF: PARAM CMP PRINTER NAME   Brother MFC-5840CN Printer
[03670567] 040000 INF: PARAM INTERFACE          LAN
[03670567] 040000 INF: PARAM PRINTER ID
[03670567] 040000 INF: PARAM MODE               1
[03670567] 040000 INF: ----- Network Port Check Start -----
[03670567] 040000 INF: NETWORK PORT CHECK       = BRN_6007C0
[03670567] 040000 INF: INTERFACE    = LAN
[03670567] 040000 INF: ----- Nework Connect Check Start -----
[03670577] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03670577] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 0)
[03672589] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03672589] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 1)
[03674602] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03674602] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 2)
[03676615] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03676615] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 3)
[03678628] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03678628] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 4)
[03680641] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03680641] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 5)
[03682654] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03682654] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 6)
[03684667] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03684667] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 7)
[03686680] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03686680] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 8)
[03688693] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03688693] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 9)
[03690706] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03690706] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 10)
[03692718] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03692718] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 11)
[03694731] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03694731] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 12)
[03696744] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03696744] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 13)
[03698757] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03698757] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 14)
[03700760] 040000 INF: PORT CHECK           = NG
[03700760] 040000 INF: ----- Network Port Check End   -----
[03700760] 040000 INF: ----- Printer Driver Check End   -----
```

91

*91 There is no response from BRN_6007C0(or IP address) assigned to the port and attempting again.

Net Cable Disconnected

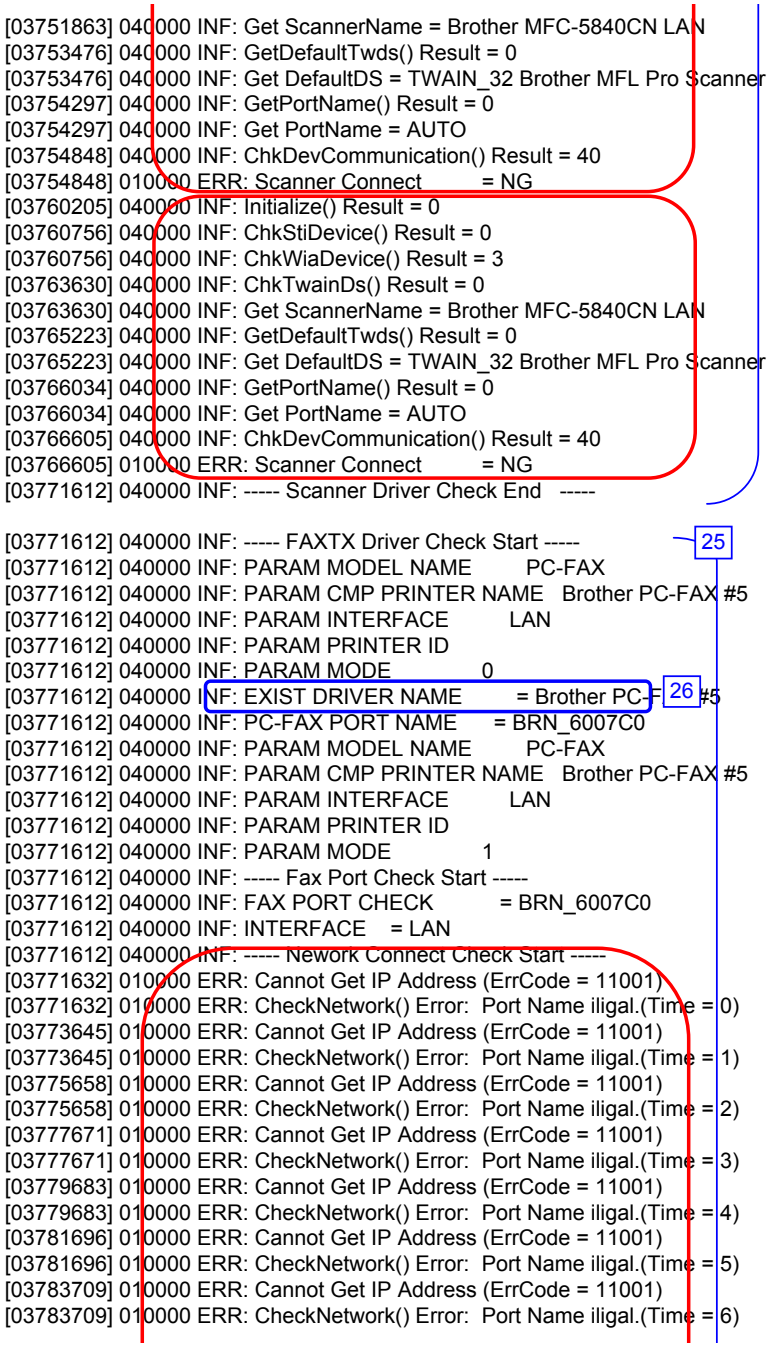


*22 Scanner Driver Installation Check
*23 There is no error in scanner
*24 Driver is properly installed

*92 It cannot make a connection to Scanner Brother MFC-5840CN LAN.

*93 Attempting again because the first attempt was NG

Net Cable Disconnected



*26 PC-FAX sending driver is properly installed.

Net Cable Disconnected

```
[03785722] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03785722] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 7)
[03787735] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03787735] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 8)
[03789748] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03789748] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 9)
[03791761] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03791761] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 10)
[03793774] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03793774] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 11)
[03795787] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03795787] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 12)
[03797800] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03797800] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 13)
[03799812] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03799812] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 14)
[03801815] 040000 INF: PORT CHECK          = NG  94
[03801815] 040000 INF: ----- Fax Port Check End   -----
[03806822] 040000 INF: PARAM MODEL NAME        PC-FAX
[03806822] 040000 INF: PARAM CMP PRINTER NAME   Brother PC-FAX #5
[03806822] 040000 INF: PARAM INTERFACE         LAN
[03806822] 040000 INF: PARAM PRINTER ID
[03806822] 040000 INF: PARAM MODE              1
[03806822] 040000 INF: ----- Fax Port Check Start -----
[03806822] 040000 INF: FAX PORT CHECK          = BRN_6007C0
[03806822] 040000 INF: INTERFACE    = LAN
[03806822] 040000 INF: ----- Nework Connect Check Start -----
[03806832] 010000 ERR: Cannot Get IP Address (ErrCode = 1100  95
[03806832] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 0)
[03808845] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03808845] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 1)
[03810858] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03810858] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 2)
[03812871] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03812871] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 3)
[03814884] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03814884] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 4)
[03816897] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03816897] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 5)
[03818910] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03818910] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 6)
[03820923] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03820923] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 7)
[03822936] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03822936] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 8)
[03824949] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03824949] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 9)
[03826961] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03826961] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 10)
[03828974] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03828974] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 11)
```

*94 There is no response from BRN_6007C0 (or IP address) assigned to the port and attempting again.

*95 Attempting again because the first attempt was NG

```
[03830987] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03830987] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 12)
[03833000] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03833000] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 13)
[03835013] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03835013] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 14)
[03837016] 040000 INF: PORT CHECK = NG
[03837016] 040000 INF: ----- Fax Port Check End   -----
[03837016] 040000 INF: ----- FAXTX Driver Check End   -----

[03837016] 040000 INF: ----- FAXRX Check Start -----
[03837016] 040000 INF: FAXRX FILE CHECK = OK   28   27
[03837016] 040000 INF: ----- FAXRX Check End   -----

[03837016] 040000 INF: ----- RSP Check Start   -----
[03837016] 040000 INF: RSP FILE CHECK = OK   30   29
[03837016] 040000 INF: ----- RSP Check End   -----

[03837016] 040000 INF: ----- Serial Port Check Start -----
[03837016] 040000 INF: ----- Serial Port Check End   ---32   31

[03837016] 040000 INF: ----- Enumerate Host Controllers Check Start -----
[03837146] 040000 INF: USB Host Controler:      \\.\HCD0    = Intel 82371AB/EB PCI to USB Universal Host Controller
                                                                                                    33
[03837777] 040000 INF: ----- Connect Device Information Start -----
[03837777] 040000 INF: Port1:  Dev1 = USB Composite Device   34
[03837777] 040000 INF: ----- Connect Device Information End   -----

[03838278] 040000 INF: ----- Connect Device Information Start -----
[03838278] 040000 INF: ----- Connect Device Information End   -----
                                                                79
[03838748] 040000 INF: ----- Connect Device Information Start -----
[03838748] 040000 INF: ----- Connect Device Information End   -----

[03838748] 040000 INF: ----- Connect Device Information Start ----51
[03838748] 040000 INF: Port1:  Dev1 = USB Printing Support
[03838748] 040000 INF: Port1:  Dev2 = USB Mass Storage Device
[03838748] 040000 INF: ----- Connect Device Information End   ---52

[03838748] 040000 INF: USB Hub Information: [Port1] DeviceConnected    = USB Composite Device
                                                                                          53
[03838748] 040000 INF: USB Hub Information: [Port2] NoDeviceConnected    = NoDeviceConnected

[03838748] 040000 INF: ----- Enumerate Host Controllers Check End   -----
```

*27 FAX(Rx) File Check
*28 If installation was done by network connection, it indicates NG.
In this example, installation is done by local connection in advance.

*29 Remote Setup File Check
*30 If installation was done by network connection, it indicates NG.
In this example, installation is done by local connection in advance.

*31 Serial Port (COM Port Driver Check)
*32 Network connection doesn't support RSP, PC-FAXRx(COM Port Driver) and doesn't indicate.

*33 Communication Check
(It obtains the status of connecting to local network, even though it is connecting to network,)
*34 USB device is connected to USB Port1
If other USB devices are connected to USB Port2, it will be also indicated.
! If no device is recognized, HUB might be connected to the port. In this case, displace it.
*79 No meaning (Ignore)

*51 It indicates connected devices
USB Printing Support, USB Mass Storage Device is connected to Port 1.

*52 If another device is connected to USB Port2, it is also indicated.

```
[03839169] 040000 INF: ----- USB Chip information Check Start -----
[03839169] 040000 INF: USB Chip0(Device25)      = Intel 82371AB/EB PCI to ISA bridge (ISA mode)
[03839179] 040000 INF: USB Chip1(Device26)      = Intel(r) 82371AB/EB PCI Bus Master IDE Controller
[03839179] 040000 INF: USB Chip2(Device27)      = Intel 82371AB/EB PCI to USB Universal Host Controller
[03839179] 040000 INF: USB Chip3(Device28)      = Intel 82443BX Pentium(r) II Processor to PCI Bridge
[03839179] 040000 INF: USB Chip4(Device29)      = Intel 82443BX Pentium(r) II Processor to AGP Controller
[03839179] 040000 INF: ----- USB Chip information Check End   -----

[03839179] 040000 INF: ----- ADD/REMOVE APPLICATION Check Start -----
[03839179] 040000 INF: AddRemove Display Name:     DisplayName1   = Brother HL-5070
[03839179] 040000 INF: AddRemove Display Name:     DisplayName2   = NVIDIA Windows 2000 Display Drivers
[03839179] 040000 INF: AddRemove Display Name:     DisplayName3   = Microsoft Visual Studio 6.0 Enterprise Edition
[03839179] 040000 INF: AddRemove Display Name:     DisplayName4   = Microsoft Web Publishing Wizard
[03839179] 040000 INF: AddRemove Display Name:     DisplayName5   = Microsoft Office 2000 Premium
[03839179] 040000 INF: AddRemove Display Name:     DisplayName6   = Brother MFL-Pro Suite
[03839179] 040000 INF: AddRemove Display Name:     DisplayName7   = Brother Drivers
[03839179] 040000 INF: AddRemove Display Name:     DisplayName8   = WebFldrs
[03839179] 040000 INF: AddRemove Display Name:     DisplayName9   = Brother Drivers
[03839179] 040000 INF: ----- ADD/REMOVE APPLICATION Check End   -----

[03845718] 040000 INF: ----- Process Information Start -----
[03845718] 010000 ERR: Process1=
[03845718] 010000 ERR: Process2=
[03845718] 010000 ERR: Process3=\SystemRoot\System32\smss.exe
[03845718] 010000 ERR: Process4=
[03845718] 010000 ERR: Process5=\??\C:\WINNT\system32\winlogon.exe
[03845718] 010000 ERR: Process6=C:\WINNT\system32\services.exe
[03845718] 010000 ERR: Process7=C:\WINNT\system32\lsass.exe
[03845718] 010000 ERR: Process8=C:\WINNT\system32\svchost.exe
[03845718] 010000 ERR: Process9=C:\WINNT\system32\spoolsv.exe
[03845718] 010000 ERR: Process10=C:\WINNT\System32\svchost.exe
[03845718] 010000 ERR: Process11=C:\WINNT\system32\regsvc.exe
[03845718] 010000 ERR: Process12=C:\WINNT\system32\MSTask.exe
[03845718] 010000 ERR: Process13=C:\WINNT\System32\WBEM\WinMgmt.exe
[03845718] 010000 ERR: Process14=C:\WINNT\Explorer.EXE
[03845718] 010000 ERR: Process15=C:\Program Files\Brownie\brstswnd.exe
[03845718] 010000 ERR: Process16=C:\Program Files\Brownie\Brcdcmon.exe
[03845718] 010000 ERR: Process17=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[03845718] 010000 ERR: Process18=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[03845718] 010000 ERR: Process19=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Diagnosis\BR_collect.exe
[03845718] 040000 INF: ----- Process Information End   -----

[03845718] 040000 INF: ----- Startup Information Start -----
[03845718] 040000 INF: STARTUP:  = Microsoft Office.lnk
[03845718] 040000 INF: STARTUP:  = Status Monitor.lnk
[03845718] 040000 INF: ----- Startup Information End   -----
```

54

*54 USB Chip Information

55

*55 Add/Remove Application Information

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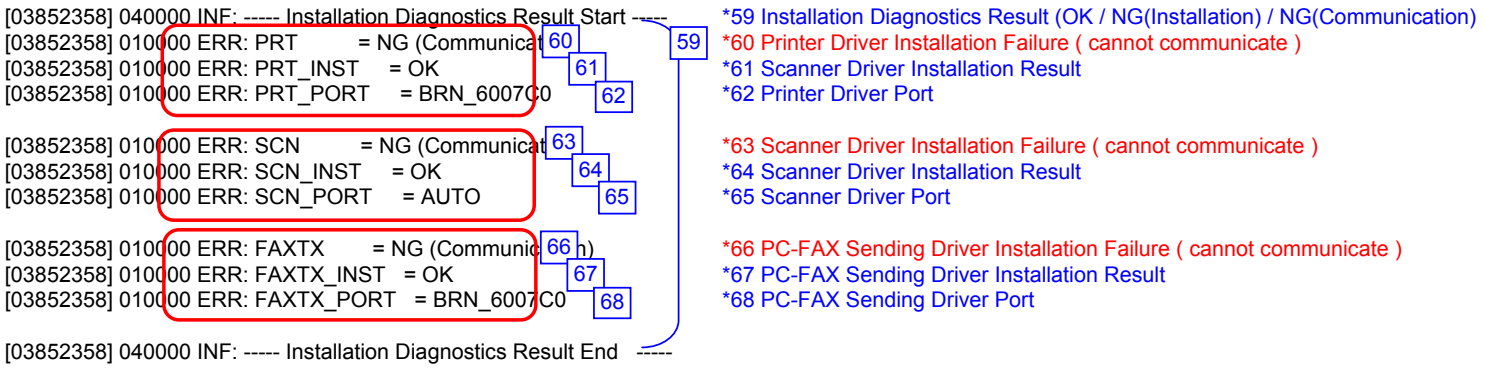
56

*56 Process Information which is running
! If you failed to install and virus checker was running, quit the software.

*57 ERRs are just a bug. Fix with ALL

58

*58 Startup Registration
! If you failed to install and virus checker was running, quit the software.



*59 Installation Diagnostics Result (OK / NG(Installation) / NG(Communication)
*60 Printer Driver Installation Failure (cannot communicate)
*61 Scanner Driver Installation Result
*62 Printer Driver Port

*63 Scanner Driver Installation Failure (cannot communicate)
*64 Scanner Driver Installation Result
*65 Scanner Driver Port

*66 PC-FAX Sending Driver Installation Failure (cannot communicate)
*67 PC-FAX Sending Driver Installation Result
*68 PC-FAX Sending Driver Port

**********Debug Write End 2004/07/25 20:48:04**********

Scanner Error Code

Define name	Error Code	Contents
SCDIAG_OK	0	The processing is completed or confirmation is successful.
SCDIAG_FAIL	1	The system stopped processing due to errors which don't fall into ones above, such as the lack of memory.
SCDIAG_NOT_INITIALIZE	2	The system tried to run functions without the initialization processing.
SCDIAG_NOT_SUPPORT	3	This Scanner driver type doesn't support the function which is tried to run, This confirmation of the function is not necessary.
SCDIAG_NOT_INSTALL	4	The specified device is not installed.
SCDIAG_NOT_CONNECTED	5	The specified device is not connected. (only USB connection)
SCDIAG_NOT_FOUND_DEVICE	6	The specified device is not found, No device may be connected or may fail to install.
SCDIAG_NOT_FOUND_TWDS	10	The specified TWAIN Data Source is not found, No device may be connected or may fail to install.
SCDIAG_NOT_SELECT_TWDS	11	The TWAIN Data Source Manager fails to recognize the default TWAIN Data Source.
SCDIAG_TWAIN_SYSTEM_ERROR	12	The TWAIN Data Source Manager to use the TWAIN protocol is not available. The TWAIN Data Source Manager may not exist.
SCDIAG_STIDEVICE_CREATE_FAIL	20	The system failed to create the STI device. The STI/WIA service or the minidriver may have problems.
SCDIAG_STI_SYSTEM_ERROR	21	The STI Interface (IStillImage) is not available. The STI service may not start or the operation system may have problems.
SCDIAG_WIADEVICE_CREATE_FAIL	30	The system failed to create the WIA device. The WIA service or the minidriver may have problems.
SCDIAG_WIA_SYSTEM_ERROR	31	The WIA Service (IWiaDevMgr Interface and so on) is not available. The WIA service may not start or the operation system may have problems.
SCDIAG_OPEN_ERROR	40	The system failed to open the scanner device. The attempt may be rejected because the object device is running or so.
SCDIAG_WRITE_ERROR	41	The system failed to send the scanner command.
SCDIAG_READ_ERROR	42	The system failed to read the data from the device.
SCDIAG_TIMEOUT	43	The system failed to receive the response after the request has timed out.
SCDIAG_NO_RSM	44	The system failed to recognize the Resource Manager and failed to restart. The Resource Manager may not be installed or running incorrectly.

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