brother

FACSIMILE EQUIPMENT
SERVICE MANUAL

MODELS:
MFC3820CN/MFC3420C

Preface

This Service Manual is intended for use by service personnel and details the specifications, construction, theory of operation, and maintenance for the Brother facsimile equipment 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 facsimile equipment 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 eight 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

Summarizes the scanner and printing mechanisms and control electronics. It also provides information about sensors and their actuators. This chapter helps you to understand the operating principles and isolate the source of a problem (troubleshooting).

CHAPTER 4 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 5 ADJUSTMENTS AND UPDATING OF SETTINGS REQUIRED AFTER PARTS REPLACEMENT

Details adjustments and updating of settings, which are required if the print head unit, carriage, PCBs and some other parts have been replaced. Settings are stored in the EEPROM on the driver PCB.

CHAPTER 6 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 7 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 print head 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 8 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 of the facsimile machine from the host PC. No hardware replacement is required for updating.

Control programs of the facsimile machine are stored in the flash ROM on the main PCB. The updating procedure is required also if the main PCB has been replaced since a new PCB supplied has no firmware installed.

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 driver PCB. If the driver 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 may 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 MJ PCB (MFC3820CN), NCU PCB (MFC3420C), and power supply PCB.

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

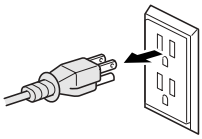
SAFETY PRECAUTIONS

To use the MFC safely

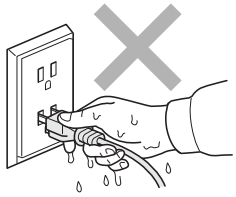
Please refer to these instructions for later reference and before attempting any maintenance.

WARNING

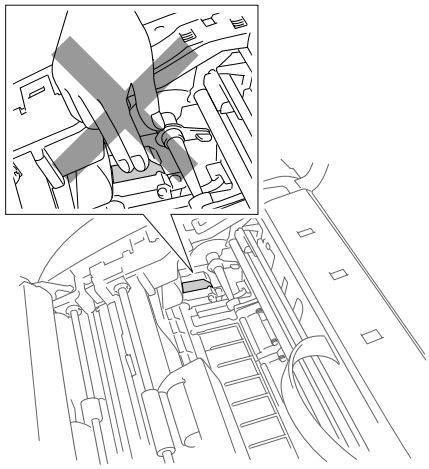
There are high voltage electrodes inside the MFC. Before you clean the MFC or clear a paper jam, make sure you have unplugged the power cord from the AC power outlet.



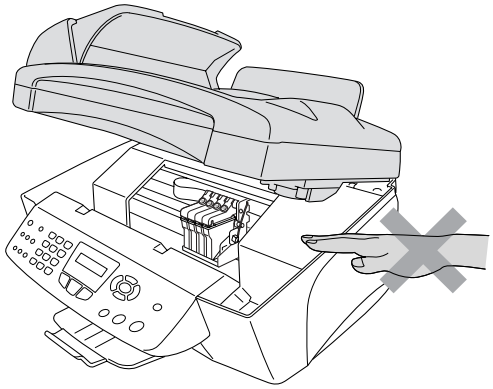
Do not handle the plug with wet hands. Doing this might cause an electrical shock.



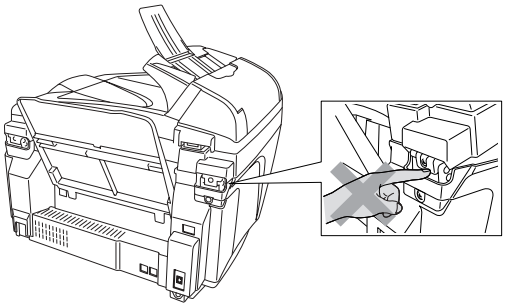
After you use your MFC, the area shown in the illustrations is extremely HOT! To prevent injuries, be careful not to put your fingers in the area shown.

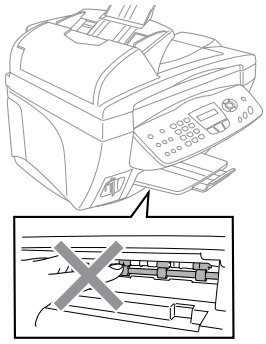
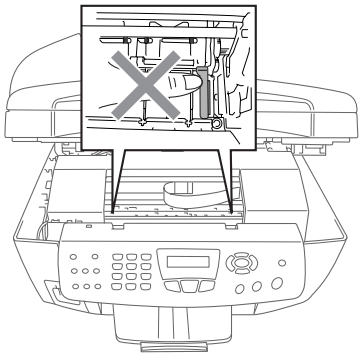
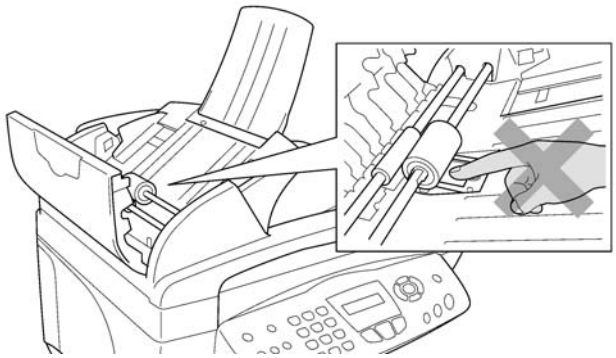


To prevent injuries, be careful not to put your hands on the edge of the MFC under the scanner cover.

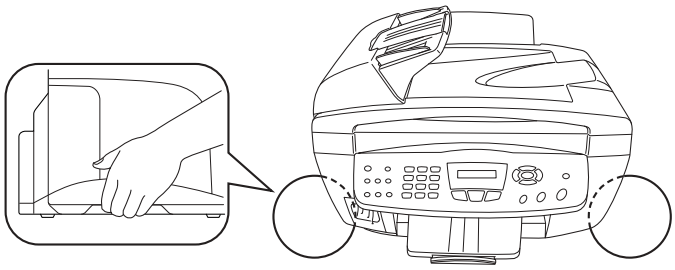


To prevent injuries, be careful not to put your fingers in the area shown in the illustration.



⊘	To prevent injuries, be careful not to touch the area shaded in the illustration. 	⊘	To prevent injuries, be careful not to touch the edge of the metallic part shown in the illustration. 
⊘	To prevent injuries, be careful not to put your fingers in the area shown in the illustration. 		

⚠ WARNING



- When you move the MFC, grasp the side handholds as shown above. Do NOT carry the MFC by holding it at the bottom.
- 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 emergencies, you must disconnect the power cord from the AC power outlet in order to shut off 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.

	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 persons, including the following: 1. Do not use this product near water, for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement or near a swimming pool. 2. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning. 3. Do not use the telephone to report a gas leak in the vicinity of the leak. SAVE THESE INSTRUCTIONS

Choosing a location

Place your MFC on a flat, stable surface that is free of vibration and shocks, such as a desk. Put the MFC near a telephone wall jack and a standard, grounded AC power outlet. Choose a location where the temperature remains between 50°F and 95°F (10°-35°C).

Caution

- Avoid placing your MFC in a high-traffic area.
- Avoid placing your MFC on the carpet.
- Do not place near heaters, air conditioners, water, chemicals, or refrigerators.
- Do not expose the MFC to direct sunlight, excessive heat, moisture, or dust.
- Do not connect your MFC to electrical outlets controlled by wall switches or automatic timers.
- Disruption of power can wipe out information in the MFC's memory.
- Do not connect your MFC to electrical outlets 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.

CHAPTER 1

PARTS NAMES & FUNCTIONS

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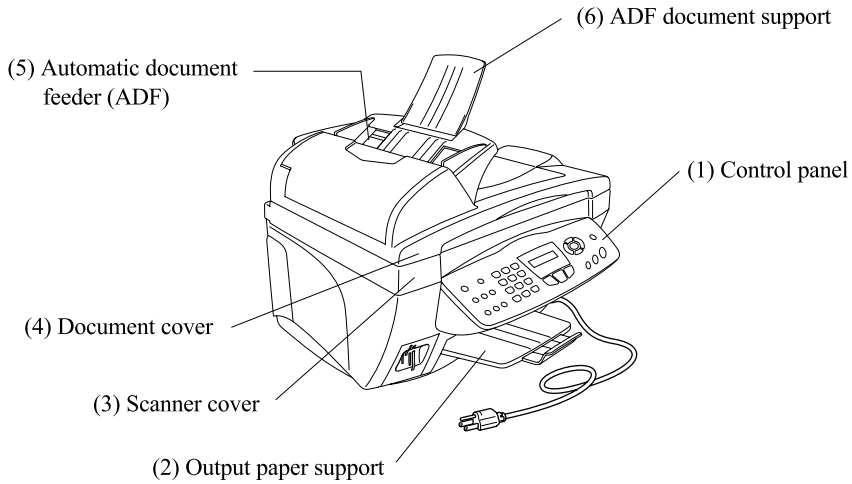
This chapter contains external views and names of components and describes their functions. Information about the keys on the control panel is included to help you check operation or make adjustments.

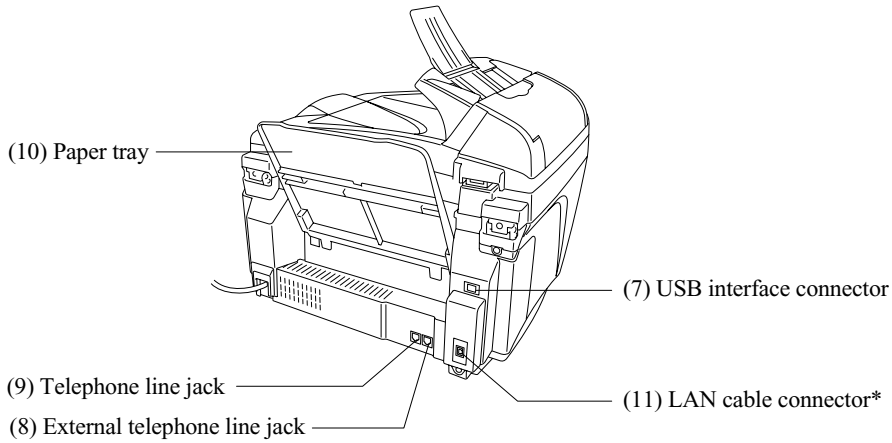
CONTENTS

1.1 EQUIPMENT OUTLINE

Front view



Rear view

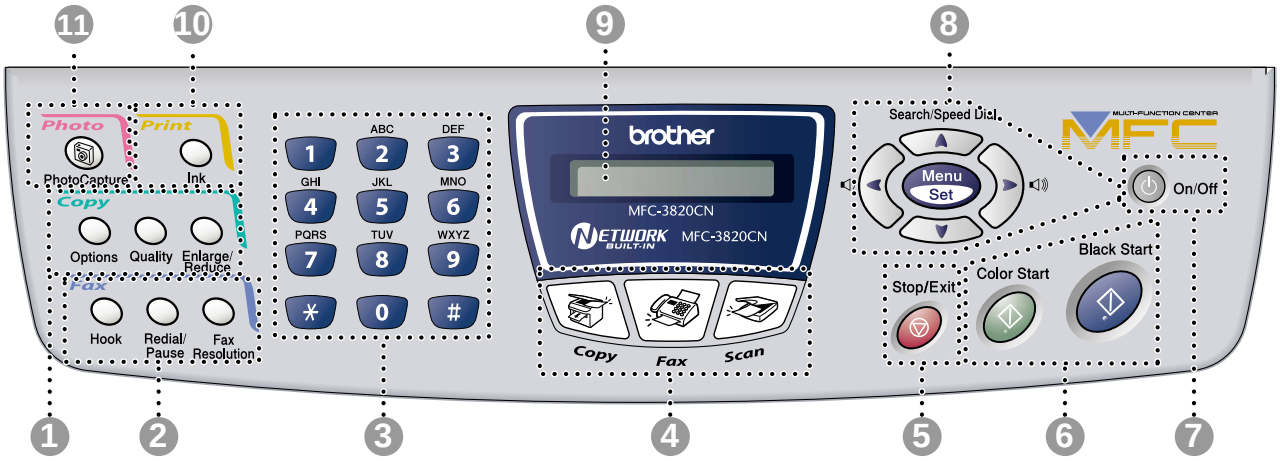


*MFC3820CN only

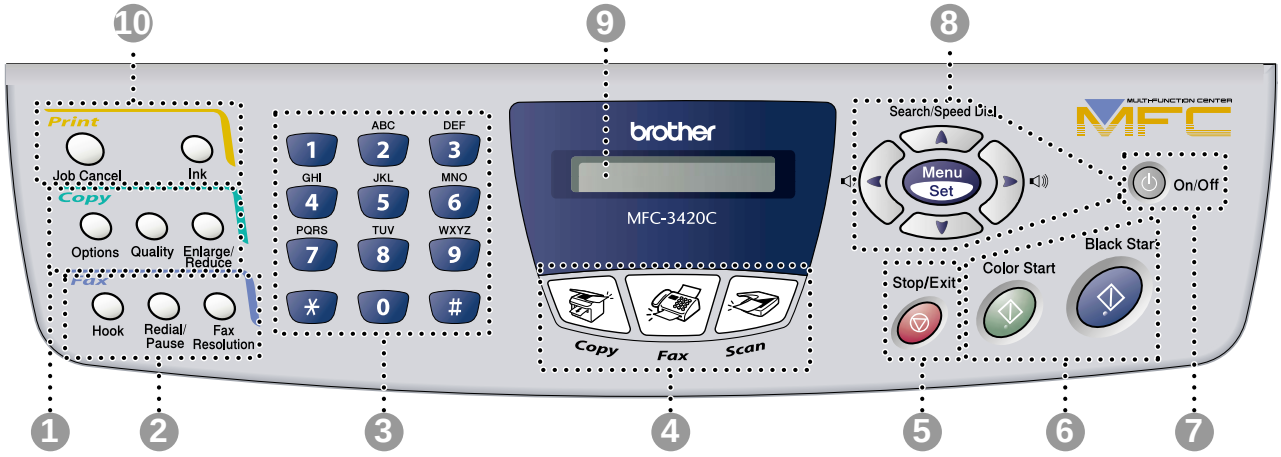
No.	Name	Description
(1)	Control panel	Use the keys to operate the machine. The liquid crystal display (LCD) shows the machine operation status.
(2)	Output paper support	Printed paper comes out here.
(3)	Scanner cover	Open to install an ink cartridge or to remove jammed paper.
(4)	Document cover	Open to place the document (original) on the scanner glass.
(5)	Automatic Document Feeder (ADF)	Documents will be fed into the machine, sheet by sheet.
(6)	ADF document support	Load documents here.
(7)	USB interface connector	Connect the USB cable here.
(8)	External telephone line jack	Plug in the modular plug on the external telephone line here.
(9)	Telephone line jack	Plug in the modular plug on the telephone line here.
(10)	Paper tray	Load paper here. Paper will be fed into the machine, sheet by sheet.
(11)	LAN cable connector (on the MFC3820CN only)	Connect the LAN cable here.

1.2 CONTROL PANEL

■ **MFC3820CN**



■ **MFC3420C**



1. Copy keys (Temporary settings)

Options

You can quickly and easily select temporary settings for copying.

Quality

Use this key to temporarily change the quality for copying.

Enlarge/Reduce

Lets you enlarge or reduce copies depending on the ratio you select.

2. Fax and telephone keys

Hook

Press before dialing if you want to make sure a fax MFC will answers, and then press **Black Start** or **Color Start**.

Redial/Pause

Redials the last number you called. It also inserts a pause in auto dial numbers.

Fax Resolution

Sets the resolution when you send a fax.

3. Dial Pad

Use these keys to dial telephone and fax numbers and as a keyboard for entering information into the MFC.

The # key lets you temporarily switch the dialing mode during a telephone call from Pulse to Tone.

4. Mode keys

 **Copy**

Lets you access Copy mode.

 **Fax**

Lets you access Fax mode.

 **Scan**

Lets you access Scan mode.

5. Stop/Exit

Stops an operation or exits from the menu.

6. Start keys

Black Start

Lets you start sending faxes or making copies in black and white.

Also lets you start a scanning operation. (Color or mono, depending on the scanning setting on your PC)

Color Start

Lets you start sending faxes or making copies in full color.

Also lets you start a scanning operation. (Color or mono, depending on the scanning setting on your PC)

7. On/Off

You can turn the MFC on or off.

8. Navigation keys

Menu/Set

Lets you access the Menu to program and store your settings in the MFC.

Volume

When using the speaker or during ringing in fax mode, you can press these keys to adjust the 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 two-digit number.

Press to scroll backward to a menu selection.

 or 

Press to scroll through the menus and options.

Also, you can use these keys to do a numeral search for the names of stored numbers in fax mode.

9. Liquid Crystal Display (LCD)

Displays messages on the screen to help you set up and use the MFC.

10. Print keys

Job Cancel (MFC-3420C only)

Clears data from the printer memory.

Ink

Lets you clean the print heads, replace an ink cartridge and check the available ink volume.

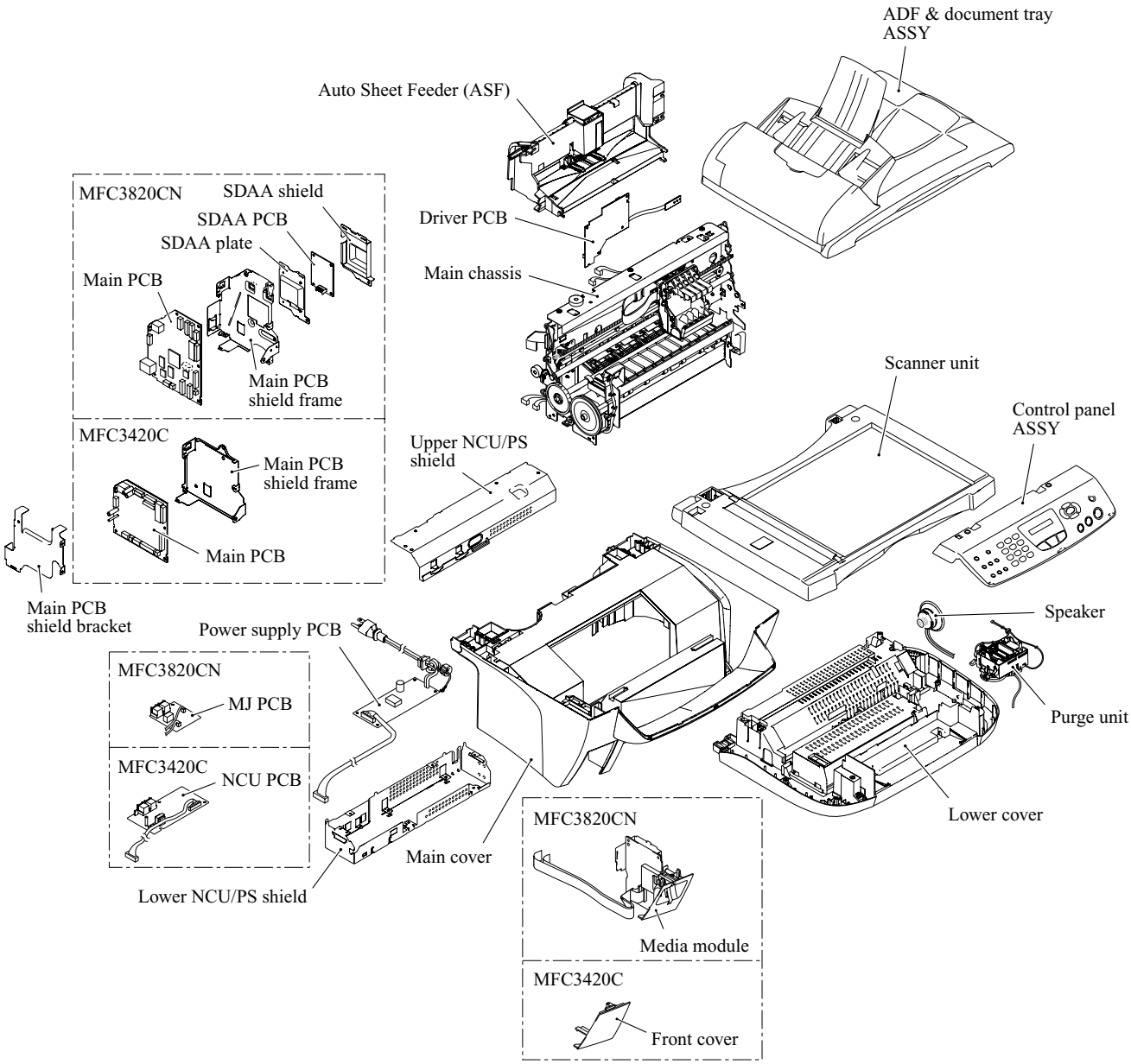
11. Photo key (MFC3820CN only)

PhotoCapture

Lets you access the PhotoCapture Center.

1.3 COMPONENTS

The equipment consists of the following major components:



CHAPTER 2

SPECIFICATIONS

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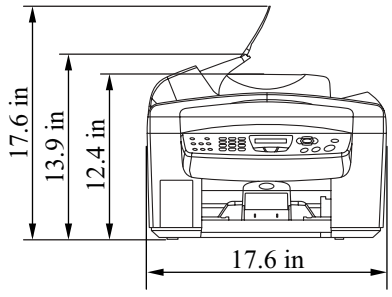
This chapter lists the specifications of each model, which enables you to make a comparison of different models.

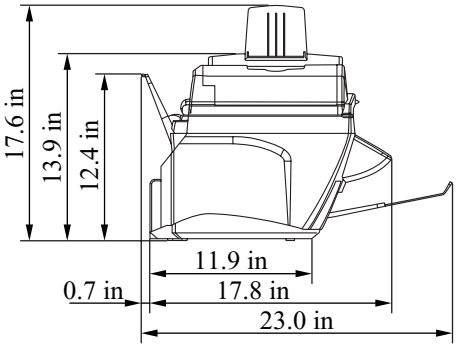
CONTENTS

2.1 GENERAL

2.1.1 General Specifications

Memory Capacity		
	MFC3420C:	8 MB
	MFC3820CN:	16 MB
Automatic Document Feeder (ADF)		Up to 20 sheets Under the following conditions: - Temperature: 68 to 86°F (20 to 30°C) - Humidity: 50% to 70% - Paper: 20 lb., letter size
Paper Tray		100 sheets (20 lb.)
Printer Type		Ink Jet
Print Method		Piezo with 75 x 2 nozzles
Liquid Crystal Display (LCD)		16 characters x 1 line
Operating Environment		50 to 95°F (10 to 35°C)
Best Print Quality		68 to 91°F (20 to 33°C)
Power Source		120 VAC, 50/60 Hz (U.S.A. and Canadian versions only)
Power Consumption		
	MFC3820CN:	Standby: under 4 watts Ready state: under 9 watts Peak: under 26 watts
	MFC3420C:	Standby: under 5 watts Ready state: under 8 watts Peak: under 24 watts
Dimensions (W x D x H)		17.6 x 17.8 x 13.9 inches (448 x 453 x 354 mm)
(incl. ADF document support and output paper support)		17.6 x 23.0 x 17.6 inches (448 x 585 x 446 mm)





Weight

	MFC3820CN	MFC3420C
	23.1 lb. (10.5 kg)	22.0 lb. (10 kg)
(incl. ADF document support and output paper support)	24.3 lb. (11 kg)	23.1 lb. (10.5 kg)

2.1.2 Paper Specifications

Recommended paper

Plain Paper:	Hammermill Copy Plus Paper
Inkjet Paper:	Burlington Photo matte Heavy weight
Glossy Paper:	Jet PrintPhoto GRAFHIC IMAGE PAPER GLOSS FINISH
Transparencies:	3M Transparency Film (CG3410)

Paper Capacity of the Paper Tray

Paper Type	Paper Size	Number of Sheets
Plain paper (Cut sheet)	Letter, Executive, A5, A6, B5 (JIS)	100 of 20 lb. (80 g/m^2) Up to 0.39 in. (10 mm)
	Legal	50 of 20 lb. (80 g/m^2)
Inkjet paper	Letter	20
Glossy paper	Letter	20
Transparencies	Letter	10
Envelopes	DL, COM-10, C5, Monarch, JE4	10
Photo card	4" x 6", L (3.5" x 5"), 2L (5" x 7")	30
Index card	5" x 8"	30

* You can copy only on Letter, Legal and Photo Card (4"(W) x 6"(H)) paper.

* You can receive faxes only on Letter or Legal paper.

Paper Specifications for the Paper Tray

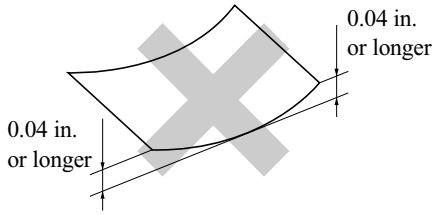
Cut Sheet Paper Weight	Plain paper: 17 to 32 lb. (64 to 120 g/m^2) Inkjet paper: 17 to 53 lb. (64 to 200 g/m^2) Glossy paper: Up to 58 lb. (218 g/m^2) Index card: Up to 32 lb. (120 g/m^2)
Thickness	Plain paper: 0.003 to 0.006 in. (0.08 to 0.15 mm) Inkjet paper: 0.003 to 0.01 in. (0.08 to 0.25 mm) Glossy paper: Up to 0.01 in. (0.25 mm) Envelopes: Up to 0.02 in. (0.52 mm) Photo card: Up to 0.017 in. (0.42 mm) Index card: Up to 0.006 in. (0.15 mm)

Paper Capacity of the Output Paper Support

Output Paper Support	Up to 50 sheets of 20 lb. (Letter) ■ Transparencies and glossy paper must be picked up from the output paper support one page at a time to avoid smudging. ■ Legal cannot be stacked on the output paper support.

Do not use paper or envelopes:

■ that are damaged, curled, wrinkled, or irregularly shaped



■ that are extremely shiny or highly textured

■ that were previously printed by a printer

■ that cannot be arranged uniformly when stacked

■ that are made with a short grain

Do not use envelopes:

■ that are of a baggy construction

■ that are embossed (have raised writing on them)

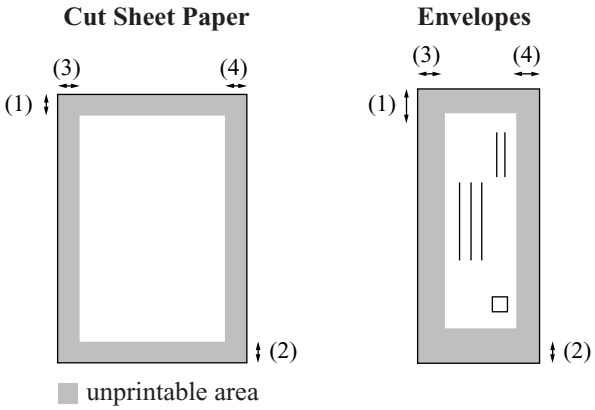
■ that have clasps on them

■ that are not sharply creased

■ that are preprinted on the inside

2.1.3 Printable Area

The printable area depends on the settings in the application you are using. The figures below show the unprintable areas on cut sheet paper and envelopes.



(Unit: inch)

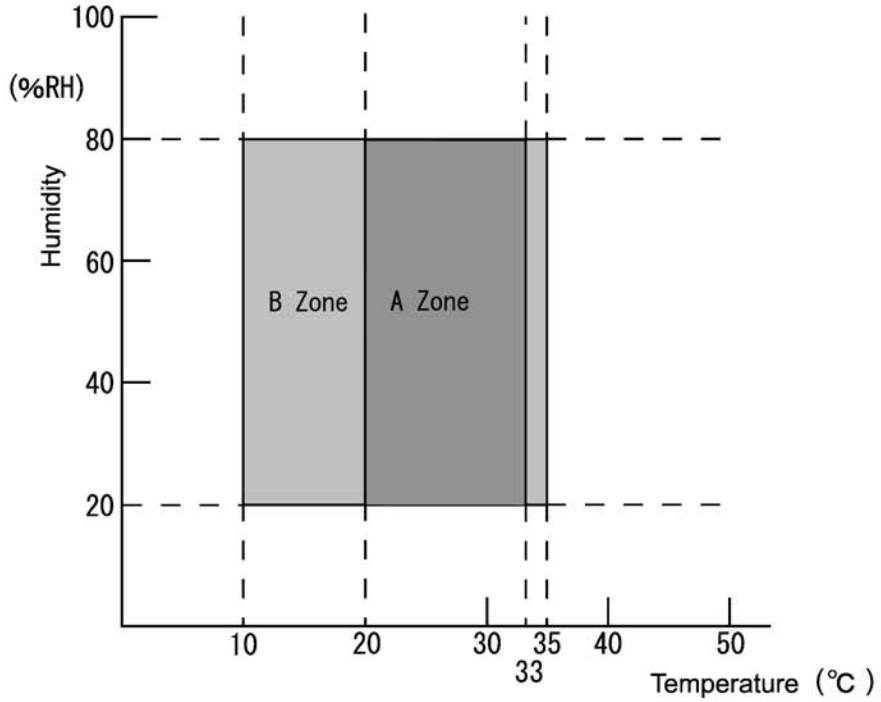
Paper	Paper Size		(1) Top	(2) Bottom	(3) Left	(4) Right
Cut sheet	Letter, Legal	Fax	0.12	0.47	0.23	0.23
		Copy	0.12	0.12	0.12	0.12
		Printer	0.12	0.12	0.23	0.23
Photo card	4" x 6"	Printer	0.12	0.12	0.12	0.12
		Copy	0.12	0.12	0.12	0.12
	L (3.5" x 5") , 2L (5" x 7")	Printer	0.12	0.12	0.12	0.12
Index card	5" x 8"	Printer	0.12	0.12	0.12	0.12
Envelopes	DL, Com-10, C5, Monarch, JE4	Printer	0.39	0.79	0.12	0.12

Printable area depends on the Printer driver settings.

The figures above are approximate and the printable area may vary depending on the type of cut sheet paper you are using.

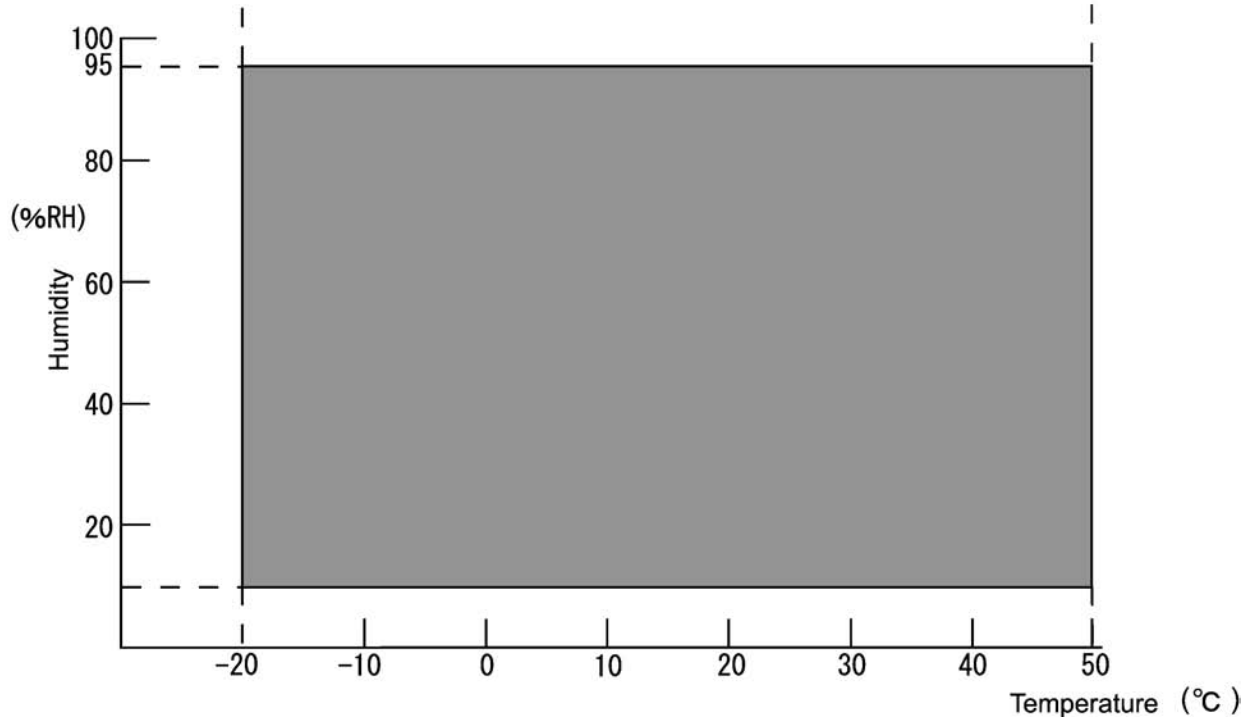
2.1.4 Environmental Conditions

Under operational conditions : 10°C to 35°C/20% to 80%



A Zone : Recommended condition
B Zone : Operation Area

Under non operational conditions : -20°C to 50°C/10% to 95%



2.2 SPECIFICATIONS LIST

U.S.A., Canadian, Argentine, and Chilean versions

Model Name	MFC-3420C (US/CA)	MFC-3420C (AR/CL)	MFC-3820CN (US/CA)
GENERAL			
Print Engine	2 head BH: 75 nozzles/color		2 head BH: 75 nozzles/color
Technology	Inkjet		Inkjet
Scanning Method	CIS		CIS
CPU Speed	RISC 133MHz		RISC 133MHz
Back up Clock	Yes (1 hour)		Yes (1 hour)
Operating Environment Temperature Humidity	10 - 35 (20-33)degrees Centigrade 20 - 80 %(without condensation)		10 - 35 (20-33)degrees Centigrade 20 - 80 %(without condensation)
On/Off Switch	Yes		Yes
Demo Model	Yes for US (require 2MB for demo model)	N/A	Yes for US (require 2MB for demo model)
Simultaneous Operation	Yes		Yes
Demo Print	Yes for US demo model	N/A	Yes for US demo model
Test Sheet	Yes (in Menu Table)		Yes (in Menu Table)
Min. Input of ADF (Width/Height)	5.8"/5.8"		5.8"/5.8"
Max. Input of ADF (Width/Height)	8.5"/14"		8.5"/14"
Max. Input of Glass (Width/Height)	8.5"/11.7"		8.5"/11.7"
Min. Output of Auto Cut sheet	3.5"/4"		3.5"/4"
Max. Output of Auto Cut sheet	8.5"/14"		8.5"/14"
Min. Output of Manual Feed Slot (Width/Height)	-		-
Max. Output of Manual Feed Slot(Width/Height)	-		-
Min. Output of Multi-Purpose Tray(Width/Height)	-		-
Max. Output of Multi-Purpose Tray(Width/Height)	-		-
Sheet Weight (Paper tray)	64 - 120 g/m2 (17 - 32 lb.)		64 - 120 g/m2 (17 - 32 lb.)
Sheet Weight (ADF)	64 - 90 g/m2 (17 - 24 lb.)		64 - 90 g/m2 (17 - 24lb.)
Sheet Weight (Manual Feed Slot)			-
Sheet Weight (MP Tray)	-		-
ADF(pages)	20		20
Paper Capacity(sheets)	100 (80 gsm)		100 (80 gsm)
Output Paper Capacity(sheets)	50		50
Optional Paper Tray (sheets)	-		-
Cassette Control Function	-		-
Recommended Paper (Plain/Inkjet/Glossy/Transparency)	Plain : Hammermill Copy Plus Paper Inkjet : Burlington Photo matte Heavy weight Glossy : Jet PrintPhoto GRAFHIC IMAGE PAPER GLOSS FINISH	Plain : Hammermill Copy Plus Paper Inkjet : Burlington Photo matte Heavy weight Glossy : Jet PrintPhoto GRAFHIC IMAGE PAPER GLOSS FINISH	Plain : Hammermill Copy Plus Paper Inkjet : Burlington Photo matte Heavy weight Glossy : Jet PrintPhoto GRAFHIC IMAGE PAPER GLOSS FINISH
LCD Size	(Standard size) 16 Characters x 1 line		(Standard size) 16 Characters x 1 line
LCD Back Light	N/A		N/A
On-Screen Programming	Yes		Yes
LCD Language	English only for US English/French for CA	SPA	English only for US English/French for CA
Memory Capacity(physical: Mbytes)	8 Mbytes (RAM)		16 Mbytes (RAM)
Memory Backup (with battery)	N/A		N/A
Back Up Print:ON/OFF Feature	N/A		N/A
Optional Memory	N/A		N/A
Memory Security	N/A		N/A
Transmission Lock	N/A		N/A
Dimensions w/ Carton (WxDxH)	22.4"x21.9"x18.1" (568x555x460 mm)		22.4"x21.9"x18.1" (568x555x460 mm)
Dimensions w/o Carton (WxDxH)*1	17.6"x17.8"x13.9" (448x453x354 mm)		17.6"x17.8"x13.9" (448x453x354 mm)
Dimensions w/o Carton (WxDxH)*2	17.6"x23.0"x17.6" (448x585x446 mm)		17.6"x23.0"x17.6" (448x585x446 mm)
Weight w/ Carton	30.9 lb (14 kg)		30.9 lb (14 kg)
Weight w/o Carton*1	22.0 lb (10 kg)		23.1 lb (10.5 kg)
Weight w/o Carton*2	23.1 lb (10.5 kg)		24.3 lb (11 kg)

*1 Excluding the ADF document support, output paper support, and ink cartridges.

*2 Including the components above.

Model Name	MFC-3420C (US/CA)	MFC-3420C (AR/CL)	MFC-3820CN (US/CA)
Body Color	Not painted		Not painted
Power Source	120 VAC 50/60Hz	220-240 VAC 50/60Hz	120 VAC 50/60Hz
Power Consumption(Standby/Power Save(CPU Sleep)/ Sleep/ Ready state/ Peak)	Less than, 5 Wh/ - / - / 8 Wh/ 24 Wh	Less than, 4 Wh/ - / - / 7 Wh/ 22 Wh	Less than, 4 Wh/ - / - / 9 Wh/ 26 Wh
Energy Star Compliant (USA Only)	Yes		Yes
Machine Noise (Standby/Copying)	35/48dB		35/48dB
Page Counter	Yes (In Maintenance)		Yes (In Maintenance)
Total print pages (Internal counter)	Yes (In Maintenance)		Yes (In Maintenance)
Copy pages (Internal counter)	Yes (In Maintenance)		Yes (In Maintenance)
PC print pages (Internal counter)	Yes (In Maintenance)		Yes (In Maintenance)
Fax RX pages (Internal counter)	Yes (In Maintenance)		Yes (In Maintenance)
Ink Gauge Indication	Yes (In Maintenance)		Yes (in Menu Table/ Remote Setup)
LIST/REPORT			
Activity Report/Journal Report	Yes (up to 200)		Yes (up to 200)
Transmission Verification Report	Yes (in Menu Table)		Yes (in Menu Table)
Cover page	N/A		N/A
Help List	Yes (in Menu Table)		Yes (in Menu Table)
Call Back Message	N/A		N/A
Caller ID List	Yes	Yes (Same as US)	Yes
Quick Dial List	N/A		N/A
Quick Dial List (New)	Yes (in Menu Table)		Yes (in Menu Table)
Tel Index List	N/A		N/A
Memory Status List	N/A		N/A
System Setup(User Setting) List	Yes (in Menu Table)		Yes (in Menu Table)
Order Form	N/A		N/A
INTERFACE			
External TAD Interface	Yes		Yes
Host Interface	USB2.0（@FULL－SPEED）		USB2.0（@FULL－SPEED）
Host Interface Auto Switching	N/A		N/A
Cable included	N/A		N/A
Acceptable Media Card Slot	N/A		SM/CF/MS/SD/xD Card with CF adapter
SUPPLIES/ OPTIONS			
Starter Toner	-		-
Toner/Drum Life / Yield	-		-
Starter Ribbon	-		-
Ribbon Life / Yield (size x meters) of cartridge	-		-
Starter Ink	BK:500pages(Draft 5%) C/M/Y:400pages(Draft 5%)		BK:500pages(Draft 5%) C/M/Y:400pages(Draft 5%)
Ink Cartridge Life / Yield Ink Cartridge (LC31)	BK:500pages (Draft 5%) BKL:900pages (Draft 5%) C/M/Y:400pages (Draft 5%)	BK:500pages (Draft 5%) C/M/Y:400pages (Draft 5%)	BK:500pages(Draft 5%) BKL:900pages(Draft 5%) C/M/Y:400pages(Draft 5%)
Options	-		-
SERVICE INFORMATION			
Monthly Volume	Max. 3000 pages		Max. 3000 pages
Machine Life (year)	5 years or 50000 pages		5 years or 50000 pages
Periodical Replacement Parts for Laser;	-		-
Fixing Unit	-		-
Separation Pad Assy	-		-
Paper Pick-up Roller Assy	-		-
Scanner Unit	-		-
MTBF (Mean Time Between Failures)	Longer than 4000 hours		Longer than 4000 hours
MTTR (Mean Time To Be Repaired)	Less than 30 minutes		Less than 30 minutes

Model Name	MFC-3420C (US/CA)	MFC-3420C (AR/CL)	MFC-3820CN (US/CA)
TELEPHONE			
Ozone Emission;	-		-
Printer	-		-
Scanner(Mono/Color)	-		-
Handset	N/A		N/A
Hook	Yes(Hook key)		Yes(Hook key)
Off Hook Alarm	N/A		N/A
Speaker Phone	N/A		N/A
Power Failure Phone	N/A		N/A
Power Failure Dialing	N/A		N/A
Chain Dialing	Yes		Yes
Automatic Redial	Yes(1time/5min)		Yes(1time/5min)
PBX Feature (EUROPE)	-		-
Handset Volume	-		-
Speaker Volume	Yes (3 steps + OFF)		Yes (3 steps + OFF)
Ring Volume	Yes (3 steps + OFF)		Yes (3 steps + OFF)
Hold/Mute Key	N/A		N/A
Music on Hold	-		-
Monitoring the Line on Hold with Music	-		-
One-Touch Dial	N/A		N/A
Speed Dial	40		100
Figures of One-Touch & Speed Dial	20 digits		20 digits
Resisterable Number Of Characters	15 characters		15 characters
Group Dial (Up to X groups)	Yes (6)		Yes (6)
Telephone Index	Yes(with Search/Speed dial key)		Yes(with Search/Speed dial key)
Pre-registered for FAX BACK SYSTEM (USA)	Yes for US only	N/A	Yes
Caller ID	Yes	Yes (Same as US)	Yes
Call Waiting Caller ID	N/A		N/A
Call waiting Ready (Only for USA)	N/A		N/A
Distinctive Ringing	Yes	Yes	Yes
COLOR FAX			
Modem Speed(bps)	14,400(Fax)		33.600(Fax)
Transmission Speed(sec.)	Approx.6 (Brother#1,MMR)		Approx.3 (Brother#1,MMR)
ITU-T Group	G3		Super G3
Coding Method	Mono:MH/MR/MMR, Color:JPEG		Mono:MH/MR/MMR, Color:JPEG
Fax/Tel Switch	Yes (Hook key)		Yes (Hook key)
Super Fine	Yes (TX & RX:B&W only)		Yes (TX & RX:B&W only)
Gray Scale	256		256
Contrast	Yes (Auto/Light/Dark)		Yes (Auto/Light/Dark)
Smoothing	-		-
Dual Access	Yes (B&W only)		Yes (B&W only)
Enhanced Remote Activate	Yes		Yes
Station ID	Yes(20digits/20characters)		Yes(20digits/20characters)
Remote Maintenance	Yes		Yes
RX Mode Indication	LCD		LCD
Resolution Indication	LCD		LCD
Fax Library	N/A		N/A
Paper Handling Size	LTR, LEGAL	A4, LTR, LEGAL	LTR, LEGAL
Delayed Timer	Yes (up to 50:B&W only)		Yes (up to 50:B&W only)
Polled Sending (type)	Yes (B&W only)		Yes (B&W only)
Multi Transmission	N/A		N/A
Multi Resolution Transmission	N/A		N/A
Next-Fax Reservation	Yes (Dual Access)		Yes (Dual Access)
Batch Transmission	Yes (B&W only)		Yes (B&W only)
Call Reservation Over Auto TX	N/A		N/A
Call Reservation Over Manual TX	N/A		N/A
Quick-Scan(Memory transmission)	Approx. 3 sec./page (A4 standard)		Approx. 3 sec./page (A4 standard)

Model Name	MFC-3420C (US/CA) / MFC-3420C (AR/CL)	MFC-3820CN (US/CA)
Memory Transmission (ITU-T Test Chart #1)	UP to 170 Pages (MMR)	Up to 400 Pages (MMR)
Memory Transmission (Brother Chart)	UP to 200 Pages (MMR)	UP to 480 Pages (MMR)
ECM(Error Correction Mode)	Yes	Yes
Error Re-Transmission	N/A	N/A
Broadcasting	Yes (90 locations)	Yes (150 locations)
Manual Broadcasting	Yes(50 locations)	Yes(50 locations)
Easy Receive/Fax Detect	Yes	Yes
Polling Receiving (type)	Yes (B&W only)	Yes (B&W only)
Auto Reduction	Yes	Yes
Out-of-Paper Reception (ITU-T Test Chart #1)	UP to 170 Pages (MMR)	Up to 400 Pages (MMR)
Out-of-Paper Reception (Brother Chart)	UP to 200 Pages (MMR)	UP to 480 Pages (MMR)
Remote Access	Yes	Yes
Fax Retrieval	Yes (B&W only)	Yes (B&W only)
Fax Forwarding	Yes (B&W only)	Yes (B&W only)
Paging	Yes	Yes
Color FAX (Document Send/Receive)	Yes/Yes	Yes/Yes
Color FAX (Memory Send/Receive)	No / Yes	No / Yes
COLOR PRINTER		
Color/Mono	Color	Color
Engine Type	2 head BH: 75 nozzles/color	2 head BH: 75 nozzles/color
Resolution(dpi)	up to 4800x1200 dpi	up to 4800x1200 dpi
Speed(ppm) Simple	14/12ppm (Mono/Color: 600x150 dpi)	14/12ppm (Mono/Color: 600x150 dpi)
Speed(ppm) Duplex	-	-
First print out time (from READY mode *3)	-	-
Warm up Time (from SLEEP mode)	0 seconds	0 seconds
Emulation	N/A	N/A
Resident Fonts	N/A	N/A
Fonts Disk Based	Yes (35 TrueType)	Yes (35 TrueType)
Paper Handling Size (Paper Tray)	LTR, LGL, EXE, JISB5, A5, A6, Photo 4"x6", Indexcard 5"x8", Photo L 3.5"x5", Photo 2L 5"x7", Post Card 1 100x148mm, Post Card 2 (Double) 148x200mm, C5 Envelope, Com-10, DL Envelope, Monarch, JE4 Envelope.	LTR, LGL, EXE, JISB5, A5, A6, Photo 4"x6", Indexcard 5"x8", Photo L 3.5"x5", Photo 2L 5"x7", Post Card 1 100x148mm, Post Card 2 (Double) 148x200mm, C5 Envelope, Com-10, DL Envelope, Monarch, JE4 Envelope.
Paper Handling Size (Manual Slots)	-	-
Paper Handling Size (MP)	-	-
Media Type (Paper Tray)	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency
Media Type (Manual Slots)	-	-
Media Type (MP Tray)	-	-
Print Paper Margin (upper, lower, left, right)	0.12, 0.12, 0.23, 0,23"/ 3, 3, 6, 6mm (@LTR, LGL) 0.12, 0.12, 0.12, 0,12"/ 3, 3, 3, 3mm (@EXE, A4, A5, Photo, Postcard, Indexcard) 0.39, 0.79, 0.12, 0,12"/ 10, 20, 3, 3mm (@C5 Envelope, Com-10, DL Envelope, Monarch)	0.12, 0.12, 0.23, 0,23" (@LTR, LGL) 0.12, 0.12, 0.12, 0,12" (@EXE, A4, A5, Photo, Postcard, Indexcard) 0.39, 0.79, 0.12, 0,12" (@C5 Envelope, Com-10, DL Envelope, Monarch)
Variable Dot Print	Yes (3 sizes)	Yes (3 sizes)
Minimum Droplet Size	5 pl	5 pl
Shingling Print	N/A	N/A
Color Enhancement	Yes	Yes
COLOR COPY		
Color/Mono	Color	Color
Speed(cpm)	12/10 ppm (Mono/Color: 600x150 dpi)	12/10 ppm (Mono/Color: 600x150 dpi)
First copy out time (from READY mode *3)	-	-
Warm up Time (from SLEEP mode)	0 seconds	0 seconds
Multi Copy(Stack)	Yes (Up to 99)	Yes (Up to 99)
Multi Copy(Sort)	Yes	Yes
Reduction/Enlargement(%)	25 -- 400 in 1% increments	25 -- 400 in 1% increments
Resolution(dpi)	Print: Max. 1200x1200 dpi Scan: Max. 600x600 dpi	Print: Max. 1200x1200 dpi Scan: Max. 600x600 dpi

*3 At Read mode condition while the MFC is idling with the scanner lamp being ON.

Model Name	MFC-3420C (US/CA)	MFC-3420C (AR/CL)	MFC-3820CN (US/CA)
N in 1	2in1, 4in1/ Color: A4, LTR only		2in1, 4in1/ Color: A4, LTR only
Poster	Yes (3x3)		Yes (3x3)
Image Enhancement	N/A		N/A
Paper Handling Size (Paper Tray)	LTR, LGL, Postcard (4"Wx6"H)	A4, LTR, LGL, A5, Postcard (4"Wx6"H)	LTR, LGL, Postcard (4"Wx6"H)
Paper Handling Size (Manual Slots)	-		-
Paper Handling Size (MP)	-		-
Media Type (Paper Tray)	Plain, Inkjet, Glossy, Transparency		Plain, Inkjet, Glossy, Transparency
Media Type (Manual Slots)	-		-
Media Type (MP Tray)	-		-
Print Paper Margin (upper, lower, left, right)	0.12, 0.12, 0.12, 0,12"/ 3, 3, 3, 3mm(@A4, A5, Postcard) 0.12, 0.12, 0.23, 0,23"/ 3, 3, 6, 6mm (@LTR, LGL)		0.12, 0.12, 0.12, 0,12"
Duplex Copy	N/A		N/A
Resolution Indication	LCD		LCD
COLOR SCANNER			
Color/Mono	Color		Color
Optical Resolution (dpi)	600x2400 dpi		600x2400 dpi
Interpolated Resolution (dpi)	up to 9600x9600 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)		up to 9600x9600 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)
Warm up Time (from Scanner Lamp OFF)	0 second		0 second
Warm up Time (from Scanner Lamp OFF: Color)	0 second		0 second
Gray Scale	256		256
Scan Image	Yes (Scan to key)		Yes (Scan to key)
Scan / OCR	Yes (Scan to key)		Yes (Scan to key)
Scan to E-mail	Yes (Scan to key)		Yes (Scan to key)
Scan to File	Yes (Scan to key)		Yes (Scan to key)
Fax to Card	N/A		N/A
Scan to Card	N/A		Yes (Scan to key)
Scan speed (Color/Mono)	Max. 3/ 5 sec		Max. 3/ 5 sec
Scanner Lamp Switch	-		-
Color Depth (Input/Output)	30/36 bit color processing/24		30/36 bit color processing/24
MESSAGE CENTER/MESSAGE MANAGER			
TAD	N/A		N/A
ICM Recording Time	N/A		N/A
Toll Saver	N/A		N/A
Memo/Recording Conversation	N/A		N/A
OGM (MC/TAD,Paging, F/T)	N/A		N/A
User Recording OGM (MC/TAD, F/T)	N/A		N/A
PC FAX			
Supplier	Brother		Brother
Color/Mono	Mono		Mono
Sending	Yes		Yes
Receiving	N/A		Yes
Protocol Compliance	N/A		N/A
Broadcasting	up to 50		up to 50
Support OS Version (For Windows)			
Printer Driver	Win98(SE)/Me/2000/XP with Auto Installer Program		Win98(SE)/Me/2000/XP with Auto Installer Program
Scanner Driver	Brother TWAIN: Win98(SE)/Me/2000 Windows WIA: Windows XP		Brother TWAIN: Win98(SE)/Me/2000 Windows WIA: Windows XP
PC Fax Sending Driver	Win98(SE)/Me/2000/XP with Auto Installer Program		Win98(SE)/Me/2000/XP with Auto Installer Program
PhotoCapture Center (Media Drive function)	-		Win98(SE)/Me/2000/XP with Auto Installer Program
Remote Setup	Win98(SE)/Me/2000/XP with Auto Installer Program		Win98(SE)/Me/2000/XP with Auto Installer Program

Model Name	MFC-3420C (US/CA)	MFC-3420C (AR/CL)	MFC-3820CN (US/CA)
Bundled software: PaperPort 8.0 (Scan Viewer)	Win98(SE)/Me/2000/XP with Auto Installer Program		Win98(SE)/Me/2000/XP with Auto Installer Program
Bundled software: Pop Up Menu (Brother Control Center)	Win98(SE)/Me/2000/XP with Auto Installer Program		Win98(SE)/Me/2000/XP with Auto Installer Program
Bundled software: Scan to feature	Win98(SE)/Me/2000/XP with Auto Installer Program		Win98(SE)/Me/2000/XP with Auto Installer Program
Bundled software: PhotoPrinter4.0 (Editor software)	-		-
Bundled software: Auto E-mail Printing	-		-
Bundled software: BRAdmin Professional	-		Win98(SE)/Me/2000/XP
Bundled software: Network Print Software(LPR)	-		**Win98(SE)/Me/2000/XP**
Bundled software: Network Print Software (NetBIOS/SMTP)	-		-
BUNDLED SOFTWARE (For MAC)			
Printer Driver	Mac OS 8.6-9.2, Mac OS X 10.1/10.2.1 - 10.2.4		Mac OS 8.6-9.2, Mac OS X 10.1/10.2.1 - 10.2.4
Scanner Driver	Brother TWAIN:Mac OS 8.6-9.2, Mac OS X 10.2.1 - 10.2.4		Brother TWAIN:Mac OS 8.6-9.2, Mac OS X 10.2.1 - 10.2.4
PC Fax Sending Driver	Mac OS 8.6-9.2, Mac OS X 10.1/10.2.1 - 10.2.4		Mac OS 8.6-9.2, Mac OS X 10.1/10.2.1 - 10.2.4
PhotoCapture Center (Media Drive function)	-		Mac OS 8.6-9.2, Mac OS X 10.1/10.2.1 - 10.2.4
Remote Setup	Mac OS X 10.1/10.2.1 - 10.2.4		Mac OS X 10.1/10.2.1 - 10.2.4
Bundled software: PaperPort 8.0 (Scan Viewer)	-		-
Bundled software: Pop Up Menu (Brother Control Center)	-		-
Bundled software: Scan to feature	-		-
Bundled software: PhotoPrinter4.0 (Editor software)	-		-
Bundled software: PageManager	Mac OS 8.6-9.2, Mac OS X 10.1/10.2.1 - 10.2.4		Mac OS 8.6-9.2, Mac OS X 10.1/10.2.1 - 10.2.4
Bundled software: BRAdmin Professional	-		-
Bundled software: Network Print Software(LPR)	-		-
Bundled software: Network Print Software (NetBIOS/SMTP)	-		-
PHOTO CAPTURE CENTER			
Acceptable Media	-		Smart Media (3.3V):4MB-128MB Compact Flash (Type-1/2, excl. Micro-Drive):4MB-1GB Memory Stick:16MB-128MB Memory Stick Pro:256MB-1GB Secure Digital:16MB-512MB xD to CF-Adapter: OLYMPUS MACF-10, FUJIFILM DPC-CF
Paper Handling Size (Paper Tray)	-		LTR, Photo Card (4"Wx6"H)
Paper Handling Size (Manual Slots)	-		-
Paper Handling Size (MP)	-		-
Media Type (Paper Tray)	-		Plain, Inkjet, Glossy
Media Type (Manual Slots)	-		-
Media Type (MP Tray)	-		-
Fit to Page	-		Yes
	-		@Photo card (4Wx6H)
Direct Print Size	-		4.0x3.0"/ 5.0x3.5"/6.0x4.0"/7.0x5.0"/8.0"x6.0"
Media Format	-		DPOF, Exif, DCF
Image Format	-		Photo Print: JPEG, TIFF Scan to Card: JPEG/PDF (Color), TIFF/PDF
Color Enhancement	-		Yes (True2Life)
Media Drive	-		Yes
Scan to Card	-		Yes
Data Management with Network board	-		Yes (FTP browser)

Model Name	MFC-3420C (US/CA)	MFC-3420C (AR/CL)	MFC-3820CN (US/CA)
NETWORK			
Standard/Option(User Option or Dealer Option)	-		Yes：Standard
Model Name	-		Embedded:NC-100h
Share Printer	-		Yes
Share Scanner	-		Yes
Share PC FAX	-		Yes
Internet FAX	-		Yes
ITU SUB Addressing	-		N/A
Support OS version	-		Win98(SE)/Me/2000/XP
Support OS version	-		N/A (Novell NetWare)
Support OS version	-		Print/PC-Fax: Mac OS 8.6-9.2, 10.2.4
Network connection	-		Ethernet 10/100BASE-TX Auto Negotiation
Support Protocols	-		TCP/IP
TCP/IP Protocols	-		RARP, BOOTP, DHCP, APIPA, NetBIOS, WINS
TCP/IP Protocols	-		LPR/LPD, Port9100, SMTP/POP3
TCP/IP Protocols	-		N/A (SMB(NetBIOS/ IP), IPP, IPX/DLC)
TCP/IP Protocols	-		Rendezvous, FTP, TELNET, SNMP, TFTP, Scanner port
Network Management	-		BRAdmin Professional
Network Management	-		N/A (Network Remote Setup)
Network Management	-		N/A (MIB-II as well as Brother private MIB)
Format (Scan to E-mail Server)	-		Tiff & PDF for Mono/ JPEG & PDF for color

EU and Asia versions

Model Name	MFC-3420C (EU)	MFC-3420C (Asia/Oce)	MFC-3820CN (EU)	MFC-3820CN (Asia/Oce)
GENERAL				
Print Engine	2 head BH: 75 nozzles/color		2 head BH: 75 nozzles/color	
Technology	Inkjet		Inkjet	
Scanning Method	CIS		CIS	
CPU Speed	RISC 133MHz		RISC 133MHz	
Back up Clock	Yes (1 hour)		Yes (1 hour)	
Operating Environment Temperature Humidity	10 - 35 (20-33)degrees Centigrade 20 - 80 %(without condensation)		10 - 35 (20-33)degrees Centigrade 20 - 80 %(without condensation)	
On/Off Switch	Yes		Yes	
Demo Model	N/A (4MB for demo)		N/A (4MB for demo)	
Simultaneous Operation	Yes		Yes	
Demo Print	N/A		N/A	
Test Sheet	Yes (in Menu Table)		Yes (in Menu Table)	
Min. Input of ADF (Width/Height)	147/147 mm		147/147 mm	
Max. Input of ADF (Width/Height)	216/356 mm		216/356 mm	
Max. Input of Glass (Width/Height)	216/297 mm		216/297 mm	
Min. Output of Auto Cut sheet	89/102 mm		89/102 mm	
Max. Output of Auto Cut sheet	216/356 mm		216/356 mm	
Min. Output of Manual Feed Slot (Width/Height)	-		-	
Max. Output of Manual Feed Slot(Width/Height)	-		-	
Min. Output of Multi-Purpose Tray(Width/Height)	-		-	
Max. Output of Multi-Purpose Tray(Width/Height)	-		-	
Sheet Weight (Paper tray)	64 - 120 g/m2 (17 - 32 lb.)		64 - 120 g/m2 (17 - 32 lb.)	
Sheet Weight (ADF)	64 - 90 g/m2 (17 - 24 lb.)		64 - 90 g/m2 (17 - 24 lb.)	
Sheet Weight (Manual Feed Slot)	-		-	
Sheet Weight (MP Tray)	-		-	
ADF(pages)	20		20	
Paper Capacity(sheets)	100 (80 gsm)		100 (80 gsm)	
Output Paper Capacity(sheets)	50		50	
Optional Paper Tray (sheets)	-		-	
Cassette Control Function	-		-	
Recommended Paper (Plain/Inkjet/Glossy/Transparency)	Plain: Xerox 80 Inkjet: Glossy: Z-weckform@ Inkjet Photographic Paper Transparency: 3M Transparency Film		Plain: Xerox 80 Inkjet: Glossy: Z-weckform@ Inkjet Photographic Paper Transparency: 3M Transparency Film	
LCD Size	(Standard size) 16 Characters x 1 line		(Standard size) 16 Characters x 1 line	
LCD Back Light	N/A		N/A	
On-Screen Programming	Yes		Yes	
LCD Language	English		English	
Mode key	Fax/Scan/Copy		Fax/Scan/Copy	
Memory Capacity(physical: Mbytes)	8 Mbytes (RAM)		16 Mbytes (RAM)	
Memory Backup (with battery)	N/A		N/A	
Back Up Print:ON/OFF Feature	N/A		N/A	
Optional Memory	N/A		N/A	
Memory Security	N/A		N/A	
Transmission Lock	Yes		Yes	
Dimensions w/ Carton (WxDxH)	22.4"x21.9"x18.1" (568x555x460 mm)		22.4"x21.9"x18.1" (568x555x460 mm)	
Dimensions w/o Carton (WxDxH)*1	17.6"x17.8"x13.9" (448x453x354 mm)		17.6"x17.8"x13.9" (448x453x354 mm)	
Dimensions w/o Carton (WxDxH)*2	17.6"x23.0"x17.6" (448x585x446 mm)		17.6"x23.0"x17.6" (448x585x446 mm)	
Weight w/ Carton	30.9 lb (14 kg)		30.9 lb (14 kg)	
Weight w/o Carton*1	22.0 lb (10 kg)		23.1 lb (10.5 kg)	
Weight w/o Carton*2	23.1 lb (10.5 kg)		24.3 lb (11 kg)	

*1 Excluding the ADF document support, output paper support, and ink cartridges.

*2 Including the components above.

Model Name	MFC-3420C (EU)	MFC-3420C (Asia/Oce)	MFC-3820CN (EU)	MFC-3820CN (Asia/Oce)
Body Color	Not painted		Not painted	
Power Source	220-240 VAC 50/60Hz		220-240 VAC 50/60Hz	
Power Consumption(Standby/Power Save(CPU Sleep)/ Sleep/ Ready state/ Peak)	Less than, 4 Wh/ - / - / 7 Wh/ 22 Wh		Less than, 4 Wh/ - / - / 10 Wh/ 26 Wh	
Energy Star Compliant (USA Only)	Yes		Yes	
Machine Noise (Standby/Copying)	35/48dB		35/48dB	
Page Counter	Yes (In Maintenance)		Yes (In Maintenance)	
Total print pages (Internal counter)	Yes (In Maintenance)		Yes (In Maintenance)	
Copy pages (Internal counter)	Yes (In Maintenance)		Yes (In Maintenance)	
PC print pages (Internal counter)	Yes (In Maintenance)		Yes (In Maintenance)	
Fax RX pages (Internal counter)	Yes (In Maintenance)		Yes (In Maintenance)	
Ink Gauge Indication	Yes (in Ink key/ Remote Setup)		Yes (in Ink key/ Remote Setup)	
LIST/REPORT				
Activity Report/Journal Report	Yes (up to 200)		Yes (up to 200)	
Transmission Verification Report	Yes (in Reports key)		Yes (in Reports key)	
Cover page	N/A		N/A	
Help List	Yes (in Reports key)		Yes (in Reports key)	
Call Back Message	N/A		N/A	
Caller ID List	N/A	Yes	N/A	Yes
Quick Dial List	N/A		N/A	
Quick Dial List (New)	Yes (in Reports key)		Yes (in Reports key)	
Tel Index List	N/A		N/A	
Memory Status List	N/A		N/A	
System Setup(User Setting) List	Yes (in Reports key)		Yes (in Reports key)	
Order Form	N/A		N/A	
INTERFACE				
External TAD Interface	Yes		Yes	
Host Interface	USB2.0（@FULL－SPEED）		USB2.0（@FULL－SPEED）	
Host Interface Auto Switching	N/A		N/A	
Cable included	N/A		N/A	
Acceptable Media Card Slot	N/A		SM/CF/MS/SD/xD Card with CF adapter	
SUPPLIES/ OPTIONS				
Starter Toner	-		-	
Toner/Drum Life / Yield	-		-	
Starter Ribbon	-		-	
Ribbon Life / Yield (size x meters) of cartridge	-		-	
Starter Ink	BK:500pages(Draft 5%) C/M/Y:400pages(Draft 5%)		BK:500pages(Draft 5%) C/M/Y:400pages(Draft 5%)	
Ink Cartridge Life / Yield	BK:500pages(Draft 5%)		BK:500pages(Draft 5%)	
	-		-	
Ink Cartridge (LC800)	C/M/Y:400pages(Draft 5%)		C/M/Y:400pages(Draft 5%)	
Options	-		-	
SERVICE INFORMATION				
Monthly Volume	Max. 3000 pages		Max. 3000 pages	
Machine Life (year)	5 years or 50000 pages		5 years or 50000 pages	
Periodical Replacement Parts for Laser;	-		-	
Fixing Unit	-		-	
Separation Pad Assy	-		-	
Paper Pick-up Roller Assy	-		-	
Scanner Unit	-		-	
MTBF (Mean Time Between Failures)	Longer than 4000 hours		Longer than 4000 hours	
MTTR (Mean Time To Be Repaired)	Less than 30 minutes		Less than 30 minutes	

Model Name	MFC-3420C (EU)	MFC-3420C (Asia/Oce)	MFC-3820CN (EU)	MFC-3820CN (Asia/Oce)
TELEPHONE				
Ozone Emission;	-		-	
Printer	-		-	
Scanner(Mono/Color)	-		-	
Handset	N/A		N/A	
Hook	N/A		N/A	
Off Hook Alarm	N/A		N/A	
Speaker Phone	N/A		N/A	
Power Failure Phone	N/A		N/A	
Power Failure Dialing	N/A		N/A	
Chain Dialing	Yes		Yes	
Automatic Redial	Yes(3time/5min)		Yes(3time/5min)	
PBX Feature (EUROPE)	-		-	
Handset Volume	-		-	
Speaker Volume	Yes (3 steps + OFF)		Yes (3 steps + OFF)	
Ring Volume	Yes (3 steps + OFF)		Yes (3 steps + OFF)	
Hold/Mute Key	N/A		N/A	
Music on Hold	-		-	
Monitoring the Line on Hold with Music	-		-	
One-Touch Dial	N/A		N/A	
Speed Dial	40		100	
Figures of One-Touch & Speed Dial	20 digits		20 digits	
Resisterable Number Of Characters	15 characters		15 characters	
Group Dial (Up to X groups)	Yes (6)		Yes (6)	
Telephone Index	Yes(with Search/Speed dial key)		Yes(with Search/Speed dial key)	
Pre-registered for FAX BACK SYSTEM (USA)	Yes		Yes	
Caller ID	Yes		Yes	
Call Waiting Caller ID	N/A		N/A	
Call waiting Ready (Only for USA)	N/A		N/A	
Distinctive Ringing	Yes		Yes	
COLOR FAX				
Modem Speed(bps)	14,400(Fax)		33.600(Fax)	
Transmission Speed(sec.)	Approx.6 (Brother#1,MMR)		Approx.3 (Brother#1,MMR)	
ITU-T Group	G3		Super G3	
Coding Method	Mono:MH/MR/MMR, Color:JPEG		Mono:MH/MR/MMR, Color:JPEG	
Fax/Tel Switch	Yes (Hook key)		Yes (Hook key)	
Super Fine	Yes (TX & RX:B&W only)		Yes (TX & RX:B&W only)	
Gray Scale	Mono:64, Color:256		Mono:64, Color:256	
Contrast	Yes (Auto/Light/Dark)		Yes (Auto/Light/Dark)	
Smoothing	-		-	
Dual Access	Yes (B&W only)		Yes (B&W only)	
Enhanced Remote Activate	Yes		Yes	
Station ID	Yes(20digits/20characters)		Yes(20digits/20characters)	
Remote Maintenance	Yes		Yes	
RX Mode Indication	LCD		LCD	
Resolution Indication	LCD		LCD	
Fax Library	N/A		N/A	
Paper Handling Size	A4		A4	
Delayed Timer	Yes (up to 50:B&W only)		Yes (up to 50:B&W only)	
Polled Sending (type)	Yes (Std/Seq:B&W only)		Yes (Std/Seq:B&W only)	
Multi Transmission	N/A		N/A	
Multi Resolution Transmission	N/A		N/A	
Next-Fax Reservation	Yes (Dual Access)		Yes (Dual Access)	
Batch Transmission	Yes (B&W only)		Yes (B&W only)	
Call Reservation Over Auto TX	N/A		N/A	
Call Reservation Over Manual TX	N/A		N/A	
Quick-Scan(Memory transmission)	Approx. 3 sec./page (A4 standard)		Approx. 3 sec./page (A4 standard)	

Model Name	MFC-3420C (EU)	MFC-3420C (Asia/Oce)	MFC-3820CN (EU)	MFC-3820CN (Asia/Oce)
Memory Transmission (ITU-T Test Chart #1)	Up to 170 Pages (MMR)		Up to 400 Pages (MMR)	
Memory Transmission (Brother Chart)	UP to 200 Pages (MMR)		UP to 480 Pages (MMR)	
ECM(Error Correction Mode)	Yes		Yes	
Error Re-Transmission	N/A		N/A	
Broadcasting	Yes (90 locations)		Yes (150 locations)	
Manual Broadcasting	Yes(50 locations)		Yes(50 locations)	
Easy Receive/Fax Detect	Yes		Yes	
Polling Receiving (type)	Yes (Std/Seq:B&W only)		Yes (Std/Seq:B&W only)	
Auto Reduction	Yes		Yes	
Out-of-Paper Reception (ITU-T Test Chart #1)	Up to 170 Pages (MMR)		Up to 400 Pages (MMR)	
Out-of-Paper Reception (Brother Chart)	UP to 200 Pages (MMR)		UP to 480 Pages (MMR)	
Remote Access	Yes		Yes	
Fax Retrieval	Yes (B&W only)		Yes (B&W only)	
Fax Forwarding	Yes (B&W only)		Yes (B&W only)	
Paging	N/A		N/A	
Color FAX (Document Send/Receive)	Yes/Yes		Yes/Yes	
Color FAX (Memory Send/Receive)	No / Yes		No / Yes	
COLOR PRINTER				
Color/Mono	Color		Color	
Engine Type	2 head BH: 75 nozzles/color		2 head BH: 75 nozzles/color	
Resolution(dpi)	up to 4800x1200 dpi		up to 4800x1200 dpi	
Speed(ppm) Simple	14/12ppm (Mono/Color: 600x150 dpi)		14/12ppm (Mono/Color: 600x150 dpi)	
Speed(ppm) Duplex	-		-	
First print out time (from READY mode *3)	-		-	
Warm up Time (from SLEEP mode)	0 seconds		0 seconds	
Emulation	N/A		N/A	
Resident Fonts	N/A		N/A	
Fonts Disk Based	Yes (35 TrueType)		Yes (35 TrueType)	
Paper Handling Size (Paper Tray)	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo 102x152mm, Index card 127x203mm, Photo L 89x127mm, Photo 2L 127x178mm, Postcard 1 100x148mm, Postcard 2 (Double) 148x200mm, C5, Com-10, DL, Monarch, JE4 envelopes		A4, LTR, LGL, EXE, JISB5, A5, A6, Photo 102x152mm, Index card 127x203mm, Photo L 89x127mm, Photo 2L 127x178mm, Postcard 1 100x148mm, Postcard 2 (Double) 148x200mm, C5, Com-10, DL, Monarch, JE4 envelopes	
Paper Handling Size (Manual Slots)	-		-	
Paper Handling Size (MP)	-		-	
Media Type (Paper Tray)	Plain, Inkjet, Glossy, Transparency		Plain, Inkjet, Glossy, Transparency	
Media Type (Manual Slots)	-		-	
Media Type (MP Tray)	-		-	
Print Paper Margin (upper, lower, left, right)	3, 3, 6, 6 mm (LTR, LGL) 3, 3, 3, 3 mm (EXE, A4, A5, Photo, Postcard, Index card) 10, 20, 3, 3mm (C5, Com-10, DL, Monarch envelopes)		3, 3, 6, 6 mm (LTR, LGL) 3, 3, 3, 3 mm (EXE, A4, A5, Photo, Postcard, Index card) 10, 20, 3, 3mm (C5, Com-10, DL, Monarch envelopes)	
Variable Dot Print	Yes (3 sizes)		Yes (3 sizes)	
Minimum Droplet Size	5 pl		5 pl	
Shingling Print	N/A		N/A	
Color Enhancement	Yes		Yes	
COLOR COPY				
Color/Mono	Color		Color	
Speed(cpm)	12/10 ppm (Mono/Color: 600x150 dpi)		12/10 ppm (Mono/Color: 600x150 dpi)	
First copy out time (from READY mode *3)	-		-	
Warm up Time (from SLEEP mode)	0 seconds		0 seconds	
Multi Copy(Stack)	Yes (Up to 99)		Yes (Up to 99)	
Multi Copy(Sort)	Yes		Yes	
Reduction/Enlargement(%)	25 -- 400 in 1% increments		25 -- 400 in 1% increments	
Resolution(dpi)	Print: Max. 1200x1200 dpi Scan: Max. 600x600 dpi		Print: Max. 1200x1200 dpi Scan: Max. 600x600 dpi	

*3 At Read mode condition while the MFC is idling with the scanner lamp being ON.

Model Name	MFC-3420C (EU)	MFC-3420C (Asia/Oce)	MFC-3820CN (EU)	MFC-3820CN (Asia/Oce)
N in 1	2in1, 4in1/ Color: A4, LTR only		2in1, 4in1/ Color: A4, LTR only	
Poster	Yes (3x3)		Yes (3x3)	
Image Enhancement	N/A		N/A	
Paper Handling Size (Paper Tray)	A4, A5, Postcard (10(W)x15(H)cm)		A4, A5, Postcard (10(W)x15(H)cm)	
Paper Handling Size (Manual Slots)	-		-	
Paper Handling Size (MP)	-		-	
Media Type (Paper Tray)	Plain, Inkjet, Glossy, Transparency		Plain, Inkjet, Glossy, Transparency	
Media Type (Manual Slots)	-		-	
Media Type (MP Tray)	-		-	
Print Paper Margin (upper, lower, left, right)	3mm, 3mm, 3mm, 3mm (@A4, A5, Postcard 10(W)x15(H)cm)		3mm, 3mm, 3mm, 3mm (@A4, A5, Postcard 10(W)x15(H)cm)	
Duplex Copy	N/A		N/A	
Resolution Indication	LCD		LCD	
COLOR SCANNER				
Color/Mono	Color		Color	
Optical Resolution (dpi)	600x2400 dpi		600x2400 dpi	
Interpolated Resolution (dpi)	up to 9600x9600 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)		up to 9600x9600 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)	
Warm up Time (from Scanner Lamp OFF)	0 second		0 second	
Warm up Time (from Scanner Lamp OFF: Color)	0 second		0 second	
Gray Scale	256		256	
Scan Image	Yes (Scan to key)		Yes (Scan to key)	
Scan / OCR	Yes (Scan to key)		Yes (Scan to key)	
Scan to E-mail	Yes (Scan to key)		Yes (Scan to key)	
Scan to File	Yes (Scan to key)		Yes (Scan to key)	
Fax to Card	N/A		N/A	
Scan to Card	N/A		N/A	
Scan speed (Color/Mono)	Max. 3 sec		Max. 3 sec	
Scanner Lamp Switch	-		-	
Color Depth (Input/Output)	30/36 bit color processing/24		30/36 bit color processing/24	
MESSAGE CENTER/MESSAGE MANAGER				
TAD	N/A		N/A	
ICM Recording Time	N/A		N/A	
Toll Saver	N/A		N/A	
Memo/Recording Conversation	N/A		N/A	
OGM (MC/TAD, Paging, F/T)	N/A		N/A	
User Recording OGM (MC/TAD, F/T)	N/A		N/A	
PC FAX				
Supplier	Brother		Brother	
Color/Mono	Mono		Mono	
Sending	Yes		Yes	
Receiving	N/A		Yes	
Protocol Compliance	N/A		N/A	
Broadcasting	up to 50		up to 50	
Support OS Version (For Windows)				
Printer Driver	Win98(SE)/Me/2000/XP with Auto Installer Program		Win98(SE)/Me/2000/XP with Auto Installer Program	
Scanner Driver	Brother TWAIN: Win98(SE)/Me/2000 Windows WIA: Windows XP		Brother TWAIN: Win98(SE)/Me/2000 Windows WIA: Windows XP	
PC Fax Sending Driver	Win98(SE)/Me/2000/XP with Auto Installer Program		Win98(SE)/Me/2000/XP with Auto Installer Program	
PhotoCapture Center (Media Drive function)	-		Win98(SE)/Me/2000/XP with Auto Installer Program	
Remote Setup	Win98(SE)/Me/2000/XP with Auto Installer Program		Win98(SE)/Me/2000/XP with Auto Installer Program	

Model Name	MFC-3420C (EU)	MFC-3420C (Asia/Oce)	MFC-3820CN (EU)	MFC-3820CN (Asia/Oce)
Bundled software: PaperPort 8.0 (Scan Viewer)	Win98(SE)/Me/2000/XP with Auto Installer Program		Win98(SE)/Me/2000/XP with Auto Installer Program	
Bundled software: Pop Up Menu (Brother Control Center)	Win98(SE)/Me/2000/XP with Auto Installer Program		Win98(SE)/Me/2000/XP with Auto Installer Program	
Bundled software: Scan to feature	Win98(SE)/Me/2000/XP with Auto Installer Program		Win98(SE)/Me/2000/XP with Auto Installer Program	
Bundled software: PhotoPrinter4.0 (Editor software)	-		-	
Bundled software: Auto E-mail Printing	-		-	
Bundled software: BRAdmin Professional	-		Win98(SE)/Me/2000/XP	
Bundled software: Network Print Software(LPR)	-		Win98(SE)/Me/2000/XP	
Bundled software: Network Print Software (NetBIOS/SMTP)	-		-	
BUNDLED SOFTWARE (For MAC)				
Printer Driver	Mac OS 8.6-9.2, Mac OS X 10.1/10.2.1 - 10.2.4		Mac OS 8.6-9.2, Mac OS X 10.1/10.2.1 - 10.2.4	
Scanner Driver	Brother TWAIN:Mac OS 8.6-9.2, Mac OS X 10.2.1 - 10.2.4		Brother TWAIN:Mac OS 8.6-9.2, Mac OS X 10.2.1 - 10.2.4	
PC Fax Sending Driver	Mac OS 8.6-9.2, Mac OS X 10.1/10.2.1 - 10.2.4		Mac OS 8.6-9.2, Mac OS X 10.1/10.2.1 - 10.2.4	
PhotoCapture Center (Media Drive function)	-		Mac OS 8.6-9.2, Mac OS X 10.1/10.2.1 - 10.2.4	
Remote Setup	Mac OS X 10.1/10.2.1 - 10.2.4		Mac OS X 10.1/10.2.1 - 10.2.4	
Bundled software: PaperPort 8.0 (Scan Viewer)	-		-	
Bundled software: Pop Up Menu (Brother Control Center)	-		-	
Bundled software: Scan to feature	-		-	
Bundled software: PhotoPrinter4.0 (Editor software)	-		-	
Bundled software: PageManager	Mac OS 8.6-9.2, Mac OS X 10.1/10.2.1 - 10.2.4		Mac OS 8.6-9.2, Mac OS X 10.1/10.2.1 - 10.2.4	
Bundled software: BRAdmin Professional	-		-	
Bundled software: Network Print Software(LPR)	-		-	
Bundled software: Network Print Software (NetBIOS/SMTP)	-		-	
PHOTO CAPTURE CENTER				
Acceptable Media	-		Smart Media (3.3V):4MB-128MB Compact Flash (Type-1/2, excl. Micro-Drive):4MB-1GB Memory Stick:16MB-128MB Memory Stick Pro:256MB-1GB Secure Digital:16MB-512MB xD to CF-Adapter: OLYMPUS MACF-10, FUJIFILM DPC-CF	
Paper Handling Size (Paper Tray)	-		A4, Photo Card 15(W)x10(H)cm, 13(W)x18(W)cm	
Paper Handling Size (Manual Slots)	-		-	
Paper Handling Size (MP)	-		-	
Media Type (Paper Tray)	-		Plain, Inkjet, Glossy	
Media Type (Manual Slots)	-		-	
Media Type (MP Tray)	-		-	
Fit to Page	-		Yes	
	-		@Photo card 15(W)x10(H)cm, 13(W)x18(W)cm	
Direct Print Size	-		10x8cm/ 13x9cm/ 15x10cm/ 18x13cm/ 20x15cm	
Media Format	-		DPOF, Exif, DCF	
Image Format	-		Photo Print: JPEG, TIFF	
Color Enhancement	-		Yes (True2Life)	
Media Drive	-		Yes	
Scan to Card	-		Yes	
Data Management with Network board	-		Yes (FTP browser)	

Model Name	MFC-3420C (EU)	MFC-3420C (Asia/Oce)	MFC-3820CN (EU)	MFC-3820CN (Asia/Oce)
NETWORK				
Standard/Option(User Option or Dealer Option)	-		Yes：Standard	
Model Name	-		Embedded (NC-100h)	
Share Printer	-		Yes	
Share Scanner	-		Yes	
Share PC FAX	-		Yes	
Internet FAX	-		N/A	
ITU SUB Addressing	-		N/A	
Support OS version	-		Win98(SE)/Me/2000/XP	
Support OS version	-		N/A (Novell NetWare)	
Support OS version	-		Print/PC-Fax: Mac OS 8.6-9.2, 10.2.4	
Network connection	-		Ethernet 10/100BASE-TX Auto Negotiation	
Support Protocols	-		TCP/IP	
TCP/IP Protocols	-		RARP, BOOTP, DHCP, APIPA, NetBIOS, WINS	
TCP/IP Protocols	-		LPR/LPD, Port9100, SMTP/POP3	
TCP/IP Protocols	-		N/A (SMB(NetBIOS/ IP), IPP, IPX/DLC)	
TCP/IP Protocols	-		Rendezvous, FTP, TELNET, SNMP, TFTP, Scanner port	
Network Management	-		BRAdmin Professional	
Network Management	-		N/A (Network Remote Setup)	
Network Management	-		N/A (MIB-II as well as Brother private MIB)	
Format (Scan to E-mail Server)	-		N/A	

CHAPTER 3

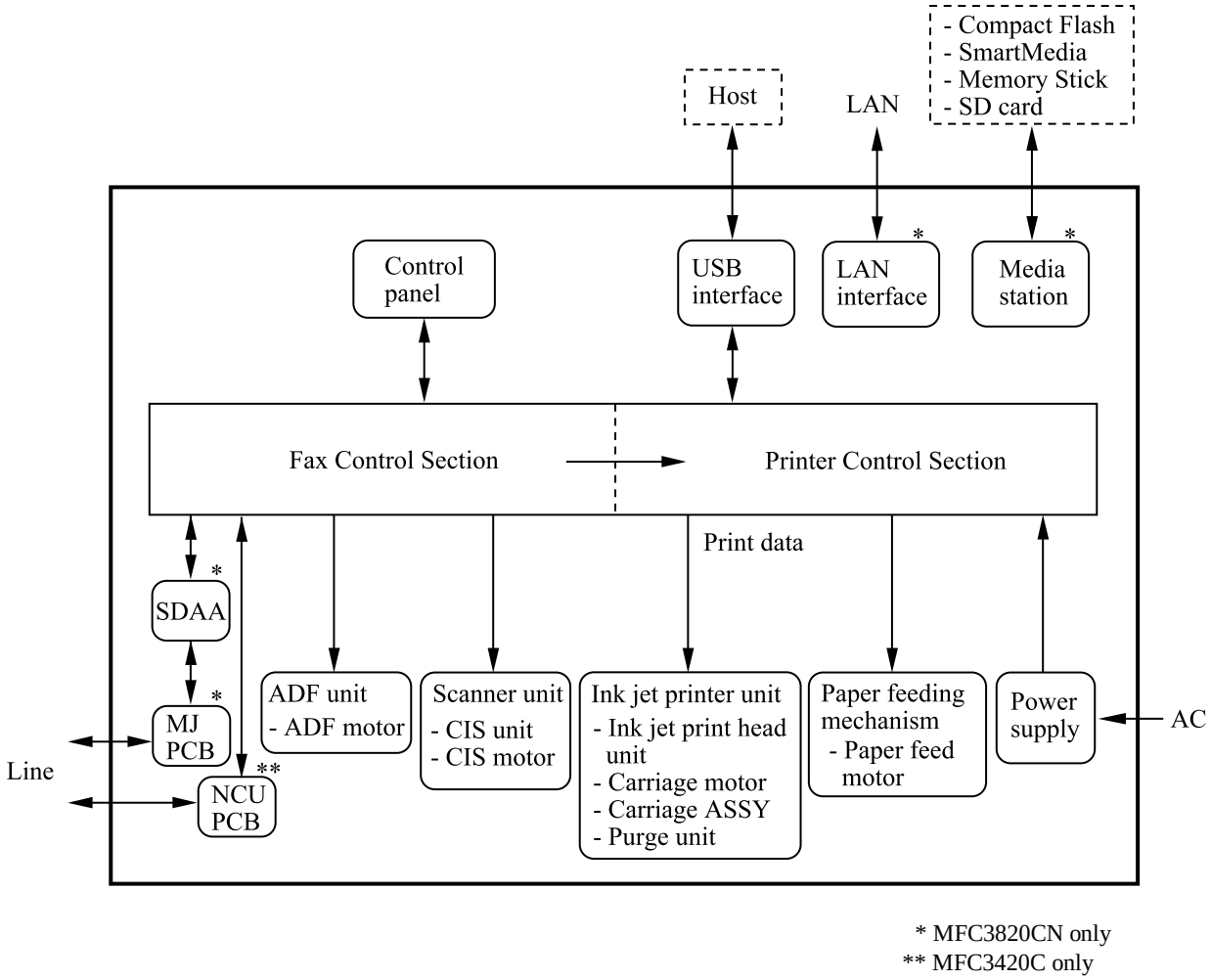
THEORY OF OPERATION

CHAPTER 3 THEORY OF OPERATION

This chapter summarizes the scanner and printing mechanisms and control electronics. It also provides information about sensors and their actuators. This chapter helps you to understand the operating principles and isolate the source of a problem (troubleshooting).

CONTENTS

3.1 OVERVIEW

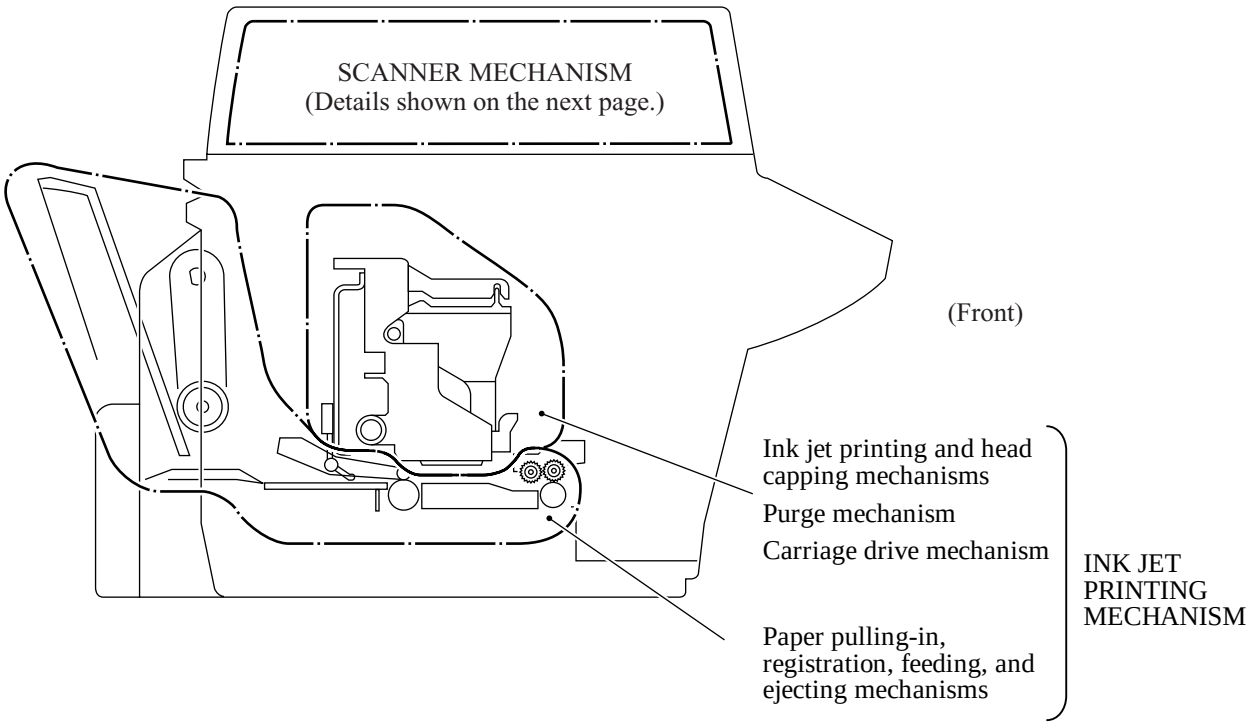


* MFC3820CN only
** MFC3420C only

3.2 MECHANISMS

The facsimile machine is classified into the following mechanisms:

- ■ SCANNER MECHANISM
  - ADF mechanism
  - Document scanning mechanism
- ■ INK JET PRINTING MECHANISM
  - Paper pulling-in, registration, feeding, and ejecting mechanisms
  - Ink jet printing and head capping mechanisms
  - Purging mechanism
  - Carriage drive mechanism
- ■ SENSORS AND ACTUATORS



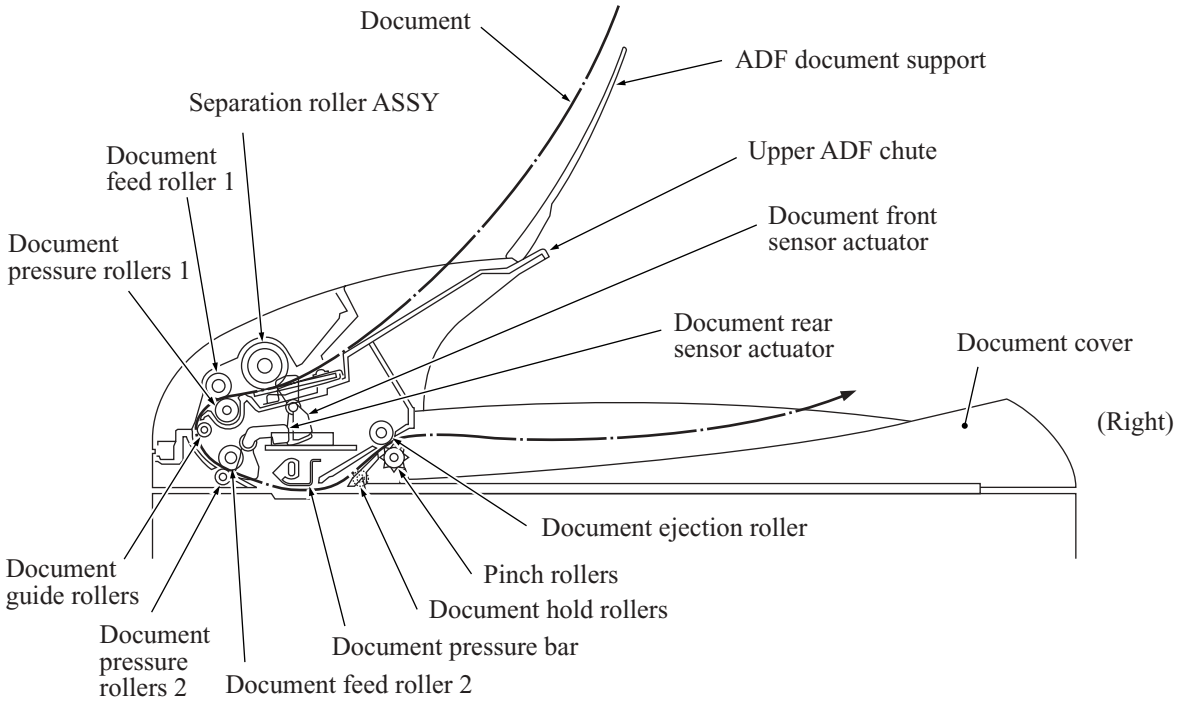
3.2.1 Scanner Mechanism

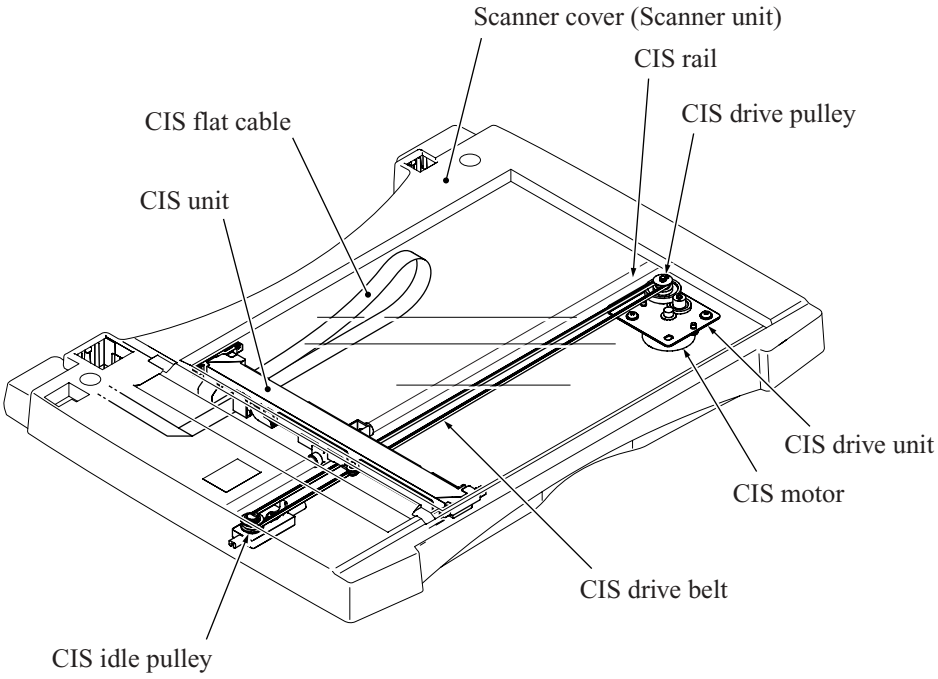
This mechanism consists of the ADF (automatic document feeder) unit, document cover, and scanner cover (scanner unit).

The ADF unit contains a separation roller ASSY, document feed rollers 1 and 2, document ejection roller, ADF motor, document pressure bar, and document front and rear sensors.

The scanner cover contains a CIS unit, CIS motor, and CIS drive mechanism.

For details about the sensors, refer to Section 3.2.3.





This scanner mechanism supports a dual scanning system.

(1) If you set documents on the document guide base with their faces up and start the scanning operation, then the ADF motor rotates to pull in those documents into the ADF unit, starting from the top sheet to the bottom, page by page. Each document curves downwards and turns to the right with the document feed rollers so as to advance above the CIS unit, and then it is fed out to the document cover with the document ejection roller ASSY.

    This way, documents move above the CIS unit being kept in a stationary position.

(2) If you open the document cover, put a sheet of document with its face down (or put a bound book opened) on the top glass of the scanner cover (scanner unit), close the document cover, and start the scanning operation, then the CIS drive mechanism will be driven.

    The CIS unit, which is supported and guided by the CIS rail, is secured to the CIS drive belt. Clockwise and counterclockwise rotation of the CIS motor moves the CIS unit to the left and right, respectively.

    The CIS unit uses a built-in Contact Image Sensor (CIS) unit which consists of an LED array for illuminating documents, a self-focus lens array for collecting the reflected light from the scanned image data, a CIS PCB for performing photoelectric conversion to output picture element data, and a glass cover.

3.2.2 Ink Jet Printing Mechanism

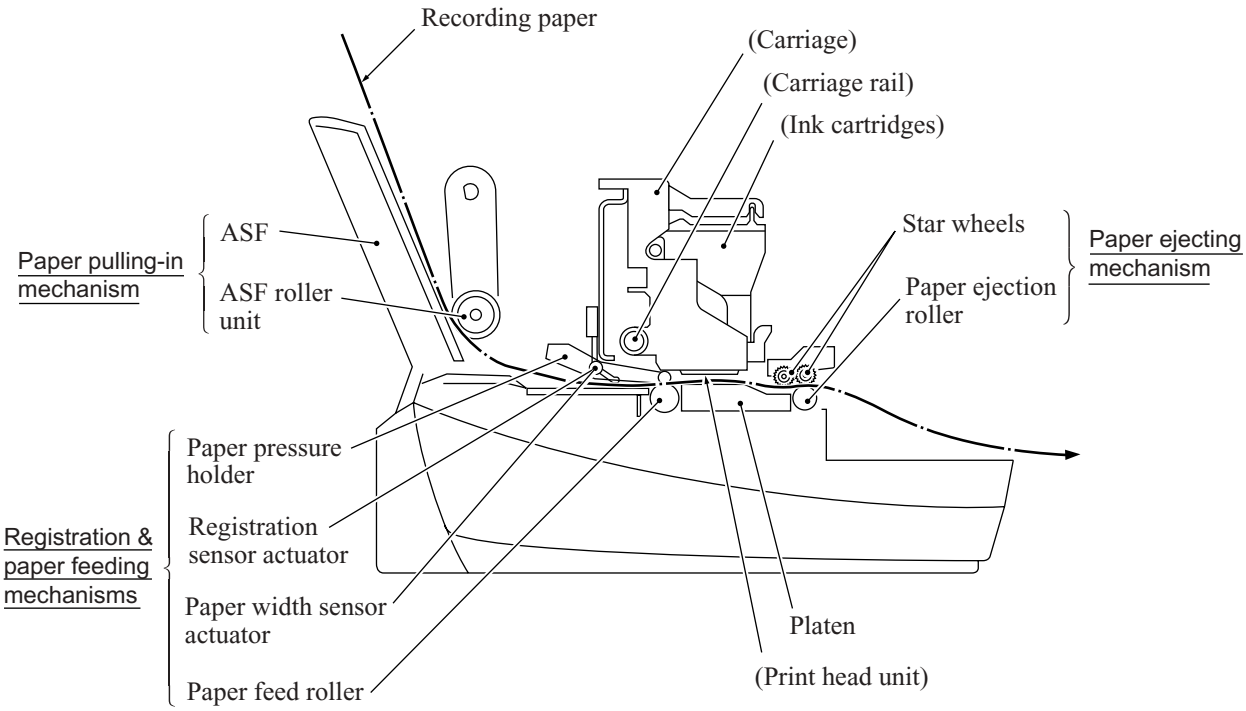
3.2.2.1 Paper pulling-in, registration, feeding, and ejecting mechanisms

The paper pulling-in, registration, feeding, and ejecting mechanisms are driven by a single paper feed motor located at the left side of the main chassis via the gear train. (See the illustration given on page 3-7.)

First, the paper feed motor* rotates clockwise (when viewed from the output gear). The rotation is transmitted to both the PF roller gear* and paper ejection roller gear*. Both the paper feed roller and paper ejection roller rotates in the backward direction.

(*The paper feed motor gear, PF roller gear, and paper ejection roller gear use plastic dual spur gears (Nobusic gears manufactured by CHIBA DIES Co., Ltd.) that are half pitch phase-shifted.)

At the right end of the paper feed roller is the PF roller gear R which is always engaged with the ASF/purge idle gear. Engaged with the ASF/purge idle gear, the ASF-purge switching gear 23 transmits the rotation via the gear train to the ASF roller unit. This way, the ASF roller will pull in paper.



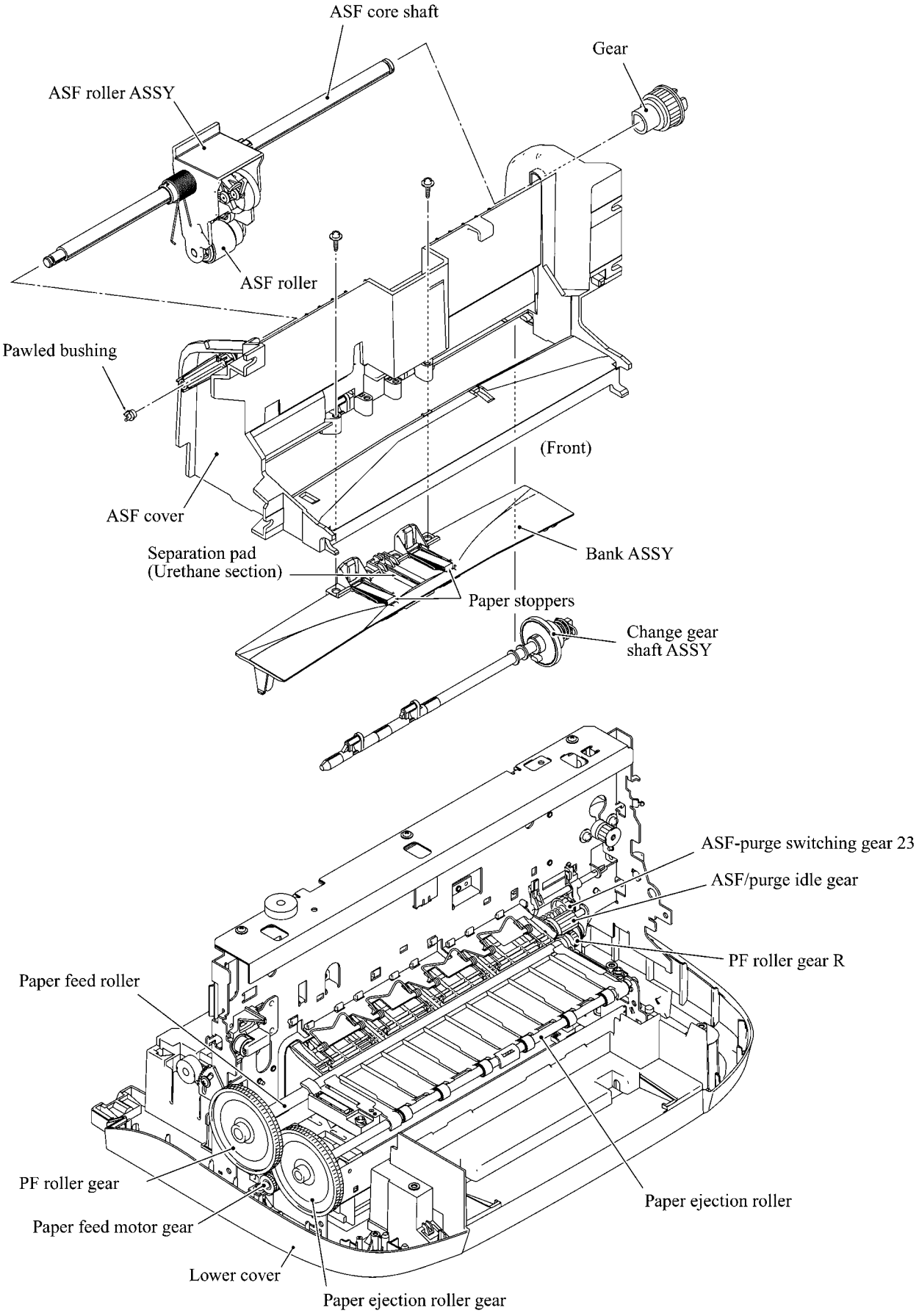
See the illustration given on the next page.

At the same time, the motor rotation is also transmitted to the change gear shaft ASSY that lowers the paper stoppers below the surface of the bank ASSY so that the paper stoppers will not interfere with the paper feed.

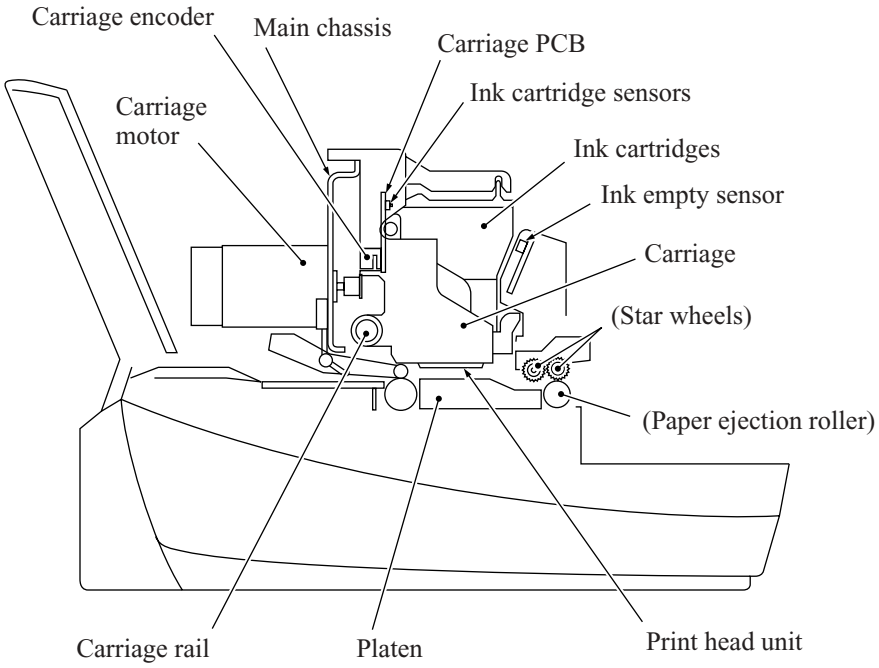
When the ASF roller is pulling in paper, the paper feed roller rotates in the backward direction to register the leading edge of the pulled-in paper.

Next, the paper feed motor rotates counterclockwise to rotate the paper feed roller in the forward direction. The paper will advance through the paper path. During the paper feeding operation, no rotation is transmitted to the ASF roller because of the planetary gear system built in the ASF roller unit. And, the paper stoppers lift up to prevent other sheets from slipping into the machine.

The above paper pulling-in and feeding operations take place when the carriage is in printing operation. If the carriage reaches the purge position, the ASF-purge switching gear 23 becomes disengaged from the gear 25 and engaged with purge bevel gear A. The purging mechanism is described in Section 3.2.2.3.

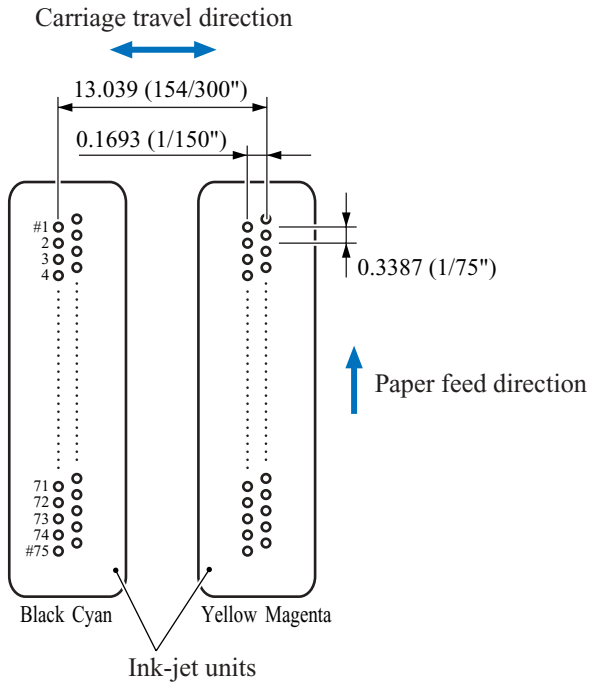

ASF core shaft
Gear
ASF roller ASSY
ASF roller
Pawled bushing
(Front)
ASF cover
Separation pad
(Urethane section)
Bank ASSY
Paper stoppers
Change gear
shaft ASSY
ASF-purge switching gear 23
ASF/purge idle gear
PF roller gear R
Paper feed roller
PF roller gear
Paper feed motor gear
Lower cover
Paper ejection roller
Paper ejection roller gear

3.2.2.2 Ink jet printing and capping mechanisms



(1) Print head unit

This machine uses drop-on-demand ink jet printing. Each of the right and left print heads has an ink-jet unit that has a pair of nozzle columns for two color inks. A nozzle column consists of 75 nozzles, 75 channels covered with piezoelectric ceramic (PZT), a manifold, and filter. As illustrated below, the pair of nozzle columns is staggered.

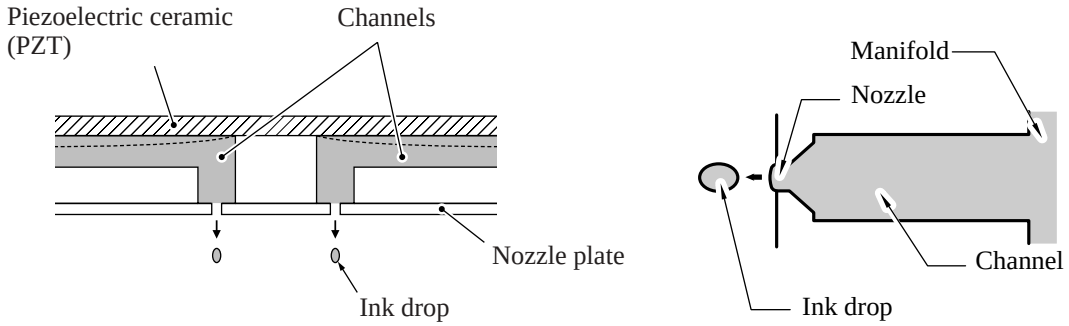


Nozzle Layout (viewed from the bottom)

If the controller issues a print command, a biased voltage will be applied to all electrodes formed on the surface of the piezoelectric ceramic so that each actuator will be distorted as shown with broken lines.

If the electrodes on a target channel are deenergized according to drive signals, then the associated piezoelectric ceramic actuator returns to the previous form so that the ink in the manifold will be vacuumed out to the channel.

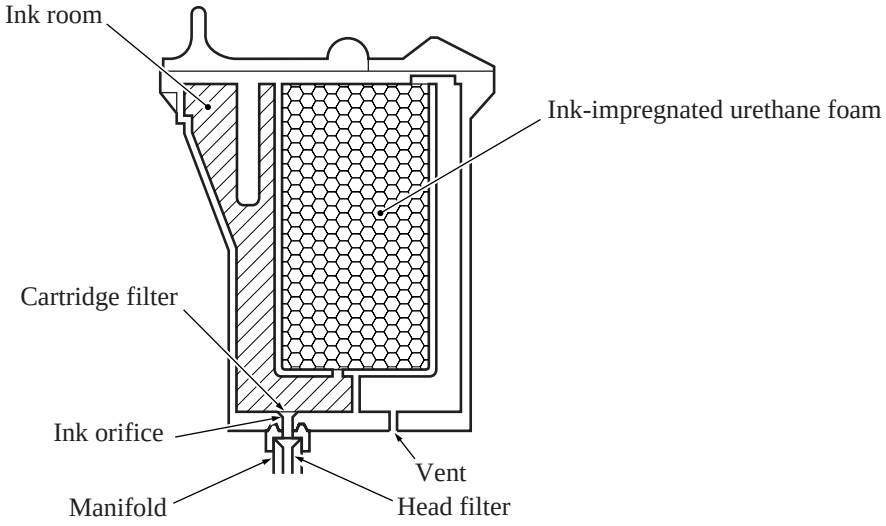
If the voltage is applied again, the piezoelectric ceramic actuator will be distorted again to apply pressure to the ink in the channel, causing the ink to jet out through the nozzle. The jetted-out ink drop will be splashed and produce a dot on paper held by the platen.



As the carriage holding the print head unit travels at the printing speed, the controller sends print command pulses to the piezoelectric actuator driver circuit embedded in the print head unit.

(2) Ink cartridges

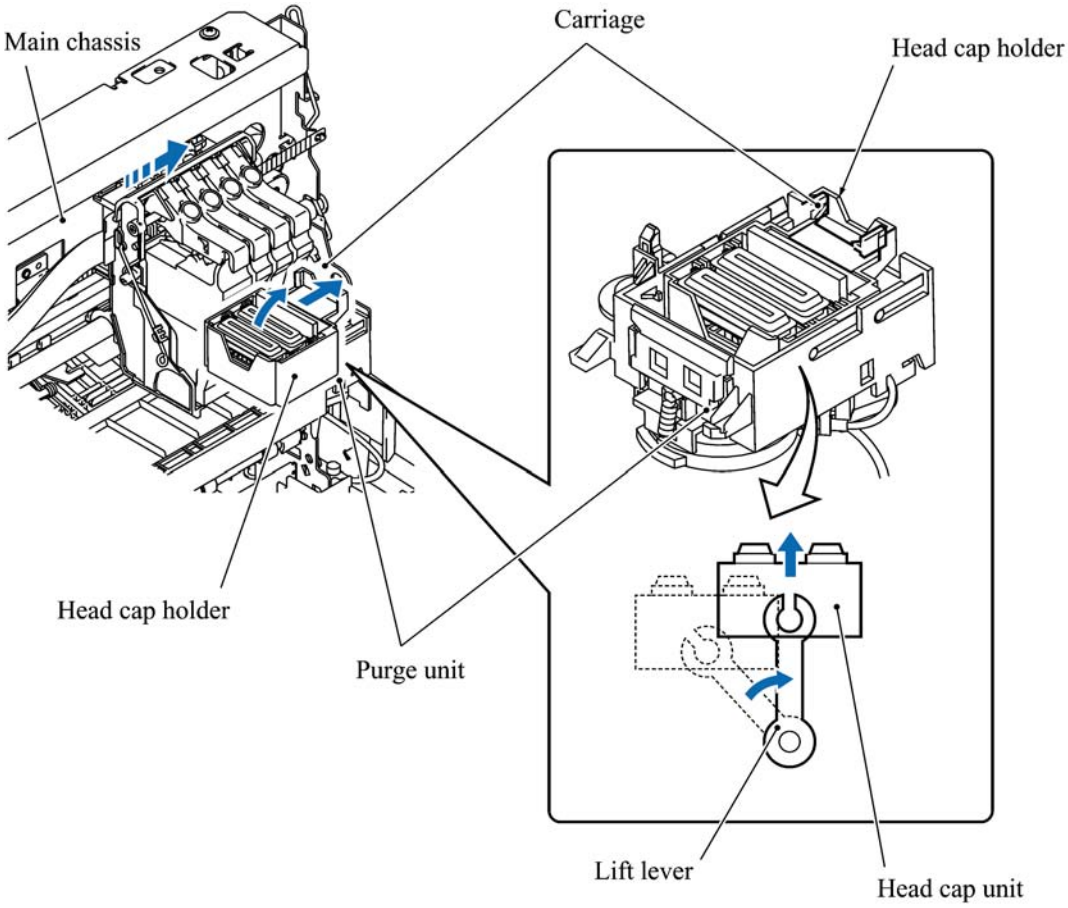
The machine uses four ink cartridges (black, cyan, yellow, and magenta) of disposable type to supply ink to the print head unit. As shown below, an ink cartridge contains an ink-impregnated urethane foam. If ink-jet print operation or purging operation takes place, ink comes out of the urethane foam and is supplied to the print head unit through the ink room, filters, and manifold.



(3) Head caps

Shown below is a head cap mechanism that prevents the nozzles of the print heads from drying up when they are not in use.

Upon completion of printing, the carriage travels to the right and moves the head cap holder provided on the purge unit to the right together. In the head cap holder is a head cap unit which is supported with a lift lever. The rightward movement of the head cap holder turns the lift lever and pushes up the head cap unit to the position where the head caps come into tight contact with the print heads. This way, the nozzles will be capped.



3.2.2.3 Purging mechanism

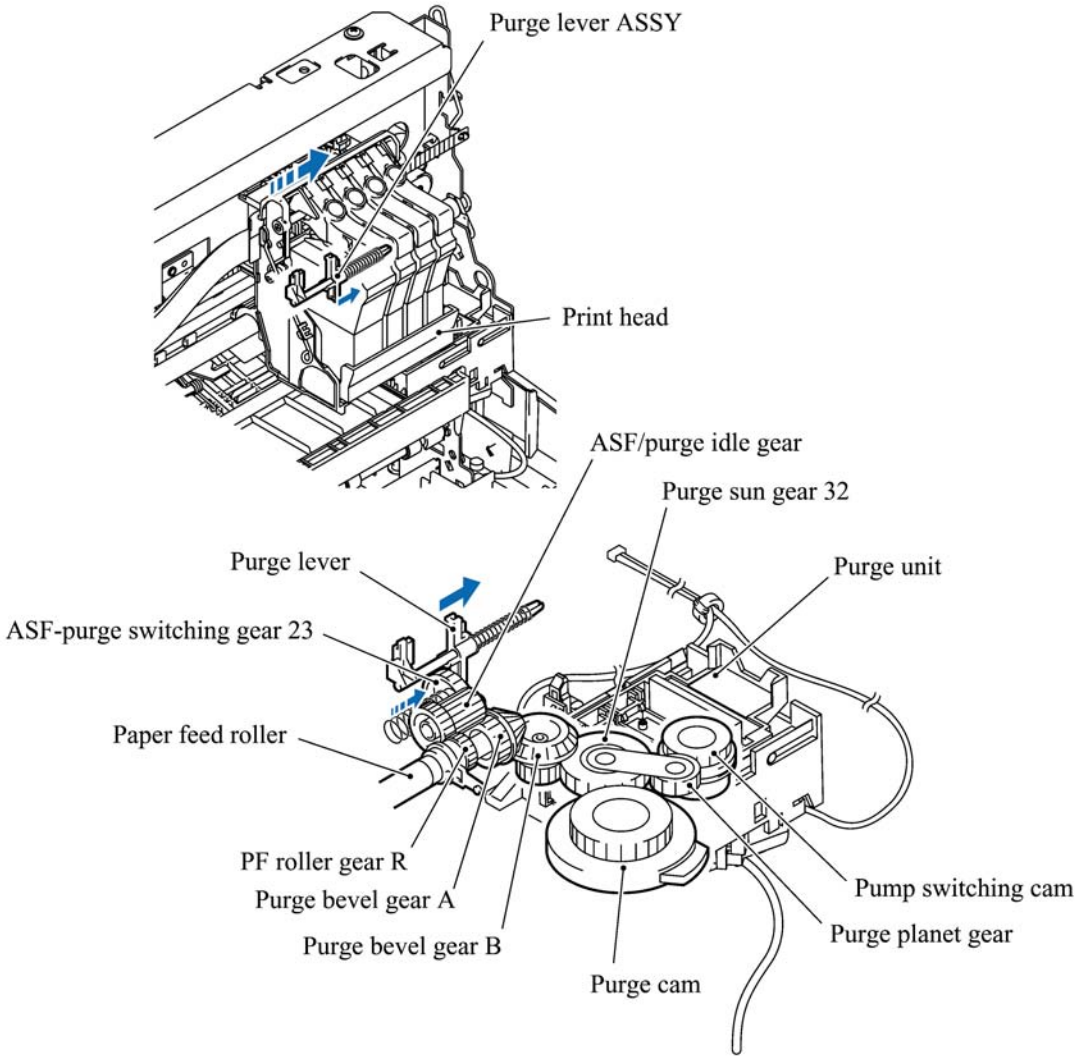
The purge mechanism is driven by the paper feed motor (stepping motor) located at the left side of the main chassis.

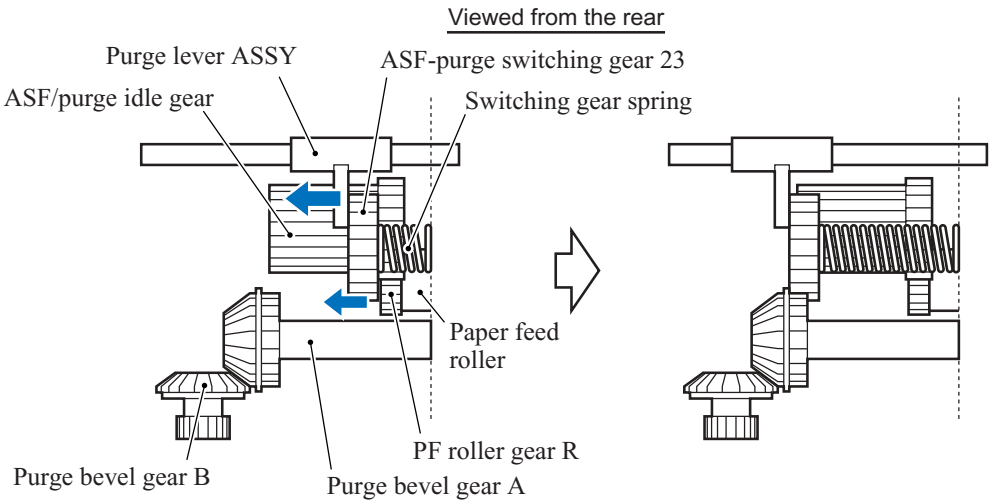
Gear train from the paper feed motor to the purge unit

As described in Section 3.2.2.1, the motor rotation is transmitted to the ASF/purge idle gear at the right side of the main chassis. Engaged with the ASF/purge idle gear, the ASF-purge switching gear 23 works as a clutch gear.

When the carriage travels from the left to right to reach the purge position, the tab provided on the back of the carriage pushes the purge lever on the main chassis to the right (see the illustration below). Accordingly, the ASF-purge switching gear 23 (which was shifted to the left by the purge lever) will move to the right by the switching gear spring so as to become disengaged from the gear 25 and engaged with the purge bevel gear A. (See the illustration given on the next page.) This engagement will transmit the motor rotation to the purge bevel gear B on the purge unit. This way, when the carriage is in the purge position, the motor rotation is transmitted to the purge unit.

On the contrary, if the carriage travels from the purge position to the left, the tab on the back of the carriage releases the purge lever which will be pulled back to the left. The ASF-purge switching gear 23 will be disengaged from the purge bevel gear A.



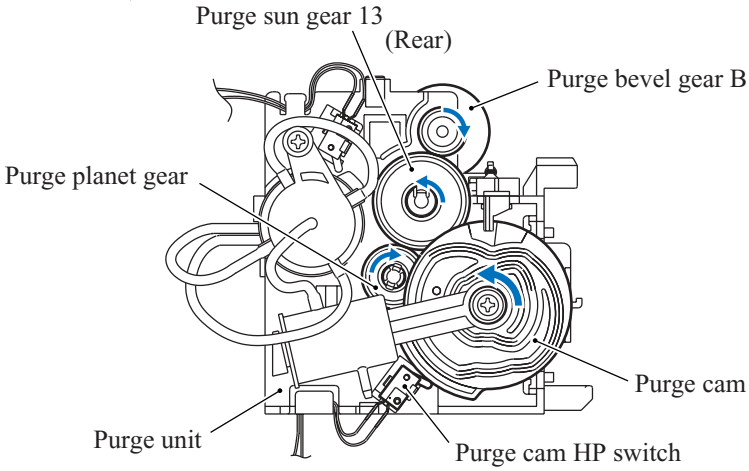


During printing: The ASF-purge switching gear 23 is not engaged with purge bevel gear A (but engaged with gear 25 in the ASF gear train).

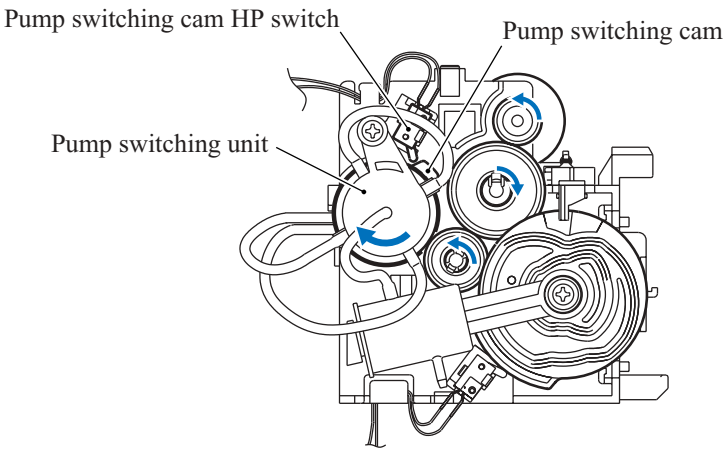
During purging: The ASF-purge switching gear 23 is engaged with purge bevel gear A.

Roles of the purge cam and pump switching cam in the purge unit

When the motor rotation is transmitted to the purge unit, its counterclockwise and clockwise rotations drive the purge cam and the pump switching cam, respectively (when viewed from the output gear of the motor).



When the paper feed motor rotates counterclockwise



When the paper feed motor rotates clockwise

The purge cam is so designed that:

- the carriage lock pops out to lock the carriage before purging and pops in before cleaning with the head wiper (see the illustration below),
- the pump works to draw out ink from each of the four head nozzles and drain it to the ink absorber felts, and
- the head wiper comes out to clean the nozzle surface (see the illustration below).

The pump switching cam is so designed that:

- the pump switching unit switches application of the pump's negative pressure between the four head nozzles in the order of black, cyan, yellow, and magenta nozzles. When the pump switching cam is in the home position, normal atmospheric pressure will be restored.

The home position of the purge cam and pump switching cam are detected by their HP switches. For those switches, refer to Section 3.2.3.

(1) Carriage lock

If the purge cam is driven, the carriage lock of the purge unit pops out and locks the carriage to align ink-jet units with the mating head caps during purge operation. After purging but before cleaning with the head wiper, it pops in to release the carriage. When the power is off, the carriage lock keeps the print heads pressed against the head caps.

(2) Purging

If activated, the pump draws out ink to purge air bubbles or dust from the inside of the head nozzles and channels. As the purge cam rotates by one turn, the piston of the pump reciprocates two strokes. To complete purging of all four nozzles and channels, the purge cam rotates by two turns ad the piston reciprocates four strokes.

(3) Draining

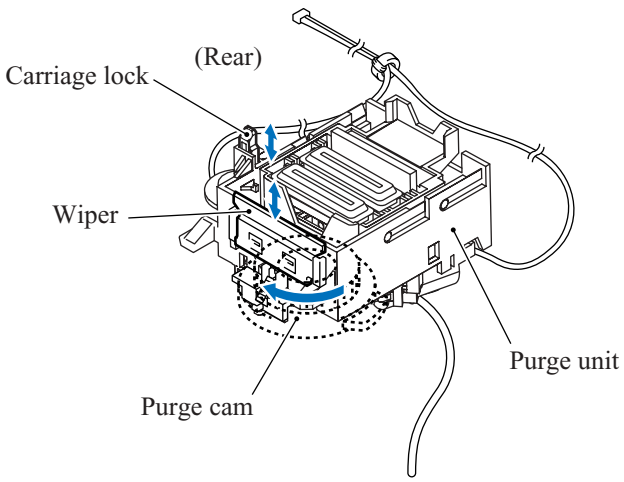
The pump drains drawn ink into the ink absorber felts.

(4) Cleaning with the head wiper

After purging operation, the head wiper comes out and the carriage moves from the right to left so as to clean ink remaining on the heads' surface.

(5) Restoring the pump's pressure to normal atmospheric pressure

When the pump switching cam is in the home position, the controller stops to produce negative pressure and restore the pump's pressure to normal atmospheric pressure.



Purge types, time required, amount of ink used, and purge count

Purge type	Contents	Time required	Amount of ink used	Purge count (See note below.)
Initial purge	This purge is performed automatically when the power is first applied by the user after shipment. It fills the print head unit with ink.	Approx. 4 min	0.56 ±0.12 cc	4
Normal purge	This purge is performed in order to remove any dried up ink that has accumulated around the head nozzles. A normal purge is performed every 10 days or so. (This period varies, depending on the ambient temperature.)	Approx. 1 min 20 sec	0.14 ±0.03 cc	1
Double purge	This purge is performed in order to clean the head nozzles that have been caked with dried up ink (that could not be removed by a normal purge) due to ink viscosity increased because of a long period not in use. A double purge is performed every 60 days or so. (This period varies, depending on the ambient temperature.)	Approx. 2 min	0.28 ±0.06 cc	2
Triple purge	This purge is performed in order to clean the head nozzles that have been caked with dried up ink (that could not be removed by a double purge) due to ink viscosity increased because of a longer period not in use. A triple purge is performed every 90 days or so. (This period varies, depending on the ambient temperature.)	Approx. 4 min	0.42 ±0.09 cc	3
Ink cartridge replacement purge	This purge is performed at the time of ink cartridge replacement. It purges two colors of ink--color of the ink cartridge replaced and the one used in the same print head.	Approx. 2 min	0.42 ±0.09 cc	3
Periodical flushing	A periodical flushing is performed in order to prevent ink around the head nozzles from drying up. It is performed every 2 days or so.	---	0.0061 cc	---

(Note) The machine counts the number of purge operations carried out. If an initial purge is carried out, for example, the counter increments by four. If the counter reaches 2700, the machine displays the MACHINE ERROR 46 and can no longer perform a purge operation. It is necessary to replace the ink absorber box with a new one and reset the purge count according to the steps below.

Resetting the purge count to zero

1) Press the **Menu/Set**, *****, **2**, **8**, **6**, and **4** keys in this order to make the machine enter the maintenance mode.

2) Press the **8** and **0** keys in this order in the initial stage of the maintenance mode to call up the equipment's log information. (Function code 80. Refer to Chapter 7, Section 7.3.18.)
3) Press the **Black Start** key nine times to call up the purge count.
4) Press the **2**, **7**, **8**, and **3** keys in this order to reset the purge count to zero.
5) Press the **Stop/Exit** key to return to the initial stage of the maintenance mode.
6) Press the **9** key twice to return to the standby state.

Volume of ink in the ink cartridges

Ink cartridge type		Volume	Usable ink volume
Black ink cartridge	High volume type	24.5 cc	Approx. 16 cc
	Low volume type	14.8 cc	Approx. 11 cc
Color ink cartridge		10.4 cc	Approx. 8 cc

Service life of ink cartridges

Print condition: 3 pages/day (Black and white print, 5% duty)
Ambient temperature: 5 to 25°C

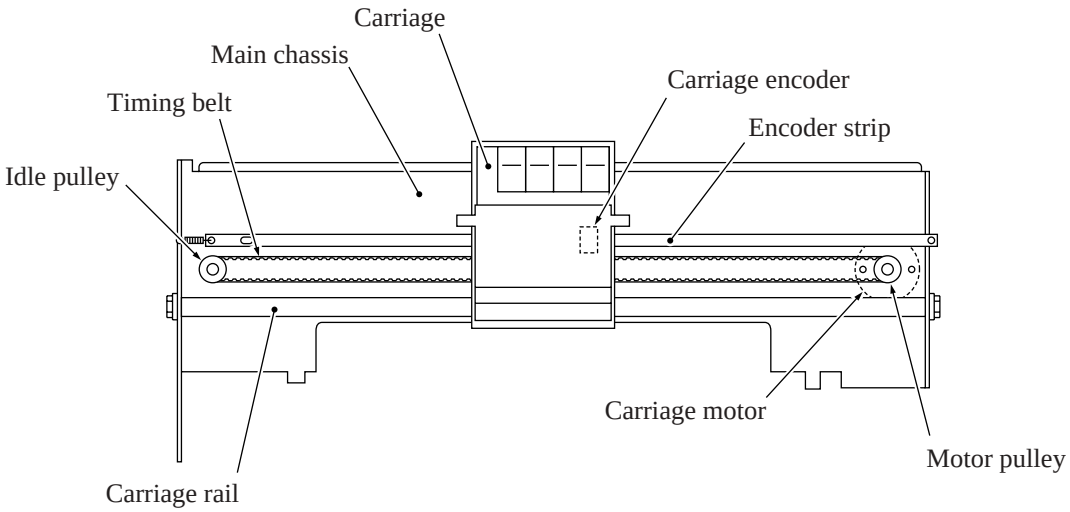
Ink cartridge type		Service life assumed
Black ink cartridge	High volume type	Approx. 15.0 months
	Low volume type	Approx. 10.7 months
Color ink cartridge	Cyan	Approx. 22.6 months
	Yellow/magenta	Approx. 29.5 months

3.2.2.4 Carriage drive mechanism

The carriage motor controls horizontal motion. The motor rotation is transmitted via the motor pulley to the timing belt.

The carriage, which is supported and guided by the carriage rail, is secured to the timing belt. Clockwise and counterclockwise rotations of the carriage motor move the carriage to the right and left, respectively.

On the back of the carriage is the carriage encoder which tells the control circuitry the current carriage position counted based on the carriage home position by using the encoder strip attached to the main chassis.



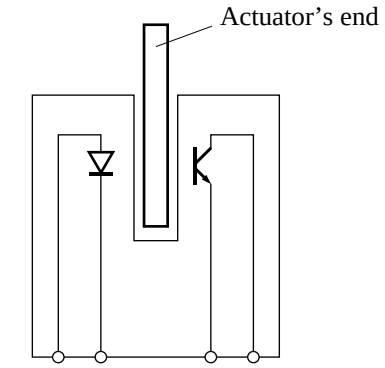
3.2.3 Sensors and Actuators

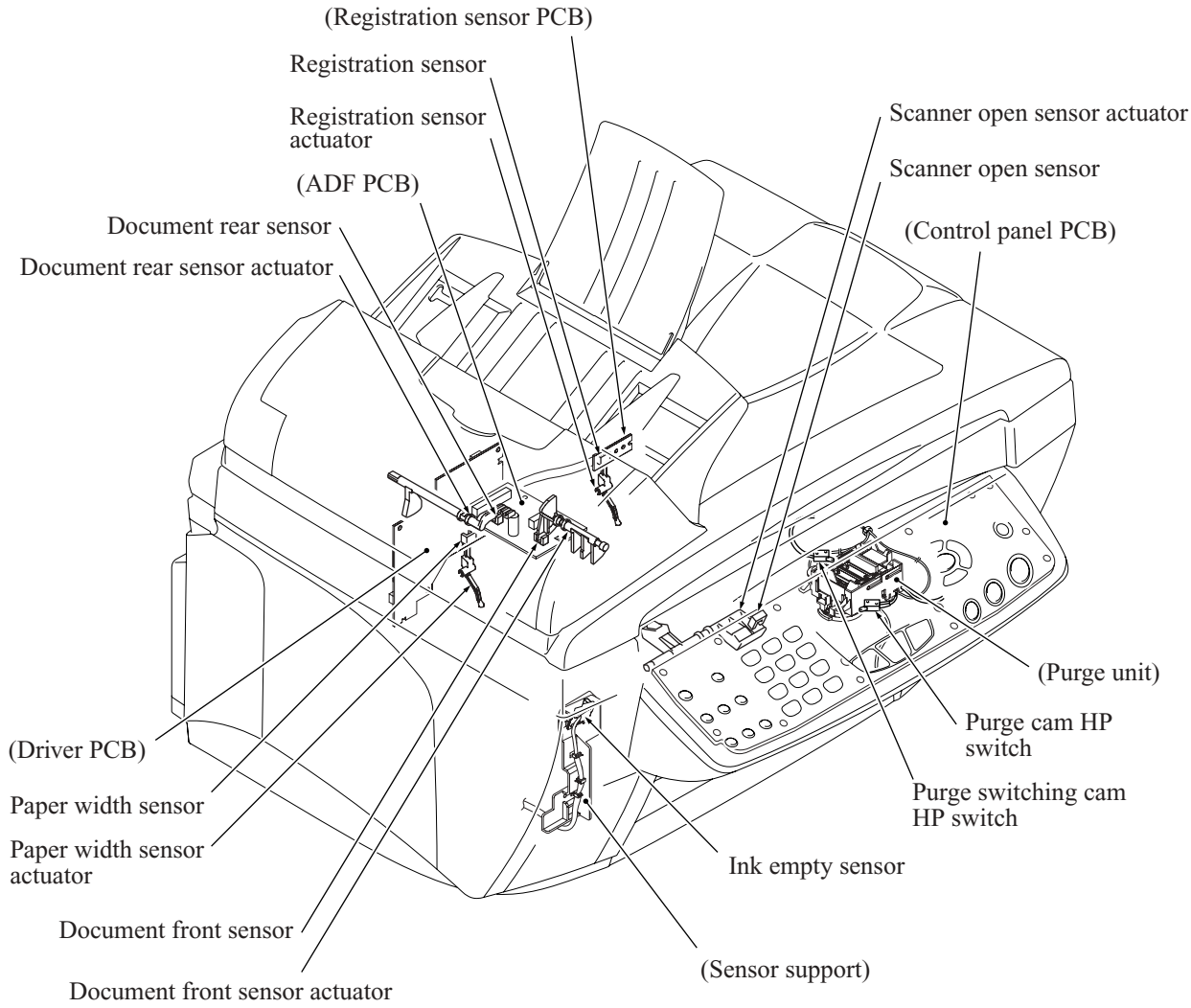
This machine has the following sensors and thermister.

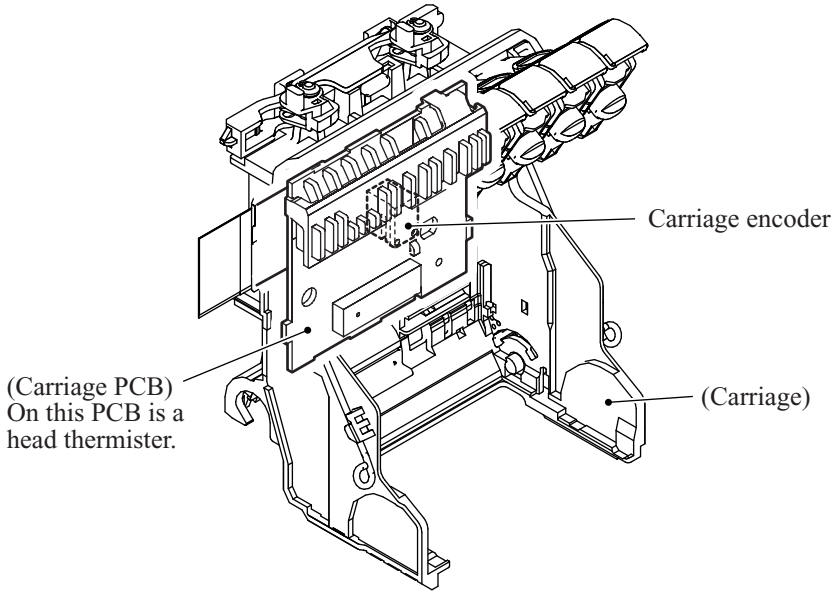
Sensor name	Type	Located on
Document front sensor	Photosensor	ADF PCB
Document rear sensor	Photosensor	
Scanner open sensor	Photosensor	Control panel PCB
Registration sensor	Photosensor	Registration sensor PCB
Paper width sensor	Photosensor	Driver PCB
Ink empty sensor	Photosensor	Sensor support
Carriage encoder	Photosensor	Carriage PCB
Head thermister	Thermister	
Purge cam HP switch	Mechanical switch	Purge unit
Pump switching cam HP switch	Mechanical switch	

- Document front sensor which detects the presence of documents.
- Document rear sensor which detects the leading and trailing edges of pages to tell the control circuitry when the leading edge of a new page has reached the starting position and when the scan for that page is over.
- Scanner open sensor which detects whether the scanner cover is closed.
- Registration sensor which detects the leading and trailing edges of paper, which allows the controller to determine the registration timing and check paper jam.
- Paper width sensor which detects whether the paper width is "A4-size or wider" or "narrower than A4-size."
- Ink empty sensor which detects at the start of printing whether any of the four ink cartridges is near empty. According to this sensor signal, the controller may display "NEAR EMPTY XXX" message.
- Carriage encoder which detects the current carriage position and carriage travel speed. If the carriage travels speed varies abnormally, the controller regards it as a paper jam.
- Head thermister which allows the controller to control the temperature of the print heads. According to the change of the thermister's internal resistance monitored, the control circuitry regulates the drive voltage applied to the piezoelectric ceramic actuators on each print head since the viscosity of the ink varies depending upon the temperature.
- Purge cam HP switch which detects whether the purge cam is in the home position.
- Pump switching cam HP switch which detects whether the pump switching cam is in the home position.

These photosensors (except the ink empty sensor that is a reflection type) are a photointerrupter consisting of a light-emitting diode and a light-sensitive transistor. Each of them has an actuator separately arranged as shown on the next page.





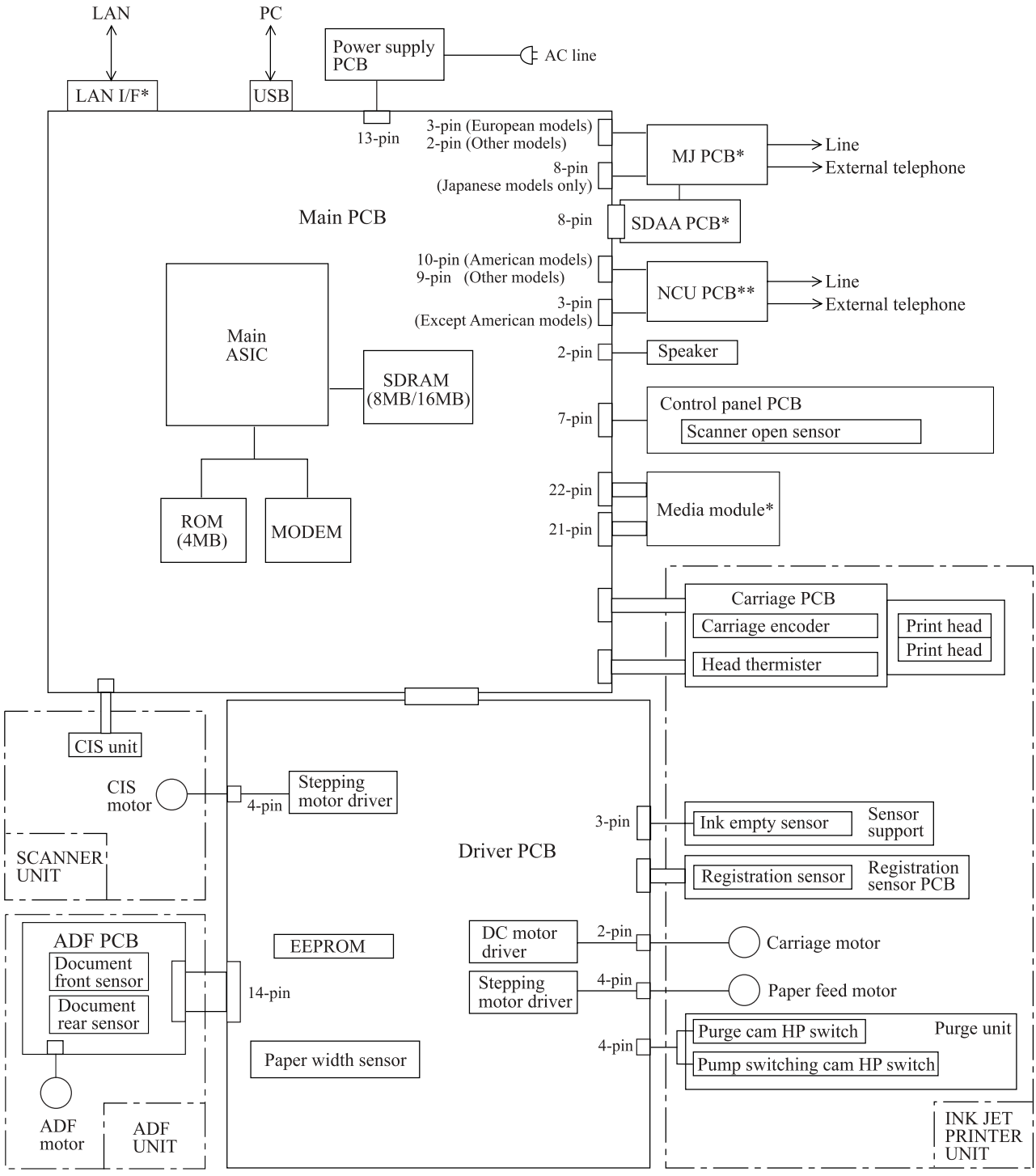


Location of Sensors and Actuators

3.3 CONTROL ELECTRONICS

3.3.1 Configuration

The hardware configuration of the facsimile machine is shown below.



Configuration of Facsimile Machine

* MFC3820CN only
** MFC3420C only

CHAPTER 4

DISASSEMBLY/REASSEMBLY AND LUBRICATION

CHAPTER 4 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 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.

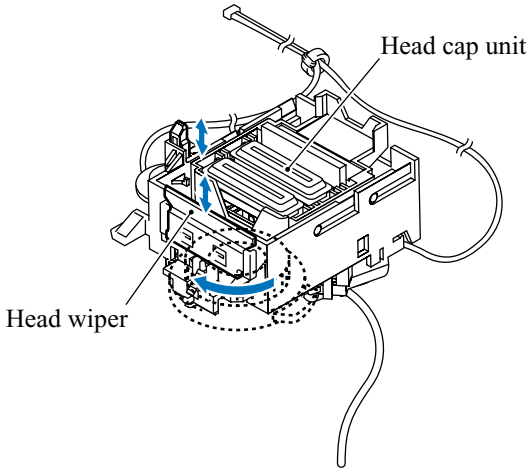
CONTENTS

4.1 DISASSEMBLY/REASSEMBLY

■ Safety Precautions

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

(1) If you unpack the package sent from the user, first check that the top edge of the head wiper is flush with that of the head cap unit before turning on the machine. If the head wiper protrudes or is out of place, lightly pull the head wiper up and towards the head cap unit to retract it.



(2) Unplug the power cord from the power outlet before replacing parts or units. When having access to the power supply, be sure to unplug the power cord from the power outlet.

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

(4) Do not remove gears from the document feed roller 1 (shown on page 4-14) or document ejection roller (shown on page 4-20) if at all possible. Once removed, they will become unusable and new gears will have to be put back in.

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

(6) Before handling the PCBs, touch a metal portion of the machine to discharge static electricity; otherwise, the electronic parts may be damaged due to the electricity charged in your body.

(7) When transporting PCBs, be sure to wrap them in conductive sheets such as aluminum foil.

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

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

(10) When connecting or disconnecting cable connectors, hold the connector bodies not the cables. 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 4.3 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) Once the print head unit prints, it will start head locking operation after five seconds from the end of printing. The head locking operation will take 5 to 10 seconds. NEVER unplug the power cord before the machine completes the head locking operation; doing so will make the print head unit unusable and require replacement with a new print head unit.

When you receive the machine from the user or when you pack it for sending it back to the user, check the head locking state.

Tightening Torque List

Location	Screw type	Q'ty	Tightening torque N•m (kgf•cm)	
ADF parts	Taptite, B M3x6	1	0.39 ±0.10	(4 ±1)
Upper ADF chute	Taptite, cup B M3x10	2	0.69 ±0.10	(7 ±1)
Grounding wire (ADF PCB)	Taptite, cup S M3x6	1	0.69 ±0.10	(7 ±1)
Lower ADF chute	Taptite, cup B M3x10	2	0.69 ±0.10	(7 ±1)
ADF drive unit	Taptite, cup B M3x10	2	0.69 ±0.10	(7 ±1)
ADF motor	Screw, pan (s/p washer) M3x6	1	0.69 ±0.10	(7 ±1)
Rear cover	Taptite, bind B M4x12	2	0.78 ±0.10	(8 ±1)
Document cover (Hinge arm)	Taptite, bind B M4x12	1	0.98 ±0.10	(10 ±1)
(Hinge L)	Taptite, bind B M4x12	1	0.98 ±0.10	(10 ±1)
Hinge arm	Taptite, bind B M4x12	3	0.98 ±0.10	(10 ±1)
Hinge L	Taptite, bind B M4x12	3	0.98 ±0.10	(10 ±1)
Hinge stoppers	Taptite, cup B M3x10	2	0.69 ±0.10	(7 ±1)
Scanner hinge R	Taptite, bind B M4x12	4	0.78 ±0.10	(8 ±1)
Scanner hinge L	Taptite, bind B M4x12	4	0.78 ±0.10	(8 ±1)
Scanner cover (Scanner hinge R)	Taptite, bind B M4x12	3	0.98 ±0.10	(10 ±1)
(Scanner hinge L)	Taptite, bind B M4x12	3	0.98 ±0.10	(10 ±1)
Control panel ASSY	Taptite, cup B M3x10	2	0.69 ±0.10	(7 ±1)
Control panel PCB	Taptite, cup B M3x8	10	0.49 ±0.10	(5 ±1)
Grounding wire	Screw, pan (s/p washer) M3x6	1	0.59 ±0.10	(6 ±1)
Main cover	Taptite, bind B M4x12	3	0.78 ±0.10	(8 ±1)
	Taptite, cup B M3x10	1	0.59 ±0.10	(6 ±1)
Coating clip	Taptite, cup B M3x10	1	0.69 ±0.10	(7 ±1)
Main PCB shield bracket	Taptite, cup S M3x6	2	0.78 ±0.10	(8 ±1)
	Taptite, cup S M3x6 (MFC3820CN)	2	0.39 ±0.05	(4 ±0.5)
	Taptite, cup S M3x6 (MFC3420C)	1	0.59 ±0.10	(6 ±1)
Main PCB shield frame	Taptite, cup S M3x6 (MFC3820CN)	2	0.78 ±0.10	(8 ±1)
	Taptite, cup S M3x6 (MFC3820CN)	1	0.39 ±0.05	(4 ±0.5)
	Taptite, cup B M3x10 (MFC3420C)	1	0.59 ±0.10	(6 ±1)
	Taptite, cup S M3x6 (MFC3420C)	1	0.59 ±0.10	(6 ±1)
	Taptite, cup S M3x6 (MFC3420C)	1	0.78 ±0.10	(8 ±1)
SDAA shield	Taptite, cup S M3x6 (MFC3820CN)	1	0.59 ±0.10	(6 ±1)
SDAA PCB	Taptite, cup S M3x4 (MFC3820CN)	2	0.59 ±0.10	(6 ±1)
Main PCB	Taptite, cup S M3x6 (MFC3820CN)	6	0.59 ±0.10	(6 ±1)
	Taptite, cup S M3x6 (MFC3420C)	4	0.59 ±0.10	(6 ±1)
USB connector	Screw, pan M3x6 (MFC3820CN)	1	0.39 ±0.05	(4 ±0.5)
ASF	Taptite, cup S M3x6	4	0.78 ±0.10	(8 ±1)
Bank ASSY	Screw, bind B M3x10	2	0.39 ±0.10	(4 ±1)
Driver PCB	Taptite, cup S M3x6	4	0.78 ±0.10	(8 ±1)
Registration sensor PCB	Taptite, cup S M3x6	1	0.78 ±0.10	(8 ±1)

Location	Screw type	Q'ty	Tightening torque N•m (kgf•cm)	
Rear support plate	Taptite, cup S M3x6	1	0.78 ±0.10	(8 ±1)
	Taptite, cup B M3x10	1	0.59 ±0.10	(6 ±1)
NCU/PS shield box	Taptite, cup S M3x6	2	0.69 ±0.10	(7 ±1)
Upper NCU/PS shield	Taptite, cup S M3x6	2	0.69 ±0.10	(7 ±1)
Power supply PCB	Taptite, cup S M3x6	4	0.69 ±0.10	(7 ±1)
Grounding wire	Screw, pan (washer) M4x8DB	1	0.69 ±0.10	(7 ±1)
MJ PCB (MFC3820CN)	Taptite, cup S M3x6	1	0.69 ±0.10	(7 ±1)
NCU PCB (MFC3420C)	Taptite, cup S M3x6	2	0.69 ±0.10	(7 ±1)
RH support plate	Taptite, cup S M3x6	1	0.78 ±0.10	(8 ±1)
	Taptite, cup B M4x12	2	0.98 ±0.10	(10 ±1)
Purge unit	Taptite, cup B M3x8	2	0.59 ±0.10	(6 ±1)
Idle pulley holder	Screw, pan (s/p washer) M3x6	1	0.69 ±0.10	(7 ±1)
Star wheel support	Taptite, pan B M3x10	2	0.59 ±0.10	(6 ±1)
Sensor support	Taptite, cup S M3x6	1	0.78 ±0.10	(8 ±1)
Carriage motor	Screw, pan (s/p washer) M3x6	2	0.69 ±0.10	(7 ±1)
Main chassis	Screw, bind B tite M4x12	5	0.78 ±0.10	(8 ±1)
Paper feed motor	Screw, bind M3x6	3	0.69 ±0.10	(7 ±1)
Ink absorber box	Taptite, cup B M3x10	1	0.59 ±0.10	(6 ±1)

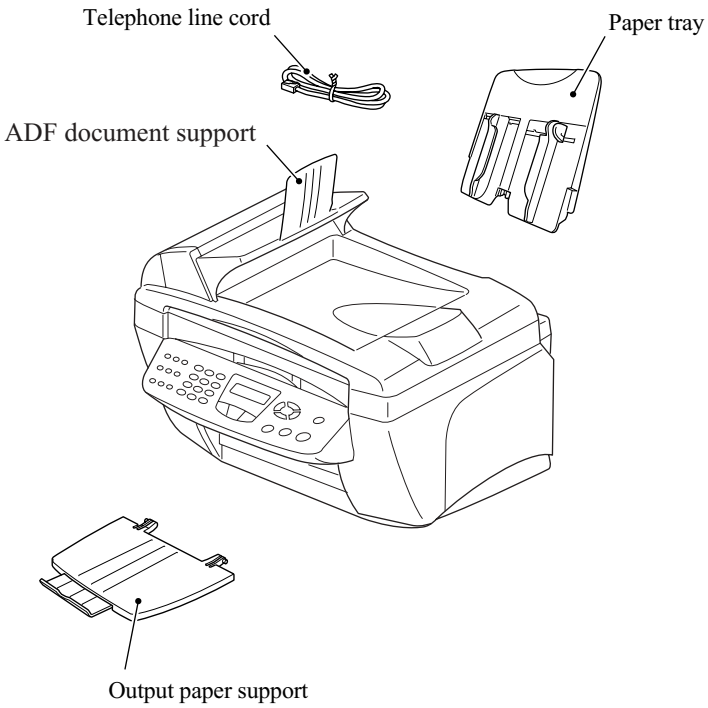
■ Preparation

Prior to proceeding to the disassembly procedure,

(1) Unplug
- the modular jack of the telephone line,
- the PC interface cable if connected (Not shown below), and
- the modular jack of an external telephone set if connected (Not shown below).

(2) Remove
- the ADF document support,
- the paper tray, and
- the output paper support.

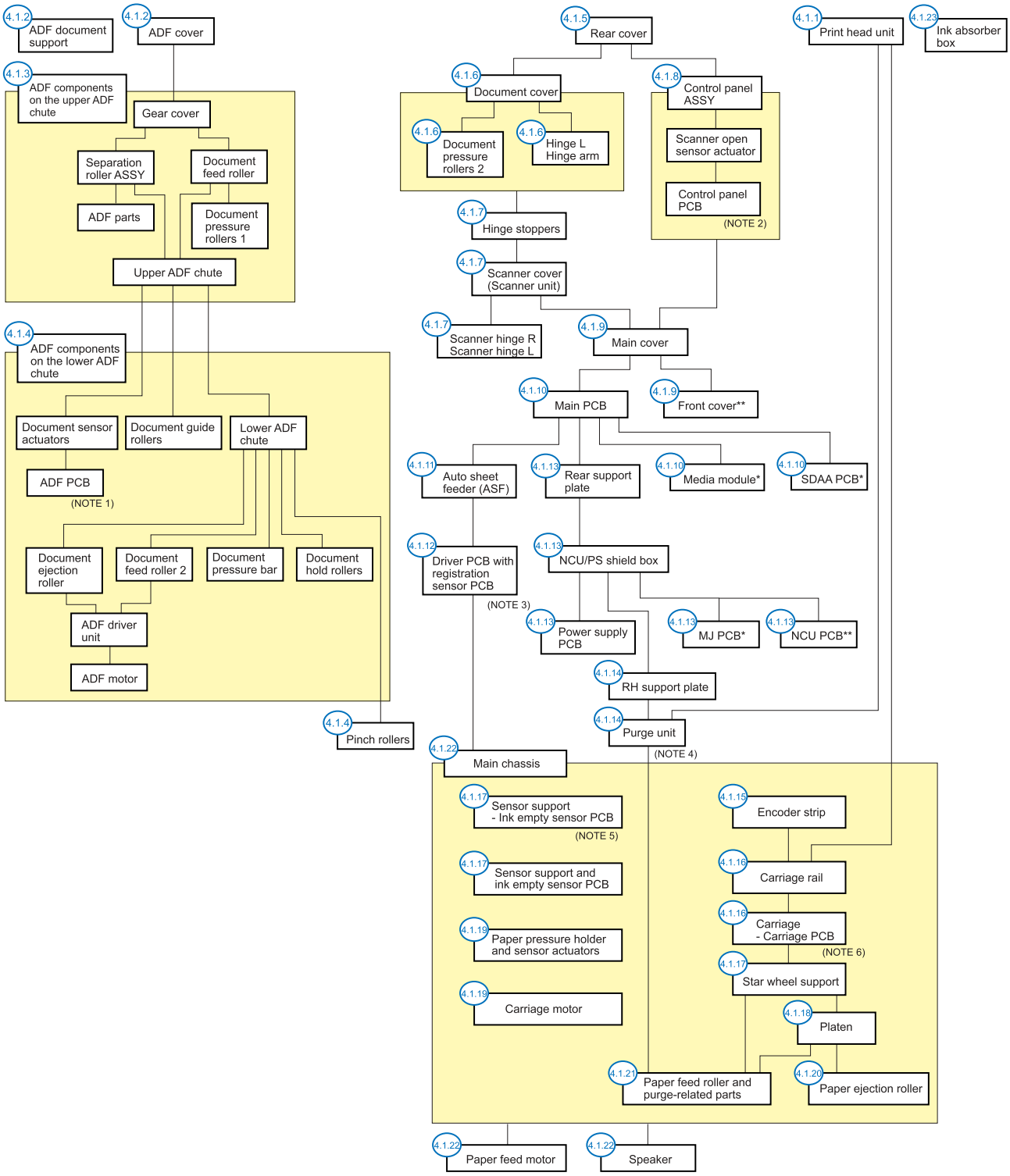
NOTE: Do not remove the ink cartridges when disassembling the machine except when removing the print head unit.



■ How to Access the Object Component

- On the next page is a disassembly order flow which helps you access the object components. To remove the driver PCB, for example, first find it on the flow and learn its number (4.1.12 in this case). You need to remove parts numbered, 4.1.5, 4.1.6, 4.1.7, 4.1.8, 4.1.9, 4.1.10 and 4.1.11 so as to access the driver PCB.
- Unless otherwise specified, the disassembled parts or components should be reassembled in the reverse order of removal.

■ Disassembly Order Flow



* MFC3820CN only
** MFC3420C only

(NOTE 1) On the ADF PCB are a document front sensor and document rear sensor.
(NOTE 2) On the control panel PCB is a scanner open sensor.
(NOTE 3) On the driver PCB and registration sensor PCB are a paper width sensor and registration sensor, respectively.
(NOTE 4) On the purge unit are a purge cam HP switch and pump switching cam HP switch.
(NOTE 5) On the sensor support is an ink empty sensor.
(NOTE 6) On the carriage PCB is a carriage encoder.

4.1.1 Print Head Unit

During disassembly jobs (except when removing the purge unit, carriage rail, or carriage), the print head unit and all the four ink cartridges should be kept in place.

NOTE: To replace the print head unit, you need to move the carriage to the ink replacement position by placing the machine in the ink replacement mode. Do not move the carriage by hand when the power is off.

NOTE: If you replace the print head unit, replace also the ink absorber box and ink cartridges with new ones.

Removal procedure

(1) Plug the power cord into a wall socket.

(2) Press the **Ink** key to place the machine in the ink replacement mode.

(3) Press the **2** key to choose "2. REPLACE INK."

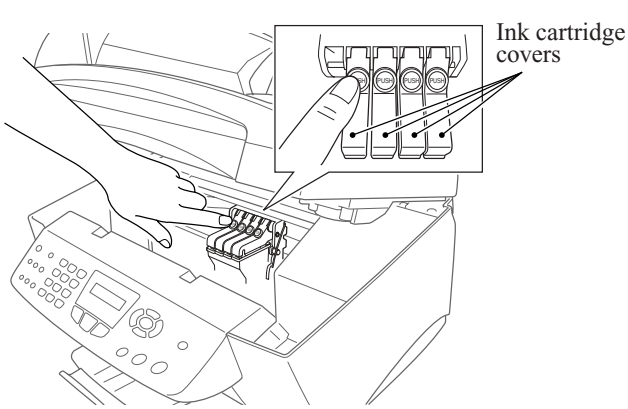
(4) Press the **Menu/Set** key.

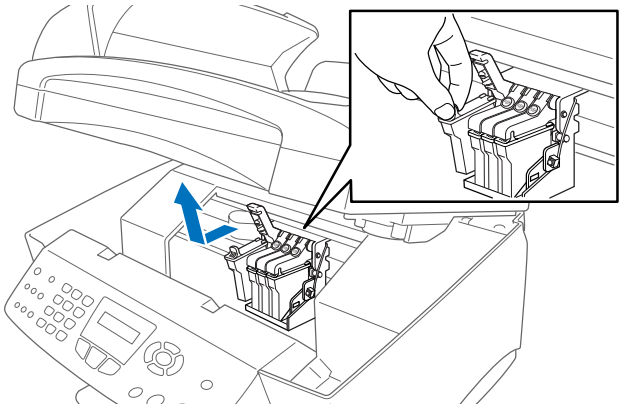
The carriage automatically moves left to the ink replacement position.

(5) Unplug the power cord from the wall socket.

(6) Open the scanner cover (scanner unit).

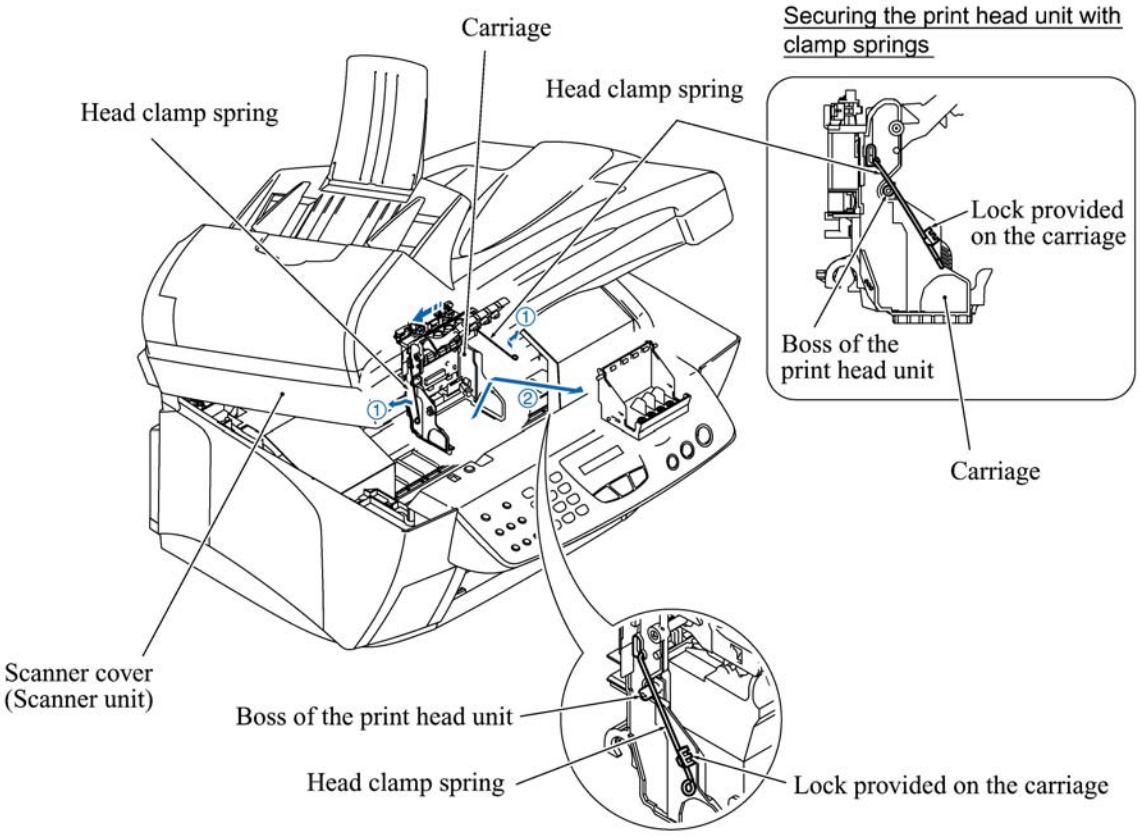
(7) Push the colored ink cartridge covers and remove all ink cartridges. (Or, remove the shipping cover.)





(8) Pull the head clamp springs in the direction of arrows ① shown below to release the print head unit.

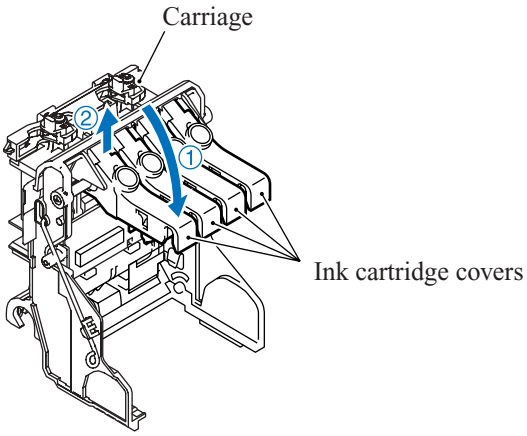
(9) Lift the print head unit up and out of the carriage (arrow ②).



NOTE: Do not touch the printing ends (nozzles) of the print head unit or the ink orifices of the ink cartridges; doing so will not only stain your hands with ink but result in an ink jet-out failure. Once you touch them, clean them with a dedicated cleaning stick and liquid.

NOTE: Do not touch the dimple contact section of the print head unit.

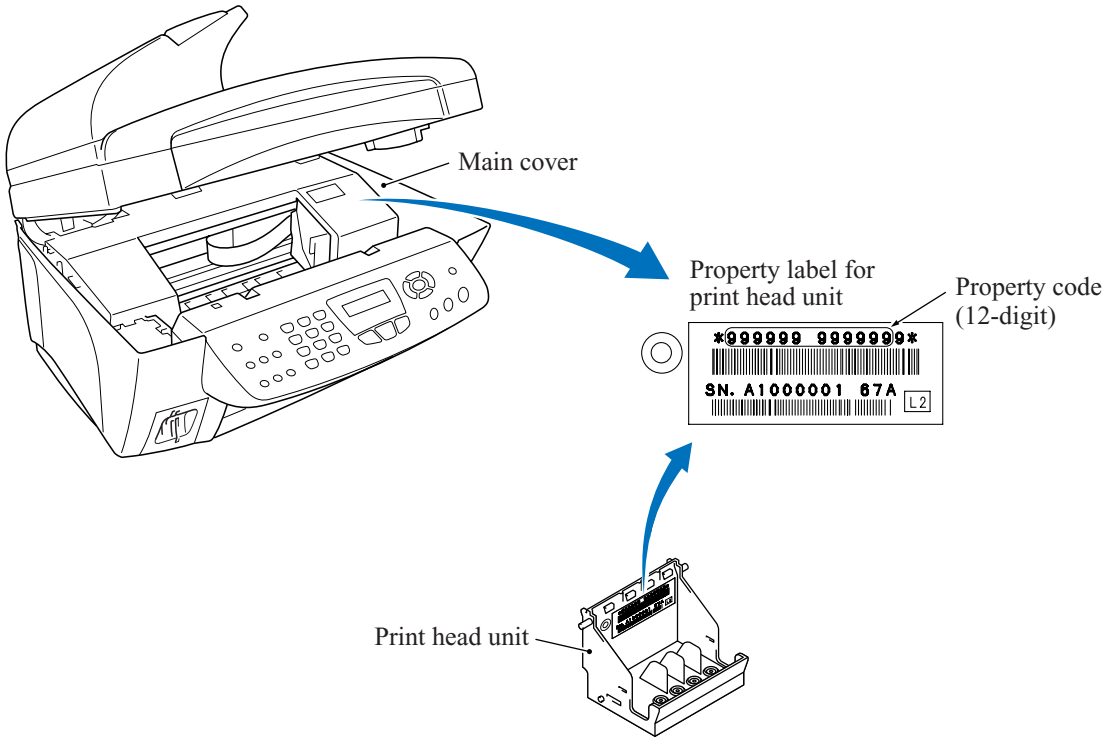
NOTE: Once the ink cartridges are removed, their colored covers rise upright. If you turn the machine upside down with those covers being upright, then they will break. To prevent it, set them to the horizontal position by turning them in the direction of arrow ① and pushing them up in the direction of arrow ②.



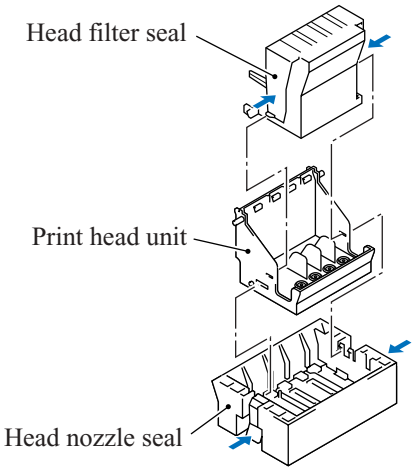
(10) Each print head is assigned a property code that represents the properties unique to that head unit. A property label, on which the property code is printed, is attached to the head unit itself and the top right of the main cover.

If you remove the print head unit and store it separately from the machine, remove the property label from the main cover and store it together with the print head unit.

If you replace the print head unit with a new one, attach the property label that comes with the new print head unit to the top right of the main cover.

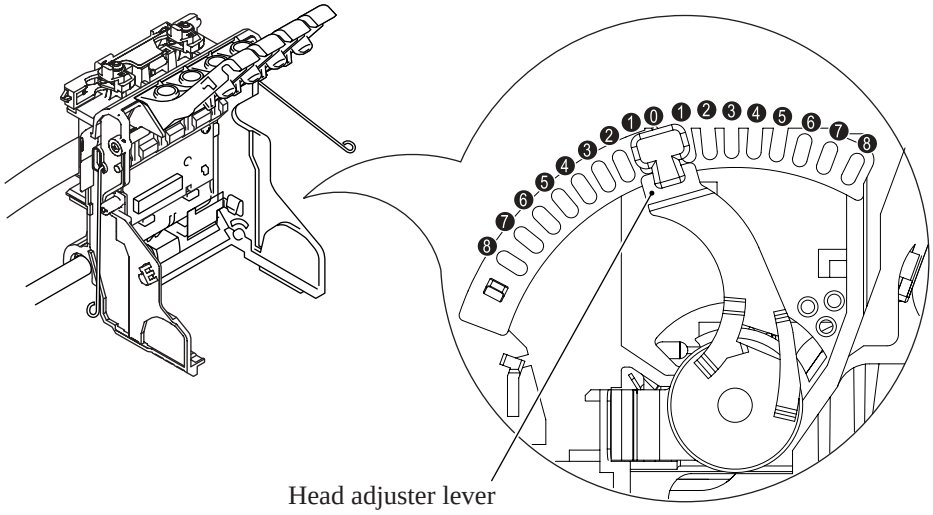


NOTE: Be sure to put a head nozzle seal and filter seal on the print head unit as shown below. Leaving the print head unit without those seals will dry up its printing ends and filters, resulting in a damaged head.



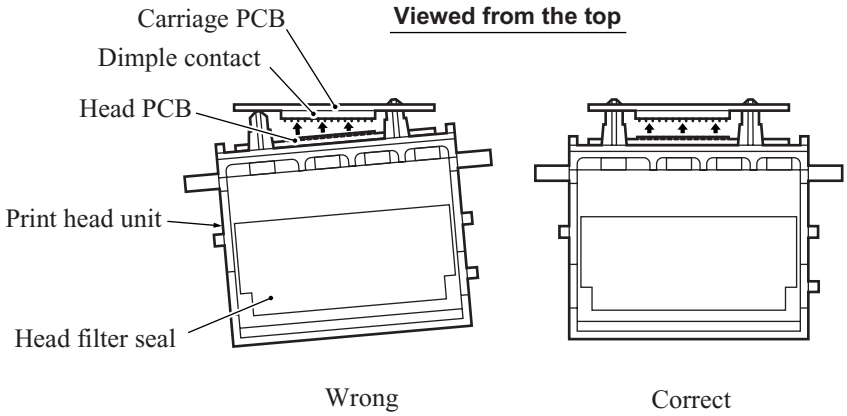
Installation procedure

(11) Turn the head adjuster lever located on the right side of the carriage to position 0.



(12) To install a new (or removed) print head unit, remove the head nozzle seal.

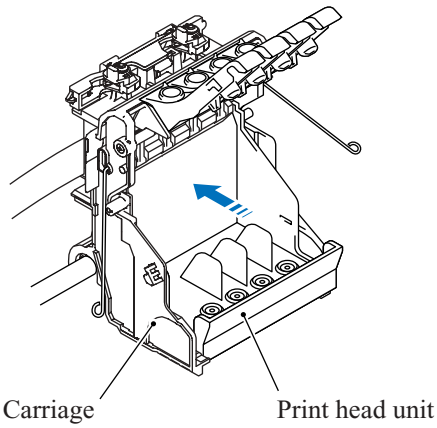
(13) Put the print head unit into the carriage with care for the dimple contact so that the electrical contact on the head PCB comes into uniform contact with that on the carriage PCB as illustrated below.



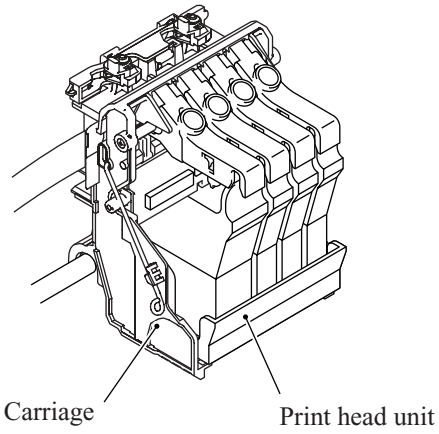
(14) Press the front center of the carriage to the rear and move the print head unit to the right and left several times. This is to assure the dimple contact between the head PCB and carriage PCB.

(15) Remove the head filter seal.

(16) While pressing the center of the print head unit as shown above, lock the print head unit with the head clamp springs.



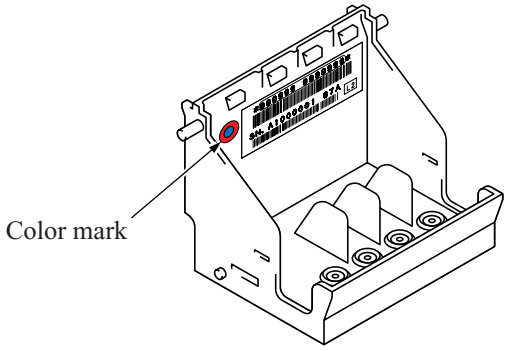
(17) Set new ink cartridges into the carriage.



(18) Close the scanner cover (scanner unit).

■ Reassembling Notes

- Each of the print head unit, paper feed roller, and paper ejection roller has a color marking (red or blue) that allows you to check the compatibility between them. Note that a new print head (and paper ejection roller) to be provided as a spare part has a red & blue marking as shown below, meaning that it is compatible with a paper feed roller and paper ejection roller having either color marking.

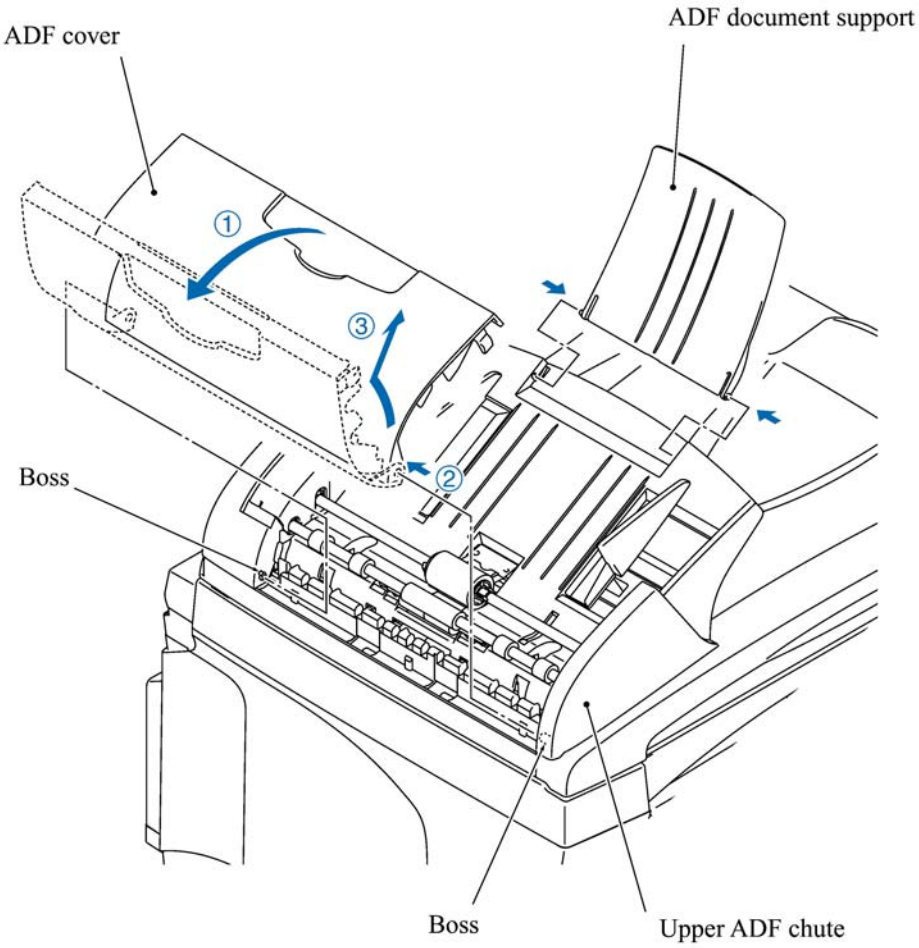


- If you replace the print head unit, you need to perform the following while referring to Chapter 5, Section 5.2.
  - Head cleaning (Priming ink)
  - Updating the head property information stored in the EEPROM on the driver PCB (Function code 68)
  - Correcting the head positioning error
  - Updating the paper feeding correction value (Function code 66)
  - Adjusting the alignment of vertical print lines (Function code 65)

4.1.2 ADF Document Support and ADF Cover

(1) Remove the ADF document support.

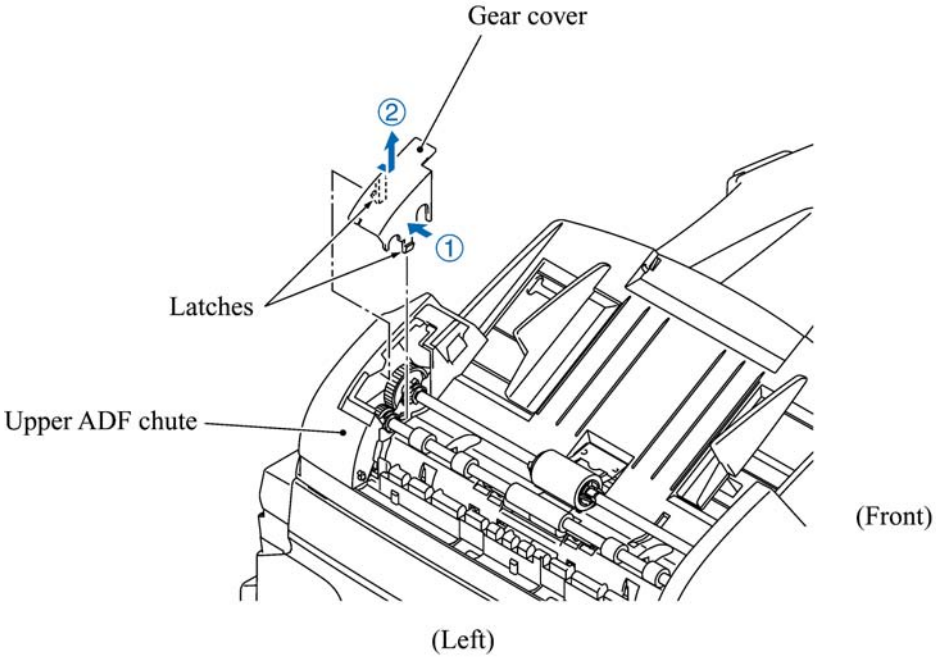
(2) Open the ADF cover, press its front end to release it from the boss provided on the upper ADF chute, and take it off (in the direction of arrows ①, ②, and ③).



4.1.3 ADF Components on the Upper ADF Chute

Gear cover

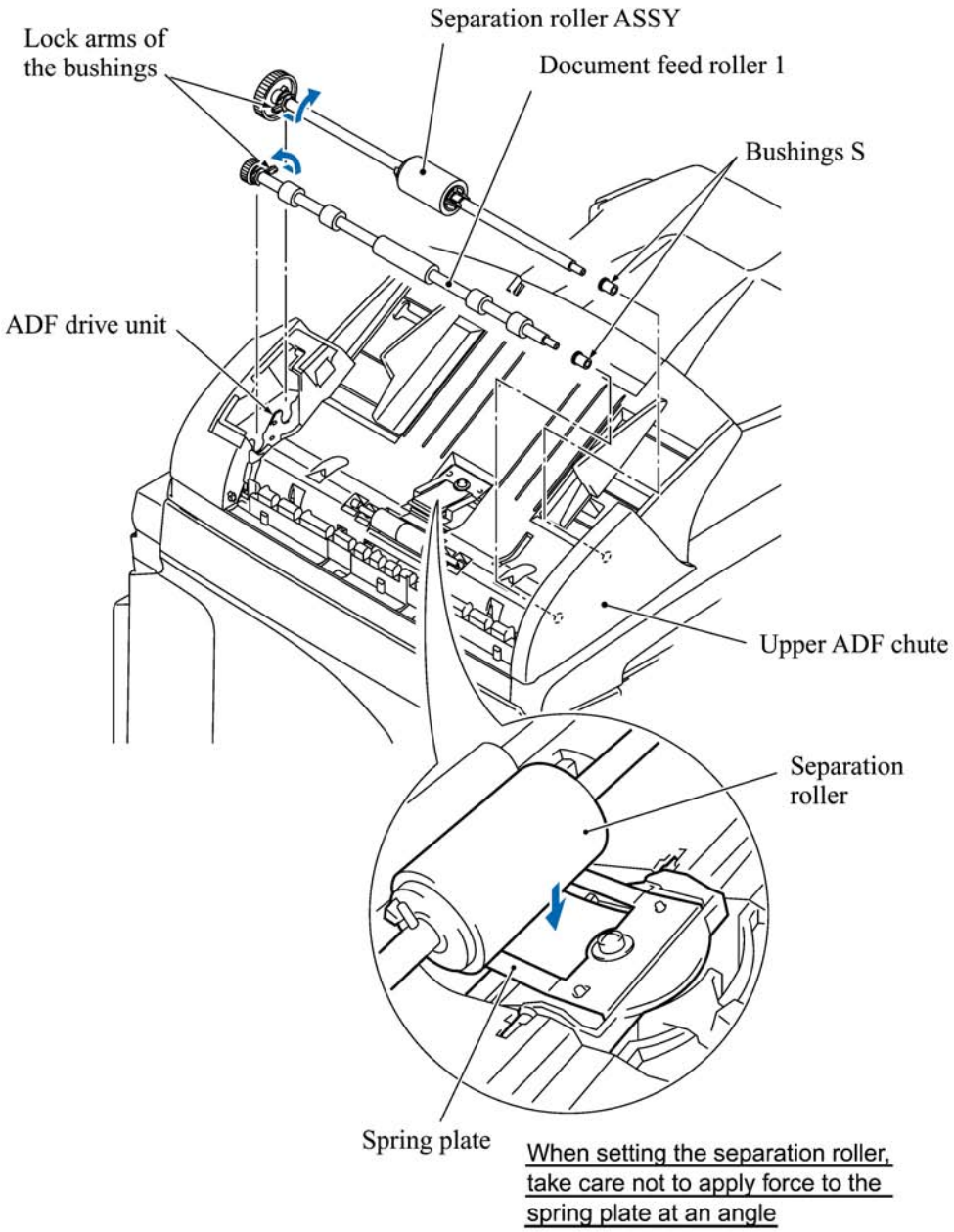
(1) As illustrated below, push up the front side of the gear cover (arrow ①) with your thumb to unlatch and remove the gear cover (arrow ②).



Separation roller ASSY and document feed roller

(2) At the rear end of each of the separation roller ASSY and document feed roller 1, release the lock arm on the bushing from the hole provided in the ADF drive unit and turn it up, using a flat screwdriver. Remove the separation roller ASSY and document feed roller 1 together with bushing S each.

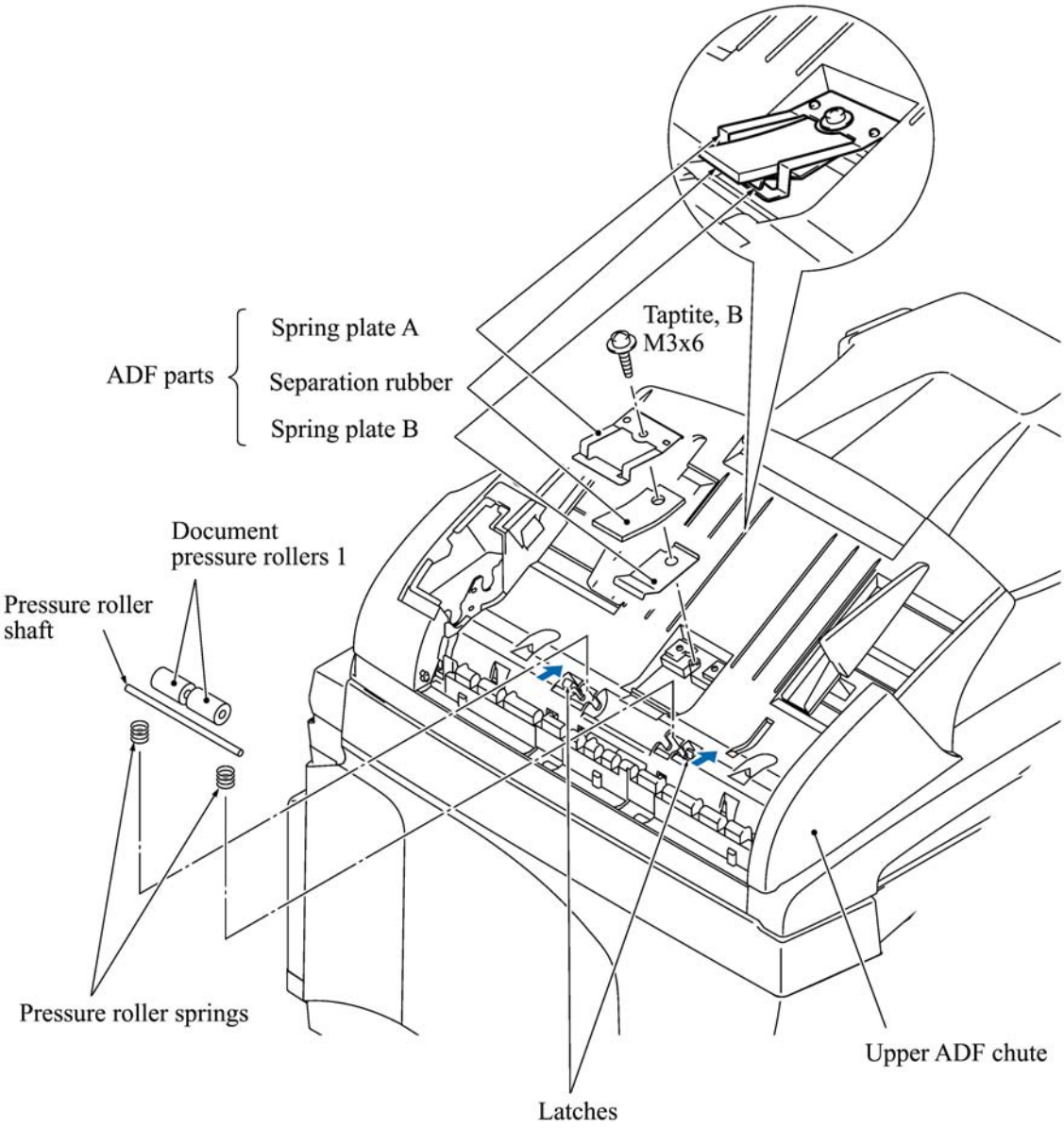
NOTE: Take care not to drop bushings S.



ADF parts and document pressure rollers 1

(3) Remove the screw and take the ADF parts (separation rubber and spring plates) out of the upper ADF chute.

(4) At either end of the pressure roller shaft, press the latch to the right and remove the document pressure rollers 1 and their shaft. Then remove their springs.



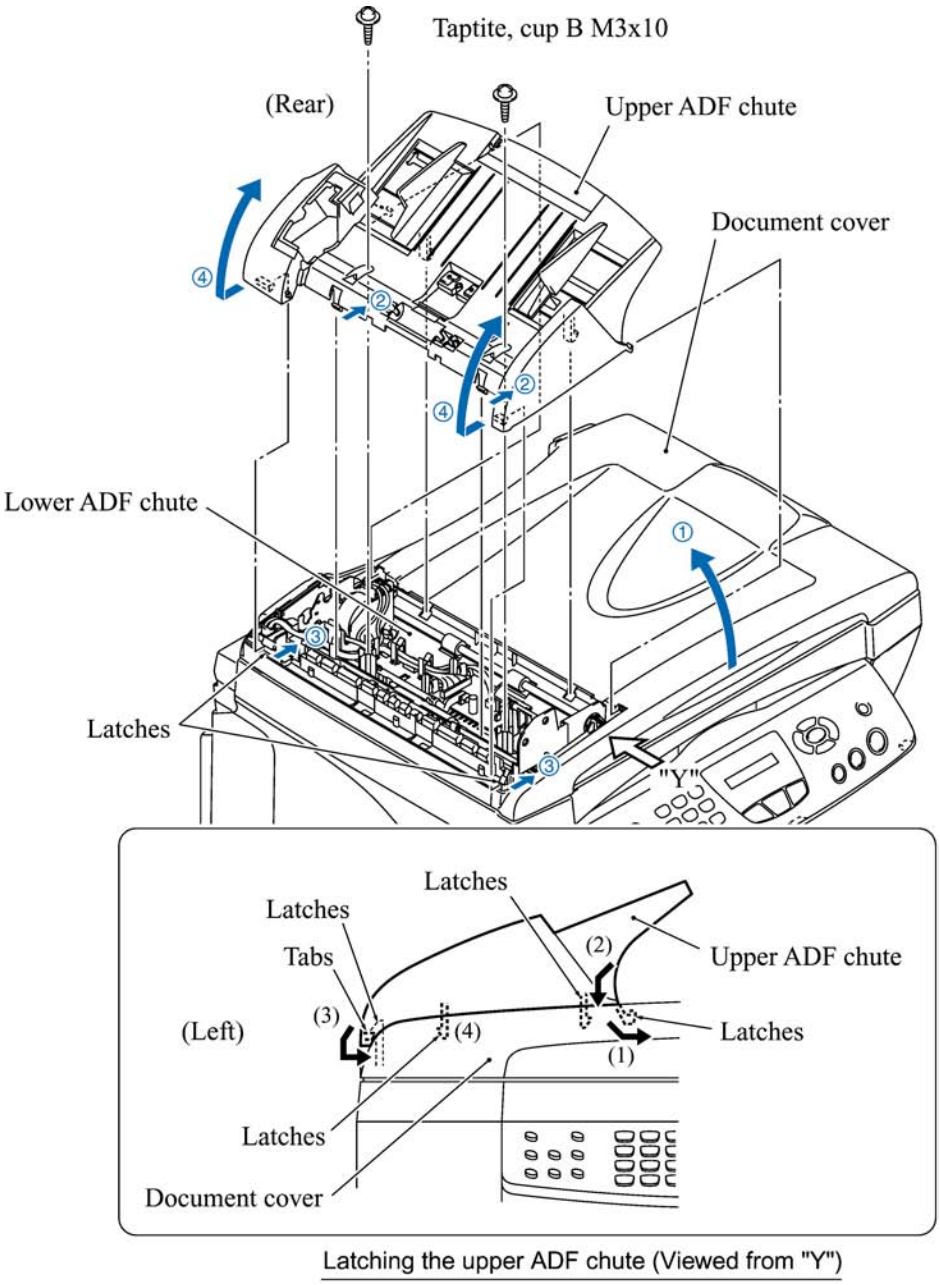
Upper ADF chute

(5) Remove the two screws from the upper ADF chute.

(6) Open the document cover (①).

(7) While pulling up the front end of the upper ADF chute, release two latches (②) on the upper ADF chute and two latches (③) on the document cover, which can be accessed from the top and underside of the document cover, respectively, with a flat screwdriver.

Remove the upper ADF chute in the direction of arrow (④).



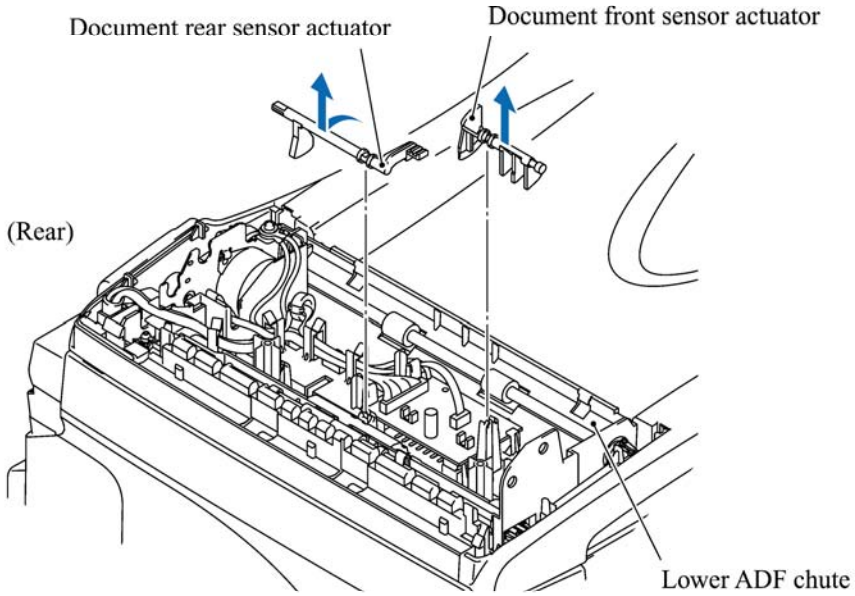
Latching the upper ADF chute (Viewed from "Y")

Reassembling Note: When latching the upper ADF chute, first fit latches (1) of the right end into the openings provided in the document cover, then press latches (2), (3), and (4) into place in this order as shown above.

4.1.4 ADF Components on the Lower ADF Chute

Document front and rear sensor actuators

(1) Lift up the document front sensor actuator. Fully turn the document rear sensor actuator counterclockwise, then lift it up.

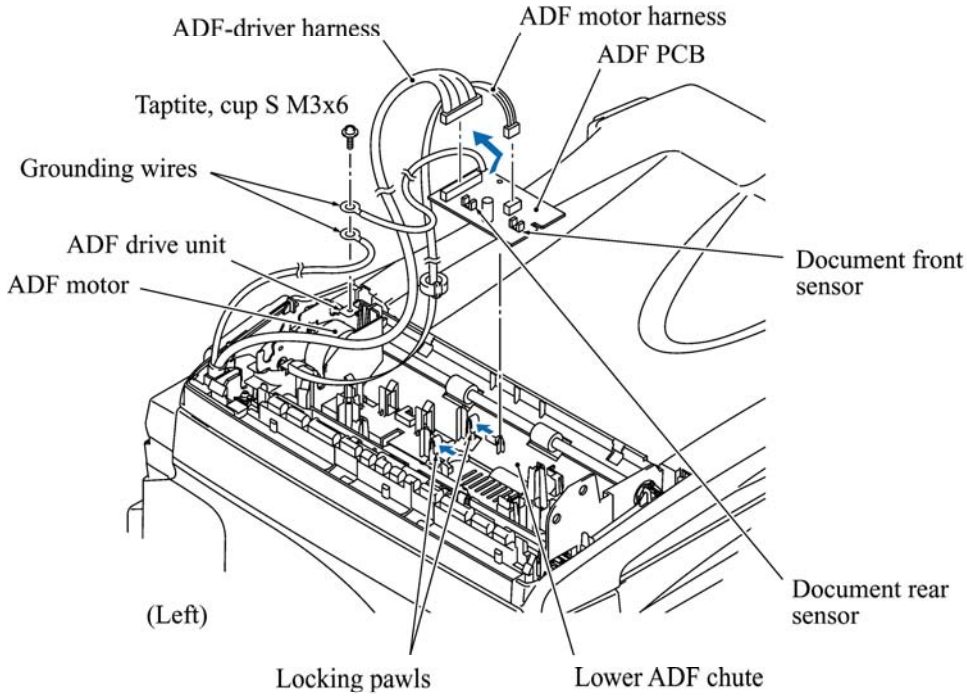


ADF PCB

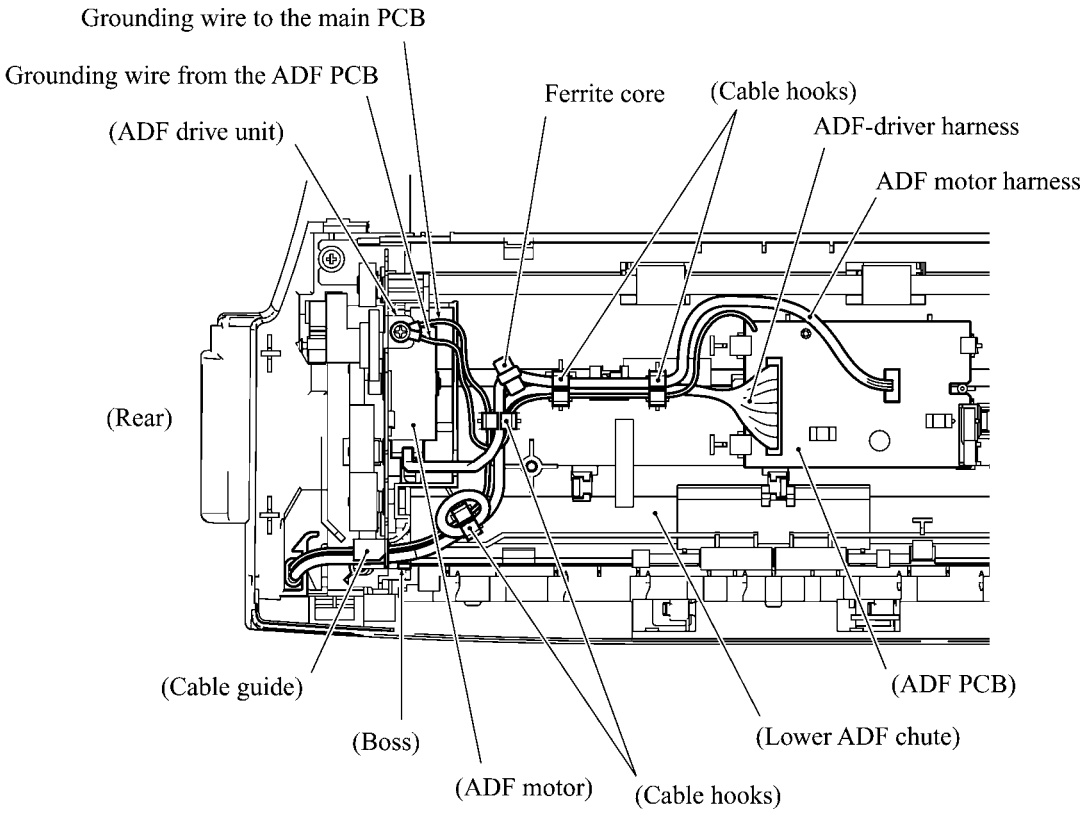
(2) Release the two grounding wires by removing the screw.

(3) Take the ADF motor harness and ADF-driver harness out of the cable hooks, then disconnect them from the ADF PCB.

(4) Press the locking pawls to the rear and take out the ADF PCB.



Reassembling Note: After setting the ADF PCB back into place, be sure to route the ADF-driver harness, ADF motor harness, and two grounding wires as shown below.

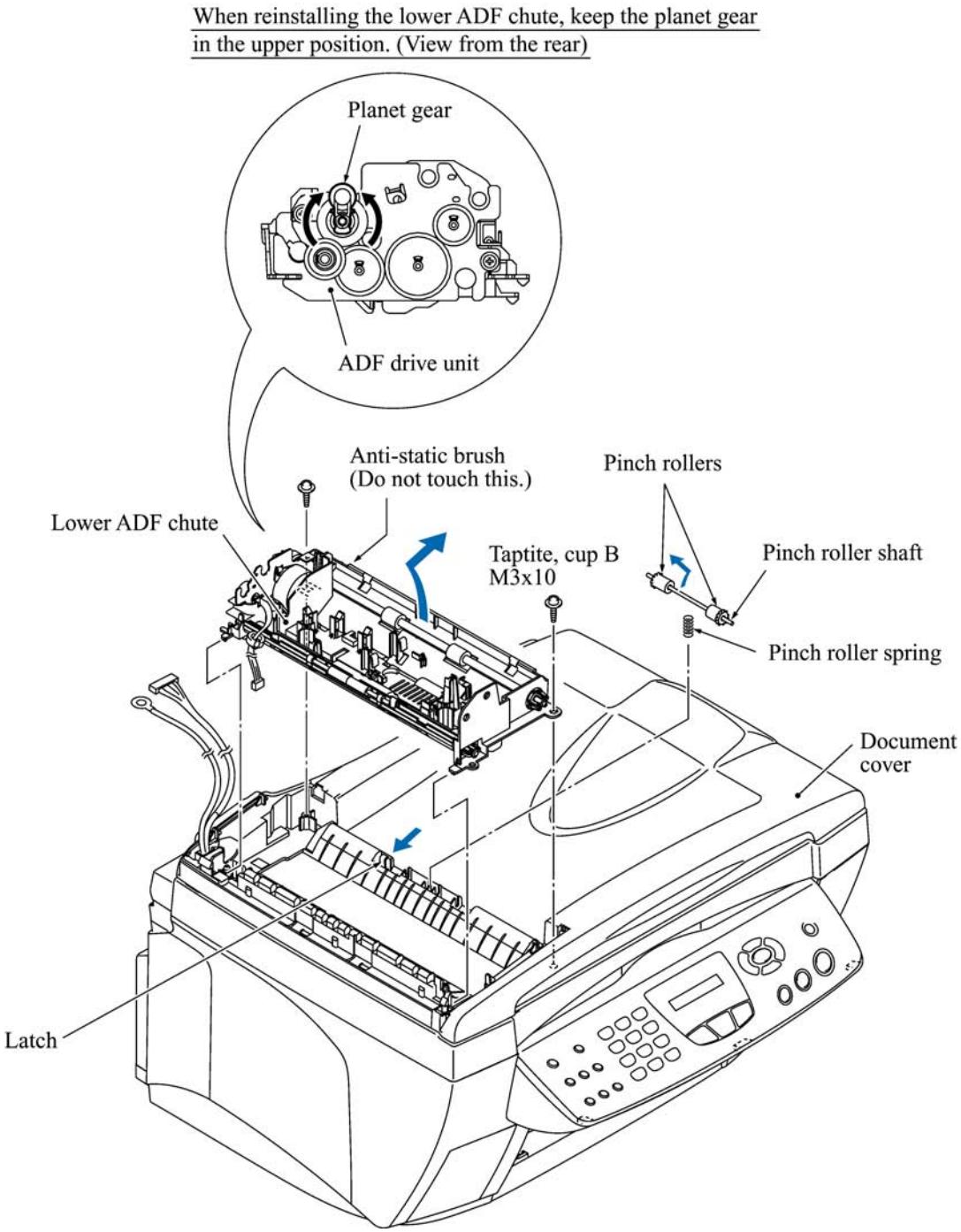


Lower ADF chute and pinch rollers

(5) Remove the two screws from the lower ADF chute.

(6) Lift up the lower ADF chute in the direction of the arrow shown below, taking care not to touch the anti-static brush.

(7) Press the latch to the left and remove the pinch rollers and its shaft. The pinch roller spring also comes off.

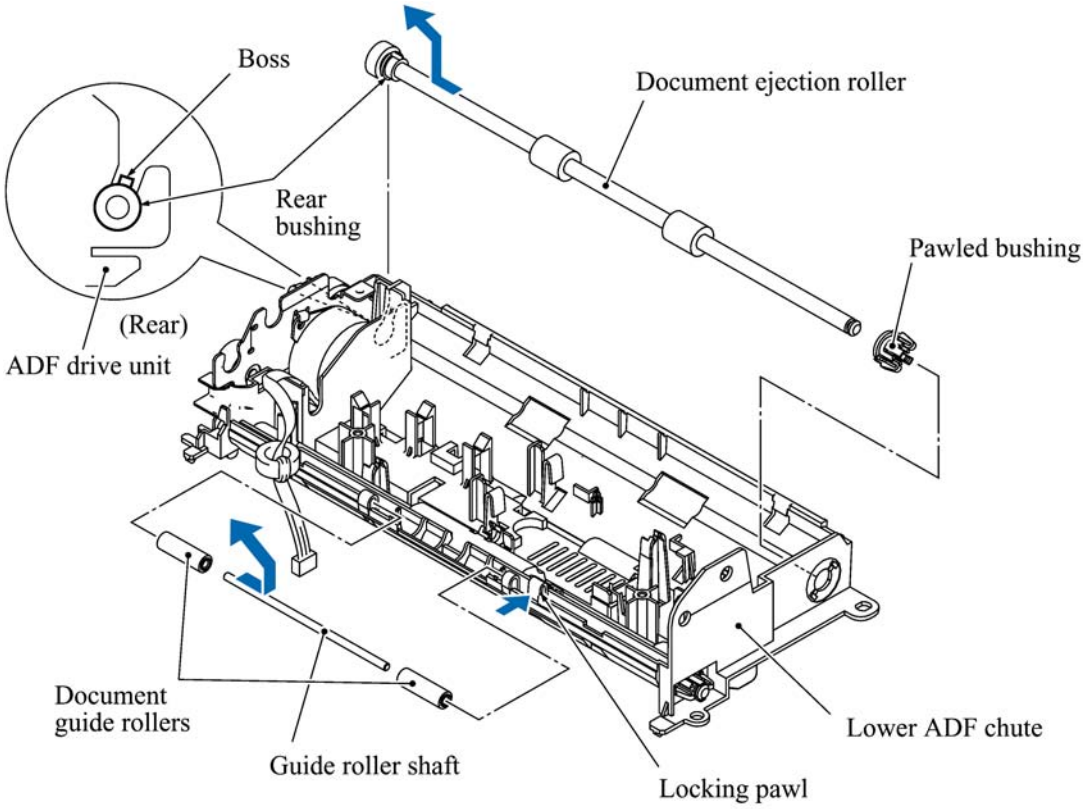


Reassembling Note: Before reinstalling the lower ADF chute to the document cover, be sure to keep the planet gear of the ADF drive unit in the upper position as shown above.

Document ejection roller and document guide rollers

(8) Remove the pawled bushing from the front end of the document ejection roller shaft by pulling its pawls outwards. Then slide the rear bushing to the rear and lift up the document ejection roller.

(9) Press the locking pawl to the right and pull out the guide roller shaft and document guide rollers in the direction of the arrow shown below.

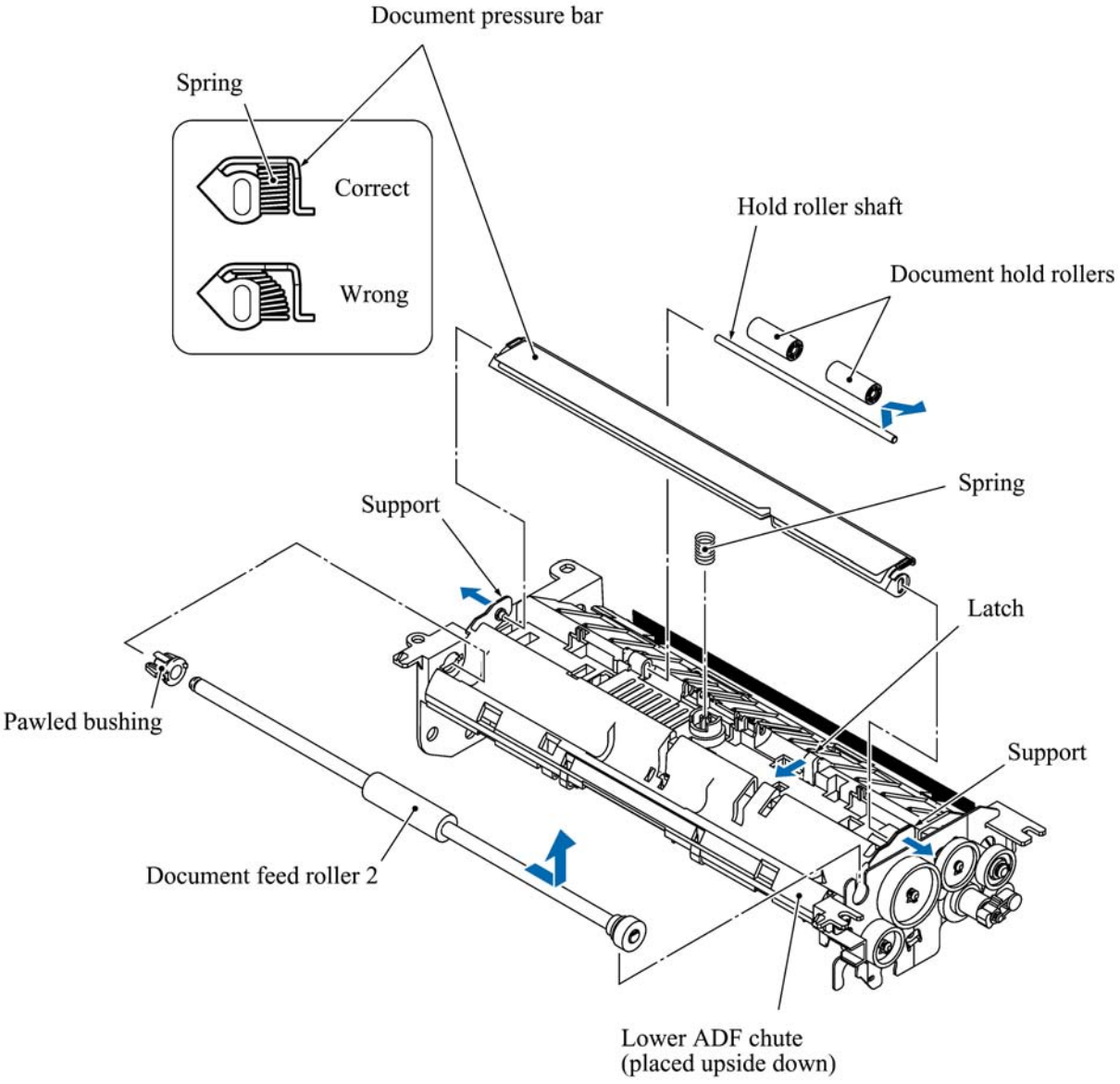


Reassembling Note: When fitting the rear bushing of the document ejection roller into the cutout of the ADF drive unit, orient the boss as illustrated above.

Document feed roller 2, document pressure bar, and document hold rollers

(10) Remove the pawled bushing from the rear end of the document feed roller 2 shaft by pulling its pawls outwards. Then remove the document feed roller 2 as shown below.

(11) Pull either of the front and rear supports outwards and remove the document pressure bar. The spring also comes off.



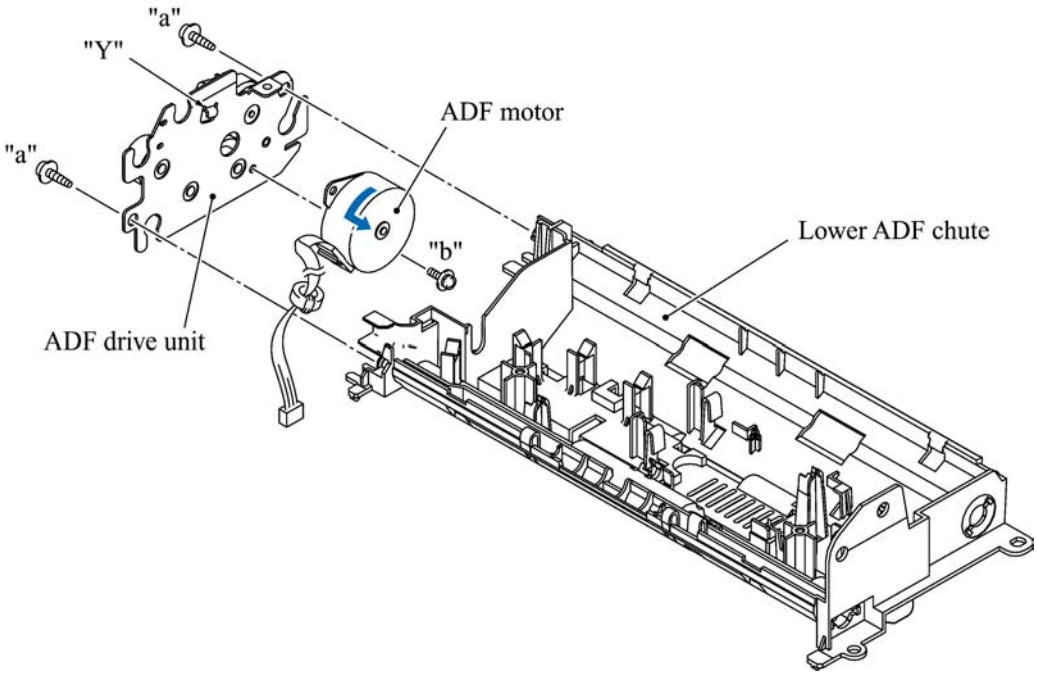
Reassembling Note: After setting the document pressure bar, check to see that the spring is in place as shown above.

ADF drive unit and ADF motor

(12) Release the ADF drive unit from the lower ADF chute by removing two screws "a."

NOTE: When using a screwdriver, take care not to scratch or damage gears on the ADF drive unit.

(13) Release the ADF motor from the drive unit by removing screw "b."

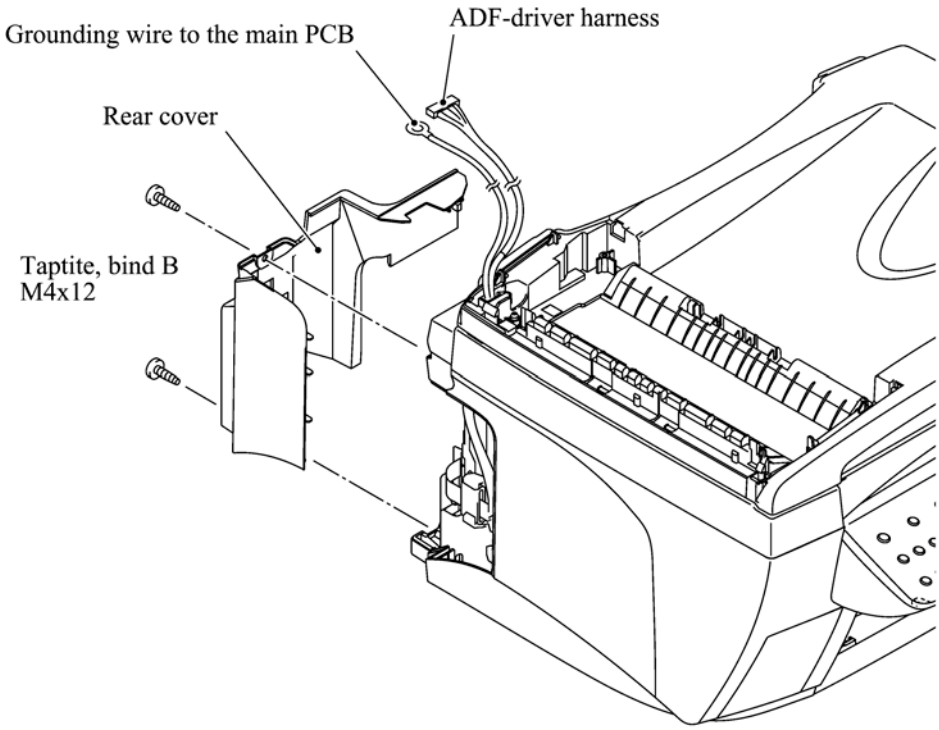


"a": Taptite, cup B M3x10
"b": Screw, pan (s/p washer) M3x6

Reassembling Note: When setting the ADF motor, hook the non-screw side of the flange on section "Y" (shown above) and secure it with screw "b."

4.1.5 Rear Cover

(1) Release the rear cover by removing the two screws.

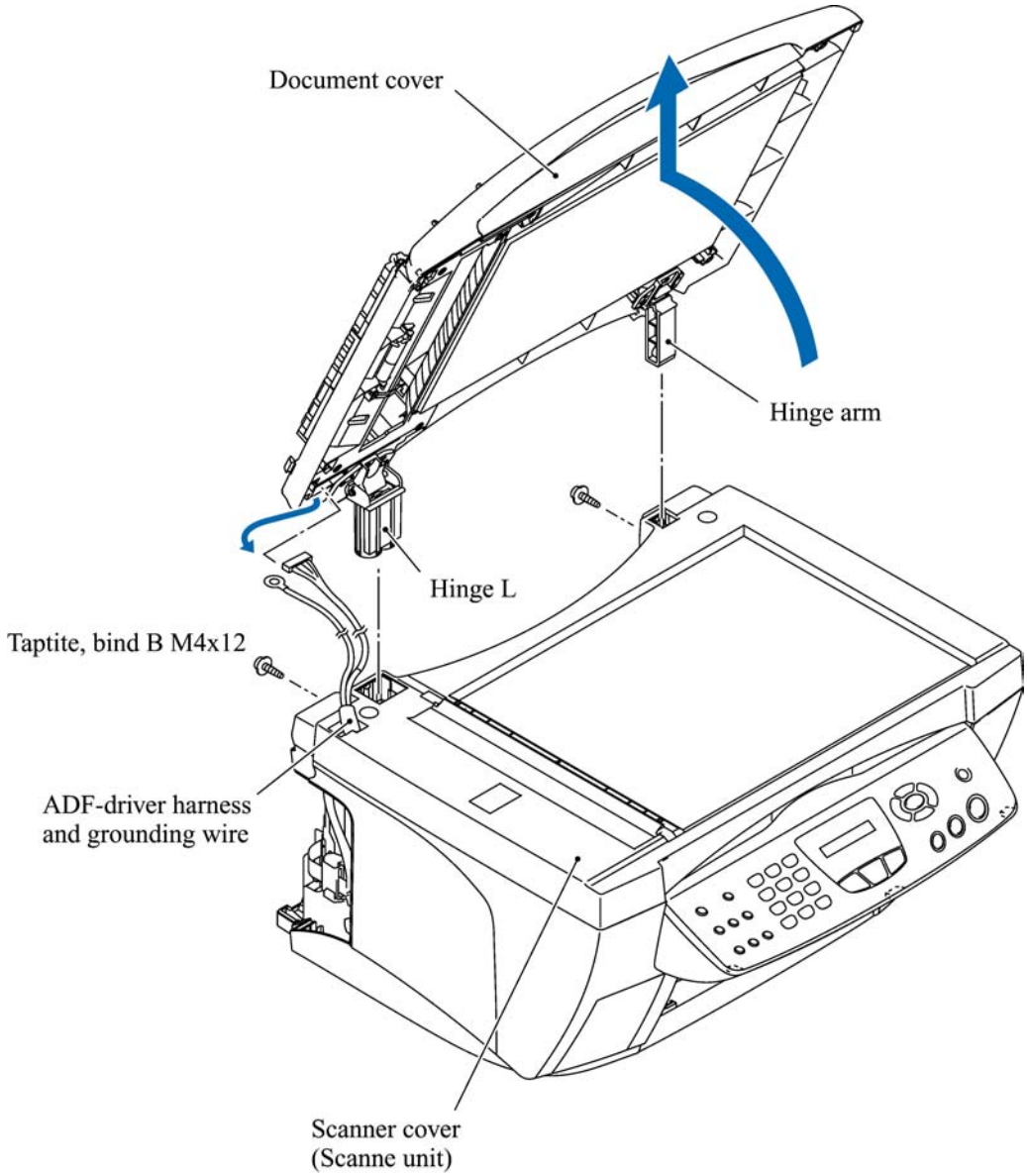


4.1.6 Document Cover and Document Pressure Rollers 2

(1) Remove the two screws from the bottom rear of the hinge L and hinge arm on the document cover.

(2) Be sure to open the document cover fully. If you pull it out of the machine without opening it, the hinge L will open with great force suddenly and unexpectedly. It is DANGEROUS!

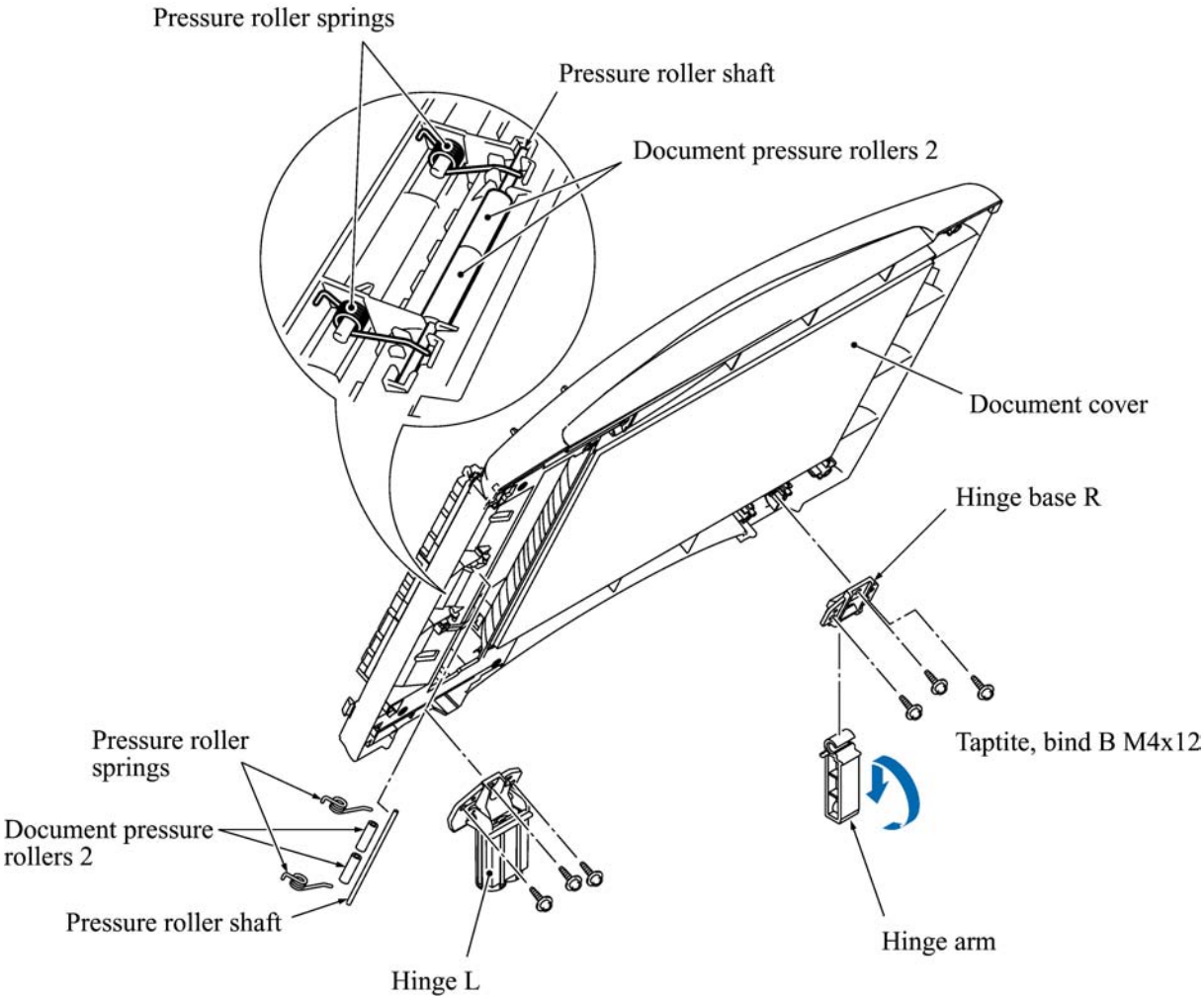
(3) Lift up the document cover.



(4) Remove the pressure roller springs, document pressure rollers 2 and their shaft.

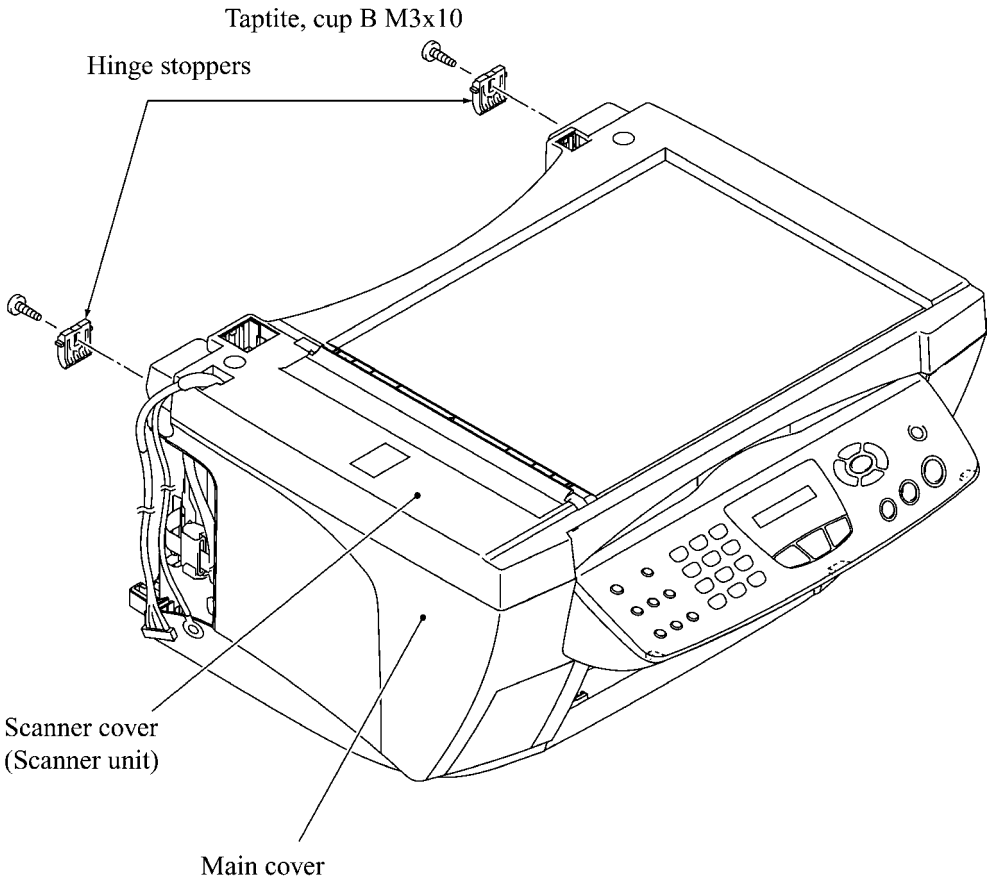
(5) From the hinge base R, remove the hinge arm as shown below. Remove the three screws and release the hinge base R.

(6) From the hinge L that should be kept opened, remove the three screws.

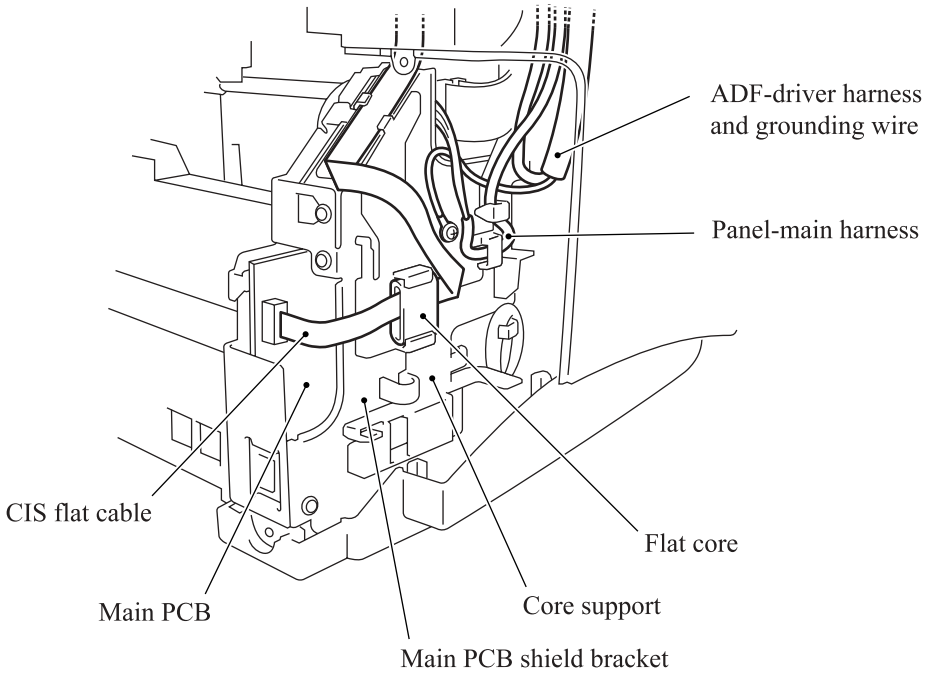


4.1.7 Scanner Cover (Scanner Unit)

(1) Release the hinge stoppers by removing the two screws.



(2) Disconnect the CIS flat cable from the main PCB and take its flat core out of the core support together with the cable.



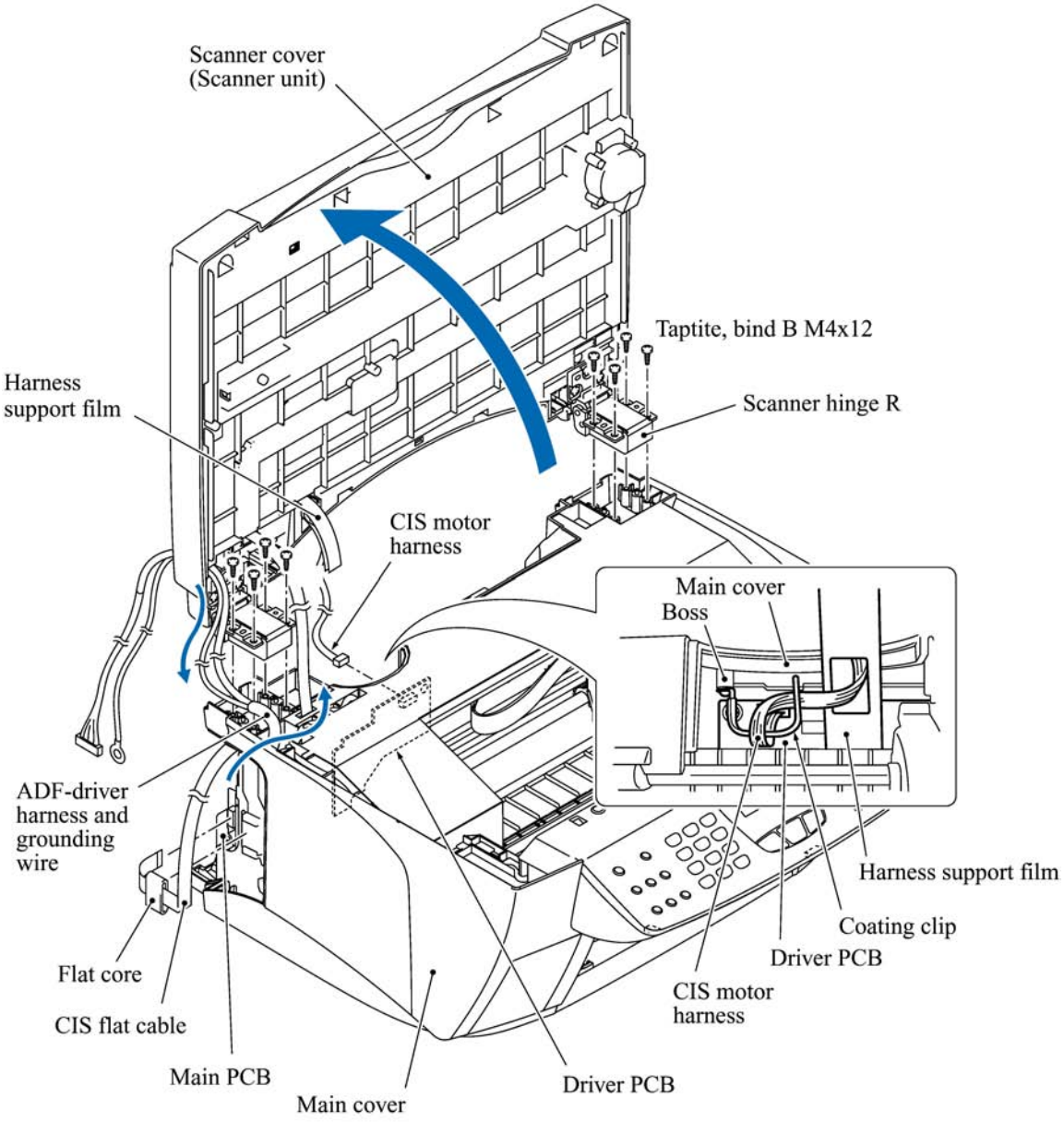
(3) Unbend the coating clip and release the CIS motor harness. Then disconnect the CIS motor harness from the driver PCB.

(4) Open the scanner cover (scanner unit) to an angle shown below.

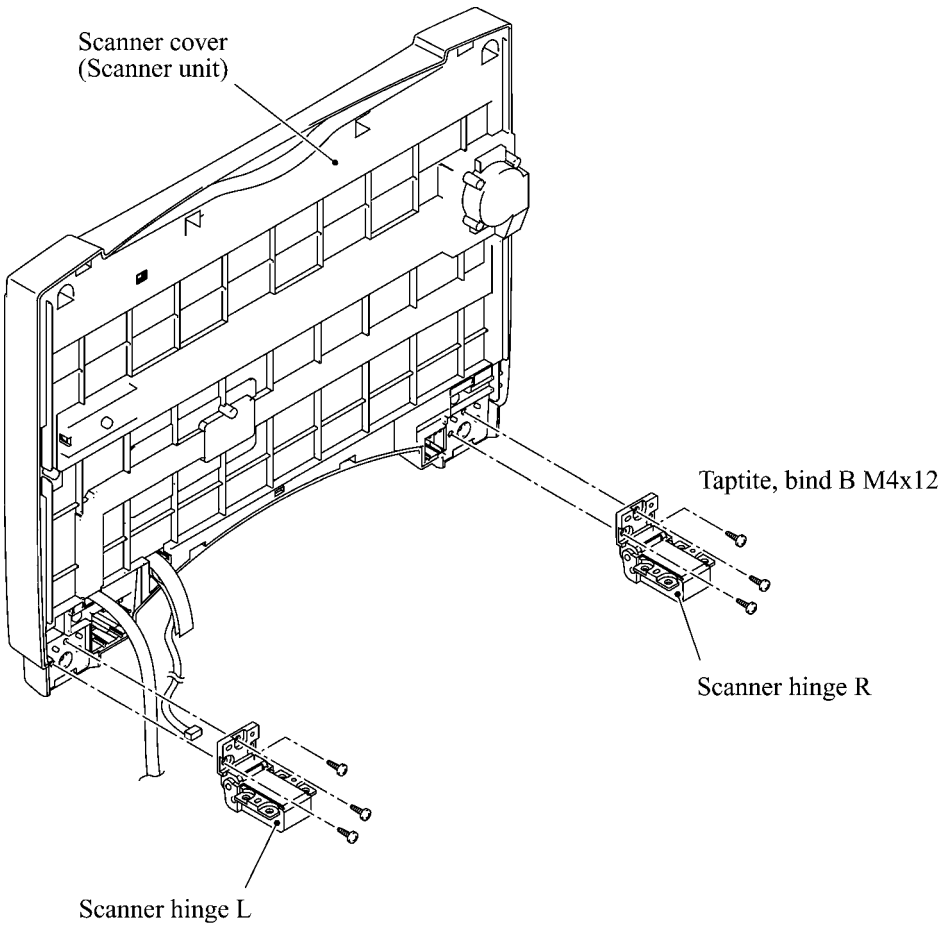
NOTE: If the hinge stoppers have not been removed in step (1) on the previous page, the scanner cover cannot be opened to that angle.

(5) While supporting the scanner cover by hand, remove the four screws from each of the scanner hinges R and L.

(6) While pulling the ADF-driver harness and grounding wire out of the scanner cover, lift up the scanner cover.



(7) Remove the three screws from each of the scanner hinges R and L.

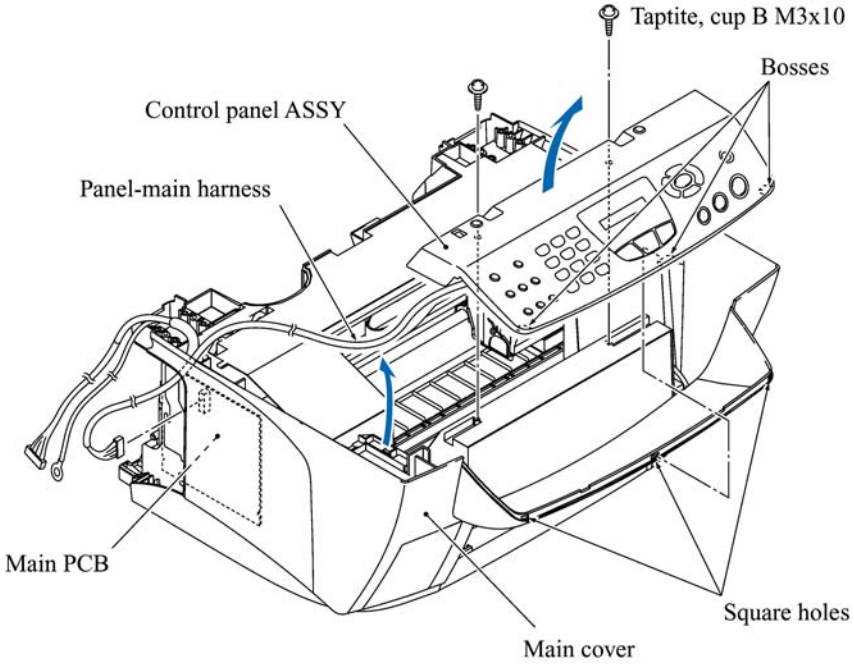


■ Reassembling Notes

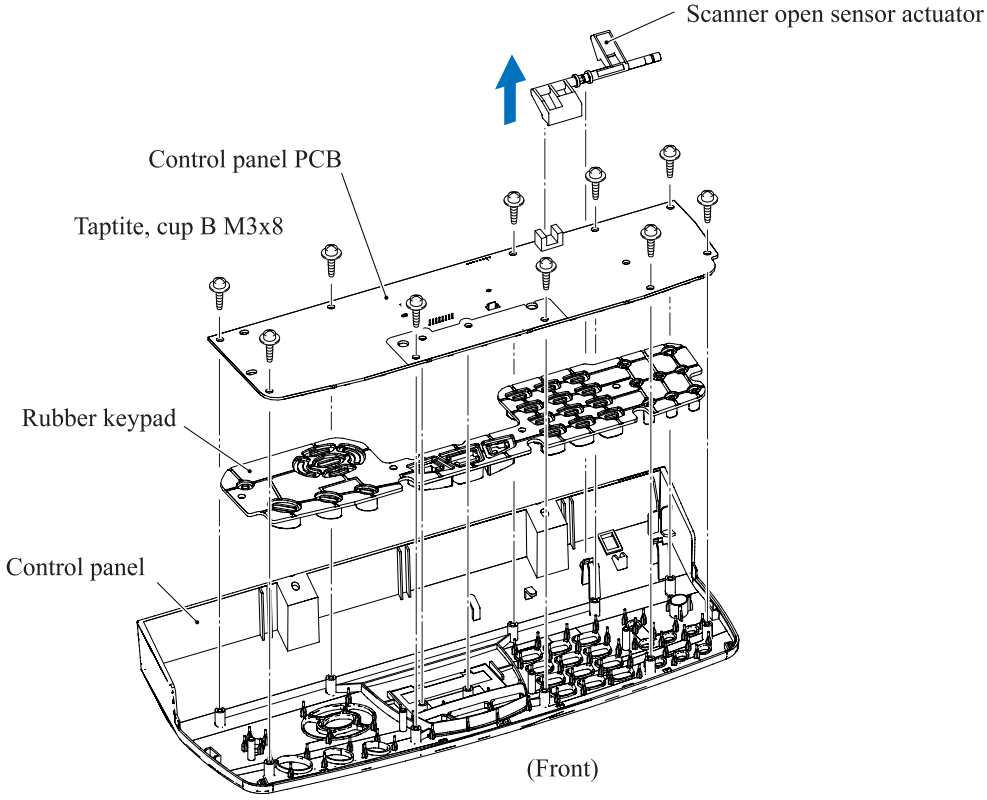
- After connecting the CIS motor harness to the driver PCB, secure it with the coating clip by bending the clip as shown on the previous page.

4.1.8 Scanner Open Sensor Actuator and Control Panel ASSY

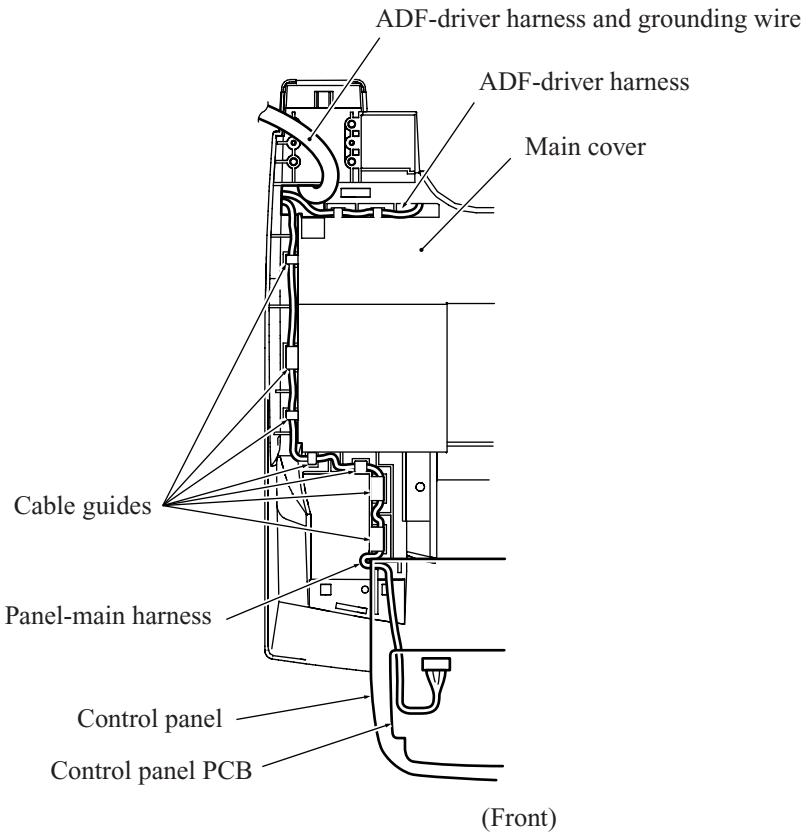
(1) Disconnect the panel-main harness from the main PCB and take it out of the cable guides.
(2) Remove the two screws.
(3) Lift up the control panel ASSY to release its three bosses from the main cover.



(4) Turn the control panel ASSY upside down.
(5) Pull up the scanner open sensor actuator.
(6) Remove the 10 screws from the control panel PCB.



Reassembling Note: Route the panel-main harness on the main cover as shown below.



4.1.9 Main Cover and Front Cover*

*MFC3420C only

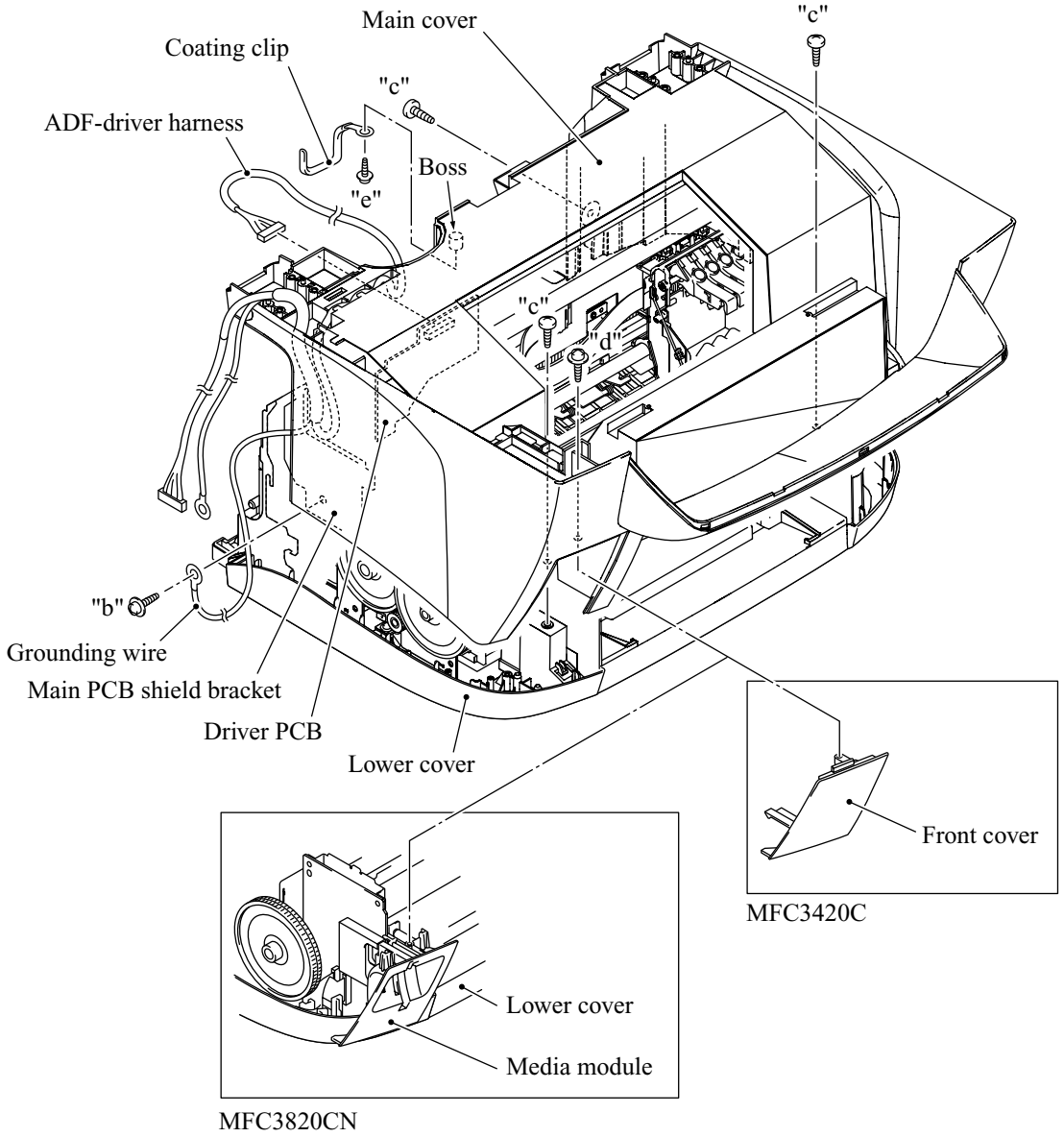
(1) Release the grounding wire by removing screw "b" from the main PCB shield bracket.

(2) Disconnect the ADF-driver harness from the driver PCB.

(3) Remove three screws "c" and one screw "d".

(4) Lift up the main cover.
In the case of the MFC3420C, the front cover also comes off.

(5) Remove screw "e" from the boss on the main cover to release the coating clip.



"b": Screw, pan (s/p washer) M3x6
"c": Taptite, bind B M4x12
"d" and "e": Taptite, cup B M3x10

■ Reassembling Notes

- For the details about the coating clip and the boss on the main cover, refer to the illustration given on page 4-27.

4.1.10 Main PCB, SDAA PCB*, and Media Module*

* MFC3820CN only

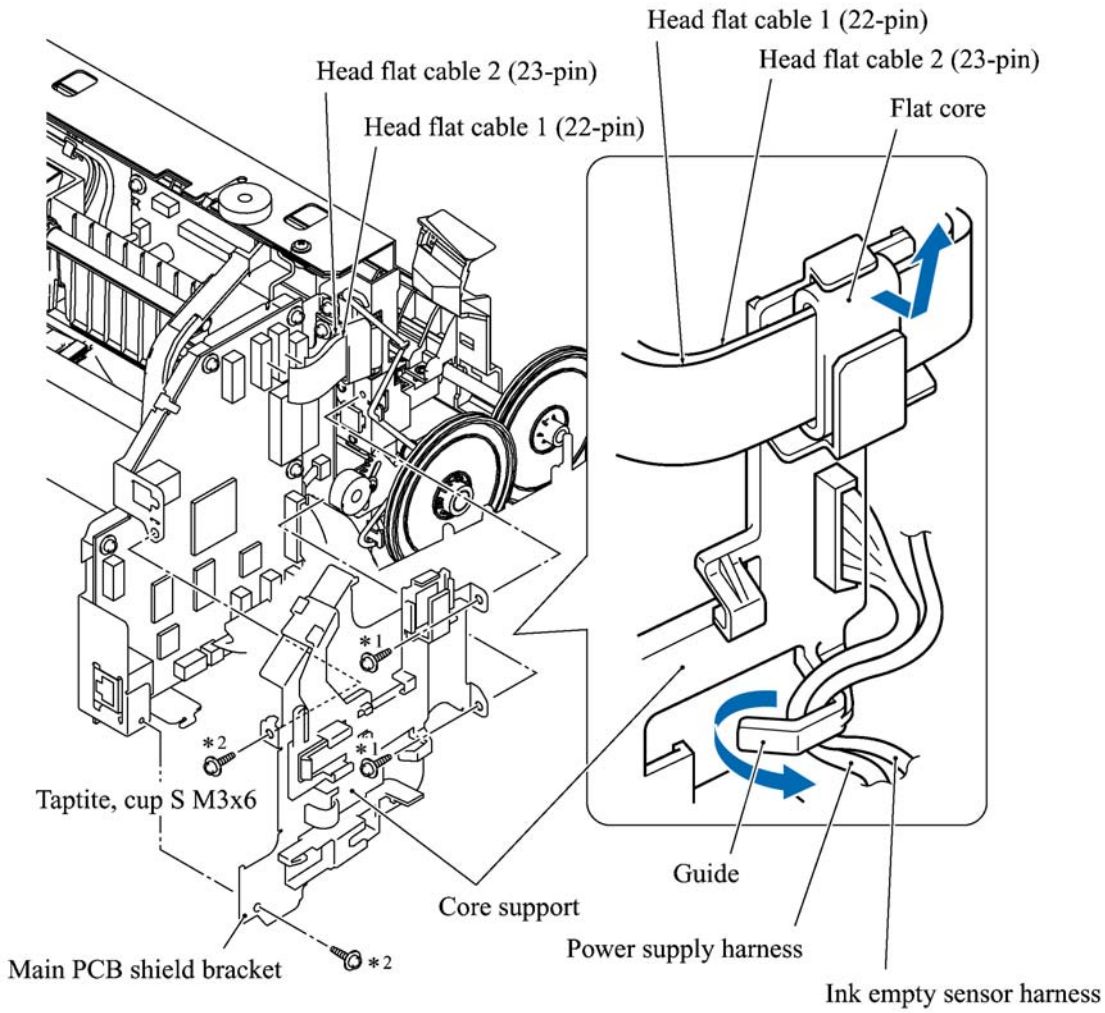
MFC3820CN

(1) Disconnect the head flat cables 1 and 2 from the main PCB, then take the flat core out of the core support together with those flat cables.

NOTE: When connecting/disconnecting the flat cables, keep them perpendicular to the connector to avoid breaking their edge contacts.

(2) Unhook the power supply harness and the ink empty sensor harness from the guide provided on the core support.

(3) Remove the four screws from the main PCB shield bracket and take it off together with the core support.



*[1] Tightening torque: 0.78 ± 0.10 N•m

*[2] Tightening torque: 0.39 ± 0.05 N•m

(4) Disconnect the SDAA-MJ harness from the SDAA PCB.

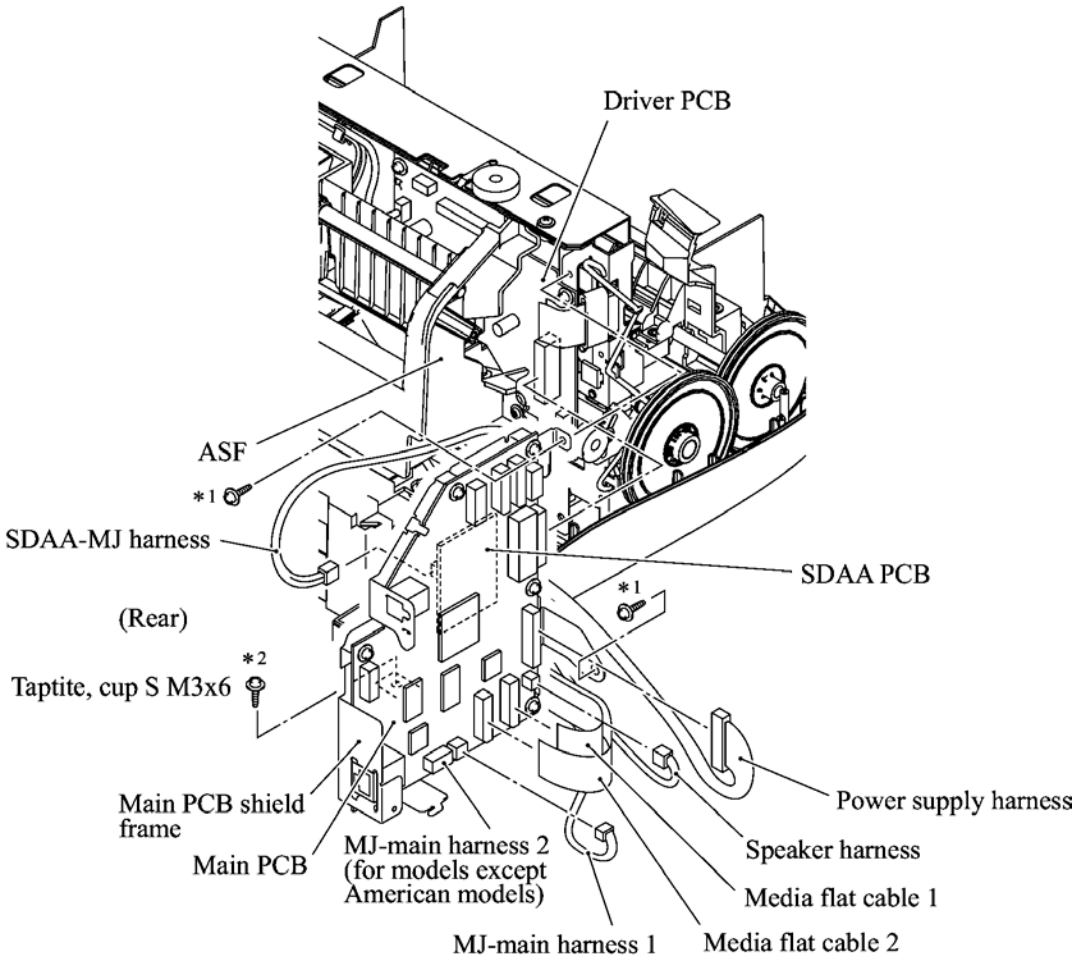
(5) Remove the three screws from the main PCB shield frame.

(6) Disconnect the following harnesses from the main PCB. (Refer to the next page for connector locations.)

- SDAA-MJ harness
- MJ-main harness 1 (3-pin for European models, 2-pin for other models)
- Media flat cable 2 (21-pin)
- Media flat cable 1 (22-pin)
- Speaker harness
- Power supply harness

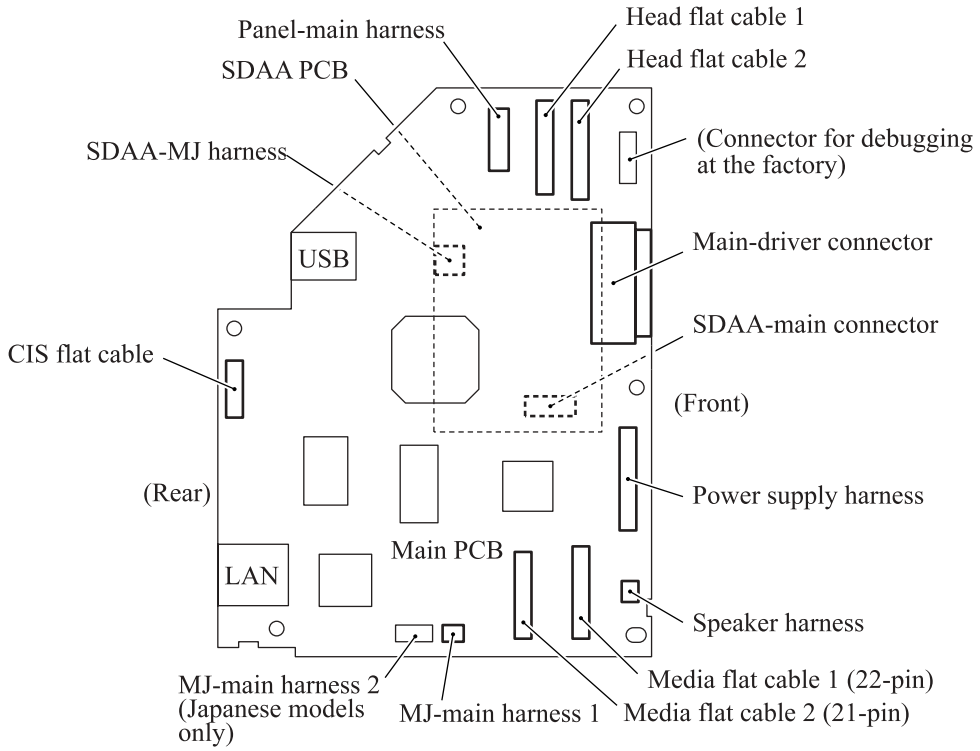
NOTE: In the top right corner of the main PCB is a 6-pin connector that is for debugging at the factory. Do not disturb it.

(7) Pull the main PCB shield frame to the rear in order to disconnect the main PCB from the driver PCB.



*1 Tightening torque: 0.59 ± 0.10 N•m

*2 Tightening torque: 0.78 ± 0.10 N•m



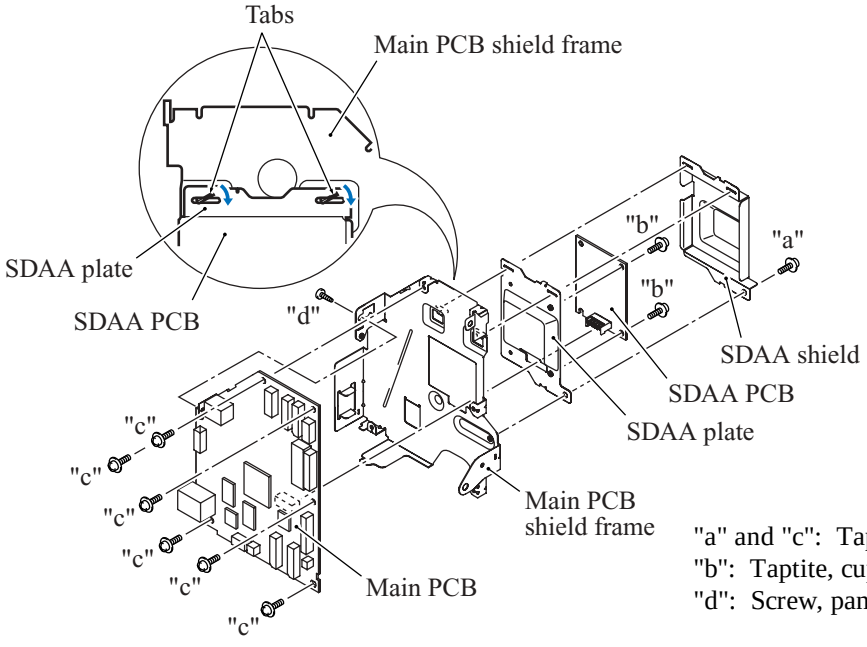
(8) Remove screw "a" from the SDAA shield, straighten the two tabs on the main PCB shield frame using a pliers, and take off the SDAA shield.

(9) Pull out the SDAA plate holding the SDAA PCB to disconnect the SDAA PCB from the main PCB.

(10) Remove two screws "b" to separate the SDAA PCB from the SDAA plate.

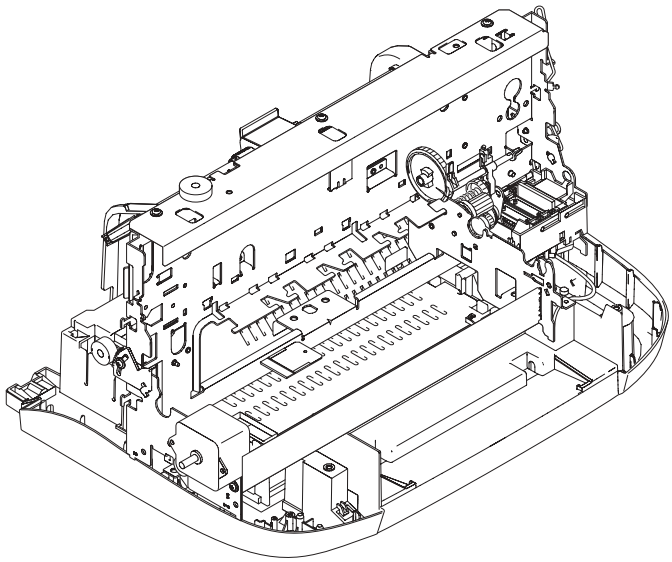
NOTE: When removing those screws, take care not to push down the SDAA PCB and damage the connector provided on the inner face of the SDAA PCB.

(11) Remove six screws "c" and one screw "d" from the main PCB and USB connector, respectively, and take the main PCB off its shield frame.



"a" and "c": Taptite, cup S M3x6
"b": Taptite, cup S M3x4
"d": Screw, pan M3x6

(12) Remove two screws from the media module and take it out of the lower cover together with the media flat cables.



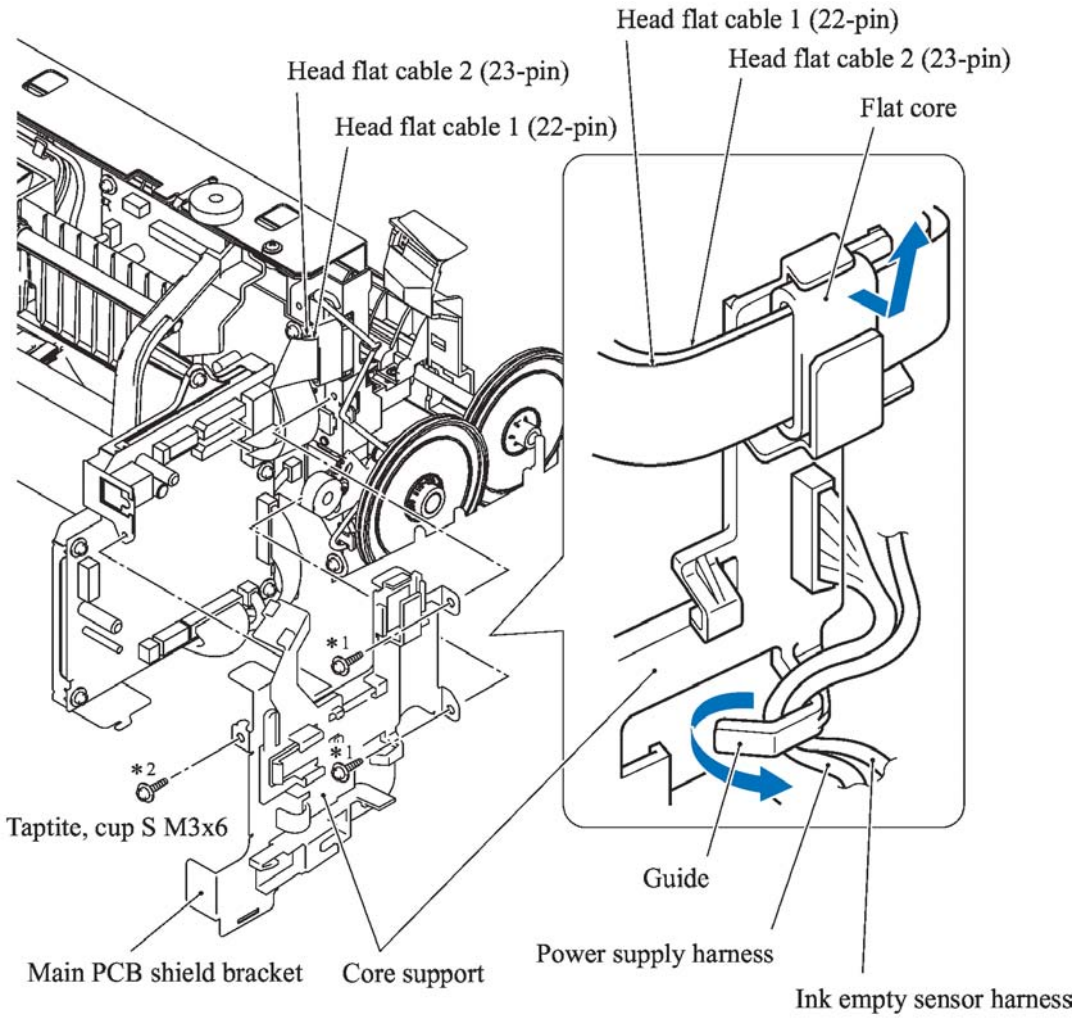
MFC3420C

(1) Disconnect the head flat cables 1 and 2 from the main PCB, then take the flat core out of the core support together with those flat cables.

NOTE: When connecting/disconnecting the flat cables, keep them perpendicular to the connector to avoid breaking their edge contacts.

(2) Unhook the power supply harness and ink empty sensor harness from the guide provided on the core support.

(3) Remove three screws from the main PCB shield bracket and take it off together with the core support.



*[1] Tightening torque: 0.78 ± 0.10 N•m
*[2] Tightening torque: 0.59 ± 0.10 N•m

(4) Remove the three screws (one long screw "a" and two short screws "b") from the main PCB shield frame.

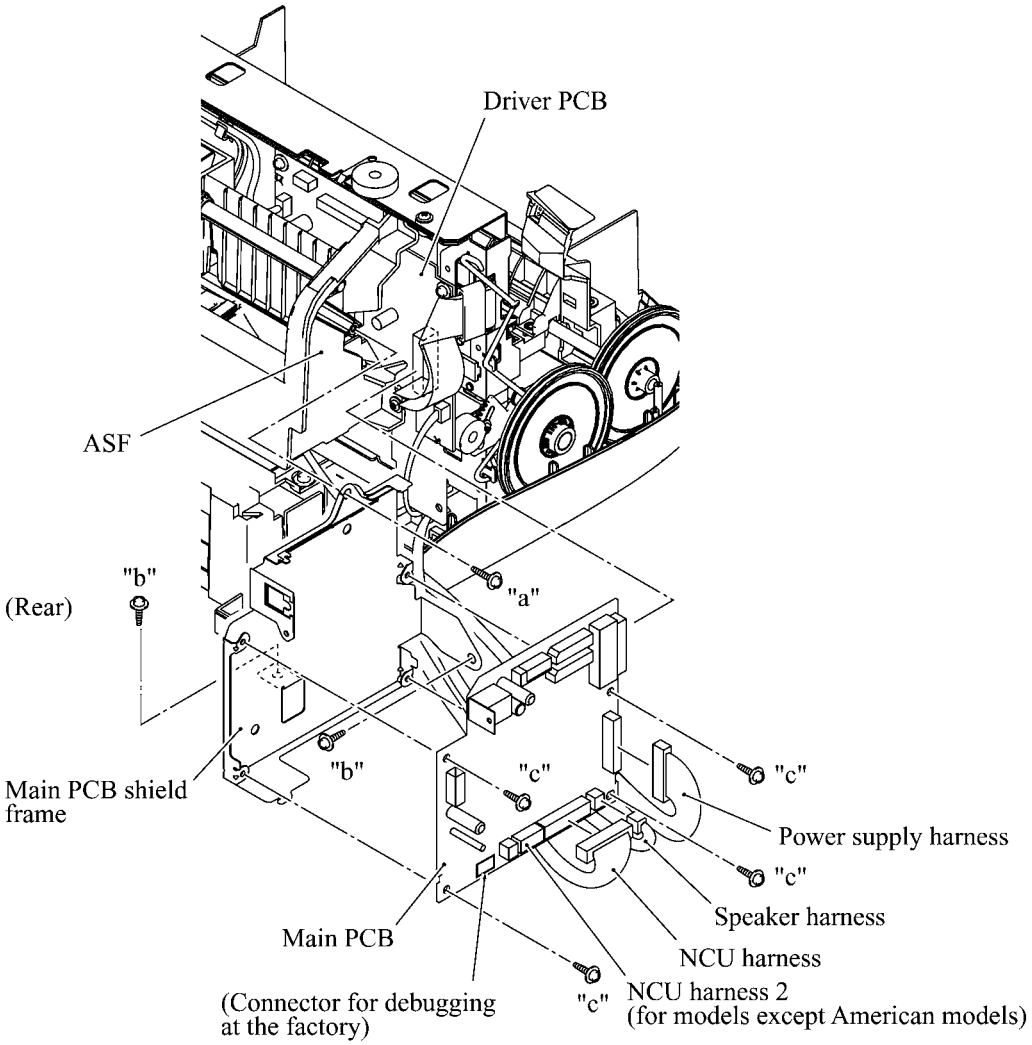
(5) Pull the main PCB shield frame to the rear in order to disconnect the main PCB from the driver PCB.

(6) Disconnect the following harnesses from the main PCB. (Refer to the next page for connector locations.)

- Power supply harness
- Speaker harness
- NCU harness (12-pin)
- NCU harness 2 (4-pin) (for models except American models)

NOTE: In the left bottom corner of the main PCB is a 6-pin connector that is for debugging at the factory. Do not disturb it.

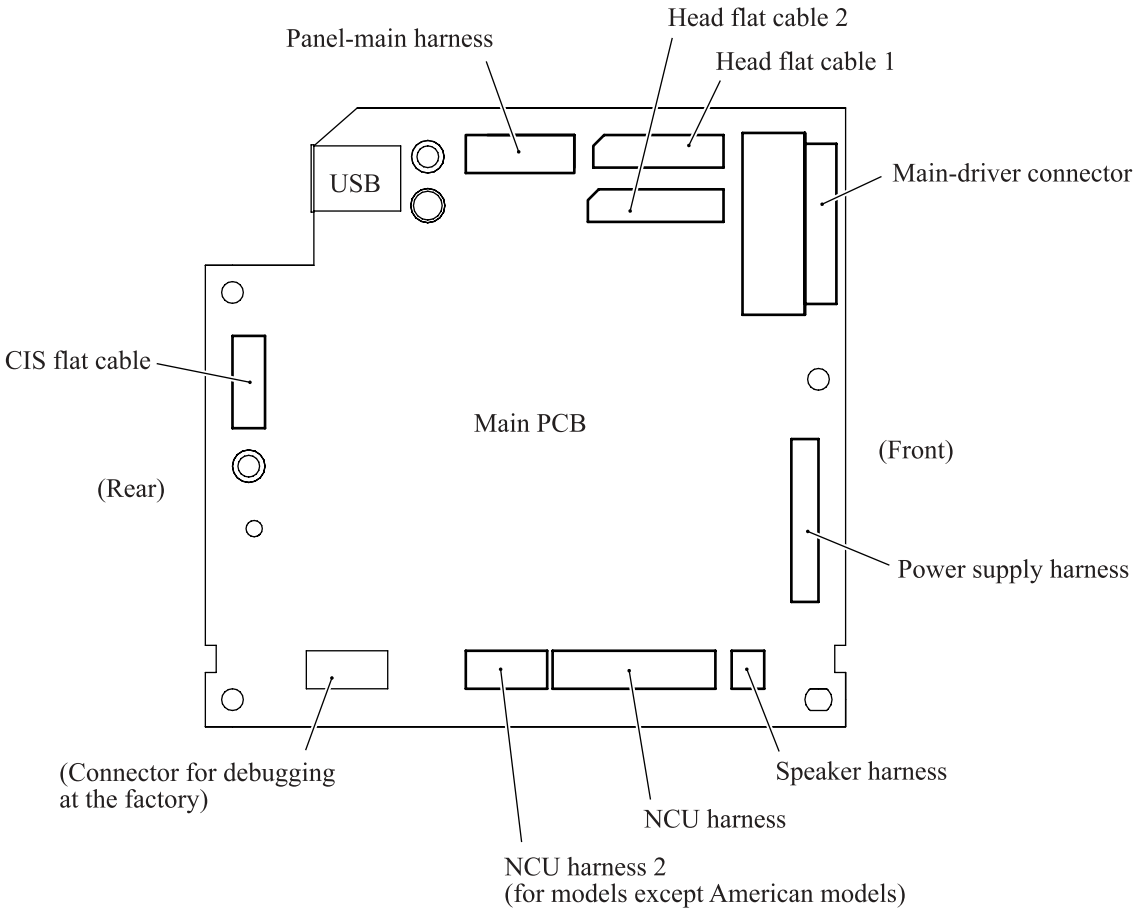
(7) Remove four screws "c" from the main PCB to release it from the main PCB shield frame.



"a": Taptite, cup B M3x10
"b" and "c": Taptite, cup S M3x6

*[1] Tightening torque: 0.59 ± 0.10 N•m

*[2] Tightening torque: 0.78 ± 0.10 N•m



■ Reassembling Notes

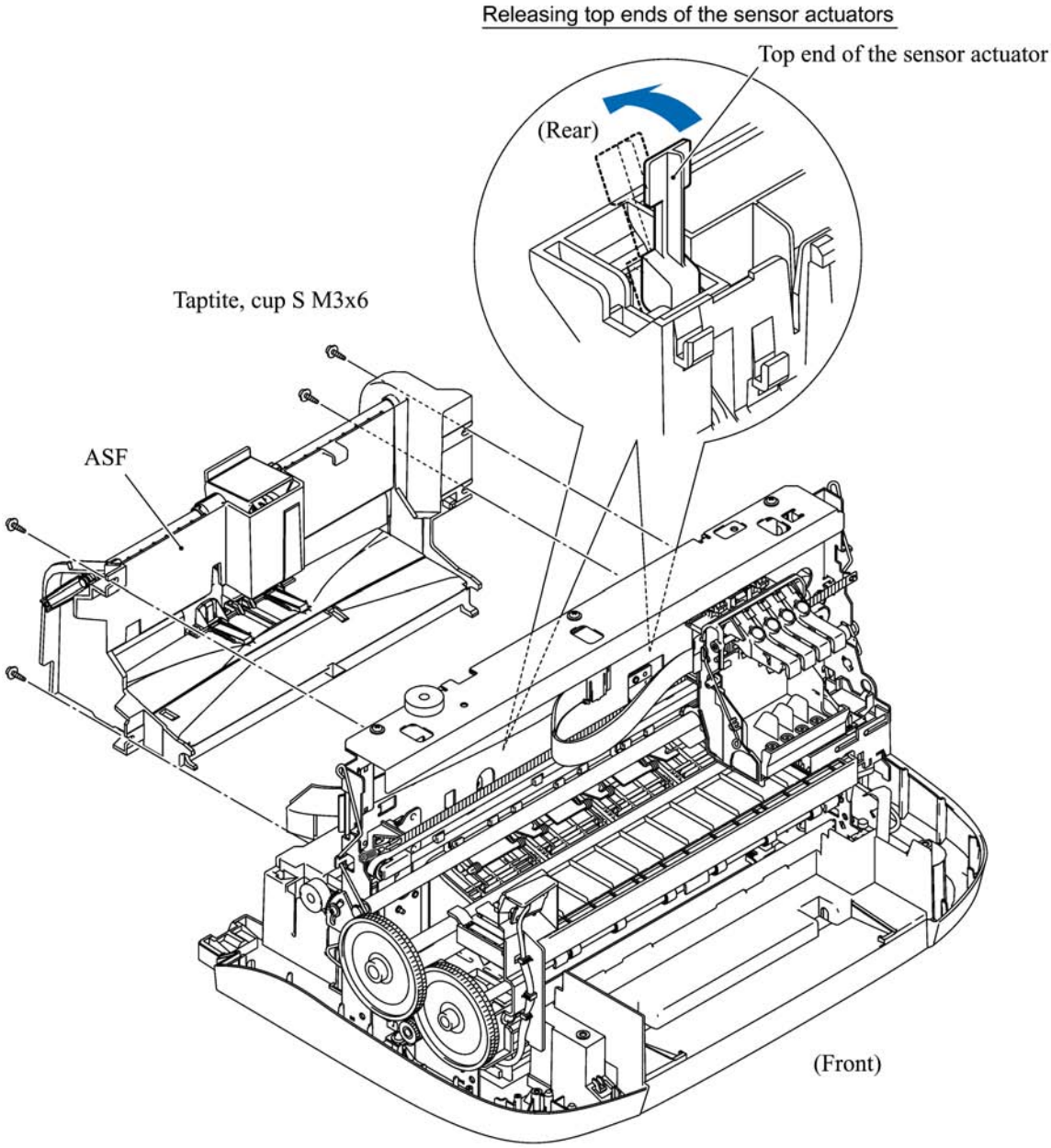
- If you replace the main PCB, you need to perform the following while referring to Chapter 5, Section 5.4.

  - Installing update data to the flash ROM on a new PCB

4.1.11 Auto Sheet Feeder (ASF)

(1) Remove the four screws from the ASF.

(2) Insert your finger from above and pull the top ends of sensor actuators (of the registration sensor and paper width sensor) to the rear to release the bottom ends from the ASF. With those sensor actuators being released, remove the ASF to the rear.



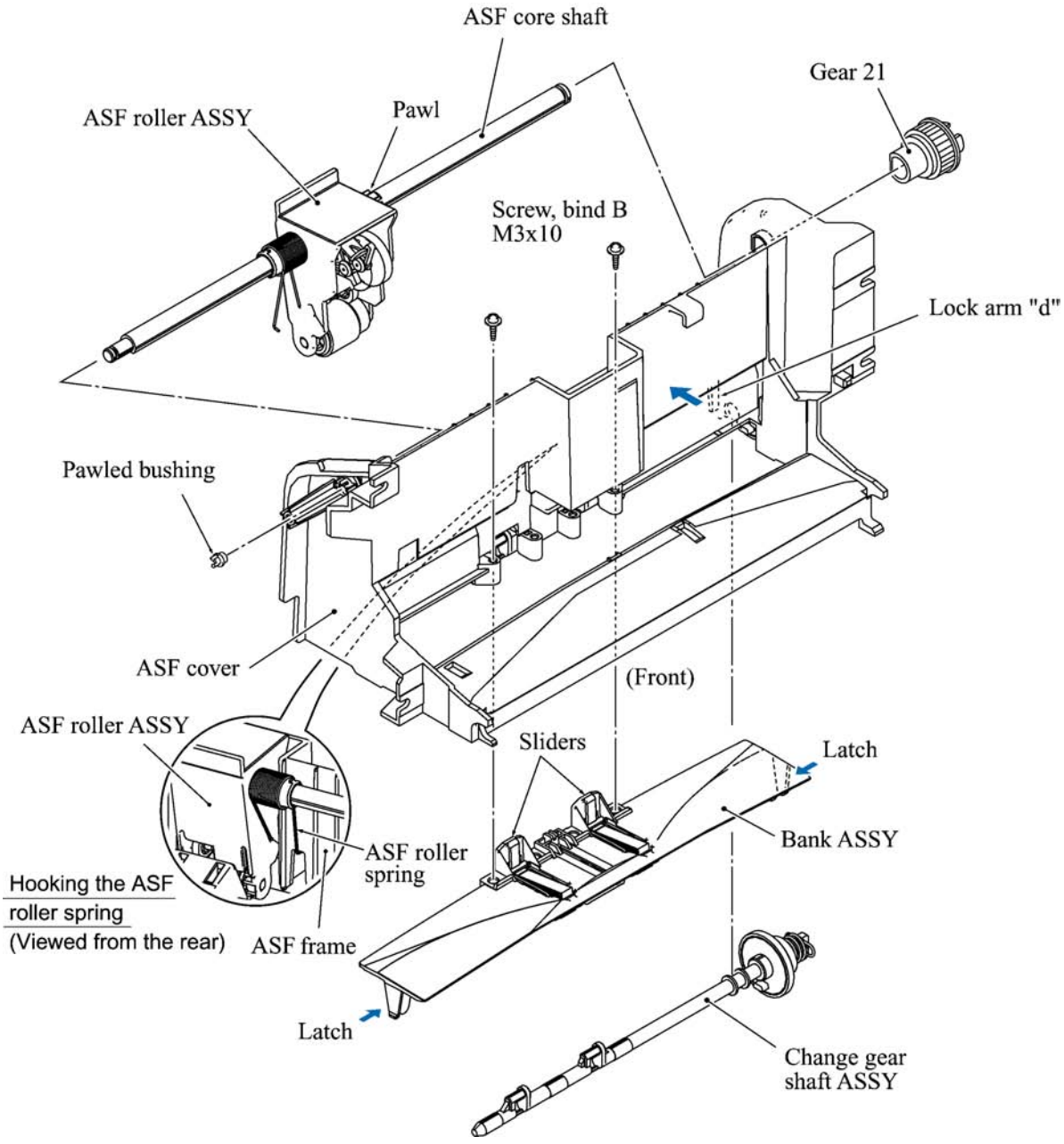
(3) Remove the pawled bushing and gear 21 from the left and right ends of the ASF core shaft, respectively, by pulling their pawls outwards.

(4) Unhook the pawl of the ASF roller ASSY from the ASF core shaft and then move the shaft to the right until you can remove the shaft from the ASF cover together with the ASF roller ASSY.

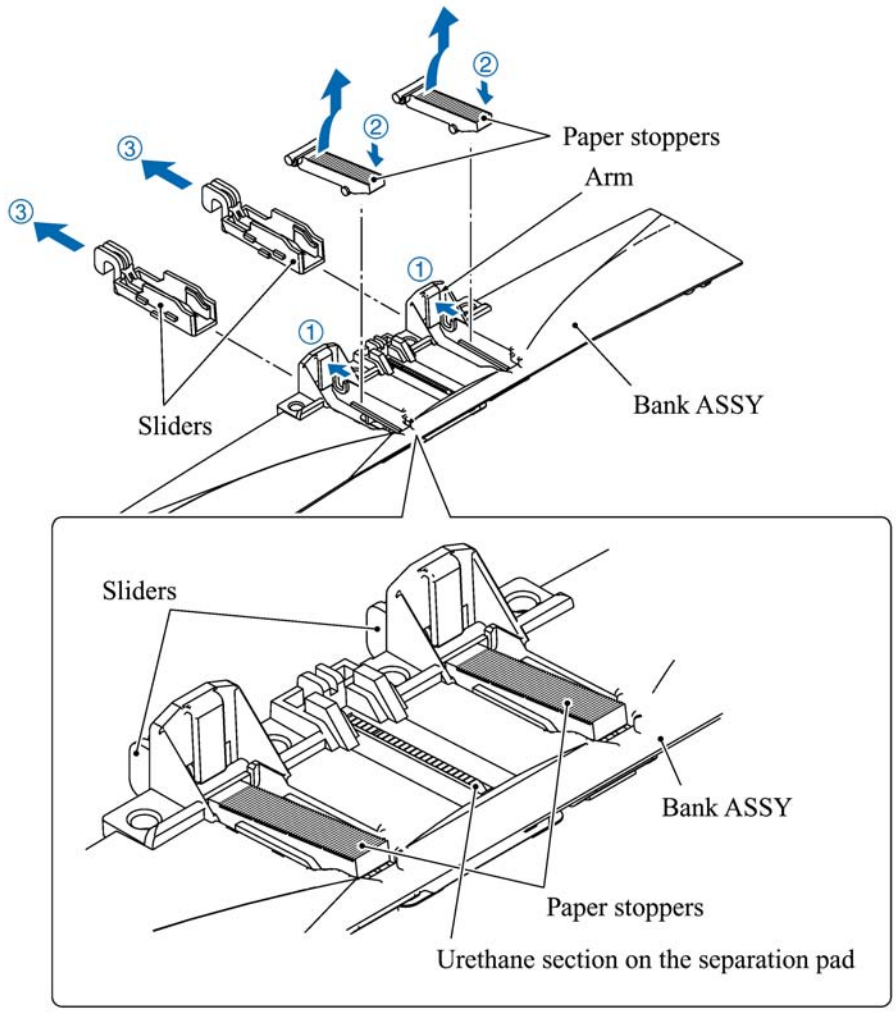
(5) Turn the ASF upside down. Pull lock arm "d" to the rear and pull the change gear shaft ASSY to the right to release it from the hooks provided on the two sliders (shown on the next page).

(6) Remove the two screws from the bank ASSY.

(7) Release the latches on the right and left ends of the bank ASSY from the ASF cover, then push up the bank ASSY.



(8) To disassemble the bank ASSY, push each of the arms to the rear (arrow ①) and press the front end of the mating paper stopper (arrow ②) to take out the paper stopper. Pull out the mating slider (arrow ③).



■ Reassembling Notes

- When handling the bank ASSY, do not touch the urethane section (on the separation pad) at the center slit by hand. The dirt or oil on your hands can easily contaminate the urethane section, affecting the paper feeding performance.
- When handling the ASF roller ASSY, take care not to touch the rubber roller by hand. The dirt or oil on your hands can easily contaminate the rubber roller, affecting the paper feeding performance.

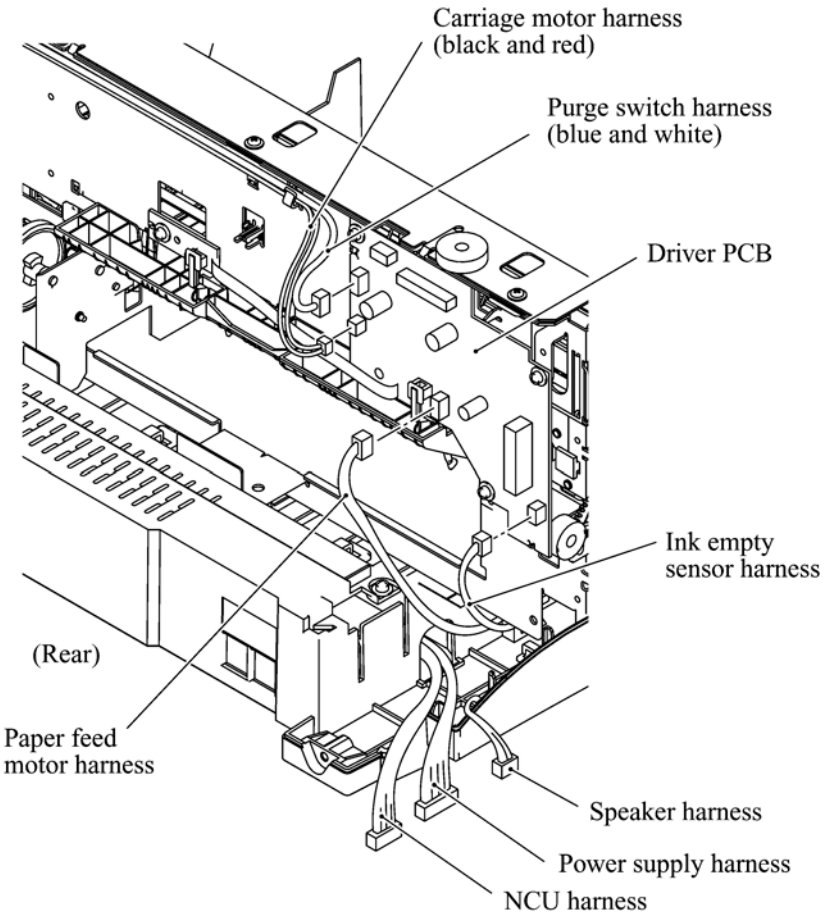
  If the rubber roller has been touched, lightly wipe it with a cloth dampened with alcohol.

  When setting the ASF roller ASSY back into place, fit the free end of the ASF roller spring in the cutout provided in the ASF frame, as shown on the previous page.

4.1.12 Driver PCB with Registration Sensor PCB

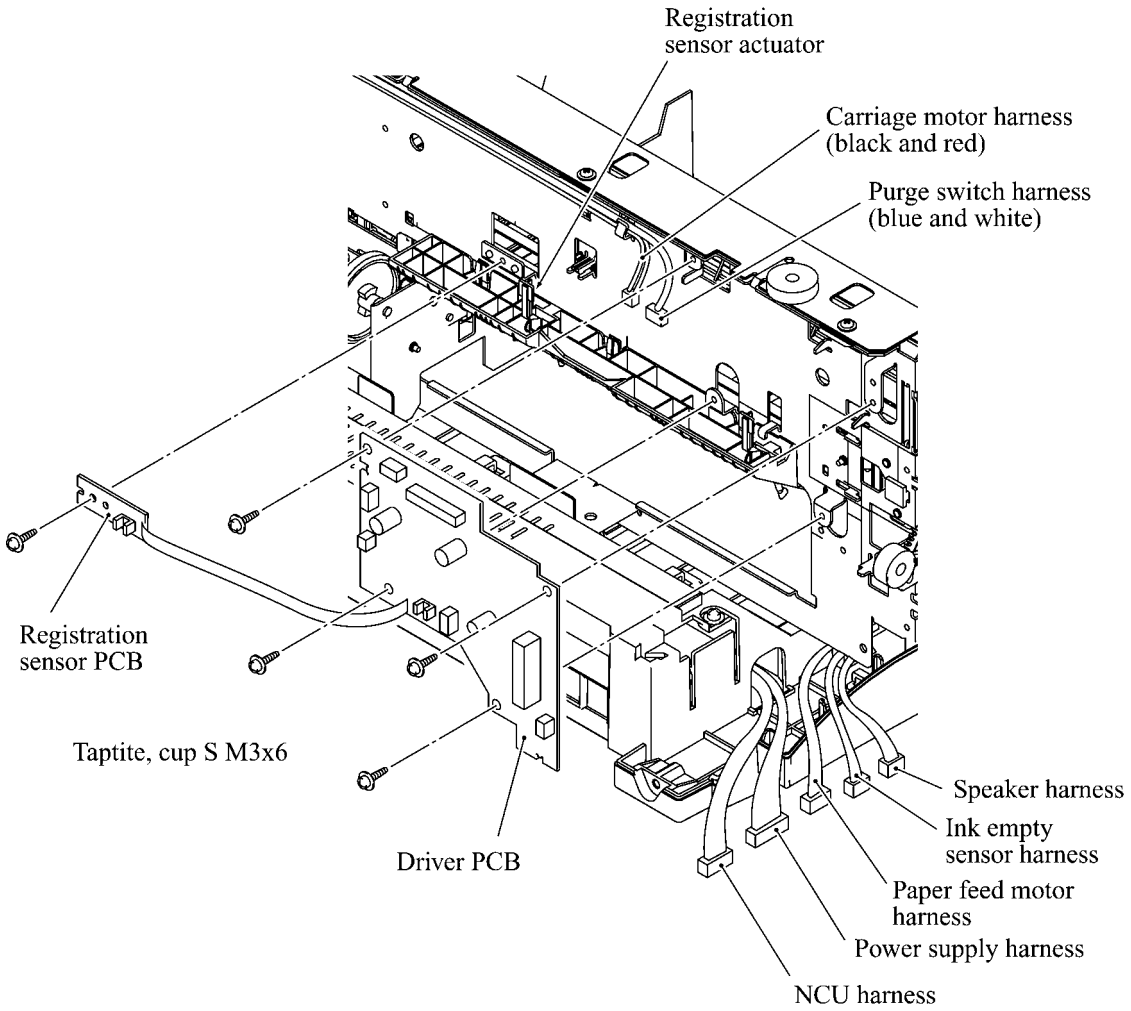
(1) Disconnect the following harnesses from the driver PCB. (Refer to page 4-44 for connector locations.)

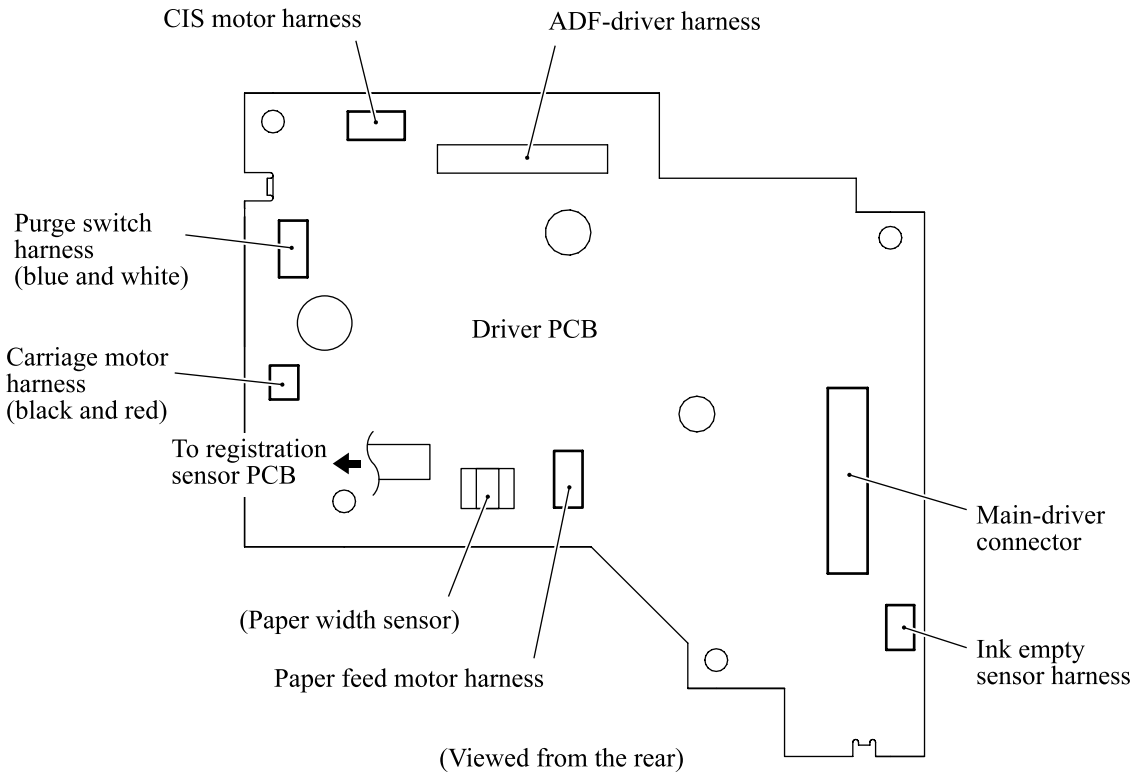
- Purge switch harness, 4-pin (blue and white)
- Carriage motor harness, 2-pin (black and red)
- Paper feed motor harness, 4-pin
- Ink empty sensor harness, 3-pin

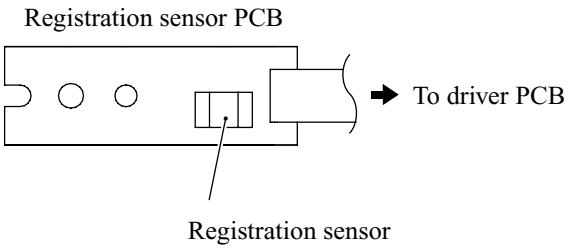


(2) Remove the screw from the registration sensor PCB and release the PCB while pulling the sensor actuator to the rear.

(3) Remove the four screws from the driver PCB.







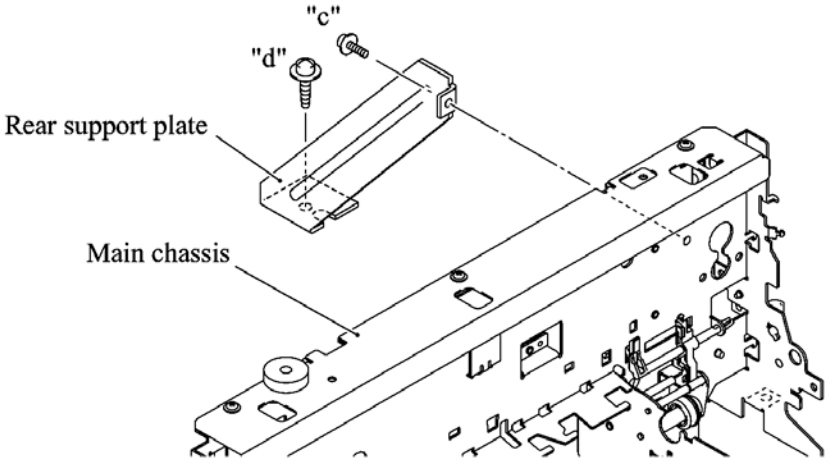
■ Reassembling Notes

- If you replace the driver PCB, you need to perform the following while referring to Chapter 5, Section 5.5. Before starting, make sure that the print head unit is installed.
  - Initializing the EEPROM parameters (Function code 01)
  - Customizing the EEPROM (Function code 74)
  - Setting the sensing reference level of the ink empty sensor (Function code 57)
  - Checking the operations of sensors (Function code 32)
  - Acquiring white level data and the CIS scanner area (Function code 55)
  - Setting ID code
  - Setting head property information to the EEPROM (Function code 68)
  - Updating paper feeding correction value (Function code 66)
  - Aligning vertical print lines (Function code 65)

4.1.13 Rear Support Plate, NCU/PS Shield Box, Power Supply PCB, MJ PCB* and NCU PCB**

* MFC3820CN only
** MFC3420C only

(0) Remove the rear support plate from the right rear corner of the main chassis by removing two screws ("c" and "d").



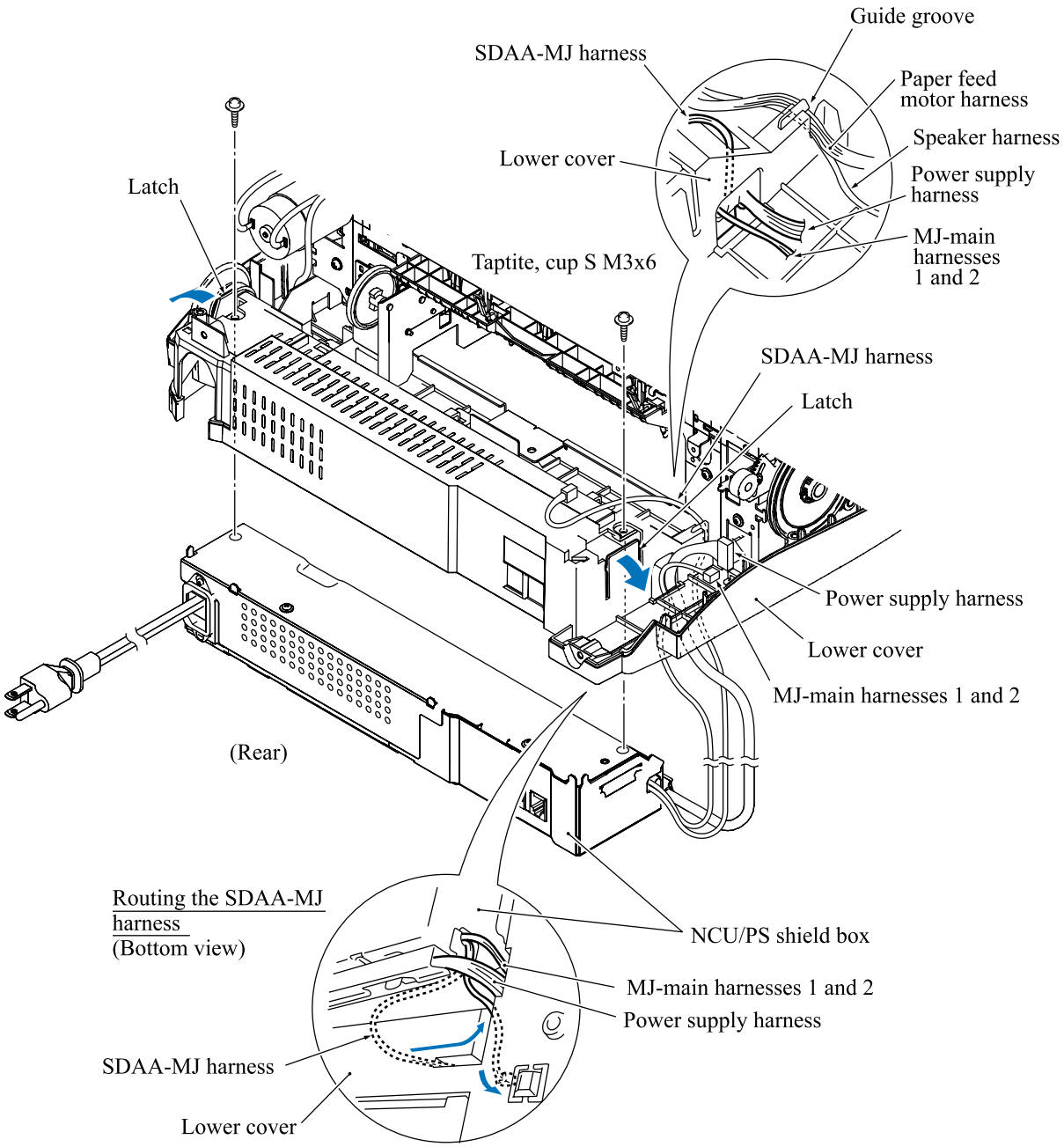
"c": Taptite, cup S M3x6
"d": Taptite, cup B M3x10

MFC3820CN

(0) Make sure that the rear support plate has been removed as shown on page 4-45.

(1) Remove the two screws from the lower cover.

(2) Pull the right and left latches on the lower cover outwards and push down the NCU/PS shield box, while taking the SDAA-MJ harness, power supply harness, and MJ-main harness 1 out of the lower cover.



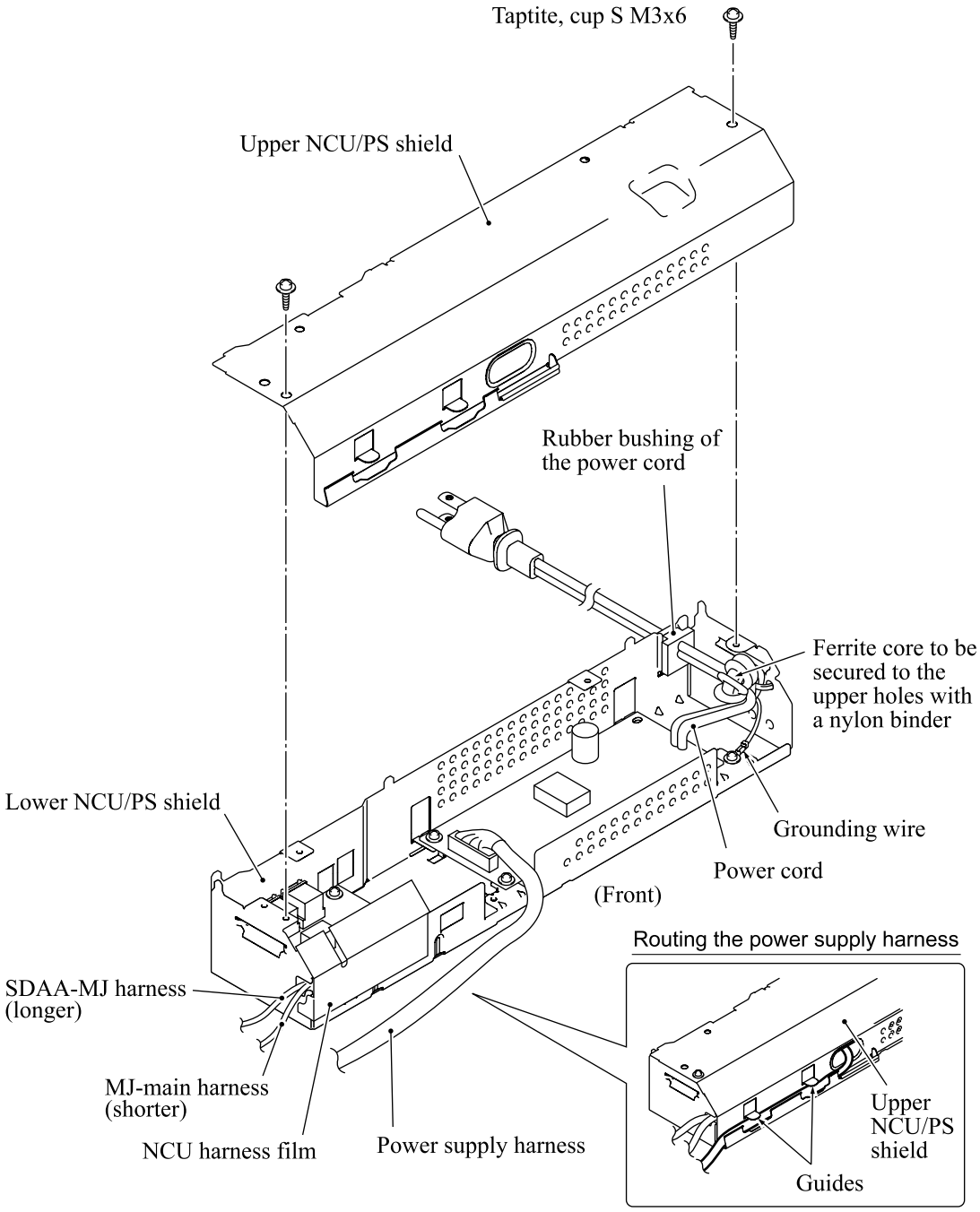
(MJ-main harness 2: Japanese models only)

(3) Take the power supply harness out of the guides provided on the upper NCU/PS shield.

(4) Remove the two screws from the upper NCU/PS shield.

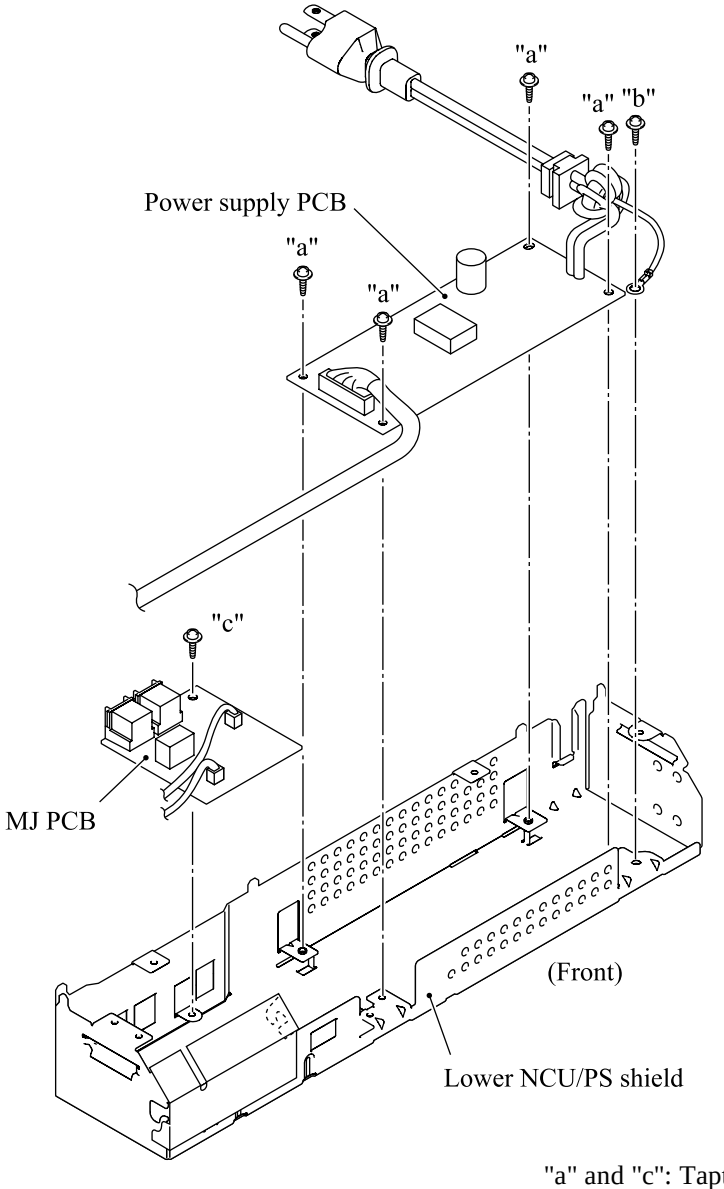
(5) Separate the upper NCU/PS shield from the lower one.

(6) Cut off the nylon binders that secures the ferrite core (on which the power cord and grounding wire are wound) to the upper holes in the lower NCU/PS shield.



(7) Remove the five screws (four "a" and one "b" screws) from the power supply PCB and the grounding wire, and then lift up the PCB.

(8) Remove the screw "c" from the NCU PCB and then take it out.



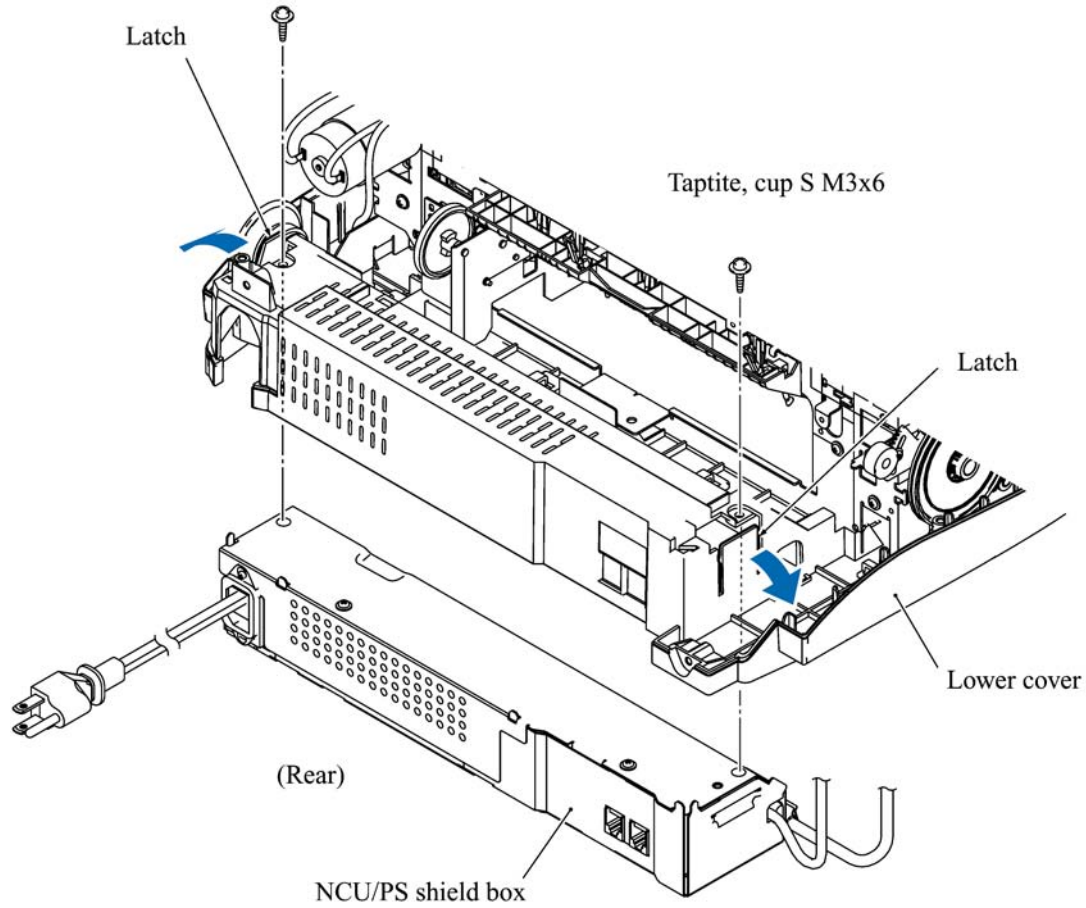
"a" and "c": Taptite, cup S M3x6
"b": Screw, pan (washer) M4x8DB

MFC3420C

(0) Make sure that the rear support plate has been removed as shown on page 4-45.

(1) Remove the two screws from the lower cover.

(2) Pull the right and left latches on the lower cover outwards and push the NCU/PS shield box down and out of the lower cover.

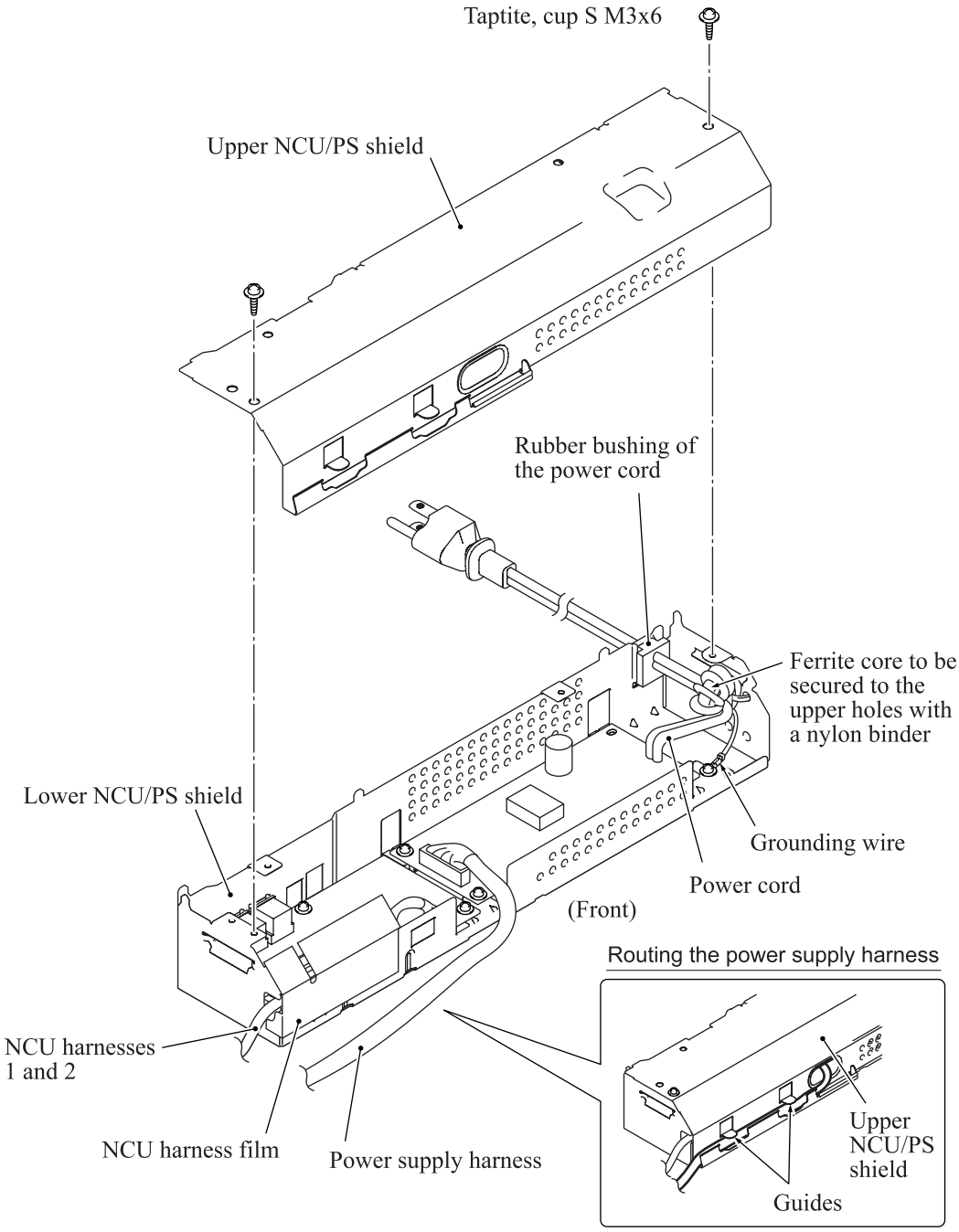


(3) Take the power supply harness out of the guides provided on the upper NCU/PS shield.

(4) Remove the two screws from the upper NCU/PS shield.

(5) Separate the upper NCU/PS shield from the lower one.

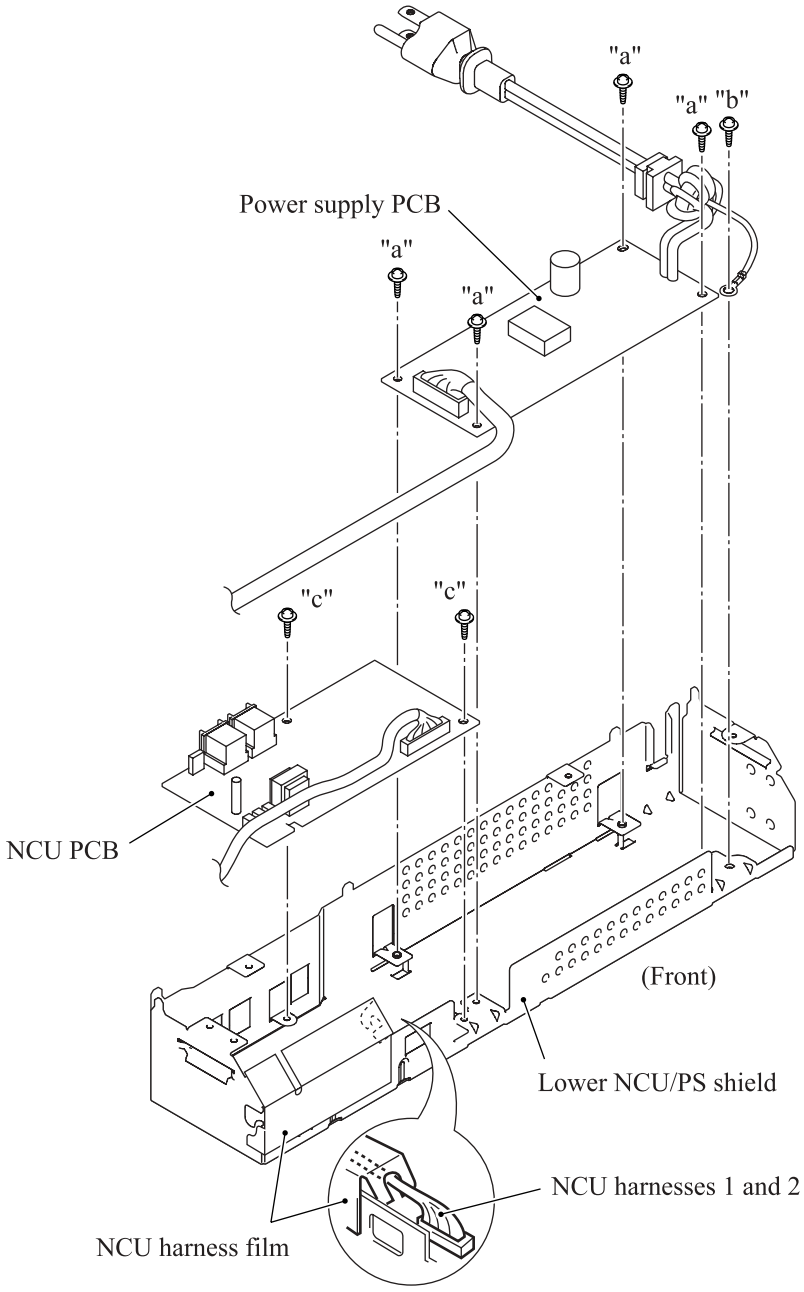
(6) Cut off the nylon binders that secures the ferrite core (on which the power cord and grounding wire are wound) to the upper holes in the lower NCU/PS shield.



(NCU harness 2: Except American models)

(7) Remove the five screws (four "a" and one "b" screws) from the power supply PCB and the grounding wire, and then lift up the PCB.

(8) Remove two screws "c" from the NCU PCB and then take it out.



(NCU harness 2: Except American models)

"a" and "c": Taptite, cup S M3x6
"b": Screw, pan (washer) M4x8DB

■ Reassembling Notes

- Make sure that the NCU harnesses 1 and 2 are routed through the NCU harness film as shown above. (NCU harness 2: Except American models)

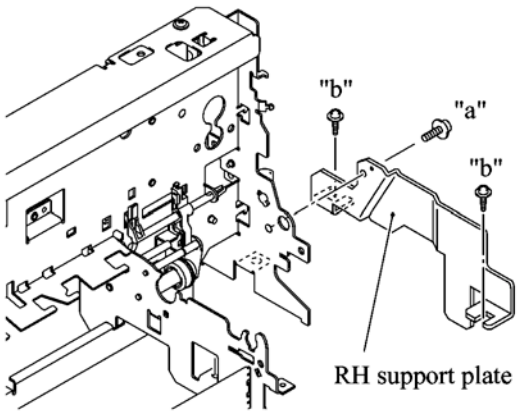
4.1.14 RH Support Plate and Purge Unit

(1) Remove the print head unit (refer to Section 4.1.1).

(2) Disconnect the purge switch harness (blue and white) from the driver PCB if you have not removed the driver PCB.

Remove the purge switch harness from the harness guides (shown on the next page) provided on the rear of the main chassis.

(3) Remove the three screws (one "a" and two "b" screws) from the right side of the main chassis to release the RH support plate.



"a": Taptite, cup S M3x6
"b": Taptite, cup B M4x12

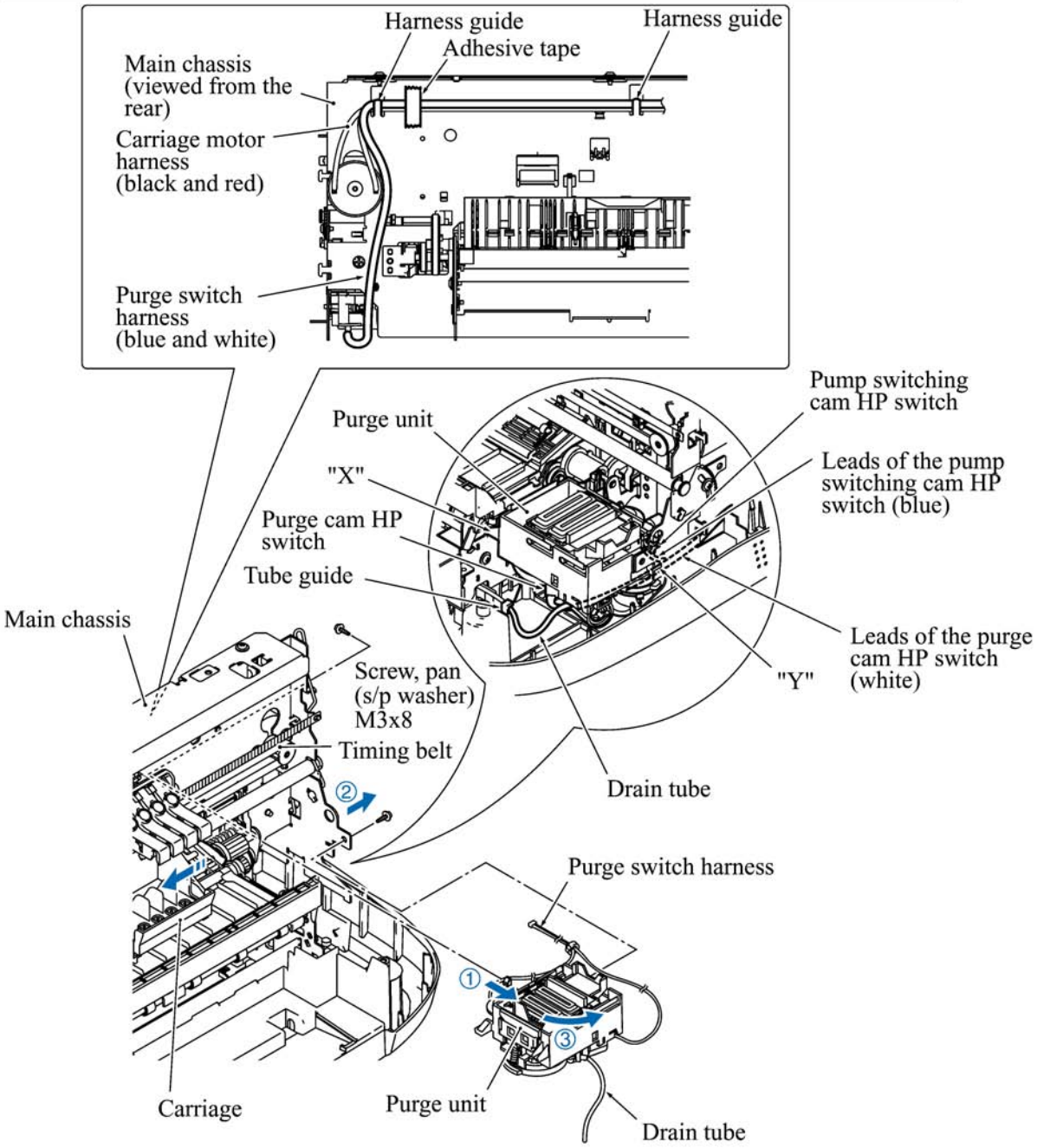
(4) As shown on the next page, remove the two screws, one from the right side and the other from the rear side of the purge unit.

(5) Pull the drain tube off the tube joint that is latched to the tube guide.

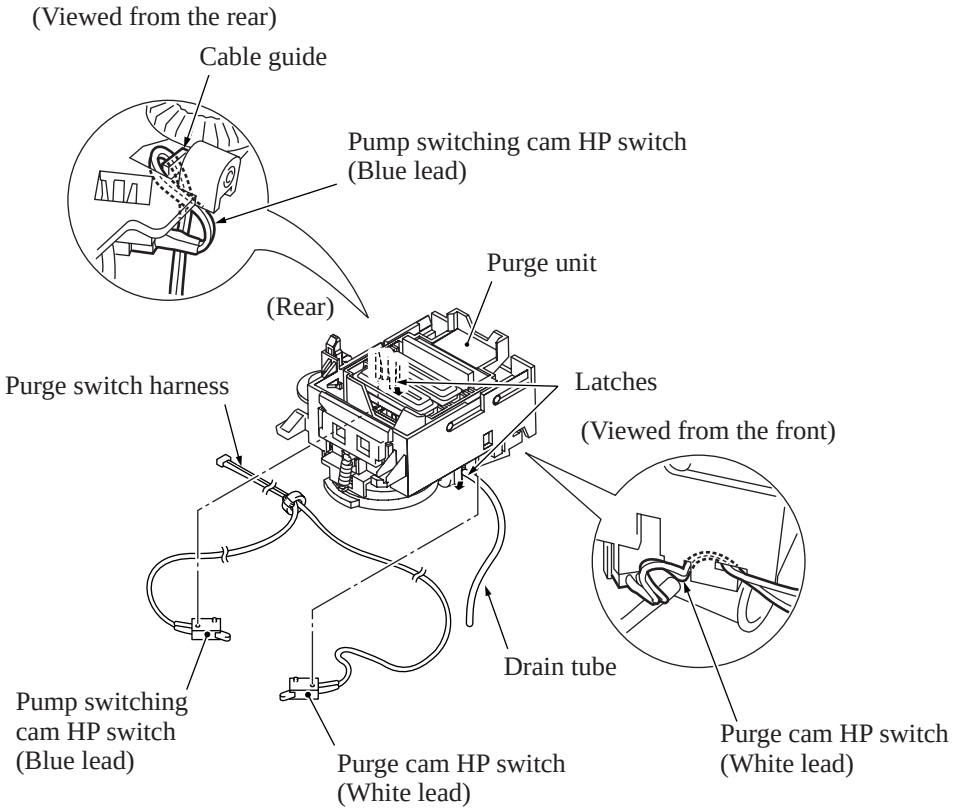
NOTE: Cover the end of the drain tube with a waste cloth to prevent drained ink from leaking out and making stains on the machine.

(6) Pull the purge unit to the front in the order of arrows ① to ③ as shown on the next page.

Routing the purge switch harness and carriage motor harness on the rear side of the main chassis



(7) Remove the purge cam HP switch and pump switching cam HP switch from the purge unit by pulling the latches outwards, respectively.



■ Reassembling Notes

- When installing the purge unit, be sure to insert the end of the drain tube to the tube joint and latch the joint to the tube guide.

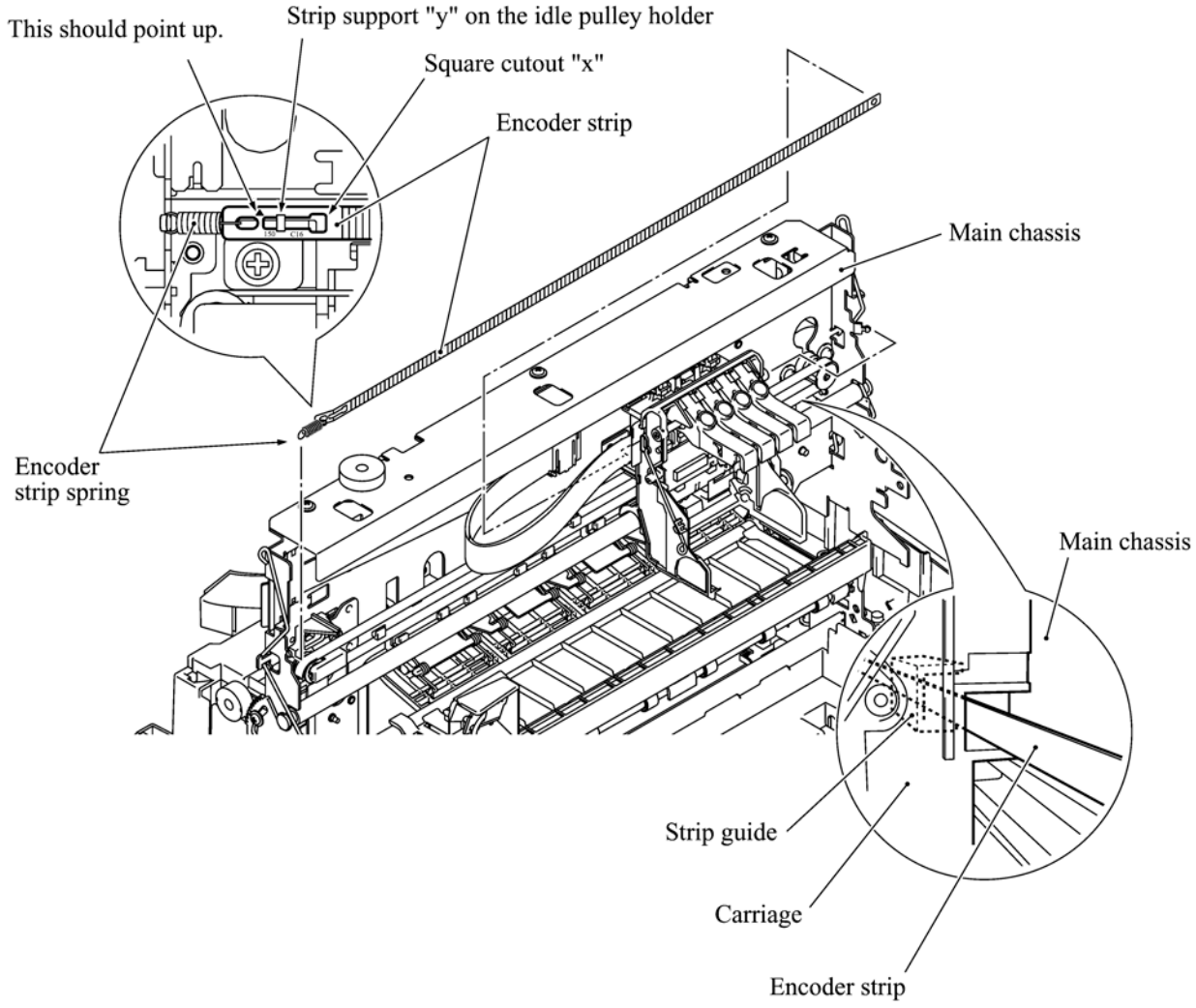
4.1.15 Encoder Strip

NOTE: When handling the encoder strip, take care not to touch the striped face by hand, scratch or damage the encoder strip. If it becomes dirty, wipe it with a soft, dry cloth.

(1) Unhook the right end of the encoder strip from the main chassis.

(2) Slide the encoder strip to the left until square cutout "x" becomes aligned with strip support "y" on the idle pulley holder.

(3) Unhook the encoder strip spring from the main chassis and pull out the encoder strip to the left.



■ Reassembling Notes

- As shown above, pass the encoder strip through the strip guide provided on the back of the carriage so that the ▲-marked end comes to the left and the ▲ mark points up. Fit square cutout "x" provided in the encoder strip over strip support "y" on the idle pulley holder, slide the strip to the right, and hook the encoder strip spring on the main chassis. Then hook the right end of the encoder strip on the main chassis.

4.1.16 Carriage Rail, Carriage, and Carriage PCB

(1) If the ink cartridges and print head have not been removed, remove them (refer to Section 4.1.1).

(2) Move the carriage to the center of its travel.

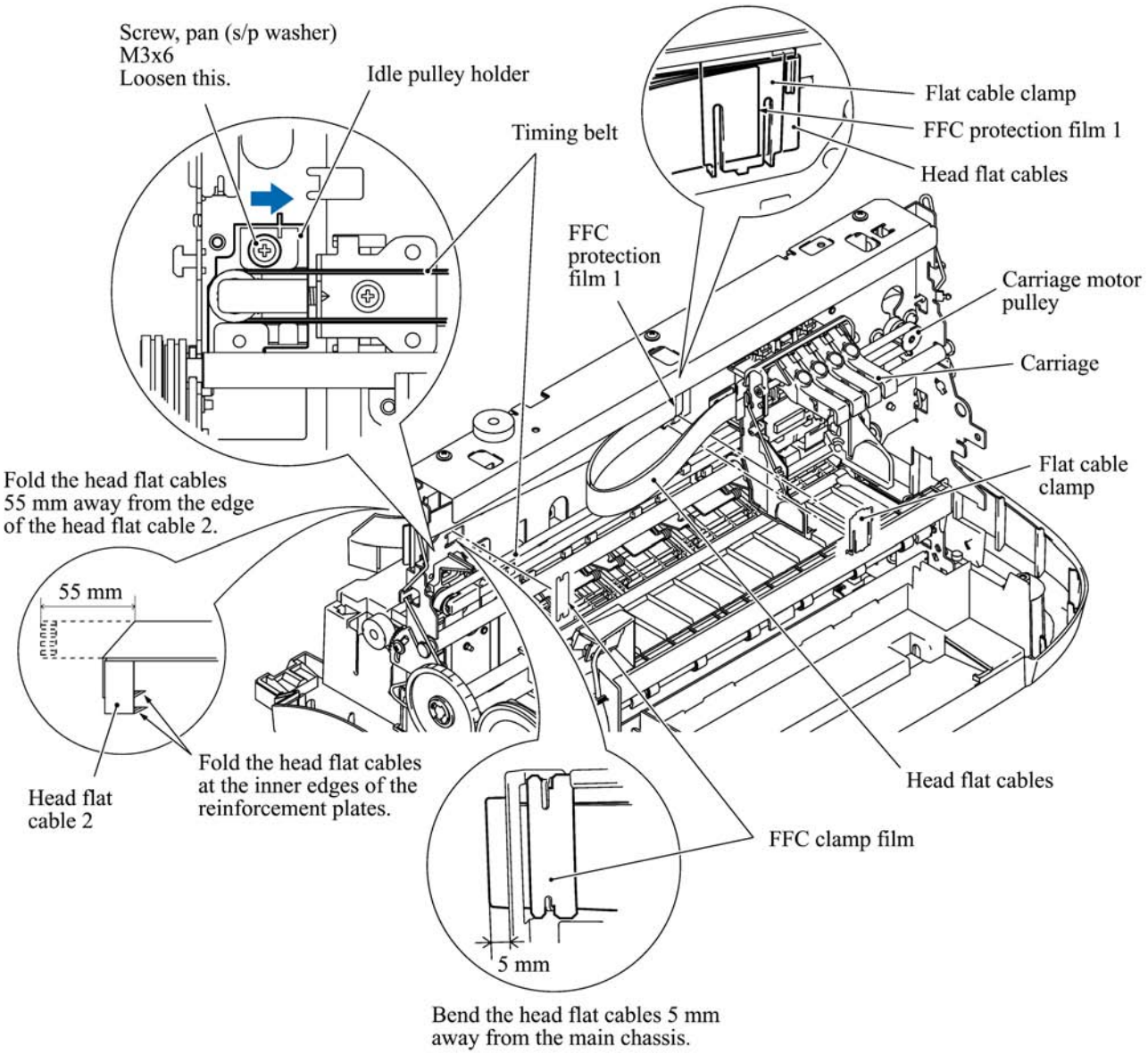
(3) Loosen the screw on the idle pulley holder.

(4) At the rear side of the main chassis, while pushing the back of the idle pulley holder towards the carriage motor, remove the timing belt from the carriage motor pulley and idle pulley.

(5) Remove the FFC clamp film from the left end of the main chassis.

(6) Move the carriage to the right.

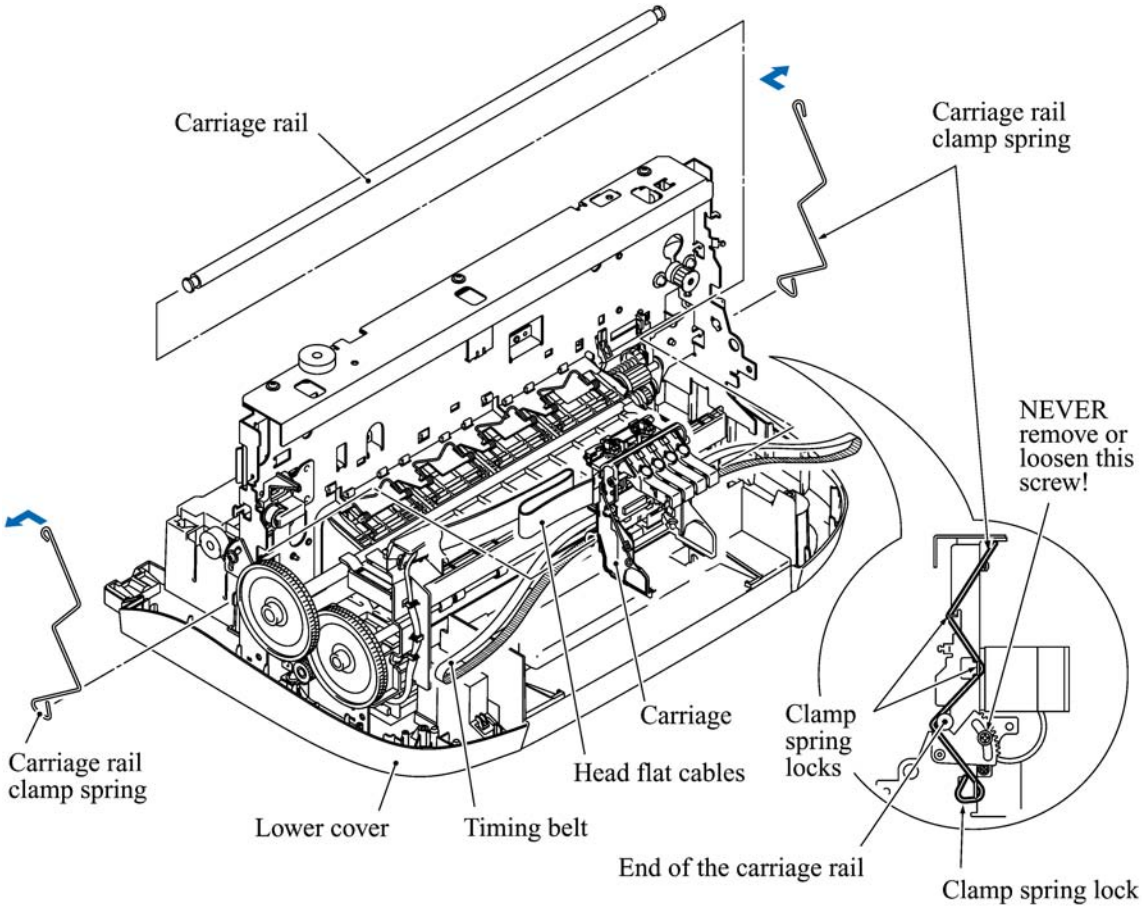
(7) Remove the flat cable clamp from the center of the main chassis to release the head flat cables.



(8) Remove the carriage rail clamp springs from the right and left sides of the main chassis.

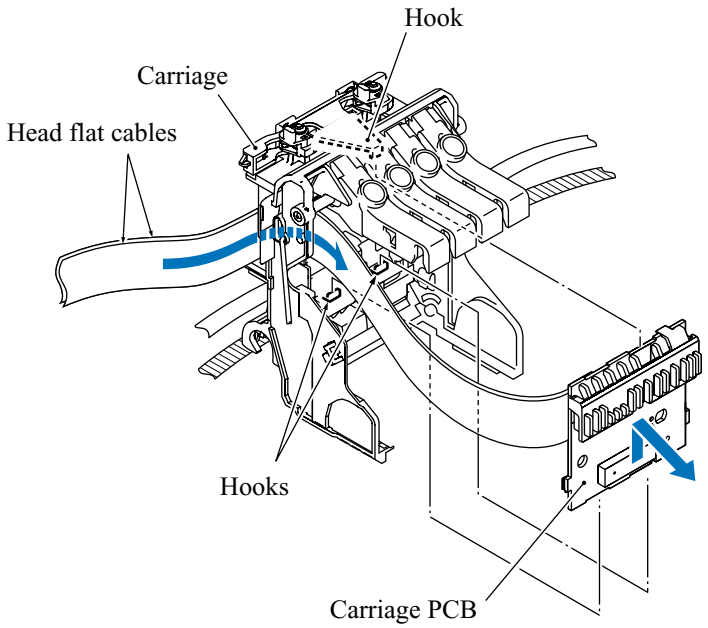
(9) Pull out the carriage rail to the right.

(10) Take the carriage out of the main chassis.



(11) Remove the timing belt from the back of the carriage.

(12) Pull up the carriage PCB to release its lower end from the hooks on the carriage and take it out of the carriage together with the head flat cables.



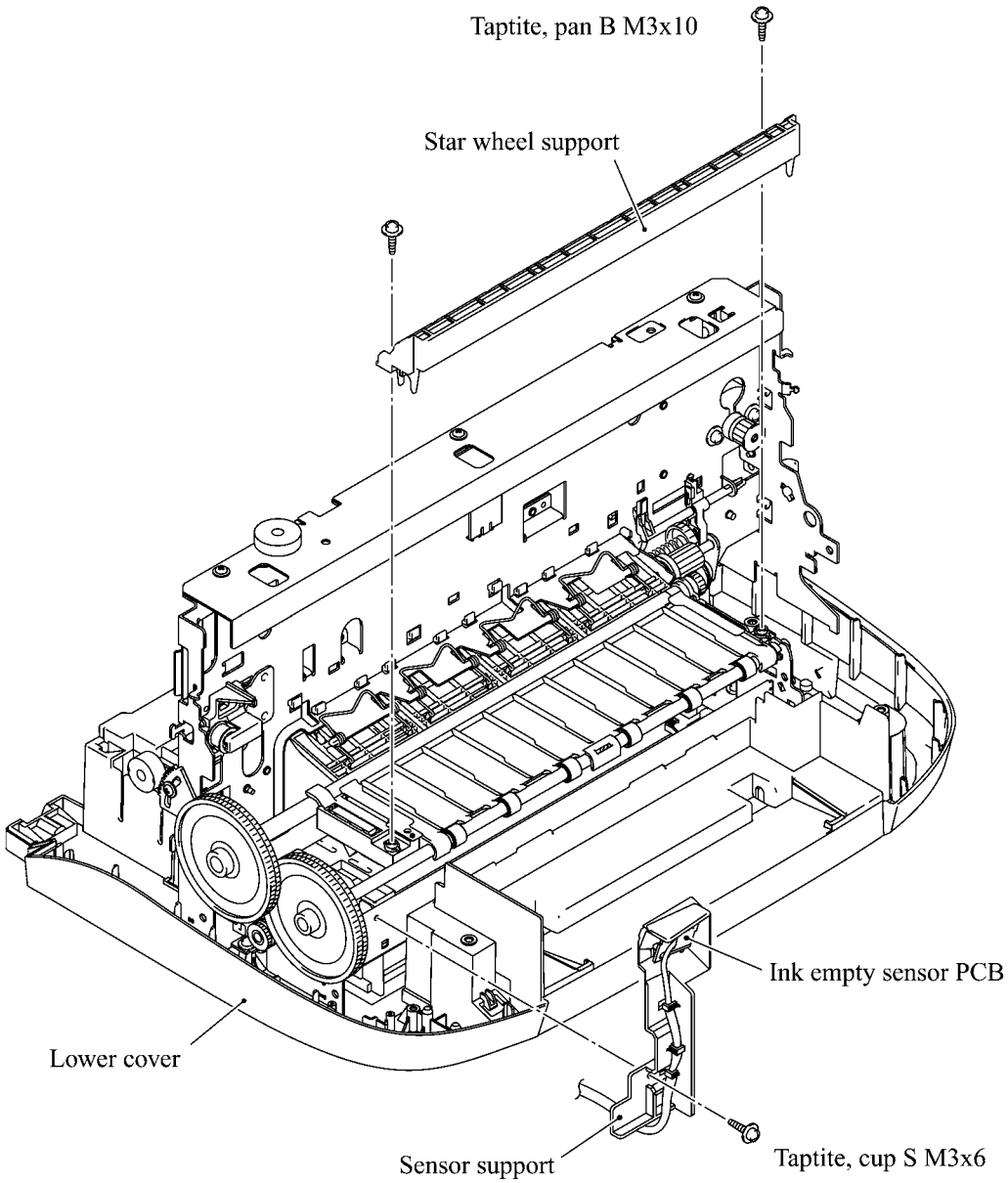
■ Reassembling Notes

- After setting the carriage to the main chassis and routing the head flat cables, be sure to fold those cables as specified on page 4-56.
- If you replace the carriage, you need to perform the following while referring to Chapter 5, Section 5.3.
  - Cleaning the new print head unit
  - Correcting the positioning error of the print head
  - Updating the paper feeding correction value (Function code: 66)
  - Aligning vertical print lines (Function code 65)

4.1.17 Sensor Support (Ink Empty Sensor PCB) and Star Wheel Support

(1) Remove the screw from the sensor support (holding the ink empty sensor PCB) and take it off the main chassis.

(2) Remove the two screws from the star wheel support and lift it up.



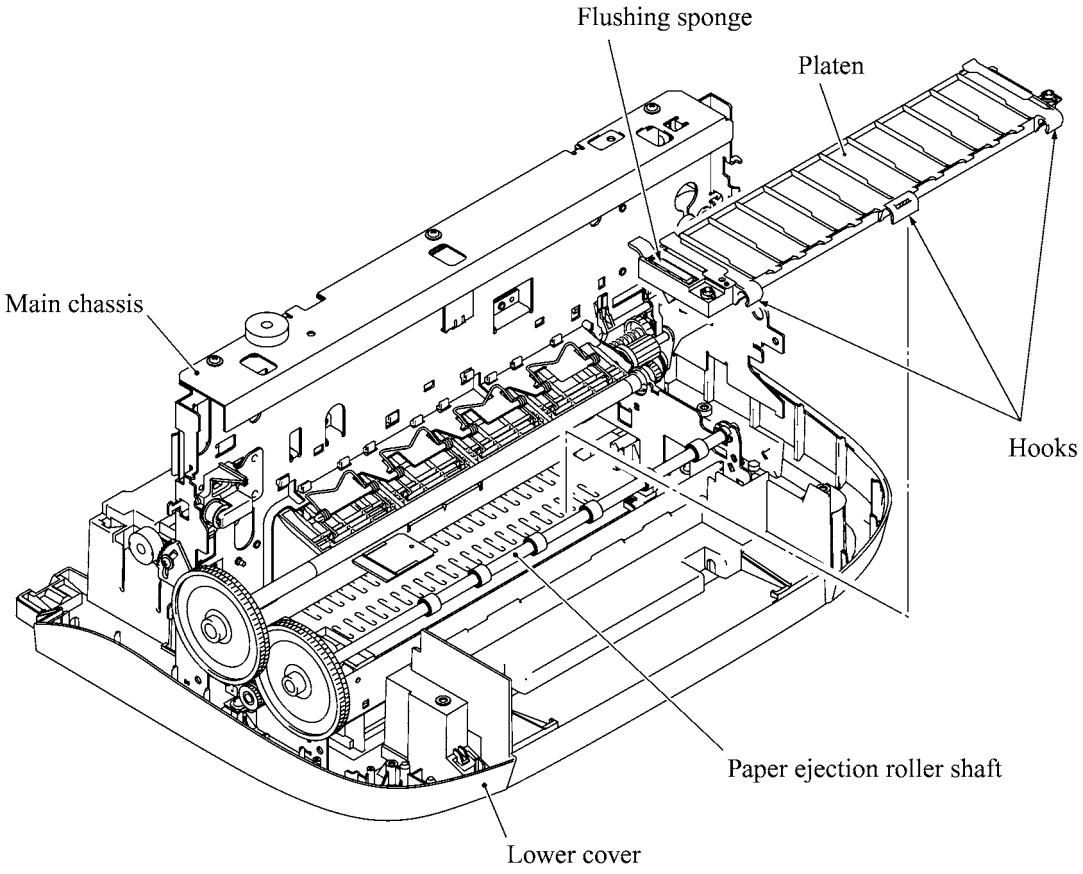
■ **Reassembling Notes**

- If you replace the ink empty sensor PCB, you need to perform the following while referring to Chapter 5, Section 5.7.
  - Setting the sensing reference level of the ink empty sensor (Function code 57)

4.1.18 Platen

(1) Push up the three hooks on the front end of the platen to release them from the paper ejection roller shaft, and then lift up the platen.

NOTE: Take care not to touch the flushing sponge that is impregnated with ink.



■ **Reassembling Notes**

- When replacing the platen, be careful with the size. There are A4- and letter-sized platens available.

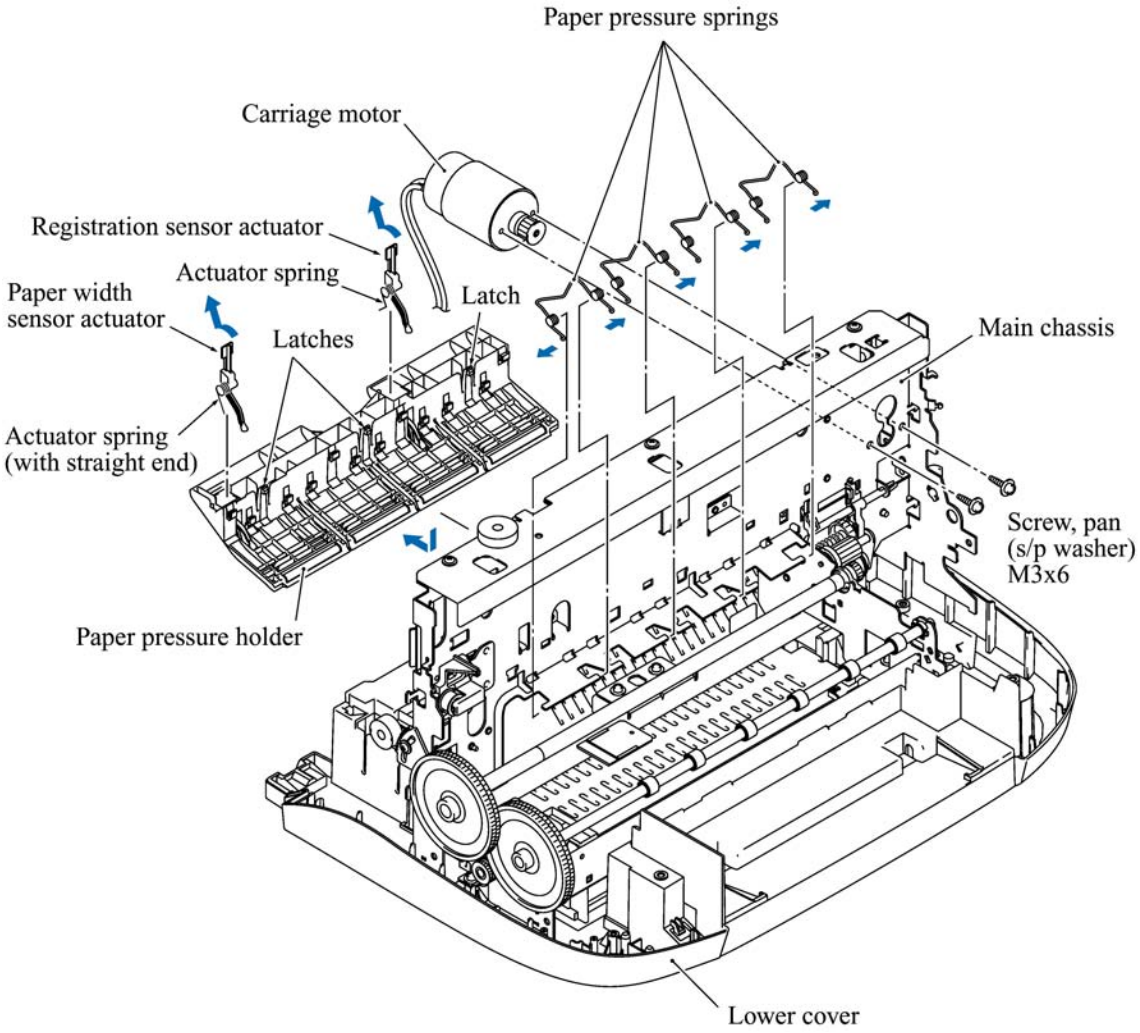
4.1.19 Paper Pressure Holder, Sensor Actuators and Carriage Motor

(1) Remove the four paper pressure springs from the main chassis by pulling both ends of each spring to the right except the left end of the leftmost spring, as shown below.

(2) At the front side of the main chassis, press the three latches on the paper pressure holder to the rear through the openings provided in the main chassis. At the rear side, push down the paper pressure holder.

(3) Turn the top end of each of sensor actuators (of the paper width sensor and registration sensor) to the rear and lift it up together with the spring.

(4) Remove the carriage motor by removing the two screws.



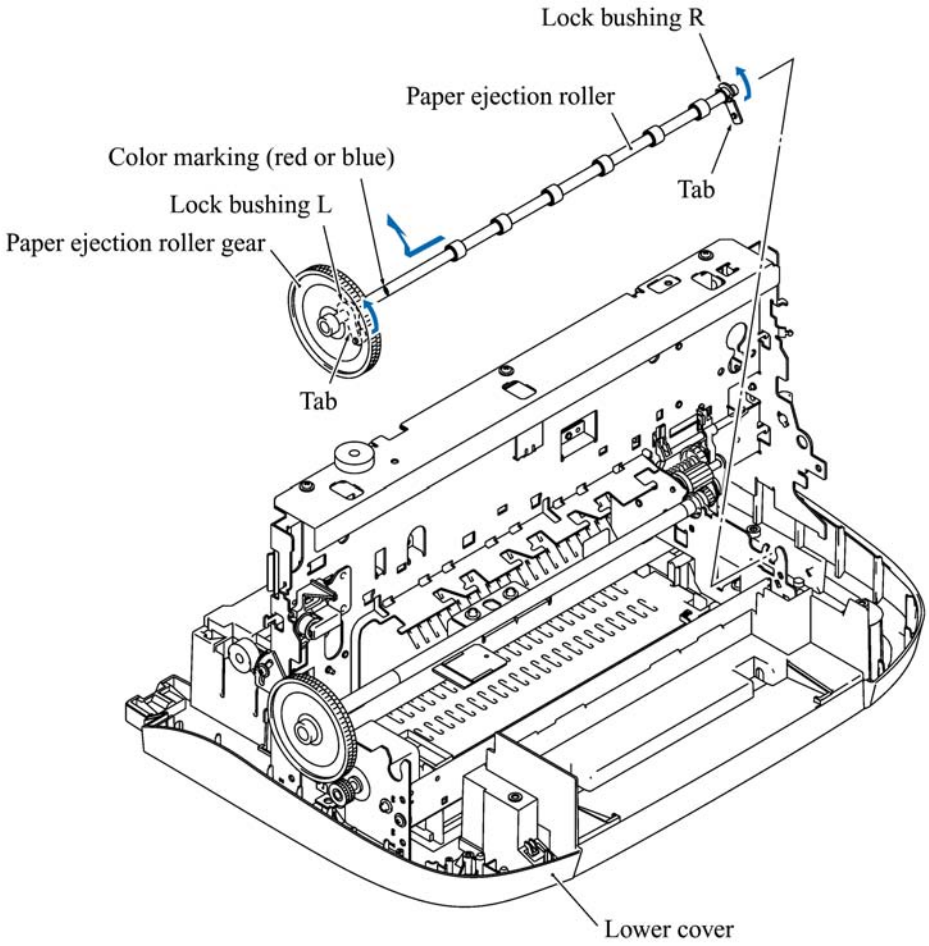
■ **Reassembling Notes**

- The actuator springs for the paper width sensor actuator and registration sensor actuator are not compatible with each other, while those actuators are compatible. Set the actuator spring whose one end is straight onto the paper width sensor actuator as shown above.

4.1.20 Paper Ejection Roller

(1) At the right end of the paper ejection roller, pull the tab of lock bushing R to the right, turn it clockwise (viewed from the right), and pull it out to the right.

(2) At the left end, pull the tab of lock bushing L to the right, turn it clockwise until it becomes horizontal, and then lift up the paper ejection roller.

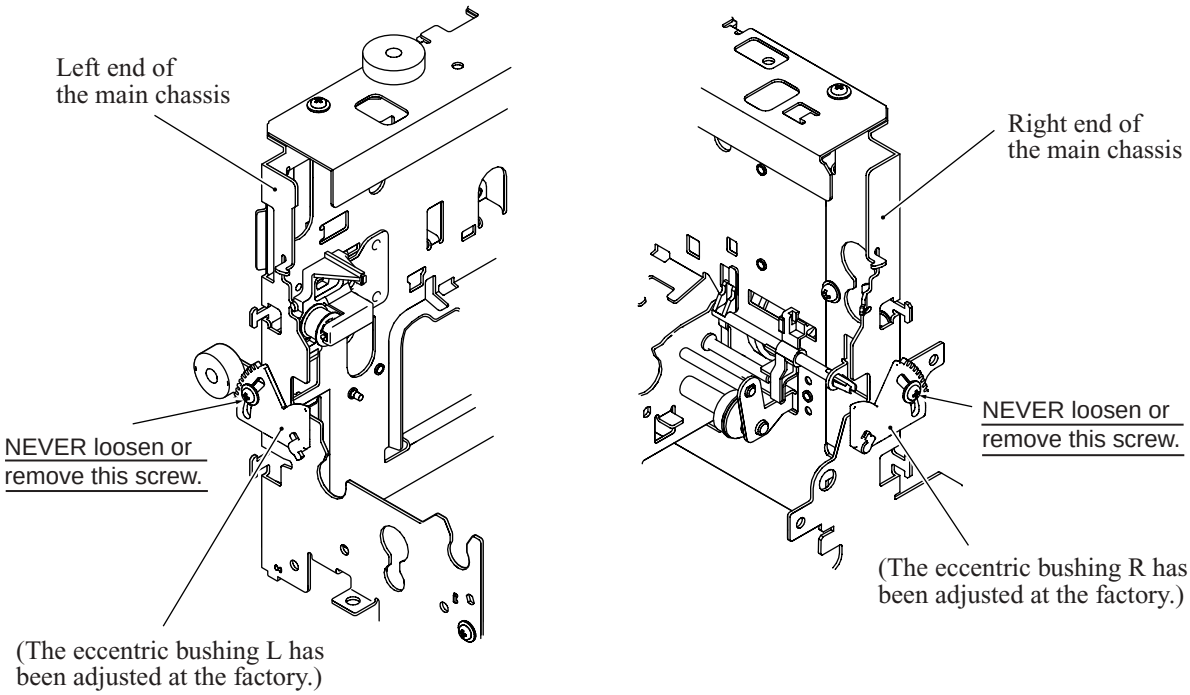


■ **Reassembling Notes**

- Each of the paper ejection roller, paper feed roller, and print head unit has a color marking (red or blue) that allows you to check the compatibility between them. Note that a new paper ejection roller (and print head unit) to be provided as a spare part has a red & blue marking, meaning that it is compatible with a paper feed roller and print head unit having either color marking. (Refer to Chapter 5, Section 5.6.)
- If you replace the paper ejection roller (and/or the paper feed roller), you need to update the paper feeding correction value stored in the memory (EEPROM) on the driver PCB, referring to Chapter 5, Section 5.6.

4.1.21 Paper Feed Roller and Purge-Related Parts (Purge Lever, Purge Shaft, and ASF-Purge Switching Gear 23)

CAUTION: Never loosen or remove screws that secure the eccentric bushings at the right and left ends of the main chassis.



NOTE: When accessing the paper feed roller and its surroundings, take care not to touch the coated section of the paper feed roller.

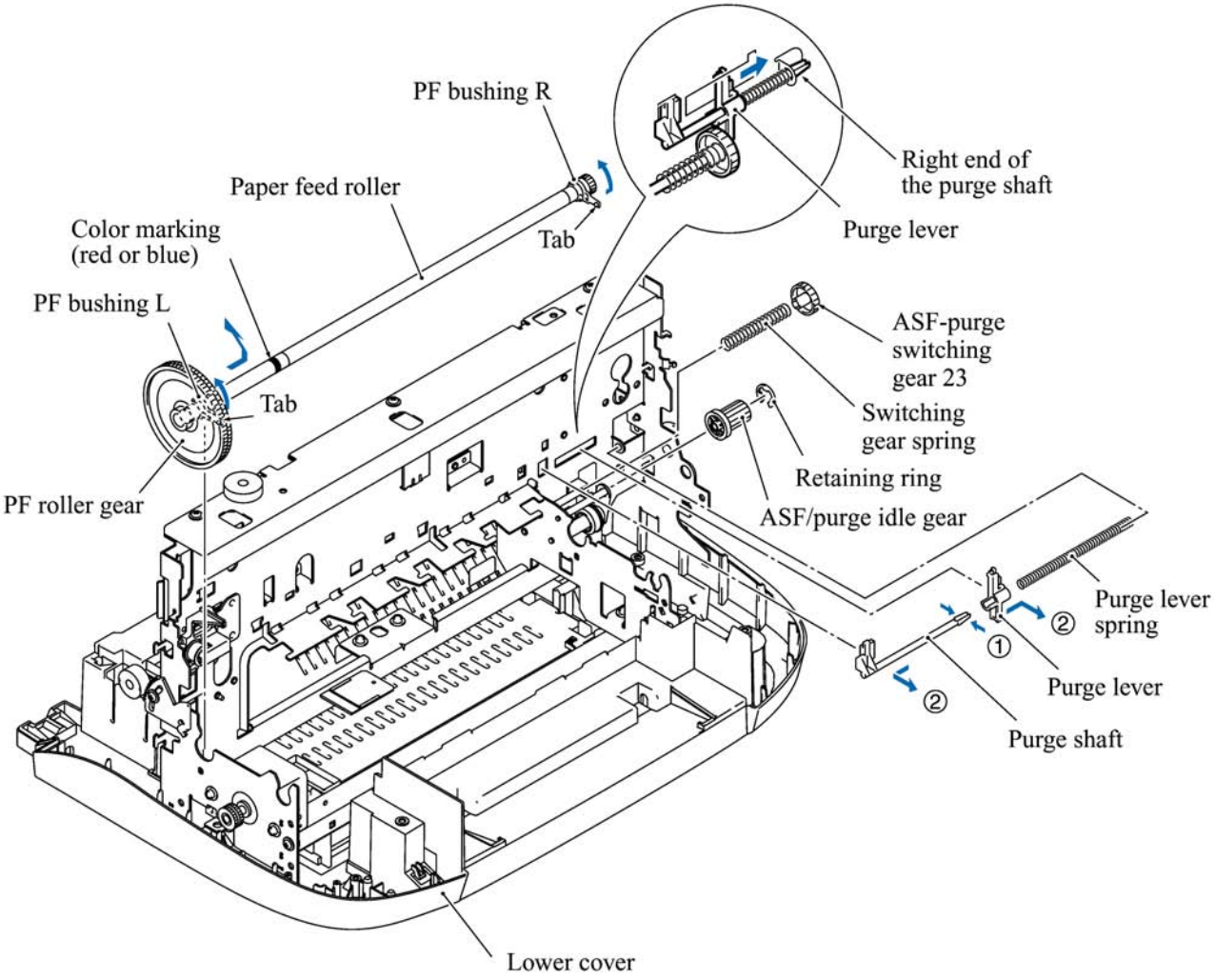
(1) At the right end of the paper feed roller, pull the tab of lock bushing R to the right and turn it clockwise (viewed from the right) until it becomes horizontal. (See the next page.)

(2) At the left end, pull the tab of lock bushing L to the right and turn it clockwise until it becomes vertical. Then lift the paper feed roller up and to the front.

(3) Press the right end of the purge shaft inwards (arrow ① shown on the next page) and pull it out of the purge lever (arrow ②). The purge lever spring also comes off.

(4) Remove the ASF-purge switching gear 23 and its spring.

(5) Remove the ASF/purge idle gear by removing the retaining ring.



■ Reassembling Notes

- Each of the paper feed roller, paper ejection roller, and print head unit has a color marking (red or blue) that allows you to check the compatibility between them. (Note that a new paper ejection roller or print head unit to be provided as a spare part has a red & blue marking, meaning that it is compatible with other parts having either color marking. Refer to Chapter 5, Section 5.6.)

  When replacing the paper feed roller, ensure that the new roller has a color marking matching the paper ejection roller and print head unit. For details about the compatibility, refer to Chapter 5, Section 5.6.
- If you replace the paper feed roller (and/or the paper ejection roller), you need to update the paper feeding correction value stored in the memory (EEPROM) on the driver PCB, referring to Chapter 5, Section 5.6.

4.1.22 Main Chassis, Paper Feed Motor, and Speaker

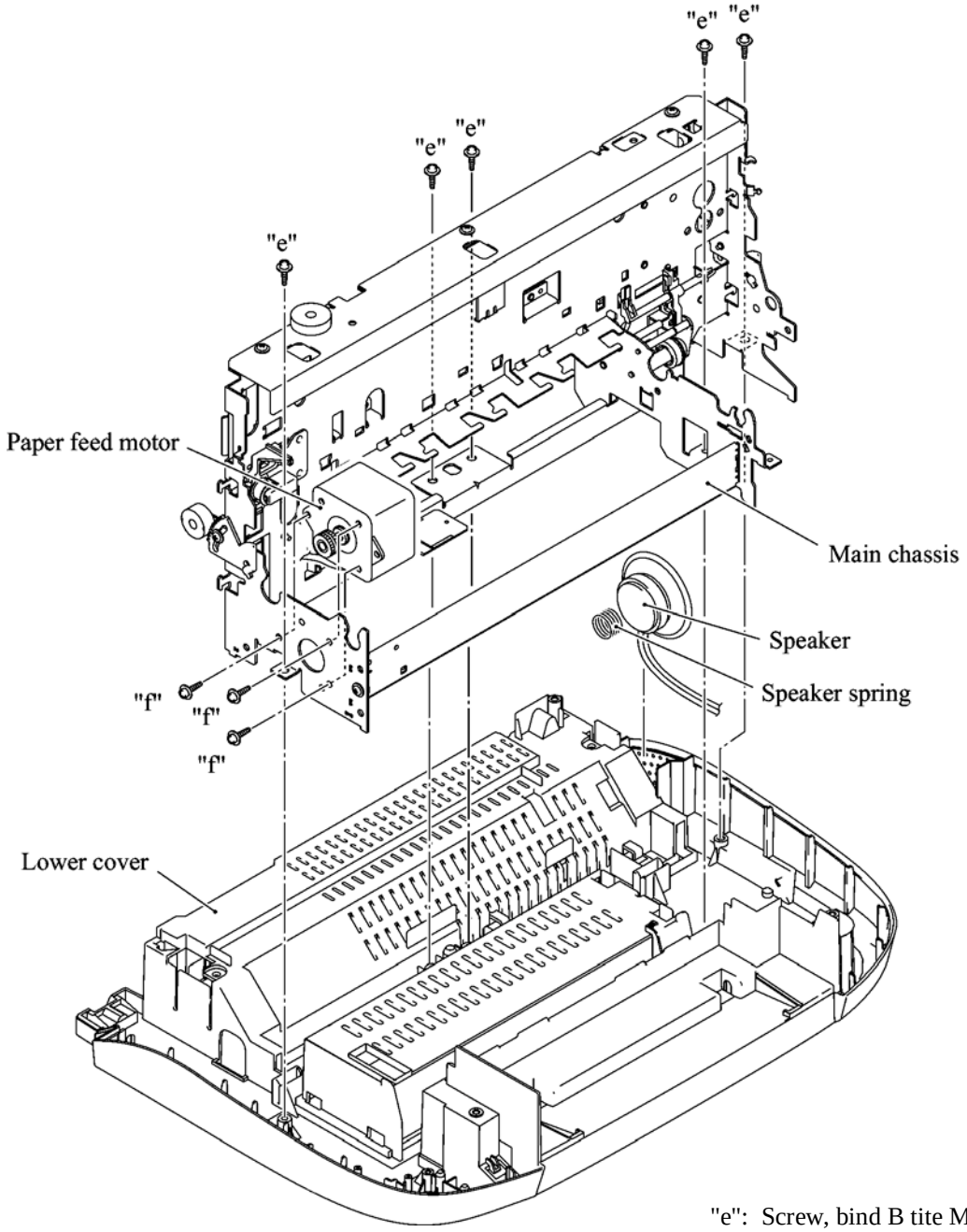
(1) If the rear support plate has not been removed from the right rear corner of the main chassis in Section 4.1.13, take it off by removing two screws.

(2) If the RH support plate has not been removed from the right side of the main chassis in Section 4.1.14, take it off by removing three screws.

(3) Remove five screws "e" from the main chassis.

(4) Lift the main chassis up and out of the lower cover.

NOTE: Place the main chassis on a flat plane. Do not press the main chassis or apply load to it. The main chassis may be easily warped or distorted so that the print quality could deteriorate.



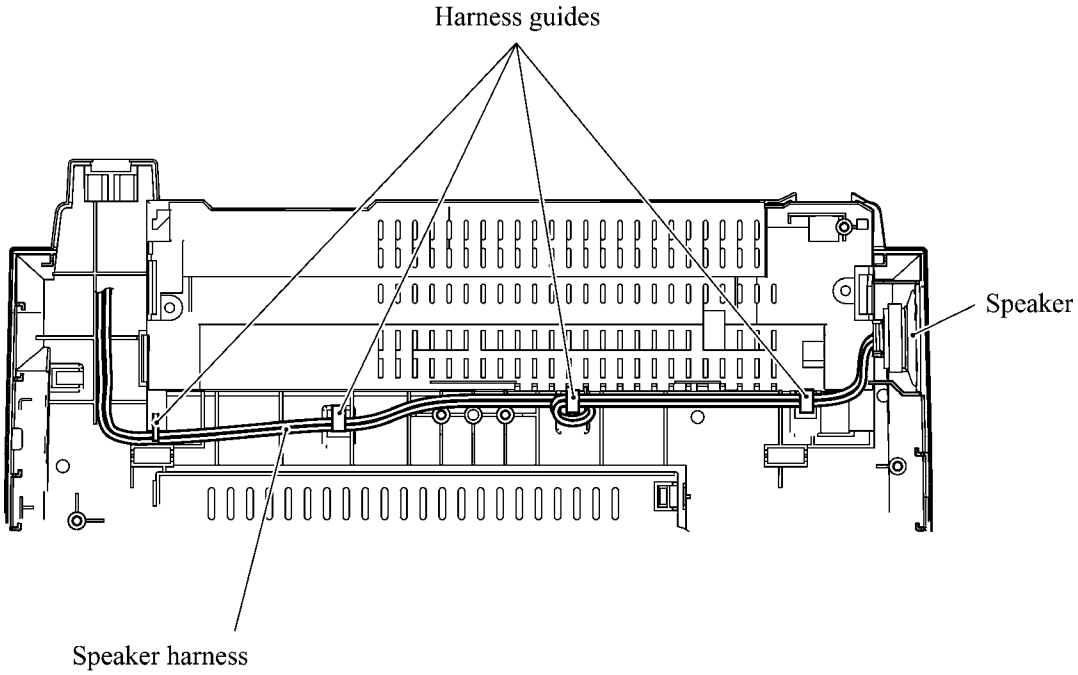
"e": Screw, bind B tite M4x12
"f": Screw, bind M3x6

(5) Remove the paper feed motor by removing three screws "f."

(6) Pull up the speaker together with its spring.

■ Reassembling Notes

- When securing the paper feed motor, face down the motor end where the harness comes from.
- Before installing the main chassis to the lower cover, make sure that the paper feed motor and speaker have been set back into place. Also make sure that the speaker harness is routed as shown below.



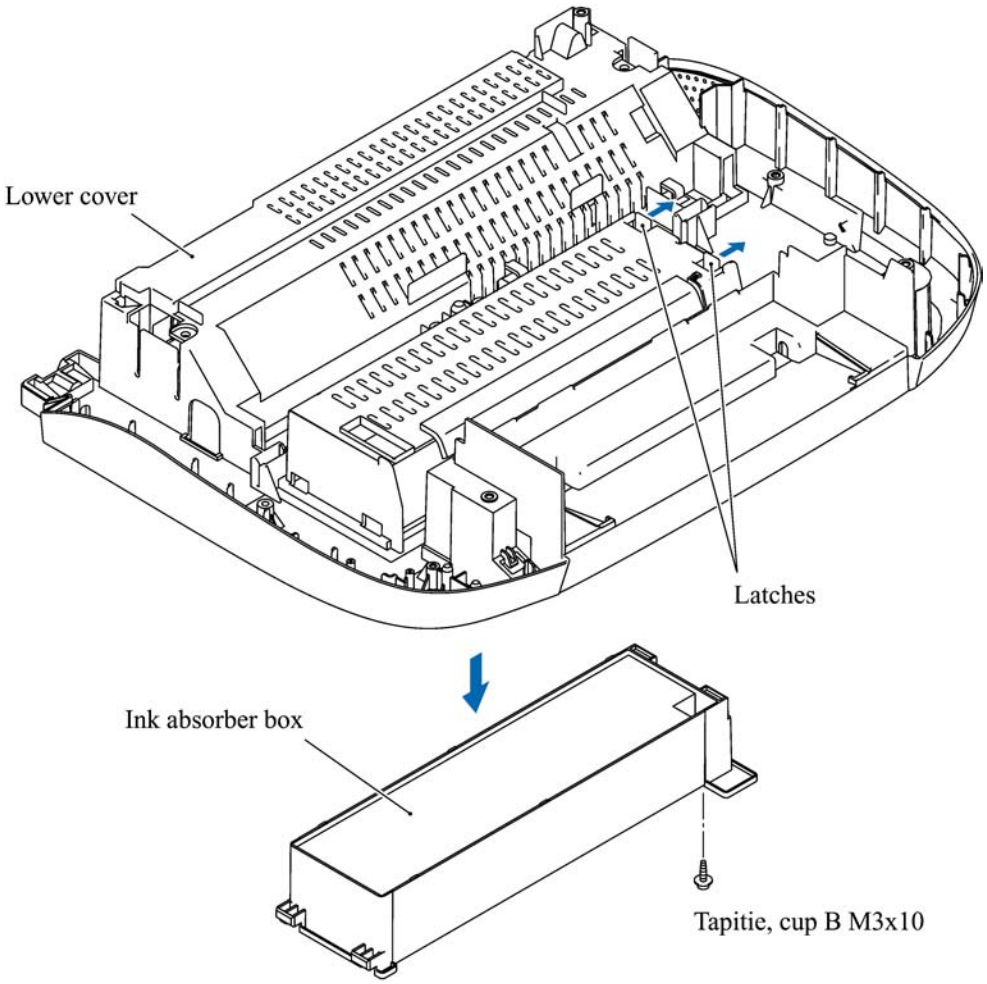
4.1.23 Ink Absorber Box

NOTE: Do not remove the ink absorber box unless it requires replacement. When replacing it, set a new one soon after the removal to prevent the machine from getting stained with drained ink.

NOTE: If the print head unit is replaced, replace also the ink absorber box.

(1) Pull the two latches provided on the lower cover to the right and push down the ink absorber box.

NOTE: If the ink absorber box or the surrounding parts are stained with ink, wipe them with a waste cloth.



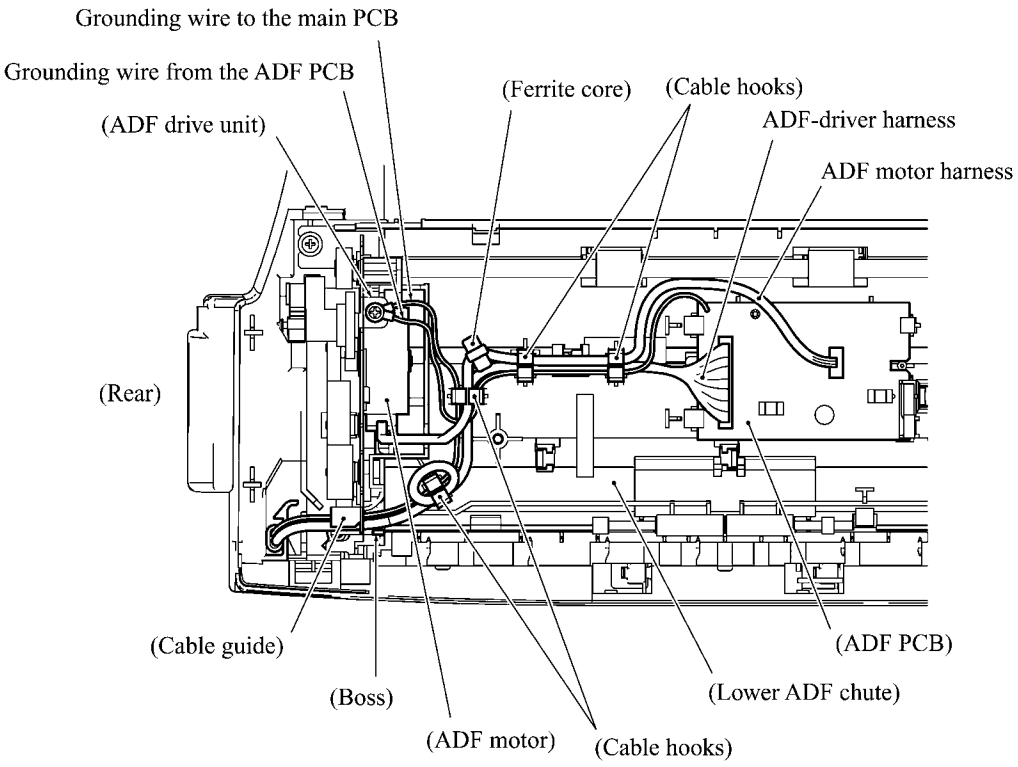
■ Reassembling Notes

- If you replace the ink absorber box, you need to perform the following while referring to Chapter 5, Section 5.8.
  - Resetting the purge counter to zero (Function code 80 + 2783)

4.2 HARNESS ROUTING

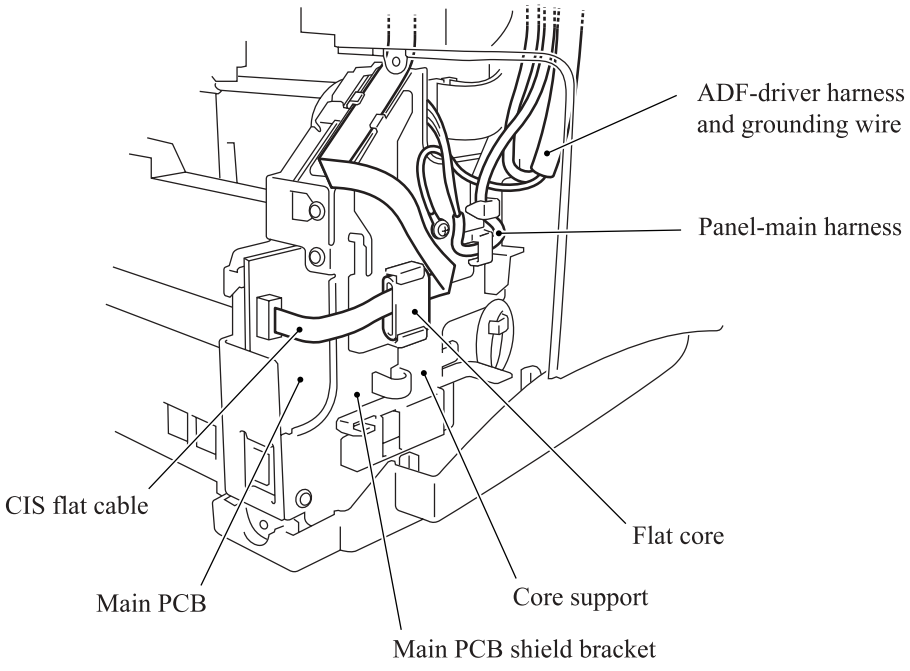
Harness routing A: ADF-driver harness, ADF motor harness, and grounding wires

On the top of the lower ADF chute

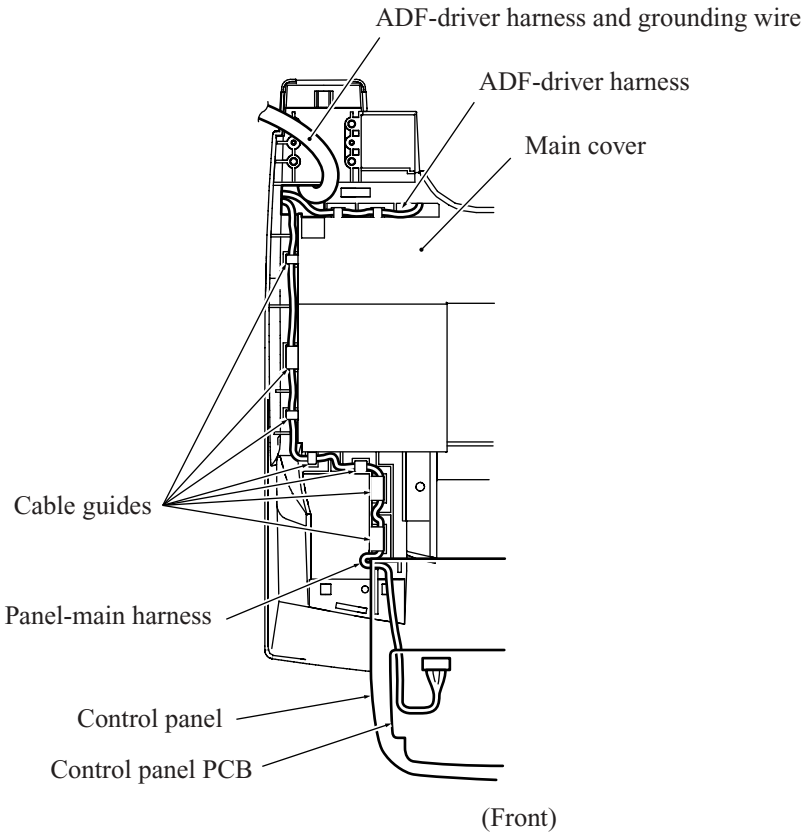


Harness routing B ADF-driver harness, panel-main harness, and CIS flat cable

On the LH side of the main chassis

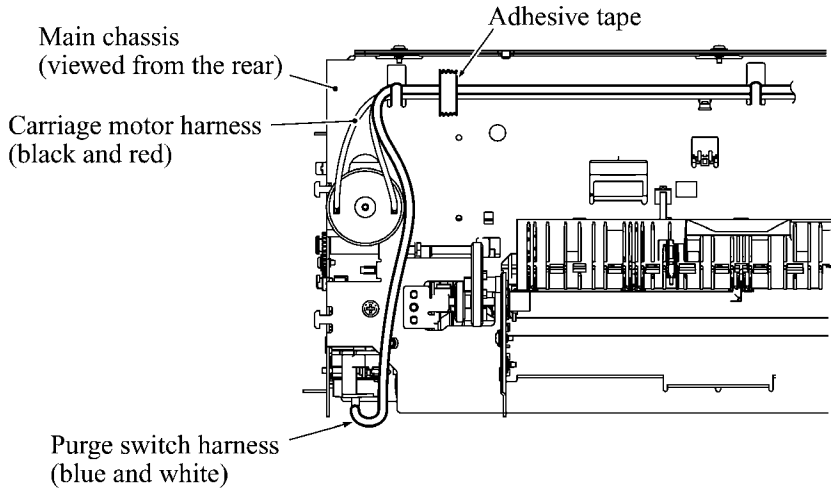


On the top of the main cover

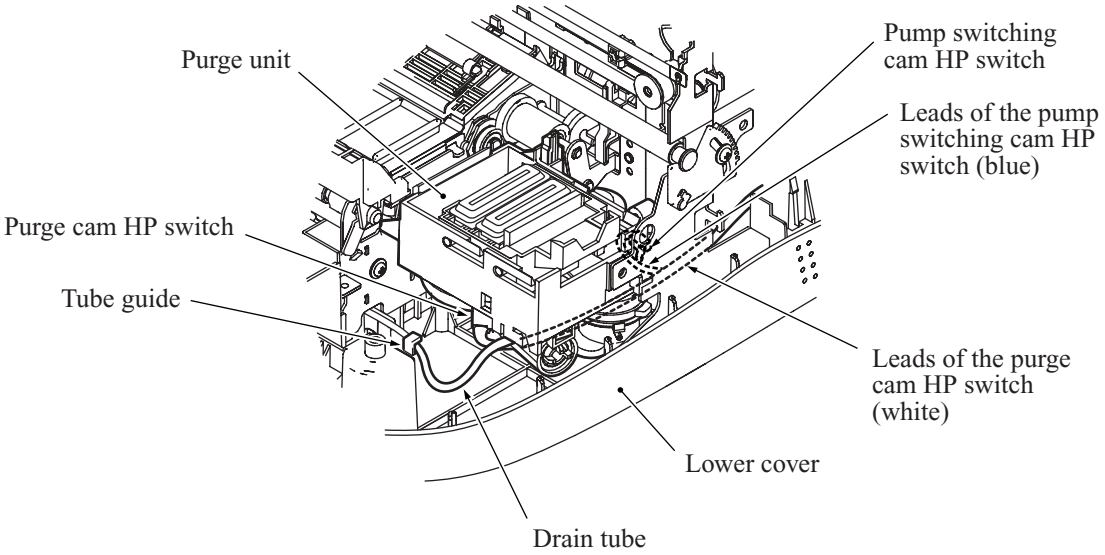


Harness routing C: Purge switch harness and carriage motor harness

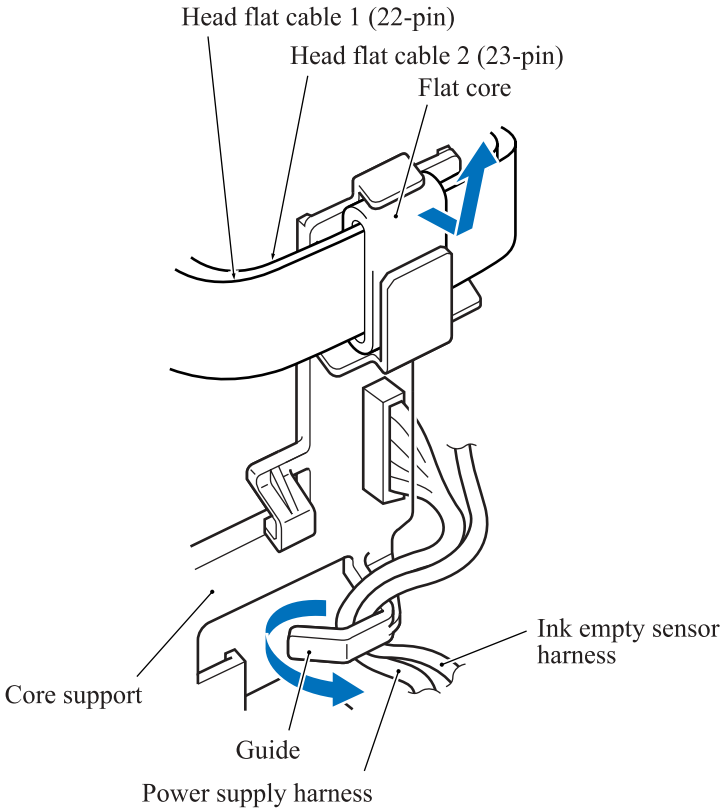
On the inside of the main chassis



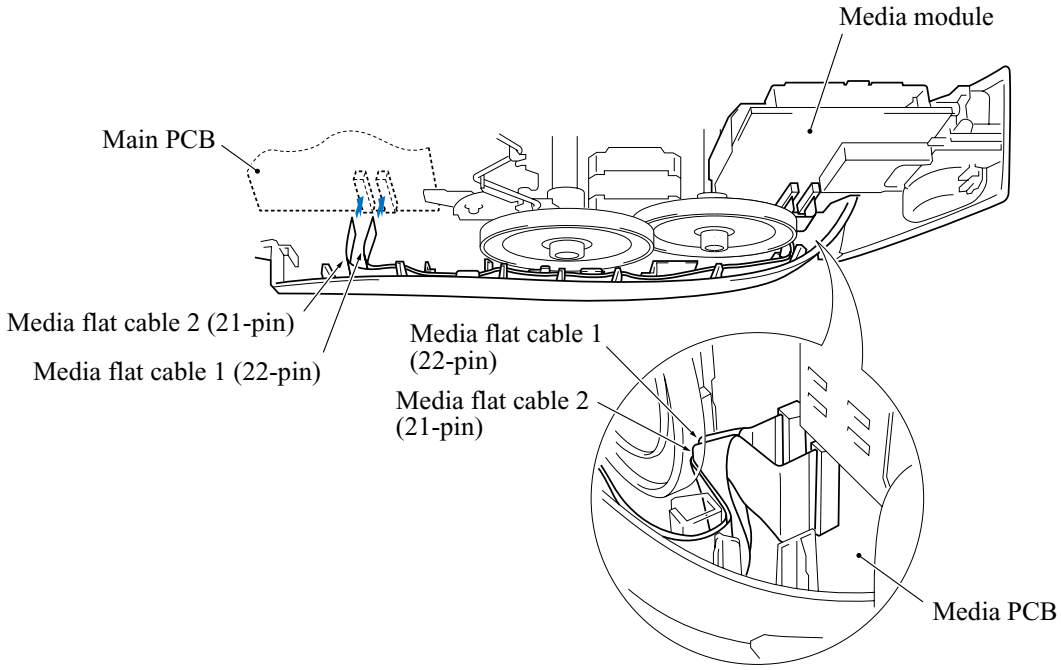
On the lower cover



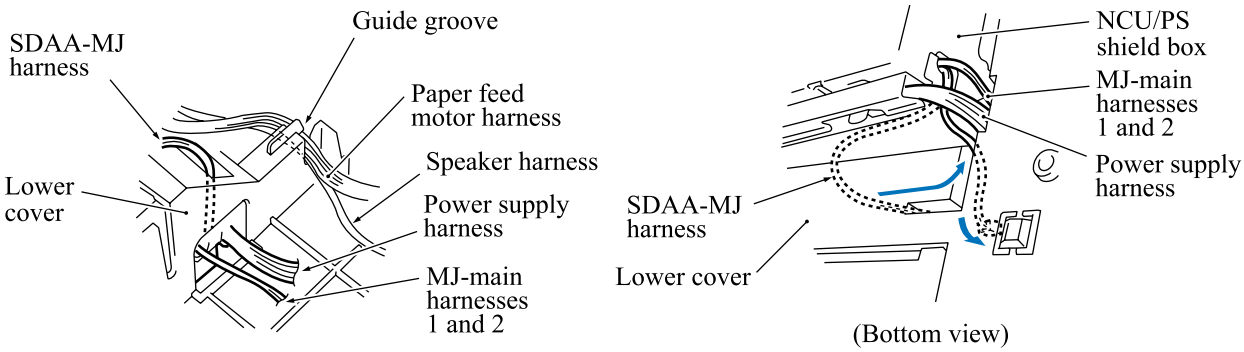
Harness routing D: Head flat cables, power supply harness, and ink empty sensor harness



Harness routing E: Media flat cables (MFC3820CN)

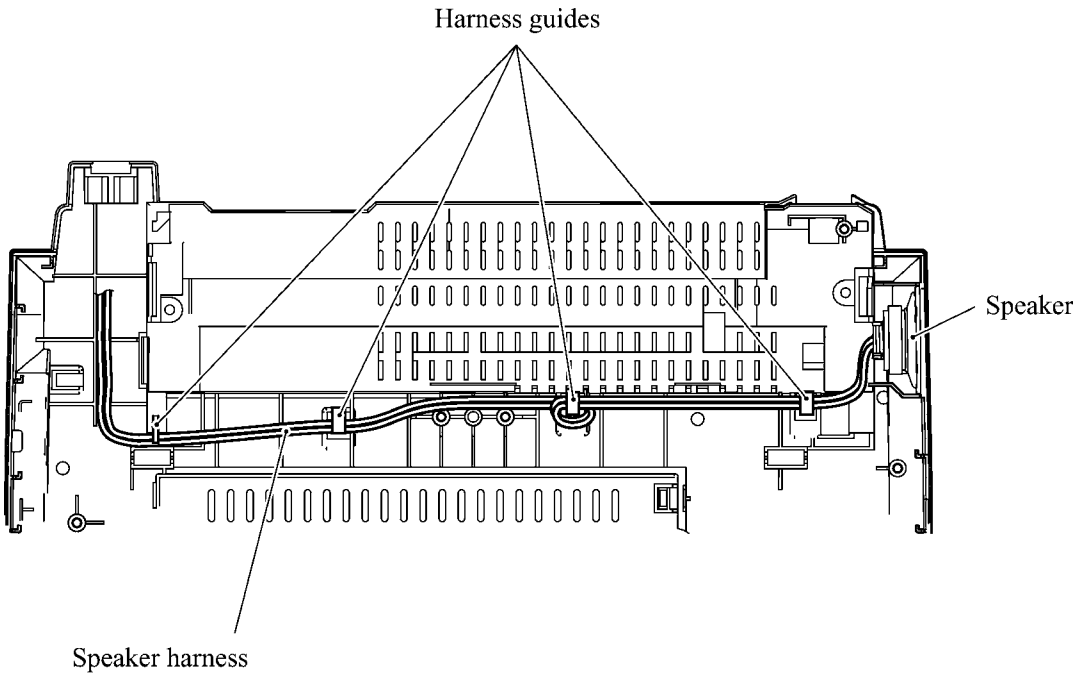


Harness routing F: SDAA-MJ harness, MJ-main harnesses, paper feed motor harness, power supply harness, and speaker harness on the lower cover



(MJ-main harness 2: Japanese models only)

Harness routing G: Speaker harness

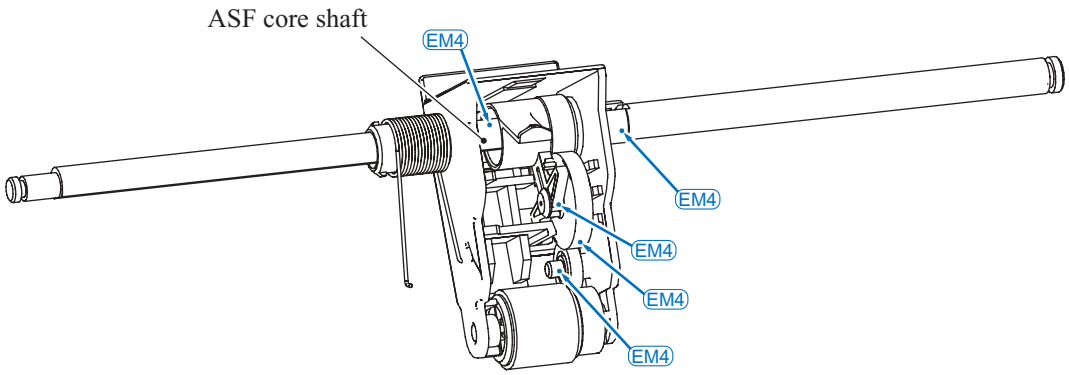


4.3 LUBRICATION

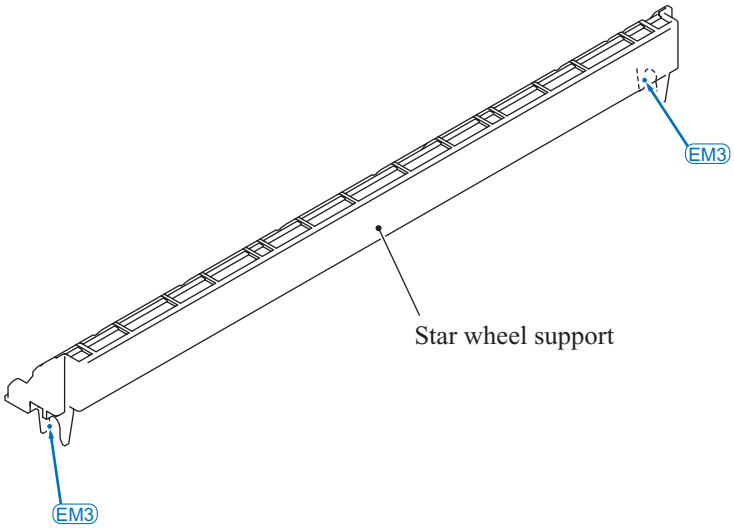
Apply the specified lubricants to the lubrication points as shown below.

Lubricant type (Manufacturer)	Lubricant amount			
	Thin coat of grease with a brush	2 mm dia. ball	3 mm dia. ball (Rice-sized pinch of grease)	4 mm dia. ball
Molykote EM-30LG or EM-30L (Dow Corning)	———	(EM2)	(EM3)	(EM4)
Conductive grease FLOIL 951P-32 (Kanto Kasei Ltd.)	———	———	(P3)	———
FLOIL BG-999 (Kanto Kasei Ltd.)	———	———	(BG3)	———
FLOIL BG-107A or BG-107G (Kanto Kasei Ltd.)	———	———	———	(BGA4)

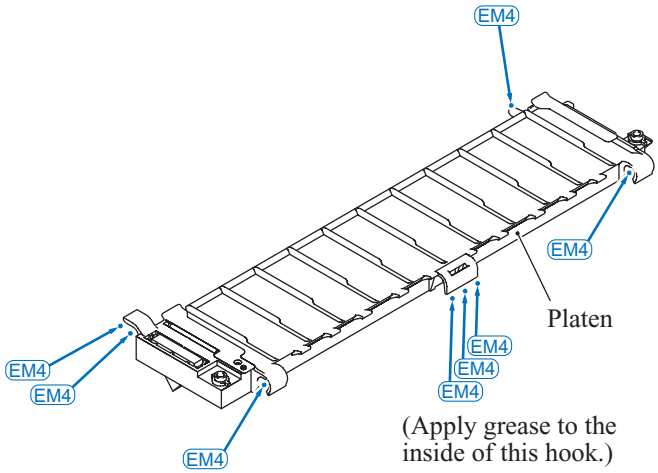
[1] ASF roller ASSY



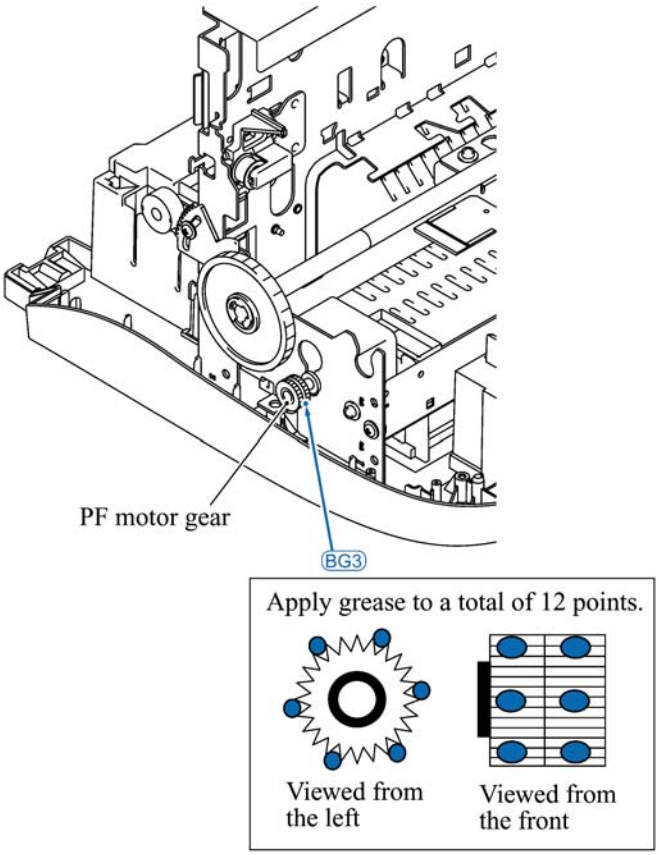
[2] Star wheel support



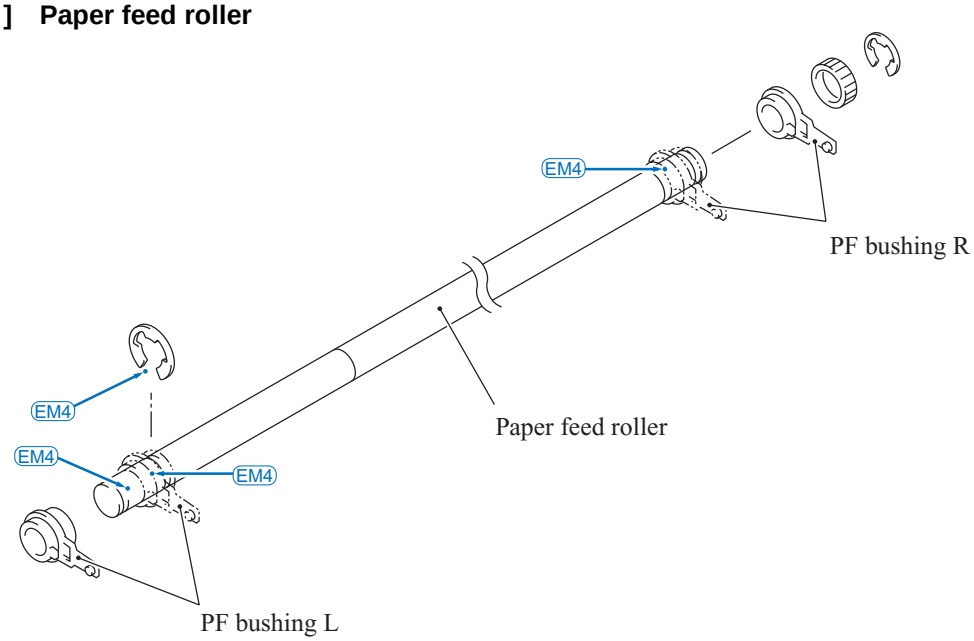
[3] Platen



[4] PF motor gear

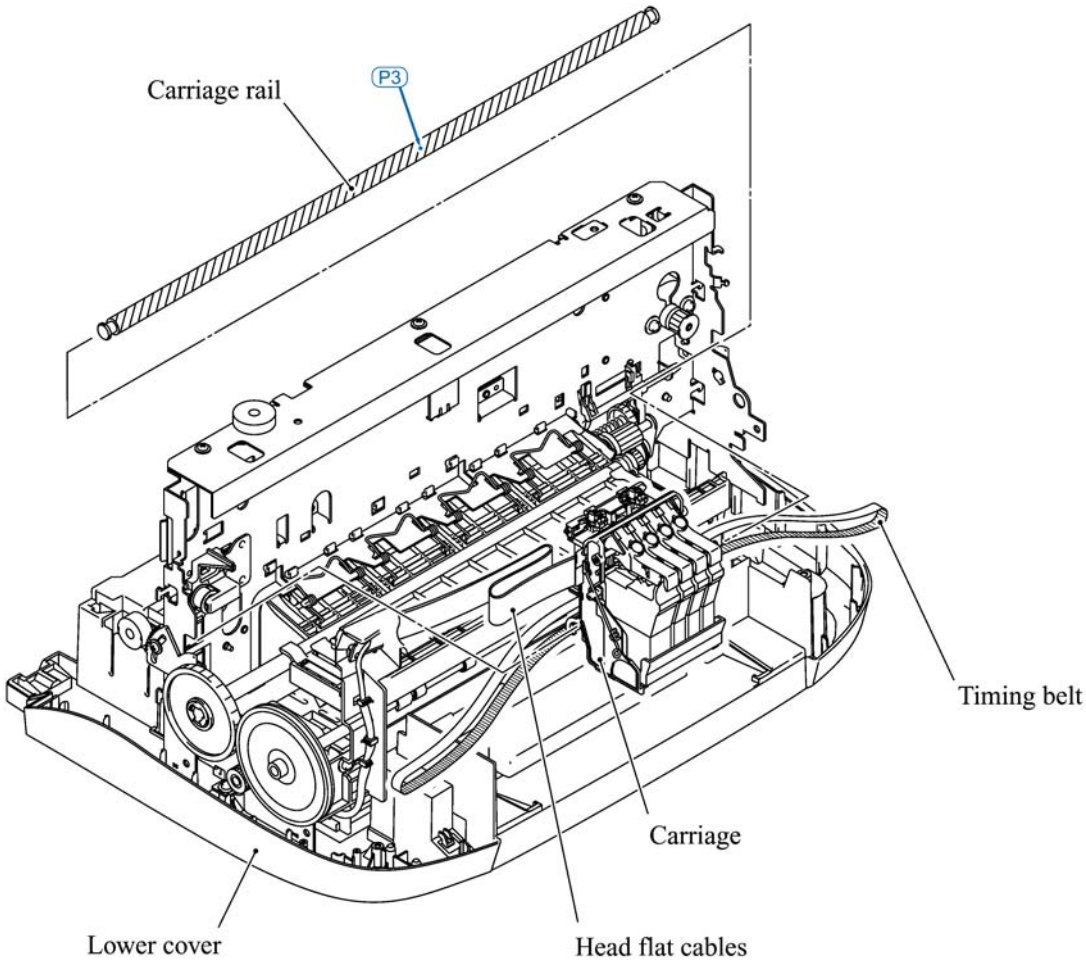


[5] Paper feed roller

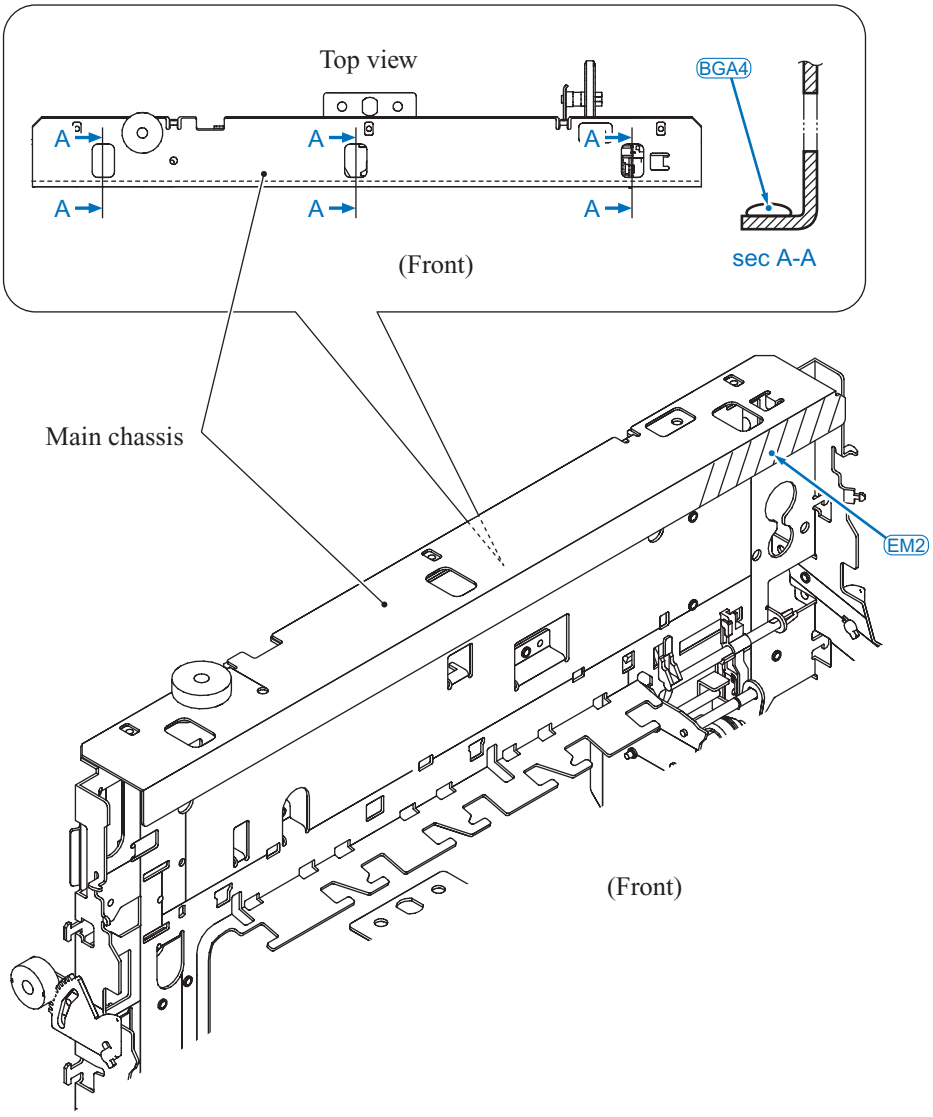


[6] Carriage rail

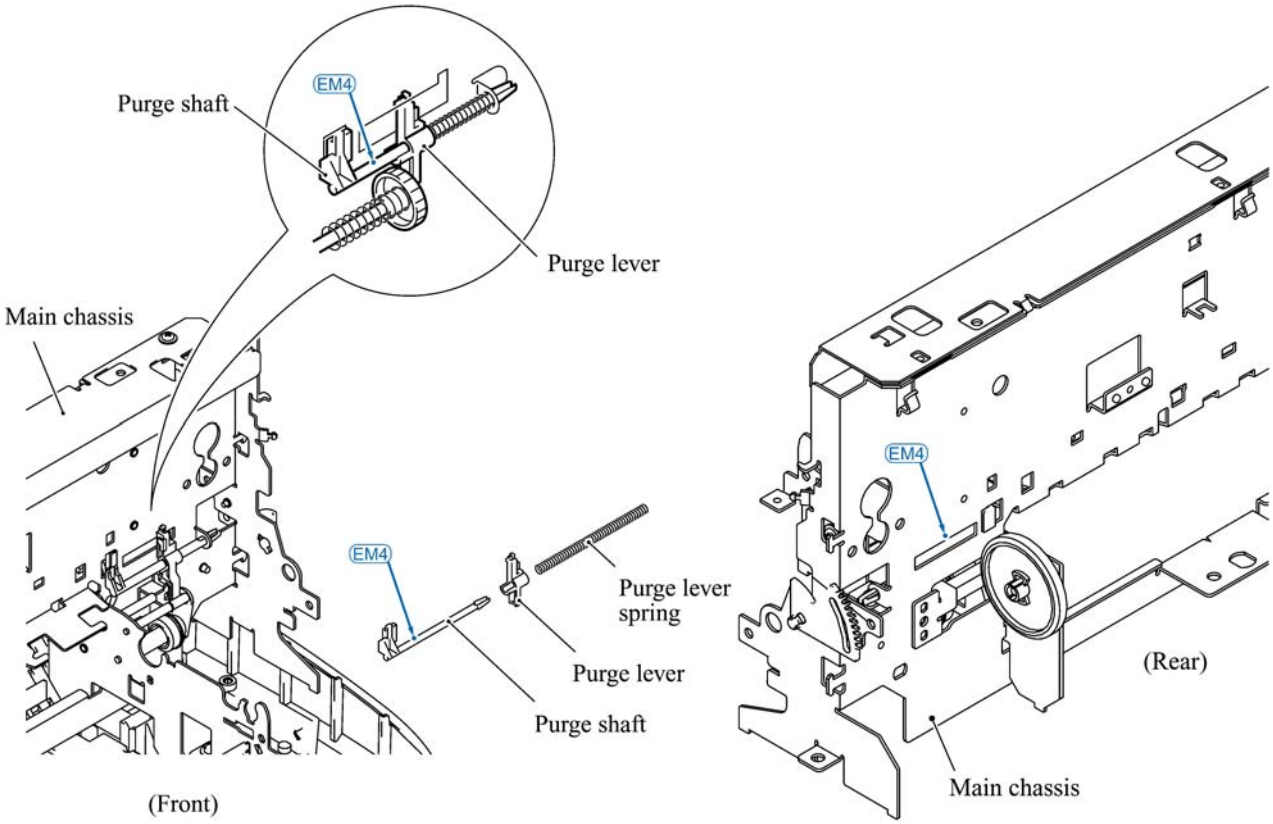
Apply a thin coat of grease to the whole surface of the carriage rail with a brush.



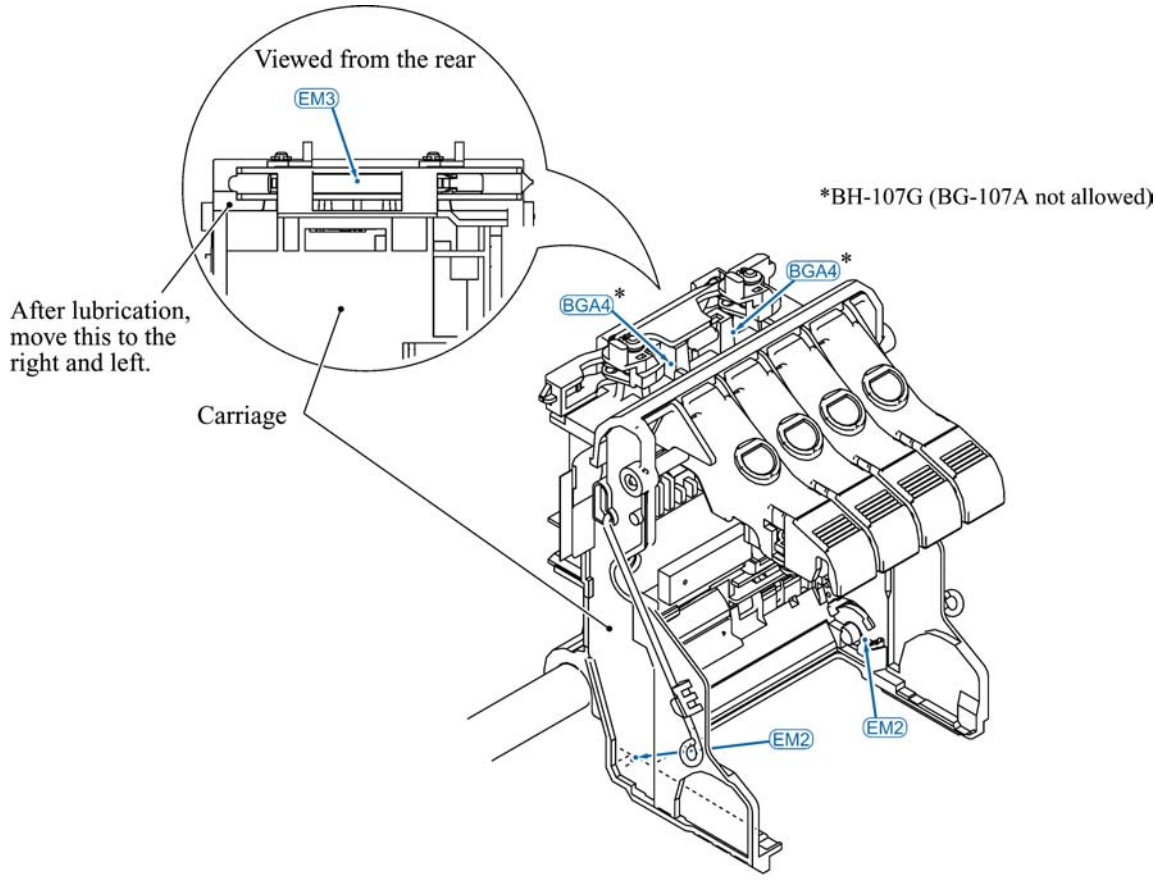
[7] Main chassis (slideway of the carriage guide)



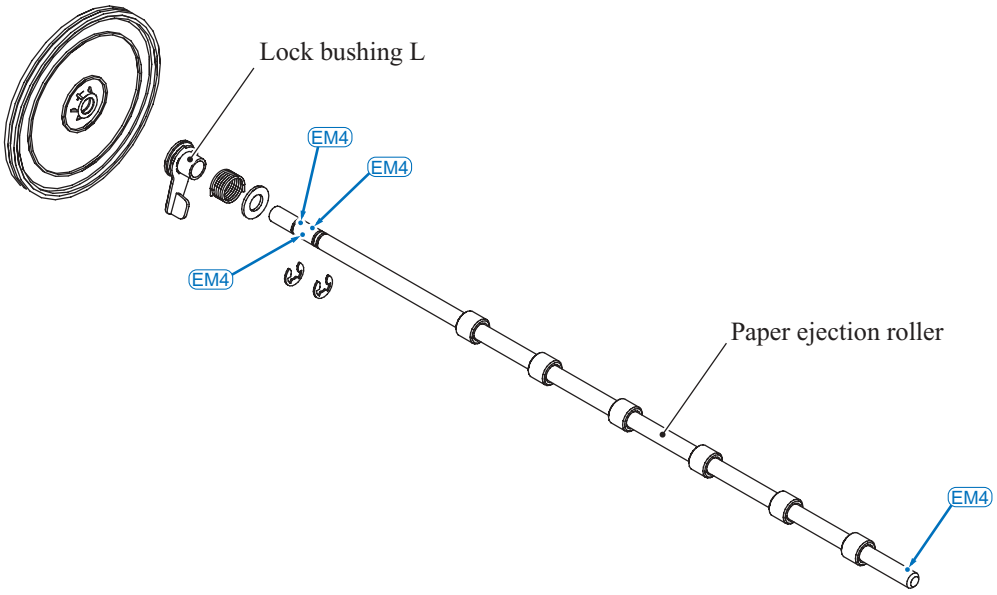
[8] Purge shaft and slideway of the purge lever on the main chassis



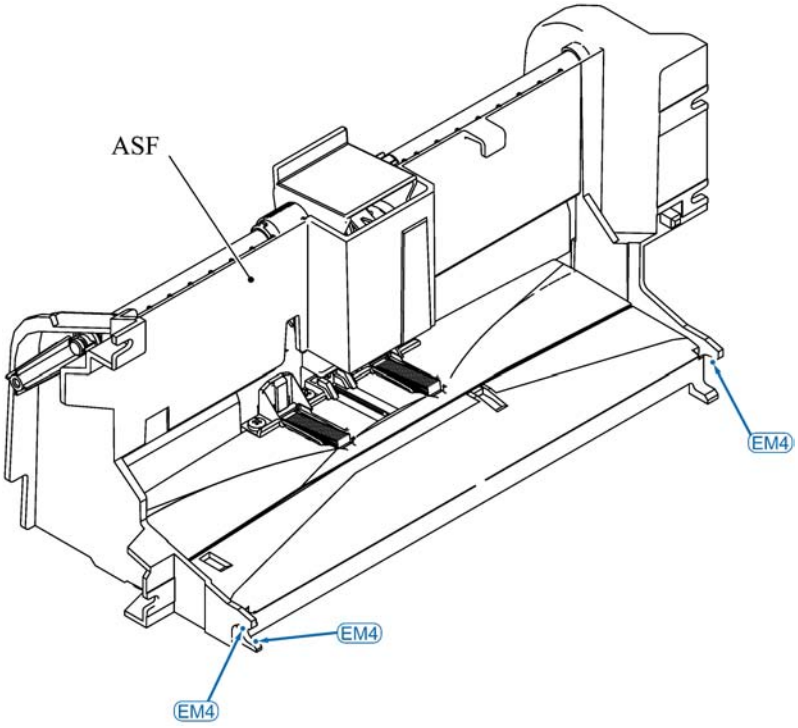
[9] Carriage



[10] Paper ejection roller



[11] Auto sheet feeder (ASF)



4.4 LONG-PERIOD STORAGE

If the machine will be stored for a long period, you need to substitute initial liquid for ink remaining in the print head using the procedure below.

This is because ink inside the print head or on the nozzle surface will dry up when the machine is not in use for a long period, resulting in clogged nozzles. To prevent such problems, use initial liquid that is not easily volatile.

(1) Have four initial liquid cartridges (three for color ink and one for black ink) and a head filter seal on hand.

(2) Plug the power cord into a wall socket.

(3) Make the machine enter the maintenance mode by pressing:

Menu/Set, *****, **2**, **8**, **6** and **4** keys in this sequence.

← Within 2 seconds →

The "■■ MAINTENANCE■■■" should appear on the LCD.

(4) Press the **6** and **3** keys in this order to place the machine in the ink replacement mode.

The machine shows the "PLEASE WAIT" and locks the carriage.

(5) After a while, the "4. CARRIAGE MOVE" and "6. INITIAL LIQUID" appears alternately.

Press the **6** key.

The "PLS COVER OPEN" appears.

(6) Open the scanner cover (scanner unit).

The carriage automatically moves left to the ink replacement position.

(7) Replace all ink cartridges with initial liquid cartridges.

(8) Close the scanner cover.

The "CHANGE CART OK" appears.

(9) Press the **Black Start** button.

The machine starts substituting initial liquid for ink remaining in the print head. After completion of substitution, the machine returns to the initial stage of the maintenance mode.

(10) Press the **6** and **3** keys in this order again to place the machine in the ink replacement mode.

The machine shows the "PLEASE WAIT" and locks the carriage.

(11) After a while, the "4. CARRIAGE MOVE" and "6. INITIAL LIQUID" appear alternately.

Press the **4** key this time.

The "PLS COVER OPEN" appears.

(12) Open the scanner cover.

The carriage automatically moves left to the ink replacement position.

(13) Remove the initial liquid cartridges and set the head filter seal instead.

(14) Close the scanner cover.

The "CHANGE CART OK" appears.

(15) Press the **Black Start** button.

The machine shows the "PLEASE WAIT" and then "HEAD LOCKED."

If the "MANU. CP ERROR" appears instead of the "HEAD LOCKED," the head filter seal is not in place. Correct its position using the procedure given below.

(16) Unplug the power from the wall socket.

If the "MANU. CP ERROR" appears:

(1) Press the **Stop** button to return to the initial stage of the maintenance mode.

(2) Press the **6** and **3** keys in this order again to place the machine in the ink replacement mode.

The machine shows the "PLEASE WAIT" and locks the carriage.

(3) After a while, the "4. CARRIAGE MOVE" and "6. INITIAL LIQUID" appear alternately.

Press the **INK** button this time.

The "PLS COVER OPEN" appears.

(4) Open the scanner cover.

The carriage automatically moves left to the ink replacement position.

(5) Remove the head filter seal once and set it into place again, then close the scanner cover.

The "CHANGE CART OK" should appear.

(6) Press the **Black Start** button.

The machine returns to the initial stage of the maintenance mode.

(7) Press the **9** key twice to exit from the maintenance mode and unplug the power cord from the wall socket.

CHAPTER 5

ADJUSTMENTS AND UPDATING OF SETTINGS, REQUIRED AFTER PARTS REPLACEMENT

CHAPTER 5 ADJUSTMENTS AND UPDATING OF SETTINGS, REQUIRED AFTER PARTS REPLACEMENT

This chapter details adjustments and updating of settings, which are required if the print head unit, carriage, PCBs and some other parts have been replaced. Settings are stored in the EEPROM on the driver PCB.

CONTENTS

5.1 PREPARATION

5.1.1 Requirements

Before proceeding to perform any adjustments or update any settings, you need to be provided with the executables, files, spare parts and supplies (listed below) by Brother Industries and set up your PC.

NOTE: Use a PC/AT-compatible computer running Windows 98/98SE, Windows Me, Windows 2000 Professional, or Windows XP Home/Professional.

Executables and Files Required for Adjustments and Updating of Settings

	BHL2-Maintenance Printer	BrUsbsn.exe	brusbsn.ini	PFROLL_BHL2.PRN	INCLINE004.PRN	FILEDG32.exe
Print head unit (Section 5.2)	√	√	√	√	√	√
Carriage (Section 5.3)	√			√	√	√
Main PCB (Section 5.4)	√					√
Driver PCB (Section 5.5)	√	√	√	√	√	√
Paper feed roller/Paper ejection roller (Section 5.6)	√			√		√
Ink empty sensor (Section 5.7)						
Ink absorber box (Section 5.8)						

NOTE: Executables and files listed above should be saved in an arbitrary folder in your PC beforehand.

Spare Parts and Supplies Required for Adjustments and Updating of Settings

	Recording paper	Reference cartridges	Ink cartridges
Print head unit (Section 5.2)	√		√
Carriage (Section 5.3)	√		√
Main PCB (Section 5.4)			
Driver PCB (Section 5.5)	√	√	√
Paper feed roller/ Paper ejection roller (Section 5.6)	√		√
Ink empty sensor (Section 5.7)		√	√
Ink absorber box (Section 5.8)			

5.1.2 Installing the BHL2-Maintenance Printer driver

To identify terminals connected via USB interface, a PC requires the corresponding virtual USB ports to be implemented on the PS/2 keyboard port by driver/software. If you connect any number of FAX machines repaired to your PC, therefore, the same number of virtual USB ports will be automatically configured on your PC. To prevent virtual USB ports from being configured limitlessly, use the unique driver installation procedure described below that enables your PC to identify terminals via a single virtual USB port.

NOTE: Once this installation procedure is carried out for a PC, no more driver/software installation will be required for that PC to identify FAX 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 (listed on the previous page) is stored in your PC.

(1) Make sure that the power cord of the FAX machine is unplugged from a wall socket.

If the FAX machine is connected to a PC, unplug the USB cable.

(2) Switch on your PC.

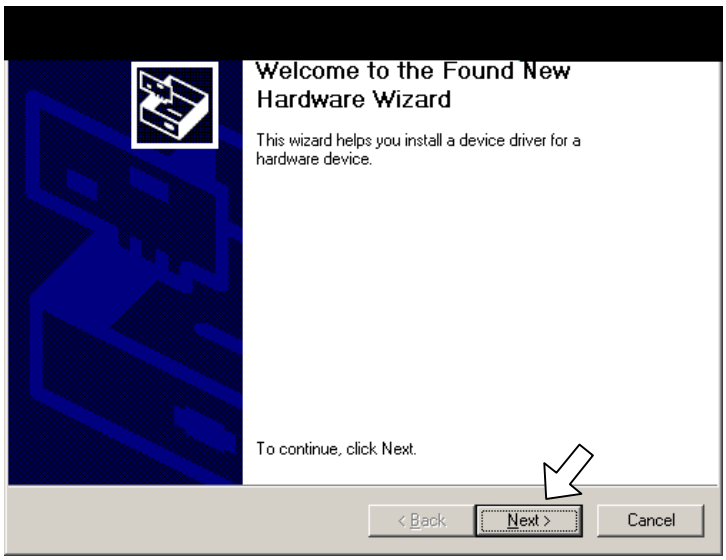
(3) Plug the power cord of the FAX machine into a wall socket.

(4) Press the **Menu/Set**, *****, **2**, **8**, **6**, and **4** keys on the FAX machine in this order to enter the maintenance mode.

(5) Connect the FAX machine to your PC using the USB cable.

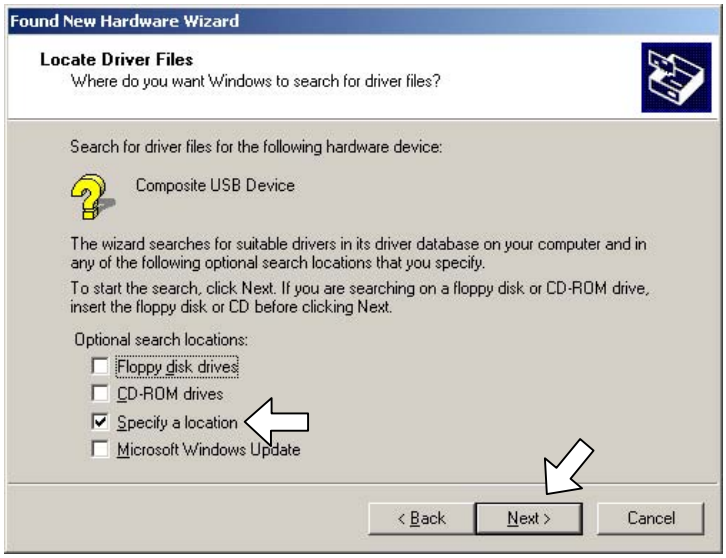
The following window appears.

(6) The following screen appears, indicating the detection of new hardware device by the system. Click **Next** to proceed.

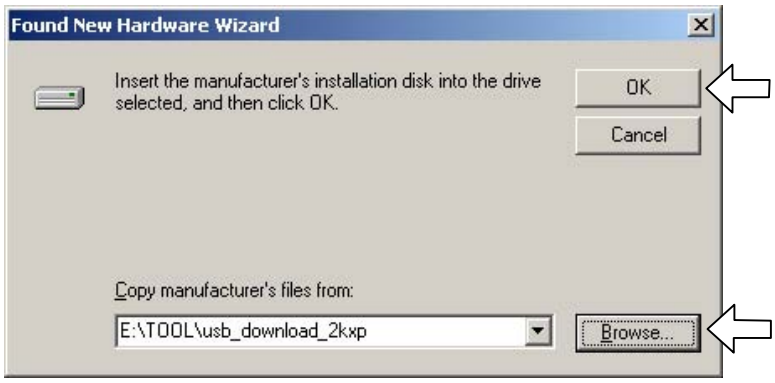


(7) Select "Search for a suitable driver for my device (recommended)" and click **Next**.

(8) Select "Specify a location" and click **Next**.

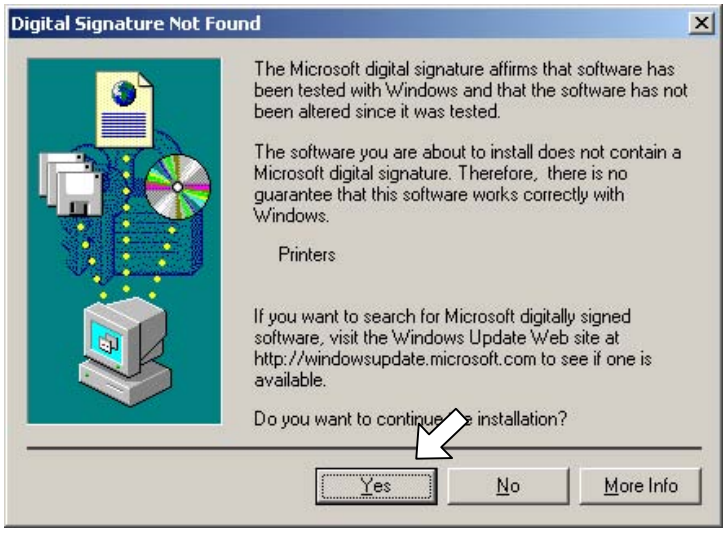


(9) Select the folder where the copy of the BHL2-Maintenance Printer driver is located (or click **Browse** to specify it), then click **OK**.
(This sample screen is captured on the Windows 2000 desktop.)



(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 you press the **9** key on the FAX machine twice to exit the maintenance mode, the "Found New Hardware Wizard" screen in step (5) appears again. Click **Cancel**.

NOTE: To check that the printer driver is successfully installed, click **Start**|**Settings**|**Printers** to call up the Printers window and confirm that the Brother BHL2-Maintenance Printer icon (shown on the sample window on page 5-9) is displayed.

5.2 IF YOU REPLACE THE PRINT HEAD UNIT

[1] Clean the new print head unit

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

The "Cleaning" and "Select ▲▼ & Set" appear alternately on the LCD.

(2) Select "Cleaning" using the ▲ and ▼ keys, then press the **Menu/Set** key.

The "Black/Cyan" and "Select ▲▼ & Set" appear alternately.

(3) Select "All" using the ▲ and ▼ keys, then press the **Menu/Set** key.

The machine starts a head cleaning cycle (that will take approx. 4 minutes) while displaying the "Please wait" and "Cleaning" alternately.

[2] Update the head property information stored in the EEPROM on the driver PCB

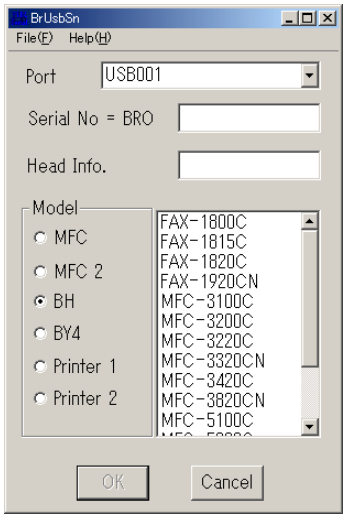
NOTE: Make sure that the Brother BHL2-Maintenance Printer driver has been installed to your PC. Click **Start**|**Settings**|**Printers** to call up the Printers window and confirm that the Brother BHL2-Maintenance Printer icon (shown on the sample window on page 5-9) is displayed. If the driver has not been installed, install it referring to Section 5.1.2.

(1) Switch your PC on.

(2) Press the **Menu/Set**, *****, **2**, **8**, **6** and **4** keys on the FAX machine in this order to enter the maintenance mode.

(3) Connect the FAX machine to your PC using a USB cable.

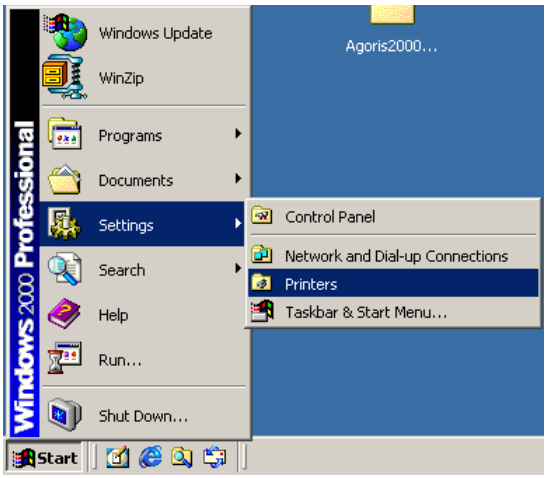
(4) On your PC, run the ID/head property setup utility (BrUsbsn.exe) in the folder created. The following window will appear.



(5) On the **Model** menu, click **BH**.

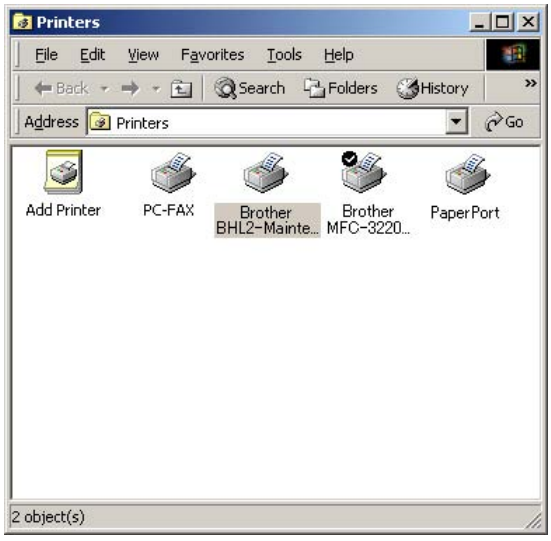
(6) In **Port**, select the port number assigned to the Brother BHL2-Maintenance Printer driver. To confirm the port number, follow the instructions below.

Click **Start|Settings|Printers**.

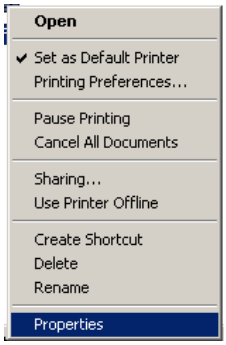


The Printers window appears as shown below.

Right-click the Brother BHL2-Maintenance Printer driver icon.

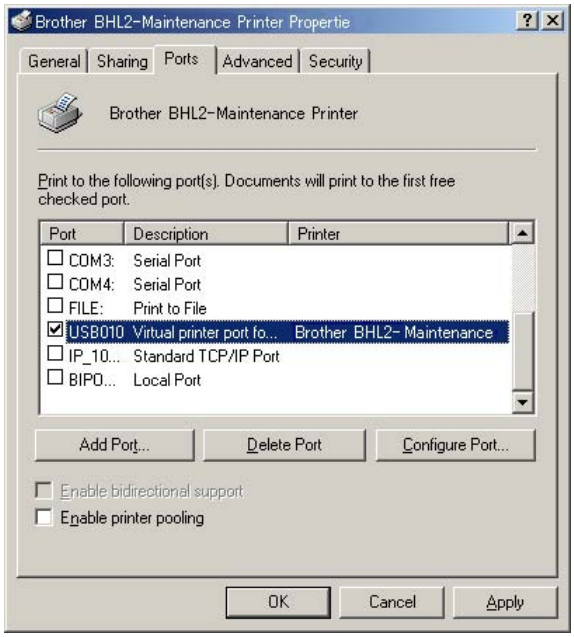


Click **Properties**.



The Brother BHL2-Maintenance Printer Properties window appears as shown below.

Click the **Ports** tab.



The port number assigned to the Brother BHL2-Maintenance Printer, USB010 in this example, is one that has been selected in **Port** on the BrUsbSn screen (page 5-6).

(7) In the **Head Info.** box on the BrUsbSn screen (page 5-6), type all digits (e.g., 66667F657031H) of the 13-digit property code (enclosed with asterisks, e.g., *66667F657031H*) which is printed on the bar code label attached to the print head unit. Click the **OK** button.

(8) To check whether the entered head property is correct, make the machine enter the maintenance mode and press the **6** and **8** keys in this order. Press the **2**, **5**, **8**, **0** keys in this order. The LCD shows the current head property information (13-digit code) stored in the EEPROM on the driver PCB. (Refer to Chapter 7, Section 7.3.15.)

(9) Check that the character string entered in step (7) is displayed in "XXXXXXXXXXXX."

If it is OK, press the **Stop/Exit** key.

If something other than that is displayed in XXXXXXXXXXXX, check the connection between the PC and FAX machine and go back to step (3).

[3] Correct the positioning error of the print head

(1) Press the **6**, **3**, and **INK** keys in this order.

The "PLS COVER OPEN" appears on the LCD.

(2) Open the scanner cover (scanner unit).

The carriage automatically moves to the ink replacement position and the "CLOSE COVER" appears on the LCD.

(3) Make sure that:

- the print head is secured to the carriage by the head clamp springs,
- the ink cartridges are set into place, and
- paper is loaded in the ASF.

(4) Turn the head adjuster lever located on the right side of the carriage to position 0. (See the illustration given on the next page.)

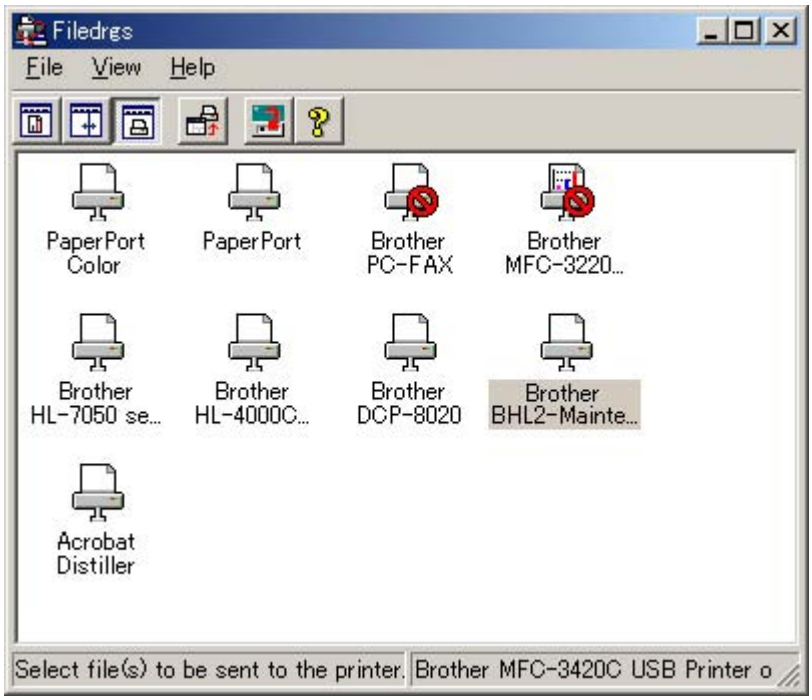
(5) Close the scanner cover.

The "CHANGE CART OK" appears.

(6) Press the **Black Start** key.

(7) Run "FILEDG32.exe" in the folder created.

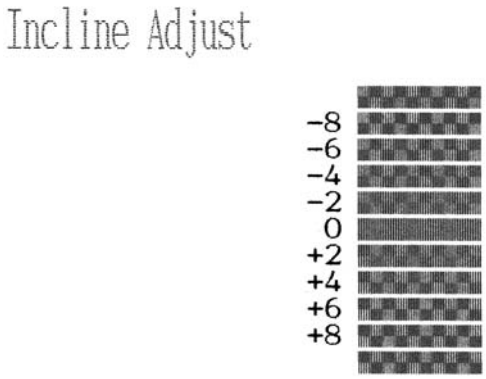
The Filedrgs window appears as shown below.



(8) Drag and drop the "INCLINE004.PRN" icon onto the Brother BHL2-Maintenance Printer icon in the Filedrgs window shown above.

The "Incline Adjust" test chart will be printed out.

(9) Check the printed test patterns and select the one that is the least uneven print. Make a note of that pattern number.



Head Positioning Test Pattern

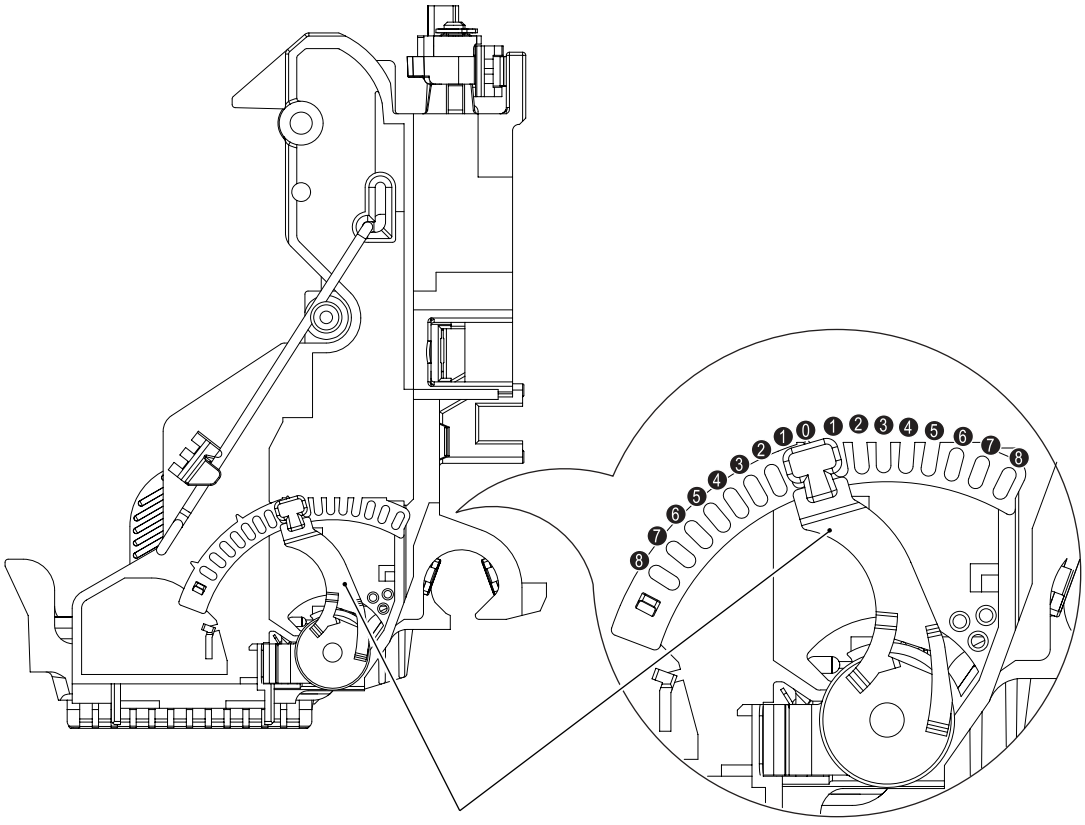
(10) Turn the head adjuster lever by the number of divisions specified by the pattern number you recorded in step (9). (In this sample above, pattern 0 is the least uneven print, so no adjustment is required.)

If pattern +4 is the least uneven print, for example, turn the head adjuster lever to the front by four divisions; if pattern -4, turn the lever to the rear by four divisions.

If the uppermost or lowermost pattern (no number assigned) is the least uneven print, go back to step (4).

(11) Repeat the above printing sequence until pattern 0 becomes the least uneven print.

NOTE: If pattern 0 will not become the least uneven print, check whether the print head unit is set into place.

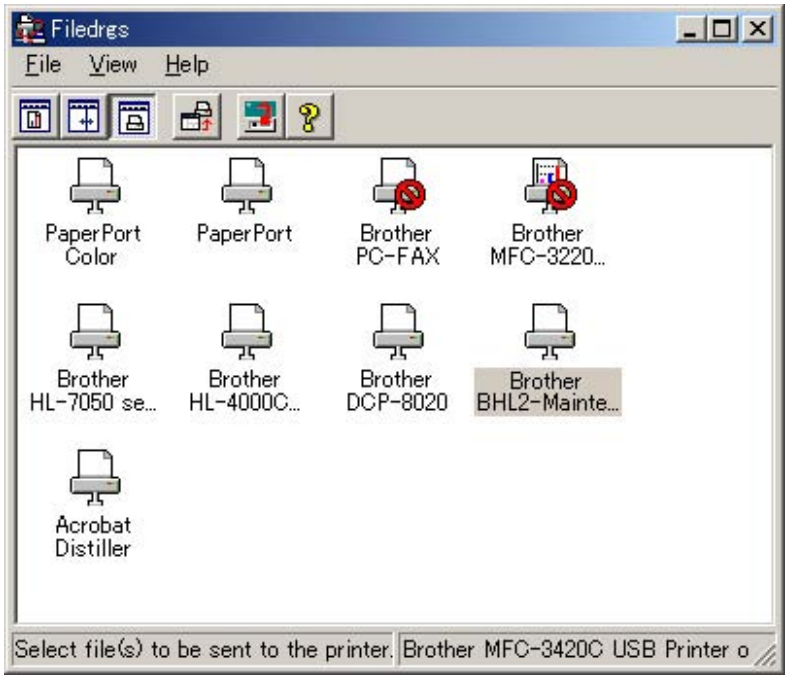


Head adjuster lever

[4] Update the paper feeding correction value

(1) Run "FILEDG32.exe" in the folder created in Section 5.1.1.

The Filedrgs window appears as shown below.



(2) Drag and drop the "PFROLL_BHL2.PRN" onto the Brother BHL2-Maintenance Printer icon in the Filedrgs window shown above.

The FAX machine displays the "RECEIVING DATA" on the LCD and prints out "PF ADJUST" and "EXIT ADJUST" check patterns (see the next page for a sample printout).

(3) Press the **6** key twice on the FAX machine.

The "1.PF 2.EXIT" appears on the LCD.

(4) Press the **1** key to select the paper feed roller adjustment.

(5) Check the PF ADJUST check patterns and select the one that is the least uneven print. Make a note of that pattern number.

If the unevenness is far to the left of check pattern 3, regard it as 3; if it is far to the right of check pattern 7, regard it as 7. In this case, you need to check whether the paper feed roller and print head unit are set into place.

(6) Enter the number of the lease uneven check pattern found in step (5).

The FAX machine automatically returns to the initial stage of the maintenance mode.

(7) Press the **6** key twice.

The "1.PF 2.EXIT" appears on the LCD.

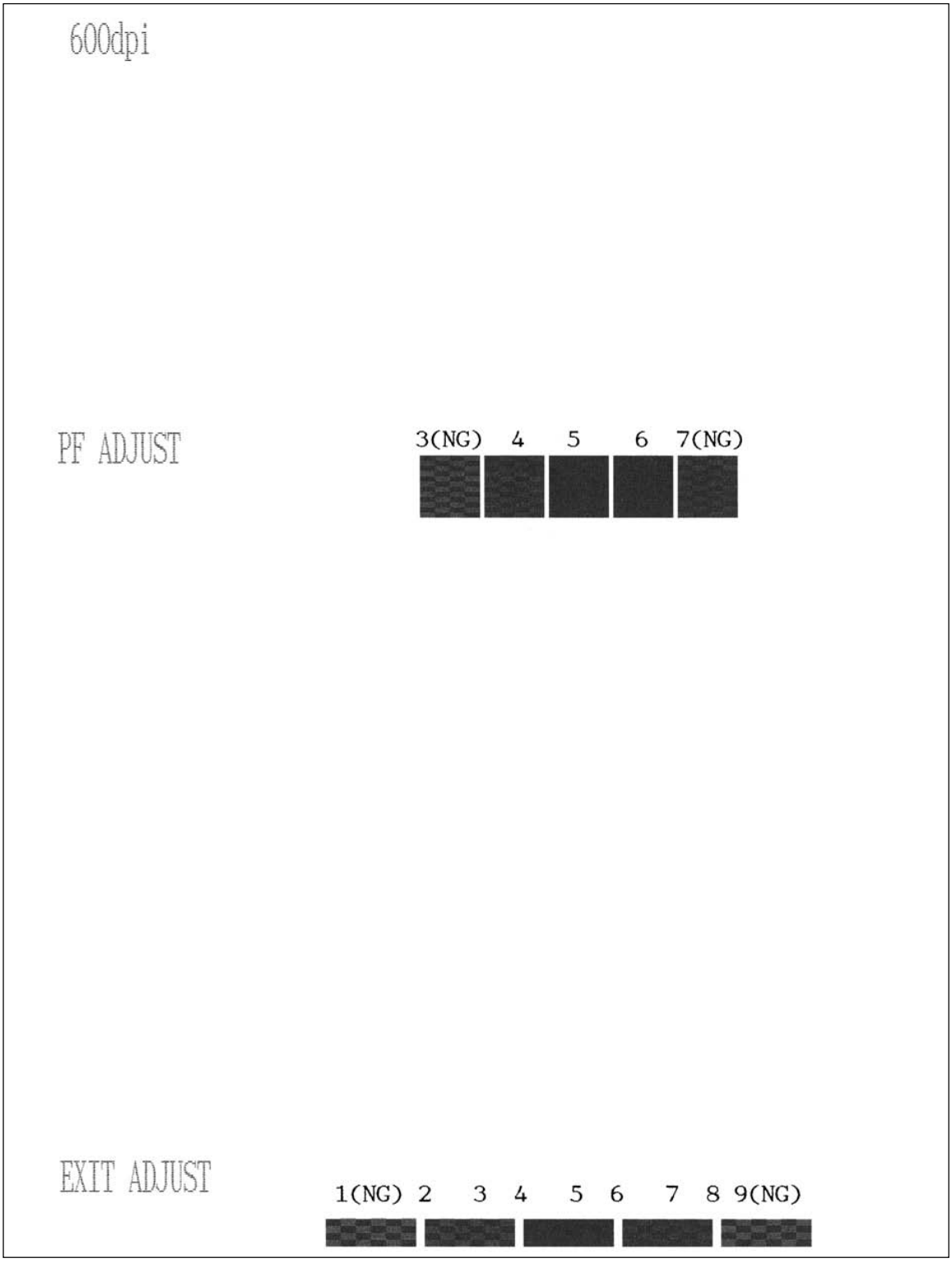
(8) Press the **2** key to select the paper ejection roller adjustment.

The "EXIT ADJ No.(2-8)" appears on the LCD.

(9) Check the EXIT ADJUST check patterns and select the one that is the least uneven print. Make a note of that pattern number.

If the unevenness is far to the left of check pattern 1, regard it as 1; If it is far to the right of check pattern 9, regard it as 9. In this case, you need to check whether the paper ejection roller and print head unit are set into place.

(10) Enter the number of the least uneven check pattern found in step (9).
The machine automatically returns to the initial stage of the maintenance mode.



Paper Feeding Check Patterns for the Paper Feed Roller and Paper Ejection Roller

[5] Align vertical print lines

(1) Press the **6** and **5** keys in this order.

The FAX machine prints out a set of vertical alignment check patterns (see the next page) which consist of No. 1 to No. 9 lines for each of the 600 dpi and 1200 dpi.

If the vertical alignment is ON, No. 5 line (each in the 600 dpi and 1200 dpi printouts) shows vertically aligned lines as given on the next page.

The "600DPI NO.(1-9)" appears on the LCD.

(2) Check the printed vertical alignment check patterns for the 600 dpi and find which number line shows full alignment. If the line is other than No. 5, enter that line number by using the numerical keys.

The "1200DPI NO.(1-9)" appears.

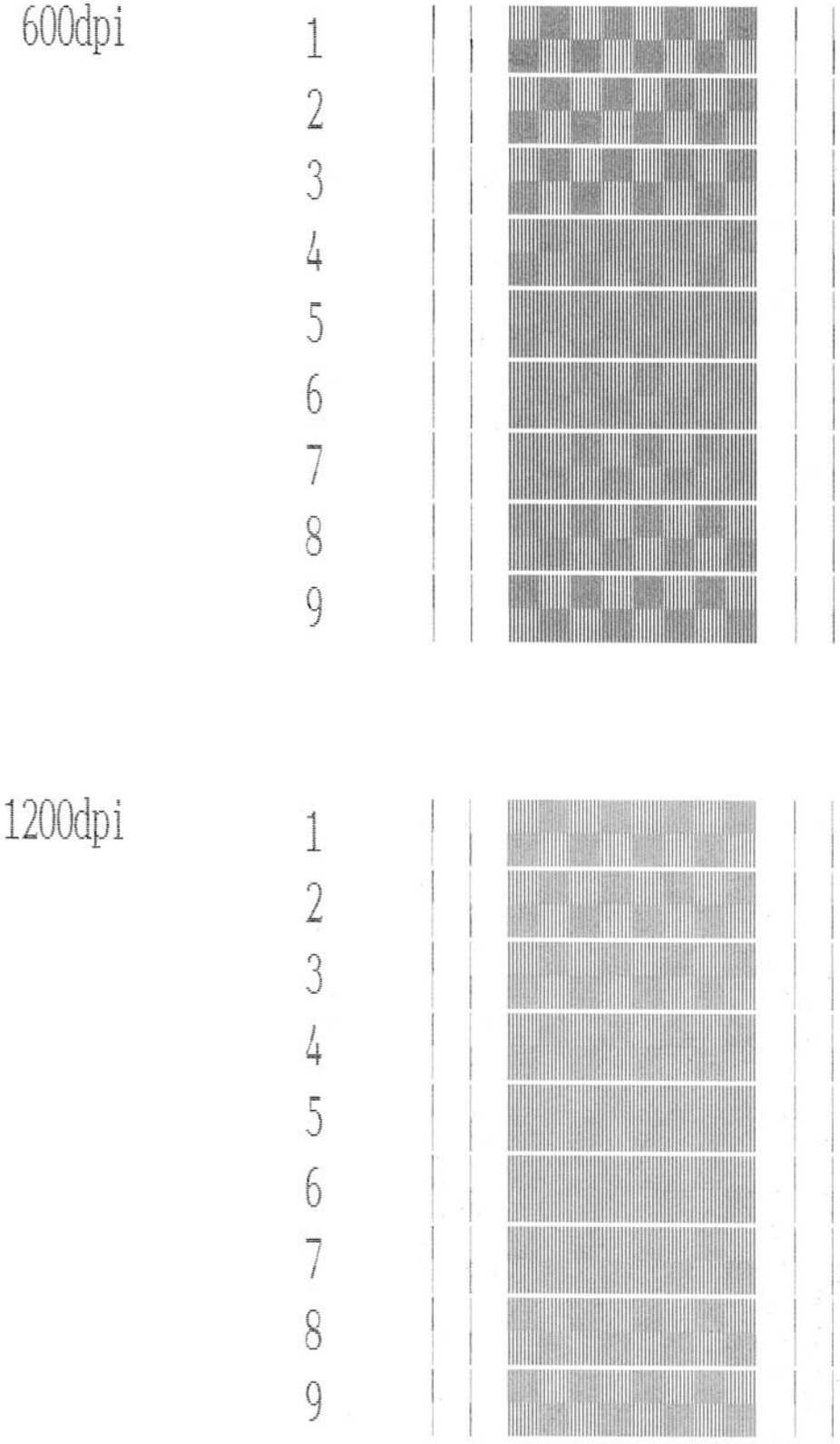
(3) For the 1200 dpi, perform the same operation as in step (2).

The FAX machine automatically returns to the initial stage of the maintenance mode.

NOTE: If No. 1 line or No. 9 line is fully aligned so that you press the **1** or **9** key in the above procedure, then go back to step (1) to confirm that No. 5 line becomes aligned.

(4) After completion of the adjustment, disconnect the USB cable and press the **9** key twice to return to the standby state.

NOTE: Be sure to disconnect the USB cable first. Returning to the standby state without disconnecting the USB cable will run "Found New Hardware Wizard" to start USB driver installation (as described in Section 5.1.2).



Vertical Alignment Check Pattern

5.3 IF YOU REPLACE THE CARRIAGE

[1] Clean the new print head unit

Refer to Section 5.2, [1].

[2] Set up your PC and FAX machine

NOTE: Make sure that the Brother BHL2-Maintenance Printer driver has been installed to your PC. Click **Start**|**Settings**|**Printers** to call up the Printers window and confirm that the Brother BHL2-Maintenance Printer icon (shown on the sample window on page 5-9) is displayed. If the driver has not been installed, install it referring to Section 5.1.2.

(1) Make sure that your PC is turned off.

(2) Connect the FAX machine to your PC using a USB cable.

(3) Plug the power cord of the FAX machine into a wall socket.

(4) Press the **Menu/Set**, *****, **2**, **8**, **6**, and **4** keys in this order to enter the maintenance mode.

(5) Switch your PC on.

[3] Correct the positioning error of the print head

Refer to Section 5.2, [3].

[4] Update the paper feeding correction value

Refer to Section 5.2, [4].

[5] Align vertical print lines

Refer to Section 5.2, [5].

5.4 IF YOU REPLACE THE MAIN PCB

Install update data to the flash ROM on the new main PCB

NOTE: Make sure that the Brother BHL2-Maintenance Printer driver has been installed to your PC. Click **Start|Settings|Printers** to call up the Printers window and confirm that the Brother BHL2-Maintenance Printer icon (shown on the sample window on page 5-9) is displayed. If the driver has not been installed, install it referring to Section 5.1.2.

(1) Make sure that your PC is turned off and not connected with the FAX machine using a USB cable.

(2) Make sure that the power cord of the FAX machine is unplugged from the wall socket.

(3) While holding down the **5** key, plug the power cord of the FAX machine into a wall socket.

(4) Check to see that the following pattern displays on the LCD. If it does not display, go back to step (2) above.

(5) Connect the FAX machine to your PC using a USB cable

(6) Switch on your PC.

(7) Run the FILEDG32.exe in the folder created in Section 5.1.1.

(8) Drag and drop the firmware (e.g., LZ0076A.upd) to be downloaded onto the Brother BHL2-Maintenance Printer icon in the Filedrgs window.

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 downloading starts, the FAX machine beeps intermittently. After approx. 2 to 5 minutes, downloading is complete and the FAX machine automatically reboots and returns to the standby state.

NOTE: When the FAX machine reboots, the PC system automatically runs "Found New Hardware Wizard" to start USB driver installation (as described in Section 5.1.2). Click **Cancel** on the wizard screen.

(9) Press the * and # keys at the same time.

The firmware version appears on the LCD.

In this example, if "A0306161502:40BC" appears, it means downloading ends normally.

(10) If downloading fails, turn the FAX machine off and on. The FAX machine automatically enters the download mode. Perform the above steps again.

(11) After completion of downloading, check the sensors, control panel operation, copy function, and FAX send/receive operation. Also check that harnesses and flat cables are connected to the main PCB firmly.

5.5 IF YOU REPLACE THE DRIVER PCB

NOTE: If you replace the driver PCB, also replace the ink absorber box with a new one. Using the machine without replacing the ink absorber box may cause an overflow of drained ink from the ink absorber box, thereby staining the machine.

[1] Make the FAX machine enter the maintenance mode

Press the **Menu/Set**, *****, **2**, **8**, **6**, and **4** keys.

[2] Initialize the EEPROM on the driver PCB (Function code 01)

Press the **0** and **1** keys in this order. Refer to Chapter 7, Section 7.3.1.

[3] Customize the EEPROM on the driver PCB (Function code 74)

Press the **7** and **4** keys in this order. Refer to Chapter 7, Section 7.3.17.

[4] Set the sensing reference level of the ink empty sensor (Function code 57)

Press the **5** and **7** keys in this order. Refer to Chapter 7, Section 7.3.11.

[5] Make a sensor operational check (Function code 32)

Press the **3** and **2** keys in this order. Refer to Chapter 7, Section 7.3.8.

[6] Acquire white level data and set the CIS scanner area (Function code 55)

Press the **5** key twice in this order. Refer to Chapter 7, Section 7.3.10.

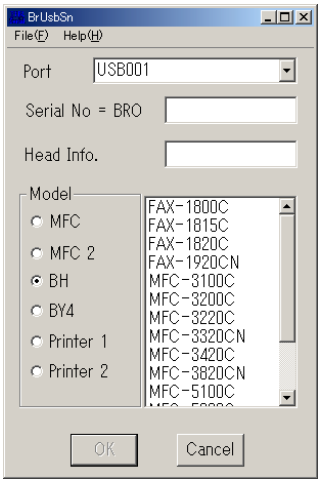
[7] Set an ID code and update the head property information

NOTE: Make sure that the Brother BHL2-Maintenance Printer driver has been installed to your PC. Click **Start**|**Settings**|**Printers** to call up the Printers window and confirm that the Brother BHL2-Maintenance Printer icon (shown on the sample window on page 5-9) is displayed. If the driver has not been installed, install it referring to Section 5.1.2.

(1) Make sure that your PC is turned off, then connect the FAX machine to your PC using a USB cable.

(2) Switch your PC on.

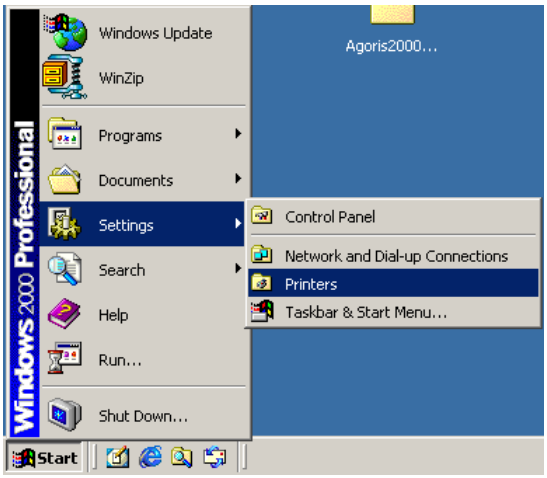
(3) On your PC, run the ID/head property utility (BrUsbsn.exe) in the folder created in Section 5.1.1. The following window appears.



(4) On the **Model** menu, click **BH**.

(5) In **Port**, select the port number assigned to the Brother BHL2-Maintenance Printer driver. To confirm the port number, follow the instructions below.

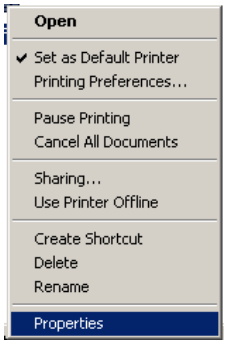
Click **Start**|**Settings**|**Printers**.



The Printers window appears as shown below.

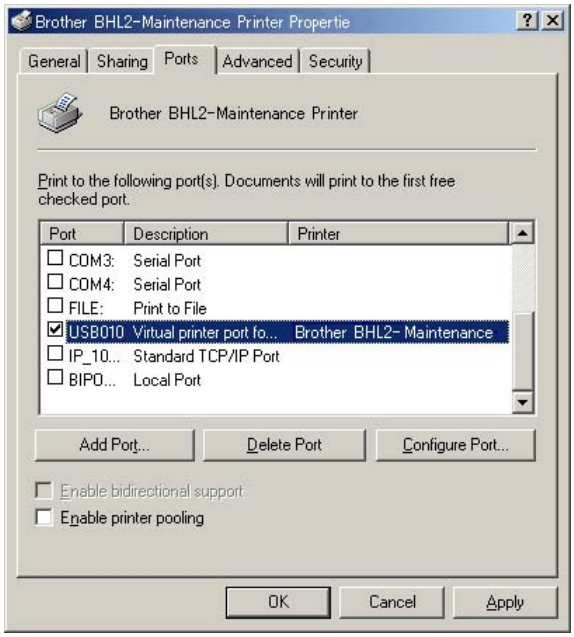
Right-click the Brother BHL2-Maintenance Printer driver icon.

Click **Properties**.



The Brother BHL2-Maintenance Printer Properties window appears as shown below.

Click the **Ports** tab.



The port number assigned to the Brother BHL2-Maintenance Printer, USB010 in this example, is one that has been selected in **Port** on the BrUsbSn screen (page 5-17).

(6) In the **Serial No = BRO** box on the BrUsbSn screen (page 5-17), type the 9-digit serial number (e.g., M2J012345) printed on the nameplate labeled to the back of the FAX machine as an ID code.

(7) In the **Head Info.** box, type all digits (e.g., 66667F657031H) of the 13-digit property code (enclosed with asterisks, e.g., *66667F657031H*) which is printed on the bar code label attached to the print head unit. Click the **OK** button.

(8) To check whether the entered character strings (ID code and head property information) are correct, make the machine enter the maintenance mode.

Press the **8** and **0** keys in this order, and the current ID code appears. Check that the character string entered in step (6) is displayed correctly.

Press the **6** and **8** keys in this order. Then press the **2**, **5**, **8**, **0** keys in this order, and the current head property information appears. Check that the character string entered in step (7) is displayed correctly.

(9) If both are OK, proceed to [8] below.

If something wrong is displayed, check the connection between the PC and FAX machine and go back to step (2).

[8] Update the paper feeding correction value (Function code 66)

Press the **6** key twice in this order. Refer to Chapter 7, Section 7.3.14.

[9] Align vertical print lines (Function code 65)

Press the **6** and **5** keys in this order. Refer to Chapter 7, Section 7.3.13.

5.6 IF YOU REPLACE THE PAPER FEED ROLLER

[1] Check the compatibility between paper feed roller, paper ejection roller, and print head unit

Each of the paper feed roller, paper ejection roller, and print head unit has a color marking (red or blue) that allows you to check the compatibility between them. (For locations of those color markings, refer to pages 4-64, 4-62, and 4-11 in Chapter 4, respectively.)

Note that a new paper ejection roller or print head unit to be provided as a spare part has a red & blue marking, meaning that it is compatible with other parts having either color marking.

When replacing the paper feed roller, check the color marking on the new roller and ensure that it matches ones on the paper ejection roller and print head unit. The compatibility table is given below.

Color marking on the print head unit	Color marking on the paper ejection roller	Color marking on the paper feed roller
Red	Red	Red
	Red & blue*	
Blue	Blue	Blue
	Red & blue*	
Red & blue*	Red	Red
	Blue	Blue
	Red & blue*	Either red or blue

*A paper ejection roller or print head unit to be provided as a spare part has a red & blue marking and it is compatible with other parts having either color marking.

[2] Update the paper feeding correction value

NOTE: Make sure that the Brother BHL2-Maintenance Printer driver has been installed to your PC. Click **Start**|**Settings**|**Printers** to call up the Printers window and confirm that the Brother BHL2-Maintenance Printer icon (shown on the sample window on page 5-9) is displayed. If the driver has not been installed, install it referring to Section 5.1.2.

(1) Make sure that your PC is turned off.

(2) Connect the FAX machine to your PC using a USB cable.

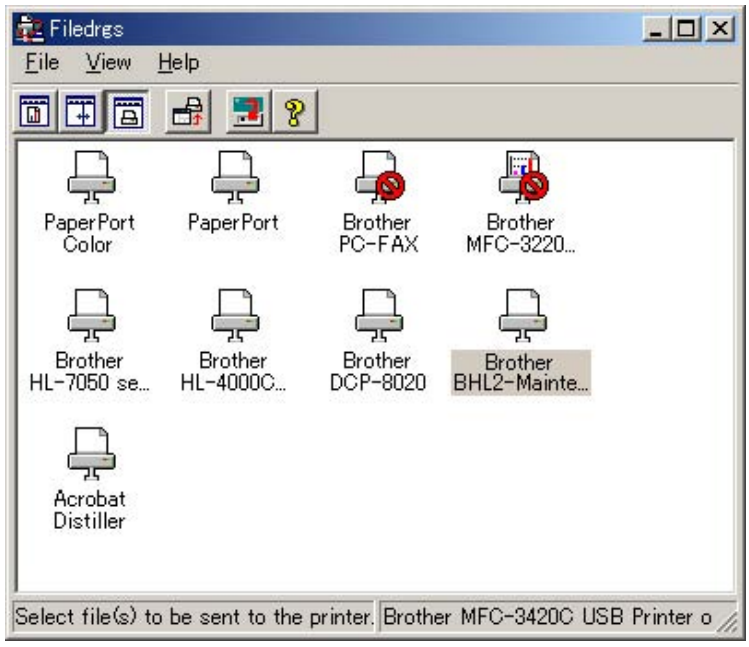
(3) Plug the power cord of the FAX machine into a wall socket.

(4) Press the **Menu/Set**, *****, **2**, **8**, **6**, and **4** keys in this order to enter the maintenance mode.

(5) Switch your PC on.

(6) Run "FILEDG32.exe" in the folder created in Section 5.1.1.

The Filedrgs window appears as shown below.



(7) Drag and drop the "PFROLL_BHL2.PRN" icon onto the Brother BHL2-Maintenance Printer icon in the Filedrgs window shown above.

The FAX machine displays the "RECEIVING DATA" on the LCD and prints out "PF ADJUST" and "EXIT ADJUST" check patterns (see the next page for a sample printout).

(8) Press the **6** key twice on the FAX machine.

The "1.PF 2.EXIT" appears on the LCD.

(9) Press the **1** key to select the paper feed roller adjustment.

(10) Check the PF ADJUST check patterns and select the one that is the least uneven print. Make a note of that pattern number.

If the unevenness is far to the left of check pattern 3, regard it as 3; if it is far to the right of check pattern 7, regard it as 7. In this case, you need to check whether the paper feed roller and print head unit are set into place.

(11) Enter the number of the lease uneven check pattern found in step (10).

The FAX machine automatically returns to the initial stage of the maintenance mode.

(12) Press the **6** key twice.

The "1.PF 2.EXIT" appears on the LCD.

(13) Press the **2** key to select the paper ejection roller adjustment.

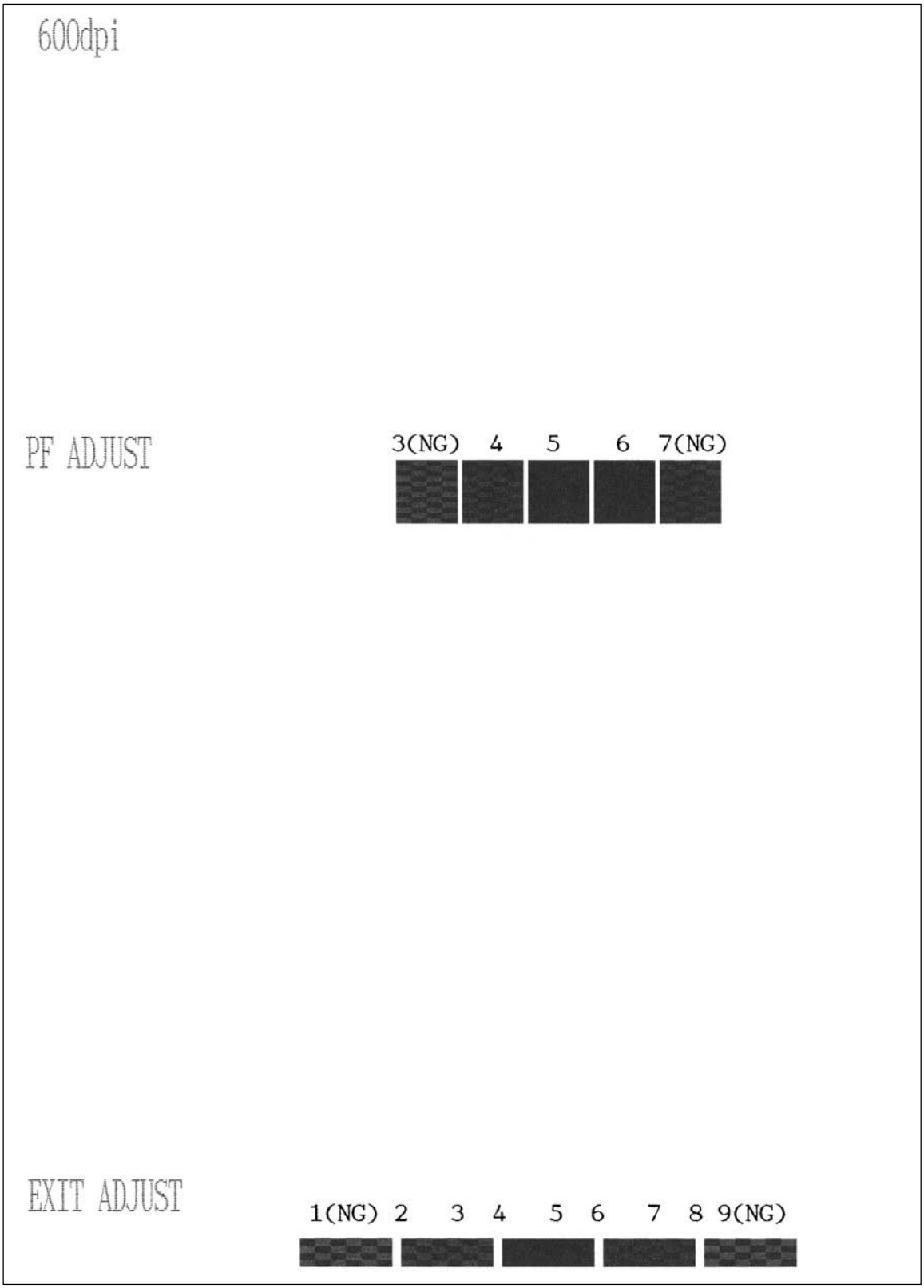
The "EXIT ADJ No.(2-8)" appears on the LCD.

(14) Check the EXIT ADJUST check patterns and select the one that is the least uneven print. Make a note of that pattern number.

If the unevenness is far to the left of check pattern 1, regard it as 1; If it is far to the right of check pattern 9, regard it as 9. In this case, you need to check whether the paper ejection roller and print head unit are set into place.

(15) Enter the number of the least uneven check pattern found in step (14).

The machine automatically returns to the initial stage of the maintenance mode.



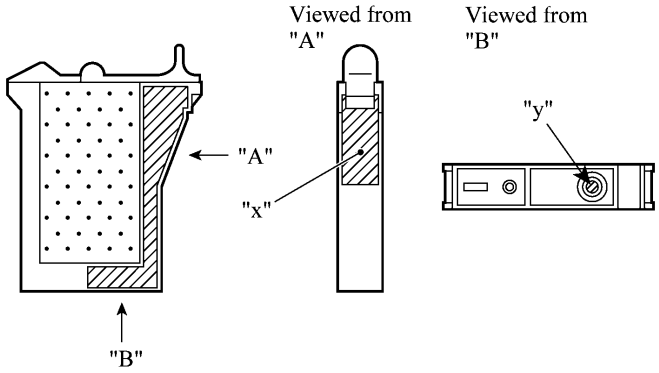
Paper Feeding Check Patterns for the Paper Feed Roller and Paper Ejection Roller

5.7 IF YOU REPLACE THE INK EMPTY SENSOR

Set the sensing reference level of the ink empty sensor

Handling notes for the reference cartridge: Shown below is a reference cartridge (foam-empty cartridge) to be used for setting the sensing reference level of the ink empty sensor. Do not touch section "x" or "y."

If any dust or dirt is found on "x" or "y," wipe it off with a soft cloth. If "x" is scratched, replace the cartridge with a new one. Using such a scratched cartridge will fail to set correct reference level. After completion of the setting procedure, store the cartridge in the container.



Reference cartridge

(1) Press the **Menu/Set**, *****, **2**, **8**, **6** and **4** keys on the FAX machine in this order to enter the maintenance mode.

(2) Press the **5** and **7** keys in this order in the initial stage of the maintenance mode.

(3) Open the scanner cover (scanner unit).

The carriage automatically moves left to the ink replacement position.

(4) Remove the yellow ink cartridge.

The LCD shows "SET F.EMP CART!!."

NOTE: When this message is displayed, do not load or unload any other ink cartridges.

(5) Set the reference cartridge into the yellow ink cartridge position.

(6) Close the scanner cover.

The FAX machine shows the "-INKEMP CHECK-" and starts setting the sensing level for the reference cartridge.

If the machine completes setting normally, it beeps and displays the "INKEMP TST:OK!." If it fails, the "INKEMP F.EMP:NG!" appears, so press the **Stop/Exit** key and go back to step (2).

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

(8) Press the **INK** key. Use the ▲ and ▼ keys to select "2. INK REPLACE" and then press the **Menu/Set** key.

(9) Open the scanner cover and remove the reference cartridge.

(10) Set the yellow ink cartridge removed in step (4) back into place, then close the scanner cover. The "Have you removed Blck?" "1.Yes 2.No" appears.

(11) Press the **2** key. For other color confirmations, press the **2** key in the same way.

5.8 IF YOU REPLACE THE INK ABSORBER BOX

Reset the purge counter to zero

(1) Press the **Menu/Set**, *****, **2**, **8**, **6**, and **4** keys in this order to enter the maintenance mode.

(2) Press the **8** and **0** keys in this order in the initial stage of the maintenance mode.

(3) Press the **Black Start** key nine times to display the purge count on the LCD.

(4) Press the **2**, **7**, **8**, and **3** keys in this order to reset the purge count to zero.

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

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

CHAPTER 6

CLEANING

CHAPTER 6 CLEANING

This chapter 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.

CONTENTS

For the cleaning procedures of the print head unit, scanner, and platen, refer to the User's Guide.

6.1 CLEANING THE PURGE UNIT

(1) Unplug the machine's power cord from the wall socket.

(2) Plug the power cord again. After you hear the carriage moving out of the home position for initialization, unplug the power cord again. The carriage will stop at the middle of the travel.

(3) Open the scanner cover (scanner unit).

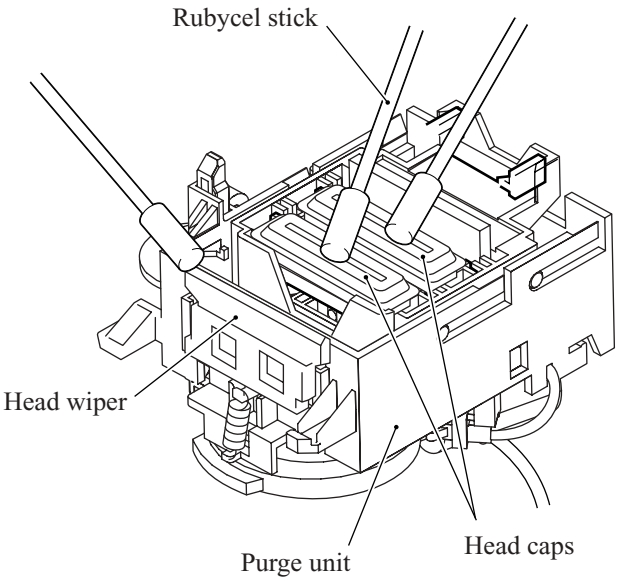
(4) Clean the two head caps and wiper of the purge unit with a "Rubycel" stick that is a head cleaner stick provided as a spare part.

NOTE: Do not use a cotton swab that may leave lint on the cleaned sections. Lint left on the purge unit will affect the print performance.

NOTE: Use a new Rubycel stick and do not use the used one for any other purge units.

NOTE: During the cleaning jobs, take care not to touch the head caps or wiper directly by hand or scratch their surfaces. Do not remove them from the head cap holder.

(5) Close the scanner cover.



CHAPTER 7

MAINTENANCE MODE

CHAPTER 7 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.

In the maintenance mode, you can update memory (EEPROM: electrically erasable programmable read-only memory) contents for optimizing the drive conditions of the print head 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).

CONTENTS

7.1 ENTRY INTO THE MAINTENANCE MODE

To make the facsimile equipment enter the maintenance mode, press the **Menu/Set**, *****, **2**, **8**, **6**, and **4** keys in this order.
←Within 2 seconds→

The equipment 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 equipment is ready to accept entry from the keys.

To select one of the maintenance-mode functions listed in Section 7.2, 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 7.3.)

NOTES:
- Pressing the **9** key twice in the initial stage of the maintenance mode makes the equipment exit from the maintenance mode, restoring it to the standby state.
- Pressing the **Stop/Exit** key after entering only one digit restores the equipment to the initial stage of the maintenance mode.
- If an invalid function code is entered, the equipment resumes the initial stage of the maintenance mode.

7.2 LIST OF MAINTENANCE-MODE FUNCTIONS

Maintenance-mode Functions

Function Code	Function	Reference Section (Page)
01	EEPROM Parameter Initialization	7.3.1 (7-4)
05	Printout of Scanning Compensation Data	7.3.2 (7-5)
08	ADF* Performance Test	7.3.3 (7-7)
09	Test Pattern	7.3.4 (7-8)
10	Firmware Switch Setting	7.3.5 (7-9)
11	Printout of Firmware Switch Data	7.3.5 (7-11)
12	Operational Check of LCD	7.3.6 (7-12)
13	Operational Check of Control Panel PCB (Check of Keys and Buttons)	7.3.7 (7-13)
32	Sensor Operational Check	7.3.8 (7-15)
54	Fine Adjustment of Scanning Start/End Position	7.3.9 (7-16)
55	Acquisition of White Level Data and CIS Scanner Area Setting	7.3.10 (7-17)
57	Setting the Sensing Reference Level of the Ink Empty Sensor	7.3.11 (7-18)
59	Output of Scanning Clock	7.3.12 (7-19)
65	Alignment of Vertical Print Lines	7.3.13 (7-19)
66	Updating of Paper Feeding Correction Value	7.3.14 (7-21)
68	Updating of Head Property Information	7.3.15 (7-23)
69	Initial Adjustment of PWM Value (Aging of the carriage)	7.3.16 (7-24)
74	EEPROM Customizing	7.3.17 (7-25)
80	Display of the Equipment's Log Information	7.3.18 (7-26)
82	Equipment Error Code Indication	7.3.19 (7-27)
87	Output of Transmission Log to the Telephone Line	7.3.20 (7-28)
91	EEPROM Parameter Initialization (except the telephone number storage area)	7.3.1 (7-4)
99	Exit from the Maintenance Mode	----- (7-1)
(**Menu/Set**, and #, **2**, **7**, **9**, **0**, **0**)	Cancellation of the Pin TX Lock Mode (Not applicable to the American models)	7.3.21 (7-28)

* ADF: Automatic document feeder

- **IMPORTANT** -

Basically, the maintenance-mode functions listed on the previous page should be accessed by service personnel only. However, you may allow end users to access some of these under the guidance of service personnel (e.g., by telephone).

The user-accessible functions (codes 10, 11, 12, 54, 65, 80, 82, 87 and 91) 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 may 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** and **Fax Resolution** keys in this order.

The LCD clears the current display.

NOTE: The **Fax Resolution** key is disabled during standby for redialing and timer.

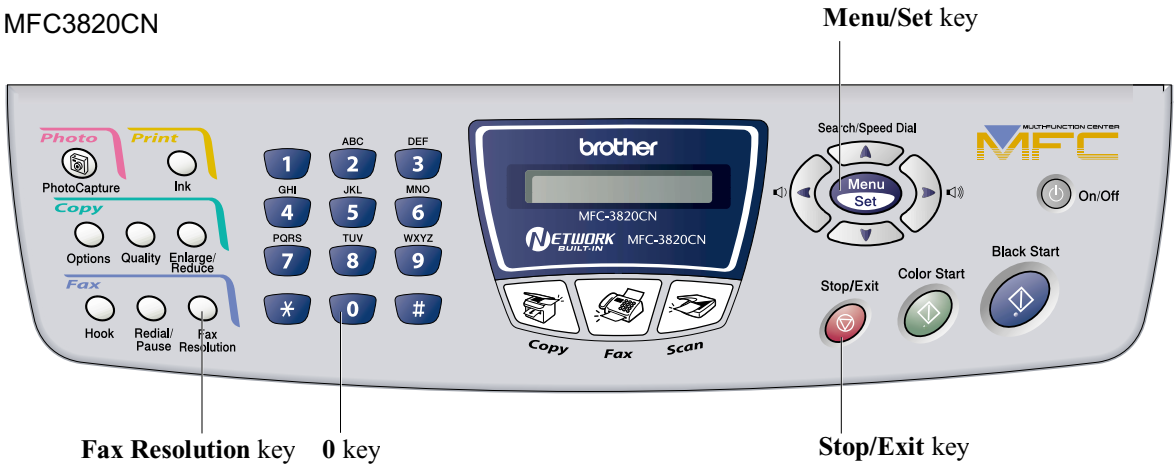
(2) Press the **0** key.

(3) Enter the desired function code (10, 11, 12, 54, 65, 66, 80, 82, 87, or 91) with the numerical keys.

For function code 10, access the desired firmware switch according to the operating procedure described in Appendix 4.

(4) To make the equipment return to the standby state, press the **Stop/Exit** key.

MFC3820CN



MFC3420C

7.3 DETAILED DESCRIPTION OF MAINTENANCE-MODE FUNCTIONS

7.3.1 EEPROM Parameter Initialization (Function code 01, 91)

■ Function

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

<table>
<tr><th>Function code / Data item</th><th>01</th><th>91</th></tr>
<tr><td>Maintenance-mode functions
User switches
Firmware switches
Remote activation code</td><td rowspan="2">All of these will be. initialized</td><td>These will be initialized</td></tr>
<tr><td>Activity report
Station ID data
Outside line number
Telephone function registration
One-touch dialing
Speed dialing
Group dialing</td><td>These will <u>not</u> be initialized</td></tr>
<tr><td>EEPROM customizing code (4-digit)</td><td colspan="2">This will <u>not</u> be initialized.
(Note that the first digit of the 4-digit code will be initialized to "0." If the code is <u>1</u>001, for example, it will be initialized to <u>0</u>001.)</td></tr>
</table>

NOTE: you replace the main PCB with one used for other facsimile equipment, carry out this procedure and then customize the EEPROM (maintenance-mode function code 74 in Section 7.3.17).

■ 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 equipment returns to the initial stage of the maintenance mode.

7.3.2 Printout of Scanning Compensation Data (Function code 05)

■ Function

The equipment 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.

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

The "PRINTING" is displayed during printing of a), and the "WHITE LEVEL 1" during printing of b) through m).

a) White/black level data graph (1 page)
b) LED PWM data for color scan (1 byte)
c) LED PWM data for monochrome scan (1 byte)
d) Green LED pulse data (2 bytes)
e) Blue LED pulse data (2 bytes)
f) Red LED pulse data (2 bytes)
g) CLMP data for color scan (2 bytes)
h) CLMP data for mono scan (2 bytes)
i) Compensation data for background color (1 byte)
j) Black level data (4970 or 2490 bytes)*
k) White level data for red image (4970 or 2490 bytes)*
l) White level data for green image (4970 or 2490 bytes)*
m) White level data for blue image (4970 or 2490 bytes)*

* The number of bytes to be printed differs depending upon the resolution selected before printing of the white and black level data.

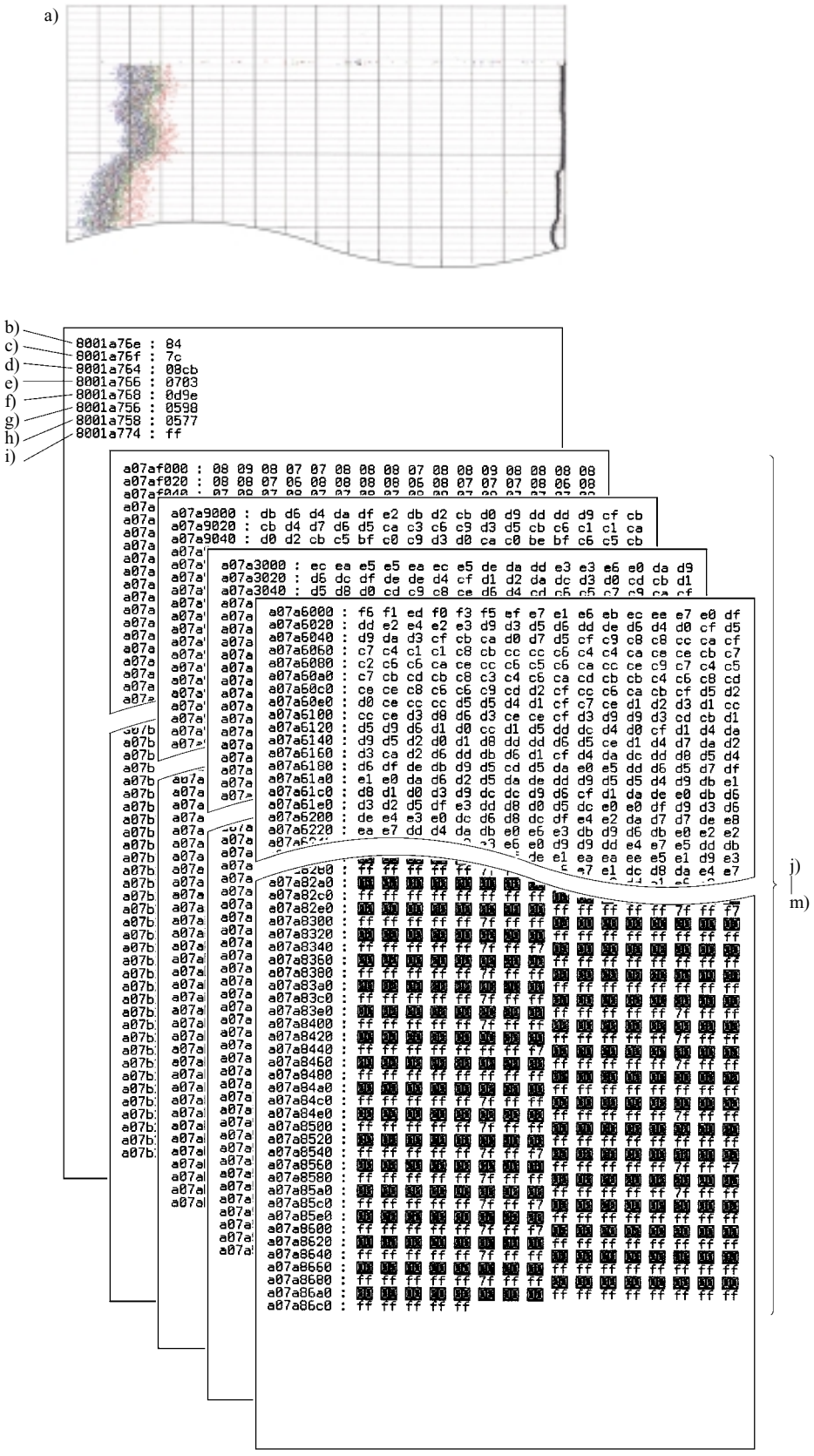
4970 bytes: Best quality in color copy or any quality in black copy has been selected.

2490 bytes: Fast or Normal quality in color copy has been selected.

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

NOTE: When the equipment prints monochrome images after monochrome scanning, only the green data is valid.

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



Scanning Compensation Data List

7.3.3 **ADF Performance Test** (Function code 08)

■ Function

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

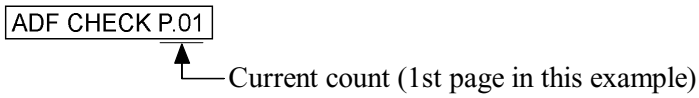
■ Operating Procedure

(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 equipment feeds them in and out, displaying the current count on the LCD as shown below.



(3) After counting all documents, the equipment shows the final count. To return the equipment to the initial stage of the maintenance mode, press the **Stop/Exit** key.

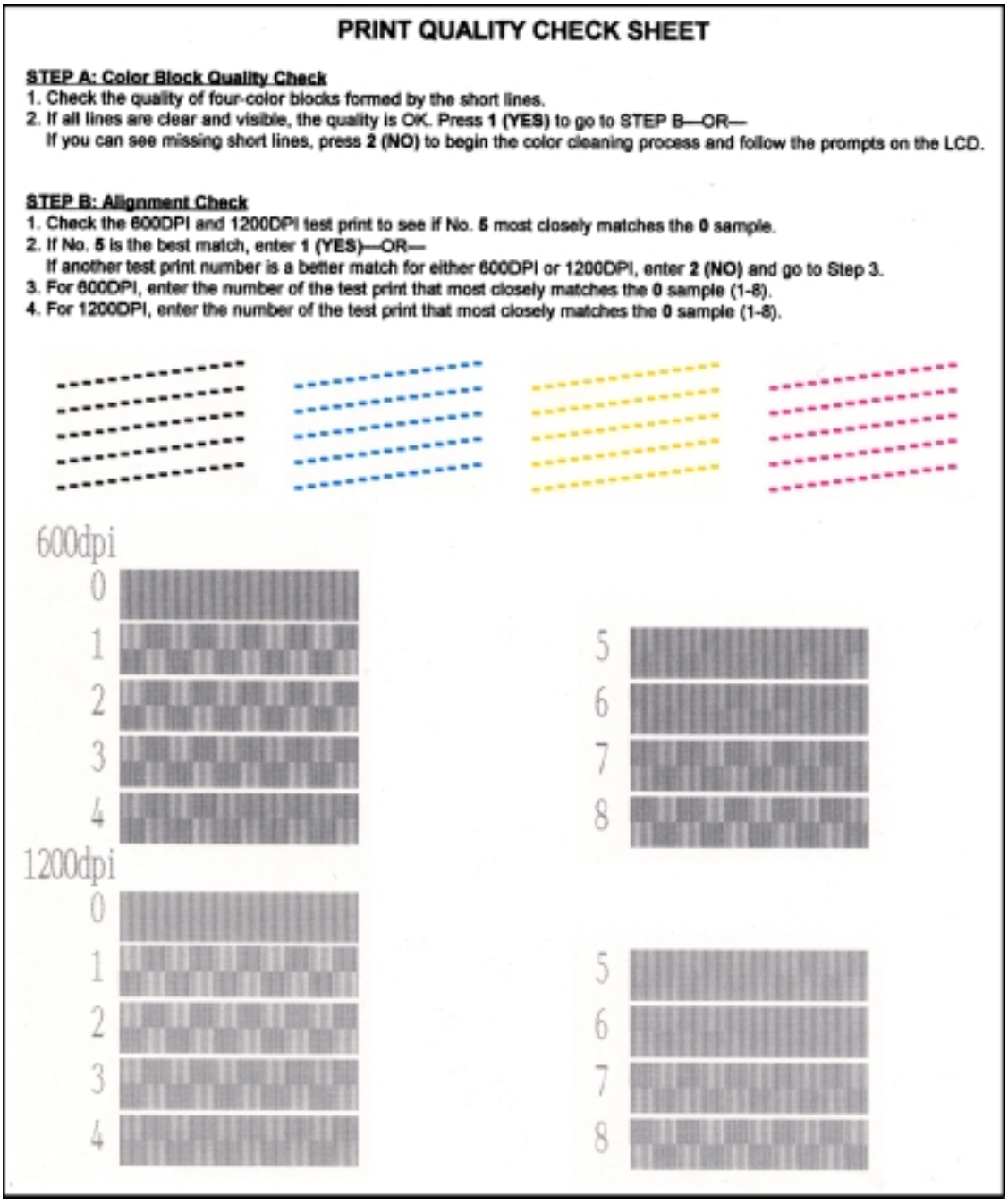
7.3.4 **Test Pattern** (Function code 09)

■ Function

This function, much like the copying function, prints out a test pattern (PRINT QUALITY CHECK SHEET) 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 print quality check sheet. According to the instructions given on this sheet, you can check and correct the print quality.



Test Pattern

7.3.5 **Firmware Switch Setting and Printout** (Function codes 10 and 11)

[A] Firmware switch setting

■ Function

The facsimile equipment 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 codes 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 WSW50)

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	**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	Not used.
WSW31	Function setting 9
WSW32	Function setting 10
WSW33	Function setting 11

Firmware Switches (WSW01 through WSW50) ***Continued***

WSW No.	Function
WSW34	Function setting 12
WSW35	Not used.
WSW36	Function setting 14
WSW37	Function setting 15
WSW38	V.34 transmission settings
WSW39	V.34 transmission speed
WSW40	V.34 modem settings
WSW41	ON-duration of CIS LEDs
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	Not used.
WSW49	End-of-copying beep and print in black
WSW50	SDAA settings

■ Operating Procedure

(1) Press the **1** and **0** keys in this order in the initial stage of the maintenance mode.

The equipment 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 50).

The following appears on the LCD:

Selector 1 ↓ Selector 8 ↓

WSWXX = 0 0 0 0 0 0 0 0

(3) Use the right and left arrow keys to move the cursor to the selector position to be modified.

(4) Enter the desired number (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 equipment 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 **Menu/Set** or **Stop/Exit** key to return the equipment to the initial stage of the maintenance mode.

NOTES:
- To cancel this operation and return the equipment 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 equipment 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.

[B] Printout of firmware switch data

■ Function

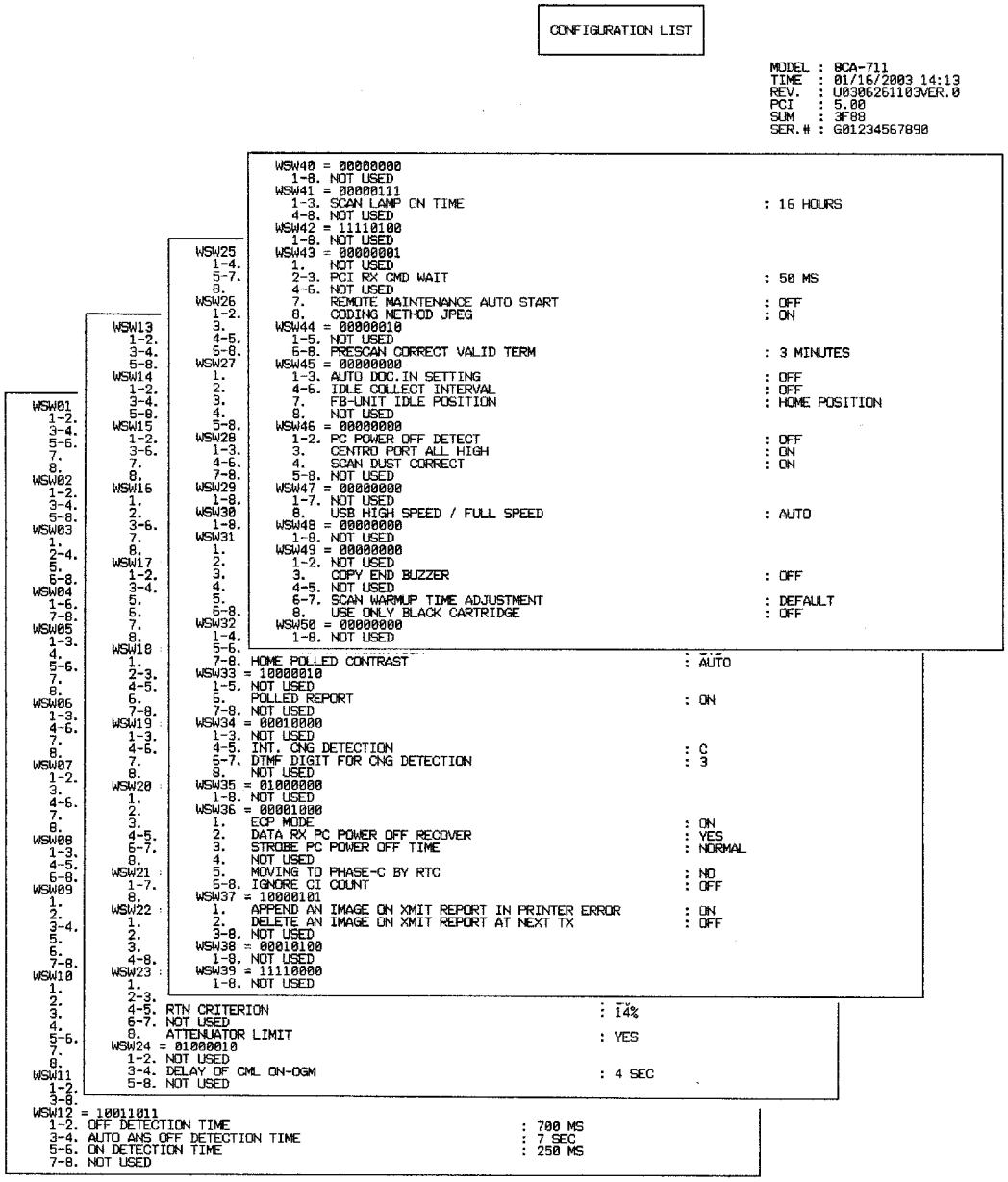
The equipment prints out the setting items and contents specified by the firmware switches.

■ 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 equipment prints out the configuration list as shown in the figure below.

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



Configuration List

7.3.6 **Operational Check of LCD** (Function code 12)

■ Function

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

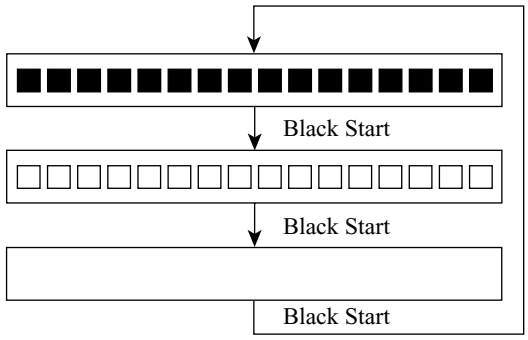
■ Operating Procedure

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

The LCD shows the screen given at right.

(2) Press the **Black Start** key.

Each time you press the **Black Start** key, the LCD cycles through the displays shown at right.



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

7.3.7 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 equipment 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 equipment beeps and returns to the initial stage of the maintenance mode.

To terminate this operation, press the **Stop/Exit** key. The equipment returns to the initial stage of the maintenance mode.

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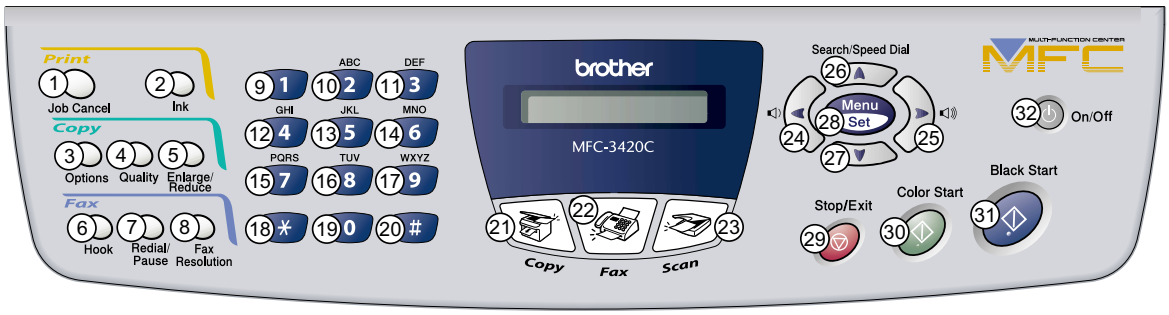
Key & Button Entry Order (1)

MFC3420C



Key & Button Entry Order (2)

7.3.8 **Sensor Operational Check** (Function code 32)

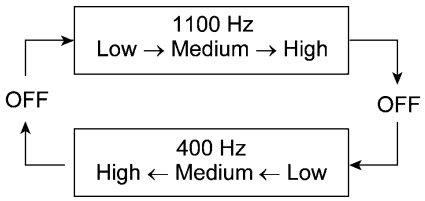
■ Function

This function allows you to check the following:

- Document front sensor
- Document rear sensor
- Scanner open sensor
- Registration sensor
- Paper width sensor
- Purge cam HP switch
- Pump switching cam HP switch

■ Operating Procedure

(1) Press the **3** and **2** keys in this order in the initial stage of the maintenance mode. The equipment sounds 1100 Hz and 400 Hz tones cyclically through the following volumes for testing the speaker:



NOTE: To stop beeping, press the **Menu/Set** key.

If the sensing status are as listed below, the LCD will show the following string. (The MFC3820CN/MFC3420C has no hook switch, but the "HK" always appears.)

"DFDRCVRSPWP1P2HK"

Given below is the relationship between the LCD indication, sensor name and sensor status.

LCD	Sensors	Sensing status
DF	Document front sensor	No document detected.
DR	Document rear sensor	No document detected.
CV	Scanner open sensor	Scanner cover closed.
RS	Registration sensor	No recording paper detected.
PW	Paper width sensor	No paper detected.
P1	Purge cam HP switch	Purge cam placed in the home position.
P2	Pump switching cam HP switch	Pump switching cam placed in the home position.
HK	(Not supported.)	

(2) Change the detecting conditions (e.g., insert paper through the document sensors, registration sensor or paper width sensor, and open the scanner cover) and then check that the indication on the LCD changes according to the sensor states.

(3) To stop this operation and return the equipment to the initial stage of the maintenance mode, press the **Stop/Exit** key.

7.3.9 Fine Adjustment of Scanning Start/End Position (Function code 54)

■ Function

This function allows you to adjust the scanning start/end position.

■ Operating Procedure

(1) Press the **5** and **4** keys in this order in the initial stage of the maintenance mode.

The "SCAN START ADJ." and "1:ADF 2:FB" appear on the LCD in this order.

(2) Press the **1** or **2** key, and the current scanning position correction value appears.

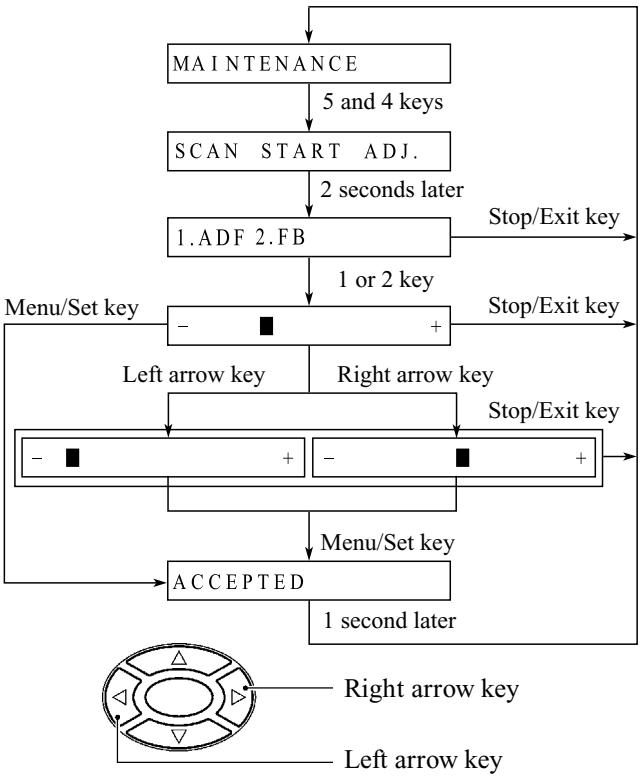
You may adjust the correction value to 11 levels from +5 to -5 (mm).

(3) To increase the correction value, press the right arrow key; to decrease it, press the left arrow key.

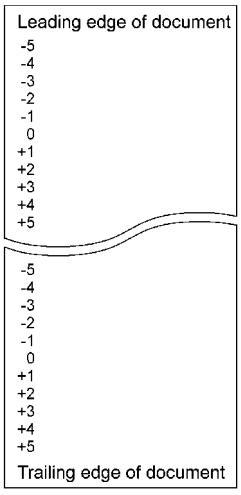
If you press the **Stop/Exit** key, the equipment returns to the initial stage of the maintenance mode without making change of the correction value.

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

The "ACCEPTED" appears on the LCD. After one second, the equipment returns to the initial stage of the maintenance mode.



NOTE: The relationship between the scanning start/end positions and their correction values is shown below.



7.3.10 Acquisition of White Level Data and CIS Scanner Area Setting (Function code 55)

■ Function

This function allows the equipment to obtain white level data for the CIS scanner and save it together with the CIS scanner area into the EEPROM on the driver 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 equipment automatically obtains while level data.

(2) If this operation completes normally, the equipment returns to the initial stage of the maintenance mode.

If any error is noted, the "SCANNER ERROR" appears on the LCD. To return the equipment to the initial stage of the maintenance mode, press the **Stop/Exit** key.

7.3.11 Setting the Sensing Reference Level of the Ink Empty Sensor (Function code 57)

■ Function

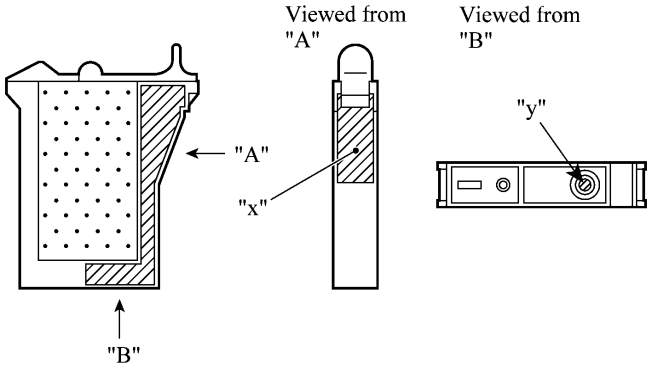
This function allows you to set the sensing reference level of the ink empty sensor which apply when the controller judges whether there is ink in the ink cartridge. The setting procedure requires a foam-empty cartridge as a reference cartridge.

NOTE: If you replace the driver PCB or ink empty sensor, carry out this procedure.

■ Operating Procedure

Handling notes for the reference cartridge: Shown below is a reference cartridge (foam-empty cartridge) to be used for setting the sensing reference level of the ink empty sensor. Do not touch section "x" or "y."

If any dust or dirt is found on "x" or "y," wipe it off with a soft cloth. If "x" is scratched, replace the cartridge with a new one. Using such a scratched cartridge will fail to set correct reference level. After completion of the setting procedure, store the cartridge in the container.



Reference cartridge

(1) Press the **5** and **7** keys in this order in the initial stage of the maintenance mode.

(2) Open the scanner cover (scanner unit).
The carriage automatically moves left to the ink replacement position.

(3) Remove the yellow ink cartridge.
The LCD shows "SET F.EMP CART!!."
NOTE: When this message is displayed, do not load or unload any other ink cartridges.

(4) Set the reference cartridge into the yellow ink cartridge position.

(5) Close the scanner cover.
The equipment shows the "-INKEMP CHECK-" and starts setting the sensing level for the reference cartridge.
If the equipment completes setting normally, it beeps and displays the "INKEMP TST:OK!." If it fails, the "INKEMP F.EMP:NG!" appears, so press the **Stop/Exit** key and go back to step (1).

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

(7) Press the **INK** key. Use the ▲ and ▼ keys to select "2. INK REPLACE" and then press the **Menu/Set** key.

(8) Open the scanner cover and remove the reference cartridge.

(9) Set the yellow ink cartridge removed in step (3) back into place, then close the scanner cover. The "Have you removed Blck?" "1.Yes 2.No" appears.

(10) Press the **2** key. For other color confirmations, press the **2** key in the same way.

7.3.12 **Output of Scanning Clock** (Function code 59)

■ Function

This function is designed for debugging at the factory. Do not disturb it in maintenance.

7.3.13 **Alignment of Vertical Print Lines** (Function code 65)

■ Function

This function allows you to align vertical lines printed in the forward and backward direction of the carriage.

NOTE: Before this alignment job, be sure to correct the positioning error of the print head. Refer to Chapter 5, Section 5.2.

■ Operating Procedure

(1) Press the **6** and **5** keys in this order in the initial stage of the maintenance mode.

The "PRINTING" appears on the LCD.

The equipment prints out a set of vertical alignment check patterns which consist of No. 1 to No. 9 lines for each of the 600 dpi and 1200 dpi.

If the vertical alignment is ON, No. 5 line (each in the 600 dpi and 1200 dpi printouts) shows vertically aligned lines as given on the next page.

The LCD shows the "600DPI NO.(1-9)."

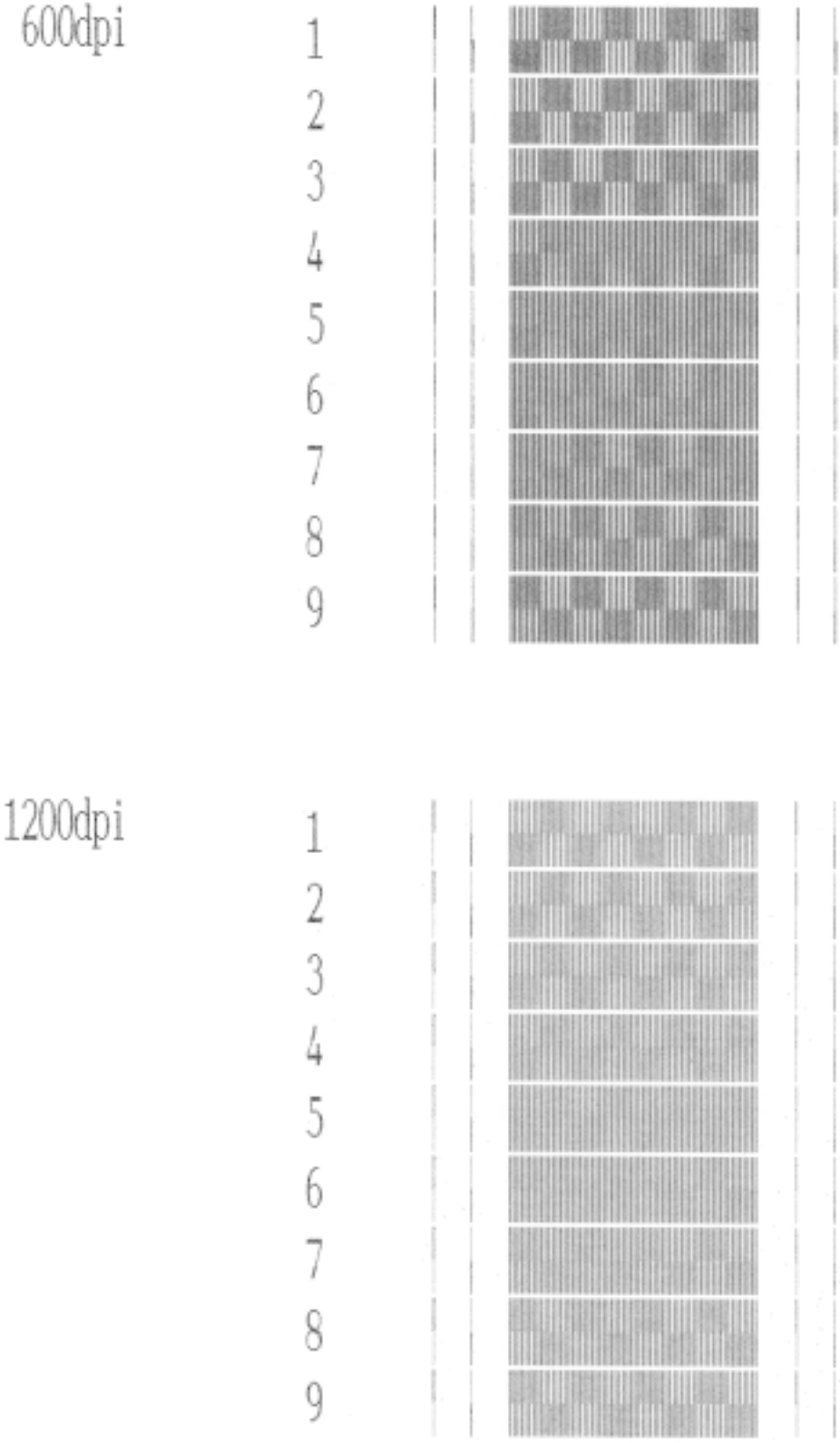
(2) Check the printed vertical alignment check patterns for the 600 dpi and find which number line shows full alignment. If the line is other than No. 5, enter that line number by using the numerical keys.

The LCD shows the "1200DPI NO.(1-9)."

(3) For the 1200 dpi, perform the same operation as in step (2).

The equipment automatically returns to the initial stage of the maintenance mode.

NOTE: If No. 1 line or No. 9 line is fully aligned so that you press the **1** or **9** key in the above procedure, then go back to step (1) to confirm that No. 5 line becomes aligned.



Vertical Alignment Check Pattern

7.3.14 Updating of Paper Feeding Correction Value (Function code 66)

■ Function

To keep the paper feeding performance in the best condition for quality print, the controller optimizes the rotation of the paper feed roller and paper ejection roller, using the correction value stored in the EEPROM of the driver PCB.

If you replace the paper feed roller, paper ejection roller, or print head unit of the machine, then you need to update the paper feeding correction value according to the procedure given here.

TIP: This updating procedure requires a PC for printing out downloaded test patterns. Refer to Chapter 5, Section 5.6.

■ Operating Procedure

(1) Connect the facsimile machine to your PC via the USB, set up your PC and facsimile machine, and then print out test patterns. Refer to Chapter 5, Section 5.6.

(2) Press the **6** key twice in the initial stage of the maintenance mode.

The "1.PF 2.EXIT" appears on the LCD.

(3) Press the **1** key to select the paper feed roller adjustment.

The "PF ADJ NO.(4-6)" appears on the LCD.

(4) Check the PF ADJUST check patterns and select the one that is the least uneven print. Make a note of that pattern number. See the next page for a sample printout.

If the unevenness is far to the left of check pattern 3, regard it as 3; if it is far to the right of check pattern 7, regard it as 7. In this case, you need to check whether the paper feed roller and print head unit are set into place.

(5) Enter the number of the least uneven check pattern found in step (4).

The machine automatically returns to the initial stage of the maintenance mode.

(6) Press the **6** key twice again.

The "1.PF 2.EXIT" appears on the LCD.

(7) Press the **2** key to select the paper ejection roller adjustment.

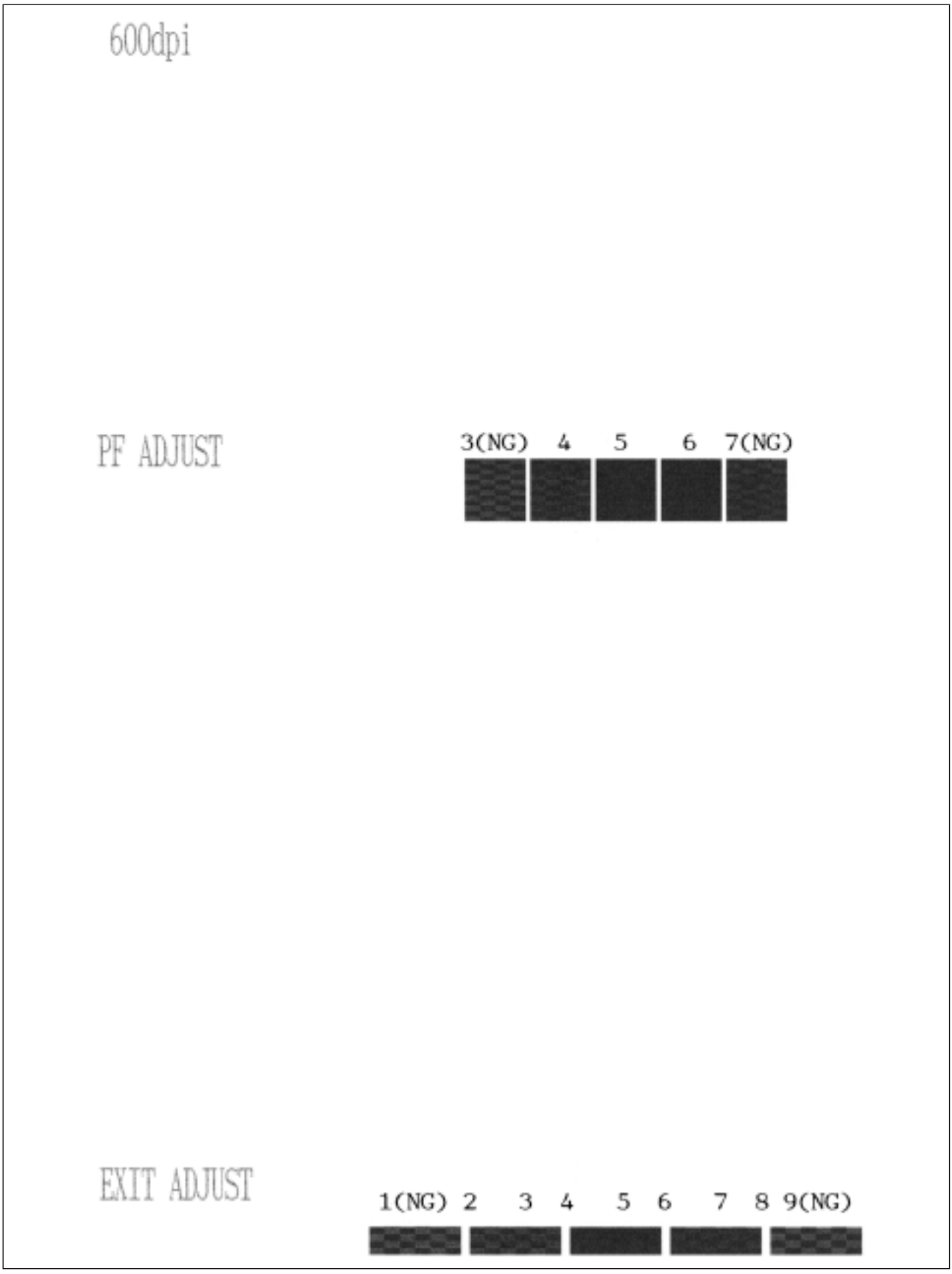
The "EXIT ADJ NO.(2-8)" appears on the LCD.

(8) Check the EXIT ADJUST check patterns and select the one that is the least uneven print. Make a note of that pattern number.

If the unevenness is far to the left of check pattern 1, regard it as 1; if it is far to the right of check pattern 9, regard it as 9. In this case, you need to check whether the paper ejection roller and print head unit are set into place.

(9) Enter the number of the least uneven check pattern found in step (8).

The machine automatically returns to the initial stage of the maintenance mode.



Paper Feeding Check Patterns for the Paper Feed Roller and Paper Ejection Roller

7.3.15 Updating of Head Property Information (Function code 68)

■ Function

To keep the print quality, the controller optimizes the head drive strength, ink jet-out timing, and other drive conditions according to the electromechanical properties unique to individual print heads and ambient temperature. The head property information is stored in the EEPROM on the driver PCB.

If you replace the print head unit and/or driver PCB of the machine, then you need to update the head property according to the procedure given here.

TIP: You may update the head property information from a PC connected to the facsimile machine. For the procedure, refer to Chapter 5, Section 5.2.

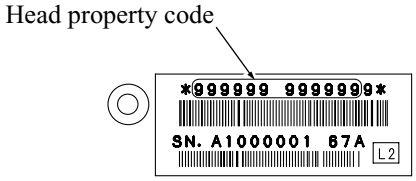
■ Operating Procedure

(1) Press the **6** and **8** keys in this order in the initial stage of the maintenance mode.

(2) Press the **2**, **5**, **8**, **0** keys in this order.

The facsimile machine shows the current head property information (13-digit code, e.g., 45352DABB485F) stored in the EEPROM on the LCD and becomes ready to accept entry.

(3) Check the head property code printed on the bar code label attached to the print head unit. Out of the 13-digit property code (enclosed with asterisks, e.g., *66667F657031H*), type upper 12 digits (e.g., 66667F657031).



NOTE: To enter letters "A" through "F," press the **1** through **6** keys while holding down the **#** key, respectively.

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

The machine beeps, shows the "INPUT ACCEPTED" on the LCD, and writes the entered property code into the EEPROM. Then the machine returns to the initial stage of the maintenance mode.

NOTE: If the entered data contains any checksum error, the machine beeps, shows the "INPUT ERROR," and then returns to the ready-to-enter state. Go back to step (3).

7.3.16 Initial Adjustment of PWM Value (Aging of the Carriage) (Function code 69)

■ Function

This function obtains the initial value of the PWM by aging the carriage and writes it onto the EEPROM, as well as checking the head drive voltage level.

This aging procedure should be performed if you replace the print head, carriage ASSY, carriage motor, or encoder strip or if you loosen the timing belt.

NOTE: Opening the scanner cover (scanner unit) during the aging procedure will result in an error. If you perform this aging procedure with either of them opened, the equipment will slowly age the carriage resulting in an error after completion of the aging.

■ Operating Procedure

(1) Press the **6** and **9** keys in this order in the initial stage of the maintenance mode.

The equipment starts aging the carriage, showing the "CR AGING" on the LCD.

After writing the initial value of the PWM onto the EEPROM and checking the head drive voltage level, the equipment automatically returns to the initial stage of the maintenance mode.

If any error occurs, the equipment beeps and shows some message, e.g., "OK30 NG15 NG07" on the LCD. This sample message indicates that the speed variation is within the allowable range when the carriage travels at high speed of 30 inches/sec.; however, it is out of the range at medium or low speed of 15 inches/sec. or 7 inches/sec.

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

7.3.17 **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 driver 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., 3001 in the case of MFC3420C U.S.A. versions) appears.

(2) Enter the desired customizing code (e.g., 2002 in the case of MFC3420C Canadian versions).

NOTE: To enter letters "A" through "F," press the **1** through **6** keys while holding down the **#** key, respectively.

The newly entered code appears.

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

(3) Press the **Black Start** key.

The equipment 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 equipment stops the procedure and returns to the initial stage of the maintenance mode.

7.3.18 Display of the Equipment's Log Information (Function code 80)

■ Function

The equipment may display its log information on the LCD.

With this procedure, you may also reset the purge count. It is necessary when the ink absorber box is replaced with a new one without replacing the driver PCB. It is also necessary if the purge count reaches 2700 so that the machine displays the MACHINE ERROR 46 and can no longer perform a purge operation. For the purge count, refer to Chapter 3, Section 3.2.2.3, "Purge types, time required, amount of ink used, and purge count" table.

■ 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) Ink drop count, indicating how many droplets have been jetted out from each of the ink cartridges*[1]
2) Ink drop count after near-empty, indicating how many droplets have been jetted out from each of the ink cartridges*[1] after the ink empty sensor detects near-empty
3) Total ink drop count, indicating how many droplets the equipment has been jetted out from each of the ink cartridges*[1] since produced
4) Jam count, indicating how many times a paper jam has occurred
5) Total page count, indicating how many pages have been printed since the equipment was produced
6) PC print page count, indicating how many pages the equipment has been printed as an output device of the connected PC
7) Copy page count, indicating how many copies have been made
8) FAX page count, indicating how many received FAX pages have been printed
9) Purge count, indicating how many times the purge operation has been carried out
With the purge count displayed, pressing the **2**, **7**, **8** and **3** keys in this order resets the purge count to zero.
10) Wiper count, indicating how many times the wiper operation has been carried out
11) Ink cartridge change count, indicating how many times ink cartridge replacement has been made for each color*[1]
12) Error code of the most recent machine error*[2]
13) Error code of the most recent communications error*[3]
14) ADF jam count, indicating how many times a document jam has been occurred
15) ADF page count, indicating how many documents have been fed
16) Flat-bed page count, indicating how many documents have been scanned

If you press the **Black Start** key, the screen goes back to the USB serial number indication in step (1) above.

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

*1 To check each of the four ink cartridges, press the **Menu/Set** key. Pressing the key cycles through black, yellow, cyan, and magenta.

*2 When a machine error code is displayed, pressing the **Menu/Set** key toggles between the latest error and 2nd latest error.

*3 When a communications error code is displayed, pressing the **Menu/Set** key cycles through the latest error, 2nd latest error, and 3rd latest error.

7.3.19 Equipment 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) To stop this operation and return the equipment to the initial stage of the maintenance mode, press the **Stop/Exit** key.

7.3.20 Output of Transmission Log to the Telephone Line (Function code 87)

■ Function

This function outputs the transmission log (that the equipment has stored about the latest transmission) to the telephone line. It allows the service personnel to receive the transmission log of the user's equipment at a remote location and use it for analyzing problems arising in the user's equipment.

■ Operating Procedure

(1) If the user's equipment has a transmission-related problem, call the user's equipment at a remote location from your equipment.

(2) If the line is connected, have the user perform the following:

1) Press the **Menu/Set**, **Fax Resolution**, and **0** keys in this order.
2) Press the **8** and **7** keys in this order.

The above operation makes the user's equipment send CNG to your equipment for sending the transmission log.

(3) If you hear the CNG sent from the user's equipment, press the **Black Start** key of your equipment.

Your equipment will start to receive the transmission log from the user's equipment.

7.3.21 Cancellation of the Pin TX Lock Mode (Not applicable to American models)

■ Function

This procedure can cancel the Pin TX lock mode. Use this procedure if the user forgets his/her password entered when setting the Pin TX lock mode so as not to exit from the mode.

NOTE: Carrying out this procedure will lose passwords previously entered but retain FAX messages received in the Pin TX lock mode.

■ Operating Procedure

(1) When the PIN TX LOCK is displayed on the LCD, press the **Menu/Set** and **#** keys *at the same time*. Within two seconds, start to press the **2**, **7**, **9**, **0**, and **0** keys.

The Pin TX lock mode will be canceled and the equipment returns to the calendar clock screen.

CHAPTER 8

ERROR INDICATION AND TROUBLESHOOTING

CHAPTER 8 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

8.1 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.

8.1.1 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 7, Section 7.3.19 (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

Messages on the LCD	Probable Cause
CHECK CARTRIDGE Open cover, then reinstall ink cartridge. (These messages appear alternately.)	Any of the ink cartridges is not loaded.
CHECK DOCUMENT CHECK ORIGINAL Remove documents, then press STOP KEY. (These messages appear alternately.)	■ Document jam (1) The document length exceeds the limitation (400 or 90 cm) registered by firmware switch WSW16. (Refer to Appendix 4.) (Both the document front and rear sensors stay ON even after the document has been fed by the registered length.) (2) The document rear sensor detects no trailing edge of a document after the document has been fed by 400 cm. (The document rear sensor stays ON even after the document has been fed when the document front and rear sensors were OFF and ON, respectively.)

Messages on the LCD	Probable Cause
CHECK DOCUMENT CHECK ORIGINAL Remove documents, then press STOP KEY. (These messages appear alternately.)	■ Document loading error (1) The document rear sensor detects no leading edge of a document within 10 seconds from the start of document loading operation. (The document rear sensor stays OFF even after the document has been fed when the document front sensor was ON.) (2) The loaded document is too short. (Since the document is shorter than the distance between the document front and rear sensors, the document front sensor is turned OFF before the document rear sensor is turned ON.)
CHECK PAPER Reload paper, then press Black or Color Start. (These messages appear alternately.)	The registration sensor detects no recording paper loaded in the auto sheet feeder (ASF).
COOLING DOWN WAIT FOR A WHILE (These messages appear alternately.)	The temperature inside the machine is too high.
COVER OPEN PLS CLOSE COVER (These messages appear alternately.)	The scanner open sensor detects that the scanner cover (scanner unit) is not closed.
INK EMPTY CYAN INK EMPTY MAGENT INK EMPTY YELLOW INK EMPTY BLACK	The ink dot counter (for the indicated color) in the EEPROM on the driver PCB has counted up the specified number of dots, meaning that the ink has run out. Once any of these messages is displayed, color printing is no longer possible.
LOW TEMPERATURE Room temperature is below spec. (These messages appear alternately.)	The temperature inside the machine is too low.

Messages on the LCD	Probable Cause
NEAR EMPTY CYAN NEAR EMPTY MGENT NEAR EMPTY YELLW NEAR EMPTY BLACK	The ink empty sensor detects that the ink cartridge (cyan, magenta, yellow, or black) is near empty. Even if any of these messages is displayed, color printing is still possible.
PAPER JAM Open cover, then remove jammed paper. (These messages appear alternately.)	The registration sensor detects that a paper jam has occurred.
PC BUSY OR FAIL	After connected with the host computer, the equipment has received no response from the computer. (A communications error has occurred.)
PLS OPEN COVER	To display the relating detailed error code, use maintenance-mode function code 82. (Refer to Chapter 7, Section 7.3.19.) If this message appears, open and close the scanner cover (scanner unit). The message may disappear if opening/closing the scanner cover removes the error. If the error persists, the "MACHINE ERROR X X" will appear instead of this message.
SCANNER ERROR	In the scanning compensation data list printed by the maintenance-mode function code 05 (refer to Chapter 7, Section 7.3.2), fifty percent or more of the white level data is faulty. (This message may appear only in the maintenance mode)

If only an alarm beep is heard without any message appearing on the LCD when the equipment is turned on, this indicates that an error has occurred in the ROM or RAM. Turn the equipment off and back on again. If an alarm beep is heard again, it indicates that the ROM and/or RAM is defective.

[2] Error codes contained in "MACHINE ERROR X X" messages

If the LCD shows the "PLS OPEN COVER" message, you can display the detailed error code following the MACHINE ERROR by using maintenance-mode function code 82 described in Chapter 7, Section 7.3.19.

NOTE: When checking a PCB as instructed in the "Check:" column, also check its harness.

NOTE: To check sensors, use maintenance-mode function code 32 described in Chapter 7, Section 7.3.8 (that is, press the **3** and **2** keys in the maintenance mode).

Error Code (Hex)	Error factor	Check:
20 | 24	Reserved.	
25	Ink cartridges had already been loaded when the power was first applied.	Reload ink cartridges, referring to the User's Guide.
26	The black ink has run out.	• Ink cartridges • Main PCB • Ink empty sensor PCB • Driver PCB
27	The yellow ink has run out.	
28	The cyan ink has run out.	
29	The magenta ink has run out.	
2A	Reserved. (No black ink cartridge is loaded.)	
2B	Reserved. (No yellow ink cartridge is loaded.)	
2C	Reserved. (No cyan ink cartridge is loaded.)	
2D	Reserved. (No magenta ink cartridge is loaded.)	
2E 2F	Reserved.	
3*	Carriage travel error.	• Carriage ASSY • Encoder strip (Any stains or scratches? Hooked correctly?) • Carriage motor • Main PCB • Power supply PCB • Purge unit • Main chassis • Driver PCB • Foreign materials in the carriage travel path

Error Code (Hex)	Error factor	Check:
40	Reserved	
41	The head drive voltage has not been turned from Low to High within the specified time.	• Carriage ASSY • Main PCB • Print head unit • Power supply PCB
42	The head drive voltage has not been turned from High to Low within the specified time.	
43	Head thermister broken.	• Print head unit • Carriage ASSY • Main PCB • Driver PCB
44	Head thermister short-circuited or error in its related parameters stored in the EEPROM on the driver PCB	
45	Flushing operation abnormally ended. (The head temperature has arisen abnormally.)	• Print head unit
46	The number of performed purge sequences has reached the limit.	• Ink absorber box • Driver PCB
47	Head parameters stored in the EEPROM are invalid. (This code may appear only in the maintenance mode.)	• Print head unit • Driver PCB • Power supply PCB
48	Weak connection of the head flat cables.	• Head flat cables • Main PCB
49 | 4A	Reserved.	
4B	Reserved. (Weak connection of the head flat cables.)	
4C	Reserved.	
4D	Reserved. (Error in the head drive voltage parameter stored in the EEPROM but not accessible at the user site.) (This code may appear only in the maintenance mode.)	• Driver PCB
4E	Out of the allowable range of the head drive voltage designed for individual print head properties. (This code may appear only in the maintenance mode.)	• Driver PCB
4F	Reserved.	

Error Code (Hex)	Error factor	Check:
50	The purge cam HP switch does not come ON even after the purge cam has been driven by the specified number of pulses.	• Purge unit • Purge-related gears on the main chassis (Purge bevel gear A, ASF/purge idle gear, and ASF-purge switching gear 23) • Main chassis • Paper feed motor • Main PCB • Driver PCB
51	The purge cam HP switch does not go OFF even after the purge cam has been driven by the specified number of pulses.	
52	The pump switching cam HP switch does not come ON even after the switching cam has been driven by the specified number of pulses.	
53	The pump switching cam HP switch does not go OFF even after the switching cam has been driven by the specified number of pulses.	
54	Reserved. (The air pump motor does not rotate.)	
55	Reserved. (The air pump motor rotates abnormally. This code may appear only in the maintenance mode.)	
56 | 5F	Reserved.	
60	Reserved. (Paper width sensor (media sensor) error.)	
61		
62		
63		
64 | 67	Reserved.	
68	Reserved. (The ASF switch remains OFF after the ASF motor is driven by the specified steps.)	
69	Reserved. (The ASF switch remains ON after the ASF motor is driven by the specified steps.)	
6A | 7C	Reserved.	
7D	Reserved. (Any of the ink dot counters has counted up to the specified number of dots, meaning the end of the head service life.)	

Error Code (Hex)	Error factor	Check:
7E	No head parameters stored in the EEPROM. (This code may appear only in the maintenance mode.)	• Print head unit • Main PCB • Driver PCB
7F	Reserved. (Print engine error.)	
80	At the start of recording operation, it is detected that paper is smaller than A4 size in length or width.	• Paper width sensor • Paper size
81	Recording paper jam. The paper width sensor stays ON.	• Paper width sensor
82	Reserved. (Recording paper feeding error.)	
83	Recording paper jam. (At the retry of paper pulling-in operation, the registration sensor is not OFF.)	• Registration sensor actuator • Main PCB • Driver PCB
84	Recording paper jam. (The paper width sensor and/or registration sensor has detected a paper jam.)	• Paper width sensor actuator • Registration sensor actuator • Main PCB • Driver PCB
85 86	Reserved.	
87	Reserved. (The paper feed motor has not stopped at the correct position.)	
88	Recording paper jam. (Even after paper pulling-in operation, the registration sensor is still OFF.)	• Paper width sensor actuator • Registration sensor actuator • Main PCB • Driver PCB
89 | A0	Reserved.	
A1	Scanner cover opened.	• Scanner open sensor actuator • Main PCB • Scanner cover (scanner unit) • Control panel PCB

Error Code (Hex)	Error factor	Check:
A2	Document too long to scan.	• Document front sensor actuator • Document rear sensor actuator • ADF PCB • Document feed roller • ADF motor • Main PCB
A3	Document not detected by the document rear sensor.	
A4	Reserved. (50% or more faulty of white level data.)	
A5 A6	Reserved.	
A7	Reserved. (One-line feeding timeout.)	
A8	Reserved. (One-line scanning timeout.)	
A9	Reserved.	
AA	Reserved. (The document cover is not closed.)	
AB	Reserved.	
AC	Reserved. (Less than 50% faulty of white level data.)	
AD	Reserved.	
AE	CIS positioning error. (Sticks to the home position.)	• CIS unit • Driver PCB • Main PCB
AF	CIS positioning error. (Cannot return to the home position.)	• CIS unit • Driver PCB • Main PCB
B0	Weak connection of the ADF-driver harness.	• ADF-driver harness • ADF PCB • Driver PCB
B1	Reserved. (Dark level offset data level error for scanning.)	
B2	Reserved. (Gain control data level error for scanning.)	
B3	Reserved. (Scan area left edge detection error.)	

Error Code (Hex)	Error factor	Check:
B4	Reserved. (Scan area right edge detection error.)	
B5	Reserved. (Horizontal scanning edge reduction detection error in scanning area setting.)	
B6	Reserved. (Horizontal scanning edge enlargement detection error in scanning area setting.)	
B7	A/D converter reference voltage error (at High level).	• Main PCB
B8	A/D converter reference voltage error (at Low level).	• Main PCB
B9	Light emission intensity error of the LED array (Exceeding the upper limit).	• CIS unit • Main PCB
BA	Reserved.	
BB	White level data error.	• CIS unit • CIS flat cable • Main PCB • Document pressure bar
BC	Reserved.	
BD	Black level data error.	• CIS unit • Main PCB • CIS flat cable
BE	Reserved. (Scan starting edge detection error.)	
BF	Reserved.	
D*	Modem error.	• Main PCB
E0 | E3	Reserved.	
E4	Out of recording paper.	• ASF • Registration sensor actuator • Paper feed roller • Main PCB • Driver PCB • Paper feed related gears
E5	Reserved.	

Error Code (Hex)	Error factor	Check:
E6	Write error in EEPROM.	• Main PCB • Driver PCB
E7	Reserved.	
E8	Data scanning error during transmission.	• CIS unit • Main PCB
E9	Reserved.	
EA	Document removed at phase B.	
EB | F2	Reserved.	
F3	Internal software error.	• Replace the main PCB if this error occurs frequently.
F4	Reserved.	
F5	Internal software error.	• Replace the main PCB if this error occurs frequently.
F6	PC interface error.	• Interface cable • Main PCB
F7	Media module connection error.	• Media module • Main PCB
F8	Reserved. (Backup battery not loaded correctly.)	
F9	Weak connection of media flat cables.	• Media module • Main PCB
FA | FE	Reserved.	
FF	Memory management error.	• Replace the main PCB if this error occurs frequently.

8.1.2 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	No tone detected after dialing.
17	07	No response from the calling station in receiving.

*Available in German versions 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	Undefined 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 broad-casting 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: 5 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 versions 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 8.1.1 [2].)

8.2 TROUBLESHOOTING

8.2.1 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.

8.2.2 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.

8.2.3 Checking prior to Troubleshooting

Prior to proceeding to the troubleshooting procedures given in Section 8.2.4, 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 is 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.

Ink cartridges

(1) Check that all of four ink cartridges are loaded.

Print head

(1) Check that the print head is installed on the carriage correctly. (Check the dimple contact between the print head PCB and the carriage PCB.)

(2) Repeat the head purging operation several times.

(3) Clean the print surface of the print head unit. (Refer to the User's Guide.)

8.2.4 Troubleshooting based on problem type

[1] Control panel problems

Problem	Check:
(1) LCD shows nothing.	• Panel-main harness • Control panel PCB • Power supply PCB • Main PCB
(2) Control panel inoperative.	• Panel-main harness • Control panel PCB • Rubber keypad • Main PCB

[2] Telephone problems

Problem	Check:
(1) No phone call can be made.	• Rubber keypad • Control panel PCB • NCU PCB (MFC3420C only) • Main PCB • SDAA PCB (MFC3820CN only) • MJ PCB (MFC3820CN only)
(2) Speed dialing will not work.	• Ordinary dialing function (other than the speed and one-touch dialing) If it works normally, check the main PCB; if not, refer to item (1) above.
(3) Dial does not switch between tone and pulse.	• Main PCB
(4) Telephone does not ring.	• Speaker • NCU PCB (MFC3420C only) • Main PCB • SDAA PCB (MFC3820CN only) • MJ PCB (MFC3820CN only)

[3] Communications problems

Problem	Check:
(1) No tone is transmitted.	• Main PCB • SDAA PCB (MFC3820CN only) • MJ PCB (MFC3820CN only) • NCU PCB (MFC3420C only)

[4] Paper/document feeding problems

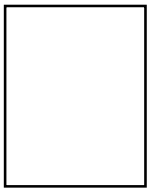
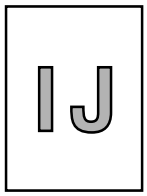
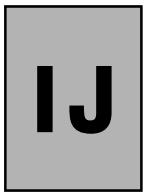
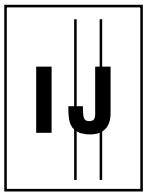
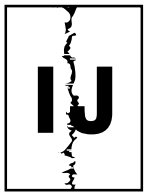
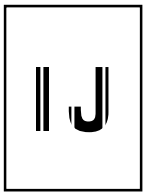
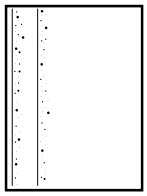
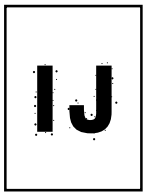
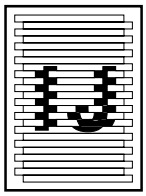
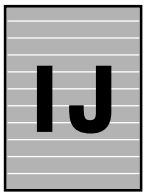
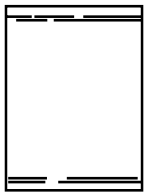
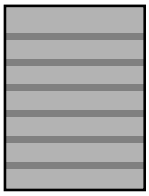
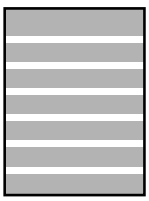
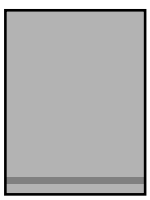
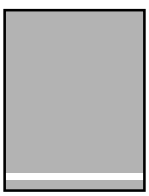
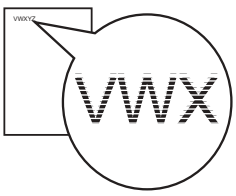
Problem	Check:
(1) The "Enter Fax No." message does not appear although documents are set.	• Sensors by using maintenance-mode function code 32. (Refer to Chapter 7, Section 7.3.8.) • Document front sensor actuator • Main PCB
(2) Document not fed.	• ADF and its related sections • ADF motor and its harness • Document feed rollers and their related gears • Main PCB • Driver PCB • ADF PCB
(3) Document double feeding	• ADF parts
(4) Document jam	• ADF motor • Document rear sensor actuator • ADF PCB • Main PCB • Driver PCB
(5) Recording paper not fed.	• PF-related gears • Main PCB • Driver PCB • Paper feed motor
(6) Recording paper jam	• Paper feeding mechanism • Check that the print head unit is installed to the carriage correctly.

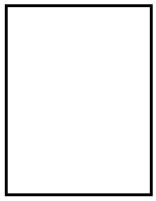
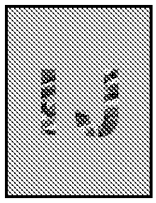
[5] Print-image problems

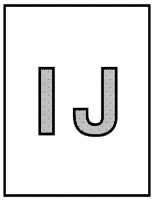
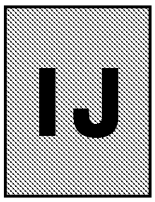
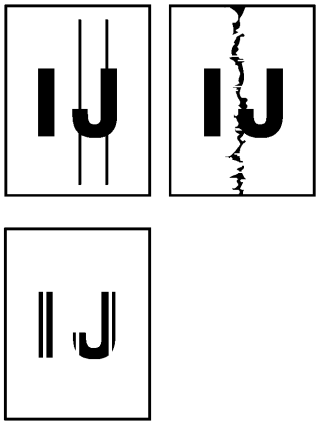
If there is any problem with any image received or sent, first make a copy of it using the facsimile.

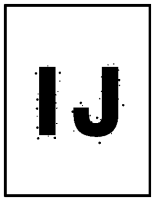
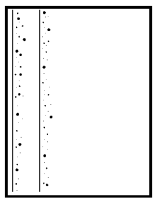
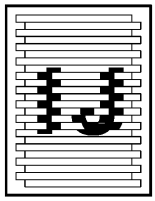
If the copied image is normal, the cause of the problem may be the remote terminal; if it is abnormal, proceed with the following checks:

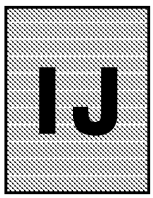
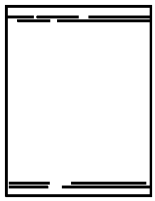
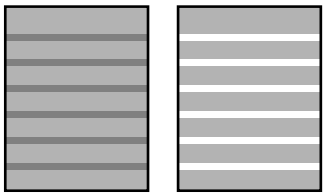
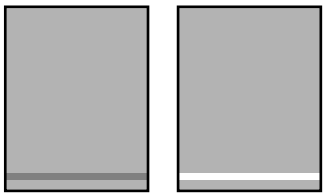
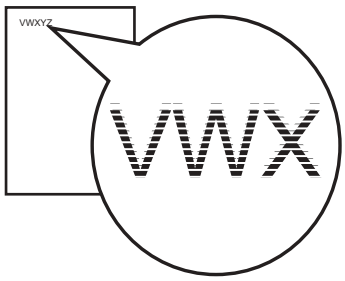
Examples of Defective Images

Completely blank	All black	Random color	Light	Dark
				
Straight vertical stripes	Blurred vertical stripes	White vertical streaks	Ink splash	Ink splash
				
Print edges not aligned	Random missing dots	White horizontal streaks	Stained leading edge of recording paper	Overlapping lines over the whole page
				
Separated lines over the whole page	Overlapping lines at the trailing edge of the recording paper	Separated lines at the trailing edge of the recording paper	Ghost	
				

Problem	Action to be taken
(1) Completely blank 	At the scanner Check the following components: - CIS flat cable - Main PCB - CIS unit At the printer • Check the ink cartridges. If any cartridges have run out of ink, replace them. • Check the dimple contact between each of the print head PCB and the mating carriage PCB. Clean it if contaminated. (If the problem persists, replace the carriage ASSY.) • Check the connection of the head flat cables on the main PCB. (If either of those cables is broken or damaged, replace it.) • Replace the main PCB. • Clean the head caps and wiper of the purge unit with a Rubycel stick. For the cleaning procedure, refer to Chapter 6, Section 6.1 "CLEANING THE PURGE UNIT."
(2) Random color 	
(3) All black 	At the scanner Check the following components: - CIS flat cable - CIS unit - Main PCB At the printer Check the following components: - Print head unit - Main PCB - Carriage ASSY

Problem	Action to be taken
(4) Light 	<u>At the scanner</u> Check the following components: - CIS unit - Main PCB <u>At the printer</u> Check the following components: - Ink cartridges - Print head unit - Main PCB - Power supply PCB - Head property info (to be installed to the driver PCB from the connected PC. Refer to Chapter 5, Section 5.5.)
(5) Dark 	<u>At the scanner</u> Check the following components: - CIS unit - Main PCB <u>At the printer side</u> • For each of the four ink-jet units, perform the head purging operation several times to remove dust or air bubbles from its nozzles. If the problem persists, replace the print head unit. • Replace the main PCB and power supply PCB.
(6) Straight or blurred vertical stripes 	<u>Scanner</u> Check the following components: - CIS unit - Scanner glass <u>Printer</u> • Check whether paper is coming into contact with any components other than the ones it should during ejecting. • Check the encoder strip for stains or scratches. (If the encoder strip is not hooked properly, correct it.)

Problem	Action to be taken
(7) Ink splash  	Printer • For each of the four ink-jet units, perform the head purging operation several times to remove dust or air bubbles from its nozzles. • Check the ink cartridges. Any of them has run out of ink or the ink viscosity has been increased, so replace it. • Replace the print head unit. • Replace the driver PCB. • Replace the main PCB. • Replace the power supply PCB. • Check that the print head unit is installed to the carriage correctly. • Check that the carriage rail clamp springs catch the carriage rail correctly.
(8) Print edges not aligned 	Printer • Check the alignment of vertical print lines using maintenance-mode function code 65. (Refer to Chapter 7, Section 7.3.13). • Check the print head unit. • Check the encoder strip for stains or scratches. (If the encoder strip is not hooked properly, correct it.) • Correct the positioning error of the print head unit. (Refer to Chapter 5, Section 5.2, [3].)
(9) Random missing dots 	Printer • For each of the four ink-jet units, perform the head purging operation several times to remove dust or air bubbles from its nozzles. • Check the ink cartridges. If any cartridges have run out of ink, replace them. • Check the dimple contact between each of the print head PCB and the mating carriage PCB. Clean it if contaminated. • Replace the print head unit. (If the problem persists, replace the carriage ASSY.) • Check the connection of the head flat cables on the main PCB. (If either of those cables is broken or damaged, replace it.) • Replace the main PCB. • Clean the head caps and wiper of the purge unit with a Rubycel stick. For the cleaning procedure, refer to Chapter 6, Section 6.1 "CLEANING THE PURGE UNIT."

Problem	Action to be taken
(10) White horizontal streaks 	• For each of the four ink-jet units, perform the head purging operation several times to remove dust or air bubbles from its nozzles. • Replace the print head unit. • Check the paper feed-related rollers. • Clean the head caps and wiper of the purge unit with a Rubycel stick. For the cleaning procedure, refer to Chapter 6, Section 6.1 "CLEANING THE PURGE UNIT."
(11) Stained leading edge of recording paper 	Printer • Clean the nozzle ends of the ink-jet units. • Check that the print head unit is setting in the carriage correctly.
(12) Overlapping or separated lines over the whole page 	• Check that the color marking made on the paper feed roller matches that on the print head unit. (Refer to Chapter 4, Section 4.1.21.) • Adjust the paper feeding correction value of the paper feed roller. (Refer to Chapter 5, Section 5.6 "IF YOU REPLACE THE PAPER FEED ROLLER AND/OR PAPER EJECTION ROLLER.")
(13) Overlapping or separated lines at the trailing edge of the recording paper 	• Adjust the paper feeding correction value of the paper ejection roller. (Refer to Chapter 5, Section 5.6 "IF YOU REPLACE THE PAPER FEED ROLLER AND/OR PAPER EJECTION ROLLER.")
(14) Ghost 	• Adjust the paper feeding correction value of the paper feed roller and paper ejection roller. (Refer to Chapter 4, Sections 4.1.21 and 4.1.20.) • Correct the positioning error of the print head unit. (Refer to Chapter 5, Section 5.2, [3].)

[6] PC-driven printing problems

Problem	Action to be taken
(1) PC-driven printing is impossible.	• Interface with the host computer • PC interface cable • Main PCB • USB interface

8.2.5 Problems encountered frequently in the past

This section lists the four problems most frequently encountered during on-site service in the past.

- Paper jams
- Error message "MACHINE ERROR 41"
- Ink-related problems
- Auto document feeder (ADF) failure

[1] Paper jams

A paper jam may occur not only due to machine malfunction but also to the user's actions.

IMPORTANT: In some cases, foreign material that has found its way into the machine without the user realizing can be the cause a paper jam. Instruct the user to place nothing on top of the machine that might fall into it.

Problems due to the user's actions

Check	Possible causes	Problems that may result
Recording paper	Paper not suited to use with the machine was used.	Paper with labels attached, for example, may leave labels inside the machine.
For foreign materials	Fragments of paper that were left behind when previous paper jams occurred. Foreign materials such as tacks have found their way into the machine.	Foreign materials can hinder the paper feed.

Problems due to machine malfunction

Check	Possible causes	Problems that may result
Star wheels on star wheel support	Star wheels became dislocated when paper jam occurred.	Dislocated star wheels can hinder paper feed.
Sensors and actuators	Any sensor(s) not working.	If a sensor does not turn on, the related roller(s) will not rotate.
Urethane section on the separation pad (Refer to page 4-41.)	The urethane section on the separation pad has worn thin.	A worn urethane section on the separation pad can cause double-feeding.
Encoder strip	The encoder strip is stained.	A stained encoder strip can cause a carriage drive error during printing that will stop the printing operation.

[2] "MACHINE ERROR 41" error message

The error message "MACHINE ERROR 41" appears if the head drive voltage exceeds the specified upper limit. The source of the problem is either the print head unit or power supply PCB.

Check	Possible causes	Problems that may result
Print head unit	- The dimple contact section of the print head unit is stained. - The head clamp springs are not set into place.	At the start of printing or head cleaning operation, correct voltage will not be applied to the electrodes on the surface of the piezoelectric ceramic (described in Chapter 3, Section 3.2.2.2).
Power supply PCB	- A power failure when the machine was in operation resulted in a damaged part. - Exposure to power surges caused by lightning damaged electronic devices on the power supply PCB.	The head drive voltage will be too low to drive the print head.

[3] Ink-related problems

Problems of this nature may arise not only due to machine malfunction but also to the user's actions.

IMPORTANT: In many cases, the user fails to set ink cartridges in place.

Problems due to the user's actions

Check	Possible causes	Problems that may result
Ink cartridges	- Ink cartridges are not inserted fully into the print head unit. - One or more of the ink cartridges are not loaded. - One or more of the ink cartridges has run out of ink. - The sealing tape(s) on one or more of any new ink cartridges was not peeled off.	The machine will not be able to print.
Data setting required after replacement	The related ink dot counter(s) was not reset after replacement of ink cartridge(s).	After the machine is used for a while, the "INK EMPTY XXX" message will appear and the machine will no longer be able to print.

Problems due to machine malfunction

Check	Possible causes	Problems that may result
Print head unit	Dust or foreign materials have found their way into the print head unit.	Dot missing occurs on the printout.
Carriage	- Head flat cables are broken. - Head flat cables have not been inserted into the carriage PCB.	The machine will not be able to print or drive the carriage.
Purge unit	Dust or foreign materials get into the purge unit.	Head cleaning operation will not be possible and/or the purge unit will not work.
CIS unit	The CIS unit is weak in identifying colors.	The quality of print colors in copying operation will be low.

[4] Auto document feeder (ADF) malfunction

An ADF failure may occur not only due to machine malfunction but also to the user's actions.

Problems due to the user's actions

Check	Possible causes	Problems that may result
Document guides on the upper ADF chute	The document guides are not positioned to match the width of document(s) loaded.	Documents will skew.
Inside the ADF	- Foreign materials have found their way into ADF. - The size of the document loaded is smaller than the specified size.	Foreign materials can hinder document feeding. The document will jam inside the ADF.
Scanner cover (Scanner unit)	The scanner cover is not closed properly.	The "COVER OPEN" message will appear and the machine will no longer operate.

Problems due to machine malfunction

Check	Possible causes	Problems that may result
ADF PCB	The motor driver IC is defective.	Documents will not be able to be drawn in.
ADF	The spring plates of the ADF parts are deformed.	Documents will stop halfway through feeding.
	The ADF parts are deformed or worn.	Two or more sheets of documents will be fed through at once.
Pressure roller	The pressure roller is dislocated or warped.	Documents will not be able to be drawn in.
Document rear sensor	- The document rear sensor is defective. - The document rear sensor actuator is deformed.	Documents will stop halfway through feeding or the machine will not be able to recognize them.

8.2.6 Possible component defects and resulting problems

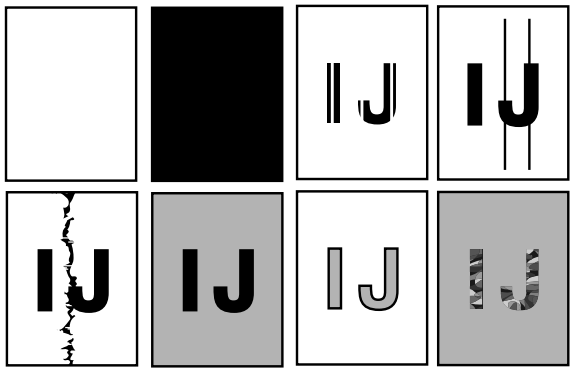
This section lists possible component defects and what happens due to them. It also describes what happens if the necessary adjustments or data settings into the memories is not made.

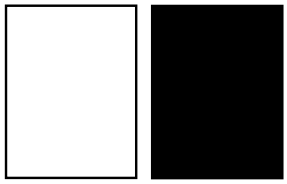
[1] ADF mechanism

Defective component	Result	Error codes
Pressure rollers	- Documents will jam.	A2, A3
ADF motor	- Document will not be able to be fed.	---
Document feed roller	- Documents will jam. - Documents will skew. - Documents will not be able to be fed.	A2, A3
Document ejection roller	- Documents will jam. - Documents will not be able to be fed.	A2, A3
Separation rubber	- Two or more sheets of documents will be fed at once.	---
Document front sensor actuator	- Document draw-in operation will not start even though documents have been set.	A3
Document rear sensor actuator	- Document draw-in operation will not start even though documents have been set. - Document draw-in operation will continue even though all documents have been fed into the machine.	A2, A3

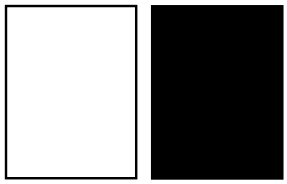
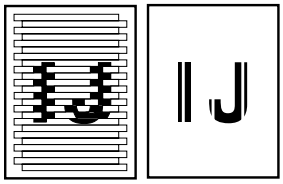
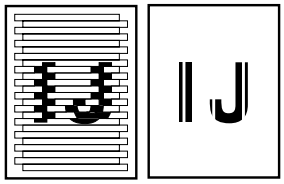
[2] Scanner mechanism

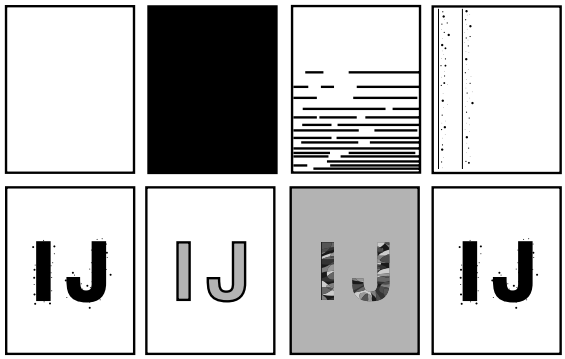
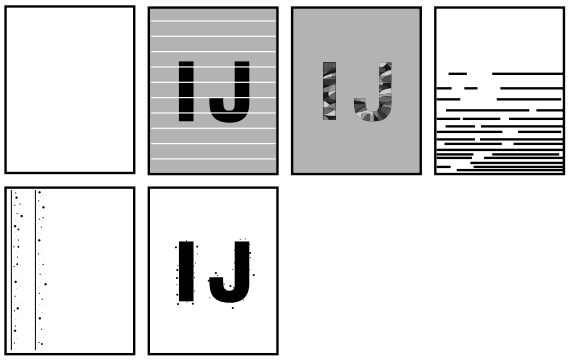
Defective component	Result	Error codes

CIS unit	- Any of the following images may appear on the printout of received, copied, or scanned data:
	 
	- When the power is turned on, abnormal noises will be heard from the machine.
	- Any of the following errors occurs:
	  - Dark level offset data level error for scanning
	  - Gain control data level error for scanning
	  - Scan area right/left edge detection error
	  - Horizontal scanning edge reduction/enlargement detection error in scanning area setting
	  - White/black level data error
	  - Scan starting edge detection error
		B9, BB, BD

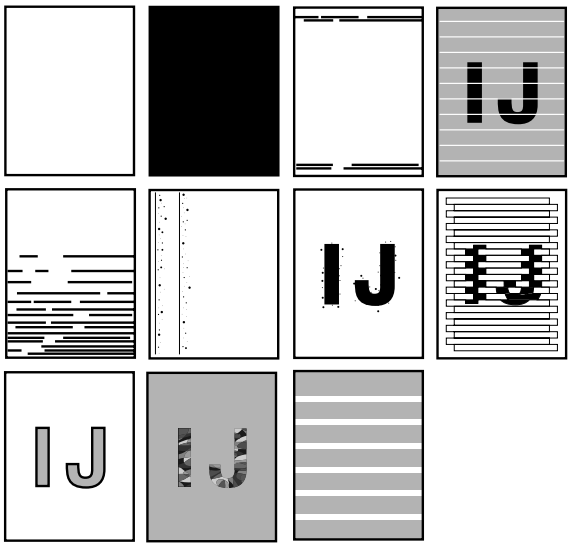
CIS flat cable	- Any of the following images may appear on the printout of received, copied, or scanned data: 	
Scanner drive unit	- When the power is turned on, abnormal noises will be heard from the machine.	---

[3] Carriage drive and purge mechanisms

Defective component	Result	Error codes
Carriage	- Any of the following images may appear on the printout of received, copied, or scanned data: 	---
Carriage motor	- The carriage will not be able to travel normally. - Any of the following images may appear on the printout of received, copied, or scanned data: 	30, 31, 32, 33
Encoder strip	- The carriage will not be able to travel normally. - Any of the following images may appear on the printout of received, copied, or scanned data: 	30, 31, 32, 33
Ink empty sensor PCB	- The "INK EMPTY XXX" message will appear even through there is ink. - Even through the ink has run out, the "INK EMPTY XXX" message will not appear.	26, 27, 28, 29
Paper width sensor	- A paper jam will occur.	81

Defective component	Result	Error codes
Driver PCB	- Documents will jam. - Documents will not be fed. - Any of the following images may appear on the printout of received, copied, or scanned data: 	30, 31, 32, 33, 35
Purge unit Head caps or wiper	- Any of the following images may appear on the printout of received, copied, or scanned data: 	---
Purge pump	- The purge pump will not draw out ink from the head nozzles.	
Purge cam HP switch Pump switching cam HP switch	- The purge cam HP switch will not detect the purge cam ON/OFF timing. - The pump switching cam HP switch will not detect the pump switching cam ON/OFF timing.	50, 51, 52, 53

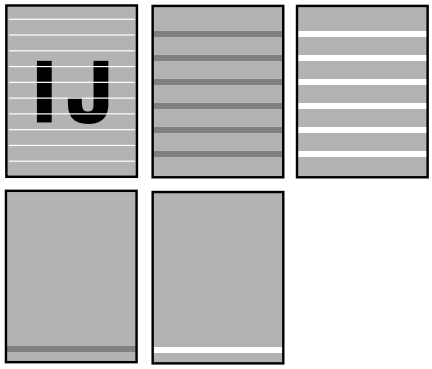
[4] Print head mechanism

Defective component	Result	Error codes
Print head unit	- Any of the following images may appear on the printout of received, copied, or scanned data: 	---

[5] ASF mechanism

Defective component	Result	Error codes
Bank ASSY	- Two or more sheets of paper will be fed at once. - Paper will jam.	83, 84, 88
ASF roller ASSY	- Paper will not be fed. - Paper will skew. - Paper will jam.	83, 84, 88, E4

[6] Paper feeding mechanism

Defective component	Result	Error codes
Paper feed roller Paper ejection roller	- Any of the following images may appear on the printout of received, copied, or scanned data: 	---

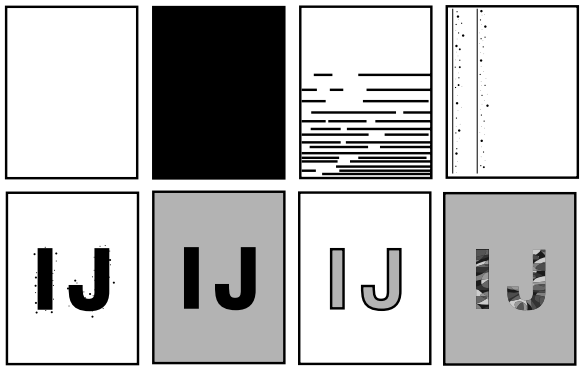
[7] Speaker

Defective component	Result	Error codes
Speaker	- No key clicks will be heard. - Abnormal noises will be heard from the machine. - The telephone will not ring. - No tone will be transmitted.	---

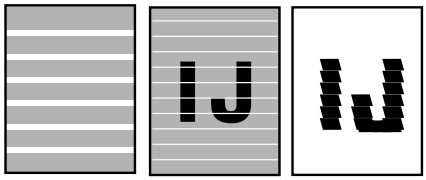
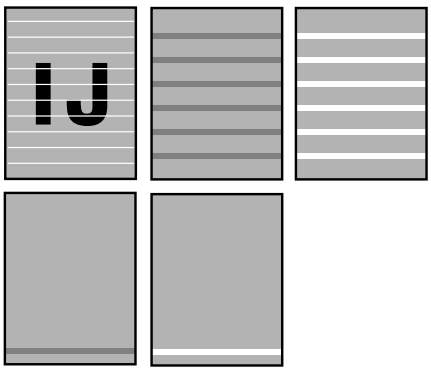
[8] Control panel

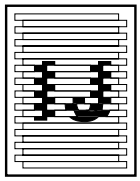
Defective component	Result	Error codes
Rubber keypad	- Keys will not work.	---
Control panel PCB	- The LCD will show nothing. - Keys will not work.	---

[9] PCBs

Defective component	Result	Error codes
Main PCB Driver PCB	- No faxes will be able to be sent. - No phone calls will be able to be made. - Copying will not be possible. - PC-driven printing will not be possible. - Scanning will not be possible. - The machine will not be able to be turned on. - Any of the following images may appear on the printout of received, copied, or scanned data: 	---
SDAA PCB (MFC3820CN) MJ PCB (MFC3820CN) NCU PCB (MFC3420C)	- No faxes will be able to be sent. - No phone calls will be able to be made. - The telephone will not ring. - No tone will be detected. - The machine will not be able to switch to the external telephone.	D*
Power supply PCB	- The machine will not be able to be turned on. - The printed image will become lighter.	---

[10] Adjustments/data setting into the memories

Adjustment/data setting not performed	Result	Refer to:	Error codes
Proper customizing code (in the EEPROM)	- The machine will not work correctly at the shipping destination.	- Chapter 7, Section 7.3.17 - Appendix 3	
ID code	- The machine will not be able to be identified by the PC connected to it when more than one machine is connected to that PC via USB.	- Chapter 5, Section 5.5	
Head property data (in the EEPROM)	- The print quality will deteriorate.	- Chapter 5, Section 5.2, [2] - Chapter 7, Section 7.3.15	
Correction of head positioning error	- Any of the following images may appear on the printout of received, copied, or scanned data: 	- Chapter 5, Section 5.2 [3]	
Updating of the paper feeding correction value for the paper feed roller/paper ejection roller	- Any of the following images may appear on the printout of received, copied, or scanned data: 	- Chapter 5, Section 5.6, [2] - Chapter 7, Section 7.3.14	
Setting of the CIS scanner area	- The areas close to the edge of a document will not be able to be scanned.	- Chapter 7, Section 7.3.10	B3, B4, B5, B6

Adjustment/data setting not performed	Result	Refer to:	Error codes
Sensing reference level of the ink empty sensor	- The "INK EMPTY XXX" message will appear even though there is ink. - Even though the ink has run out, the "INK EMPTY XXX" message will not appear.	- Chapter 5, Section 5.7 - Chapter 7, Section 7.3.11	26, 27, 28, 29
Alignment of vertical print lines	- Any of the following images may appear on the printout of received, copied, or scanned data: 	- Chapter 5, Section 5.2, [5] - Chapter 7, Section 7.3.13	

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Appendix 1. Serial Numbering System

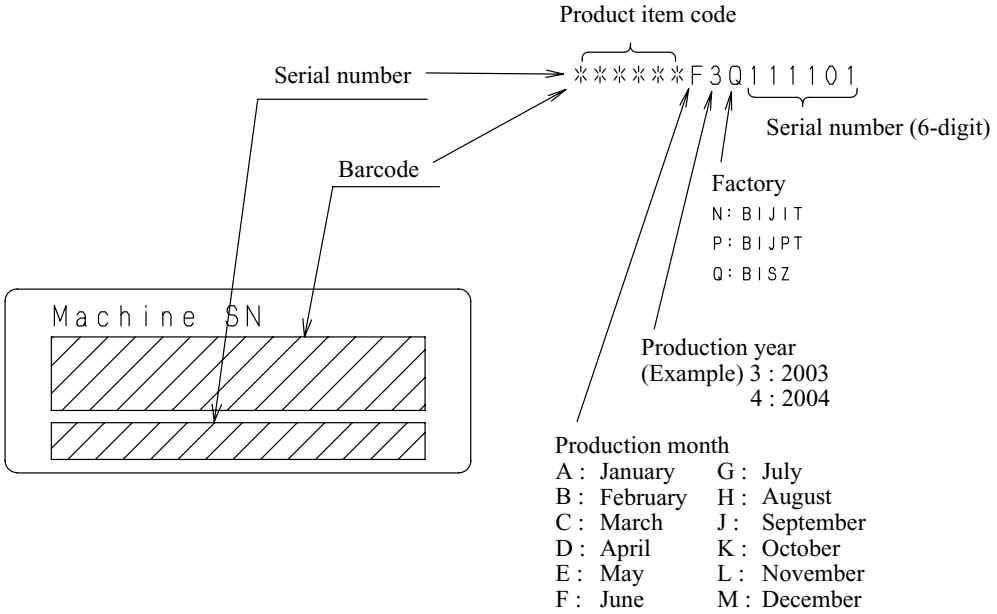
This appendix shows the location of serial number labels put on some parts and lists the coding information pertaining to the serial numbers.

SERIAL NUMBERING SYSTEM

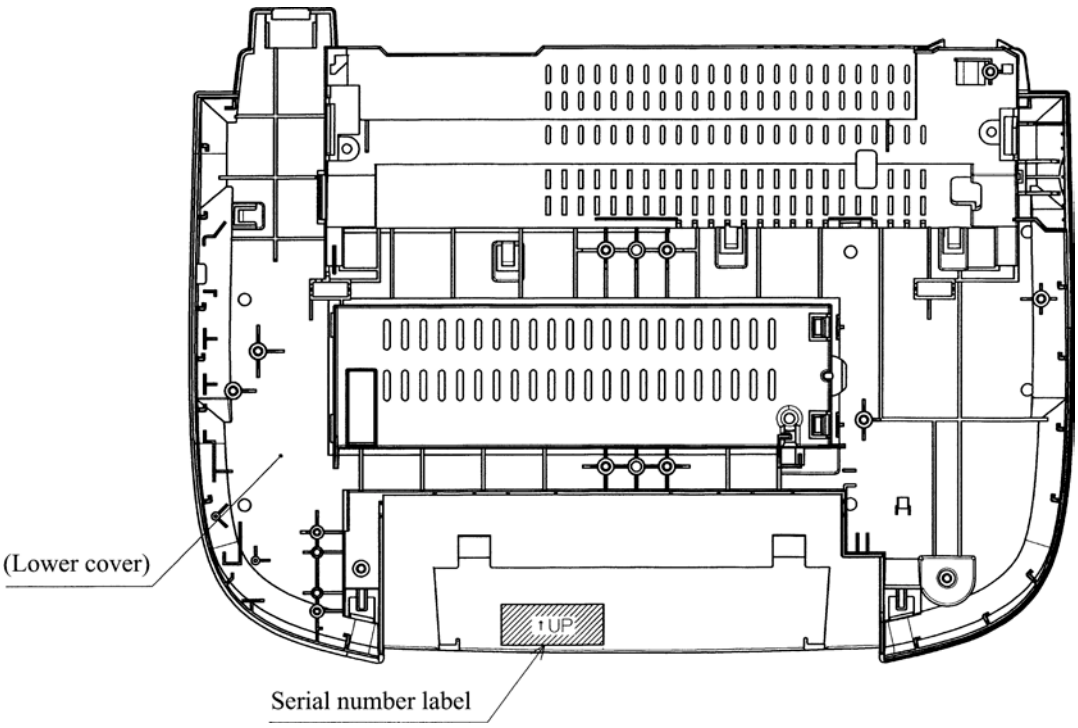
Each facsimile machine has a serial number label for the machine itself and a property label for the print head unit.

This section lists the coding information for those serial numbers and property codes.

(1) Serial number label for the machine itself

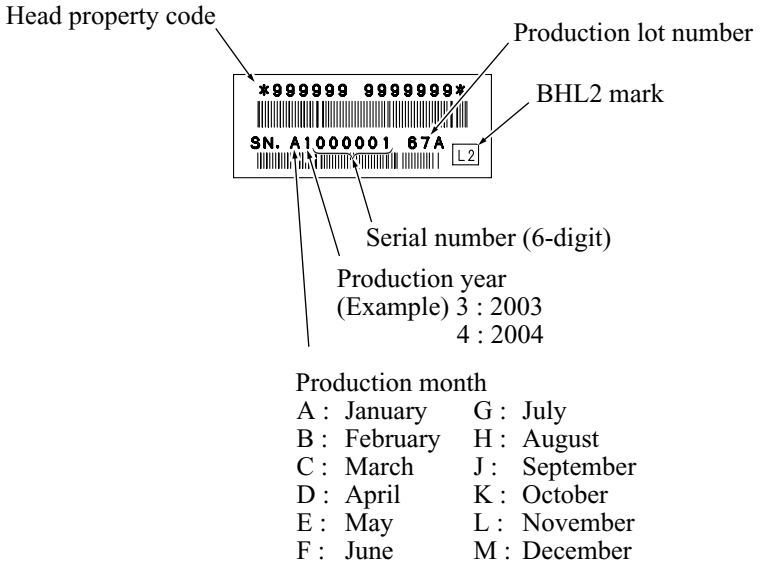


Location

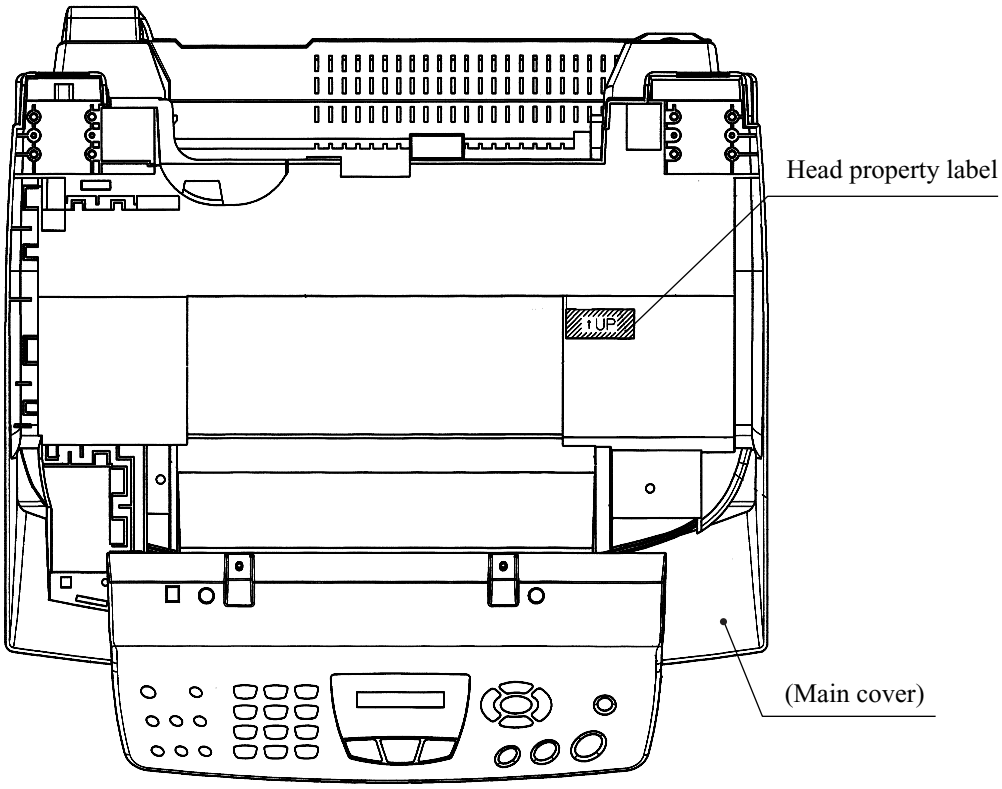


(2) Head property label

■ Property label for the print head 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 of the facsimile machine from the host PC. No hardware replacement is required for updating.

Control programs of the facsimile machine are stored in the flash ROM on the main PCB. The updating procedure is required also if the main PCB has been replaced since a new PCB supplied has no firmware installed.

A2.1 Downloading the Update Programs/Data to the Facsimile Machine

If you want to update the current programs/data stored in the flash ROM on the main PCB or after you replace the main PCB, download the update programs/data to the flash ROM.

Downloading requires a PC/AT-compatible computer running Windows 98/98SE, Windows Me, Windows 2000 Professional, or Windows XP Home/Professional.

CAUTION: During downloading, do not turn the power off, interrupt downloading, or download invalid data. If you do so, downloading will fail, causing the PCB to be unusable. You will need to replace the main PCB and download update programs/data to a new PCB.

Preparation

You need to be provided with the BHL2-Maintenance Printer driver and FILEDG32.exe by Brother Industries. 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 ports to be implemented on the PS/2 keyboard port by driver/software. If you connect any number of FAX machines repaired to your PC, therefore, the same number of virtual USB ports will be automatically configured on your PC. To prevent virtual USB ports from being configured limitlessly, use the unique driver installation procedure described below that enables your PC to identify terminals via a single virtual USB port.

NOTE: Once this installation procedure is carried out for a PC, no more driver/software installation will be required for that PC to identify FAX 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 (listed in Chapter 5, Section 5.1.1) is stored in your PC.

(1) Make sure that the power cord of the FAX machine is unplugged from a wall socket.

If the FAX machine is connected to a PC, unplug the USB cable.

(2) Switch on your PC.

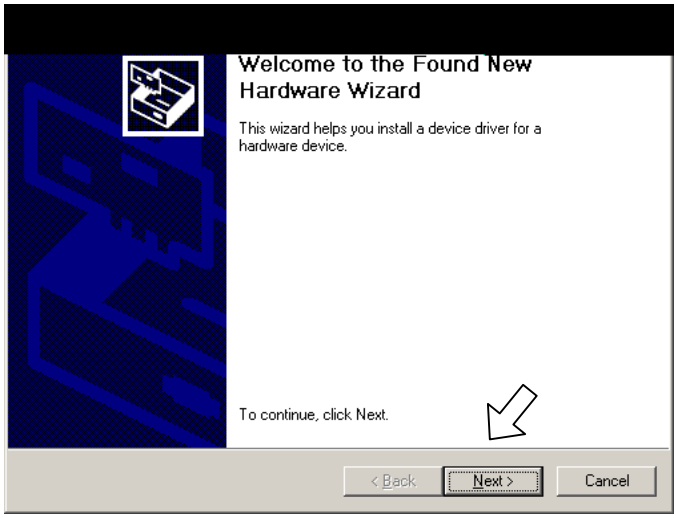
(3) Plug the power cord of the FAX machine into a wall socket.

(4) Press the **Menu/Set**, *****, **2**, **8**, **6**, and **4** keys on the FAX machine in this order to enter the maintenance mode.

(5) Connect the FAX machine to your PC using the USB cable.

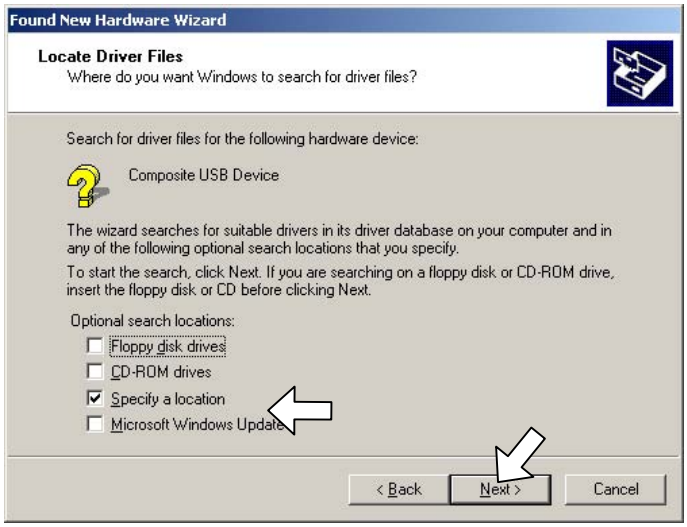
The following window appears.

(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**.

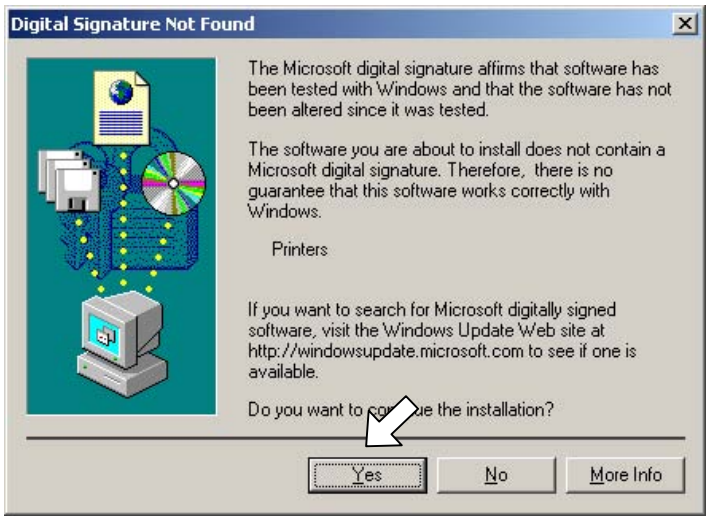


(9) Select the folder where the copy of the BHL2-Maintenance Printer driver is located (or click **Browse** to specify it), then click **OK**.

(This sample screen is captured on the Windows 2000 desktop.)

(10) Click **Next**.

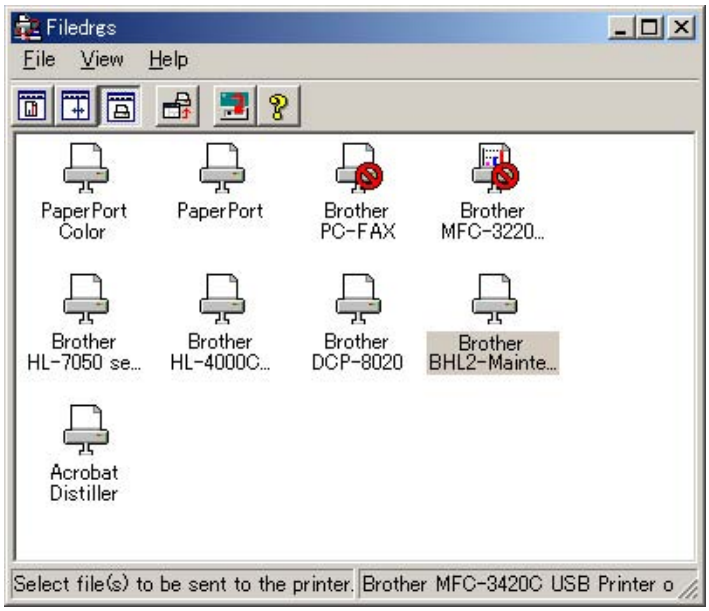
(11) To proceed, click **Yes**.



(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 you press the **9** key on the FAX machine twice to exit 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 facsimile machine

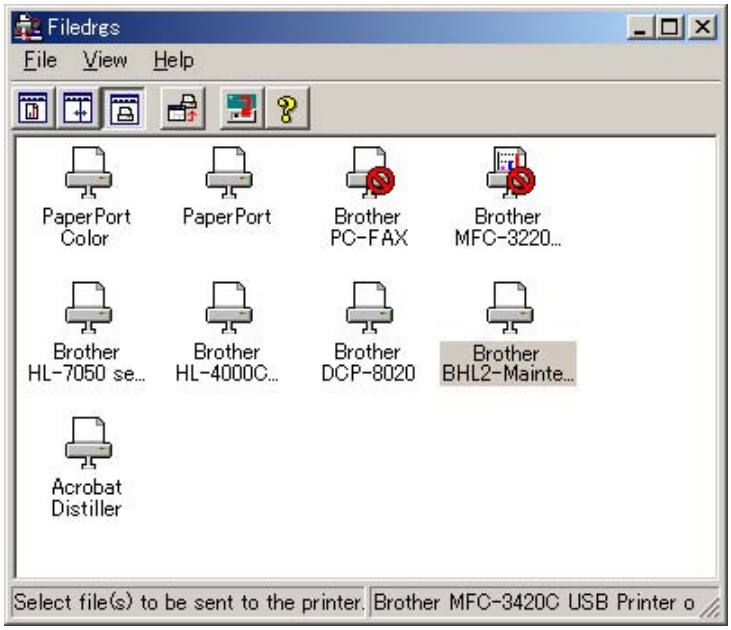
After the installation procedure of the BHL2-Maintenance Printer driver, proceed to the firmware download.

If the BHL2-Maintenance Printer driver has been installed so that you start from downloading firmware, turn off the facsimile machine and then turn it on while holding down the **5** key. (The machine should show the black and white pattern on the LCD.)

NOTE: Never unplug the power cables of the facsimile machine and your PC or the USB cable during downloading.

(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 Brother 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 downloading starts, the FAX machine beeps intermittently. After approx. 2 to 5 minutes, downloading is complete and the FAX 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.

In this example, if "A0307252244:CF30" appears, it means that the downloading has been successfully finished.

(4) If downloading finishes abnormally, turn the facsimile machine off and on. The machine automatically enters the download mode and emits a large beep. Perform the downloading procedure above again.

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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 driver PCB. If the driver 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

←Within 2 seconds→

(1) Press the **Menu**, *****, **2**, **8**, **6**, and **4** keys in this order to make the facsimile equipment enter the maintenance mode.

The equipment 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 (e.g., 3001 in the case of MFC3420C U.S.A. versions) appears.

(3) Enter the desired customizing code (e.g., 2002 in the case of MFC3420C Canadian version).

The newly entered code appears.

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

(4) Press the **Black Fax Start** key.

The equipment 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 equipment stops the procedure and returns to the initial stage of the maintenance mode.

■ EEPROM Customizing Codes List

Versions	Model	
	MFC3420C	MFC3820CN
U.S.A.	3001	3001
CANADA	2002	---
GERMANY	2003	2003
U.K.	2004	2004
FRANCE	2005	2005
BELGIUM	2008	2008
NETHERLANDS	2009	2009
SWITZERLAND	2010	2010
IRELAND	2004	2004
DENMARK	2013	2013
AUSTRIA	2003	2003
SPAIN	2015	2015
ITALY	2016	2016
PORTUGAL	2018	2018
CHINA	2020	---
ARGENTINA	2035	---
CHILI	2035	---
SINGAPORE/HONG KONG	2040	2040
GENERAL	2054	2054
PAN NORDIC (NORWAY/SWEDEN/FINLAND)	2057	2057
OCEANIA (AUSTRALIA/NEW ZEALAND)	2056	2056

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Appendix 4. Firmware Switches (WSW)

This appendix describes the functions of the firmware switches, which may 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. 4-2
WSW02	Tone signal setting	App. 4-3
WSW03	PABX mode setting	App. 4-4
WSW04	TRANSFER facility setting	App. 4-5
WSW05	1st dial tone and busy tone detection	App. 4-6
WSW06	**Pause** key setting and 2nd dial tone detection	App. 4-8
WSW07	Dial tone setting 1	App. 4-10
WSW08	Dial tone setting 2	App. 4-11
WSW09	Protocol definition 1	App. 4-12
WSW10	Protocol definition 2	App. 4-13
WSW11	Busy tone setting	App. 4-14
WSW12	Signal detection condition setting	App. 4-15
WSW13	Modem setting	App. 4-16
WSW14	AUTO ANS facility setting	App. 4-17
WSW15	REDIAL facility setting	App. 4-18
WSW16	Function setting 1	App. 4-19
WSW17	Function setting 2	App. 4-20
WSW18	Function setting 3	App. 4-21
WSW19	Transmission speed setting	App. 4-22
WSW20	Overseas communications mode setting	App. 4-23
WSW21	TAD setting 1	App. 4-24
WSW22	ECM and call waiting caller ID	App. 4-24
WSW23	Communications setting	App. 4-25
WSW24	TAD setting 2	App. 4-26
WSW25	TAD setting 3	App. 4-26
WSW26	Function setting 4	App. 4-27
WSW27	Function setting 5	App. 4-28
WSW28	Function setting 6	App. 4-29
WSW29	Function setting 7	App. 4-30
WSW30	Not used.	App. 4-30
WSW31	Function setting 9	App. 4-31
WSW32	Function setting 10	App. 4-32
WSW33	Function setting 11	App. 4-32
WSW34	Function setting 12	App. 4-33
WSW35	Not used.	App. 4-33
WSW36	Function setting 14	App. 4-34
WSW37	Function setting 15	App. 4-35
WSW38	V.34 transmission settings	App. 4-36
WSW39	V.34 transmission speed	App. 4-37
WSW40	V.34 modem settings	App. 4-38
WSW41	ON-duration of CIS LEDs	App. 4-40
WSW42	Internet mail settings	App. 4-40
WSW43	Function setting 21	App. 4-41
WSW44	Speeding up scanning-1	App. 4-42
WSW45	Speeding up scanning-2	App. 4-43
WSW46	Monitor of power ON/OFF state and parallel port kept at high	App. 4-44
WSW47	Switching between high- and full-speed USB	App. 4-45
WSW48	Not used.	App. 4-45
WSW49	End-of-copying beep and print in black	App. 4-46
WSW50	SDAA settings	App. 4-47

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

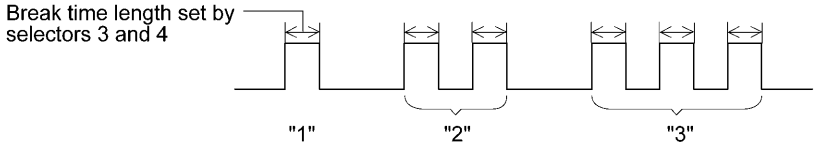
- **Selectors 1 and 2: Dial pulse generation mode**

  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.

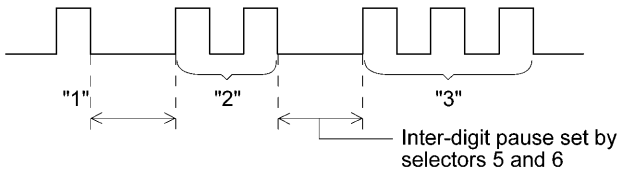
- **Selectors 3 and 4: Break time length in pulse dialing**

  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 may 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**

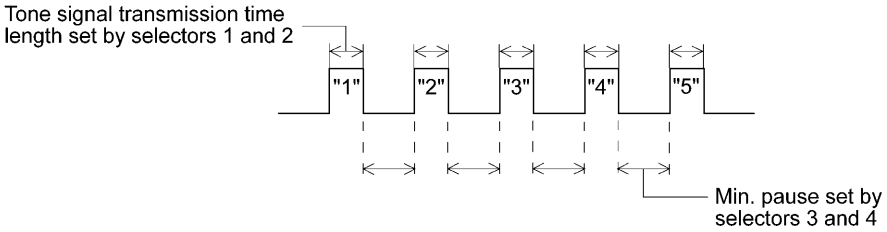
  This selector sets the default dialing mode (pulse dialing or tone dialing) which may be changed by the function switch. If the user switches it with the function switch when selector 7 is set to "0," the setting specified by this selector will also be switched automatically.

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 equipment detects a CNG signal when a line is connected to a telephone sharing a modular wall socket with the equipment. Upon detection of CNG signals by the number of cycles specified by these selectors, the equipment 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 equipment 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 equipment 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 equipment 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 | 4	Not used.	
5 6	Earth time length for earth function (Not used.)	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.

- **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 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 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 equipment 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 equipment 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 equipment 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 equipment 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 equipment does not disconnect the line.

  Setting selectors 5 and 6 to "0" and "1," respectively, makes the equipment detect a busy tone only after dialing and disconnect the line.

  Setting both of selectors 5 and 6 to "1" makes the equipment 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 equipment automatically disconnects the line upon detection of a busy tone in automatic receiving mode.

WSW06 (Pause key setting and 2nd dial tone detection)

Selector No.	Function	Setting and Specifications
1 | 3	**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: Pause key setting and 2nd dial tone detection**

Selectors 1	2	3	
0	0	0	No WAIT is inserted even if the **Pause** key is pressed.
0 0 0 1	0 1 1 0	1 0 1 0	If you press the **Pause** key during dialing, the facsimile equipment will insert WAIT as defined in the above table. If the **Pause** key is pressed repeatedly, the equipment inserts the specified WAIT multiplied by the number of depressions. It applies also in hook-up dialing.
1 1 1	0 1 1	1 0 1	When these selectors are set to "1, 0, 1": Each time you press the **Pause** key in dialing, the equipment 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 **Pause** key in pulse dialing, the equipment will first wait for the 2nd dial tone to be sent via the communications line. After that, pressing the **Pause** key will cause the equipment to insert a WAIT of 3.5 seconds. In tone dialing, the equipment will insert a WAIT of 3.5 seconds. When these selectors are set to "1, 1, 1": If you press the **Pause** key, the equipment 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 **Pause** key will cause the equipment 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.)

- **Selectors 4 through 6: Detection of international tone**

  Upon detection of the 2nd dial tone for the time length specified by these selectors, the equipment 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 of WSW05 are set to "1,1,1."

- **Selector 3: Line current detection (Not used.)**

  This selector determines whether or not the equipment should 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 equipment starts dialing.

  This setting is effective only when selectors 1 through 3 of 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 equipment 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 versions) 60 sec. (in other versions) 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 facsimile equipment can divide a message into 64-octet frames.

  Remarks: The error correction mode (ECM) is a facsimile transmission manner in which the equipment divides a message into frames for transmission so that if any data error occurs on the transmission line, the equipment retransmits only those frames containing the error data.

- **Selector 2: Use of non-standard commands**

  If this selector is set to "0," the equipment may 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 equipment 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 equipment (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 equipment 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 equipment 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 equipment 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 use of the MR/MMR coding system will be allowed.

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 of 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 8	Not used.	

*1000 ms in Chinese versions.

- **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 equipment 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 equipment acknowledge itself to be called. That is, if the equipment continuously detects a CI signal with the frequency set by selectors 1 through 4 of 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 facsimile equipment.

- **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 of 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 of 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 X : 70 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 versions, 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 equipment 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 equipment (calling station), the equipment 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** key pressed during reception	0: Not functional 1: Functional

- **Selector 2: ITU-T (CCITT) superfine recommendation**

  If this selector is set to "1," the equipment 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** 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.	

NOTE: Selector 4 is not applicable to those models having a 2-row LCD.
NOTE: Selector 5 is not applicable in Japan.

- **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 equipment 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 facsimile equipment, the equipment 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 of 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 versions.

- **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 equipment attempts to establish the transmission link via the MODEM. If the establishment fails, the equipment automatically steps down to the next lowest speed and attempts to establish the transmission link again. The equipment 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	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	Limitation on CNG detection	0: OFF 1: ON

* EP: Echo protection

NOTE: Selectors 6 and 7 are applicable to models equipped with an SDAA PCB.

- **Selector 1: EP tone prefix**

  Setting this selector to "1" makes the equipment 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 equipment 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 facsimile equipment malfunctions in overseas communications. According to the communications error state, select the signal specifications.

  Setting selector 2 to "1" allows the equipment 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 equipment 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 6 and 7: Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation**

  If the equipment 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.

- **Selectors 8: Limitation on CNG detection**

  If this selector is set to "1," the equipment detects a CNG signal according to the condition preset by selectors 2 and 3 of WSW18 after a line is connected. If it is set to "0," the equipment detects a CNG signal as long as the line is connected.

WSW21 (TAD setting 1)

Selector No.	Function	Setting and Specifications
1 | 7	Not used.	
8	Erasure of message stored in the memory after the message transfer	0: Yes 1: No

- **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 | 8	Acceptable TCF bit error rate (%) (Only at 4800 bps) (Not used.)	0: 0% 1: 8% 0: 0% 1: 4% 0: 0% 1: 2% 0: 0% 1: 1%

* ECM: Error correction mode

NOTE: Selector 3 is applicable to the American versions only.
NOTE: Selectors 5 through 8 are applicable to the Chinese, Taiwanese and Asian versions 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 versions.

- **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 facsimile equipment 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	Not used.	
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	Not used.	

- **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 those versions which have an OGM facility, the settings made by these selectors also apply to the length of time from CML-ON up to the start of OGM transmission.

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 only to the U.S.A. versions.

- **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 | 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 facsimile equipment waits for document reading into the memory to complete and then starts dialing. This enables the equipment 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 equipment 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 except in the external TAD mode or via the built-in telephone.

WSW27 (Function setting 5)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	Ringer OFF setting	0: Yes 1: No
3	Not used.	
4	Detection of distinctive ringing pattern	0: Yes 1: No
5 | 8	Not used.	

NOTE: Selector 4 is applicable only to the U.S.A. versions.

- **Selector 2: Ringer OFF setting**

  This selector determines whether or not the ringer can be set to OFF.

- **Selector 4: Detection of distinctive ringing pattern**

  If this selector is set to "1," the equipment detects only the number of rings; if it is set to "0," the equipment detects the number of rings and the ringing time length to compare the detected ringing pattern with the registered distinctive one.

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 equipment for the Standard. Never access them.

WSW29 (Function setting 7)

Selector No.	Function	Setting and Specifications
1 | 6	Not used.	
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 7 and 8 are applicable only to the European versions.

- **Selector 8: Prompt beep for activity report**

  This selector determines whether or not the equipment will 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

Selector No.	Function	Setting and Specifications
1 | 8	Not used.	

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	Ink empty sensor	0: Yes 1: No
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. versions.

- **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 equipment records one-page data at full size (100%) without reduction; if it is set to "1," the equipment 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 equipment 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 equipment monitors ringer signals at 10-ms intervals. If the signal is ON, the equipment 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 equipment interprets the current signal as being ON.

  If the counter returns to zero, the equipment 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 equipment is turned on or completes a transaction.

- **Selectors 7 and 8: Default contrast**

  These selectors set the default contrast which applies when the equipment is turned on or completes a transaction.

WSW33 (Function setting 11)

Selector No.	Function	Setting and Specifications
1 | 5	Not used.	
6	Report output of polled transmission requests	0: Yes 1: No
7 8	Not used.	

WSW34 (Function setting 12)

Selector No.	Function	Setting and Specifications
1 | 3	Not used.	
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 facsimile equipment 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 6 and 7 are applicable to models equipped with an NCU PCB.

- **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 facsimile equipment in F/T mode)**

  The equipment 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 facsimile equipment 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 equipment 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

Selector No.	Function	Setting and Specifications
1 | 8	Not used.	

WSW36 (Function setting 14)

Selector No.	Function	Setting and Specifications
1	ECP mode*	0: ON 1: OFF
2	Recovery from Inactive PC Interface	0: Disable 1: Enable
3	PC Power-off Recognition Time	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 of 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**

  The ECP mode enhances the normal bidirectional communications between the facsimile equipment and the connected PC for higher transmission speed.

- **Selector 2: Recovery from Inactive PC Interface**

  If the facsimile equipment 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 equipment.

  This selector determines whether the equipment 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**

  This selector sets the time length from when the equipment 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 equipment may mistakenly detect PC powered off.

- **Selector 5: Escape from phase C**

  This selector determines whether or not the equipment 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 of WSW14**

  At the start of reception, if the equipment detects the frequency of a CI signal specified by selectors 1 through 4 of WSW14, it starts the ringer sounding. However, the equipment 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 of WSW36.

  If the equipment 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 the 1st-page image data of a document will be printed out 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 facsimile equipment 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 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
5 | 8	Last transmission speed choice for fallback	

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 equipment attempts to establish the transmission link via the modem. If the establishment fails, the equipment automatically steps down to the next highest speed and attempts to establish the transmission link again. The equipment 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 of 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 and 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 of 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 of 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 CIS LEDs)

Selector No.	Function	Setting and Specifications
1 | 3	ON-duration of the LEDs built in the CIS unit (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 | 8	Not used.	

- **Selectors 1 through 3: ON-duration of the LEDs built in the CIS unit (Not used.)**

  If the scanning operation is started when the LEDs are off, then they will come on for scanning. These selectors determine how long the LEDs will stay ON after scanning.

  If these selectors are set to "1, 1, 1," the LEDs will go off immediately after the scanning sequence.

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 equipment 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	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: WSW44 is applicable only to models equipped with a flat-bed scanner.

- **Selectors 6 through 8: Effective time length of the white level compensation data obtained beforehand**

  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	0: CIS lock position 1: Location of the white-level reference film
8	Not used.	

NOTE: WSW45 is applicable only to models equipped with a flat-bed scanner.

- **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**

  This selector determines whether the standby position of the CIS unit should be the lock position (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 lock 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	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	0: Enable 1: Disable
4	Previous filtering parameters for white level compensation	0: Enable 1: Disable
5 | 8	Not used.	

NOTE: Selector 4 is not applicable to models equipped with a flat-bed scanner.

- **Selectors 1 and 2: Monitoring the PC ON/OFF state**

  For the related functions, refer to WSW36, selectors 2 and 3.

- **Selector 3: Parallel port output pins kept at high level**

  Setting this selector to "0" will keep all parallel output pins of the facsimile equipment 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 facsimile equipment.

- **Selector 4: Previous filtering parameters for white level compensation**

  At the start of scanning operation, the equipment usually initializes white and black level data stored in the EEPROM by scanning the while-level reference film attached to the document pressure bar. After long use of the equipment, 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 | 7	Not used.	
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)

WSW48

Selector No.	Function	Setting and Specifications
1 | 8	Not used.	

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	Not used.	
8	Print in black	0: No (Normal color print) 1: Yes

- **Selectors 4 and 5: Command flag detection time**

  After receiving a command flag, the equipment will wait for the command that should follow for the time length specified by these selectors.

- **Selector 8: Print in black**

  Setting this selector to "1" allows printing in black only.

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)	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	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	0: 600 ohm termination 1: ZR termination
5 6	Current control to be applied immediately after connection of the line	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	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 an SDAA PCB.

- **Selectors 5 and 6: Current control to be applied immediately after connection of the line**

  Fax models equipped with an SDAA PCB (on which an NTU chip is mounted) might not be connected to a broad band line such as an ADSL (Asynchronous Digital Subscriber Line) in a stable condition. If those models fail to connect to such a line, try to change the current control to be applied immediately after connection of the line by using selectors 5 and 6.

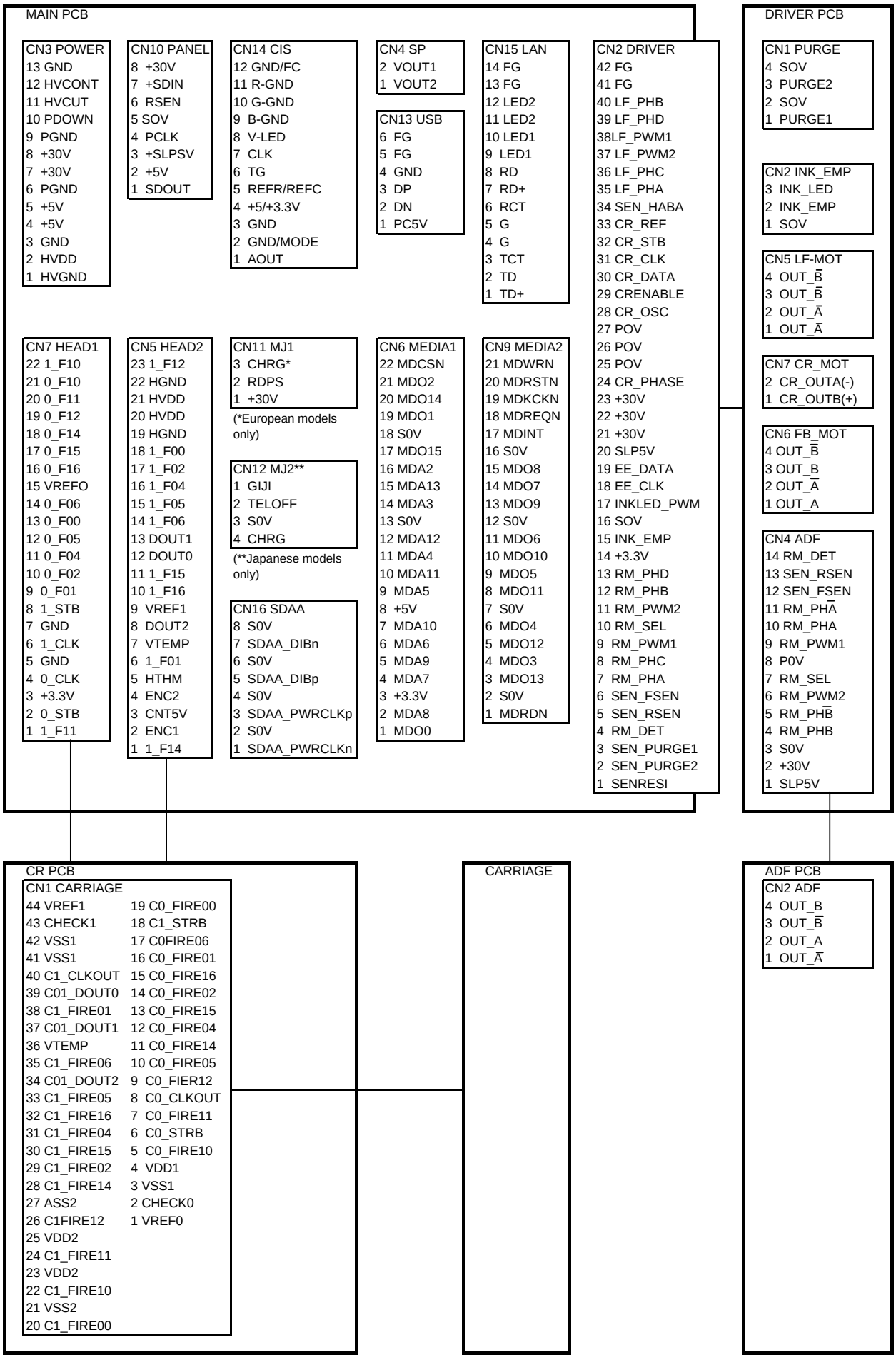
  If selectors 5 and 6 are set to "0" and "1," respectively, the SDAA draws more current, decreasing the period required to terminate the current control. If they are set to "1" and "0," the SDAA finely controls precision of the termination current against the voltage to approach nearer to the specified DC curve that specifies the current vs. voltage characteristics of the network termination. Selecting either control may solve an unsable connection problem.

MFC3820CN/MFC3420C

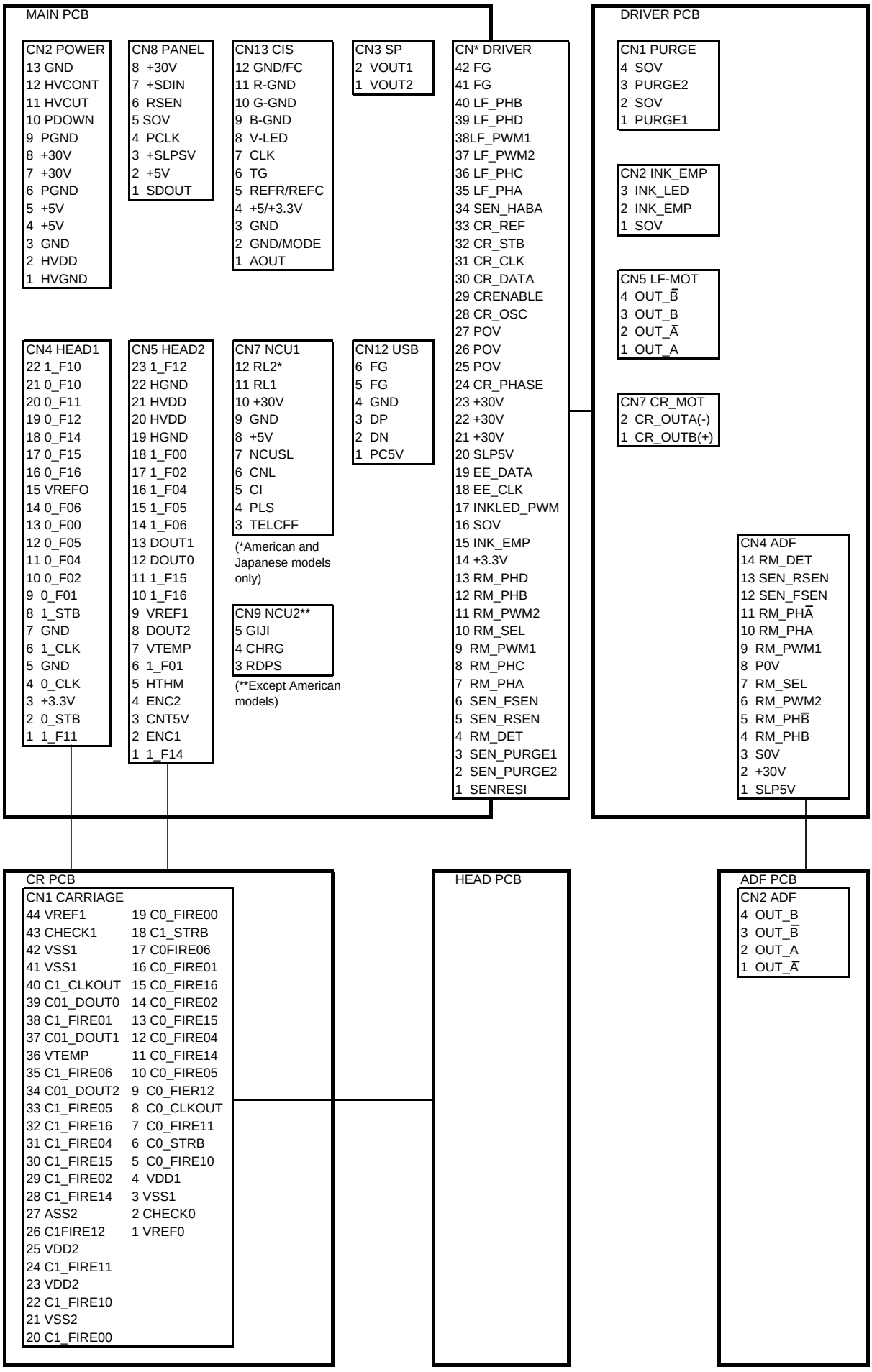
Appendix 5. Wiring Diagram

This appendix provides the wiring diagram that helps you understand the connections between PCBs.

■ MFC3820CN


MAIN PCB
CN3 POWER
13 GND
12 HVCONT
11 HVCUT
10 PDOWN
9 PGND
8 +30V
7 +30V
6 PGND
5 +5V
4 +5V
3 GND
2 HVDD
1 HVGND
CN10 PANEL
8 +30V
7 +SDIN
6 RSEN
5 SOV
4 PCLK
3 +SLPSV
2 +5V
1 SDOUT
CN14 CIS
12 GND/FC
11 R-GND
10 G-GND
9 B-GND
8 V-LED
7 CLK
6 TG
5 REFR/REFC
4 +5/+3.3V
3 GND
2 GND/MODE
1 AOUT
CN4 SP
2 VOUT1
1 VOUT2
CN13 USB
6 FG
5 FG
4 GND
3 DP
2 DN
1 PC5V
CN15 LAN
14 FG
13 FG
12 LED2
11 LED2
10 LED1
9 LED1
8 RD
7 RD+
6 RCT
5 G
4 G
3 TCT
2 TD
1 TD+
CN2 DRIVER
42 FG
41 FG
40 LF_PHB
39 LF_PHD
38LF_PWM1
37 LF_PWM2
36 LF_PHC
35 LF_PHA
34 SEN_HABA
33 CR_REF
32 CR_STB
31 CR_CLK
30 CR_DATA
29 CRENABLE
28 CR_OSC
27 POV
26 POV
25 POV
24 CR_PHASE
23 +30V
22 +30V
21 +30V
20 SLP5V
19 EE_DATA
18 EE_CLK
17 INKLED_PWM
16 SOV
15 INK_EMP
14 +3.3V
13 RM_PHD
12 RM_PHB
11 RM_PWM2
10 RM_SEL
9 RM_PWM1
8 RM_PHC
7 RM_PHA
6 SEN_FSEN
5 SEN_RSEN
4 RM_DET
3 SEN_PURGE1
2 SEN_PURGE2
1 SENRESI
CN7 HEAD1
22 1_F10
21 0_F10
20 0_F11
19 0_F12
18 0_F14
17 0_F15
16 0_F16
15 VREFO
14 0_F06
13 0_F00
12 0_F05
11 0_F04
10 0_F02
9 0_F01
8 1_STB
7 GND
6 1_CLK
5 GND
4 0_CLK
3 +3.3V
2 0_STB
1 1_F11
CN5 HEAD2
23 1_F12
22 HGND
21 HVDD
20 HVDD
19 HGND
18 1_F00
17 1_F02
16 1_F04
15 1_F05
14 1_F06
13 DOUT1
12 DOUT0
11 1_F15
10 1_F16
9 VREF1
8 DOUT2
7 VTEMP
6 1_F01
5 HTHM
4 ENC2
3 CNT5V
2 ENC1
1 1_F14
CN11 MJ1
3 CHRG*
2 RDPS
1 +30V
(*European models only)
CN12 MJ2**
1 GIJI
2 TELOFF
3 S0V
4 CHRG
(**Japanese models only)
CN16 SDAA
8 S0V
7 SDAA_DIBn
6 S0V
5 SDAA_DIBp
4 S0V
3 SDAA_PWRCLKp
2 S0V
1 SDAA_PWRCLKn
CN6 MEDIA1
22 MDCSN
21 MDO2
20 MDO14
19 MDO1
18 S0V
17 MDO15
16 MDA2
15 MDA13
14 MDA3
13 S0V
12 MDA12
11 MDA4
10 MDA11
9 MDA5
8 +5V
7 MDA10
6 MDA6
5 MDA9
4 MDA7
3 +3.3V
2 MDA8
1 MDO0
CN9 MEDIA2
21 MDWRN
20 MDRSTN
19 MDKCKN
18 MDREQN
17 MDINT
16 S0V
15 MDO8
14 MDO7
13 MDO9
12 S0V
11 MDO6
10 MDO10
9 MDO5
8 MDO11
7 S0V
6 MDO4
5 MDO12
4 MDO3
3 MDO13
2 S0V
1 MDRDN
DRIVER PCB
CN1 PURGE
4 SOV
3 PURGE2
2 SOV
1 PURGE1
CN2 INK_EMP
3 INK_LED
2 INK_EMP
1 SOV
CN5 LF-MOT
4 OUT_B̄
3 OUT_B
2 OUT_Ā
1 OUT_A
CN7 CR_MOT
2 CR_OUTA(-)
1 CR_OUTB(+)
CN6 FB_MOT
4 OUT_B̄
3 OUT_B
2 OUT_Ā
1 OUT_A
CN4 ADF
14 RM_DET
13 SEN_RSEN
12 SEN_FSEN
11 RM_PHĀ
10 RM_PHA
9 RM_PWM1
8 P0V
7 RM_SEL
6 RM_PWM2
5 RM_PHB̄
4 RM_PHB
3 S0V
2 +30V
1 SLP5V
CR PCB
CN1 CARRIAGE
44 VREF1
43 CHECK1
42 VSS1
41 VSS1
40 C1_CLKOUT
39 C01_DOUT0
38 C1_FIRE01
37 C01_DOUT1
36 VTEMP
35 C1_FIRE06
34 C01_DOUT2
33 C1_FIRE05
32 C1_FIRE16
31 C1_FIRE04
30 C1_FIRE15
29 C1_FIRE02
28 C1_FIRE14
27 ASS2
26 C1FIRE12
25 VDD2
24 C1_FIRE11
23 VDD2
22 C1_FIRE10
21 VSS2
20 C1_FIRE00
19 C0_FIRE00
18 C1_STRB
17 C0FIRE06
16 C0_FIRE01
15 C0_FIRE16
14 C0_FIRE02
13 C0_FIRE15
12 C0_FIRE04
11 C0_FIRE14
10 C0_FIRE05
9 C0_FIER12
8 C0_CLKOUT
7 C0_FIRE11
6 C0_STRB
5 C0_FIRE10
4 VDD1
3 VSS1
2 CHECK0
1 VREF0
CARRIAGE
ADF PCB
CN2 ADF
4 OUT_B
3 OUT_B̄
2 OUT_A
1 OUT_Ā

■ MFC3420C


MAIN PCB
CN2 POWER
13 GND
12 HVCONT
11 HVCUT
10 PDOWN
9 PGND
8 +30V
7 +30V
6 PGND
5 +5V
4 +5V
3 GND
2 HVDD
1 HVGND
CN8 PANEL
8 +30V
7 +SDIN
6 RSEN
5 SOV
4 PCLK
3 +SLPSV
2 +5V
1 SDOUT
CN13 CIS
12 GND/FC
11 R-GND
10 G-GND
9 B-GND
8 V-LED
7 CLK
6 TG
5 REFR/REFC
4 +5/+3.3V
3 GND
2 GND/MODE
1 AOUT
CN3 SP
2 VOUT1
1 VOUT2
CN* DRIVER
42 FG
41 FG
40 LF_PHB
39 LF_PHD
38LF_PWM1
37 LF_PWM2
36 LF_PHC
35 LF_PHA
34 SEN_HABA
33 CR_REF
32 CR_STB
31 CR_CLK
30 CR_DATA
29 CRENABLE
28 CR_OSC
27 POV
26 POV
25 POV
24 CR_PHASE
23 +30V
22 +30V
21 +30V
20 SLP5V
19 EE_DATA
18 EE_CLK
17 INKLED_PWM
16 SOV
15 INK_EMP
14 +3.3V
13 RM_PHD
12 RM_PHB
11 RM_PWM2
10 RM_SEL
9 RM_PWM1
8 RM_PHC
7 RM_PHA
6 SEN_FSEN
5 SEN_RSEN
4 RM_DET
3 SEN_PURGE1
2 SEN_PURGE2
1 SENRESI
CN4 HEAD1
22 1_F10
21 0_F10
20 0_F11
19 0_F12
18 0_F14
17 0_F15
16 0_F16
15 VREFO
14 0_F06
13 0_F00
12 0_F05
11 0_F04
10 0_F02
9 0_F01
8 1_STB
7 GND
6 1_CLK
5 GND
4 0_CLK
3 +3.3V
2 0_STB
1 1_F11
CN5 HEAD2
23 1_F12
22 HGND
21 HVDD
20 HVDD
19 HGND
18 1_F00
17 1_F02
16 1_F04
15 1_F05
14 1_F06
13 DOUT1
12 DOUT0
11 1_F15
10 1_F16
9 VREF1
8 DOUT2
7 VTEMP
6 1_F01
5 HTHM
4 ENC2
3 CNT5V
2 ENC1
1 1_F14
CN7 NCU1
12 RL2*
11 RL1
10 +30V
9 GND
8 +5V
7 NCUSL
6 CNL
5 CI
4 PLS
3 TELCFF
(*American and Japanese models only)
CN9 NCU2**
5 GIJI
4 CHRG
3 RDPS
(**Except American models)
CN12 USB
6 FG
5 FG
4 GND
3 DP
2 DN
1 PC5V
DRIVER PCB
CN1 PURGE
4 SOV
3 PURGE2
2 SOV
1 PURGE1
CN2 INK_EMP
3 INK_LED
2 INK_EMP
1 SOV
CN5 LF-MOT
4 OUT_B̄
3 OUT_B
2 OUT_Ā
1 OUT_A
CN7 CR_MOT
2 CR_OUTA(-)
1 CR_OUTB(+)
CN4 ADF
14 RM_DET
13 SEN_RSEN
12 SEN_FSEN
11 RM_PHĀ
10 RM_PHA
9 RM_PWM1
8 P0V
7 RM_SEL
6 RM_PWM2
5 RM_PHB̄
4 RM_PHB
3 S0V
2 +30V
1 SLP5V
CR PCB
CN1 CARRIAGE
44 VREF1
43 CHECK1
42 VSS1
41 VSS1
40 C1_CLKOUT
39 C01_DOUT0
38 C1_FIRE01
37 C01_DOUT1
36 VTEMP
35 C1_FIRE06
34 C01_DOUT2
33 C1_FIRE05
32 C1_FIRE16
31 C1_FIRE04
30 C1_FIRE15
29 C1_FIRE02
28 C1_FIRE14
27 ASS2
26 C1FIRE12
25 VDD2
24 C1_FIRE11
23 VDD2
22 C1_FIRE10
21 VSS2
20 C1_FIRE00
19 C0_FIRE00
18 C1_STRB
17 C0FIRE06
16 C0_FIRE01
15 C0_FIRE16
14 C0_FIRE02
13 C0_FIRE15
12 C0_FIRE04
11 C0_FIRE14
10 C0_FIRE05
9 C0_FIER12
8 C0_CLKOUT
7 C0_FIRE11
6 C0_STRB
5 C0_FIRE10
4 VDD1
3 VSS1
2 CHECK0
1 VREF0
HEAD PCB
ADF PCB
CN2 ADF
4 OUT_B
3 OUT_B̄
2 OUT_A
1 OUT_Ā

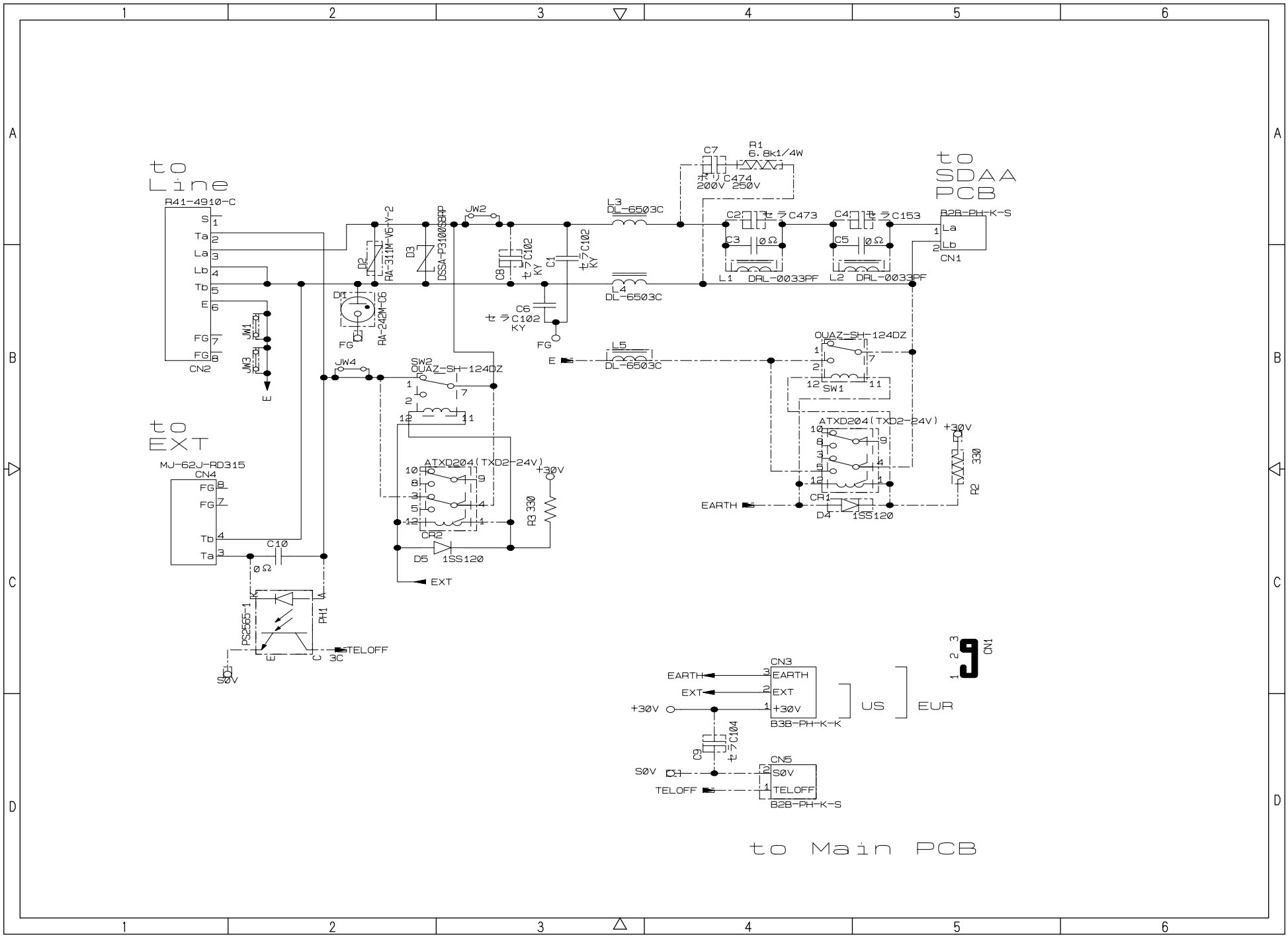
MFC3820CN/MFC3420C

Appendix 6. Circuit Diagrams

This appendix provides the circuit diagrams of the MJ PCB (MFC3820CN), NCU PCB (MFC3420C) and power supply PCB.

Terms in circuit diagrams

セラC: Ceramic capacitor
デンC: Chemical capacitor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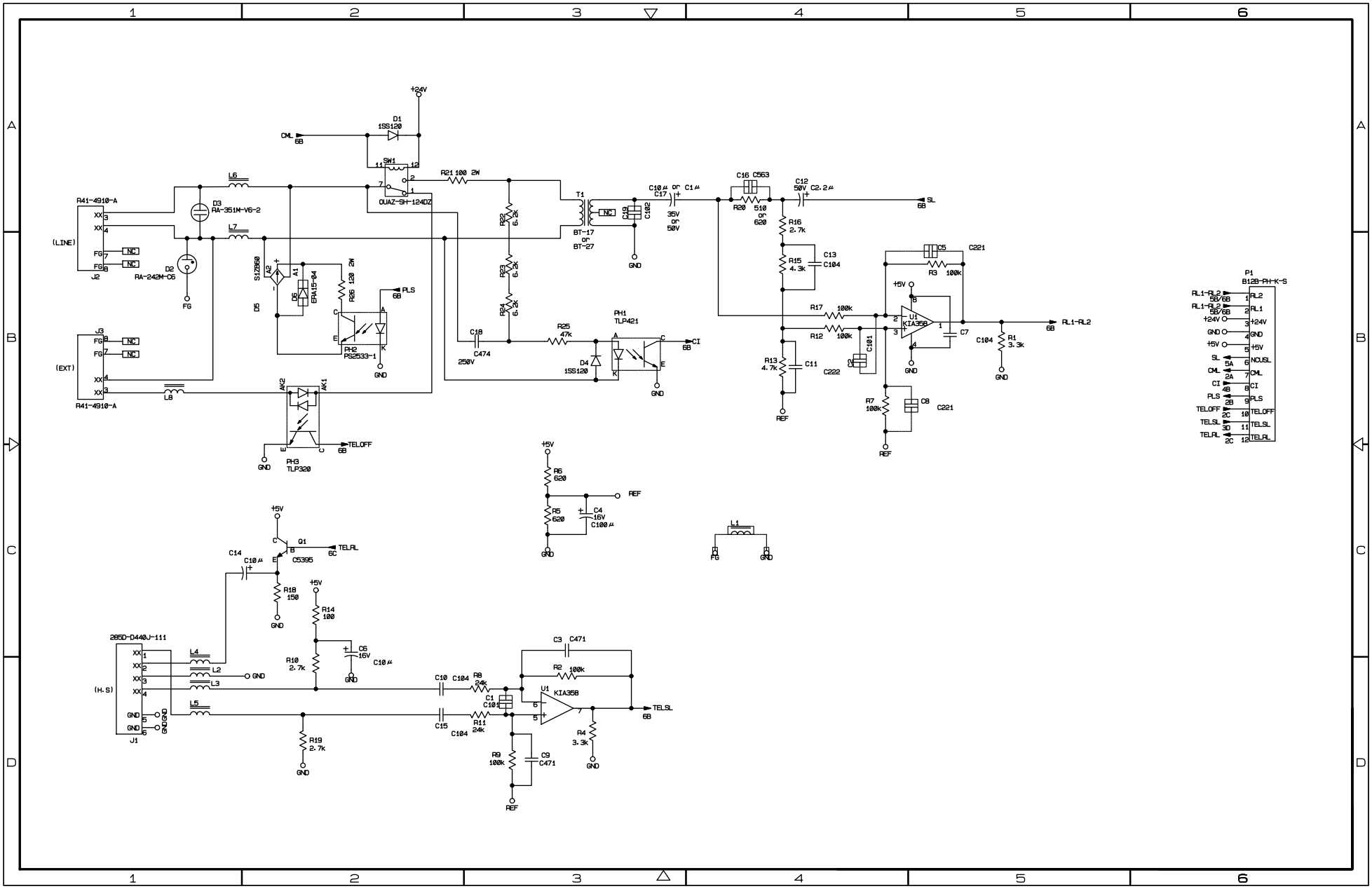
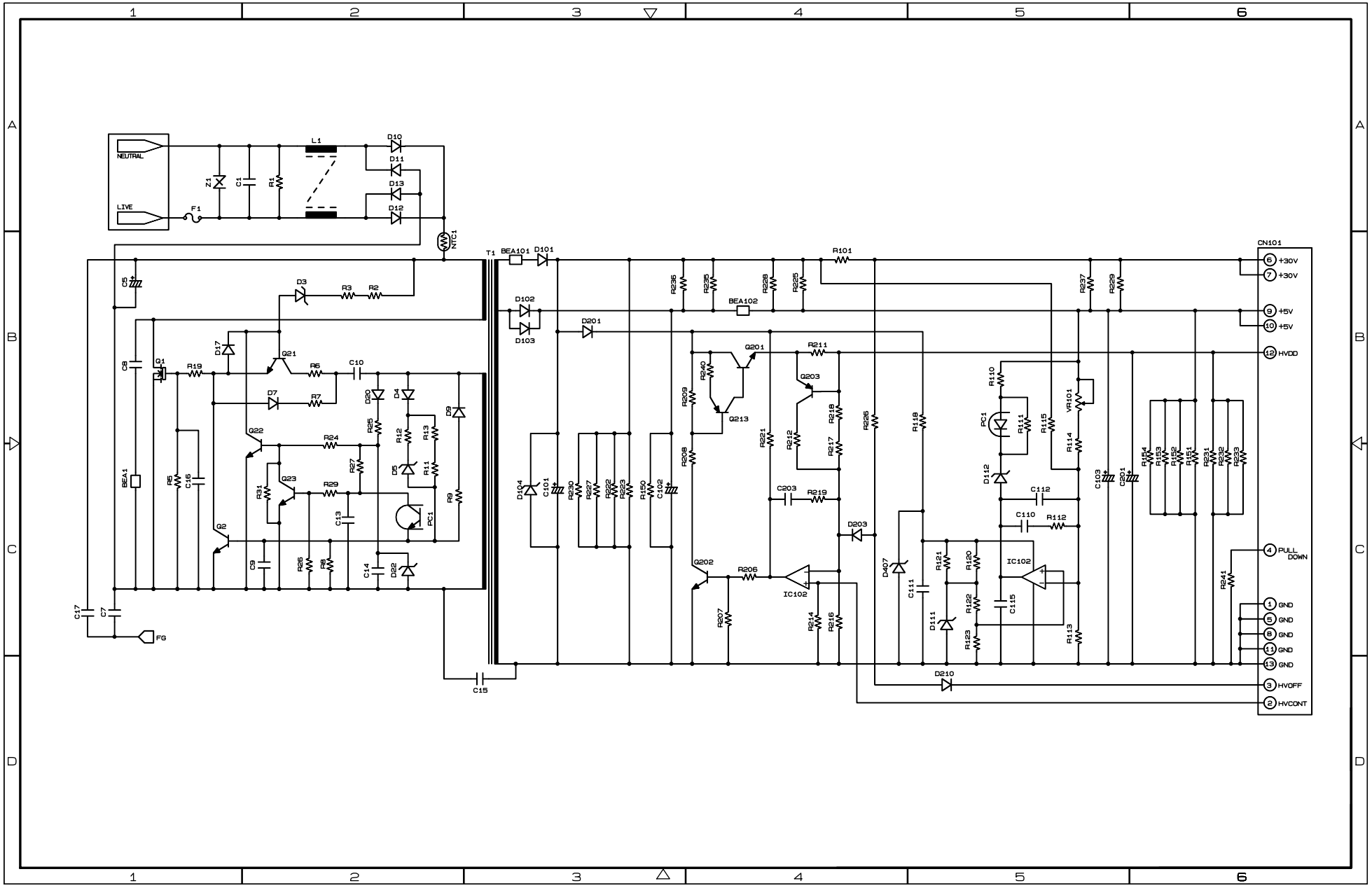
R41-4910-C
S
Ta
La
Lb
Tb
E
FG
FG
CN2
JW1
JW3
D1
RA-242M-05
D2
RA-311M-V6-Y-2
D3
DSSA-P3100SBAP
JW2
C8
C102
KY
C1
C102
KY
L3
DL-6503C
L4
DL-6503C
C7
R1
6.8K1/4W
C474
200V 250V
C2
C473
C3
C4
C153
C5
L1 DRL-0033PF
L2 DRL-0033PF
B2B-PH-K-S
La
Lb
CN1
to SDAA PCB
C6
C102
KY
L5
DL-6503C
JW4
SW2
QUAZ-SH-124DZ
SW1
QUAZ-SH-124DZ
ATXD204(TXD2-24V)
+30V
R3 330
CR2
D5 1SS120
EXT
ATXD204(TXD2-24V)
+30V
R2 330
CR1
D4 1SS120
EARTH
to EXT
MJ-62J-RD315
CN4
FG
FG
Tb
Ta
C10
PS2565-1
PH1
TELOFF
SØV
CN3
EARTH
EXT
+30V
B3B-PH-K-K
US
EUR
CN1
C9
C104
CN5
SØV
TELOFF
B2B-PH-K-S
to Main PCB


+24V
D1
1SS120
CML
6B
SW1
OUAZ-SH-124DZ
R21 100 2W
L6
L7
D3
RA-351M-V6-2
R41-4910-A
(LINE)
J2
D2
RA-242M-C6
FG
S1ZB60
D5
ERA15-04
R26 120 2W
PH2
PS2533-1
PLS
6B
GND
J3
(EXT)
L8
AK2
AK1
PH3
TLP320
TELOFF
6B
R22 6.2k
R23 6.2k
R24 6.2k
T1
BT-17
or
BT-27
C19
C102
C10μ or C1μ
C17
35V
or
50V
C18
C474
250V
R25
47k
PH1
TLP421
D4
1SS120
CI
6B
C16 C563
C12
50V C2.2μ
R20
510
or
620
SL
6B
R16
2.7k
R15
4.3k
C13
C104
R17 100k
R12 100k
C101
C222
R13
4.7k
C11
REF
C5
C221
R3 100k
+5V
U1
KIA358
C7
C104
R1
3.3k
R7
100k
C8
C221
RL1-RL2
6B
P1
B12B-PH-K-S
RL2
RL1
+24V
GND
+5V
NCUSL
CML
CI
PLS
TELOFF
TELSL
TELRL
R6
620
R5
620
C4
16V
C100μ
L1
FG
Q1
C5395
TELRL
6C
C14
C10μ
R18
150
R14
100
C6
16V
C10μ
R10
2.7k
2850-D440J-111
(H.S)
J1
L4
L2
L3
L5
R19
2.7k
C10 C104
C15 C104
R8
24k
R11
24k
C1
C101
C3 C471
R2 100k
U1
KIA358
TELSL
6B
R4
3.3k
R9
100k
C9
C471

C. Power Supply PCB



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SM-FAX020 (1)
8CA711
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