brother®

FACSIMILE EQUIPMENT
SERVICE MANUAL

MODELS: **MFC620CN**
                MFC420CN/410CN
                MFC210C
                FAX2440C
                DCP310CN/110C

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Preface

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

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

How this manual is organized

This manual is made up of nine chapters and appendices.

CHAPTER 1   PARTS NAMES AND FUNCTIONS

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

CHAPTER 2   SPECIFICATIONS

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

CHAPTER 3   THEORY OF OPERATION

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

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

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

CHAPTER 5   DISASSEMBLY/REASSEMBLY AND LUBRICATION

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

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

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

CHAPTER 6   ADJUSTMENTS AND UPDATING OF SETTINGS REQUIRED AFTER PARTS REPLACEMENT

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

CHAPTER 7   CLEANING

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

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CHAPTER 8   MAINTENANCE MODE

Describes the maintenance mode which is exclusively designed for the purpose of checks, settings and adjustments using the keys on the control panel.

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

CHAPTER 9   ERROR INDICATION AND TROUBLESHOOTING

Details error messages and codes that the incorporated self-diagnostic functions display if any error or malfunction occurs. If any error message appears, refer to this chapter to find which components should be checked or replaced.

The latter half of this chapter provides sample problems that could occur in the main sections of the machine and related troubleshooting procedures. This will help service personnel pinpoint and repair defective components.

Appendix 1   Serial Numbering System

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

Appendix 2   Firmware Installation

Provides instructions on how to update firmware stored in the flash ROM on the main PCB or load firmware to a new main PCB from the host PC.

No hardware replacement is required for updating.

Appendix 3   Customizing Codes According to Shipping Destination

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

Customizing codes customize firmware for individual models, enabling the common firmware to be used for various models. They come with the firmware data provided by Brother Industries.

Appendix 4   Firmware Switches (WSW)

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

Appendix 5   Wiring Diagram

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

Appendix 6   Circuit Diagrams

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

Appendix 7   Viewing the Event Log File

When installing the printer driver, the installer logs events that occur during the installation process in the event log file. This appendix views a sample of the event log file. Selecting Start | Program | Brother | MFL-Pro Suite *model name* | Installation Diagnostics reads out the event log file.
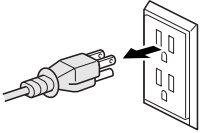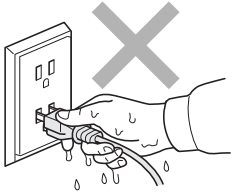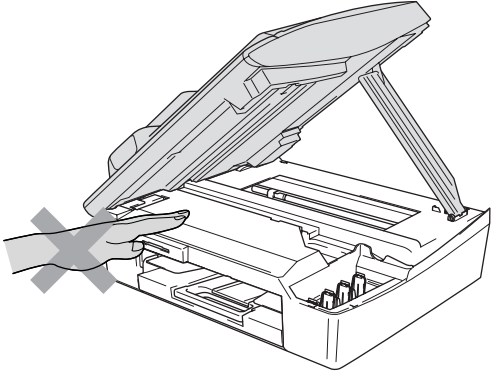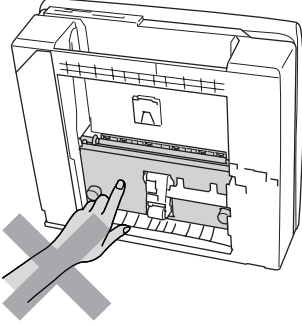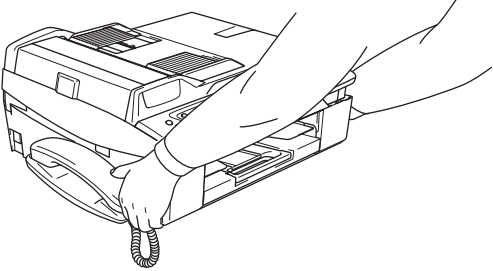
This manual describes the models and their versions destined for major countries. The specifications and functions are subject to change depending upon each destination.

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SAFETY PRECAUTIONS

To use the machine safely

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

⚠ WARNING

⚡	There are high voltage electrodes inside the machine. Before you clean the machine, make sure you have unplugged the telephone line cord first and then the power cord from the AC power outlet.	⚡	Do not handle the plug with wet hands. Doing this might cause an electrical shock.
⚠	To prevent injuries, be careful not to put your hands on the edge of the machine under the scanner cover.	⚠	To prevent injuries, be careful not to touch the area shaded in the illustration.
⚠	When moving the machine you must lift it from the base, by placing a hand at each side of the unit as shown in the illustration. Do NOT carry the machine by holding the scanner cover.		

⚠ WARNING

◼ 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.

◼ When lifting up the machine, hold it from the base. Holding the scanning cover (scanner unit) leaves the machine body inclined, disengaging the scanner cover from the machine body or letting the machine body fall.

⚠	**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 washing machine, in a wet basement or near a swimming pool.
	2. Avoid using this product during an electrical storm. There may be a remote risk of electric shock from lightning.
	3. Do not use this product to report a gas leak in the vicinity of the leak.
	4. Use only the power cord provided with the MFC.
	SAVE THESE INSTRUCTIONS

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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°C and 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.

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CHAPTER 1

PARTS NAMES & FUNCTIONS

CHAPTER 1 PARTS NAMES & FUNCTIONS

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

CONTENTS

1.1 OUTLINE

Front view

(6) ADF & document cover ASSY

(5) Scanner cover (Scanner unit)

(1) Control panel

(2) Paper tray

EXT.

LINE

(4) External telephone line jack

(3) Telephone line jack

Rear view

(8) LAN cable connector*

(9) Jam clear cover

(7) USB interface connector
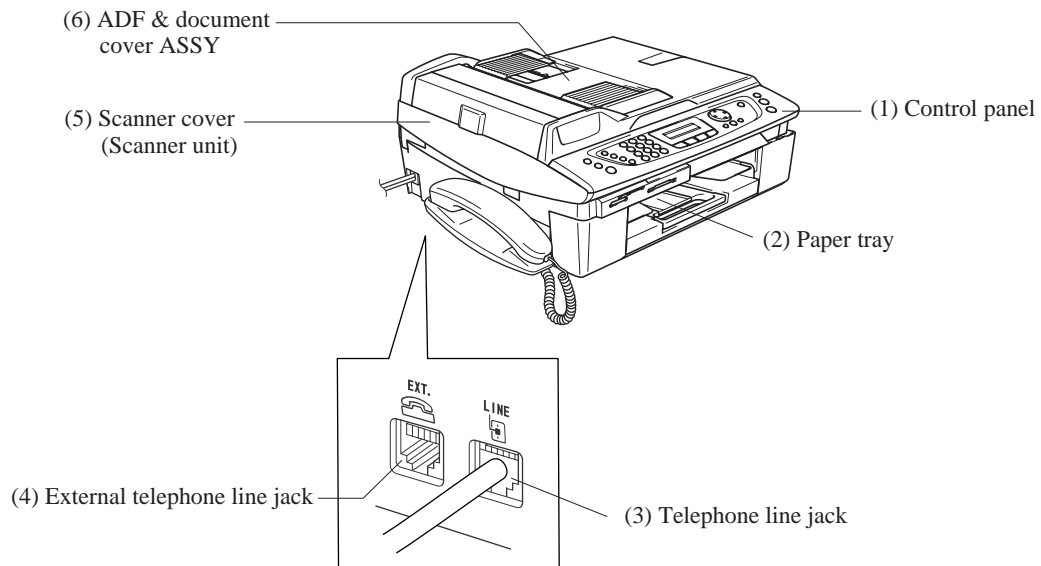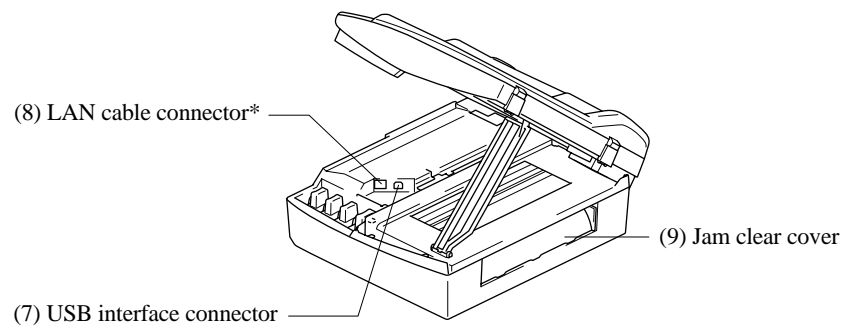
*Provided on the MFC620CN/420CN/410CN and DCP310CN

No.	Name	Description
(1)	Control panel	Use the keys to operate the machine. The liquid crystal display (LCD) shows the machine operation status.
(2)	Paper tray	Load paper here. Paper will be fed into the machine, sheet by sheet.
(3)	Telephone line jack	Plug in the modular plug on the telephone line here.
(4)	External telephone line jack	Plug in the modular plug on the external telephone line here.
(5)	Scanner cover (Scanner unit)	Open to load ink cartridges or remove jammed paper.
(6)	ADF* & document cover ASSY (*MFC620CN/420CN and FAX2440C)	ADF: Load documents (originals) here. Documents will be fed into the machine, page by page. Document cover: Open to place the document (original) on the scanner glass.
(7)	USB interface connector	Connect the USB cable here.
(8)	LAN cable connector (MFC620CN/420CN/410CN and DCP310CN)	Connect the LAN cable here.
(9)	Jam clear cover	Open to remove paper jammed inside the machine.

1.2 CONTROL PANEL

■ **MFC620CN**

■ **FAX2440C**

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1. Message Center keys

MC On/Off

Lets you activate the Message Center and will blink if you have new messages.

Play/Record

Lets you listen to voice messages stored in memory. Also, lets you record telephone calls.

Erase

Lets you delete voice messages, all fax messages or all messages.

2. Telephone keys

Microphone

Picks up your voice when you speak to another party using Speaker Phone.

Speaker Phone

Lets you speak to another party without lifting the handset.

Redial/Pause

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

Hold

Lets you place telephone calls on hold.

Ink

Lets you clean the print heads, check the print quality, and check the available ink volume.

3. Dial Pad

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

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

4. Mode keys

PhotoCapture (MFC620CN only)

Lets you access the PhotoCapture Center™ mode.

Copy

Lets you access Copy mode.

Fax

Lets you access Fax mode.

Scan (MFC620CN only)

Lets you access Scan mode.

5. Copy Options

You can quickly and easily select temporary settings for copying.

6. Fax Resolution

Adjusts the resolution when you send a fax.

7. Black Start

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

Also for MFC620CN, lets you start a scanning operation. (Color or mono, depending on the scanning setting on your PC)

8. Color Start

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

Also for MFC620CN, lets you start a scanning operation. (Color or mono, depending on the scanning setting on your PC)

9. Stop/Exit

Stops an operation or exits from the menu.

10. On/Off

You can turn the machine on or off.

11. Navigation keys

Menu/Set

The same key is used for Menu and Set operations.

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

◁〉 ◁〉〉

When 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.

12. Liquid Crystal Display (LCD)

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

The LCD examples are for models with a two-line display. There may be slight differences between the examples and models that have a one-line display.

13. One-Touch keys (FAX2440C only)

These keys give you instant access to previously stored Quick-Dial numbers.

14. Shift (FAX2440C only)

Lets you access memory locations 4 to 6 in the One-Touch keys.

■ MFC210C

1. Redial/Pause	5. Mode keys
Redials the last number you called. It also inserts a pause in auto dial numbers.	**PhotoCapture** Lets you access the PhotoCapture Center™ mode. **Copy** Lets you access Copy mode. **Fax** Lets you access Fax mode. **Scan** Lets you access Scan mode.
2. Hook	
Press before dialing if you want to make sure a machine will answer, and then press **Black Start** or **Color Start**.	
3. Ink	
Lets you clean the print heads, check the print quality, and check the available ink volume.	
4. Dial Pad	**6. Copy Options**
Use these keys to dial telephone or 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.	You can quickly and easily select temporary settings for copying.
	7. Fax Resolution
	Sets the resolution when you send a fax.
	8. 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)

9. 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)

10. Stop/Exit

Stops an operation or exits from the menu.

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Menu/Set

The same key is used for Menu and Set operations.

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

◁)   ◁))

When using the speaker or during ringing in fax mode, you can press these keys to adjust the volume.

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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.

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12. Liquid Crystal Display (LCD)

Displays messages on the screen to help you set up and use your MFC. The LCD examples in this guide are for models with a two-line display. There may be slight differences between the examples provided and models with a one-line display.

13. On/Off

You can turn the MFC on or off.

1.3 COMPONENTS

The machine consists of the following major components:

Scanner cover (Scanner unit)

Document cover***

ADF & document cover ASSY**

Scanner cover damper

Scanner cover stopper

Control panel ASSY

Head/carriage unit

Maintenance unit

Upper cover

Engine unit

Ink refill ASSY

Ink absorber box

Main PCB ASSY

Lower cover

Paper tray

Hook switch PCB*

Handset mount*

MJ/PS shield box

MJ PCB

Handset*

Power supply PCB
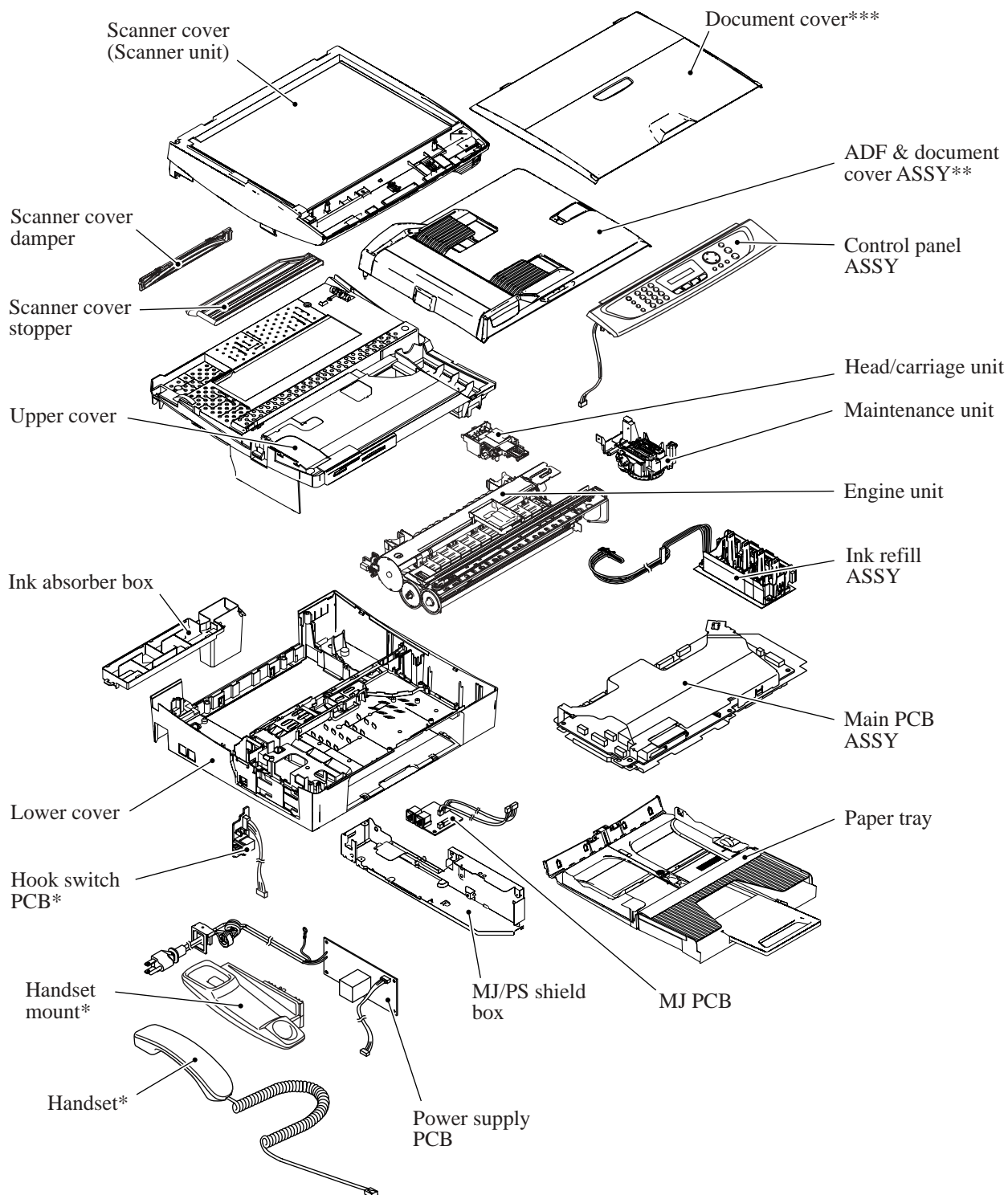
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 *   MFC620CN U.S.A./Canadian models and FAX2440C
 **  MFC620CN/420CN and FAX2440C
*** MFC410CN/210C and DCP310CN/110C
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CHAPTER 2

SPECIFICATIONS

CHAPTER 2 SPECIFICATIONS

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
        MFC620CN: 16 MB

Automatic Document Feeder (ADF)   Up to 10 sheets
(MFC620CN/420CN and FAX2440C only)

Paper Tray   100 sheets (20 lb.)

Printer Type   Ink Jet

Print Method   Piezo with 74 nozzles for each of three colors + a pair of 74 nozzles
for black

Liquid Crystal Display (LCD)
        MFC620CN: 16 characters x 2 lines

Operating Environment   50 to 95°F (10 to 35°C)

Best Print Quality   68 to 91°F (20 to 33°C)

Power Source   100 to 120 VAC, 50/60 Hz (U.S.A./Canada)

                         230 VAC, 50/60 Hz (Europe/Asia)

Power Consumption
  MFC620CN U.S.A./Canadian models: Minimum: under 3.5 Wh
                                Standby: 9.5 Wh or less (25°C)
                                Peak: 27 Wh or less
  MFC620CN European/Asian models: Minimum: under 4.0 Wh
                                Standby: 9.5 Wh or less (25°C)
                                Peak: 26 Wh or less

Dimensions (W x D x H)

MFC620CN U.S.A./Canadian models and FAX2440C:

17.3 x 13.7 x 6.5 inches (438 x 347 x 165 mm)

(with paper tray and document 17.9 x 17.9 x 6.5 inches (454 x 455 x 165 mm)
stopper opened)
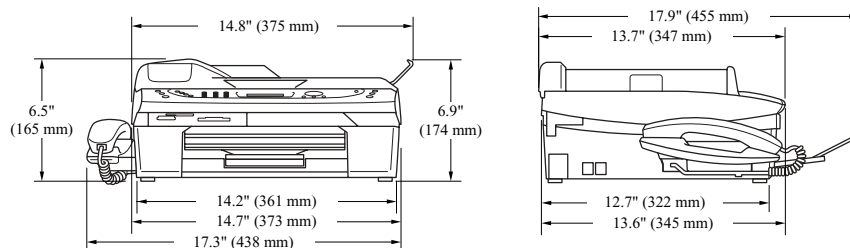
MFC620CN European/Asian models and MFC420CN:

14.7 x 13.6 x 6.5 inches (373 x 345 x 165 mm)

(with paper tray and document 14.8 x 17.9 x 6.9 inches (375 x 455 x 174 mm)
stopper opened)
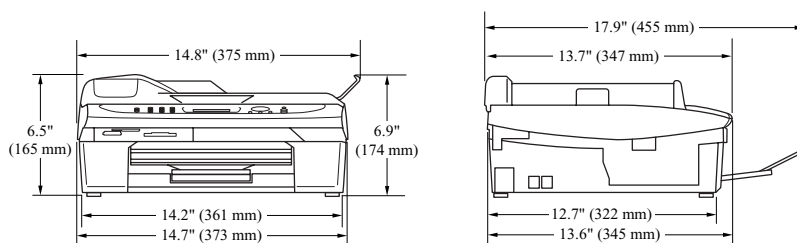
MFC210C and DCP310CN/110C:

14.7 x 13.6 x 5.3 inches (373 x 345 x 135 mm)

(with paper tray opened) 14.7 x 17.8 x 5.3 inches (373 x 453 x 135 mm)
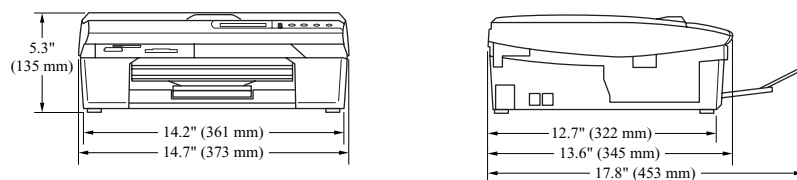
Weight

MFC620CN:

(Machine proper)	13.4 lb. (6.1 kg)	U.S.A./Canadian models
	13.2 lb. (6 kg)	European/Asian models
(In package)	17.6 lb. (8 kg)	U.S.A./Canadian models
	18.9 lb. (8.6 kg)	European/Asian models

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2.1.2 Paper Specifications

Recommended Paper

Brother Paper

Paper Type	Item
Letter Plain	BP60PL
Letter Glossy	BP60GLL
Letter Inkjet (Photo Matte)	BP60ML

Transparencies: 3M Transparency Film

Paper Type and Size for Each Operation

Paper Type	Paper Size		Usage			
			Fax	Copy	PhotoCapture	Printer
Cut Sheet	Letter	8 1/2" x 11" (216 x 279 mm)	Yes	Yes	Yes	Yes
	A4	8.3" x 11.7" (210 x 297 mm)	Yes	Yes	Yes	Yes
	Legal	8 1/2" x 14" (216 x 356 mm)	Yes	Yes	-	Yes
	Executive	7 1/4" x 10 1/2" (184 x 267 mm)	-	-	-	Yes
	JIS B5	7.2" x 10.1" (182 x 257 mm)	-	-	-	Yes
	A5	5.8" x 8.3" (148 x 210 mm)	-	Yes	-	Yes
	A6	4.1" x 5.8" (105 x 148 mm)	-	-	-	Yes
Cards	Photo	4" x 6" (102 x 152 mm)	-	Yes	Yes	Yes
	Photo L	3 1/2" x 5" (89 x 127 mm)	-	-	-	Yes
	Photo 2L	5" x 7" (127 x 178 mm)	-	-	Yes	Yes
	Index Card	5" x 8" (127 x 203 mm)	-	-	-	Yes
	Post Card 1	3.9" x 5.8" (100 x 148 mm)	-	-	-	Yes
	Post Card 2 (Double)	5.8" x 7.9" (148 x 200 mm)	-	-	-	Yes
Envelopes	C5 Envelope	6.4" x 9" (162 x 229 mm)	-	-	-	Yes
	DL Envelope	4.3" x 8.7" (110 x 220 mm)	-	-	-	Yes
	COM-10	4 1/8" x 9 1/2" (105 x 241 mm)	-	-	-	Yes
	Monarch	3 7/8" x 7 1/2" (98 x 191 mm)	-	-	-	Yes
	JE4 Envelope	4.1" x 9.3" (105 x 235 mm)	-	-	-	Yes
Transparencies	Letter	8 1/2" x 11" (216 x 279 mm)	-	Yes	-	Yes
	A4	8.3" x 11.7" (210 x 297 mm)	-	Yes	-	Yes

Paper Weight, Thickness and Capacity

Paper Type		Weight	Thickness	No. of sheets
Cut Sheet	Plain Paper	17 to 32 lb (64 to 120 g/m^2)	0.003" to 0.006" (0.08 to 0.15 mm)	100
	Inkjet Paper	17 to 53 lb (64 to 200 g/m^2)	0.003" to 0.01" (0.08 to 0.25 mm)	20
	Glossy Paper	Up to 58 lb (Up to 220 g/m^2)	Up to 0.01" (Up to 0.25 mm)	20
Cards	Photo Card	Up to 64 lb (Up to 240 g/m^2)	Up to 0.01" (Up to 0.28 mm)	20
	Index Card	Up to 32 lb (Up to 120 g/m^2)	Up to 0.006" (Up to 0.15 mm)	30
	Post Card	Up to 53 lb (Up to 200 g/m^2)	Up to 0.01" (Up to 0.23 mm)	30
Envelopes		-	Up to 0.02" (Up to 0.52 mm)	10
Transparencies		-	-	10

* Up to 50 sheets for Legal size paper (20 lb).

* Up to 100 sheets of 20 lb.

Paper Capacity of the Output Paper Support

Output Paper Support	Up to 25 sheets of 20 lb (Letter) ■ Transparencies or glossy paper must be picked up from the output paper support one page at a time to avoid smudging. ■ Legal paper cannot be stacked on the output paper support.

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⃠ Do not use paper or envelopes:

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

0.04 in.
or longer

0.04 in.
or longer
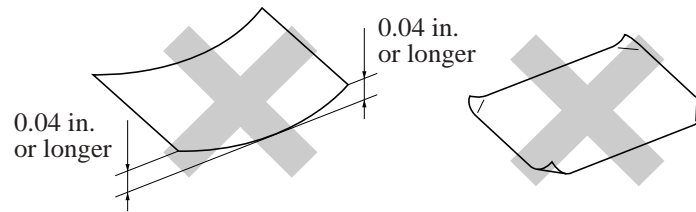
■ that are extremely shiny or highly textured

■ 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

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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.

Cut Sheet Paper   **Envelopes**
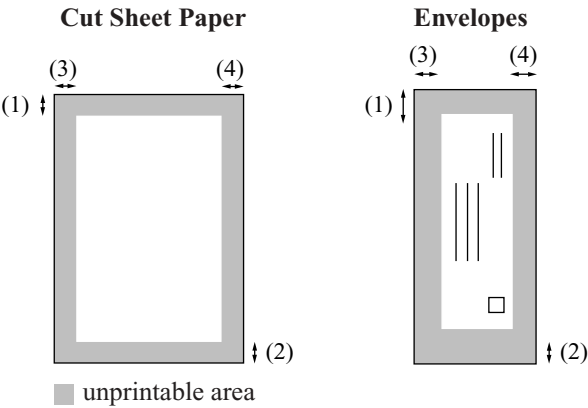
unprintable area

Paper	(1) Top	(2) Bottom	(3) Left	(4) Right
Cut sheet	0.12 in. (0 in.)*	0.12 in. (0 in.)*	0.12 in. (0 in.)*	0.12 in. (0 in.)*
Envelopes	0.47 in.	0.94 in.	0.12 in.	0.12 in.

* When you set the Borderless feature to On.
  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.

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2.2 SPECIFICATIONS LIST

MFC210C/MFC420CN/MFC410CN

(1/14)

	USA	EUR	ASIA/OCE/CHN	USA	EUR	ASIA/OCE/CHN
Model name	**MFC-210C**	**MFC-210C**	**MFC-210C**	**MFC-420CN**	**MFC-410CN**	**MFC-410CN**
GENERAL						
Print Engine	BH3 (KKCMY) 74 nozzles/line	BH3 (KKCMY) 74 nozzles/line	BH3 (KKCMY) 74 nozzles/line	BH3 (KKCMY) 74 nozzles/line	BH3 (KKCMY) 74 nozzles/line	BH3 (KKCMY) 74 nozzles/line
Technology	Inkjet	Inkjet	Inkjet	Inkjet	Inkjet	Inkjet
Scanning Method	CIS	CIS	CIS	CIS	CIS	CIS
CPU Speed	RISC 128MHz	RISC 128MHz	RISC 128MHz	RISC 128MHz	RISC 128MHz	RISC 128MHz
Back up Clock	1 hour	1 hour	1 hour	1 hour	1 hour	1 hour
Operating Environment Temperature (BestPrintQuality)	5 - 35 (20-33) degrees Centigrade	5 - 35 (20-33) degrees Centigrade	5 - 35 (20-33) degrees Centigrade	5 - 35 (20-33) degrees Centigrade	5 - 35 (20-33) degrees Centigrade	5 - 35 (20-33) degrees Centigrade
Humidity	20 - 80 % (without condensation)	20 - 80 % (without condensation)	20 - 80 % (without condensation)	20 - 80 % (without condensation)	20 - 80 % (without condensation)	20 - 80 % (without condensation)
On/Off Switch	Yes	Yes	Yes	Yes	Yes	Yes
Demo Model	Yes	-	-	Yes	-	-
Panel Key for demo sheet	Press[Copy] &[Fax] mode key at the same time.	-	-	Press[Copy] &[Fax] mode key at the same time.	-	-
Simultaneous Operation	Yes	Yes	Yes	Yes	Yes	Yes
Test Sheet	Yes:Print Quality/Alignment (in Ink Key)	Yes:Print Quality/Alignment (in Ink Key)	Yes:Print Quality/Alignment (in Ink Key)	Yes:Print Quality/Alignment (in Ink Key)	Yes:Print Quality/Alignment (in Ink Key)	Yes:Print Quality/Alignment (in Ink Key)
Min. Input of ADF (Width/Height)	-	-	-	5.8"/5.8"(147/147mm)	-	-
Max. Input of ADF (Width/Height)	-	-	-	8.5"/14" (216/356mm)	-	-
Max. Input of Glass (Width/Height)	8.5"/11.7", 216/297mm	8.5"/11.7", 216/297mm	8.5"/11.7", 216/297mm	8.5"/11.7", 216/297mm	8.5"/11.7", 216/297mm	8.5"/11.7", 216/297mm
Min. Output of Auto Cut sheet Feeder(Width/Height)	3.5"/5.0", 89/127mm	3.5"/5.0", 89/127mm	3.5"/5.0", 89/127mm	3.5"/5.0", 89/127mm	3.5"/5.0", 89/127mm	3.5"/5.0", 89/127mm
Max. Output of Auto Cut sheet Feeder(Width/Height)	8.5"/14.0", 216/356mm	8.5"/14.0", 216/356mm	8.5"/14.0", 216/356mm	8.5"/14.0", 216/356mm	8.5"/14.0", 216/356mm	8.5"/14.0", 216/356mm
Min. Output of Manual Feed Slot (Width/Height)	-	-	-	-	-	-
Max. Output of Manual Feed Slot(Width/Height)	-	-	-	-	-	-
Min. Output of Multi-Purpose	-	-	-	-	-	-
Max. Output of Multi-Purpose	-	-	-	-	-	-

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Model name	USA MFC-210C	EUR MFC-210C	ASIA/OCE/CHN MFC-210C	USA MFC-420CN	EUR MFC-410CN	ASIA/OCE/CHN MFC-410CN
Sheet Weight (Paper tray)	64 -220 g/m2 (17 - 58 lb.)	64 -220 g/m2 (17 - 58 lb.)	64 -220 g/m2 (17 - 58 lb.)	64 -220 g/m2 (17 - 58 lb.)	64 -220 g/m2 (17 - 58 lb.)	64 -220 g/m2 (17 - 58 lb.)
Sheet Weight (2nd Paper tray)	-	-	-	-	-	-
Sheet Weight (ADF)	-	-	-	64-90g/mm2 (17-24lb.)	-	-
Sheet Weight (Manual Feed Slot)	-	-	-	-	-	-
Sheet Weight (MP Tray)	-	-	-	-	-	-
ADF (pages)	-	-	-	Yes (10)	-	-
Paper Capacity (sheets)	100 (80 gsm)	100 (80 gsm)	100 (80 gsm)	100 (80 gsm)	100 (80 gsm)	100 (80 gsm)
Output Paper Capacity (sheets)	25	25	25	25	25	25
Optional Paper Tray (sheets)	-	-	-	-	-	-
Brother Paper (for Plain,Glossy and Inkjet)	LTR Plain / LTR Glossy/ LTR Inkjet	A4 Plain / A4 Glossy/ A4 Inkjet	A4 Plain / A4 Glossy/ A4 Inkjet	LTR Plain / LTR Glossy/ LTR Inkjet	A4 Plain / A4 Glossy/ A4 Inkjet	A4 Plain / A4 Glossy/ A4 Inkjet
Recommended Paper (Only for Transparency)	3M 3410 Transparency film	3M 3410 Transparency film	3M 3410 Transparency film	3M 3410 Transparency film	3M 3410 Transparency film	3M 3410 Transparency film
LCD Size	Standard 16 x 1 line	Standard 16 x 1 line	Standard 16 x 1 line	Standard 16 x 2 lines	Standard 16 x 2 lines	Standard 16 x 2 lines
LCD Back Light & Color	-	-	-	-	-	-
On-Screen Programming	Yes	Yes	Yes	Yes	Yes	Yes
LCD Language	English (+French for CAN model)	Depending on countries	English	English (+French for CAN model)	Depending on countries	English
Illuminated Mode Key	PCC/Copy/Fax /Scan	PCC/Copy/Fax /Scan	PCC/Copy/Fax /Scan	PCC/Copy/Fax /Scan	PCC/Copy/Fax /Scan	PCC/Copy/Fax /Scan
Memory Capacity (physical: Mbytes)	RAM 8MB ROM 2MB	RAM 8MB ROM 2MB	RAM 8MB ROM 2MB	RAM 16MB ROM 8MB*	RAM 16MB ROM 8MB	RAM 16MB ROM 8MB
Memory Backup (with battery 24hour)	-	-	-	-	-	-
Back Up Print: ON/OFF Feature (in function Menu)	Yes	Yes	Yes	Yes	Yes	Yes
Memory Security	-	-	-	-	-	-
Transmission Lock	-	Yes	Yes	-	Yes	Yes

*4MB (w/o demonstration program)

Confidential

	USA	EUR	ASIA/OCE/CHN	USA	EUR	ASIA/OCE/CHN
Model name	**MFC-210C**	**MFC-210C**	**MFC-210C**	**MFC-420CN**	**MFC-410CN**	**MFC-410CN**
Dimensions w/ Carton (WxDxH)=>Please refer to "Logistic Information" on Sales Data Bank.	W 420 x D 200 x H 380	W 500 x D 200 x H 450	W 500 x D 200 x H 450	W 420 x D 200 x H 380	W 500 x D 200 x H 450	W 500 x D 200 x H 450
Dimensions w/o Carton (WxDxH) * tray is not opened)=>Please refer to "Logistic Information"	W 373 x D 345 x H 135	W 373 x D 345 x H 135	W 373 x D 345 x H 135	W 373 x D 347 x H 165	W 373 x D 347 x H 165	W 373 x D 347 x H 165
Dimensions w/o Carton with tray is opend =>refer to "Logistic	W 373 x D 453 x H 135	W 373 x D 453 x H 135	W 373 x D 453 x H 135	W 375 x D 455 x H 165	W 373 x D 453 x H 135	W 373 x D 453 x H 135
Weight w/ Carton Please refer to "Logistic Information"	6.6kg	7kg	7kg	7.5kg	6.5kg	6.5kg
Weight w/o Carton w/o tray Please refer to "Logistic Information"	5.5kg	5.5kg	5.5kg	6kg	5.5kg	5.5kg
Body Color = Top Cover	BHmini Silver	BHmini Silver	BHmini Silver	Metallic Blue	Metallic Blue	Metallic Blue
Body Color = Panel cover	Black	Black	Black	Metallic Blue	Metallic Blue	Metallic Blue
Body Color = Bottom Cover	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray
Body Color = Bottom Cover (Engine unit)	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray
Power Source	AC 120 V 50/60Hz	AC 220-240 V 50/60Hz	AC 220-240 V 50/60Hz	AC 120 V 50/60Hz	AC 220-240 V 50/60Hz	AC 220-240 V 50/60Hz
Power Consumption(Power OFF/ Power Save(CPU Sleep)/ Standby/ Peak)	(3.0Wh / - / 7.0Wh / 20.0Wh)	(3.0Wh / - / 7.0Wh / 20.0Wh)	(3.0Wh / - / 7.0Wh / 20.0Wh)	(3.5Wh / - / 8.0Wh / 25.0Wh)	(4.0Wh / - / 9.0Wh / 19.0Wh)	(4.0Wh / - / 9.0Wh / 19.0Wh)
Energy Star Compliant (USA Only)	Yes	Yes	Yes	Yes	Yes	Yes
Machine Noise (Standby/Peak ex. In printing)	better than 35dBA/45dBA	better than 35dBA/45dBA	better than 35dBA/45dBA	better than 35dBA/45dBA	better than 35dBA/45dBA	better than 35dBA/45dBA
Total print pages	Yes	Yes	Yes	Yes	Yes	Yes
Copy pages	Yes	Yes	Yes	Yes	Yes	Yes
PC print pages	Yes	Yes	Yes	Yes	Yes	Yes
Fax RX pages	Yes	Yes	Yes	Yes	Yes	Yes
PCC pages	Yes	Yes	Yes	Yes	Yes	Yes
Ink Gauge Indication	Yes (in Ink Key/ Status Monitor)	Yes (in Ink Key/ Status Monitor)	Yes (in Ink Key/ Status Monitor)	Yes (in Ink Key/ Status Monitor)	Yes (in Ink Key/ Status Monitor)	Yes (in Ink Key/ Status Monitor)

Confidential

Model name	USA MFC-210C	EUR MFC-210C	ASIA/OCE/CHN MFC-210C	USA MFC-420CN	EUR MFC-410CN	ASIA/OCE/CHN MFC-410CN
LIST/REPORT						
Activity Report/Jour-l Report	Yes (up to 200)	Yes (up to 200)	Yes (up to 200)	Yes (up to 200)	Yes (up to 200)	Yes (up to 200)
Transmission Verification Report	Yes (in Menu Table)	Yes (in Menu Table)	Yes (in Menu Table)	Yes (in Menu Table)	Yes (in Menu Table)	Yes (in Menu Table)
Cover page	-	-	-	-	-	-
Help List	Yes (in Reports menu)	Yes (in Reports menu)	Yes (in Reports menu)	Yes (in Reports menu)	Yes (in Reports menu)	Yes (in Reports menu)
Call Back Message	-	-	-	-	-	-
Caller ID List	Yes(in CallerID Menu)	-	-	Yes(in CallerID Menu)	-	-
Quick Dial List	-	-	-	-	-	-
Quick Dial List (New) New =>Empty box is not printed out.	Yes (in Reports menu)	Yes (in Reports menu)	Yes (in Reports menu)	Yes (in Reports menu)	Yes (in Reports menu)	Yes (in Reports menu)
Tel Index List	-	-	-	-	-	-
Memory Status List	-	-	-	-	-	-
System Setup(User Setting) List	-	-	-	Yes (in Reports Menu)	Yes (in Reports Menu)	Yes (in Reports Menu)
Order Form	-	-	-	-	-	-
INTERFACE						
Exter-l TAD Interface	Yes	Yes	Yes	Yes	Yes	Yes
Host Interface	USB1.1/2.0(@ FULL-SPEEED)	USB1.1/2.0(@ FULL-SPEEED)	USB1.1/2.0(@ FULL-SPEEED)	USB1.1/2.0(@ FULL-SPEEED)	USB1.1/2.0(@ FULL-SPEEED)	USB1.1/2.0(@ FULL-SPEEED)
LAN	-	-	-	Yes	Yes	Yes
Cable included	-	-	-	-	-	-
PictBridge	-	-	-	-	-	-
Acceptable Media Card	CF/MS/SD/SM /xD	CF/MS/SD/SM /xD	CF/MS/SD/SM /xD	CF/MS/SD/SM /xD	CF/MS/SD/SM /xD	CF/MS/SD/SM /xD

Model name	USA MFC-210C	EUR MFC-210C	ASIA/OCE/CHN MFC-210C	USA MFC-420CN	EUR MFC-410CN	ASIA/OCE/CHN MFC-410CN
SUPPLIES/ OPTIONS						
Bundled Ink (Life / Yield)	BK:500pages (Normal 5%)	BK:500pages (Normal 5%)	BK:500pages (Normal 5%)	BK:500pages (Normal 5%)	BK:500pages (Normal 5%)	BK:500pages (Normal 5%)
	C/M/Y:400pages(Normal 5%)	C/M/Y:400pages(Normal 5%)	C/M/Y:400pages(Normal 5%)	C/M/Y:400pages(Normal 5%)	C/M/Y:400pages(Normal 5%)	C/M/Y:400pages(Normal 5%)
Supply Ink Cartridge (Life / Yield)	BK:500pages (Normal 5%)	BK:500pages (Normal 5%)	BK:500pages (Normal 5%)	BK:500pages (Normal 5%)	BK:500pages (Normal 5%)	BK:500pages (Normal 5%)
	C/M/Y:400pages(Normal 5%)	C/M/Y:400pages(Normal 5%)	C/M/Y:400pages(Normal 5%)	C/M/Y:400pages(Normal 5%)	C/M/Y:400pages(Normal 5%)	C/M/Y:400pages(Normal 5%)
Supply Ink Cartridge (Life / Yield) *HighCapacity	-	-	-	-	-	-
Options	-	-	-	-	-	-
SERVICE INFORMATION						
Monthly Volume	2500 pages	2500 pages	2500 pages	2500 pages	2500 pages	2500 pages
Machine Life (year)	30,000 pages (print)/50,000 pages (scan) or 5 years	30,000 pages (print)/50,000 pages (scan) or 5 years	30,000 pages (print)/50,000 pages (scan) or 5 years	30,000 pages (print)/50,000 pages (scan) or 5 years	30,000 pages (print)/50,000 pages (scan) or 5 years	30,000 pages (print)/50,000 pages (scan) or 5 years
Periodical Replacement Parts for Laser;	-	-	-	-	-	-
Fixing Unit	-	-	-	-	-	-
Separation Pad Assy	-	-	-	-	-	-
Paper Pick-up Roller Assy	-	-	-	-	-	-
Scanner Unit	-	-	-	-	-	-
MTBF (Mean Time Between Failures)	4,000 hours	4,000 hours	4,000 hours	4,000 hours	4,000 hours	4,000 hours
MTTR (Mean Time To BE Repaired)	30 min.	30 min.	30 min.	30 min.	30 min.	30 min.
Ozone Emission;	-	-	-	-	-	-
Printer	-	-	-	-	-	-
Scanner (Mono/Color)	-	-	-	-	-	-
TELEPHONE						
Handset	-	-	-	-	-	-
Hook	Yes	-	Yes	Yes	-	Yes
Off Hook Alarm	-	-	-	-	-	-
Duplex Speaker Phone	-	-	-	-	-	-
Power Failure Phone	-	-	-	-	-	-
Power Failure Dialing	-	-	-	-	-	-
Chain Dialing	Yes	Yes	Yes	Yes	Yes	Yes
Automatic Redial	Yes (1time/5min)	Yes (3time/5min)	Yes (3times/5min)	Yes (1time/5min)	Yes (3time/5min)	Yes (3times/5min)
Recall (For ASIA)	-	-	-	-	-	-
PBX Feature (EUR&ASIA)	-	Yes	-	-	Yes	-

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	USA	EUR	ASIA/OCE/CHN	USA	EUR	ASIA/OCE/CHN
Model name	**MFC-210C**	**MFC-210C**	**MFC-210C**	**MFC-420CN**	**MFC-410CN**	**MFC-410CN**
Handset Volume	-	-	-	-	-	-
Speaker Volume	Yes (3 steps + OFF)	Yes (3 steps + OFF)	Yes (3 steps + OFF)	Yes (3 steps + OFF)	Yes (3 steps + OFF)	Yes (3 steps + OFF)
Ring Volume	Yes (3 steps + OFF)	Yes (3 steps + OFF)	Yes (3 steps + OFF)	Yes (3 steps + OFF)	Yes (3 steps + OFF)	Yes (3 steps + OFF)
Hold/Mute Key	-	-	-	-	-	-
Music on Hold	-	-	-	-	-	-
Monitoring the Line on Hold with Music	-	-	-	-	-	-
One-Touch Dial	-	-	-	-	-	-
Speed Dial	20	20	20	80	80	80
Figures of One-Touch & Speed Dial	20 digits	20 digits	20 digits	20 digits	20 digits	20 digits
Resisterable Number Of Characters	15 characters	15 characters	15 characters	15 characters	15 characters	15 characters
Group Dial (Up to X groups)	Yes (6)	Yes (6)	Yes (6)	Yes (6)	Yes (6)	Yes (6)
Telephone Index (Search/Speed dial key)	Yes	Yes	Yes	Yes	Yes	Yes
Caller ID	Yes	-	Yes (ARL/NZ/SIN/ HK only)	Yes	-	Yes (ARL/NZ/SIN/ HK only)
Call Waiting Caller ID	-	-	-	-	-	-
Call waiting Ready (Only for USA)	-	-	-	-	-	-
Distinctive Ringing	Yes	Yes (UK,DEN only)	Yes (ARL/NZ/SIN/ HK only)	Yes	Yes (UK,DEN only)	Yes (ARL/NZ/SIN/ HK only)
COLOR FAX						
Modem Speed(bps)	14,400(Fax)	14,400(Fax)	14,400(Fax)	14,400(Fax)	14,400(Fax)	14,400(Fax)
Transmission Speed(sec.)	Approx.6 (Brother#1,MM R)	Approx.6 (Brother#1,MM R)	Approx.6 (Brother#1,MM R)	Approx.6 (Brother#1,MM R)	Approx.6 (Brother#1,MM R)	Approx.6 (Brother#1,MM R)
ITU-T Group	G3	G3	G3	G3	G3	G3
Coding Method	Mono:MH/MR/ MMR, Color:JPEG	Mono:MH/MR/ MMR, Color:JPEG	Mono:MH/MR/ MMR, Color:JPEG	Mono:MH/MR/ MMR, Color:JPEG	Mono:MH/MR/ MMR, Color:JPEG	Mono:MH/MR/ MMR, Color:JPEG
Fax/Tel Switch	Yes (Hook key)	Yes (Tel key)	Yes (Hook key)	Yes (Hook key)	Yes (Tel key)	Yes (Hook key)
Super Fine	Yes (TX & RX:B&W only)	Yes (TX & RX:B&W only)	Yes (TX & RX:B&W only)	Yes (TX & RX:B&W only)	Yes (TX & RX:B&W only)	Yes (TX & RX:B&W only)
Gray Scale	Mono:64, Color:256	Mono:64, Color:256	Mono:64, Color:256	Mono:64, Color:256	Mono:64, Color:256	Mono:64, Color:256
Contrast (Auto/S.Light/S.Dark)	Yes	Yes	Yes	Yes	Yes	Yes
Dual Access	Yes (B&W only)	Yes (B&W only)	Yes (B&W only)	Yes (B&W only)	Yes (B&W only)	Yes (B&W only)
Enhanced Remote Activate	Yes	Yes	Yes	Yes	Yes	Yes
Station ID (20digits/20characters)	Yes	Yes	Yes	Yes	Yes	Yes

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	USA	EUR	ASIA/OCE/CHN	USA	EUR	ASIA/OCE/CHN
Model name	**MFC-210C**	**MFC-210C**	**MFC-210C**	**MFC-420CN**	**MFC-410CN**	**MFC-410CN**
Remote Maintenance	-	-	-	Yes	Yes	Yes
RX Mode Indication	LCD	LCD	LCD	LCD	LCD	LCD
Resolution Indication	LCD	LCD	LCD	LCD	LCD	LCD
Paper Handling Size	LTR, A4	LTR, A4	LTR, A4	LTR, A4+LEGAL(withADF)	LTR, A4	LTR, A4
Ducument Scanning Width	208mm	208mm	208mm	208mm	208mm	208mm
Delayed Timer (up to 50:B&W only)	-	-	-	Yes	Yes	Yes
Polled Sending (type) *B&W only	-	-	-	Yes(Std.)	Yes (Std/Secure)	Yes (Std/Secure)
Next-Fax Reservation	Yes (Dual Access)	Yes (Dual Access)	Yes (Dual Access)	Yes (Dual Access)	Yes (Dual Access)	Yes (Dual Access)
Batch Transmission	-	-	-	Yes (B&W only /not color)	Yes (B&W only /not color)	Yes (B&W only /not color)
Quick-Scan(Memory transmission)	Approx.4.72sec/page@LTR Approx. 5.02 sec./page@A4	Approx.4.72sec/page@LTR Approx. 5.02 sec./page@A4	Approx.4.72sec/page@LTR Approx. 5.02 sec./page@A4	Approx.4.72sec/page@LTR Approx. 5.02 sec./page@A4	Approx.4.72sec/page@LTR Approx. 5.02 sec./page@A4	Approx.4.72sec/page@LTR Approx. 5.02 sec./page@A4
Memory Transmission (ITU-T Test Chart	Up to 170 Page	Up to 170 Pages	Up to 170 Pages	Up to 400 Pages	Up to 400 Pages	Up to 400 Pages
Memory Transmission (Brother Chart/ MMR)	UP to 200 Pages	UP to 200 Pages	UP to 200 Pages	UP to 480 Pages	UP to 480 Pages	UP to 480 Pages
ECM (Error Correction Mode)	Yes	Yes	Yes	Yes	Yes	Yes
Error Re-Transmission	-	-	-	-	-	-
Broadcasting (Speed+ OneTouch+Manual)	Yes (70 locations)	Yes (70 locations)	Yes (70 locations)	Yes (130 locations)	Yes (130 locations)	Yes (130 locations)
Manual Broadcasting	Yes(50 locations)	Yes(50 locations)	Yes(50 locations)	Yes(50 locations)	Yes(50 locations)	Yes(50 locations)
Easy Receive/Fax Detect	Yes	Yes	Yes	Yes	Yes	Yes
Polling Receiving (type) *B&W only	-	-	-	Yes (Std/Seq)	Yes (Std/Seq/Secure/Timer)	Yes (Std/Seq/Secure/Timer)
Auto Reduction	Yes	Yes	Yes	Yes	Yes	Yes
Out-of-Paper Reception (ITU-T Test Chart #1/MMR)	Up to 170 Page	Up to 170 Pages	Up to 170 Pages	Up to 400 Pages	Up to 400 Pages	Up to 400 Pages
Out-of-Paper Reception (Brother Chart/ MMR)	UP to 200 Pages	UP to 200 Pages	UP to 200 Pages	UP to 480 Pages	UP to 480 Pages	UP to 480 Pages
Remote Access	-	-	-	Yes	Yes	Yes
Fax Retrieval	-	-	-	Yes (B&W only)	Yes (B&W only)	Yes (B&W only)
Fax Forwarding	-	-	-	Yes (B&W only)	Yes (B&W only)	Yes (B&W only)
Paging	-	-	-	Yes	-	-
Color FAX (Document Send/Receive)	Yes/Yes (ITU-color FAX)	Yes/Yes (ITU-color FAX)	Yes/Yes (ITU-color FAX)	Yes/Yes (ITU-color FAX)	Yes/Yes (ITU-color FAX)	Yes/Yes (ITU-color FAX)
Color FAX (Memory Send/Receive)	No / Yes (ITU-color FAX)	No / Yes (ITU-color FAX)	No / Yes (ITU-color FAX)	No / Yes (ITU-color FAX)	No / Yes (ITU-color FAX)	No / Yes (ITU-color FAX)

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	USA	EUR	ASIA/OCE/CHN	USA	EUR	ASIA/OCE/CHN
Model name	**MFC-210C**	**MFC-210C**	**MFC-210C**	**MFC-420CN**	**MFC-410CN**	**MFC-410CN**
COLOR PRINTER						
Color/Mono	Color	Color	Color	Color	Color	Color
Resolution(dpi)	up to 1200x6000 dpi	up to 1200x6000 dpi	up to 1200x6000 dpi	up to 1200x6000 dpi	up to 1200x6000 dpi	up to 1200x6000 dpi
Speed(ppm) Simple	20/15ppm (Mono/Color: 600x150 dpi)	20/15ppm (Mono/Color: 600x150 dpi)	20/15ppm (Mono/Color: 600x150 dpi)	20/15ppm (Mono/Color: 600x150 dpi)	20/15ppm (Mono/Color: 600x150 dpi)	20/15ppm (Mono/Color: 600x150 dpi)
First print out time (from READY mode *2)	-	-	-	-	-	-
Warm up Time (from SLEEP mode)	-	-	-	-	-	-
Emulation	-	-	-	-	-	-
Resident Fonts	-	-	-	-	-	-
Fonts Disk Based	Yes (35 TrueType)	Yes (35 TrueType)	Yes (35 TrueType)	Yes (35 TrueType)	Yes (35 TrueType)	Yes (35 TrueType)
Paper Handling Size (Paper Tray)	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo(4x6"/102x 152mm), Indexcard(5x8"/1 27x203mm), Photo L (3.5x5"/89x127m m), Photo2L(5x7"/12 7x178mm), Post Card 1(3.9x5.8"/100x1 48mm), Post Card 2 (Double)(5.8x7.8" /148x200mm), C5 Envelope, Com-10, DL Envelope, Mo-rch, JE4 Envelope.	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo(4x6"/102x 152mm), Indexcard(5x8"/1 27x203mm), Photo L (3.5x5"/89x127m m), Photo2L(5x7"/12 7x178mm), Post Card 1(3.9x5.8"/100x1 48mm), Post Card 2 (Double)(5.8x7.8" /148x200mm), C5 Envelope, Com-10, DL Envelope, Mo-rch, JE4 Envelope.	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo(4x6"/102x 152mm), Indexcard(5x8"/1 27x203mm), Photo L (3.5x5"/89x127m m), Photo2L(5x7"/12 7x178mm), Post Card 1(3.9x5.8"/100x1 48mm), Post Card 2 (Double)(5.8x7.8" /148x200mm), C5 Envelope, Com-10, DL Envelope, Mo-rch, JE4 Envelope.	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo(4x6"/102x 152mm), Indexcard(5x8"/1 27x203mm), Photo L (3.5x5"/89x127m m), Photo2L(5x7"/12 7x178mm), Post Card 1(3.9x5.8"/100x1 48mm), Post Card 2 (Double)(5.8x7.8" /148x200mm), C5 Envelope, Com-10, DL Envelope, Mo-rch, JE4 Envelope.	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo(4x6"/102x 152mm), Indexcard(5x8"/1 27x203mm), Photo L (3.5x5"/89x127m m), Photo2L(5x7"/12 7x178mm), Post Card 1(3.9x5.8"/100x1 48mm), Post Card 2 (Double)(5.8x7.8" /148x200mm), C5 Envelope, Com-10, DL Envelope, Mo-rch, JE4 Envelope.	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo(4x6"/102x 152mm), Indexcard(5x8"/1 27x203mm), Photo L (3.5x5"/89x127m m), Photo2L(5x7"/12 7x178mm), Post Card 1(3.9x5.8"/100x1 48mm), Post Card 2 (Double)(5.8x7.8" /148x200mm), C5 Envelope, Com-10, DL Envelope, Mo-rch, JE4 Envelope.
Paper Handling Size (2nd Tray)	-	-	-	-	-	-
Paper Handling Size (Manual Slots)	-	-	-	-	-	-
Paper Handling Size (MP)	-	-	-	-	-	-
Media Type (Paper Tray)	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency
Media Type (2 nd Paper Tray)	-	-	-	-	-	-
Media Type (Manual Slots)	-	-	-	-	-	-
Media Type (MP Tray)	-	-	-	-	-	-

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Model name	USA MFC-210C	EUR MFC-210C	ASIA/OCE/CHN MFC-210C	USA MFC-420CN	EUR MFC-410CN	ASIA/OCE/CHN MFC-410CN
Print Paper Margin (upper, lower, left, right)	Borderless ON:0, 0, 0,0* OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm** * Borderless For A4 /LTR/A6/Photo(4x6"/102x152mm), Indexcard(5x8"/127x203mm), Photo L(3.5x5"/89x127mm), Photo 2L(5x7"/127x178mm), Post Card 1(3.9x5.8"/100x148mm), Post Card 2 (Double)(5.8x7.8"/148x200mm) only **0.47x0.95x0.12x0.12"/12,24,3,3mm for Envelops	Borderless ON:0, 0, 0,0* OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm** * Borderless For A4 /LTR/A6/Photo(4x6"/102x152mm), Indexcard(5x8"/127x203mm), Photo L(3.5x5"/89x127mm), Photo 2L(5x7"/127x178mm), Post Card 1(3.9x5.8"/100x148mm), Post Card 2 (Double)(5.8x7.8"/148x200mm) only **0.47x0.95x0.12x0.12"/12,24,3,3mm for Envelops	Borderless ON:0, 0, 0,0* OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm** * Borderless For A4 /LTR/A6/Photo(4x6"/102x152mm), Indexcard(5x8"/127x203mm), Photo L(3.5x5"/89x127mm), Photo 2L(5x7"/127x178mm), Post Card 1(3.9x5.8"/100x148mm), Post Card 2 (Double)(5.8x7.8"/148x200mm) only **0.47x0.95x0.12x0.12"/12,24,3,3mm for Envelops	Borderless ON:0, 0, 0,0* OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm** * Borderless For A4 /LTR/A6/Photo(4x6"/102x152mm), Indexcard(5x8"/127x203mm), Photo L(3.5x5"/89x127mm), Photo 2L(5x7"/127x178mm), Post Card 1(3.9x5.8"/100x148mm), Post Card 2 (Double)(5.8x7.8"/148x200mm) only **0.47x0.95x0.12x0.12"/12,24,3,3mm for Envelops	Borderless ON:0, 0, 0,0* OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm** * Borderless For A4 /LTR/A6/Photo(4x6"/102x152mm), Indexcard(5x8"/127x203mm), Photo L(3.5x5"/89x127mm), Photo 2L(5x7"/127x178mm), Post Card 1(3.9x5.8"/100x148mm), Post Card 2 (Double)(5.8x7.8"/148x200mm) only **0.47x0.95x0.12x0.12"/12,24,3,3mm for Envelops	Borderless ON:0, 0, 0,0* OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm** * Borderless For A4 /LTR/A6/Photo(4x6"/102x152mm), Indexcard(5x8"/127x203mm), Photo L(3.5x5"/89x127mm), Photo 2L(5x7"/127x178mm), Post Card 1(3.9x5.8"/100x148mm), Post Card 2 (Double)(5.8x7.8"/148x200mm) only **0.47x0.95x0.12x0.12"/12,24,3,3mm for Envelops
Variable Dot Print	Yes (3 sizes)	Yes (3 sizes)	Yes (3 sizes)	Yes (3 sizes)	Yes (3 sizes)	Yes (3 sizes)
Minimum Droplet Size	3 pl	3 pl	3 pl	3 pl	3 pl	3 pl
Shingling Print	-	-	-	-	-	-
Color Enhancement	Yes	Yes	Yes	Yes	Yes	Yes
COLOR COPY						
Color/Mono	Color	Color	Color	Color	Color	Color
Speed (cpm) *time culcurated excluding paper feeding **EU's defult is culcurated by "nomal mode"speed.	17/11cpm	17/11cpm	17/11cpm	17/11cpm	17/11cpm	17/11cpm
Warm up Time (from SLEEP mode)	-	-	-	-	-	-
Multi Copy (Stack)	Yes (Up to 99)	Yes (Up to 99)	Yes (Up to 99)	Yes (Up to 99)	Yes (Up to 99)	Yes (Up to 99)
Multi Copy (Sort)	-	-	-	Yes	-	-
Reduction/Enlargement (%)	25 -- 400 in 1% increments	25 -- 400 in 1% increments	25 -- 400 in 1% increments	25 -- 400 in 1% increments	25 -- 400 in 1% increments	25 -- 400 in 1% increments
Resolution (dpi)	Print: Max. 600x1200 dpi Scan: Max. 600x1200 dpi	Print: Max. 600x1200 dpi Scan: Max. 600x1200 dpi	Print: Max. 600x1200 dpi Scan: Max. 600x1200 dpi	Print: Max. 600x1200 dpi Scan: Max. 600x1200 dpi	Print: Max. 600x1200 dpi Scan: Max. 600x1200 dpi	Print: Max. 600x1200 dpi Scan: Max. 600x1200 dpi
N in 1	-	-	-	2in1, 4in1(Mono/Color, A4/LTR only)	2in1, 4in1(Mono/Color, A4/LTR only)	2in1, 4in1(Mono/Color, A4/LTR only)
Poster	-	-	-	Yes (3x3)	Yes (3x3)	Yes (3x3)
Image Enhancement	-	-	-	-	-	-

Model name	USA MFC-210C	EUR MFC-210C	ASIA/OCE/CHN MFC-210C	USA MFC-420CN	EUR MFC-410CN	ASIA/OCE/CHN MFC-410CN
Paper Handling Size (Paper Tray)	Letter/Legal/A4/A5/4"x6"(10(W)x15(H)cm)	Letter/Legal/A4/A5/4"x6"(10(W)x15(H)cm)	Letter/Legal/A4/A5/4"x6"(10(W)x15(H)cm)	Letter/Legal/A4/A5/4"x6"(10(W)x15(H)cm)	Letter/Legal/A4/A5/4"x6"(10(W)x15(H)cm)	Letter/Legal/A4/A5/4"x6"(10(W)x15(H)cm)
Paper Handling Size (2nd Tray)	-	-	-	-	-	-
Paper Handling Size (Manual Slots)	-	-	-	-	-	-
Paper Handling Size (MP)	-	-	-	-	-	-
Media Type (Paper Tray)	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency
Media Type (2nd Tray)	-	-	-	-	-	-
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)	0.12, 0.12, 0.12, 0,12" (3,3,3,3mm)	0.12, 0.12, 0.12, 0,12" (3,3,3,3mm)	0.12, 0.12, 0.12, 0,12" (3,3,3,3mm)	0.12, 0.12, 0.12, 0,12" (3,3,3,3mm)	0.12, 0.12, 0.12, 0,12" (3,3,3,3mm)
Duplex Copy	-	-	-	-	-	-
Resolution Indication	LCD	LCD	LCD	LCD	LCD	LCD
COLOR SCANNER						
Color/Mono	Color	Color	Color	Color	Color	Color
Optical Resolution (dpi)	600x2400 dpi	600x2400 dpi	600x2400 dpi	600x2400 dpi	600x2400 dpi	600x2400 dpi
Interpolated Resolution (dpi)	up to 19200x19200 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)	up to 19200x19200 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)	up to 19200x19200 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)	up to 19200x19200 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)	up to 19200x19200 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)	up to 19200x19200 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)
Warm up Time (from Scanner Lamp OFF)	-	-	-	-	-	-
Warm up Time (from Scanner Lamp OFF: Color)	-	-	-	-	-	-
Gray Scale	256	256	256	256	256	256
Ducument Scanning width	Max. 210mm	Max. 210mm	Max. 210mm	Max. 210mm	Max. 210mm	Max. 210mm
Scan Image	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)
Scan / OCR	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)
Scan to E-mail	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)
Scan to File	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)
Scan to Card	-	-	-	Yes (scan key)	Yes (scan key)	Yes (scan key)

	USA	EUR	ASIA/OCE/CHN	USA	EUR	ASIA/OCE/CHN
Model name	**MFC-210C**	**MFC-210C**	**MFC-210C**	**MFC-420CN**	**MFC-410CN**	**MFC-410CN**
Scan speed (Mono/Color) *@100dpi	Max. 3.54/5.58 sec @Letter_size Max. 3.76/5.93 sec @A4_size	Max. 3.54/5.58 sec @Letter_size Max. 3.76/5.93 sec @A4_size	Max. 3.54/5.58 sec @Letter_size Max. 3.76/5.93 sec @A4_size	Max. 3.54/5.58 sec @Letter_size Max. 3.76/5.93 sec @A4_size	Max. 3.54/5.58 sec @Letter_size Max. 3.76/5.93 sec @A4_size	Max. 3.54/5.58 sec @Letter_size Max. 3.76/5.93 sec @A4_size
Scanner Lamp Switch (CIS doesn't require switch)	-	-	-	-	-	-
Color Depth (Input/Output)	36/24 bit color processing	36/24 bit color processing	36/24 bit color processing	36/24 bit color processing	36/24 bit color processing	36/24 bit color processing
MESSAGE CENTER						
TAD	-	-	-	-	-	-
ICM Recording Time	-	-	-	-	-	-
Toll Saver	-	-	-	-	-	-
Memo/Recording Conversation	-	-	-	-	-	-
OGM (MC/TAD,F/T)	-	-	-	-	-	-
User Recording OGM TIME(MC/TAD, F/T)	-	-	-	-	-	-
PC FAX						
Supplier	Brother	Brother	Brother	Brother	Brother	Brother
Color/Mono	Mono	Mono	Mono	Mono	Mono	Mono
Sending	Yes	Yes	Yes	Yes	Yes	Yes
Receiving	-	-	-	Yes	Yes	Yes
Protocol Compliance	-	-	-	-	-	-
Broadcasting	up to 50	up to 50	up to 50	up to 50	up to 50	up to 50
Support OS Version (Refer to"Application&OS" sheet)						
Others	-	-	-	-	-	-

	USA	EUR	ASIA/OCE/CHN	USA	EUR	ASIA/OCE/CHN
Model name	**MFC-210C**	**MFC-210C**	**MFC-210C**	**MFC-420CN**	**MFC-410CN**	**MFC-410CN**
PHOTO CAPTURE CENTER						
Acceptable Media Card & Size	**SmartMedia (3.3V)**:4MB-128MB **Compact Flash** (Type-1, excl. Type2/Micro-Drive):4MB-2GB **Memory Stick**:16MB-128MB (Duo with Adopter) **Memory Stick Pro**:256MB-1GB (MagicGate:Yes if not use MG function) **Secure Digital**:16MB-512MB (MiniSD with Adopter) **xD Picture Card**:16-512MB	**SmarMedia (3.3V)**:4MB-128MB **Compact Flash** (Type-1, excl. Type2/Micro-Drive):4MB-2GB **Memory Stick**:16MB-128MB (Duo with Adopter) **Memory Stick Pro**:256MB-1GB (MagicGate:Yes if not use MG function) **Secure Digital**:16MB-512MB (MiniSD with Adopter) **xD Picture Card**:16-512MB	**SmartMedia (3.3V)**:4MB-128MB **Compact Flash** (Type-1, excl. Type2/Micro-Drive):4MB-2GB **Memory Stick**:16MB-128MB (Duo with Adopter) **Memory Stick Pro**:256MB-1GB (MagicGate:Yes if not use MG function) **Secure Digital**:16MB-512MB (MiniSD with Adopter) **xD Picture Card**:16-512MB	**SmartMedia (3.3V)**:4MB-128MB **Compact Flash** (Type-1, excl. Type2/Micro-Drive):4MB-2GB **Memory Stick**:16MB-128MB (Duo with Adopter) **Memory Stick Pro**:256MB-1GB (MagicGate:Yes if not use MG function) **Secure Digital**:16MB-512MB (MiniSD with Adopter) **xD Picture Card**:16-512MB	**SmartMedia (3.3V)**:4MB-128MB **Compact Flash** (Type-1, excl. Type2/Micro-Drive):4MB-2GB **Memory Stick**:16MB-128MB (Duo with Adopter) **Memory Stick Pro**:256MB-1GB (MagicGate:Yes if not use MG function) **Secure Digital**:16MB-512MB (MiniSD with Adopter) **xD Picture Card**:16-512MB	**SmartMedia (3.3V)**:4MB-128MB **Compact Flash** (Type-1, excl. Type2/Micro-Drive):4MB-2GB **Memory Stick**:16MB-128MB (Duo with Adopter) **Memory Stick Pro**:256MB-1GB (MagicGate:Yes if not use MG function) **Secure Digital**:16MB-512MB (MiniSD with Adopter) **xD Picture Card**:16-512MB
Paper Handling Size & Type (Paper Tray)	Letter Glossy/4"x6"(10x15cm) Glossy/5"x7"(13x18cm) Glossy /A4 Glossy/Letter Plai-4 Plain/Letter Inkjet/A4 Inkjet/4"x6"(10x15cm) Inkjet	Letter Glossy/4"x6"(10x15cm) Glossy/5"x7"(13x18cm) Glossy /A4 Glossy/Letter Plai-4 Plain/Letter Inkjet/A4 Inkjet/4"x6"(10x15cm) Inkjet	Letter Glossy/4"x6"(10x15cm) Glossy/5"x7"(13x18cm) Glossy /A4 Glossy/Letter Plai-4 Plain/Letter Inkjet/A4 Inkjet/4"x6"(10x15cm) Inkjet	Letter Glossy/4"x6"(10x15cm) Glossy/5"x7"(13x18cm) Glossy /A4 Glossy/Letter Plai-4 Plain/Letter Inkjet/A4 Inkjet/4"x6"(10x15cm) Inkjet	Letter Glossy/4"x6"(10x15cm) Glossy/5"x7"(13x18cm) Glossy /A4 Glossy/Letter Plai-4 Plain/Letter Inkjet/A4 Inkjet/4"x6"(10x15cm) Inkjet	Letter Glossy/4"x6"(10x15cm) Glossy/5"x7"(13x18cm) Glossy /A4 Glossy/Letter Plai-4 Plain/Letter Inkjet/A4 Inkjet/4"x6"(10x15cm) Inkjet
Paper Handling Size & Type (Manual Slots)	-	-	-	-	-	-
Paper Handling Size & Type (MP)	-	-	-	-	-	-
Print Paper Margin (upper, lower, left, right)	Borderless (For all size) ON:0, 0, 0,0 OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm	Borderless (For all size) ON:0, 0, 0,0 OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm	Borderless (For all size) ON:0, 0, 0,0 OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm	Borderless (For all size) ON:0, 0, 0,0 OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm	Borderless (For all size) ON:0, 0, 0,0 OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm	Borderless (For all size) ON:0, 0, 0,0 OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm
Available paper size for full (Max) size printing	4x6"(10x15cm) / 5x7"(13x18cm) only	4x6"(10x15cm) / 5x7"(13x18cm) only	4x6"(10x15cm) / 5x7"(13x18cm) only	All size	All size	All size
Direct Print Size for A4/LTR	4x3"(10x8cm)/ 5x3.5"(13x9cm)/ 6x4"(15x10cm)/ 7x5"(18x13cm)/ 8"x6"(20x15cm)	4x3"(10x8cm)/ 5x3.5"(13x9cm)/ 6x4"(15x10cm)/ 7x5"(18x13cm)/ 8"x6"(20x15cm)	4x3"(10x8cm)/ 5x3.5"(13x9cm)/ 6x4"(15x10cm)/ 7x5"(18x13cm)/ 8"x6"(20x15cm)	4x3"(10x8cm)/ 5x3.5"(13x9cm)/ 6x4"(15x10cm)/ 7x5"(18x13cm)/ 8"x6"(20x15cm)/ Max.Size	4x3"(10x8cm)/ 5x3.5"(13x9cm)/ 6x4"(15x10cm)/ 7x5"(18x13cm)/ 8"x6"(20x15cm)/ Max.Size	4x3"(10x8cm)/ 5x3.5"(13x9cm)/ 6x4"(15x10cm)/ 7x5"(18x13cm)/ 8"x6"(20x15cm)/ Max.Size
Borderless / Cropping (Full Auto)	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes

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	USA	EUR	ASIA/OCE/CHN	USA	EUR	ASIA/OCE/CHN
Model name	**MFC-210C**	**MFC-210C**	**MFC-210C**	**MFC-420CN**	**MFC-410CN**	**MFC-410CN**
Media Format	DPOF, Exif, DCF	DPOF, Exif, DCF	DPOF, Exif, DCF	DPOF, Exif, DCF	DPOF, Exif, DCF	DPOF, Exif, DCF
Image Format Print by PCC Scan to Card	Photo Print: JPEG Scan to Card: JPEG/PDF (Color), TIFF/PDF (B&W)	Photo Print: JPEG Scan to Card: JPEG/PDF (Color), TIFF/PDF (B&W)	Photo Print: JPEG Scan to Card: JPEG/PDF (Color), TIFF/PDF (B&W)	Photo Print: JPEG Scan to Card: JPEG/PDF (Color), TIFF/PDF (B&W)	Photo Print: JPEG Scan to Card: JPEG/PDF (Color), TIFF/PDF (B&W)	Photo Print: JPEG Scan to Card: JPEG/PDF (Color), TIFF/PDF (B&W)
Color Enhancement	-	-	-	Yes	Yes	Yes
Removable Disk	Yes (Read/Write)	Yes (Read/Write)	Yes (Read/Write)	Yes (Read/Write)	Yes (Read/Write)	Yes (Read/Write)
Scan to Card	-	-	-	Yes	Yes	Yes
Network PCC	-	-	-	Yes DL only (FTP browser)	Yes DL only (FTP browser)	Yes DL only (FTP browser)
NETWORK						
Standard/Option(User Option or Dealer Option)	-	-	-	Yes:Standard	Yes:Standard	Yes:Standard
Model name	-	-	-	Embedded (NC-110h)	Embedded (NC-110h)	Embedded (NC-110h)
Printer	-	-	-	Yes	Yes	Yes
Scanner	-	-	-	Yes	Yes	Yes
PC FAX	-	-	-	Yes	Yes	Yes
Internet FAX (Firmware)	-	-	-	-	-	-
Forrmat (Scan to E-mail server)	-	-	-	-	-	-
ITU SUB Addressing	-	-	-	-	-	-
Support OS version	-	-	-	Win98(SE)/Me /2K/XP	Win98(SE)/Me /2K/XP	Win98(SE)/Me /2K/XP
Support OS version	-	-	-	PC-Print/Fax: Mac OS 8.6-9.2, 10.2.4(greater) Scan: Mac 10.2.4(greater)	PC-Print/Fax: Mac OS 8.6-9.2, 10.2.4(greater) Scan: Mac 10.2.4(greater)	PC-Print/Fax: Mac OS 8.6-9.2, 10.2.4(greater) Scan: Mac 10.2.4(greater)
Support OS version	-	-	-	- (Novell NetWare)	- (Novell NetWare)	- (Novell NetWare)
Network connection	-	-	-	Ethernet 10/100BASE-TX Auto Negotiation	Ethernet 10/100BASE-TX Auto Negotiation	Ethernet 10/100BASE-TX Auto Negotiation

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	USA	EUR	ASIA/OCE/CHN	USA	EUR	ASIA/OCE/CHN
Model name	**MFC-210C**	**MFC-210C**	**MFC-210C**	**MFC-420CN**	**MFC-410CN**	**MFC-410CN**
Support Protocols	-	-	-	TCP/IP	TCP/IP	TCP/IP
Protocols	-	-	-	RARP, BOOTP, DHCP, APIPA, NetBIOS, WINS	RARP, BOOTP, DHCP, APIPA, NetBIOS, WINS	RARP, BOOTP, DHCP, APIPA, NetBIOS, WINS
Protocols	-	-	-	LPR/LPD, Port9100 (SMTP/POP3 available with web DL opt)	LPR/LPD, Port9100 (SMTP/POP3 available with web DL opt)	LPR/LPD, Port9100 (SMTP/POP3 available with web DL opt)
Protocols	-	-	-	- (SMB(NetBIOS/ IP), IPP, IPX/DLC)	- (SMB(NetBIOS/ IP), IPP, IPX/DLC)	- (SMB(NetBIOS/ IP), IPP, IPX/DLC)
Protocols	-	-	-	mDNS, FTP, TELNET, SNMP, TFTP, Scanner port	mDNS, FTP, TELNET, SNMP, TFTP, Scanner port	mDNS, FTP, TELNET, SNMP, TFTP, Scanner port
Network Management	-	-	-	BRAdmin Professio-l	BRAdmin Professio-l	BRAdmin Professio-l
Network Management	-	-	-	- (Network Remote Setup)	- (Network Remote Setup)	- (Network Remote Setup)
Network Management	-	-	-	- (MIB-II as well as Brother private MIB)	- (MIB-II as well as Brother private MIB)	- (MIB-II as well as Brother private MIB)
Network reset				Yes (in LAN Menu)	Yes (in LAN Menu)	Yes (in LAN Menu)
Others						
Optional I/F	Wireless OPT *via USB	Wireless OPT *via USB	Wireless OPT *via USB	Wireless OPT *via USB	Wireless OPT *via USB	Wireless OPT *via USB

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MFC620CN/DCP110C/DCP310CN

	USA	EUR	ASIA/OCE/CHN	EUR	ASIA/OCE/CHN	EUR
Model name	**MFC-620CN**	**MFC-620CN**	**MFC-620CN**	**DCP-110C**	**DCP-110C**	**DCP-310CN**
GENERAL						
Print Engine	BH3 (KKCMY) 74 nozzles/line	BH3 (KKCMY) 74 nozzles/line	BH3 (KKCMY) 74 nozzles/line	BH3 (KKCMY) 74 nozzles/line	BH3 (KKCMY) 74 nozzles/line	BH3 (KKCMY) 74 nozzles/line
Technology	Inkjet	Inkjet	Inkjet	Inkjet	Inkjet	Inkjet
Scanning Method	CIS	CIS	CIS	CIS	CIS	CIS
CPU Speed	RISC 128MHz	RISC 128MHz	RISC 128MHz	RISC 128MHz	RISC 128MHz	RISC 128MHz
Back up Clock	1 hour	1 hour	1 hour	1 hour	1 hour	1 hour
Operating Environment Temperature (BestPrintQuality)	5 - 35 (20-33) degrees Centigrade	5 - 35 (20-33) degrees Centigrade	5 - 35 (20-33) degrees Centigrade	5 - 35 (20-33) degrees Centigrade	5 - 35 (20-33) degrees Centigrade	5 - 35 (20-33) degrees Centigrade
Humidity	20 - 80 % (without condensation)	20 - 80 % (without condensation)	20 - 80 % (without condensation)	20 - 80 % (without condensation)	20 - 80 % (without condensation)	20 - 80 % (without condensation)
On/Off Switch	Yes	Yes	Yes	Yes	Yes	Yes
Demo Model	-	-	-	-	-	-
Panel Key for demo sheet	-	-	-	-	-	-
Simultaneous Operation	Yes	Yes	Yes	Yes	Yes	Yes
Test Sheet	Yes:Print Quality/Alignment (in Ink Key)	Yes:Print Quality/Alignment (in Ink Key)	Yes:Print Quality/Alignment (in Ink Key)	Yes:Print Quality/Alignment (in Ink Key)	Yes:Print Quality/Alignment (in Ink Key)	Yes:Print Quality/Alignment (in Ink Key)
Min. Input of ADF (Width/Height)	5.8"/5.8"(147/147mm)	5.8"/5.8"(147/147mm)	5.8"/5.8"(147/147mm)	-	-	-
Max. Input of ADF (Width/Height)	8.5"/14" (216/356mm)	8.5"/14" (216/356mm)	8.5"/14" (216/356mm)	-	-	-
Max. Input of Glass (Width/Height)	8.5"/11.7", 216/297mm	8.5"/11.7", 216/297mm	8.5"/11.7", 216/297mm	8.5"/11.7", 216/297mm	8.5"/11.7", 216/297mm	8.5"/11.7", 216/297mm
Min. Output of Auto Cut sheet Feeder(Width/Height)	3.5"/5.0", 89/127mm	3.5"/5.0", 89/127mm	3.5"/5.0", 89/127mm	3.5"/5.0", 89/127mm	3.5"/5.0", 89/127mm	3.5"/5.0", 89/127mm
Max. Output of Auto Cut sheet Feeder(Width/Height)	8.5"/14.0", 216/356mm	8.5"/14.0", 216/356mm	8.5"/14.0", 216/356mm	8.5"/14.0", 216/356mm	8.5"/14.0", 216/356mm	8.5"/14.0", 216/356mm
Min. Output of Manual Feed Slot (Width/Height)	-	-	-	-	-	-
Max. Output of Manual Feed Slot(Width/Height)	-	-	-	-	-	-
Min. Output of Multi-Purpose	-	-	-	-	-	-
Max. Output of Multi-Purpose	-	-	-	-	-	-

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	USA	EUR	ASIA/OCE/CHN	EUR	ASIA/OCE/CHN	EUR
Model name	**MFC-620CN**	**MFC-620CN**	**MFC-620CN**	**DCP-110C**	**DCP-110C**	**DCP-310CN**
Sheet Weight (Paper tray)	64 -220 g/m2 (17 - 58 lb.)	64 -220 g/m2 (17 - 58 lb.)	64 -220 g/m2 (17 - 58 lb.)	64 -**220** g/m2 (17 - 58 lb.)	64 -**220** g/m2 (17 - 58 lb.)	64 -**220** g/m2 (17 - 58 lb.)
Sheet Weight (2nd Paper tray)	-	-	-	-	-	-
Sheet Weight (ADF)	64-90g/mm2 (17-24lb.)	64-90g/mm2 (17-24lb.)	64-90g/mm2 (17-24lb.)	-	-	-
Sheet Weight (Manual Feed Slot)	-	-	-	-	-	-
Sheet Weight (MP Tray)	-	-	-	-	-	-
ADF (pages)	Yes (10)	Yes (10)	Yes (10)	-	-	-
Paper Capacity (sheets)	100 (80 gsm)	100 (80 gsm)	100 (80 gsm)	100 (80 gsm)	100 (80 gsm)	100 (80 gsm)
Output Paper Capacity (sheets)	25	25	25	25	25	25
Optional Paper Tray (sheets)	-	-	-	-	-	-
Brother Paper (for Plain,Glossy and Inkjet)	LTR Plain / LTR Glossy/ LTR Inkjet	A4 Plain / A4 Glossy/ A4 Inkjet	A4 Plain / A4 Glossy/ A4 Inkjet	A4 Plain / A4 Glossy/ A4 Inkjet	A4 Plain / A4 Glossy/ A4 Inkjet	A4 Plain / A4 Glossy/ A4 Inkjet
Recommended Paper (Only for Transparency)	3M 3410 Transparency film	3M 3410 Transparency film	3M 3410 Transparency film	3M 3410 Transparency film	3M 3410 Transparency film	3M 3410 Transparency film
LCD Size	Standard 16 x 2 lines	Standard 16 x 2 lines	Standard 16 x 2 lines	Standard 16 x 1 line	Standard 16 x 1 line	Standard 16 x 2 lines
LCD Back Light & Color	Yellow green	Yellow green	Yellow green	-	-	Yellow green
On-Screen Programming	Yes	Yes	Yes	Yes	Yes	Yes
LCD Language	English (+French for CAN model)	Depending on countries	English	Depending on countries	English	Depending on countries
Illuminated Mode Key	PCC/Copy/Fax /Scan	PCC/Copy/Fax /Scan	PCC/Copy/Fax /Scan	-	-	PCC
Memory Capacity (physical: Mbytes)	RAM 16MB ROM 8MB	RAM 16MB ROM 8MB	RAM 16MB ROM 8MB	RAM 8MB ROM 4MB	RAM 8MB ROM 4MB	RAM 16MB ROM 8MB
Memory Backup (with battery 24hour)	Yes	Yes	Yes	-	-	-
Back Up Print: ON/OFF Feature (in function Menu)	Yes	Yes	Yes	-	-	-
Memory Security	-	Yes	Yes	-	-	-
Transmission Lock	-	-	-	-	-	-

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	USA	EUR	ASIA/OCE/CHN	EUR	ASIA/OCE/CHN	EUR
Model name	**MFC-620CN**	**MFC-620CN**	**MFC-620CN**	**DCP-110C**	**DCP-110C**	**DCP-310CN**
Dimensions w/ Carton (WxDxH)=>Please refer to "Logistic Information" on Sales Data Bank.	W 552 x D 225 x H 450	W 500 x D 225 x H 450	W 500 x D 225 x H 450	W 500 x D 200 x H 450	W 500 x D 200 x H 450	W 500 x D 200 x H 450
Dimensions w/o Carton (WxDxH) * tray is not opened)=>Please refer to "Logistic Information"	W 438 x D 347 x H 165	W 373 x D 347 x H 165	W 373 x D 347 x H 165	W 373 x D 345 x H 135	W 373 x D 345 x H 135	W 373 x D 345 x H 135
Dimensions w/o Carton with tray is opend =>refer to "Logistic	W 454 x D 455 x H 165	W 375 x D 455 x H 165	W 375 x D 455 x H 165	W 373 x D 453 x H 135	W 373 x D 453 x H 135	W 373 x D 453 x H 135
Weight w/ Carton Please refer to "Logistic Information"	8kg	8.6kg	8.6kg	6.5kg	6.5kg	6.5kg
Weight w/o Carton w/o tray Please refer to "Logistic Information"	6.1kg	6kg	6kg	5kg	5kg	5kg
Body Color = Top Cover	Metallic Blue	Metallic Blue	Metallic Blue	BHmini Silver	BHmini Silver	Metallic Blue
Body Color = Panel cover	Metallic Blue with Frame(Silver)	Metallic Blue with Frame(Silver)	Metallic Blue with Frame(Silver)	BHmini Silver	BHmini Silver	Metallic Blue
Body Color = Bottom Cover	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray
Body Color = Bottom Cover (Engine unit)	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray	Dark gray
Power Source	AC 120 V 50/60Hz	AC 220-240 V 50/60Hz	AC 220-240 V 50/60Hz	AC 220-240 V 50/60Hz	AC 220-240 V 50/60Hz	AC 220-240 V 50/60Hz
Power Consumption(Power OFF/ Power Save(CPU Sleep)/ Standby/ Peak)	(- / 3.5Wh / 9.5Wh / 27Wh)	(- / 4.0Wh / 9.5Wh / 26Wh)	(- / 4.0Wh / 9.5Wh / 22Wh)	(3.0Wh / 6.5Wh / 8Wh / 18Wh)	(3.0Wh / 6.5Wh / 8Wh / 18Wh)	(4.0Wh / 6.9Wh / 8Wh / 18Wh)
Energy Star Compliant (USA Only)	Yes	Yes	Yes	Yes	Yes	Yes
Machine Noise (Standby/Peak ex. In printing)	better than 35dBA/45dBA	better than 35dBA/45dBA	better than 35dBA/45dBA	better than 35dBA/45dBA	better than 35dBA/45dBA	better than 35dBA/45dBA
Total print pages	Yes	Yes	Yes	Yes	Yes	Yes
Copy pages	Yes	Yes	Yes	Yes	Yes	Yes
PC print pages	Yes	Yes	Yes	Yes	Yes	Yes
Fax RX pages	Yes	Yes	Yes	Yes	Yes	Yes
PCC pages	Yes	Yes	Yes	Yes	Yes	Yes
Ink Gauge Indication	Yes (in Ink Key/ Status Monitor)	Yes (in Ink Key/ Status Monitor)	Yes (in Ink Key/ Status Monitor)	Yes (in Ink Key/ Status Monitor)	Yes (in Ink Key/ Status Monitor)	Yes (in Ink Key/ Status Monitor)

Confidential

	USA	EUR	ASIA/OCE/CHN	EUR	ASIA/OCE/CHN	EUR
Model name	**MFC-620CN**	**MFC-620CN**	**MFC-620CN**	**DCP-110C**	**DCP-110C**	**DCP-310CN**
LIST/REPORT						
Activity Report/Jour-l Report	Yes (up to 200)	Yes (up to 200)	Yes (up to 200)	-	-	-
Transmission Verification Report	Yes (in Menu Table)	Yes (in Menu Table)	Yes (in Menu Table)	-	-	-
Cover page	-	-	-	-	-	-
Help List	Yes (in Reports menu)	Yes (in Reports menu)	Yes (in Reports menu)	Yes (in Reports menu)	Yes (in Reports menu)	Yes (in Reports menu)
Call Back Message	-	-	-	-	-	-
Caller ID List	Yes(in CallerID Menu)	-	-	-	-	-
Quick Dial List	-	-	-	-	-	-
Quick Dial List (New) New =>Empty box is not printed out.	Yes (in Reports menu)	Yes (in Reports menu)	Yes (in Reports menu)	-	-	-
Tel Index List	-	-	-	-	-	-
Memory Status List	-	-	-	-	-	-
System Setup(User Setting) List	Yes (in Reports Menu)	Yes (in Reports Menu)	Yes (in Reports Menu)	Yes (in Reports Menu)	Yes (in Reports Menu)	Yes (in Reports Menu)
Order Form	-	-	-	-	-	-
INTERFACE						
Exter-l TAD Interface	Yes	Yes	Yes	-	-	-
Host Interface	USB1.1/2.0(@ FULL-SPEEED)	USB1.1/2.0(@ FULL-SPEEED)	USB1.1/2.0(@ FULL-SPEEED)	USB1.1/2.0(@ FULL-SPEEED)	USB1.1/2.0(@ FULL-SPEEED)	USB1.1/2.0(@ FULL-SPEEED)
LAN	Yes	Yes	Yes	-	-	Yes
Cable included	-	-	-	-	-	-
PictBridge	-	-	-	-	-	-
Acceptable Media Card	CF/MS/SD/SM /xD	CF/MS/SD/SM /xD	CF/MS/SD/SM /xD	CF/MS/SD/SM /xD	CF/MS/SD/SM /xD	CF/MS/SD/SM /xD

	USA	EUR	ASIA/OCE/CHN	EUR	ASIA/OCE/CHN	EUR
Model name	**MFC-620CN**	**MFC-620CN**	**MFC-620CN**	**DCP-110C**	**DCP-110C**	**DCP-310CN**
SUPPLIES/ OPTIONS						
Bundled Ink (Life / Yield)	BK:500pages (Normal 5%) C/M/Y:400pages(Normal 5%)	BK:500pages (Normal 5%) C/M/Y:400pages(Normal 5%)	BK:500pages (Normal 5%) C/M/Y:400pages(Normal 5%)	BK:500pages (Normal 5%) C/M/Y:400pages(Normal 5%)	BK:500pages (Normal 5%) C/M/Y:400pages(Normal 5%)	BK:500pages (Normal 5%) C/M/Y:400pages(Normal 5%)
Supply Ink Cartridge (Life / Yield)	BK:500pages (Normal 5%) C/M/Y:400pages(Normal 5%)	BK:500pages (Normal 5%) C/M/Y:400pages(Normal 5%)	BK:500pages (Normal 5%) C/M/Y:400pages(Normal 5%)	BK:500pages (Normal 5%) C/M/Y:400pages(Normal 5%)	BK:500pages (Normal 5%) C/M/Y:400pages(Normal 5%)	BK:500pages (Normal 5%) C/M/Y:400pages(Normal 5%)
Supply Ink Cartridge (Life / Yield) *HighCapacity	-	-	-	-	-	-
Options	-	-	-	-	-	-
SERVICE INFORMATION						
Monthly Volume	2500 pages	2500 pages	2500 pages	2500 pages	2500 pages	2500 pages
Machine Life (year)	30,000 pages (print)/50,000 pages (scan) or 5 years	30,000 pages (print)/50,000 pages (scan) or 5 years	30,000 pages (print)/50,000 pages (scan) or 5 years	30,000 pages (print)/50,000 pages (scan) or 5 years	30,000 pages (print)/50,000 pages (scan) or 5 years	30,000 pages (print)/50,000 pages (scan) or 5 years
Periodical Replacement Parts for Laser;	-	-	-	-	-	-
Fixing Unit	-	-	-	-	-	-
Separation Pad Assy	-	-	-	-	-	-
Paper Pick-up Roller Assy	-	-	-	-	-	-
Scanner Unit	-	-	-	-	-	-
MTBF (Mean Time Between Failures)	4,000 hours	4,000 hours	4,000 hours	4,000 hours	4,000 hours	4,000 hours
MTTR (Mean Time To BE Repaired)	30 min.	30 min.	30 min.	30 min.	30 min.	30 min.
Ozone Emission;	-	-	-	-	-	-
Printer	-	-	-	-	-	-
Scanner (Mono/Color)	-	-	-	-	-	-
TELEPHONE						
Handset	Yes	-	-	-	-	-
Hook	Yes (SPK)	Yes (SPK)	Yes (SPK)	-	-	-
Off Hook Alarm	-	-	-	-	-	-
Duplex Speaker Phone	Yes	Yes	Yes	-	-	-
Power Failure Phone	-	-	-	-	-	-
Power Failure Dialing	-	-	-	-	-	-
Chain Dialing	Yes	Yes	Yes	-	-	-
Automatic Redial	Yes (1time/5min)	Yes (3time/5min)	Yes (3times/5min)	-	-	-
Recall (For ASIA)	-	-	-			
PBX Feature (EUR&ASIA)	-	Yes	-	-	-	-

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	USA	EUR	ASIA/OCE/CHN	EUR	ASIA/OCE/CHN	EUR
Model name	**MFC-620CN**	**MFC-620CN**	**MFC-620CN**	**DCP-110C**	**DCP-110C**	**DCP-310CN**
Handset Volume	yes(2steps+Amplify)	-	-	-	-	-
Speaker Volume	Yes (3 steps + OFF)	Yes (3 steps + OFF)	Yes (3 steps + OFF)	-	-	-
Ring Volume	Yes (3 steps + OFF)	Yes (3 steps + OFF)	Yes (3 steps + OFF)	-	-	-
Hold/Mute Key	Yes (Hook/Hold key)	Yes (Mute)	Yes (Hold)	-	-	-
Music on Hold	-	-	-	-	-	-
Monitoring the Line on Hold with Music	-	-	-	-	-	-
One-Touch Dial	-	-	-	-	-	-
Speed Dial	80	80	80	-	-	-
Figures of One-Touch & Speed Dial	20 digits	20 digits	20 digits	-	-	-
Resisterable Number Of Characters	15 characters	15 characters	15 characters	-	-	-
Group Dial (Up to X groups)	Yes (6)	Yes (6)	Yes (6)	-	-	-
Telephone Index (Search/Speed dial key)	Yes	Yes	Yes	-	-	-
Caller ID	Yes	-	Yes (ARL/NZ/SIN/HK only)	-	-	-
Call Waiting Caller ID	-	-	-	-	-	-
Call waiting Ready (Only for USA)	-	-	-	-	-	-
Distinctive Ringing	Yes	Yes (UK,DEN only)	Yes (ARL/NZ/SIN/HK only)	-	-	-
COLOR FAX						
Modem Speed(bps)	14,400(Fax)	14,400(Fax)	14,400(Fax)	-	-	-
Transmission Speed(sec.)	Approx.6 (Brother#1,MMR)	Approx.6 (Brother#1,MMR)	Approx.6 (Brother#1,MMR)	-	-	-
ITU-T Group	G3	G3	G3	-	-	-
Coding Method	Mono:MH/MR/MMR, Color:JPEG	Mono:MH/MR/MMR, Color:JPEG	Mono:MH/MR/MMR, Color:JPEG	-	-	-
Fax/Tel Switch	Yes (by H/S or S.Phone key)	Yes (Speaker Phone key)	Yes (Speaker Phone key)	-	-	-
Super Fine	Yes (TX & RX:B&W only)	Yes (TX & RX:B&W only)	Yes (TX & RX:B&W only)	-	-	-
Gray Scale	Mono:64, Color:256	Mono:64, Color:256	Mono:64, Color:256	-	-	-
Contrast (Auto/S.Light/S.Dark)	Yes	Yes	Yes	-	-	-
Dual Access	Yes (B&W only)	Yes (B&W only)	Yes (B&W only)	-	-	-
Enhanced Remote Activate	Yes	Yes	Yes	-	-	-
Station ID (20digits/20characters)	Yes	Yes	Yes	-	-	-

	USA	EUR	ASIA/OCE/CHN	EUR	ASIA/OCE/CHN	EUR
Model name	**MFC-620CN**	**MFC-620CN**	**MFC-620CN**	**DCP-110C**	**DCP-110C**	**DCP-310CN**
Remote Maintenance	Yes	Yes	Yes	-	-	-
RX Mode Indication	LCD	LCD	LCD	-	-	-
Resolution Indication	LCD	LCD	LCD	-	-	-
Paper Handling Size	LTR, A4+LEGAL(with ADF)	LTR, A4+LEGAL(with ADF)	LTR, A4+LEGAL(with ADF)	-	-	-
Ducument Scanning Width	208mm	208mm	208mm	-	-	-
Delayed Timer (up to 50:B&W only)	Yes	Yes	Yes	-	-	-
Polled Sending (type) *B&W only	Yes(Std.)	Yes (Std/Secure)	Yes (Std/Secure)	-	-	-
Next-Fax Reservation	Yes (Dual Access)	Yes (Dual Access)	Yes (Dual Access)	-	-	-
Batch Transmission	Yes (B&W only /not color)	Yes (B&W only /not color)	Yes (B&W only /not color)	-	-	-
Quick-Scan(Memory transmission)	Approx.4.72sec/page@LTR Approx. 5.02 sec./page@A4	Approx.4.72sec/page@LTR Approx. 5.02 sec./page@A4	Approx.4.72sec/page@LTR Approx. 5.02 sec./page@A4	-	-	-
Memory Transmission (ITU-T Test Chart	Up to 400 Pages	Up to 400 Pages	Up to 400 Pages	-	-	-
Memory Transmission (Brother Chart/ MMR)	UP to 480 Pages	UP to 480 Pages	UP to 480 Pages	-	-	-
ECM (Error Correction Mode)	Yes	Yes	Yes	-	-	-
Error Re-Transmission	-	-	-	-	-	-
Broadcasting (Speed+ OneTouch+Manual)	Yes (130 locations)	Yes (130 locations)	Yes (130 locations)	-	-	-
Manual Broadcasting	Yes(50 locations)	Yes(50 locations)	Yes(50 locations)	-	-	-
Easy Receive/Fax Detect	Yes	Yes	Yes	-	-	-
Polling Receiving (type) *B&W only	Yes (Std/Seq)	Yes (Std/Seq/Secure/Timer)	Yes (Std/Seq/Secure/Timer)	-	-	-
Auto Reduction	Yes	Yes	Yes	-	-	-
Out-of-Paper Reception (ITU-T Test Chart #1/MMR)	Up to 400 Pages	Up to 400 Pages	Up to 400 Pages	-	-	-
Out-of-Paper Reception (Brother Chart/ MMR)	UP to 480 Pages	UP to 480 Pages	UP to 480 Pages	-	-	-
Remote Access	Yes	Yes	Yes	-	-	-
Fax Retrieval	Yes (B&W only)	Yes (B&W only)	Yes (B&W only)	-	-	-
Fax Forwarding	Yes (B&W only)	Yes (B&W only)	Yes (B&W only)	-	-	-
Paging	Yes(FAX&VOICE)	-	-	-	-	-
Color FAX (Document Send/Receive)	Yes/Yes (ITU-color FAX)	Yes/Yes (ITU-color FAX)	Yes/Yes (ITU-color FAX)	-	-	-
Color FAX (Memory Send/Receive)	No / Yes (ITU-color FAX)	No / Yes (ITU-color FAX)	No / Yes (ITU-color FAX)	-	-	-

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	USA	EUR	ASIA/OCE/CHN	EUR	ASIA/OCE/CHN	EUR
Model name	**MFC-620CN**	**MFC-620CN**	**MFC-620CN**	**DCP-110C**	**DCP-110C**	**DCP-310CN**
COLOR PRINTER						
Color/Mono	Color	Color	Color	Color	Color	Color
Resolution(dpi)	up to 1200x6000 dpi	up to 1200x6000 dpi	up to 1200x6000 dpi	up to 1200x6000 dpi	up to 1200x6000 dpi	up to 1200x6000 dpi
Speed(ppm) Simple	20/15ppm (Mono/Color: 600x150 dpi)	20/15ppm (Mono/Color: 600x150 dpi)	20/15ppm (Mono/Color: 600x150 dpi)	20/15ppm (Mono/Color: 600x150 dpi)	20/15ppm (Mono/Color: 600x150 dpi)	20/15ppm (Mono/Color: 600x150 dpi)
First print out time (from READY mode *2)	-	-	-	-	-	-
Warm up Time (from SLEEP mode)	-	-	-	-	-	-
Emulation	-	-	-	-	-	-
Resident Fonts	-	-	-	-	-	-
Fonts Disk Based	Yes (35 TrueType)	Yes (35 TrueType)	Yes (35 TrueType)	Yes (35 TrueType)	Yes (35 TrueType)	Yes (35 TrueType)
Paper Handling Size (Paper Tray)	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo(4x6"/102x 152mm), Indexcard(5x8"/1 27x203mm), Photo L (3.5x5"/89x127m m), Photo2L(5x7"/12 7x178mm), Post Card 1(3.9x5.8"/100x1 48mm), Post Card 2 (Double)(5.8x7.8" /148x200mm), C5 Envelope, Com-10, DL Envelope, Mo-rch, JE4 Envelope.	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo(4x6"/102x 152mm), Indexcard(5x8"/1 27x203mm), Photo L (3.5x5"/89x127m m), Photo2L(5x7"/12 7x178mm), Post Card 1(3.9x5.8"/100x1 48mm), Post Card 2 (Double)(5.8x7.8" /148x200mm), C5 Envelope, Com-10, DL Envelope, Mo-rch, JE4 Envelope.	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo(4x6"/102x 152mm), Indexcard(5x8"/1 27x203mm), Photo L (3.5x5"/89x127m m), Photo2L(5x7"/12 7x178mm), Post Card 1(3.9x5.8"/100x1 48mm), Post Card 2 (Double)(5.8x7.8" /148x200mm), C5 Envelope, Com-10, DL Envelope, Mo-rch, JE4 Envelope.	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo(4x6"/102x 152mm), Indexcard(5x8"/1 27x203mm), Photo L (3.5x5"/89x127m m), Photo2L(5x7"/12 7x178mm), Post Card 1(3.9x5.8"/100x1 48mm), Post Card 2 (Double)(5.8x7.8" /148x200mm), C5 Envelope, Com-10, DL Envelope, Mo-rch, JE4 Envelope.	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo(4x6"/102x 152mm), Indexcard(5x8"/1 27x203mm), Photo L (3.5x5"/89x127m m), Photo2L(5x7"/12 7x178mm), Post Card 1(3.9x5.8"/100x1 48mm), Post Card 2 (Double)(5.8x7.8" /148x200mm), C5 Envelope, Com-10, DL Envelope, Mo-rch, JE4 Envelope.	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo(4x6"/102x 152mm), Indexcard(5x8"/1 27x203mm), Photo L (3.5x5"/89x127m m), Photo2L(5x7"/12 7x178mm), Post Card 1(3.9x5.8"/100x1 48mm), Post Card 2 (Double)(5.8x7.8" /148x200mm), C5 Envelope, Com-10, DL Envelope, Mo-rch, JE4 Envelope.
Paper Handling Size (2nd Tray)	-	-	-	-	-	-
Paper Handling Size (Manual Slots)	-	-	-	-	-	-
Paper Handling Size (MP)	-	-	-	-	-	-
Media Type (Paper Tray)	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency
Media Type (2 nd Paper Tray)	-	-	-	-	-	-
Media Type (Manual Slots)	-	-	-	-	-	-
Media Type (MP Tray)	-	-	-	-	-	-

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	USA	EUR	ASIA/OCE/CHN	EUR	ASIA/OCE/CHN	EUR
Model name	**MFC-620CN**	**MFC-620CN**	**MFC-620CN**	**DCP-110C**	**DCP-110C**	**DCP-310CN**
Print Paper Margin (upper, lower, left, right)	Borderless ON:0, 0, 0,0* OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm** * Borderless For A4 /LTR/A6/Photo(4x6"/102x152mm), Indexcard(5x8"/127x203mm), Photo L (3.5x5"/89x127mm), Photo 2L(5x7"/127x178mm), Post Card 1(3.9x5.8"/100x148mm), Post Card 2 (Double)(5.8x7.8"/148x200mm) only ** 0.47x0.95x0.12x0.12"/12,24,3,3mm for Envelops	Borderless ON:0, 0, 0,0* OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm** * Borderless For A4 /LTR/A6/Photo(4x6"/102x152mm), Indexcard(5x8"/127x203mm), Photo L (3.5x5"/89x127mm), Photo 2L(5x7"/127x178mm), Post Card 1(3.9x5.8"/100x148mm), Post Card 2 (Double)(5.8x7.8"/148x200mm) only ** 0.47x0.95x0.12x0.12"/12,24,3,3mm for Envelops	Borderless ON:0, 0, 0,0* OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm** * Borderless For A4 /LTR/A6/Photo(4x6"/102x152mm), Indexcard(5x8"/127x203mm), Photo L (3.5x5"/89x127mm), Photo 2L(5x7"/127x178mm), Post Card 1(3.9x5.8"/100x148mm), Post Card 2 (Double)(5.8x7.8"/148x200mm) only ** 0.47x0.95x0.12x0.12"/12,24,3,3mm for Envelops	Borderless ON:0, 0, 0,0* OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm** * Borderless For A4 /LTR/A6/Photo(4x6"/102x152mm), Indexcard(5x8"/127x203mm), Photo L (3.5x5"/89x127mm), Photo 2L(5x7"/127x178mm), Post Card 1(3.9x5.8"/100x148mm), Post Card 2 (Double)(5.8x7.8"/148x200mm) only ** 0.47x0.95x0.12x0.12"/12,24,3,3mm for Envelops	Borderless ON:0, 0, 0,0* OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm** * Borderless For A4 /LTR/A6/Photo(4x6"/102x152mm), Indexcard(5x8"/127x203mm), Photo L (3.5x5"/89x127mm), Photo 2L(5x7"/127x178mm), Post Card 1(3.9x5.8"/100x148mm), Post Card 2 (Double)(5.8x7.8"/148x200mm) only ** 0.47x0.95x0.12x0.12"/12,24,3,3mm for Envelops	Borderless ON:0, 0, 0,0* OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm** * Borderless For A4 /LTR/A6/Photo(4x6"/102x152mm), Indexcard(5x8"/127x203mm), Photo L (3.5x5"/89x127mm), Photo 2L(5x7"/127x178mm), Post Card 1(3.9x5.8"/100x148mm), Post Card 2 (Double)(5.8x7.8"/148x200mm) only ** 0.47x0.95x0.12x0.12"/12,24,3,3mm for Envelops
Variable Dot Print	Yes (3 sizes)	Yes (3 sizes)	Yes (3 sizes)	Yes (3 sizes)	Yes (3 sizes)	Yes (3 sizes)
Minimum Droplet Size	3 pl	3 pl	3 pl	3 pl	3 pl	3 pl
Shingling Print	-	-	-	-	-	-
Color Enhancement	Yes	Yes	Yes	Yes	Yes	Yes
COLOR COPY						
Color/Mono	Color	Color	Color	Color	Color	Color
Speed (cpm) *time culcurated excluding paper feeding **EU's defult is culcurated by "nomal mode"speed.	17/11cpm	17/11cpm	17/11cpm	17/11cpm	17/11cpm	17/11cpm
Warm up Time (from SLEEP mode)	-	-	-	-	-	-
Multi Copy (Stack)	Yes (Up to 99)	Yes (Up to 99)	Yes (Up to 99)	Yes (Up to 99)	Yes (Up to 99)	Yes (Up to 99)
Multi Copy (Sort)	Yes	Yes	Yes	-	-	-
Reduction/Enlargement (%)	25 -- 400 in 1% increments	25 -- 400 in 1% increments	25 -- 400 in 1% increments	25 -- 400 in 1% increments	25 -- 400 in 1% increments	25 -- 400 in 1% increments
Resolution (dpi)	Print: Max. 600x1200 dpi Scan: Max. 600x1200 dpi	Print: Max. 600x1200 dpi Scan: Max. 600x1200 dpi	Print: Max. 600x1200 dpi Scan: Max. 600x1200 dpi	Print: Max. 600x1200 dpi Scan: Max. 600x1200 dpi	Print: Max. 600x1200 dpi Scan: Max. 600x1200 dpi	Print: Max. 600x1200 dpi Scan: Max. 600x1200 dpi
N in 1	2in1, 4in1(Mono/Color, A4/LTR only)	2in1, 4in1(Mono/Color, A4/LTR only)	2in1, 4in1(Mono/Color, A4/LTR only)	2in1, 4in1(Mono/Color, A4/LTR only)	2in1, 4in1(Mono/Color, A4/LTR only)	2in1, 4in1(Mono/Color, A4/LTR only)
Poster	Yes (3x3)	Yes (3x3)	Yes (3x3)	Yes (3x3)	Yes (3x3)	Yes (3x3)
Image Enhancement	-	-	-	-	-	-

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	USA	EUR	ASIA/OCE/CHN	EUR	ASIA/OCE/CHN	EUR
Model name	**MFC-620CN**	**MFC-620CN**	**MFC-620CN**	**DCP-110C**	**DCP-110C**	**DCP-310CN**
Paper Handling Size (Paper Tray)	Letter/Legal/A4/A5/4"x6"(10(W)x15(H)cm)	Letter/Legal/A4/A5/4"x6"(10(W)x15(H)cm)	Letter/Legal/A4/A5/4"x6"(10(W)x15(H)cm)	Letter/Legal/A4/A5/4"x6"(10(W)x15(H)cm)	Letter/Legal/A4/A5/4"x6"(10(W)x15(H)cm)	Letter/Legal/A4/A5/4"x6"(10(W)x15(H)cm)
Paper Handling Size (2nd Tray)	-	-	-	-	-	-
Paper Handling Size (Manual Slots)	-	-	-	-	-	-
Paper Handling Size (MP)	-	-	-	-	-	-
Media Type (Paper Tray)	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency
Media Type (2nd Tray)	-	-	-	-	-	-
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)	0.12, 0.12, 0.12, 0,12" (3,3,3,3mm)	0.12, 0.12, 0.12, 0,12" (3,3,3,3mm)	0.12, 0.12, 0.12, 0,12" (3,3,3,3mm)	0.12, 0.12, 0.12, 0,12" (3,3,3,3mm)	0.12, 0.12, 0.12, 0,12" (3,3,3,3mm)
Duplex Copy	-	-	-	-	-	-
Resolution Indication	LCD	LCD	LCD	LCD	LCD	LCD
COLOR SCANNER						
Color/Mono	Color	Color	Color	Color	Color	Color
Optical Resolution (dpi)	600x2400 dpi	600x2400 dpi	600x2400 dpi	600x2400 dpi	600x2400 dpi	600x2400 dpi
Interpolated Resolution (dpi)	up to 19200x19200 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)	up to 19200x19200 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)	up to 19200x19200 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)	up to 19200x19200 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)	up to 19200x19200 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)	up to 19200x19200 dpi (For XP, with special tool. 1200x1200dpi for XP w/o special tool)
Warm up Time (from Scanner Lamp OFF)	-	-	-	-	-	-
Warm up Time (from Scanner Lamp OFF: Color)	-	-	-	-	-	-
Gray Scale	256	256	256	256	256	256
Ducument Scanning width	Max. 210mm	Max. 210mm	Max. 210mm	Max. 210mm	Max. 210mm	Max. 210mm
Scan Image	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)
Scan / OCR	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)
Scan to E-mail	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)
Scan to File	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)
Scan to Card	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)	Yes (scan key)

	USA	EUR	ASIA/OCE/CHN	EUR	ASIA/OCE/CHN	EUR
Model name	**MFC-620CN**	**MFC-620CN**	**MFC-620CN**	**DCP-110C**	**DCP-110C**	**DCP-310CN**
Scan speed (Mono/Color) *@100dpi	Max. 3.54/5.58 sec @Letter_size Max. 3.76/5.93 sec @A4_size	Max. 3.54/5.58 sec @Letter_size Max. 3.76/5.93 sec @A4_size	Max. 3.54/5.58 sec @Letter_size Max. 3.76/5.93 sec @A4_size	Max. 3.54/5.58 sec @Letter_size Max. 3.76/5.93 sec @A4_size	Max. 3.54/5.58 sec @Letter_size Max. 3.76/5.93 sec @A4_size	Max. 3.54/5.58 sec @Letter_size Max. 3.76/5.93 sec @A4_size
Scanner Lamp Switch (CIS doesn't require switch)	-	-	-	-	-	-
Color Depth (Input/Output)	36/24 bit color processing	36/24 bit color processing	36/24 bit color processing	36/24 bit color processing	36/24 bit color processing	36/24 bit color processing
MESSAGE CENTER						
TAD	Yes	Yes	Yes	-	-	-
ICM Recording Time	Max.29minutes Or Max.99 messages (Max.180sec./ 1message.)	Max.29minutes Or Max.99 messages (Max.180sec./ 1message.)	Max.29minutes Or Max.99 messages (Max.180sec./ 1message.)	-	-	-
Toll Saver	Yes	Yes	Yes	-	-	-
Memo/Recording Conversation	Yes	-	-	-	-	-
OGM (MC/TAD,F/T)	Yes	Yes	Yes	-	-	-
User Recording OGM TIME(MC/TAD, F/T)	Yes (20sec.)	Yes (20sec.)	Yes (20sec.)	-	-	-
PC FAX						
Supplier	Brother	Brother	Brother	-	-	-
Color/Mono	Mono	Mono	Mono	-	-	-
Sending	Yes	Yes	Yes	-	-	-
Receiving	Yes	Yes	Yes	-	-	-
Protocol Compliance	-	-	-	-	-	-
Broadcasting	up to 50	up to 50	up to 50	-	-	-
Support OS Version (Refer to"Application&OS" sheet)						
Others	-	-	-	-	-	-

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	USA	EUR	ASIA/OCE/CHN	EUR	ASIA/OCE/CHN	EUR
Model name	**MFC-620CN**	**MFC-620CN**	**MFC-620CN**	**DCP-110C**	**DCP-110C**	**DCP-310CN**
PHOTO CAPTURE CENTER						
Acceptable Media Card & Size	**SmartMedia (3.3V)**:4MB-128MB **Compact Flash** (Type-1, excl. Type2/Micro-Drive):4MB-2GB **Memory Stick**:16MB-128MB (Duo with Adopter) **Memory Stick Pro**:256MB-1GB (MagicGate:Yes if not use MG function) **Secure Digital**:16MB-512MB (MiniSD with Adopter) **xD Picture Card**:16-512MB	**SmartMedia (3.3V)**:4MB-128MB **Compact Flash** (Type-1, excl. Type2/Micro-Drive):4MB-2GB **Memory Stick**:16MB-128MB (Duo with Adopter) **Memory Stick Pro**:256MB-1GB (MagicGate:Yes if not use MG function) **Secure Digital**:16MB-512MB (MiniSD with Adopter) **xD Picture Card**:16-512MB	**SmartMedia (3.3V)**:4MB-128MB **Compact Flash** (Type-1, excl. Type2/Micro-Drive):4MB-2GB **Memory Stick**:16MB-128MB (Duo with Adopter) **Memory Stick Pro**:256MB-1GB (MagicGate:Yes if not use MG function) **Secure Digital**:16MB-512MB (MiniSD with Adopter) **xD Picture Card**:16-512MB	**SmartMedia (3.3V)**:4MB-128MB **Compact Flash** (Type-1, excl. Type2/Micro-Drive):4MB-2GB **Memory Stick**:16MB-128MB (Duo with Adopter) **Memory Stick Pro**:256MB-1GB (MagicGate:Yes if not use MG function) **Secure Digital**:16MB-512MB (MiniSD with Adopter) **xD Picture Card**:16-512MB	**SmartMedia (3.3V)**:4MB-128MB **Compact Flash** (Type-1, excl. Type2/Micro-Drive):4MB-2GB **Memory Stick**:16MB-128MB (Duo with Adopter) **Memory Stick Pro**:256MB-1GB (MagicGate:Yes if not use MG function) **Secure Digital**:16MB-512MB (MiniSD with Adopter) **xD Picture Card**:16-512MB	**SmartMedia (3.3V)**:4MB-128MB **Compact Flash** (Type-1, excl. Type2/Micro-Drive):4MB-2GB **Memory Stick**:16MB-128MB (Duo with Adopter) **Memory Stick Pro**:256MB-1GB (MagicGate:Yes if not use MG function) **Secure Digital**:16MB-512MB (MiniSD with Adopter) **xD Picture Card**:16-512MB
Paper Handling Size & Type (Paper Tray)	Letter Glossy/4"x6"(10x15cm) Glossy/5"x7"(13x18cm) Glossy /A4 Glossy/Letter Plai-4 Plain/Letter Inkjet/A4 Inkjet/4"x6"(10x15cm) Inkjet	Letter Glossy/4"x6"(10x15cm) Glossy/5"x7"(13x18cm) Glossy /A4 Glossy/Letter Plai-4 Plain/Letter Inkjet/A4 Inkjet/4"x6"(10x15cm) Inkjet	Letter Glossy/4"x6"(10x15cm) Glossy/5"x7"(13x18cm) Glossy /A4 Glossy/Letter Plai-4 Plain/Letter Inkjet/A4 Inkjet/4"x6"(10x15cm) Inkjet	Letter Glossy/4"x6"(10x15cm) Glossy/5"x7"(13x18cm) Glossy /A4 Glossy/Letter Plai-4 Plain/Letter Inkjet/A4 Inkjet/4"x6"(10x15cm) Inkjet	Letter Glossy/4"x6"(10x15cm) Glossy/5"x7"(13x18cm) Glossy /A4 Glossy/Letter Plai-4 Plain/Letter Inkjet/A4 Inkjet/4"x6"(10x15cm) Inkjet	Letter Glossy/4"x6"(10x15cm) Glossy/5"x7"(13x18cm) Glossy /A4 Glossy/Letter Plai-4 Plain/Letter Inkjet/A4 Inkjet/4"x6"(10x15cm) Inkjet
Paper Handling Size & Type (Manual Slots)	-	-	-	-	-	-
Paper Handling Size & Type (MP)	-	-	-	-	-	-
Print Paper Margin (upper, lower, left, right)	Borderless (For all size) ON:0, 0, 0,0 OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm	Borderless (For all size) ON:0, 0, 0,0 OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm	Borderless (For all size) ON:0, 0, 0,0 OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm	Borderless (For all size) ON:0, 0, 0,0 OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm	Borderless (For all size) ON:0, 0, 0,0 OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm	Borderless (For all size) ON:0, 0, 0,0 OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm
Available paper size for full (Max) size printing	4x6"(10x15cm) / 5x7"(13x18cm) only	4x6"(10x15cm) / 5x7"(13x18cm) only	4x6"(10x15cm) / 5x7"(13x18cm) only	4x6"(10x15cm) / 5x7"(13x18cm) only	4x6"(10x15cm) / 5x7"(13x18cm) only	4x6"(10x15cm) / 5x7"(13x18cm) only
Direct Print Size for A4/LTR	4x3"(10x8cm)/ 5x3.5"(13x9cm)/ 6x4"(15x10cm) / 7x5"(18x13cm) / 8"x6"(20x15cm)	4x3"(10x8cm)/ 5x3.5"(13x9cm)/ 6x4"(15x10cm) / 7x5"(18x13cm) / 8"x6"(20x15cm)	4x3"(10x8cm)/ 5x3.5"(13x9cm)/ 6x4"(15x10cm) / 7x5"(18x13cm) / 8"x6"(20x15cm)	4x3"(10x8cm)/ 5x3.5"(13x9cm)/ 6x4"(15x10cm) / 7x5"(18x13cm) / 8"x6"(20x15cm)	4x3"(10x8cm)/ 5x3.5"(13x9cm)/ 6x4"(15x10cm) / 7x5"(18x13cm) / 8"x6"(20x15cm)	4x3"(10x8cm)/ 5x3.5"(13x9cm)/ 6x4"(15x10cm) / 7x5"(18x13cm) / 8"x6"(20x15cm)
Borderless / Cropping (Full Auto)	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes

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	USA	EUR	ASIA/OCE/CHN	EUR	ASIA/OCE/CHN	EUR
Model name	**MFC-620CN**	**MFC-620CN**	**MFC-620CN**	**DCP-110C**	**DCP-110C**	**DCP-310CN**
Media Format	DPOF, Exif, DCF	DPOF, Exif, DCF	DPOF, Exif, DCF	DPOF, Exif, DCF	DPOF, Exif, DCF	DPOF, Exif, DCF
Image Format Print by PCC Scan to Card	Photo Print: JPEG Scan to Card: JPEG/PDF (Color), TIFF/PDF (B&W)	Photo Print: JPEG Scan to Card: JPEG/PDF (Color), TIFF/PDF (B&W)	Photo Print: JPEG Scan to Card: JPEG/PDF (Color), TIFF/PDF (B&W)	Photo Print: JPEG Scan to Card: JPEG/PDF (Color), TIFF/PDF (B&W)	Photo Print: JPEG Scan to Card: JPEG/PDF (Color), TIFF/PDF (B&W)	Photo Print: JPEG Scan to Card: JPEG/PDF (Color), TIFF/PDF (B&W)
Color Enhancement	Yes	Yes	Yes	Yes	Yes	Yes
Removable Disk	Yes (Read/Write)	Yes (Read/Write)	Yes (Read/Write)	Yes (Read/Write)	Yes (Read/Write)	Yes (Read/Write)
Scan to Card	Yes	Yes	Yes	Yes	Yes	Yes
Network PCC	Yes DL only (FTP browser)	Yes DL only (FTP browser)	Yes DL only (FTP browser)	-	-	Yes DL only (FTP browser)
NETWORK						
Standard/Option(User Option or Dealer Option)	Yes:Standard	Yes:Standard	Yes:Standard	-	-	Yes:Standard
Model name	Embedded (NC-110h)	Embedded (NC-110h)	Embedded (NC-110h)	-	-	Embedded (NC-110h)
Printer	Yes	Yes	Yes	-	-	Yes
Scanner	Yes	Yes	Yes	-	-	Yes
PC FAX	Yes	Yes	Yes	-	-	-
Internet FAX (Firmware)	-	-	-	-	-	-
Forrmat (Scan to E-mail server)	-	-	-	-	-	-
ITU SUB Addressing	-	-	-	-	-	-
Support OS version	Win98(SE)/Me /2K/XP	Win98(SE)/Me /2K/XP	Win98(SE)/Me /2K/XP	-	-	Win98(SE)/Me /2K/XP
Support OS version	PC-Print/Fax: Mac OS 8.6-9.2, 10.2.4(greater) Scan: Mac 10.2.4(greater)	PC-Print/Fax: Mac OS 8.6-9.2, 10.2.4(greater) Scan: Mac 10.2.4(greater)	PC-Print/Fax: Mac OS 8.6-9.2, 10.2.4(greater) Scan: Mac 10.2.4(greater)	-	-	PC-Print: Mac OS 8.6-9.2, 10.2.4(greater) San: OS 10.2.4(greater)
Support OS version	- (Novell NetWare)	- (Novell NetWare)	- (Novell NetWare)	-	-	- (Novell NetWare)
Network connection	Ethernet 10/100BASE-TX Auto Negotiation	Ethernet 10/100BASE-TX Auto Negotiation	Ethernet 10/100BASE-TX Auto Negotiation	-	-	Ethernet 10/100BASE-TX Auto Negotiation

	USA	EUR	ASIA/OCE/CHN	EUR	ASIA/OCE/CHN	EUR
Model name	**MFC-620CN**	**MFC-620CN**	**MFC-620CN**	**DCP-110C**	**DCP-110C**	**DCP-310CN**
Support Protocols	TCP/IP	TCP/IP	TCP/IP	-	-	TCP/IP
Protocols	RARP, BOOTP, DHCP, APIPA, NetBIOS, WINS	RARP, BOOTP, DHCP, APIPA, NetBIOS, WINS	RARP, BOOTP, DHCP, APIPA, NetBIOS, WINS	-	-	RARP, BOOTP, DHCP, APIPA, NetBIOS, WINS
Protocols	LPR/LPD, Port9100	LPR/LPD, Port9100	LPR/LPD, Port9100	-	-	LPR/LPD, Port9100
Protocols	- (SMB(NetBIOS/ IP), IPP, IPX/DLC)	- (SMB(NetBIOS/ IP), IPP, IPX/DLC)	- (SMB(NetBIOS/ IP), IPP, IPX/DLC)	-	-	- (SMB(NetBIOS/ IP), IPP, IPX/DLC)
Protocols	mDNS, FTP, TELNET, SNMP, TFTP, Scanner port	mDNS, FTP, TELNET, SNMP, TFTP, Scanner port	mDNS, FTP, TELNET, SNMP, TFTP, Scanner port	-	-	mDNS, FTP, TELNET, SNMP, TFTP, Scanner port
Network Management	BRAdmin Professio-l	BRAdmin Professio-l	BRAdmin Professio-l	-	-	BRAdmin Professio-l
Network Management	- (Network Remote Setup)	- (Network Remote Setup)	- (Network Remote Setup)	-	-	- (Network Remote Setup)
Network Management	- (MIB-II as well as Brother private MIB)	- (MIB-II as well as Brother private MIB)	- (MIB-II as well as Brother private MIB)	-	-	- (MIB-II as well as Brother private MIB)
Network reset	Yes (in LAN Menu)	Yes (in LAN Menu)	Yes (in LAN Menu)			Yes (in LAN Menu)
Others						
Optional I/F	Wireless OPT *via USB	Wireless OPT *via USB	Wireless OPT *via USB	Wireless OPT *via USB	Wireless OPT *via USB	Wireless OPT *via USB

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FAX2440C

	USA	EUR
Model name	**FAX-2440C**	**FAX-2440C**
GENERAL		
Print Engine	BH3 (KKCMY) 74 nozzles/line	BH3 (KKCMY) 74 nozzles/line
Technology	Inkjet	Inkjet
Scanning Method	CIS	CIS
CPU Speed	RISC 128MHz	RISC 128MHz
Back up Clock	1 hour	1 hour
Operating Environment Temperature (BestPrintQuality)	5 - 35 (20-33) degrees Centigrade	5 - 35 (20-33) degrees Centigrade
Humidity	20 - 80 % (without condensation)	20 - 80 % (without condensation)
On/Off Switch	Yes	Yes
Demo Model	Yes	-
Panel Key for demo sheet	Press[Copy] &[Fax] mode key at the same time.	-
Simultaneous Operation	Yes	Yes
Test Sheet	Yes:Print Quality/Alignment (in Ink Key)	Yes:Print Quality/Alignment (in Ink Key)
Min. Input of ADF (Width/Height)	5.8"/5.8"(147/147mm)	5.8"/5.8"(147/147mm)
Max. Input of ADF (Width/Height)	8.5"/14" (216/356mm)	8.5"/14" (216/356mm)
Max. Input of Glass (Width/Height)	8.5"/11.7", 216/297mm	8.5"/11.7", 216/297mm
Min. Output of Auto Cut sheet Feeder(Width/Height)	3.5"/5.0", 89/127mm	3.5"/5.0", 89/127mm
Max. Output of Auto Cut sheet Feeder(Width/Height)	8.5"/14.0", 216/356mm	8.5"/14.0", 216/356mm
Min. Output of Manual Feed Slot (Width/Height)	-	-
Max. Output of Manual Feed Slot(Width/Height)	-	-
Min. Output of Multi-Purpose	-	-
Max. Output of Multi-Purpose	-	-

Model name	USA FAX-2440C	EUR FAX-2440C
Sheet Weight (Paper tray)	64 -**220** g/m2 (17 - 58 lb.)	64 -**220** g/m2 (17 - 58 lb.)
Sheet Weight (2nd Paper tray)	-	-
Sheet Weight (ADF)	64-90g/mm2 (17-24lb.)	64-90g/mm2 (17-24lb.)
Sheet Weight (Manual Feed Slot)	-	-
Sheet Weight (MP Tray)	-	-
ADF (pages)	Yes (10)	Yes (10)
Paper Capacity (sheets)	100 (80 gsm)	100 (80 gsm)
Output Paper Capacity (sheets)	25	25
Optional Paper Tray (sheets)	-	-
Brother Paper (for Plain,Glossy and Inkjet)	LTR Plain / LTR Glossy/ LTR Inkjet	A4 Plain / A4 Glossy/ A4 Inkjet
Recommended Paper (Only for Transparency)	3M 3410 Transparency film	3M 3410 Transparency film
LCD Size	Standard 16 x 1 line	Standard 16 x 1 line
LCD Back Light & Color	-	-
On-Screen Programming	Yes	Yes
LCD Language	English	Depending on countries
Illuminated Mode Key	Fax/Copy	Fax/Copy
Memory Capacity (physical: Mbytes)	RAM 8MB ROM 4MB	RAM 8MB ROM 8MB
Memory Backup (with battery 24hour)	Yes	Yes
Back Up Print: ON/OFF Feature (in function Menu)	Yes	Yes
Memory Security	-	Yes
Transmission Lock	-	-

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Model name	USA FAX-2440C	EUR FAX-2440C
Dimensions w/ Carton (WxDxH)=>Please refer to "Logistic Information" on Sales Data Bank.	W 552 x D 225 x H 450	W 552 x D 225 x H 450
Dimensions w/o Carton (WxDxH) * tray is not opened)=>Please refer to "Logistic Information"	W 438 x D 347 x H 165	W 438 x D 347 x H 165
Dimensions w/o Carton with tray is opend =>refer to "Logistic	W 454 x D 455 x H 174	W 454 x D 455 x H 174
Weight w/ Carton Please refer to "Logistic Information"	8kg	8kg
Weight w/o Carton w/o tray Please refer to "Logistic Information"	6.1kg	6.5kg
Body Color = Top Cover	New light Gray w/o painted	New light Gray w/o painted
Body Color = Panel cover	New light Gray w/o painted	New light Gray w/o painted
Body Color = Bottom Cover	Dark gray	Dark gray
Body Color = Bottom Cover (Engine unit)	Dark gray	Dark gray
Power Source	AC 120 V 50/60Hz	AC 220-240 V 50/60Hz
Power Consumption(Power OFF/ Power Save(CPU Sleep)/ Standby/ Peak)	(5Wh / 6.7Wh / 8Wh / 18Wh)	(5Wh / 6.7Wh / 8Wh / 18Wh)
Energy Star Compliant (USA Only)	Yes	Yes
Machine Noise (Standby/Peak ex. In printing)	better than 35dBA/45dBA	better than 35dBA/45dBA
Total print pages	Yes	Yes
Copy pages	Yes	Yes
PC print pages	Yes	Yes
Fax RX pages	Yes	Yes
PCC pages	-	-
Ink Gauge Indication	Yes (in Ink Key/ Status Monitor (required Driver DL))	Yes (in Ink Key/ Status Monitor (required Driver DL))

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	USA	EUR
Model name	**FAX-2440C**	**FAX-2440C**
LIST/REPORT		
Activity Report/Jour-l Report	Yes (up to 200)	Yes (up to 200)
Transmission Verification Report	Yes (in Reports menu)	Yes (in Reports menu)
Cover page	-	-
Help List	Yes (in Reports menu)	Yes (in Reports menu)
Call Back Message	-	-
Caller ID List	Yes(in CallerID Menu)	-
Quick Dial List	-	-
Quick Dial List (New) New =>Empty box is not printed out.	-	-
Tel Index List	-	-
Memory Status List	-	-
System Setup(User Setting) List	Yes (in Reports Menu)	Yes (in Reports Menu)
Order Form	-	-
INTERFACE		
Exter-l TAD Interface	Yes	Yes
Host Interface	USB1.1/2.0(@ FULL-SPEEED)	USB1.1/2.0(@ FULL-SPEEED)
LAN	-	-
Cable included	-	-
PictBridge	-	-
Acceptable Media Card	-	-

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	USA	EUR
Model name	**FAX-2440C**	**FAX-2440C**
SUPPLIES/ OPTIONS		
Bundled Ink (Life / Yield)	BK:500pages (Normal 5%)	BK:500pages (Normal 5%)
	C/M/Y:400pages(Normal 5%)	C/M/Y:400pages(Normal 5%)
Supply Ink Cartridge (Life / Yield)	BK:500pages (Normal 5%)	BK:500pages (Normal 5%)
	C/M/Y:400pages(Normal 5%)	C/M/Y:400pages(Normal 5%)
Supply Ink Cartridge (Life / Yield) *HighCapacity	BK:900pages (NORMAL 5%)	BK:900pages (NORMAL 5%)
Options	-	-
SERVICE INFORMATION		
Monthly Volume	2500 pages	2500 pages
Machine Life (year)	30,000 pages (print)/50,000 pages (scan) or 5 years	30,000 pages (print)/50,000 pages (scan) or 5 years
Periodical Replacement Parts for Laser;	-	-
Fixing Unit	-	-
Separation Pad Assy	-	-
Paper Pick-up Roller Assy	-	-
Scanner Unit	-	-
MTBF (Mean Time Between Failures)	4,000 hours	4,000 hours
MTTR (Mean Time To BE Repaired)	30 min.	30 min.
Ozone Emission;	-	-
Printer	-	-
Scanner (Mono/Color)	-	-
TELEPHONE		
Handset	Yes	Yes
Hook	Yes (SPK)	Yes (SPK)
Off Hook Alarm	-	-
Duplex Speaker Phone	Yes	Yes
Power Failure Phone	-	-
Power Failure Dialing	-	-
Chain Dialing	Yes	Yes
Automatic Redial	Yes (1time/5min)	Yes (3time/5min)
Recall (For ASIA)	-	-
PBX Feature (EUR&ASIA)	-	Yes

Confidential

	USA	EUR
Model name	**FAX-2440C**	**FAX-2440C**
Handset Volume	Yes (2steps + Amplify)	Yes (not adjustable)
Speaker Volume	Yes (3 steps + OFF)	Yes (3 steps + OFF)
Ring Volume	Yes (3 steps + OFF)	Yes (3 steps + OFF)
Hold/Mute Key	Yes (Hold)	Yes (Mute)
Music on Hold	-	-
Monitoring the Line on Hold with Music	-	-
One-Touch Dial	6	6
Speed Dial	80	80
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 (Search/Speed dial key)	Yes	Yes
Caller ID	Yes	-
Call Waiting Caller ID	-	-
Call waiting Ready (Only for USA)	-	-
Distinctive Ringing	Yes	Yes (U.K.(BT Call Sign), Den. only)
COLOR FAX		
Modem Speed(bps)	14,400(Fax)	14,400(Fax)
Transmission Speed(sec.)	Approx.6 (Brother#1,MMR)	Approx.6 (Brother#1,MMR)
ITU-T Group	G3	G3
Coding Method	Mono:MH/MR/ MMR, Color:JPEG	Mono:MH/MR/ MMR, Color:JPEG
Fax/Tel Switch	Yes (by H/S or S.Phone key)	Yes (by H/S or S.Phone 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 (Auto/S.Light/S.Dark)	Yes	Yes
Dual Access	Yes (B&W only)	Yes (B&W only)
Enhanced Remote Activate	Yes	Yes
Station ID (20digits/20characters)	Yes	Yes

Model name	USA FAX-2440C	EUR FAX-2440C
Remote Maintenance	Yes	Yes
RX Mode Indication	LCD	LCD
Resolution Indication	LCD	LCD
Paper Handling Size	LTR, A4 + LEGAL (with ADF)	LTR, A4 + LEGAL (with ADF)
Ducument Scanning Width	208mm	208mm
Delayed Timer (up to 50:B&W only)	Yes	Yes
Polled Sending (type) *B&W only	Yes (Std.)	Yes (Std/Secure)
Next-Fax Reservation	Yes (Dual Access)	Yes (Dual Access)
Batch Transmission	Yes (B&W only /not color)	Yes (B&W only /not color)
Quick-Scan(Memory transmission)	Approx.4.72sec/page@LTR Approx. 5.02 sec./page@A4	Approx.4.72sec/page@LTR Approx. 5.02 sec./page@A4
Memory Transmission (ITU-T Test Chart	Up to 250 Pages	Up to 250 Pages
Memory Transmission (Brother Chart/ MMR)	UP to 300 Pages	UP to 300 Pages
ECM (Error Correction Mode)	Yes	Yes
Error Re-Transmission	-	-
Broadcasting (Speed+ OneTouch+Manual)	Yes (136 locations)	Yes (136 locations)
Manual Broadcasting	Yes (50 locations)	Yes (50 locations)
Easy Receive/Fax Detect	Yes	Yes
Polling Receiving (type) *B&W only	Yes (Std/Seq)	Yes (Std/Seq/Secure/Timer)
Auto Reduction	Yes	Yes
Out-of-Paper Reception (ITU-T Test Chart #1/MMR)	Up to 250 Pages	Up to 250 Pages
Out-of-Paper Reception (Brother Chart/ MMR)	UP to 300 Pages	UP to 300 Pages
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	-
Color FAX (Document Send/Receive)	Yes/Yes (ITU-color FAX)	Yes/Yes (ITU-color FAX)
Color FAX (Memory Send/Receive)	No / Yes (ITU-color FAX)	No / Yes (ITU-color FAX)

	USA	EUR
Model name	**FAX-2440C**	**FAX-2440C**
COLOR PRINTER	**Web DL Option**	**Web DL Option**
Color/Mono	Color	Color
Resolution(dpi)	up to 1200x6000 dpi	up to 1200x6000 dpi
Speed(ppm) Simple	20/15ppm (Mono/Color: 600x150 dpi)	20/15ppm (Mono/Color: 600x150 dpi)
First print out time (from READY mode *2)	-	-
Warm up Time (from SLEEP mode)	-	-
Emulation	-	-
Resident Fonts	-	-
Fonts Disk Based	Yes (35 TrueType)	Yes (35 TrueType)
Paper Handling Size (Paper Tray)	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo(4x6"/102x 152mm), Indexcard(5x8"/1 27x203mm), Photo L (3.5x5"/89x127m m), Photo2L(5x7"/12 7x178mm), Post Card 1(3.9x5.8"/100x1 48mm), Post Card 2 (Double)(5.8x7.8" /148x200mm), C5 Envelope, Com-10, DL Envelope, Mo-rch, JE4 Envelope.	A4, LTR, LGL, EXE, JISB5, A5, A6, Photo(4x6"/102x 152mm), Indexcard(5x8"/1 27x203mm), Photo L (3.5x5"/89x127m m), Photo2L(5x7"/12 7x178mm), Post Card 1(3.9x5.8"/100x1 48mm), Post Card 2 (Double)(5.8x7.8" /148x200mm), C5 Envelope, Com-10, DL Envelope, Mo-rch, JE4 Envelope.
Paper Handling Size (2nd Tray)	-	-
Paper Handling Size (Manual Slots)	-	-
Paper Handling Size (MP)	-	-
Media Type (Paper Tray)	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency
Media Type (2 nd Paper Tray)	-	-
Media Type (Manual Slots)	-	-
Media Type (MP Tray)	-	-

Confidential

	USA	EUR
Model name	**FAX-2440C**	**FAX-2440C**
Print Paper Margin (upper, lower, left, right)	Borderless ON:0, 0, 0,0* OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm** * Borderless For A4 /LTR/A6/Photo(4x6"/102x152mm), Indexcard(5x8"/127x203mm), Photo L (3.5x5"/89x127mm), Photo 2L(5x7"/127x178mm), Post Card 1(3.9x5.8"/100x148mm), Post Card 2 (Double)(5.8x7.8"/148x200mm) only ** 0.47x0.95x0.12x0.12"/12,24,3,3mm for Envelops	Borderless ON:0, 0, 0,0* OFF:0.12, 0.12, 0.12, 0,12"/3,3,3,3mm** * Borderless For A4 /LTR/A6/Photo(4x6"/102x152mm), Indexcard(5x8"/127x203mm), Photo L (3.5x5"/89x127mm), Photo 2L(5x7"/127x178mm), Post Card 1(3.9x5.8"/100x148mm), Post Card 2 (Double)(5.8x7.8"/148x200mm) only ** 0.47x0.95x0.12x0.12"/12,24,3,3mm for Envelops
Variable Dot Print	Yes (3 sizes)	Yes (3 sizes)
Minimum Droplet Size	3 pl	3 pl
Shingling Print	-	-
Color Enhancement	Yes	Yes
COLOR COPY		
Color/Mono	Color	Color
Speed (cpm) *time culcurated excluding paper feeding **EU's defult is culcurated by "nomal mode"speed.	17/11cpm	17/11cpm
Warm up Time (from SLEEP mode)	-	-
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. 600x1200 dpi Scan: Max. 600x1200 dpi	Print: Max. 600x1200 dpi Scan: Max. 600x1200 dpi
N in 1	2in1, 4in1(Mono/Color, A4/LTR only)	2in1, 4in1(Mono/Color, A4/LTR only)
Poster	Yes (3x3)	Yes (3x3)
Image Enhancement	-	-

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	USA	EUR
Model name	**FAX-2440C**	**FAX-2440C**
Paper Handling Size (Paper Tray)	Letter/Legal/A4/A5/4"x6"(10(W)x15(H)cm)	Letter/Legal/A4/A5/4"x6"(10(W)x15(H)cm)
Paper Handling Size (2nd Tray)	-	-
Paper Handling Size (Manual Slots)	-	-
Paper Handling Size (MP)	-	-
Media Type (Paper Tray)	Plain, Inkjet, Glossy, Transparency	Plain, Inkjet, Glossy, Transparency
Media Type (2nd Tray)	-	-
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)	0.12, 0.12, 0.12, 0,12" (3,3,3,3mm)
Duplex Copy	-	-
Resolution Indication	LCD	LCD
COLOR SCANNER	-	-
Color/Mono	-	-
Optical Resolution (dpi)	-	-
Interpolated Resolution (dpi)	-	-
Warm up Time (from Scanner Lamp OFF)	-	-
Warm up Time (from Scanner Lamp OFF: Color)	-	-
Gray Scale	-	-
Ducument Scanning width	-	-
Scan Image	-	-
Scan / OCR	-	-
Scan to E-mail	-	-
Scan to File	-	-
Scan to Card	-	-

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	USA	EUR
Model name	**FAX-2440C**	**FAX-2440C**
Scan speed (Mono/Color) *@100dpi	-	-
Scanner Lamp Switch (CIS doesn't require switch)	-	-
Color Depth (Input/Output)	-	-
MESSAGE CENTER		
TAD	Yes	Yes
ICM Recording Time	Max.29minutes Or Max.99 messages (Max.180sec./ 1message.)	Max.29minutes Or Max.99 messages (Max.180sec./ 1message.)
Toll Saver	Yes	Yes
Memo/Recording Conversation	Yes	Yes
OGM (MC/TAD,F/T)	Yes	Yes
User Recording OGM TIME(MC/TAD, F/T)	Yes (20sec.)	Yes (20sec.)
PC FAX	**Web DL Option**	**Web DL Option**
Supplier	Brother	Brother
Color/Mono	Mono	Mono
Sending	Yes	Yes
Receiving	-	-
Protocol Compliance	-	-
Broadcasting	up to 50	up to 50
Support OS Version (Refer to"Application&OS" sheet)	**Web DL Option**	**Web DL Option**
Others	-	-

	USA	EUR
Model name	**FAX-2440C**	**FAX-2440C**
PHOTO CAPTURE CENTER		
Acceptable Media Card & Size	-	-
Paper Handling Size & Type (Paper Tray)	-	-
Paper Handling Size & Type (Manual Slots)	-	-
Paper Handling Size & Type (MP)	-	-
Print Paper Margin (upper, lower, left, right)	-	-
Available paper size for full (Max) size printing	-	-
Direct Print Size for A4/LTR	-	-
Borderless / Cropping (Full Auto)	-	-

Confidential

	USA	EUR
Model name	**FAX-2440C**	**FAX-2440C**
Media Format	-	-
Image Format Print by PCC Scan to Card	-	-
Color Enhancement	-	-
Removable Disk	-	-
Scan to Card	-	-
Network PCC	-	-
NETWORK		
Standard/Option(User Option or Dealer Option)	-	-
Model name	-	-
Printer	-	-
Scanner	-	-
PC FAX	-	-
Internet FAX (Firmware)	-	-
Forrmat (Scan to E-mail server)	-	-
ITU SUB Addressing	-	-
Support OS version	-	-
Support OS version	-	-
Support OS version	-	-
Network connection	-	-

(14/14)

	USA	EUR
Model name	**FAX-2440C**	**FAX-2440C**
Support Protocols	-	-
Protocols	-	-
Protocols	-	-
Protocols	-	-
Protocols	-	-
Network Management	-	-
Network Management	-	-
Network Management	-	-
Network reset		
Others		
Optional I/F	N/A	N/A

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CHAPTER 3

THEORY OF OPERATION

CHAPTER 3 THEORY OF OPERATION

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

CONTENTS

3.1 OVERVIEW


```
                                                                    - Compact Flash
                                                                    - SmartMedia
                                        Host        LAN             - Memory Stick
                                                                    - SD card
                                                                    - XD card


              Control    Backup **        USB        LAN ****    Media
              panel      battery          interface  interface   station


        ┌──────────────────────────────────────┬──────────────────────────────────┐
        │  Fax Control Section                  →   Printer Control Section         │
        └──────────────────────────────────────┴──────────────────────────────────┘

    SDAA                                              Print data


Line  MJ PCB   Speaker   Scanner unit     Ink jet printer unit    Paper feeding    Power     AC
                         - CIS unit       - Head/carriage unit    mechanism        supply
                         - CIS motor      - Carriage PCB with      - Paper feed
                                            head flat cables         motor
          Handset *    ADF unit ***      - Carriage motor
                       - ADF motor       - Ink refill ASSY
                                         - Maintenance unit
```

     * MFC620CN U.S.A./Canadian models and FAX2440C
    ** MFC620CN and FAX2440C
   *** MFC620CN/420CN and FAX2440C
  **** MFC620CN/420CN/410CN

3.2 MECHANICAL COMPONENTS

This machine consists of the following mechanisms and uses three* motors, two encoders, various sensors, and a head thermistor.

*Four motors are used in MFC620CN/420CN and FAX2440C.

MFC620CN/420CN and FAX2440C
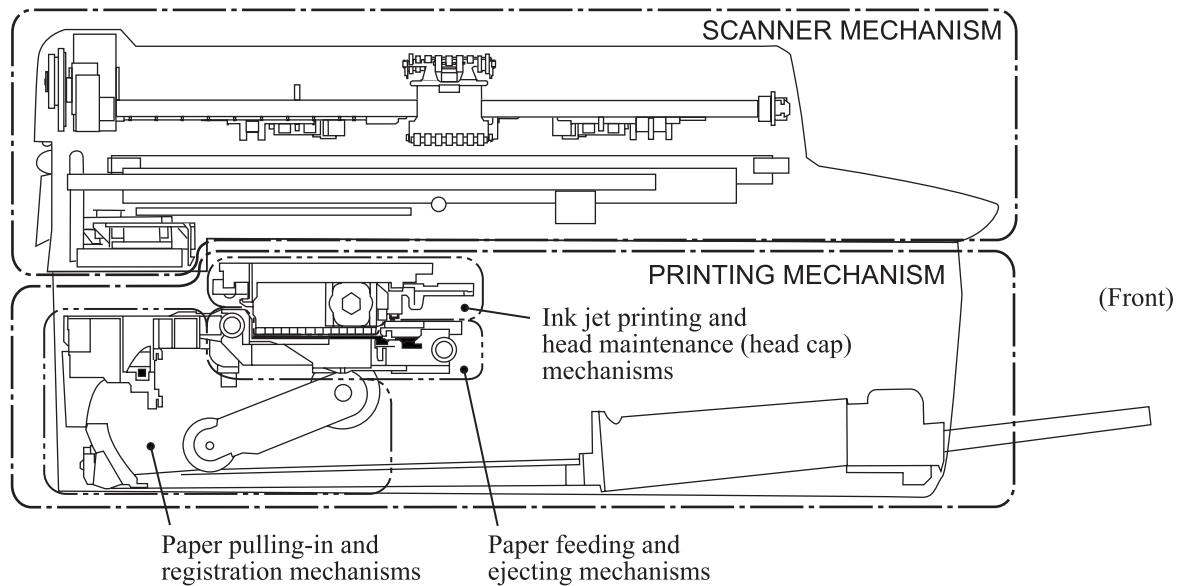
(Viewed from the left)

(Viewed from the right)

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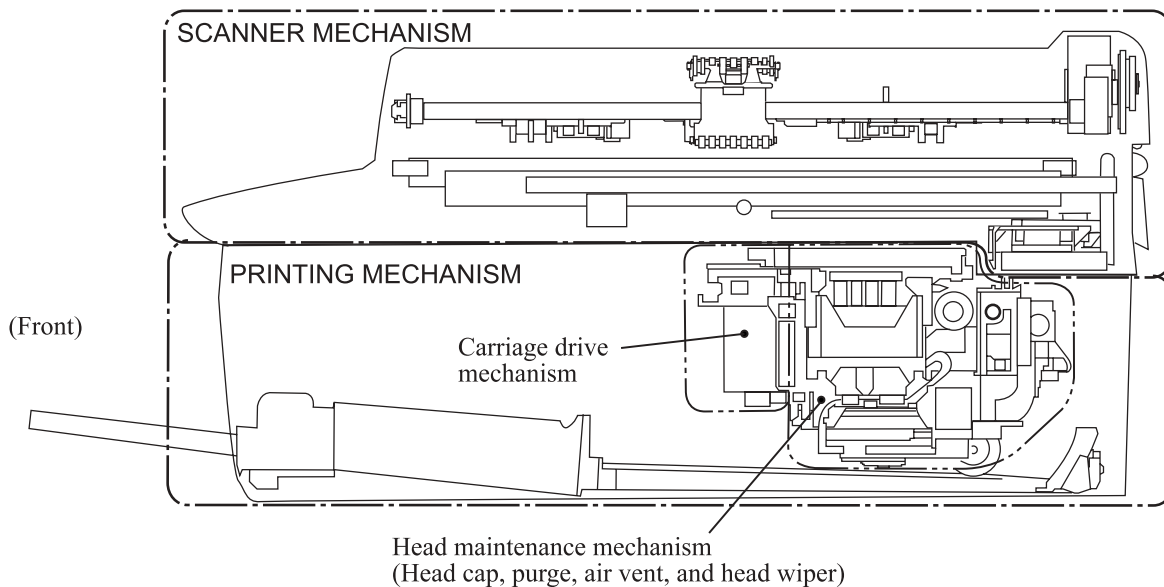
Other Models

SCANNER MECHANISM

PRINTING MECHANISM

(Front)

Ink jet printing and
head maintenance (head cap)
mechanisms

Paper pulling-in and
registration mechanisms

Paper feeding and
ejecting mechanisms

(Viewed from the left)

SCANNER MECHANISM

PRINTING MECHANISM

(Front)

Carriage drive
mechanism

Head maintenance mechanism
(Head cap, purge, air vent, and head wiper)

(Viewed from the right)

■ Scanner Mechanism (See Section 3.2.1.)	- Document scanning mechanism	CIS motor (stepping motor)
	- Automatic document feeder (ADF) mechanism*	ADF motor* (stepping motor)
	(*Provided on the MFC620CN/420CN and FAX2440C)	
■ Printing Mechanism (See Section 3.2.2.)	- Paper pulling-in, registration, paper feeding, and ejecting mechanisms (See Section 3.2.2.1.)	Paper feed motor (DC motor)
	- Ink supply and ink jet mechanism (See Section 3.2.2.2.)	
	- Head maintenance mechanism (carriage lock, head caps, purge, vent, and head wiper) (See Section 3.2.2.3.)	Paper feed motor (DC motor)
	- Carriage drive mechanism (See Section 3.2.2.4.)	Carriage motor (DC motor)
■ Encoders (See Section 3.2.3.)	- Carriage motor (CR) encoder	
	- Paper feed motor (PF) encoder	
■ Sensors (See Section 3.2.3.)	- Document front and rear sensors (MFC620CN/420CN and FAX2440C)	
	- Scanner open sensor	
	- Registration sensor	
	- Paper width (media) sensor	
	- Ink cartridge sensors	
	- Large-volume ink cartridge sensor (FAX2440C)	
	- Purge cam switch	
	- Hook switch sensor (MFC620CN U.S.A./Canadian models and FAX2440C)	
■ Thermistor (See Section 3.2.3.)	- Head thermistor	

3.2.1 Scanner Mechanism

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

* MFC620CN/420CN and FAX2440C only.

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

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

For further details on the sensors, see Section 3.2.3.

Document front sensor actuator

Document pull-in roller

Separation pad

ADF motor

Document feed roller

Output document support

Document

Document guide roller

Document tray

Document cover

(Right)

Pinch rollers

Document front sensor

Document rear sensor actuator

Document separation roller

Document rear sensor
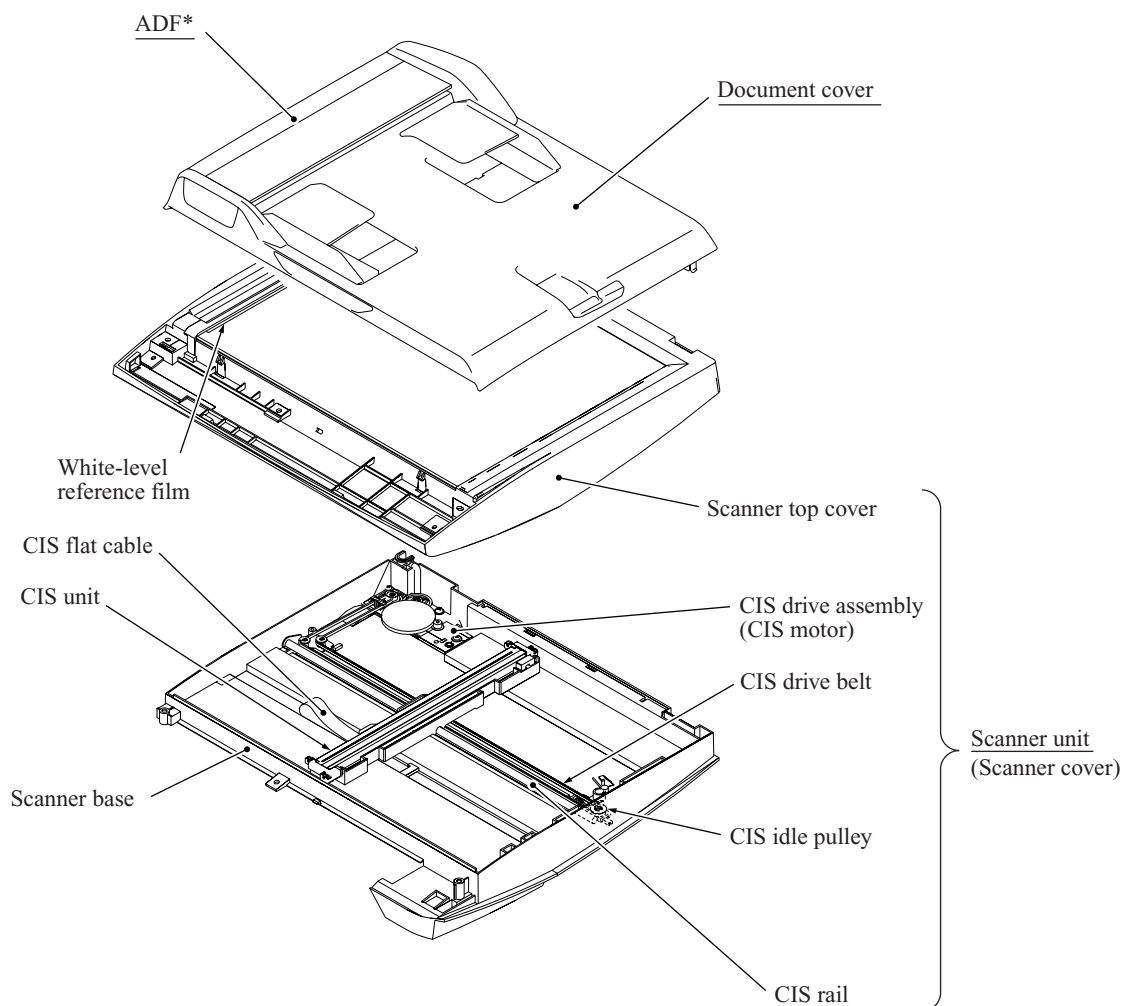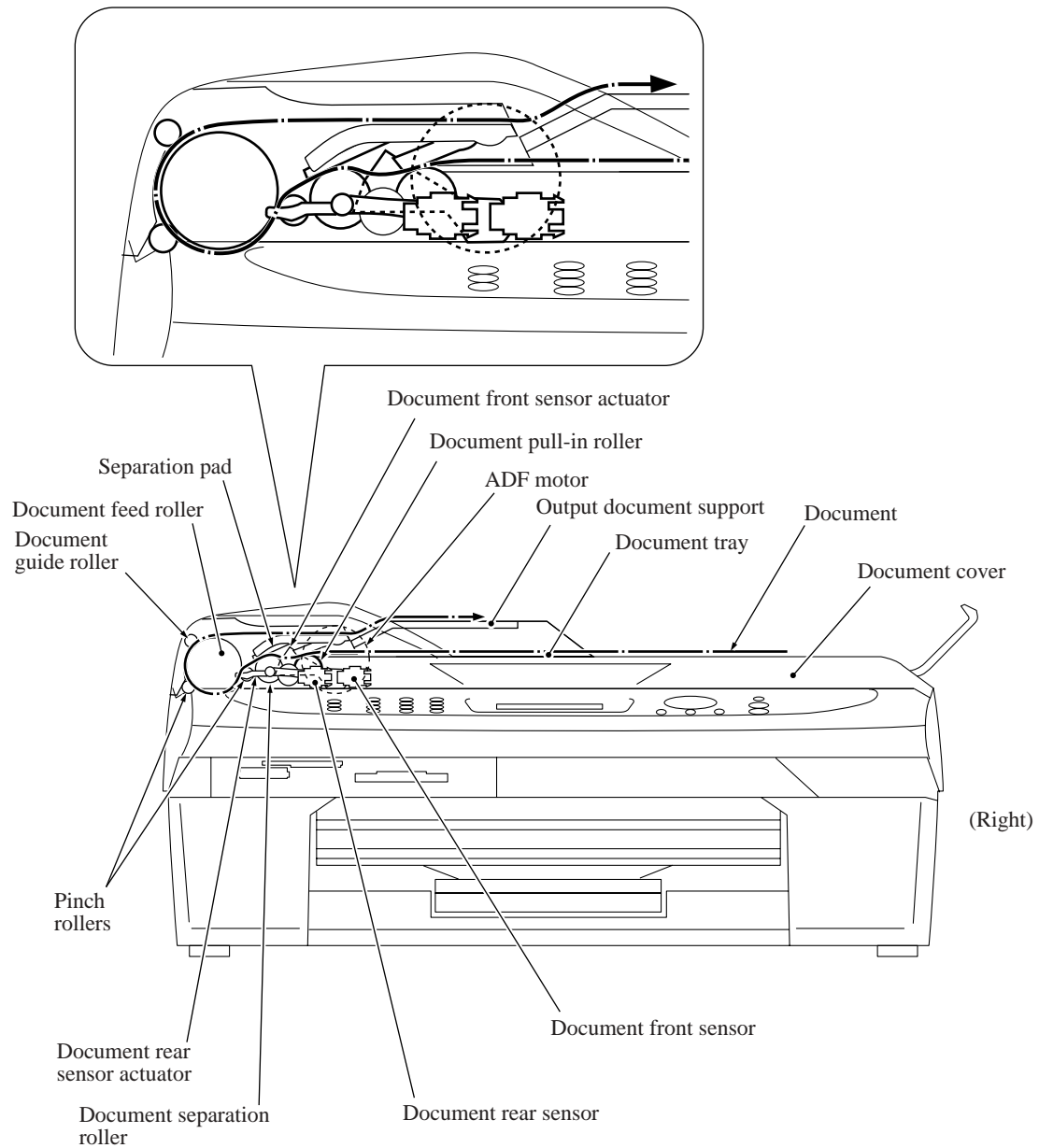
Models with ADFs offer two types of scanning: ADF scanning and flat-bed scanning. They automatically switch to the former at the start of a scan operation if the document front sensor inside the ADF detects a document. Models without ADFs offer only flat-bed scanning.

(1) ADF scanning: Document moves across stationary CIS unit
  (MFC620CN/420CN and FAX2440C only)

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

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

The ADF motor then rotates the document pull-in roller to pull the document into the ADF. This new roller has become necessary because this machine has a horizontal document path. The document separation roller feeds the pages one at a time, *starting from the bottom,* to the document feed roller, which rotates to move the page in a curve left, up, and right. The page is scanned as it passes over the CIS unit. It then leaves the machine *face up* onto the document eject support. The machine inserts subsequent pages under this one to preserve the document page order.

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

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

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

CIS drive mechanism

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

3.2.2 Printing Mechanism

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

These mechanisms are driven by a single paper feed motor located at the left of the engine unit via a gear train. (See the illustration on the next page.)

The following illustration is a cross-sectional view of the machine viewed from the right. Place the recording paper *face down* in the recording paper tray. This paper first proceeds to the rear, bends upward, heads back toward the front panel, passes under the head/carriage unit for printing, and finally enters the eject tray on top of the recording paper tray.
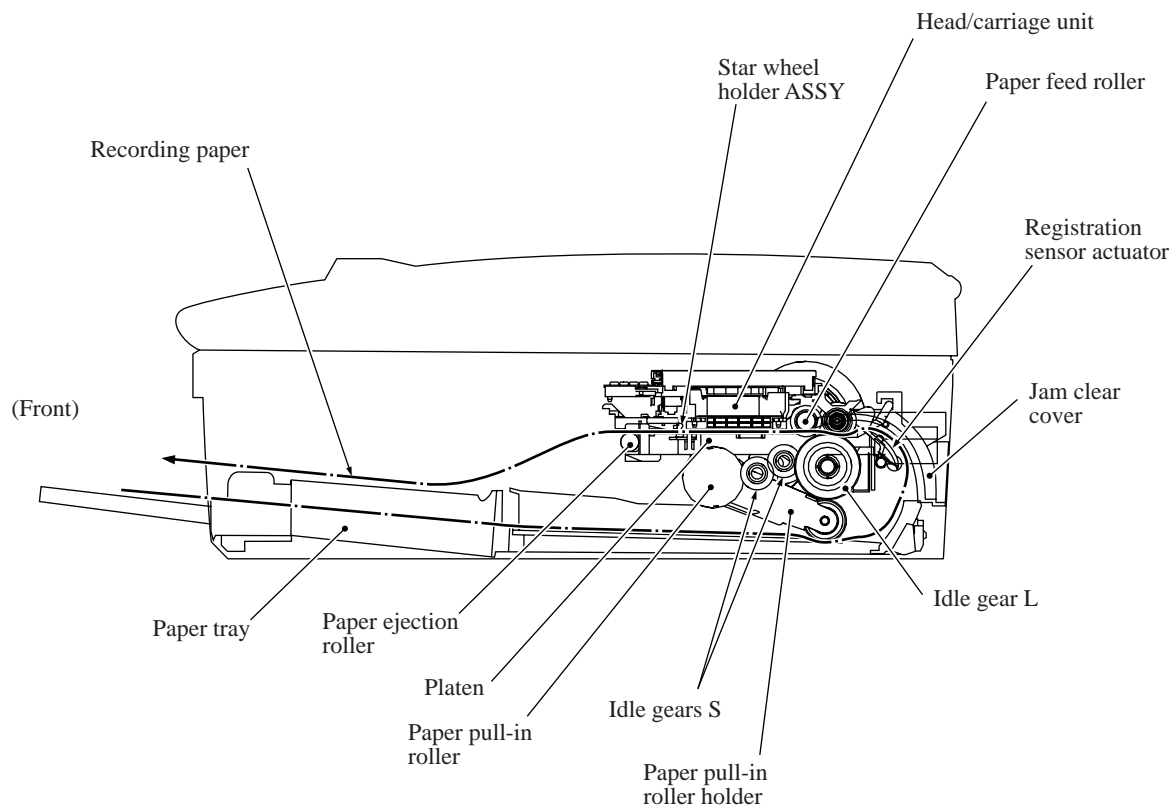
First, the paper feed motor rotates counterclockwise (when viewed from the output gear side). The motor rotation passes to the PF roller gear L and, via the ejection idle gear, the ejection roller gear to rotate the paper feed and ejection rollers in the reverse direction.

At the right end of the paper feed roller is the PF roller gear R which is always engaged with the clutch gear and the idle gear L. The latter transmits the motor rotation via the idle gears S and the paper pull-in gear shaft to the paper pull-in roller holder so that the paper pull-in roller pulls in a sheet of paper.

While the paper pull-in roller pulls the paper, the paper feed roller rotates in the reverse direction to align (register) the leading edge of the paper.

Registration sensor activation switches the paper feed motor to clockwise rotation to rotate the paper feed roller in the forward direction to feed the paper. During this paper feed operation, the planetary gear inside the paper pull-in roller holder prevents rotational torque from reaching the paper pull-in roller.

The above paper pulling-in and feeding operations take place when the head/carriage unit is in printing operation. When the head/carriage unit reaches the purge position, the clutch gear becomes disengaged from the idle gear L and engaged with the purge gear. For further details on the head maintenance mechanism, see Section 3.2.2.3.

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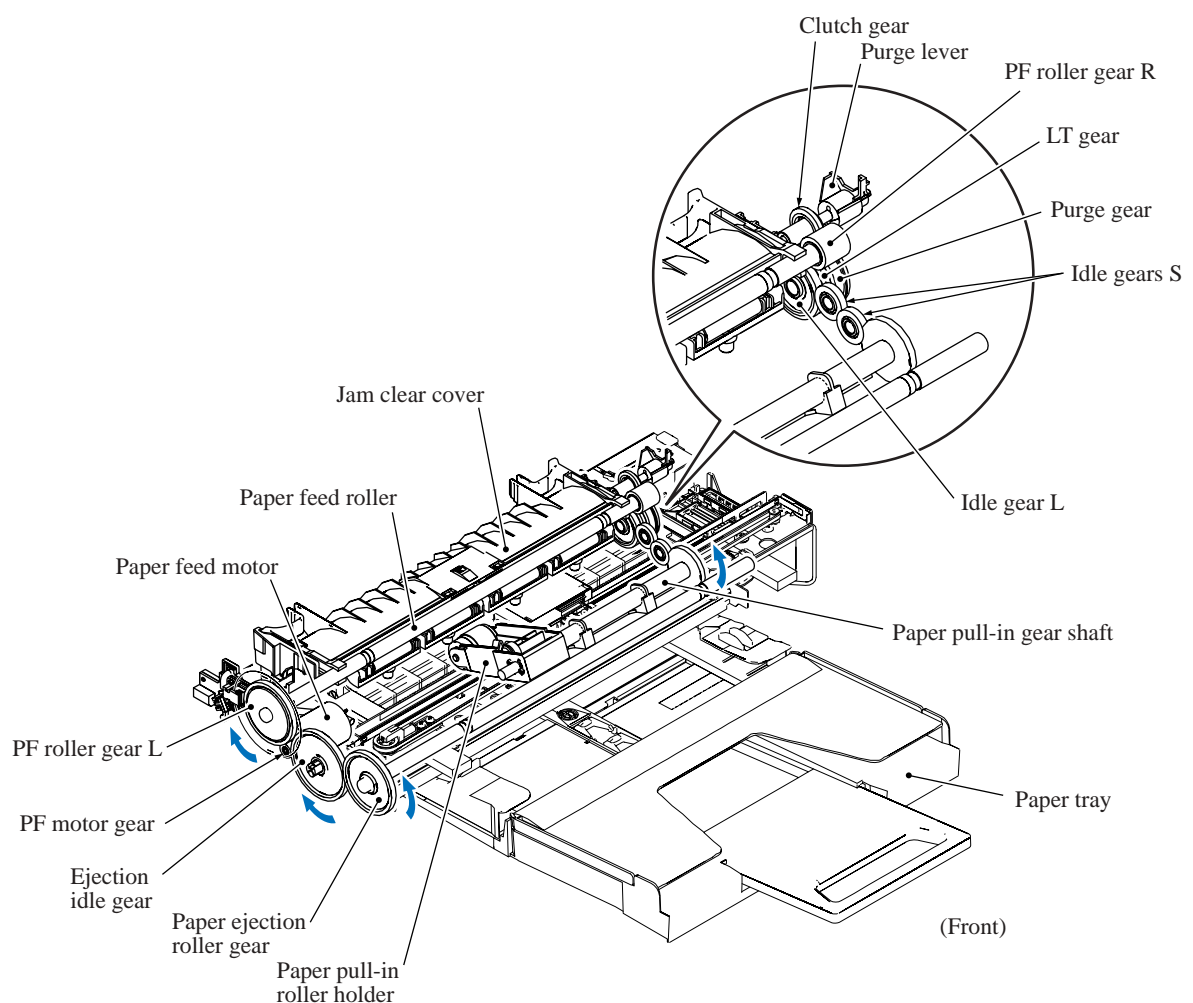
The outer circumference of the PF roller gear L functions as a 300 dpi (0.084 mm pitch) encoder disk which the PF encoder sensor uses to generate a signal indicating the gear rotation speed--in other words, the paper feed roller speed--to the controller for use in controlling paper feed position and speed. This signal from the PF encoder is a 2-phase one, for a maximum position detection resolution 300 dpi four times or 1200 dpi.

Paper stop position control

The controller uses the PF encoder signal for proportional, integration, differential (PID) control of the paper feed motor to produce high-resolution precision paper positioning during printing. This signal also determines the motor parameters for rapidly and precisely positioning the paper past a gap.

Fixed-speed paper feed

This operation rotates the paper feed roller to feed the paper at a constant speed regardless of load fluctuations. The primary application is ejecting paper when printing is complete--in other words, in situations where precision stop position control is not needed.

Paper feeding amount control

There is variation in the head nozzle pitch of individual head/carriage units, as well as in the shape of the paper feed and ejection rollers. To make those parts match each other, therefore, updating the paper feeding correction value and correcting the positioning error of the head/carriage unit are necessary (see Chapter 6).

3.2.2.2 Ink supply and ink jet mechanism

[1] Overview

The ink supply and ink-jet mechanism consists of the head/carriage unit, four ink cartridges, ink refill assembly, and ink supply tubes.

The head/carriage unit scans the surface of the recording paper, jetting out ink supplied through the ink supply tubes onto the paper to produce images. For further details, see "[3] Head/carriage unit" below.

The four ink cartridges (black, yellow, cyan, and magenta) are mounted on the ink refill assembly. For further details, see "[4] Ink cartridges" below.

The ink refill assembly secures the ink cartridges and connects them to the corresponding ink supply tubes. Ribs inside the cartridge slots prevent wrong cartridge insertion and color mixups. For further details, see "[5] Ink refill assembly" below.

The ink supply tubes supply the head/carriage unit with ink from the ink cartridges. For further details, see "[6] Ink supply tubes" below.

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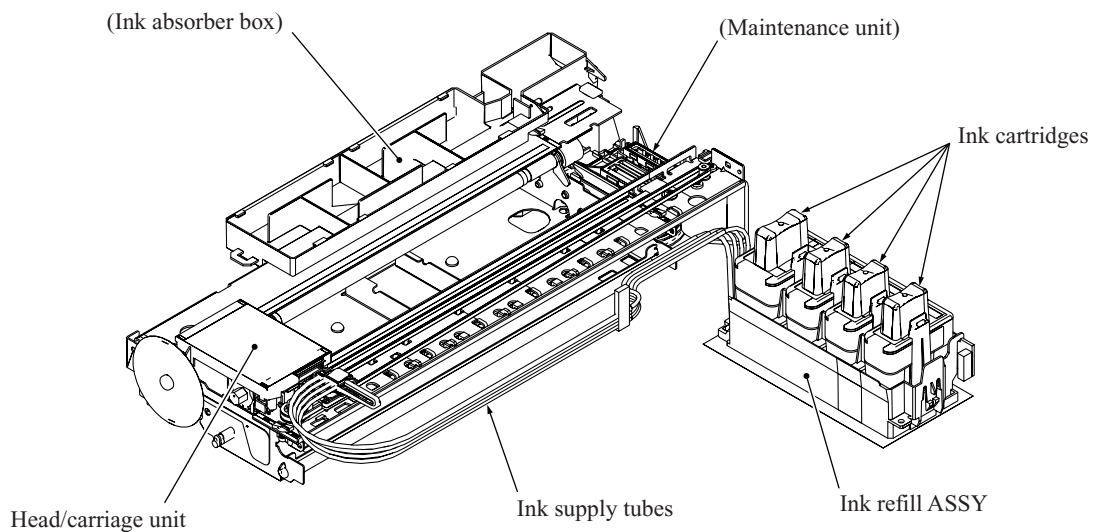
[2]   Features

A distinct feature of this machine is the use of ink supply tubes between the ink cartridges and the head/carriage unit. Relieving the head/carriage unit of the task of carrying heavy ink cartridges back and forth across the page, the approach generally adopted by other ink-jet printers, offers the following advantages.

- Smaller unit size--lower height, in particular
- Lower power consumption
- Lower noise levels

During print operation, the ink-jet mechanism inside the head/carriage unit sprays ink droplets from the head nozzles. The loss of this ink from the head produces a negative pressure that replenishes the head with ink from the ink tank through the supply tubes.

Note, however, that the above ink flow is only possible when the ink supply tubes are full of ink. The factory therefore primes the ink supply path by applying strong suction to the head nozzles with the maintenance unit to suck both air and ink through the ink supply tubes.

Leaving too long interval between this priming and actual use, however, risks air bubbles, increased viscosity, and other quality issues with the ink in the supply tubes. Before using this machine for the first time, therefore, the user must totally replace the ink supply path contents with fresh ink using an initial purge, a repeat of this priming operation. The cartridges that ship with the machine contain just that amount of ink extra over the ones sold as consumables.

When the machine is on standby, a constant negative pressure (which is produced according to the difference in height between the head/carriage unit and ink cartridges) is applied to the rear of the head/carriage unit, thus preventing ink from leading out of those nozzles.

NOTE: The above applies only as long as this machine rests on a horizontal surface. Standing this machine on end or even just tilting it backwards with the print head uncapped risks overcoming this slight negative pressure preventing ink leakage from the head nozzles.

Piezoelectric ceramic actuators inside the print head convert this ink to droplets sprayed onto the paper. For further details, see "[3] Head/carriage unit" below.

[3] Head/carriage unit

The head/carriage unit consists of a front end (ink-jet head) and a back end (buffer and air vent unit).

The front end consists of metal plates laminated together and etched to form ink flow channels. (See illustration.)

Piezoelectric ceramic actuators generate the spray pressure. The response of individual front ends to applied voltages and waveforms varies, however, because of the nature of piezoelectric materials, fluctuation in manufacturing accuracy, and other factors. The front end therefore leaves the production line with a bar code giving property data. The manufacturer writes this data to the EEPROM on the main PCB incorporating this unit to insure consistent performance without fluctuations.

These labels appear on the head/carriage unit itself and on the lower cover of the machine. Replacing the head/carriage unit requires writing 12 of the 13 property data digits on the label included with the new unit into the EEPROM with maintenance mode function code 68 and applying the new property label on the lower cover. Replacing the main PCB requires similar property data updates.

■ **Front end**
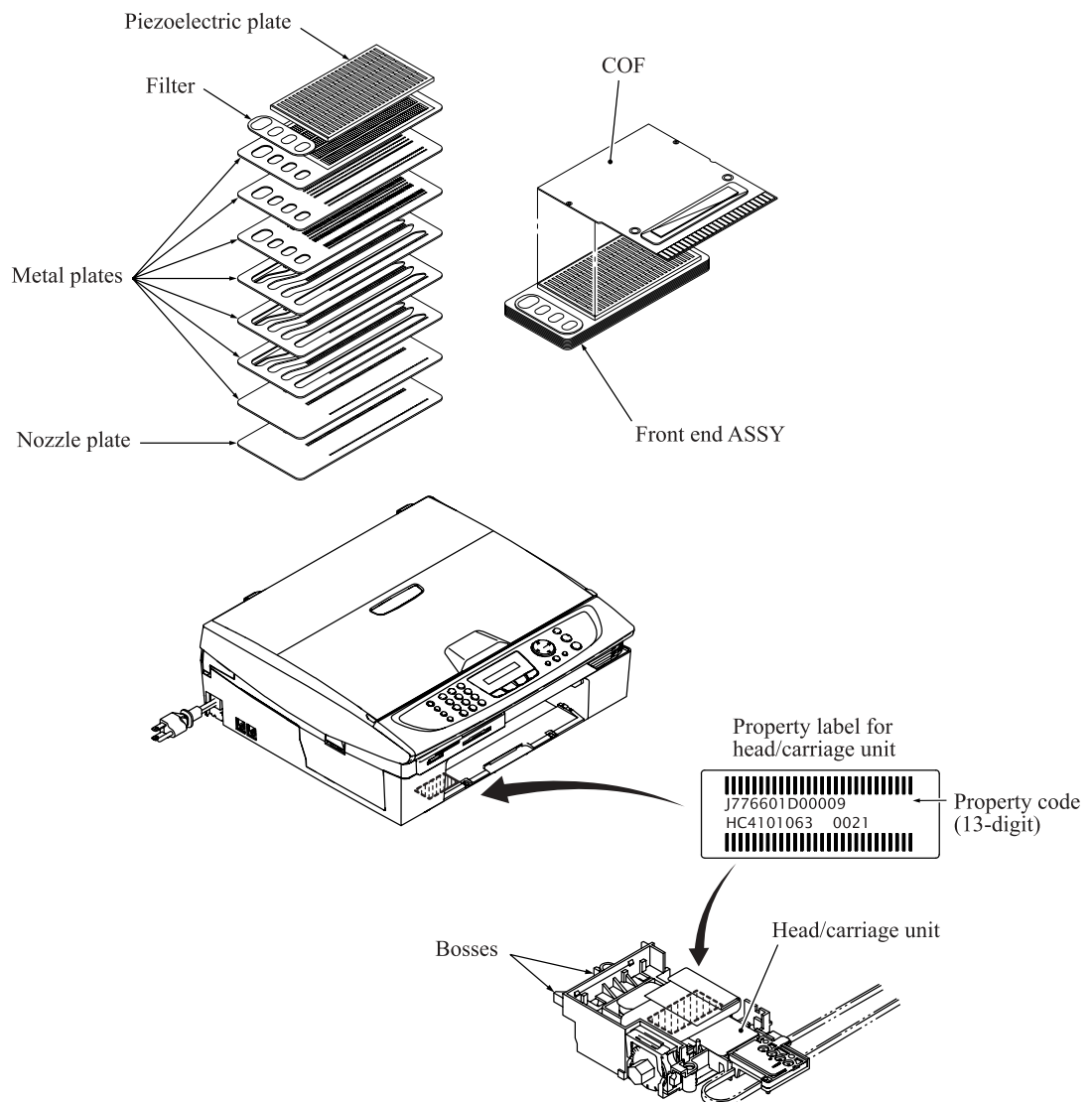
Front end components and their main roles

- Piezoelectric plate
  Applying a voltage stretches the plate, serving as the actuator for spraying ink. Consisting of thin piezoelectric plates laminated together, this plate can be driven even by a low voltage.

- Filter
  This removes foreign matter from the ink.

- Metal plates
  These form the print nozzle pressure chambers, ink flow paths, and manifolds.

- Nozzle plate
  This plate has 370 nozzles in five staggered lines with 74 nozzles each: two (148 nozzles) for black and one each for the three color inks.

- COF
  This flexible circuit board holds the piezoelectric driver chip.

Nozzle array (head bottom plate)
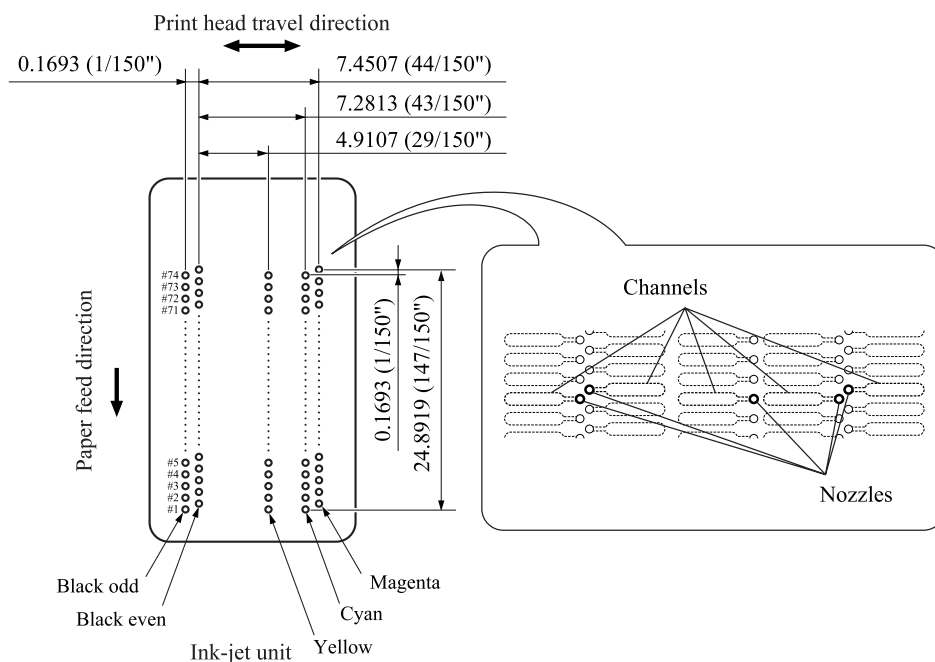
Ink spray function

The head employs drop-on-demand ink-jet printing.

Print commands to the drive circuit apply a bias voltage to the layer electrodes on the piezoelectric ceramic surface stretching the elements perpendicular to that surface. Drive signals removing this voltage for specific channel electrodes allow the piezoelectric elements to return to their original shape, sucking ink into the corresponding channels*. Reapplying the bias voltage stretches the elements once again, applying pressure to the ink, spraying it from the print nozzle. The ink drop hits the paper on the platen, forming a dot.

*Pressure chambers for individual nozzles

Confidential

Front end ASSY A

Laminated electrode

Channel

Piezoelectric plate

Manifold

Damper

Nozzle plate

A - A'

Confidential
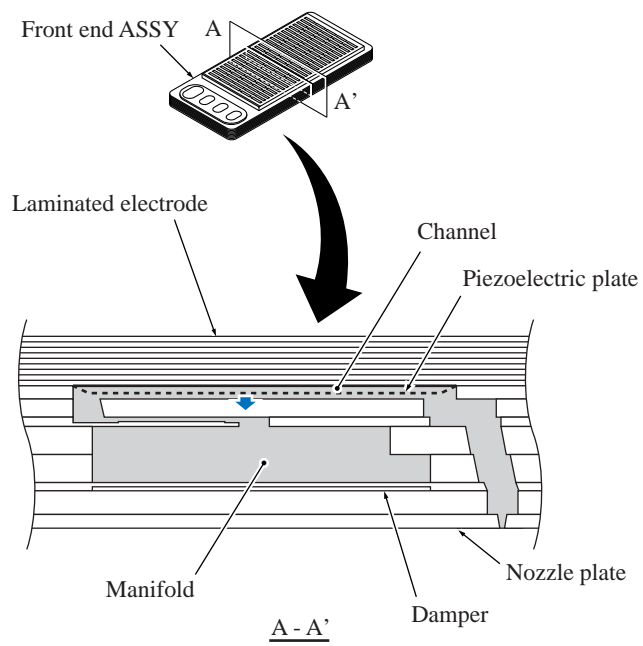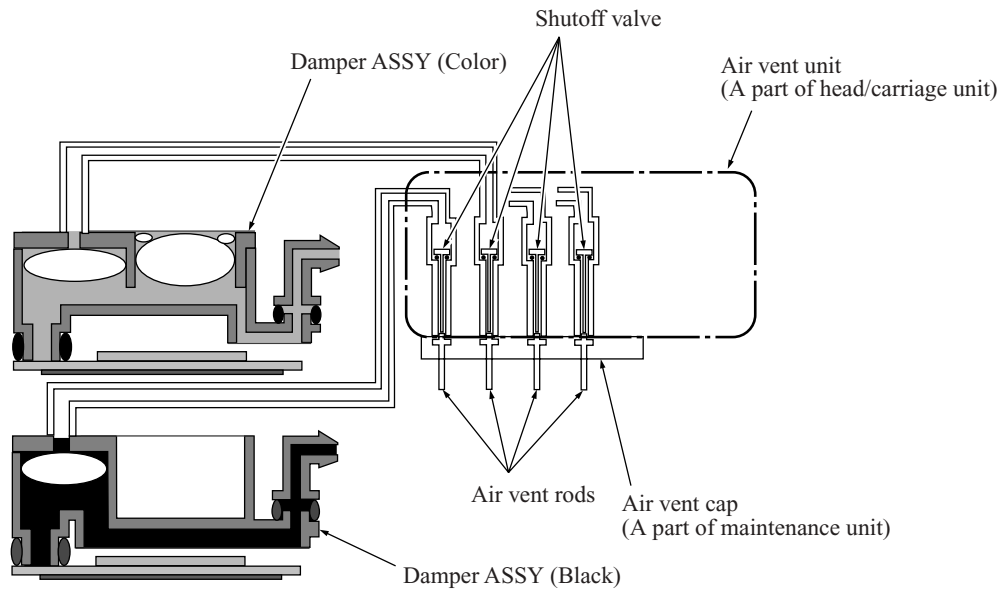
■ **Back end**

Back end components and their main roles

- Damper assembly
  This has two roles: dampening the ink pressure fluctuations** in the tubes as the carriage moves and collecting air bubbles that result from pressure changes on the ink.

  **Ink pressure fluctuations: As the head/carriage unit travels, inertia means that the ink remains in the same place, temporarily raising the pressure in the tubes.

- Air vent unit
  At regular scheduled intervals, this vents any air bubbles that have accumulated in the damper assembly.

- Air vent cap
  This fits tightly over the air vent unit to allow the negative pressure from the pump to suck air bubbles out of the unit.

- Air vent rods
  These open air vent flow paths by pushing up the normally closed shut-off valves inside the air vent unit.

Confidential

<u>Damping</u>

Without damping, ink pressure fluctuations directly affect the size of ink-jet head droplets, risking lower print quality.

The damper structure for black differs from that for the colors (C, M, and Y) because black has twice nozzles used for each color, meaning higher ink flow rates and bigger pressure fluctuations.

- Color dampers
The three color damper assemblies each have two chambers. The one on the right in the illustration serves as the damper. The air at the top constitutes a cushion that expands and contracts to absorb the pressure fluctuations caused by the inertia of the ink in the supply tubes as the head/carriage unit travels.

- Black damper
The black damper assembly is not partitioned into two chambers. Instead, it has a loose film across the bottom of its single chamber. This film immediately flexes in and out in response to rises and falls in pressure, adjusting the chamber volume to counteract pressure fluctuations in the ink supply tubes.

Color

Black

Film

This loose film flexes in and out in response to changes in ink pressure.
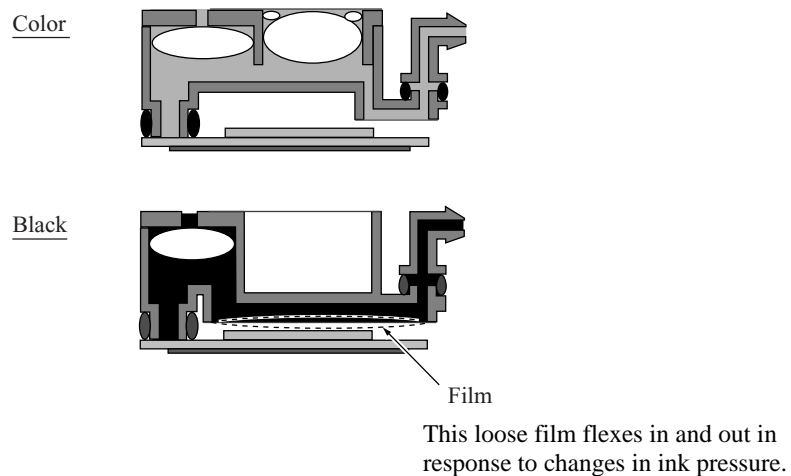
<u>Air buffering</u>

Liquid ink contains trace amounts of air. These molecules coalesce into air bubbles as the piezoelectric ceramic actuators vary the pressure on the ink in the ink-jet head channel. (See the illustration on page 3-14.) Removing as many of these bubbles as possible before the ink reaches the ink-jet head is essential to maintaining proper print quality. The above illustrations show how the damper assemblies provide air buffers, the chambers on the left, for consolidating these air bubbles away from the ink-jet head and vent flow paths for purging them at regular scheduled intervals.

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Air bubble growth

Liquid ink contains trace amounts of air. The amount varies with the pressure on the ink because increasing the pressure raises the ink's ability to absorb air from its surroundings and lowering the pressure forces the ink to give up some of this air.

The ink pressure fluctuations generated by the piezoelectric ceramic actuators repeatedly expand and contract any air bubbles, causing them to gradually grow larger as the ink pressure changes repeatedly expand and contract them.

The design therefore compensates by allowing the purging/flushing of air bubbles during printing to keep the amount of air dissolved in the ink to a minimum.

Confidential
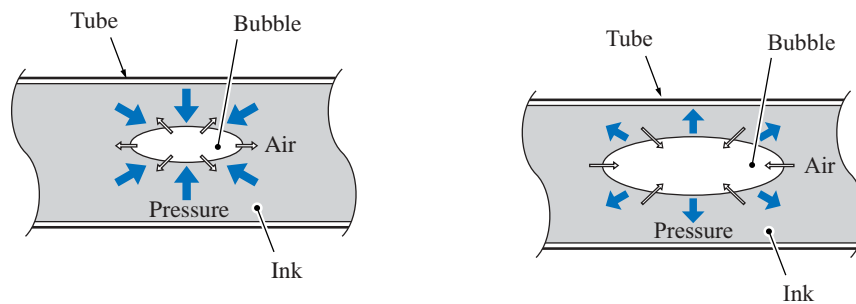
<u>What's so bad about air bubble growth?</u>

Pressure fluctuations do not affect the volume of a liquid (ink), but Boyle's Law says that the volume of a gas (air) varies with the pressure on it. The main issue with air bubbles in the ink flow path is their damping effect, absorbing the pressure from the piezoelectric ceramic actuators and thus degrading ink-jet performance.

Piezoelectric element

Pressure chamber
(Channel)

Bubble (Without pressure)

Bubble (High pressure)
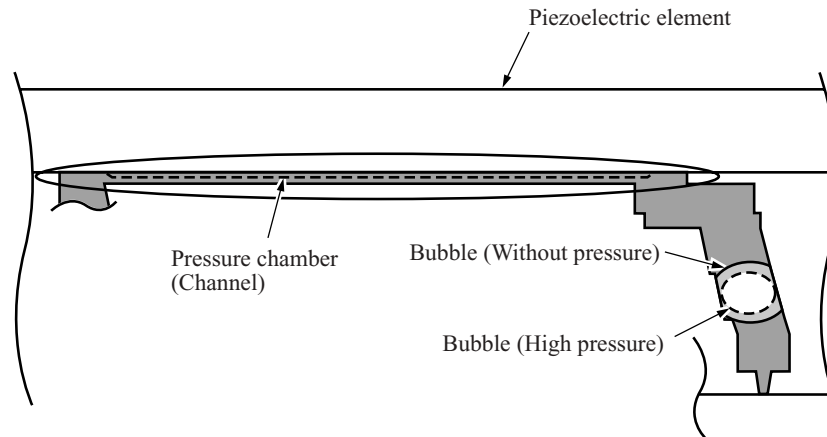
The above illustration shows an example of an extremely large air bubble reaching the print nozzle from the channel ink flow path; the dotted line, the changes resulting from applying a voltage to the laminated electrode, expanding the piezoelectric ceramic actuator. Note how contraction of the air bubble absorbs the pressure from the piezoelectric ceramic actuator, preventing ink ejection.

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[4] Ink cartridges

Ink empty   Filled with ink

Ink cartridge sensor   Sensor actuator

Valve

Disc-valve S

Disc-valve D

Ink   Air
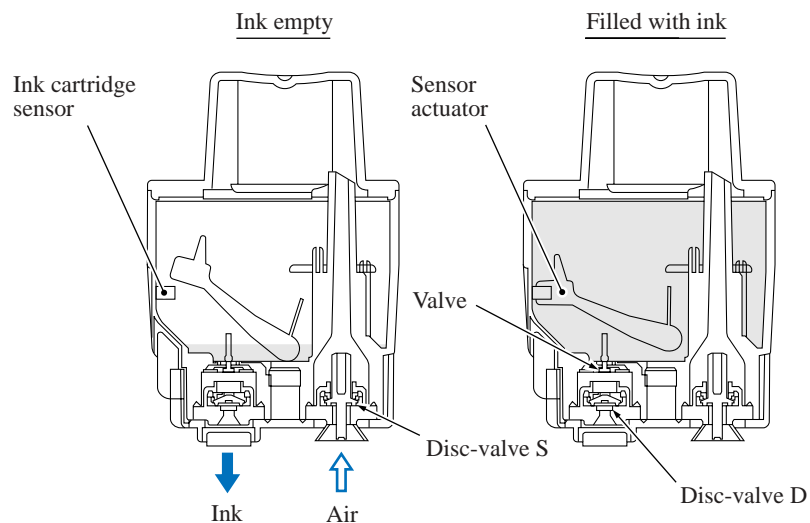
Ink cartridge features

This machine uses four ink cartridges: a black one and three color ones with a slightly lower capacity.

Previous versions featured horizontal insertion over metal needles fixed to the chassis. This one features vertical mounting in the ink refill base over plastic needles.

This vertical arrangement requires two ports in the bottom of the cartridge: one supplying the ink for printing and another supplying air to replace that ink. Both ports have disc valves preventing ink leakage. Mounting a cartridge over the plastic needles in the ink refill base forces these valves open to secure flow paths for both the ink and the air.

Inks

"Removing air"

An earlier page explained how too much air in the ink risks air bubbles degrading ink-jet performance. The manufacturing process prevents such air bubbles with a step, deaeration, that removes air from the ink before injection into the cartridge. Vacuum packaging then prevents air contamination during shipping and storage.

"Pigment-based ink"

Previous Brother machines used only dye-based inks. This one switches to a pigment-based ink for black only, reducing fuzziness from print character outlines, boosting resolution for black dots, and producing clearer images on plain paper.

This machine provides separate head caps and individual vent unit drive mechanisms for this black pigment-based ink and its dye-based color counterparts. Such special design measures are necessary because any mixing of the two types triggers a chemical reaction producing residue clogging head nozzles, filters, maintenance unit piping, and other components, degrading print performance.

Ink cartridge components and their main roles

- Disc valve S
  A plastic needle in the refill base opens this valve to supply air to the ink cartridge. Removing the ink cartridge closes this valve to prevent leakage due to ink backflow.

- Disc valve D
  A plastic needle in the refill base opens this valve to allow ink to flow out of the ink cartridge. Removing the ink cartridge closes this valve to prevent leakage.

- Valve
  This prevents ink from flowing backward through the ink outlet.

- Sensor arm
  This arm indicates the amount of ink remaining. Certain positions cut the light beam to the ink cartridge sensor on the ink cartridge PCB inside the ink refill assembly.
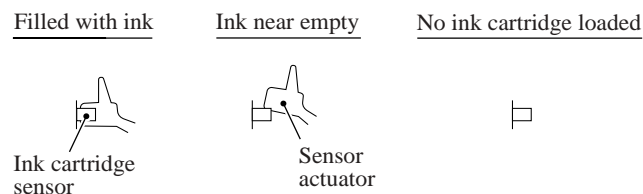
These ink cartridges are single-use affairs. There is no provision for refilling them. The design reduces environment load by using no metals and only burnable materials yielding no toxic substances.

Ink near-empty detection

The ink refill assembly has four ink cartridge sensors (photosensors of transparent type) that monitor the ink levels with sensor arms inside the ink cartridges.

Attached to one end of the sensor arm is a float. When there is ink in the cartridge, buoyancy lifts the float, rotating the sensor arm about a pivot near the center of the arm to block the light beam to the sensor, indicating that there is ink. As the ink level in the ink cartridge drops, however, the float falls, eventually moving the sensor arm out of the beam.

Light hitting the sensor is the signal that ink is running low ("Ink near-empty"), activating a firmware counter tracking ink usage during ink-jet printing, purges, and other operations. When this counter reaches a predetermined limit, the firmware considers the "ink empty" and prompts the use to replace it.

Removing an ink cartridge from its slot also causes light to hit the corresponding sensor. The firmware differentiates this from the above "running low" situation by interpreting any intervening activation of the scanner open sensor as indicating that the user has opened the scanner to remove that ink cartridge, so considers the "ink empty".

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[5] Ink refill assembly

Ink tube joints

Ink cartridge base

Cartridge clamp
springs

Ink refill base

Ink cartridge joints

Ink cartridge
sensors

Ink cartridge base

Polyurethane foam

Air flow path

Ink flow path
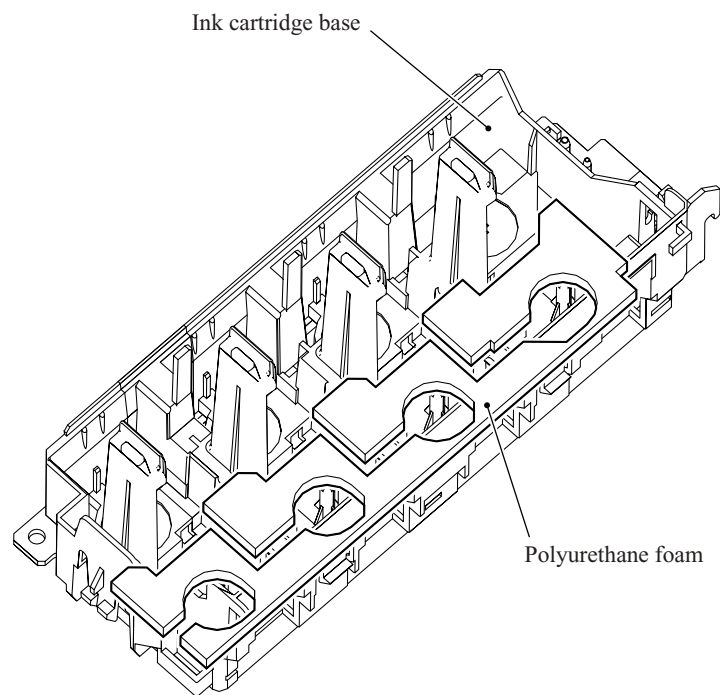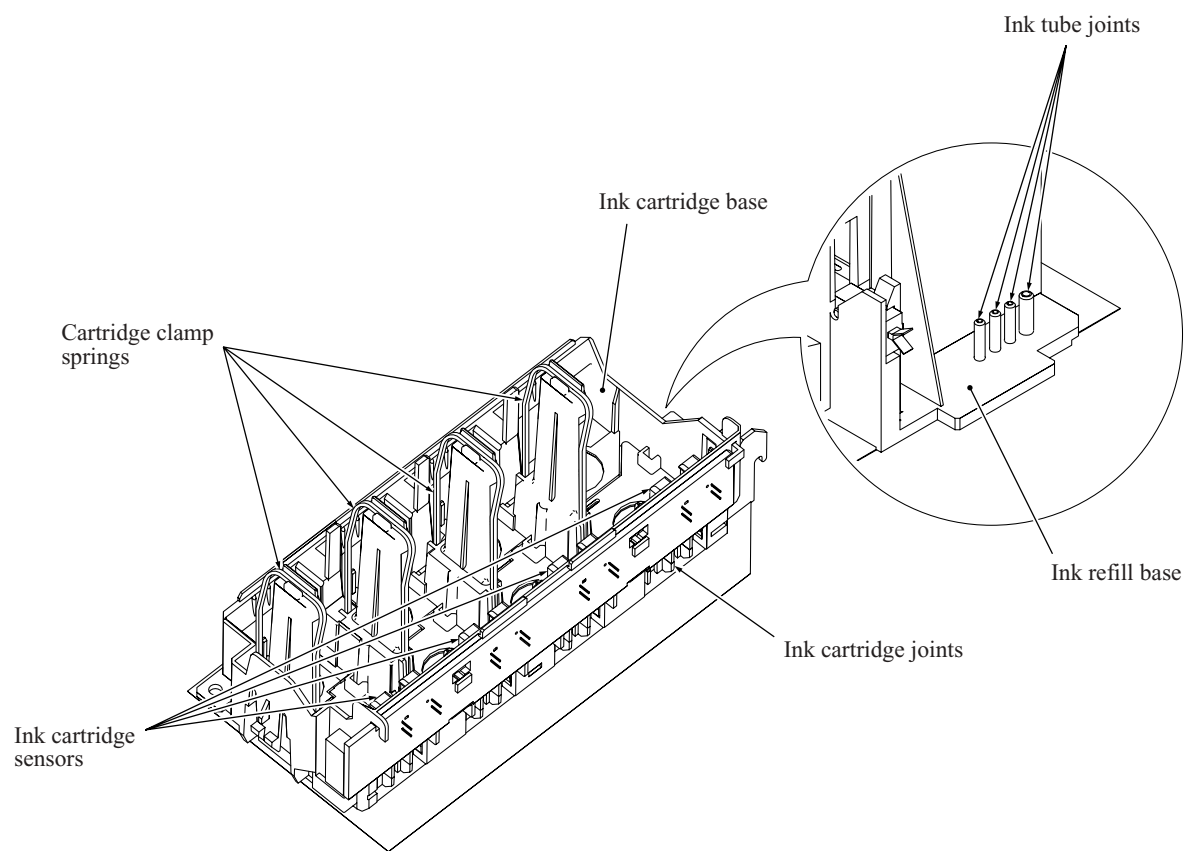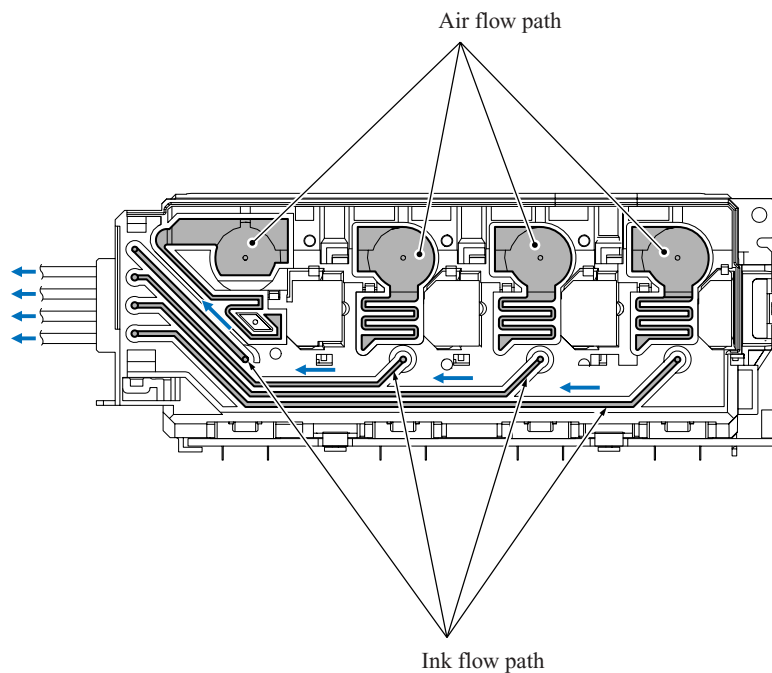
Ink refill assembly components and their main roles

- Ink refill base
  This holds the ink cartridges and feeds ink from them to the ink supply tubes.

- Cartridge clamp springs
  These force the ink cartridges into close contact with the ink cartridge joint to prevent ink leakage.

- Joint head
  This lifts the disc valves S and D, allowing ink to flow out of the ink cartridges and air to flow in. It also incorporates measures to prevent insertion of the wrong ink cartridges.

- Ink cartridge sensors
  These detect when the ink cartridges are running out of ink ("Ink near-empty").

- Polyurethane foam
  This absorbs any ink that leaks from the ink cartridges, limiting its spread and thus reducing the risk of damage to other components.

Ink refill assembly

The cartridge clamp springs force the ink cartridge ink supply ports into close contact with the joint head to prevent ink leakage.

The ink from the ink cartridges flows along paths in the ink refill base and through connectors into the ink supply tubes. As the ink level in an ink cartridge drops, the pressure inside falls, drawing in air from the air supply port in the ink refill base.

Polyurethane foam absorbs any ink that leaks from the ink cartridges, limiting its spread and thus reducing the risk of damage to other components.

An ink cartridge sensor arm blocking light to a cartridge sensor indicates that there is ink in the ink cartridge. When ink runs low, the arm moves out of the beam, activating the sensor. (Note that the firmware also interprets a missing ink cartridge as running low on ink.)

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[6] Ink supply tubes

These are made of an elastomer providing a highly impermeable barrier against air ingress and drying out of the ink during extended periods of nonuse. This material is also soft and highly flexible to better withstand the sharp and frequent bending associated with high-speed head operation repeatedly over extended periods.

3.2.2.3 Head maintenance mechanism

[1] **Maintenance mechanism components**

The head maintenance mechanism consists of the maintenance unit and the ink absorber box. (See the illustration below.)

The maintenance unit has the following functions.
- Locking the head/carriage unit
- Capping the head nozzles to prevent them from drying up (See page 3-27.)
- Purging for restoring optimum head performance by removing old ink from the head nozzles (See page 3-28.)
- Removing air bubbles from the print head (See page 3-16.)
- Cleaning with the wiper (See page 3-32.)

The ink absorber box absorbs the ink sucked out by purge operations.
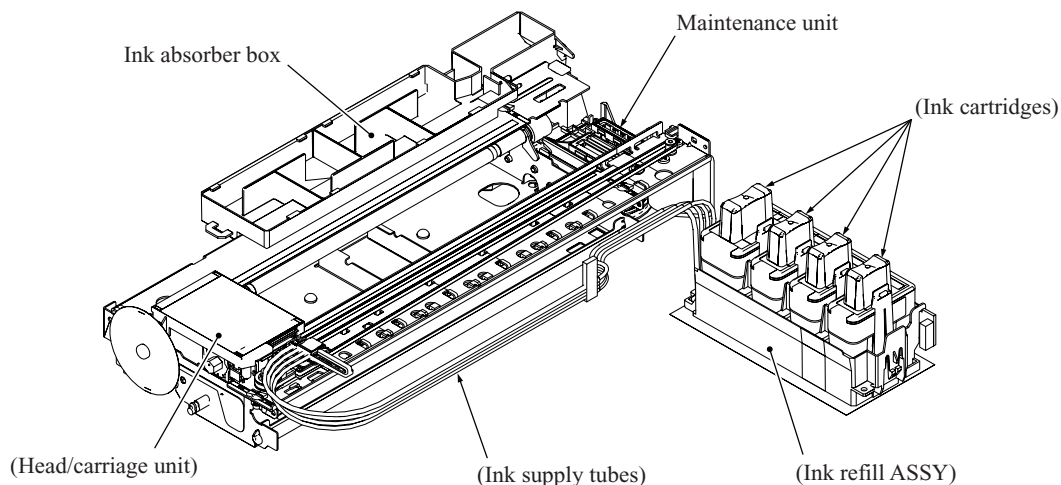
[2] **Maintenance unit components**

- Pump switching unit
  This switches the negative pressure from the tube pump and the atmosphere to the black and color head caps, the air vent unit, etc.

- Purge cam
  This rotating cam drives the carriage lock, the switching unit, the air vent rods, the head wiper, etc.

- Head/carriage lock
  This locks the head/carriage unit in its home position.

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- Planetary arm

  This switches power to the tube pump and pump switching unit depending on the direction of paper feed motor rotation.

- Bevel gear

  This transmits the power from the clutch gear to the planetary arm.

- Tube pump

  A roller squeezes the ink drain tubes looped inside, forcing their contents toward the ink absorber box and creating negative pressure.

- Head caps

  When the power is off or there is no printing, these fit tightly over the print head to prevent the head nozzles from drying up and to seal the head nozzles for purge operations to suck up old ink.

- Air vent rods

  Pushing these up opens the shut-off valves inside the air vent unit, expelling air trapped in the manifolds.

- Head wiper

  As the head/carriage unit moves, this wipes off any ink remaining on the head nozzle surface.

- Head cap holder

  This moves to the right together with the head/carriage unit as the latter returns to its home position. Rightward motion of the head cap holder turns the lift arms, fitting the head caps tightly over the print head to seal the head nozzles.
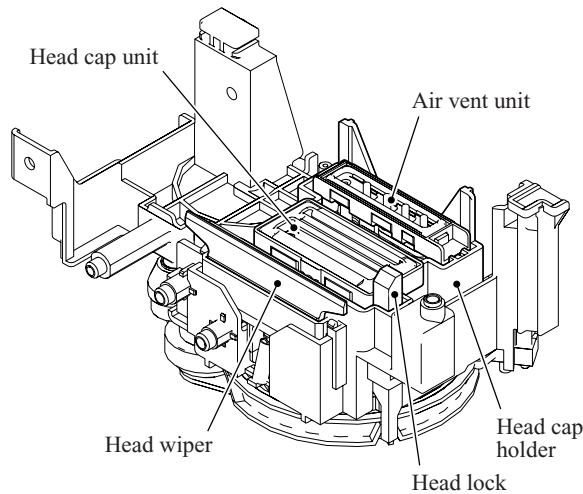
Viewed from the top   Viewed from the bottom

Confidential
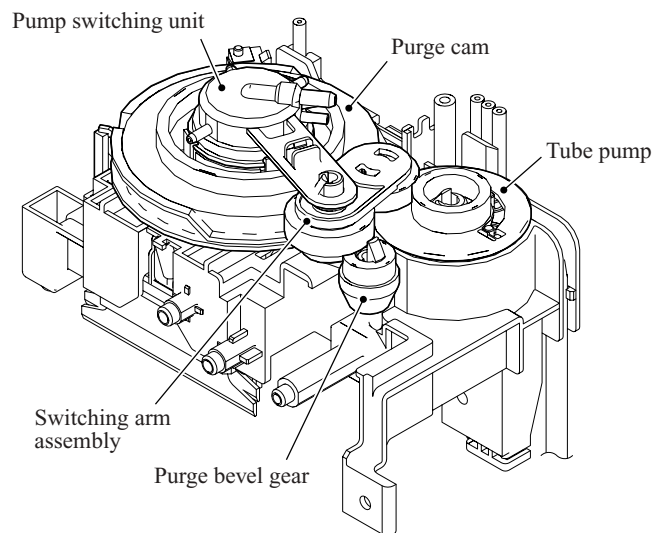
[3] Head capping mechanism

When the power is off or the machine is not printing, this mechanism fits the head caps tightly over the print head to prevent the head nozzles from drying up and to keep dust off the print nozzle surface.

The pump switching unit connects the spaces inside the caps to the atmosphere to prevent internal pressure fluctuations due to environmental changes from damaging the meniscuses. The ink remaining inside these spaces seals them. (See the illustration below.)

This mechanism moves with the head/carriage unit. When the head/carriage unit returns to its home position, it presses against the head cap holder in the maintenance unit. The lift arms in the maintenance unit raise the head caps, fitting them tightly over the head nozzle surface to protect them.
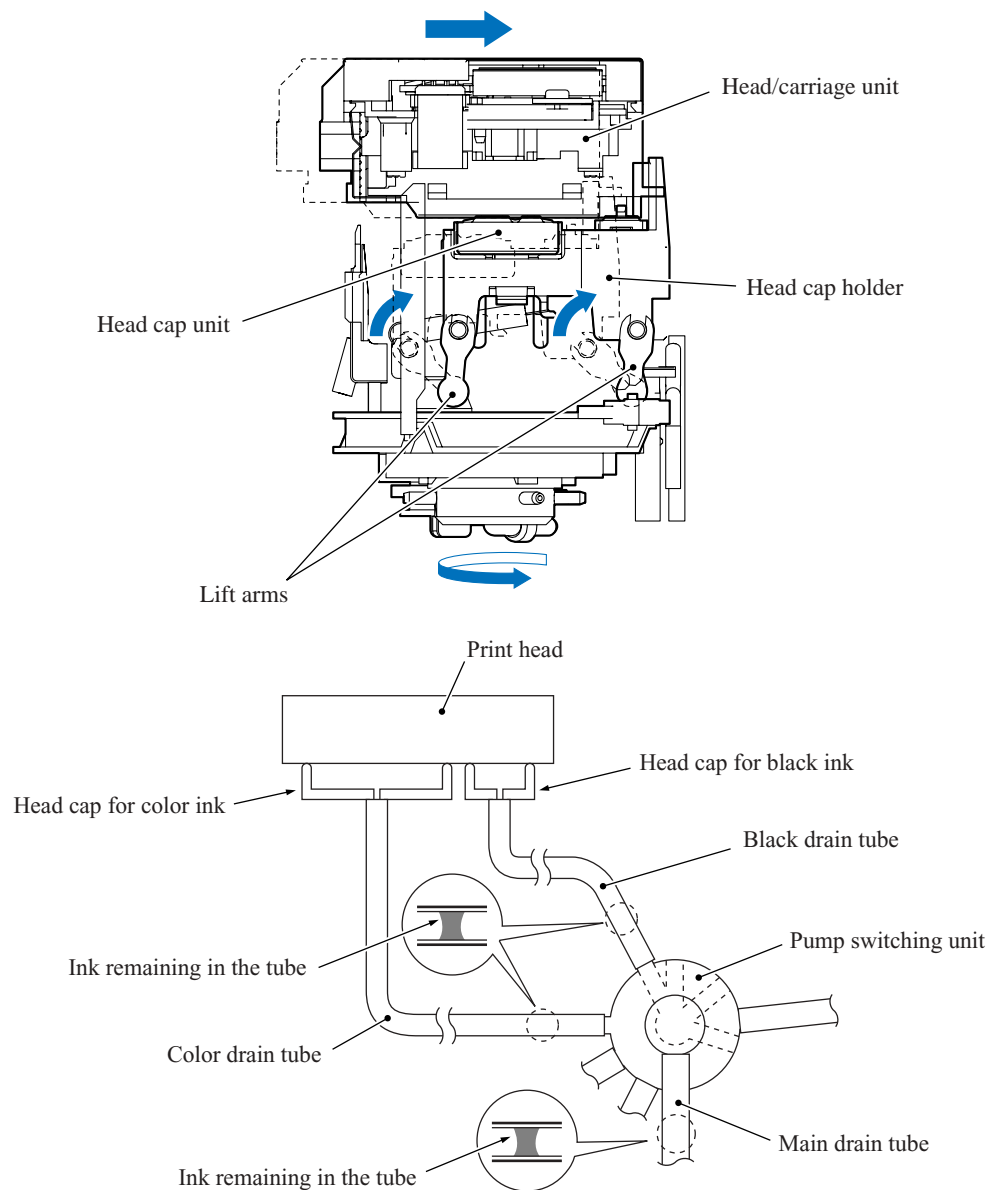
[4] Purge mechanism

This mechanism draws its power from the paper feed motor on the left side of the main chassis.

Gears between paper feed motor and maintenance unit

As described in Section 3.2.2.1, the motor drives the PF roller gear L that rotates the paper feed roller. At the right end of the roller (left in the illustration because the view is from the rear) is the PF roller gear R, which always meshes with the clutch gear.

Paper feed roller

PF roller gear L

(Front)

Paper feed motor

Purge lever

PF roller gear R

Clutch gear spring

Clutch gear

Purge lever spring

Idle gear L

Purge bevel gear

Purge gear

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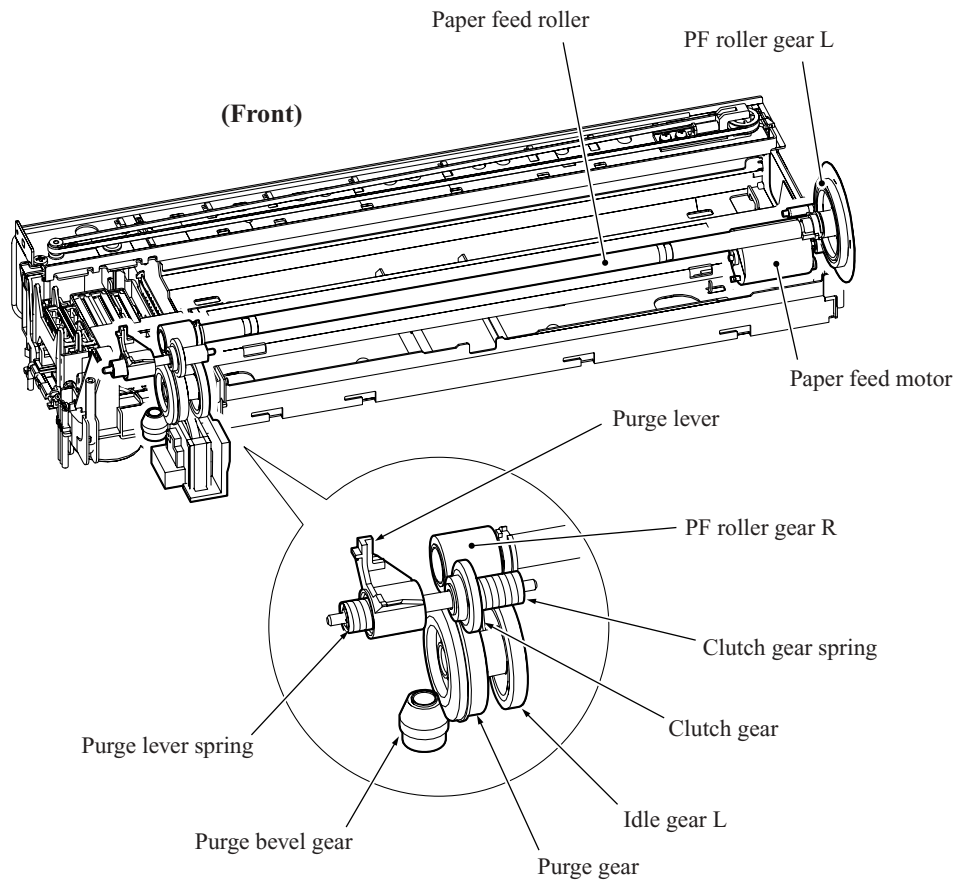
When the head/carriage unit travels from the left to right to reach the purge position, a tab on the carriage rear panel pushes the purge lever to the right (left in the illustration). The clutch gear spring pushes the clutch gear to the right, away from idle gear L, to mesh with the purge gear. At the purge position, therefore, the maintenance unit transmits the paper feed motor rotation to the bevel gear.

On the other hand, when the head/carriage unit moves left from the purge position, the tab on the carriage rear panel releases the purge lever, allowing a spring to force the purge lever and the clutch gear to the left. The purge lever spring is stronger, so forces the clutch gear spring back, disengaging it from the purge gear.

PF roller gear L

Paper feed motor

(Front)

PF roller gear R

Pump switching unit

Idle gear L

Purge gear

Switching arm assembly
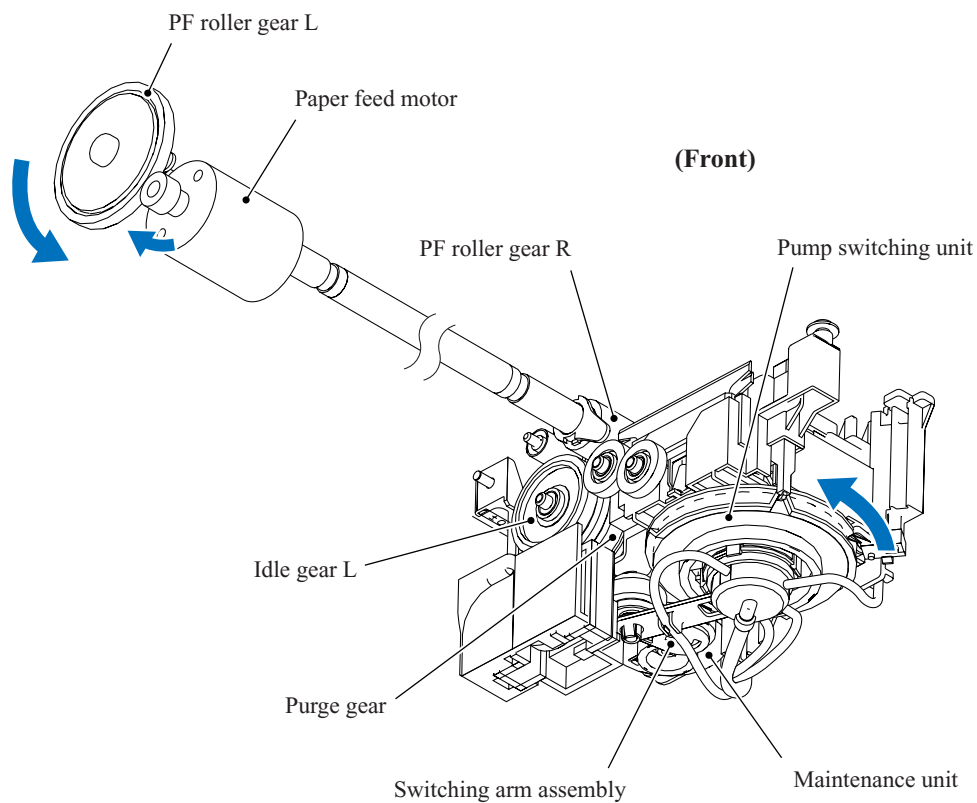
Maintenance unit

Switching arm assembly inside maintenance unit

When the paper feed motor is driving the maintenance unit, counterclockwise (when viewed from the output gear side) rotation drives the purge cam; clockwise rotation, the tube pump.

Main drain tube

Air vent tube

Purge cam

Pump switching unit

Purge bevel gear

Purge HP switch

Black drain tube

Color drain tube

Tube pump

Switching arm assembly

Opening tube to the atmospheric air
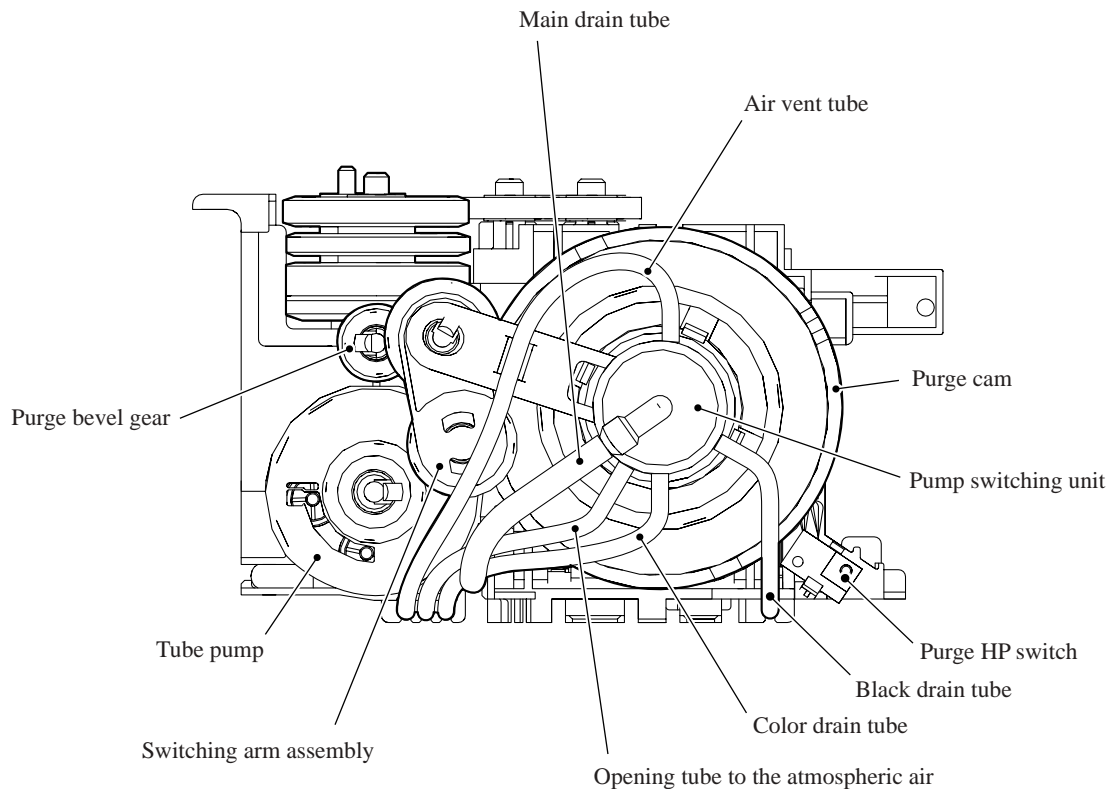
Purge cam mechanism

The purge cam is so designed that:

- the carriage lock pops out to lock the head/carriage unit before purging and pops in before cleaning with the head wiper (this lock also secures the head/carriage unit during transportation),
- the pump switching unit switches application of the negative pressure from the pump between the black head nozzles, the color head nozzles, and the air vent rod unit. When the purge cam is in the head capping position, the pump switching unit opens their interiors to normal atmospheric pressure.
- the head wiper comes out to clean the nozzle surface, and
- the air vent rods are pushed up via the slide cams to expel air trapped.

The purge cam switch detects the cam drive positions. (See Section 3.2.3.)

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(1) Carriage lock

Driving the purge cam pushes the carriage lock up and down. During the purge operation, the carriage lock pops out and locks the head/carriage unit to align ink-jet units with the mating head caps. After the purge operation, but before cleaning with the head wiper starts, the purge cam pulls in the carriage lock and releases the head/carriage unit. When the power is off, the carriage lock is released, pressing the head caps against the print head.
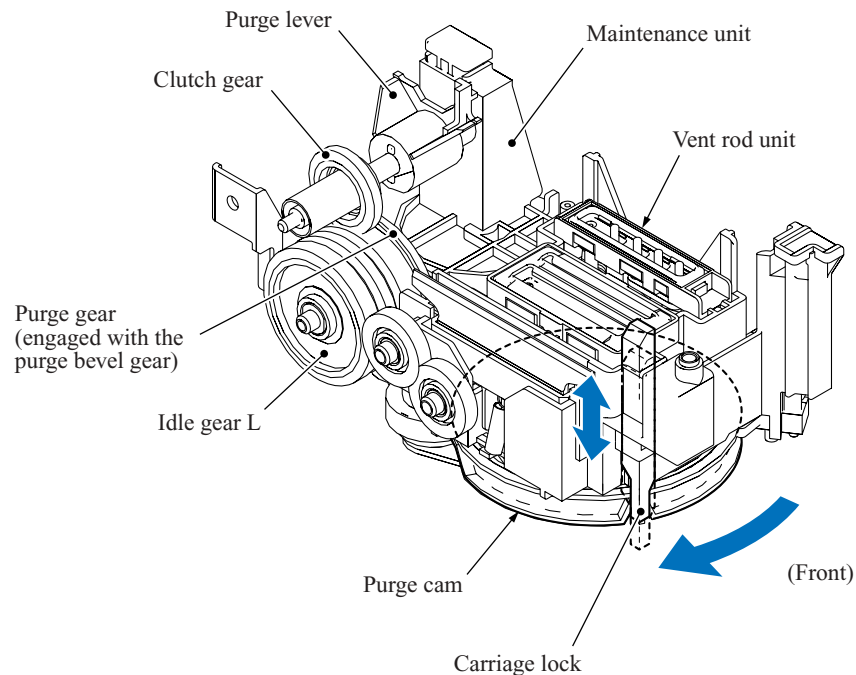
(2) Purging

Driving the purge cam to the pump switching unit's black or color position reverses the paper feed motor and activates the tube pump, producing negative pressure to drain the air and old ink from the head nozzles and channels into the ink absorber box.

　　　　　　　　　　　　　　　　　　　　　　　　　Confidential
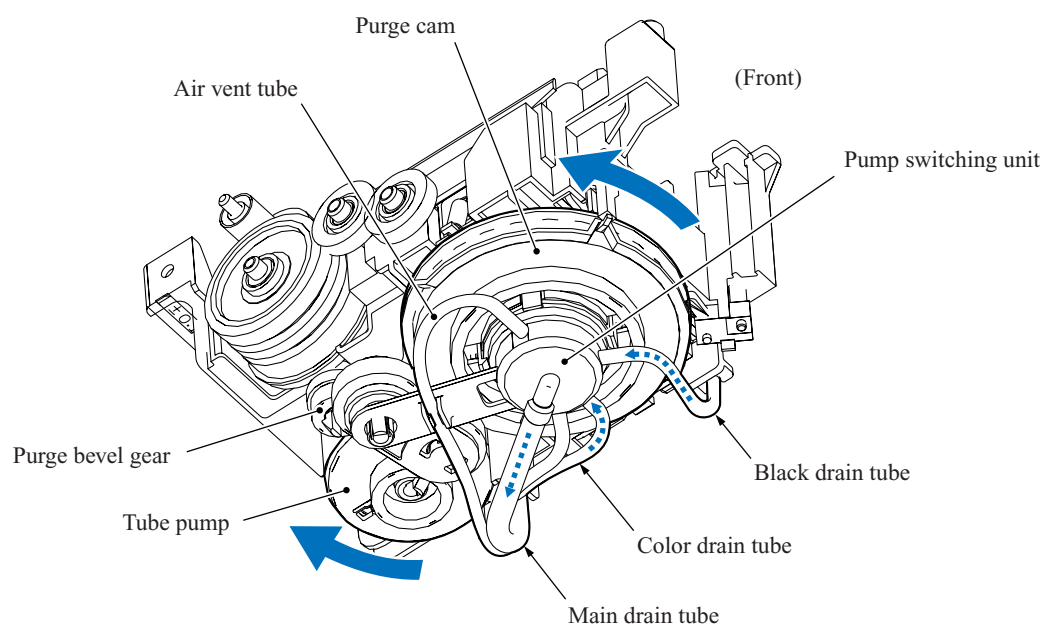
(3) Head wiper

After the purge operation, the purge cam pushes up the head wiper, wiping off any ink remaining on the head nozzle surface as the head/carriage unit moves from right to left.
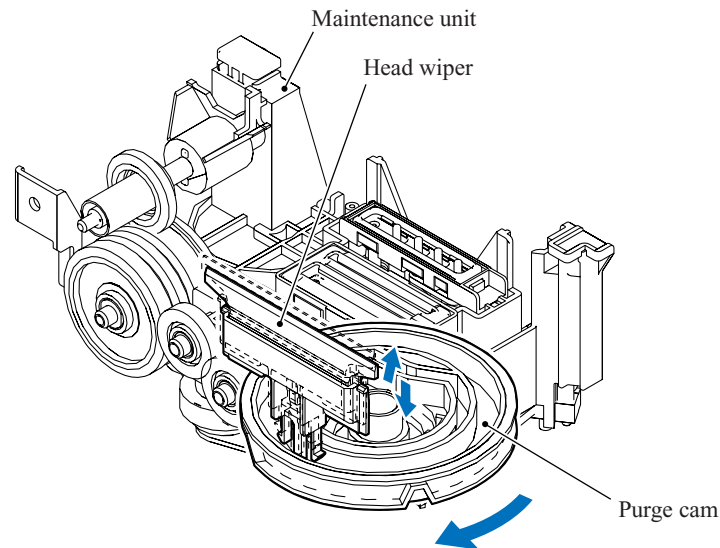
(4) Switching pump

The pump switching unit switches the negative pressure from the pump between the black head nozzles, the color head nozzles, and the air vent rod unit. Another position returns all these components to normal atmospheric pressure.

When the purge cam is in head capping position, the carriage lock fits the head caps tightly over the print head, and the pump switching unit is opened to the atmosphere.

The tube pump consists of a pump gear and tube roller. As the pump gear rotates, the tube roller on its circumference squeezes the ink drain tubes looped around the pump gear, forcing their contents toward the ink absorber box and creating negative pressure.
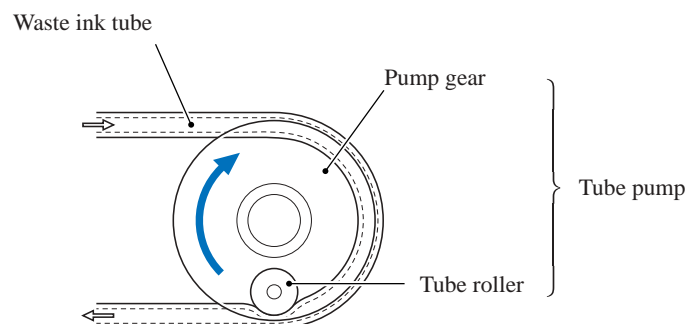
(5) Removing air

Another position of the purge cam shifts the slide cams, producing vertical motion of the air vent rods. Pushing up the air vent rods opens the shut-off valves inside the air vent unit of the head/carriage unit. Simultaneously adding negative pressure from the tube pump expels air trapped in the manifolds.

Purge types, ink used, purge counts, and purge trigger keys

Purge Types	Description	Ink Used	Purge Counts (See Note 2.)	Keys to trigger the purge, to be followed by **Black Start** key (See Note 1 for the DCP310CN/110C.)
Normal purge	This purge operation removes dried ink sticking to the head nozzles.	Black: 0.3 cc Color: 0.15 cc	Black: 15 Color: 22	**1** key
Power purge	More powerful than a reset purge, this purge operation is for removing stubborn clogging from the head nozzles and ink supply tubes.	Black: 0.85 cc Color: 0.55 cc	Black: 43 Color: 86	**3** key
Initial purge	Run automatically when the user powers up this machine for the first time, this purge operation refills the ink supply tubes and print head with fresh ink.	Black: 3.63 cc Color: 2.61 cc	Black: 187 Color: 420	**4** key
Reset purge	This purge operation removes any bubbles that have accumulated in the ink supply tubes.	Black: 0.55 cc Color: 0.4 cc	Black: 28 Color: 63	**5** key
Engine setup purge	This purge operation refills the ink supply tubes with ink when there is no ink in those tubes.	Black: 3.93 cc Color: 2.76 cc	Black: 202 Color: 443	**6** key
Cartridge replacement purge	This purge operation must follow ink cartridge replacement.	Black: 0.3 cc Color: 0.15 cc	Black: 15 Color: 22	**7** key
Ink drain purge (not used)	This purge operation drains all ink from the supply system, permitting repairs without the risk of scattering ink all over the surroundings.	--	--	
Initial liquid substitute purge (not used)	This purge operation substitutes ink in the ink supply tubes and print head with initial liquid.	--	--	--

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(Note 1) To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered on the LCD and then press the **Set** key. After that, press the **Mono Start** key.

(Note 2) This machine counts all purge operations performed since produced in order to prevent the ink absorber box from overflowing with drained ink. An initial purge, for example, advances the counter by 187 + 420 = 607. When the counter approaches <u>6400</u>, "MACHINE ERROR 46" appears, and further purge operations are prohibited. Replace the ink absorber box and reset the purge counter with the following procedure.

■ Resetting purge counter

MFC620CN/420CN/410CN/210C and FAX2440C

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

   TIP: FAX models equipped with numerical keypads can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu/Set**, *****, **2**, **8**, **6** and **4** keys in this sequence.

2) Press the **8** and **0** keys in this order in the initial stage of the maintenance mode to call up the machine's log information. (Function code 80. Refer to Chapter 8, Section 8.5.20.)

3) Press the **Black Start** key several times until the purge count appears 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 return to the standby state.

DCP310CN/110C

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

2) Press the ▲ key several times to display 8 on the LCD and then press the **Set** key. Again press the ▲ key several times to display 0 and then press the **Set** key

3) Press the **Mono Start** key several times until the purge count appears on the LCD.

4) Reset the purge count to zero by using the ▲ and **Set** keys as follows:

   Press the ▲ key several times to display 2 on the LCD and then press the **Set** key. In the same way, enter 7, 8 and 3.

5) Exit from the maintenance mode by using the ▲ and **Set** keys as follows:

   Press the ▲ key several times to display 9 on the LCD and then press the **Set** key. Again press the ▲ key several times to display 9 and press the **Set** key.

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Ink cartridge capacities

Ink cartridge type			Contents	Usable portion
Spare cartridges	Black ink cartridge	High volume type*	30.3 cc	Approx. 29.2 cc
		Low volume type	18.0 cc	Approx. 16.9 cc
	Color ink cartridges		11.3 cc	Approx. 10.5 cc
Initial cartridges (that ship with the machine)	Black ink cartridge		21.5 cc	Approx. 20.4 cc
	Color ink cartridges		14.2 cc	Approx. 13.4 cc

*Available in the FAX2440C only

Ink cartridge lifetimes

Print conditions: 3 pages/day (monochrome print, 5% duty)

Ambient temperature: 5 to 25°C

Ink Cartridge Type		Projected Lifetime
Black ink cartridge	High volume type*	Approx. 6.7 months
	Low volume type	Approx. 4.6 months
Color ink cartridges		Approx. 6.9 months

3.2.2.4 Carriage drive mechanism

The head/carriage unit, which integrates the print head unit and carriage, is supported and guided by the CR guide rail and CR support chassis. The CR timing belt (1/25.4 inch pitch) transmits the carriage motor rotation to the carriage. Clockwise motor rotations move the carriage to the right; counterclockwise ones to the left.

The CR encoder sensor on the back of the head/carriage unit scans the CR encoder strip under the engine chassis to monitor the current head position relative to the home position. The controller uses this signal for proportional, integration, differential (PID) control ensuring uniform speed. The strip's 1/150 dpi markings offer a choice of four speeds to match the print resolution: 40.0, 33.3, 32.0, and 20.0 ips.

CR support chassis

CR guide rail

CR encoder strip

Head/carriage unit

(Paper feed roller)

Idle pulley

CR timing belt

Carriage motor pulley

Carriage motor
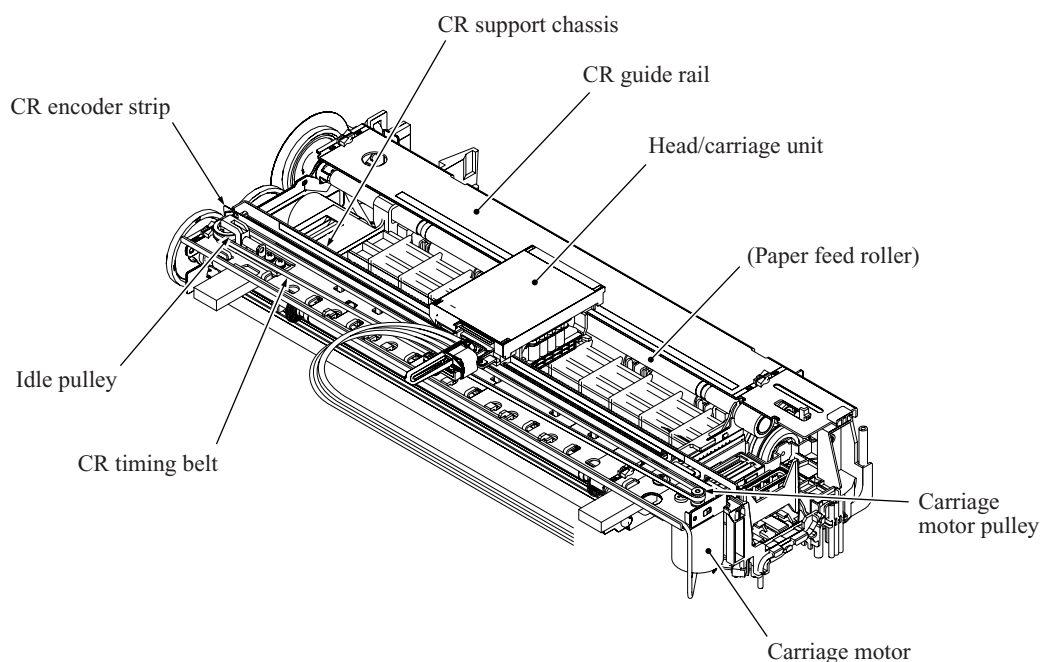
Aging

Maintenance mode function code 69 is for adjusting the initial PWM value. The firmware automatically adjusts this CR drive parameter as the head/carriage unit works to minimize speed deviations and to match the current mechanism. This aging sometimes resolves problems with ink clogging uneven operation.

For further details on maintenance function code 69, see Chapter 8, Section 8.5.17.

Adjusting print head angle relative to carriage

For optimal image printing, the print head nozzle array must be perpendicular to the head/carriage unit's line of travel. Manufacturing limitations, however, make perfect alignment impossible during mass production. The angle must be adjusted at the individual machine level.

The following describes this adjustment mechanism's components and their roles.

Slider L, the slider, and the rib attach the head/carriage unit to the CR chassis. The rib acts as a pivot for the slider's damping spring pressing the carriage to the rear. Slider L has a skew adjustment knob that shifts the slider back and forth, adjusting the angle of this backward pressure. Rotating the skew adjustment knob tilts the entire head/carriage unit, thus adjusting the print nozzle vertical angle relative to the carriage unit's line of travel.

This knob offers 15 settings, from -7 to +7.

Viewed from the bottom
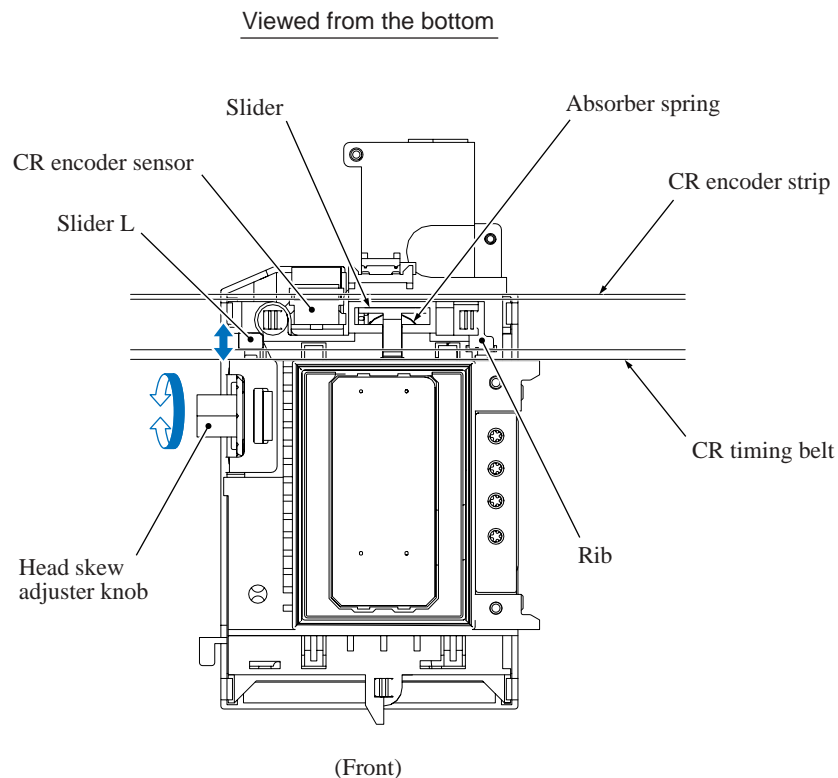
(Front)

3.2.3 Sensors and Actuators

This machine uses the following sensors and thermistor.

Sensor Name	Sensor Type	Location
Document front sensor (MFC620CN/420CN and FAX2440C)	Photosensor	In the ADF unit
Document rear sensor (MFC620CN/420CN and FAX2440C)	Photosensor	In the ADF unit
Scanner open sensor	Mechanical switch	In the rubber keypad in the control panel ASSY
Paper width sensor	Photosensor	On the carriage PCB
Head thermistor	Thermistor	On the carriage PCB
CR encoder sensor	Photosensor	On the carriage PCB
PF encoder sensor	Photosensor	On the PF sensor PCB
Registration sensor	Photosensor	On the PF sensor PCB
Purge cam switch	Mechanical switch	On the maintenance unit
Ink cartridge sensors (four)	Photosensor	On the ink cartridge PCB inside ink refill assembly
Large-volume ink cartridge sensor (FAX2440C)	Mechanical switch	On the ink refill assembly
Hook switch sensor (MFC620CN U.S.A./Canadian models and FAX2440C)	Photosensor	On the hook switch PCB in the lower cover

- The document front sensor detects whether there is a document in the ADF.

- The document rear sensor detects the leading and trailing edges of document pages, indicating to the control circuitry the point at which to start reading and when page scanning is complete.

- The scanner open sensor detects whether the scanner cover (scanner unit) is properly closed.

- The paper width (media) sensor detects the right and left paper edges, as well as the paper width in near-edge printing.

- The head thermistor detects the temperature of the print engine. According to the sensor information, the controller adjusts the head driver to compensate for changes in ink viscosity.

- The carriage motor (CR) encoder sensor monitors the head/carriage unit's current position and speed. An error in the head's travel speed usually indicates a paper jam.

- The paper feed motor (PF) encoder sensor monitors the PF roller rotation angle and speed for use in optimizing paper feed amount and speed.

- The registration sensor detects the leading and trailing edges of paper for use in determining registration timing and detecting paper jams.

- The purge cam switch detects the drive positions of the purge cam.

- There are four ink cartridge sensors, one for each color. The sensor actuator inside the ink cartridge usually blocks the light path to indicate the presence of ink. When ink runs low (near-empty), the arm moves out of the beam, activating the sensor. The same signal also indicates whether there is an ink cartridge present.

- The large-volume ink cartridge sensor detects whether a large-volume ink cartridge is loaded.

- The hook switch sensor detects whether the handset is on the handset mount.

Most sensors are photointerrupters consisting of a light-emitting diode and a light-sensitive transistor. The only exception is the paper width sensor, which uses reflective tape. The illustration on the next page gives the sensor and actuator locations.

Actuator's end

Light-emitting diode   Light-sensitive transistor

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(Carriage PCB)

(Maintenance unit)

Purge cam switch

Large-volume ink cartridge sensor*

Ink cartridge sensors

PF encoder disk

PF encoder sensor

(PF sensor PCB)

Registration sensor

Registration sensor actuator

Paper width sensor

(Ink cartridge PCB in the ink refill ASSY)

Scanner open sensor actuator

Scanner open sensor on the rubber keypad

CR encoder strip

CR encoder sensor

(Head/carriage unit)

(Hook switch PCB**)

Hook switch sensor**

Hook switch actuator**

*FAX2440C

**MFC620CN U.S.A./Canadian models and FAX2440C

(Lower cover)

Document front sensor

Document front sensor actuator

ADF & document cover ASSY (MFC620CN/420CN and FAX2440C)

Document rear sensor

Document rear sensor actuator

Sensors and Actuators Locations

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3.3 CONTROL ELECTRONICS

3.3.1 Components

The following illustration shows the hardware components for this machine. The corresponding wiring diagram appears in Appendix 5.

Machine Components

*1   MFC620CN/420CN/410CN and DCP310CN
*2   Not provided on the DCP310CN/110C.
*3   FAX2440C
*4   MFC620CN U.S.A./Canadian models and FAX2440C
*5   MFC620CN/420CN and FAX2440C
*6   Not provided on the FAX2440C.
*7   MFC620CN/FAX2440C

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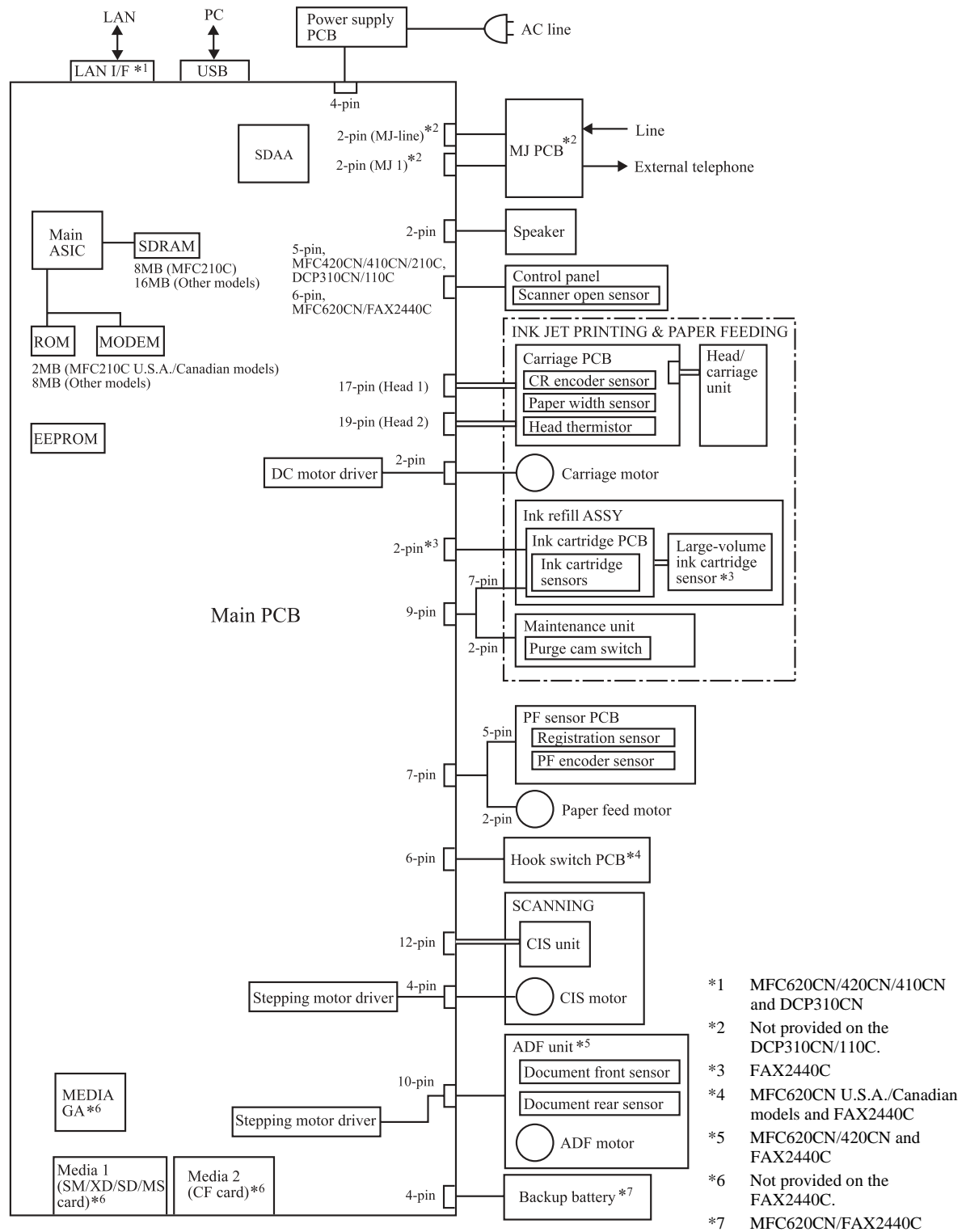
CHAPTER 4

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

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

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

CONTENTS

4.1 TRANSFERRING RECEIVED FAX DATA

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

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

NOTE: This function is not applicable to the DCP310CN/110C.

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

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

■ **Operating Procedure**

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

(2) Switch the machine on.

(3) Press the **Menu/Set**, **Black Start**, **0**, **5** and **3** keys in this order to access user-accessible functions of the maintenance mode.

The "FAX TRANSFER" appears on the LCD.

(4) <u>To check the number of received files</u>, press the **1** key.

The "1.NO. OF JOBS" appears on the LCD.

Press the **Menu/Set** key, and the number of received files appears, just as "NO. OF. JOBS: 10."

(5) <u>To transfer the activity report only</u>, press the **2** key.

The "2.ACTIVITY" appears.

<u>To transfer received files together with the activity report</u>, press the **3** key.

The "3.DOCUMENTS" appears. Note that if there is no received file, the "NO DOCUMENTS" appears.

(6) <u>To transfer the communication list for the latest communication</u>, press the **4** key.

The "4.COM.LIST (NEW)" appears.

<u>To transfer the communication list for last three errors</u>, press the **5** key.

The "5.COM.LIST (ERR3)" appears.

(7) With the "2.ACTIVITY," "3.DOCUMENTS," "4.COM.LIST (NEW)," or "5.COM.LIST (ERR3)" being displayed, press the **Menu/Set** key.

The "ENTER NO. &SET" appears.

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

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

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

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

Cover page sample

```
=== FAX TRANSFER COVER PAGE ===

NO. OF JOBS    :001                    ←————————— Job number
TOTAL PAGE[S]  :001                    ←————————— Total number of pages to be transferred
NAME           :BROTHER                ←————————— Station ID registered in the sender equipment
FAX            :052 824 2330           ←————————— FAX number of the sender equipment
TEL            :                       ←————————— Telephone number of the sender equipment
TIME           :01/02/2004 22:21  ←————————— Transfer start date

8CA-811                    ←————————————————— Model code
B0403261602                ←————————————————— Boot ROM info
U0404221449 VER.0  ←————————————————— ROM info
G01234567890            ←————————————————— Serial number
```

End page sample

```
=== FAX TRANSFER END PAGE ===

NO. OF JOBS    :001                ←————————— Job number
TOTAL PAGE[S]  :001                ←————————— Total number of pages transferred
NAME           :BROTHER            ←————————— Station ID registered in the sender equipment
FAX            :052 824 2330  ←————————— FAX number of the sender equipment
TEL            :                   ←————————— Telephone number of the sender equipment
MACHINE STATUS 1    AF:0401022216 ←————┐
MACHINE STATUS 2    43:0401022216 ←————│
MACHINE STATUS 3    48:0401022216 ←————│
MACHINE STATUS 4    AF:0401022017 ←————│
MACHINE STATUS 5    43:0401022017 ←————├— Error codes
MACHINE STATUS 6    48:0401022017 ←————│
MACHINE STATUS 7    AF:0401011756 ←————│
MACHINE STATUS 8    43:0401011756 ←————│
MACHINE STATUS 9    48:0401011756 ←————┘
```

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CHAPTER 5

DISASSEMBLY/REASSEMBLY AND LUBRICATION

CHAPTER 5 DISASSEMBLY/REASSEMBLY AND LUBRICATION

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

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

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

◆ *Illustrations and descriptions in this chapter are based on the MFC210C.*

CONTENTS

5.1 DISASSEMBLY/REASSEMBLY

■ **Safety Precautions**

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

(1) Before replacing parts or units, <u>unplug the power cord and telephone line</u>.

In particular, when having access to the power supply inside the machine, make sure that the power cord is unplugged from the electrical outlet; when having access to the main PCB or MJ PCB, make sure that both the power cord and telephone line are unplugged from the machine.

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

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

(4) Static electricity charged in your body may damage electronic parts.

Before handling the PCBs, touch a metal portion of the machine to discharge static electricity charged in your body. When transporting PCBs, be sure to wrap them in conductive sheets such as aluminum foil.

When replacing the head/carriage unit, put on a grounding wrist band and perform the job on a static mat. Also take care not to touch the conductor sections on the flat cables.

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

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

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

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

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

(10) <u>Once the head/carriage 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 head/carriage unit unusable and require replacement with a new head/carriage unit.</u>

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

Location of screw	Screw type	Q'ty	Tightening torque N•m (kgf•cm)
Grounding wire[1]	Taptite, cup S M3x6	1	0.39 ±0.1 (4 ±1)
ADF & document cover ASSY[1]	Taptite, bind B M4x12	2	0.78 ±0.1 (8 ±1)
Document guide[1]	Taptite, B M3x6	1	0.49 ±0.1 (5 ±1)
Grounding wire[1]	Taptite, cup S M3x6	1	0.59 ±0.1 (6 ±1)
ADF motor[1]	Screw, pan (s/p washer) M3x6	1	0.59 ±0.1 (6 ±1)
ADF reinforcement plate[1]	Taptite, cup B M3x10	2	0.49 ±0.1 (5 ±1)
Scanner cover (Scanner unit)	Taptite, cup B M3x10	3	0.59 ±0.1 (6 ±1)
Upper cover	Taptite, bind B M4x12	4	0.69 ±0.1 (7 ±1)
Main PCB shield	Taptite, cup S M3x6	1	0.39 ±0.1 (4 ±1)
	Taptite, cup B M3x8	2 (1)[2]	0.29 ±0.1 (3 ±1)
Main PCB	Taptite, cup B M3x8	3	0.29 ±0.1 (3 ±1)
	Taptite, cup S M3x6[3]	1	0.39 ±0.1 (4 ±1)
Main PCB shield frame	Screw, pan (s/p washer) M3x8	1	0.59 ±0.1 (6 ±1)
MJ/PS shield box	Taptite, cup S M3x6	2	0.39 ±0.1 (4 ±1)
MJ shield	Screw, pan (washer) M3x8DB	1	0.39 ±0.1 (4 ±1)
MJ PCB	Taptite, cup S M3x6	1	0.39 ±0.1 (4 ±1)
Power supply PCB	Taptite, cup S M3x6	4	0.39 ±0.1 (4 ±1)
Grounding terminal	Screw, bind M4x6	1	0.39 ±0.1 (4 ±1)
Maintenance unit (top)	Taptite, cup B M3x8	1	0.59 ±0.1 (6 ±1)
Maintenance unit (right side)	Taptite, cup S M3x6	1	0.78 ±0.1 (8 ±1)
Carriage motor	Screw, bind M3x3	2	0.39 ±0.1 (4 ±1)
PF sensor PCB	Screw, bind M2.6x8	1	0.39 ±0.1 (4 ±1)
Paper feed motor	Screw, bind M3x3	2	0.39 ±0.1 (4 ±1)

[1] Provided on the MFC620CN/420CN and FAX2440C.
[2] The number of screws enclosed with parentheses is for the MFC210C and DCP110C.
[3] Provided on the MFC620CN/420CN/410CN, FAX2440C and DCP310CN.

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■ Preparation

Prior to proceeding with the disassembly procedure,

(1) Unplug
   - the power cord from the electrical outlet,
   - the modular jack of the telephone line,
   - the modular jack of the handset (and remove the handset)*,
   - the USB cable, if connected (not shown below), and
   - the modular jack of the external telephone set if connected (not shown below).

(2) Remove
   - the paper tray and
   - the handset mount (by pulling the tab and sliding the handset mount in the direction of the arrow shown below)*.

(3) Remove memory cards if inserted in the machine.

*MFC620CN U.S.A./Canadian models and FAX2440C
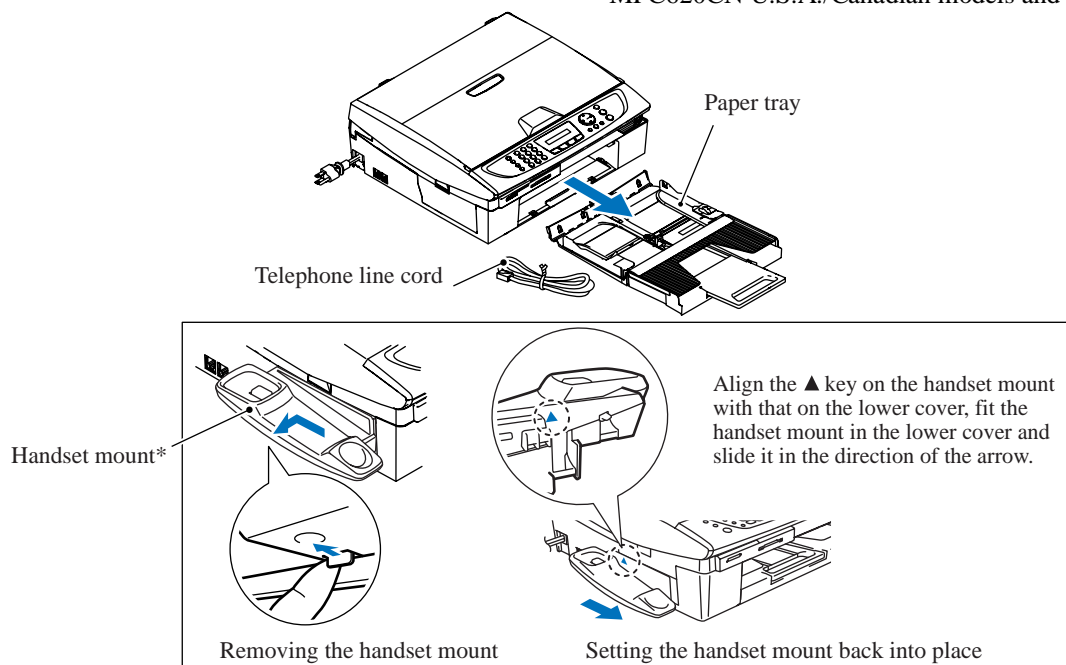
Paper tray

Telephone line cord

Handset mount*

Align the ▲ key on the handset mount with that on the lower cover, fit the handset mount in the lower cover and slide it in the direction of the arrow.

Removing the handset mount   Setting the handset mount back into place

During disassembly jobs except when removing the ink refill ASSY or engine unit (including the maintenance unit), leave the head/carriage unit and all four ink cartridges in the machine.

When removing the head/carriage unit, ink refill ASSY or engine unit, you need to remove the ink cartridges and drain the ink from the ink refill ASSY and head/carriage unit beforehand.

■ How to Access the Target Component

- On the next page is a disassembly flowchart which helps you access the target components. To remove the maintenance unit, (for example in the MFC410CN/210C and DCP310CN/110C), first find it on the flowchart and note its number (5.1.15 in this case). To access it, you need to remove all the parts above the maintenance unit on the flowchart (5.1.3, 5.1.4, 5.1.11 and 5.1.15 in this case) before the unit itself can be removed.

- Unless otherwise specified, all parts should be replaced in the opposite order to which they were removed to reassemble the machine.

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Jam clear cover — 5.1.2

Document cover *1 — 5.1.3

CIS flat cable cover — 5.1.4
Harness cover — 5.1.4
ADF & document cover ASSY *2 — 5.1.5

Scanner cover (Scanner unit) — 5.1.4
Control panel ASSY (NOTE 1) — 5.1.6

Upper cover — 5.1.7

Hook switch actuator Hook switch PCB *3 — 5.1.8

Ink refill ASSY (NOTE 2) — 5.1.11

Media module cover — 5.1.12
Ink absorber box — 5.1.14

Main PCB — 5.1.12

MJ/PS shield box — 5.1.13
MJ PCB — 5.1.13
Power supply PCB — 5.1.13 *5

Head/carriage unit — 5.1.9
Carriage PCB (NOTE 3) — 5.1.9
Backup battery *4 — 5.1.10

CR encoder strip — 5.1.16
CR timing belt — 5.1.9

Paper pressure holder — 5.1.16
Registration sensor actuator — 5.1.16

PF sensor PCB (NOTE 5) — 5.1.16
PF encoder disk — 5.1.16
Ejection idle gear — 5.1.16

Engine unit — 5.1.15

Maintenance unit (NOTE 4) — 5.1.15
Paper pull-in gear shaft and roller holder — 5.1.16

Carriage motor — 5.1.16

Paper ejection roller — 5.1.16
Platen — 5.1.16
Star wheel holder ASSY — 5.1.16
Flushing case — 5.1.16
Paper feed motor — 5.1.16

*1 MFC410CN/210C, DCP310CN/110C
*2 MFC620CN/420CN, FAX2440C
*3 MFC620CN U.S.A./Canadian models, FAX2440C
*4 MFC620CN, FAX2440C
*5 Not provided on the DCP310CN/110C

Sensors, encoders, and thermistors
(NOTE 1) On the control panel PCB is a scanner open sensor.
(NOTE 2) On the ink cartridge PCB in the ink refill ASSY are four ink cartridge sensors. A large-volume ink cartridge sensor is also provided on the FAX2440C.
(NOTE 3) On the carriage PCB are a paper width sensor, CR encoder sensor and head thermistor.
(NOTE 4) On the maintenance unit is a purge cam switch.
(NOTE 5) On the PF sensor PCB are a registration sensor and PF encoder sensor.

5.1.1 Draining the Ink from the Ink Tubes

-- Be sure to perform draining before removing the head/carriage unit, ink refill ASSY or engine unit. --

(1) Open the scanner cover (scanner unit) and pull out all four ink cartridges.

(2) As shown below, attach a piece of black vinyl adhesive tape to each of four dummy cartridges to prevent the ink cartridge sensors from detecting ink near-empty.

Then load those dummy cartridges into the cartridge slots and close the scanner cover.

Scanner cover
(Scanner unit)

Ink cartridges

Dummy cartridges

Attach a piece of
black adhesive tape.
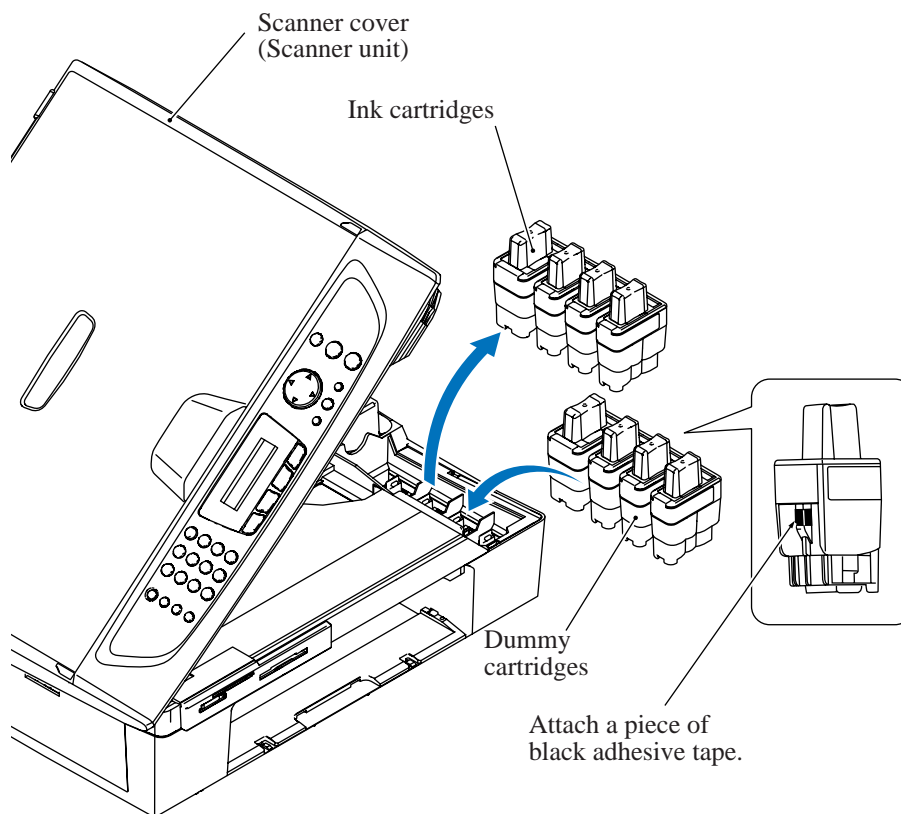
(3) Plug the power cord into an electrical outlet.

MFC620CN/420CN/410CN/210C and FAX2440C

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

The "▮▮ MAINTENANCE ▮▮▮" appears on the LCD.

TIP: FAX models equipped with numerical keypads can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu/Set**, *****, **2**, **8**, **6** and **4** keys in this sequence.

(5) Carry out "Initial purge" (with Function code 76) by pressing the **7**, **6**, **4** and **Black Start** keys.

For details, refer to Chapter 8, Section 8.5.19 "Purging Operation."

(6) Make the head/carriage unit travel to the head replacement position (with Function code 63) by pressing the **6**, **3** and ***** keys.

For details, refer to Chapter 8, Section 8.5.13 "Travel Check of the Head/Carriage Unit and Initial Setup Mode."

(7) Unplug the power cord from the electrical outlet.

(8) Replace the dummy cartridges loaded in step (2) with protective ones.

DCP310CN/110C

(4) Press the **Menu** and **Mono Start** keys. Next press the ▲ key four times to make the machine enter the maintenance mode.

The "▮▮ MAINTENANCE ▮▮▮" appears on the LCD.

(5) Carry out "Initial purge" (with Function code 76) by using the ▲ and **Set** keys as follows:

Press the ▲ key several times to display 7 on the LCD and then press the **Set** key. In the same way, enter 6 and 4.

For details, refer to Chapter 8, Section 8.5.19 "Purging Operation."

(6) Make the head/carriage unit travel to the head replacement position (with Function code 63) by using the ▲ and **Set** keys as follows:

Press the ▲ key several times to display 6 on the LCD and then press the **Set** key. In the same way, enter 3 and *.

For details, refer to Chapter 8, Section 8.5.13 "Travel Check of the Head/Carriage Unit and Initial Setup Mode."

(7) Unplug the power cord from the electrical outlet.

(8) Replace the dummy cartridges loaded in step (2) with protective ones.

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5.1.2 Jam Clear Cover

    (1) Press the two latches inwards and pull the jam clear cover out of the machine.

Latch

Latch

Jam clear cover
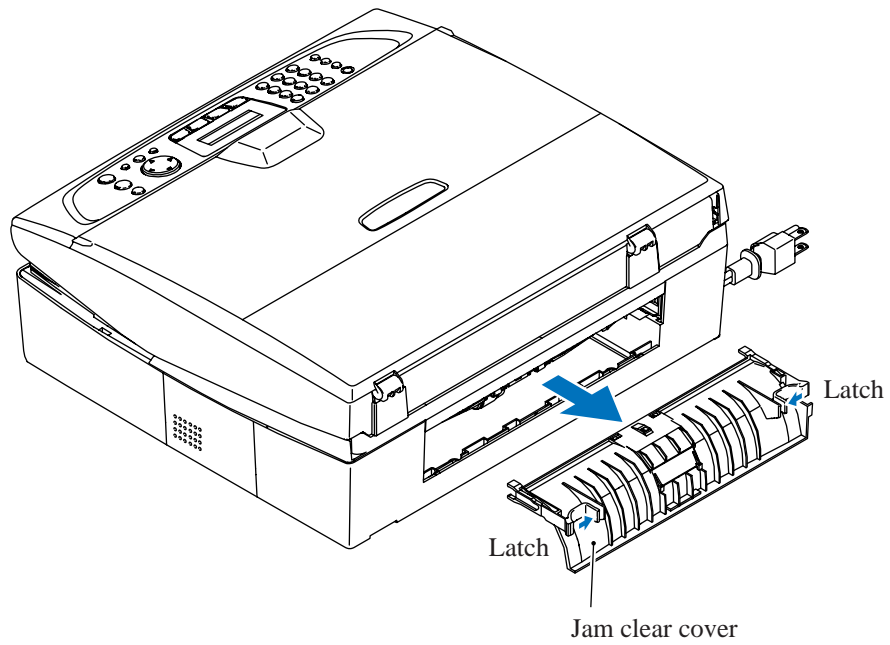
5.1.3 Document Cover (MFC410CN/210C and DCP310CN/110C)

For the MFC620CN/420CN and FAX2440C, remove the automatic document feeder (ADF) & document cover ASSY in Section 5.1.5 after separating the scanner cover from the machine in Section 5.1.4.

Do not remove the document cover in the disassembly jobs except when replacing it. Performing disassembly jobs with the document cover being set prevents the scanner glass from getting scratched or damaged.

(1) Turn the document cover upright and lift it up and off.

(2) Remove the two hinges from the document cover.

Document cover

Hinge

Scanner cover
(Scanner unit)

Hinge

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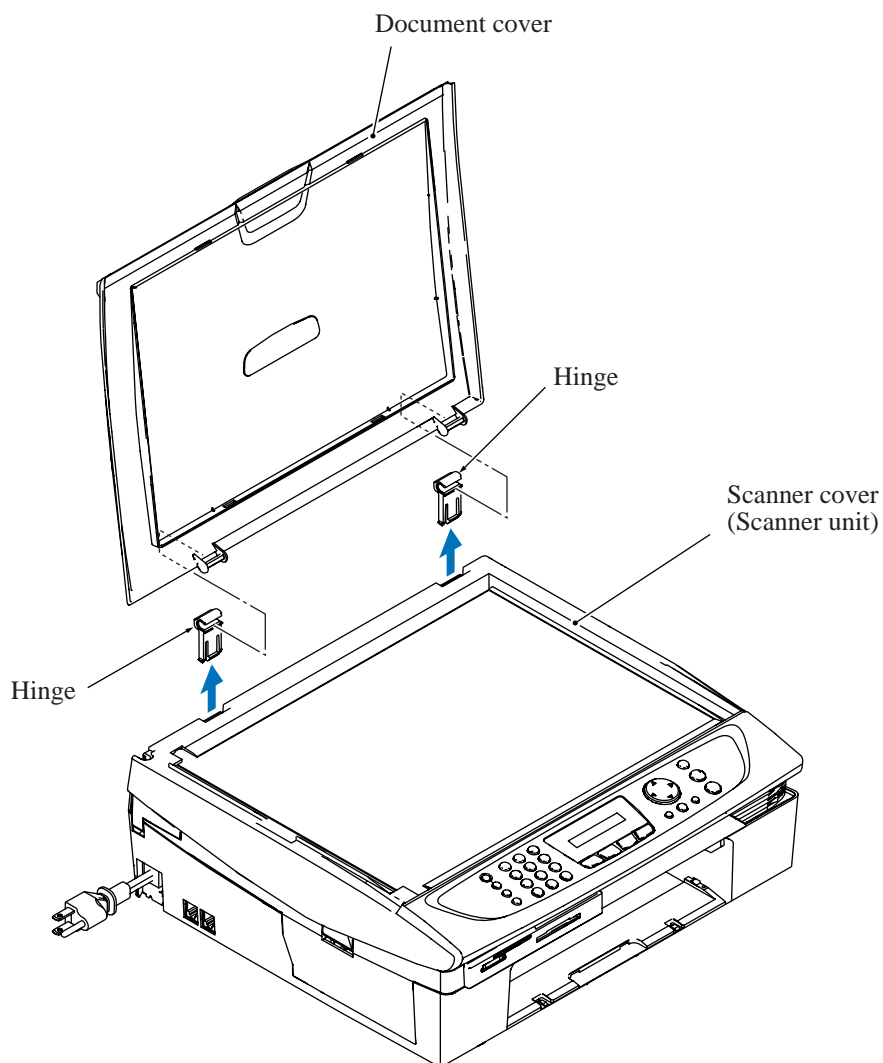
5.1.4 Scanner Cover (Scanner Unit)

MFC410CN/210C and DCP310CN/110C: The document cover has been removed from the scanner cover in Section 5.1.3.

MFC620CN/420CN and FAX2440C: The scanner cover still has the ADF & document cover ASSY whose removal procedure is described in Section 5.1.5.

(1) Open the scanner cover to the left until it locks.

(2) While supporting the scanner cover by hand, unlatch the scanner cover damper from the scanner cover using an Allen wrench (max. 30 mm x min. 70 mm) as shown below and pull it off the scanner cover.

NOTE: If using the Allen wrench cannot remove the scanner cover easily, use curved-point tweezers, taking care not to deform the tip of the tweezers.
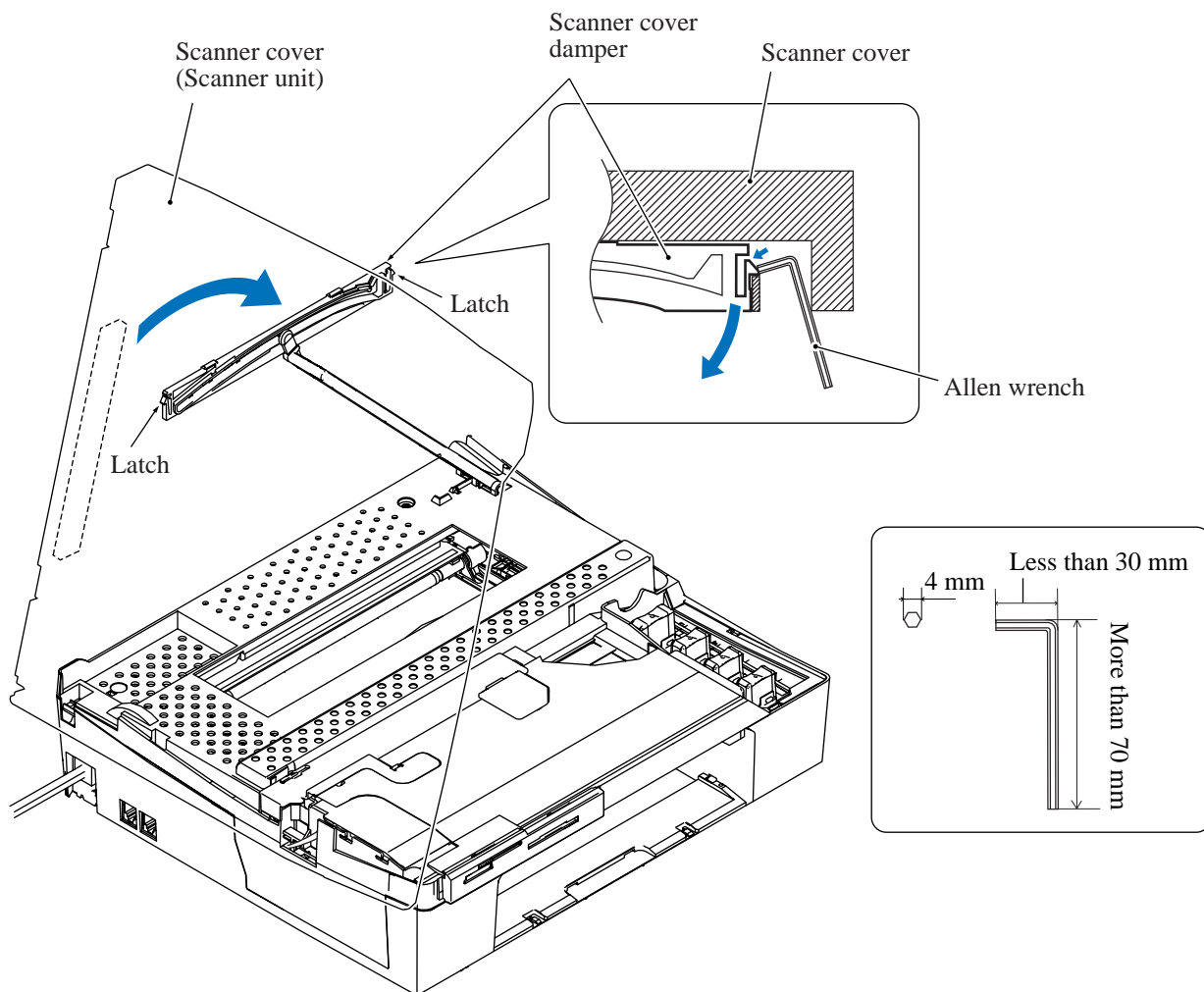
(3) Open the scanner cover further.

(4) Insert the tip of a flat screwdriver into the slot provided in the front end of the harness cover and slide the harness cover to the front.

(5) Release the four latches of the CIS flat cable cover and lift it up.

CIS flat cable cover

Latches

Scanner cover

Harness cover

Slot
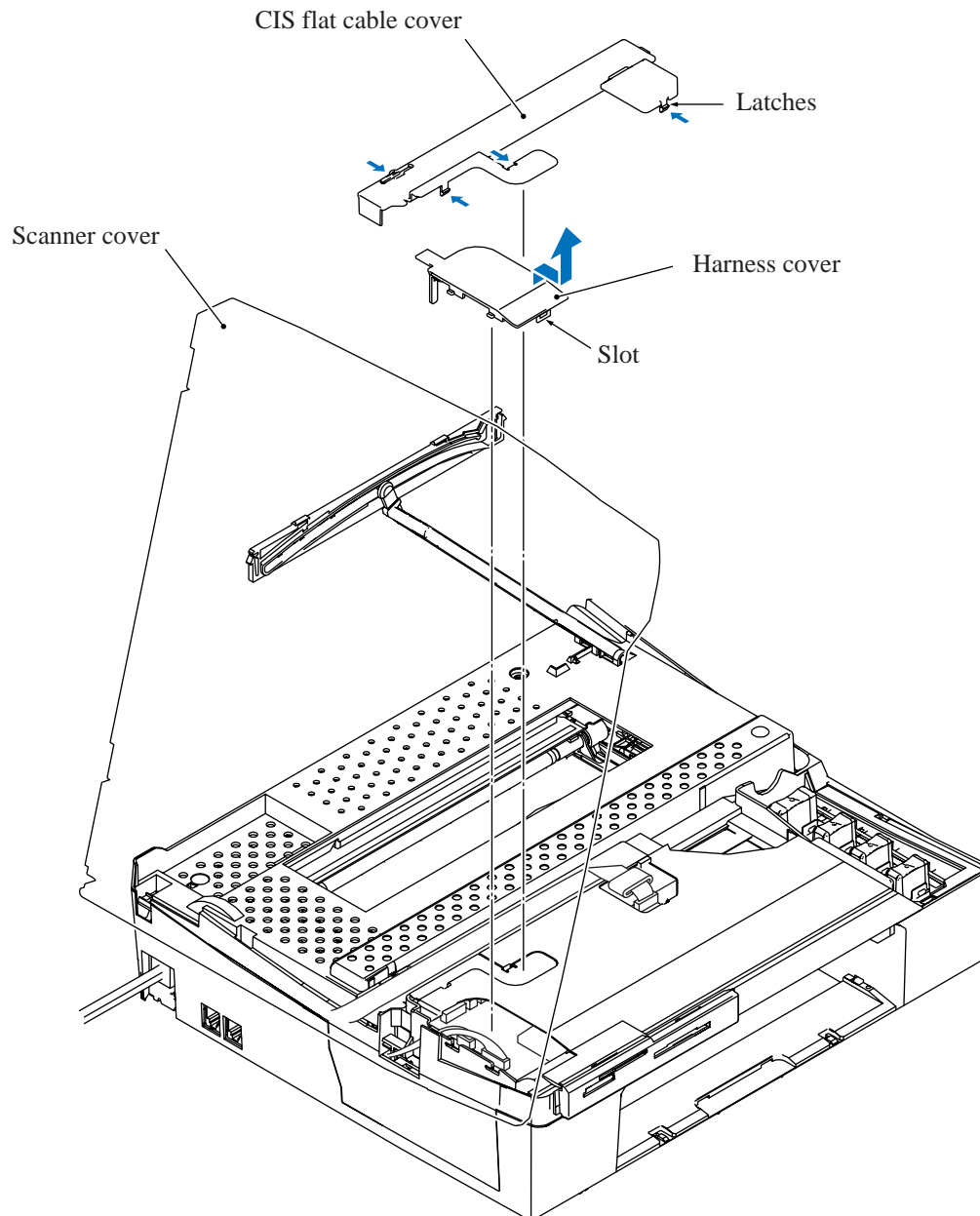
(6) MFC620CN/420CN/410CN, FAX2440C and DCP310CN

Disconnect the following cables and harnesses from the main PCB.

- the CIS flat cable,
- the panel-main harness,
- the CIS motor harness, and
- the ADF harness*

Release the grounding wire by removing the screw*.

* MFC620CN/420CN and FAX2440C

Cable guide   Grounding wire*

Scanner cover
(Scanner unit)

"X"

Press here.
ADF harness*
CIS motor harness
Panel-main harness

Main PCB   CIS flat cable

(Front)

CIS flat cable (12-pin)

CIS motor harness (4-pin)

ADF harness (10-pin)*

Main PCB

Panel-main harness
(6-pin)
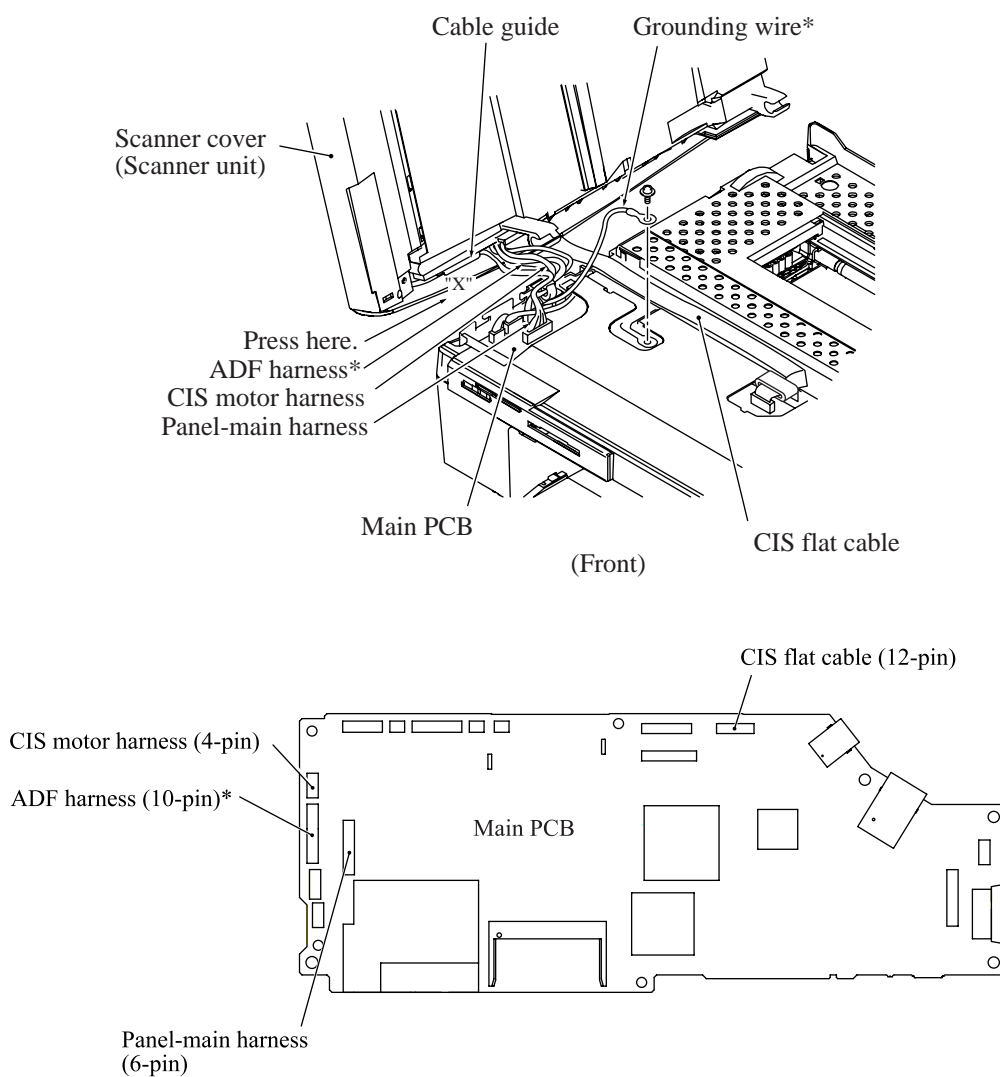
MFC210C and DCP110C

Disconnect the following cables and harnesses from the main PCB.

- the CIS flat cable,
- the panel-main harness, and
- the CIS motor harness

(Front)
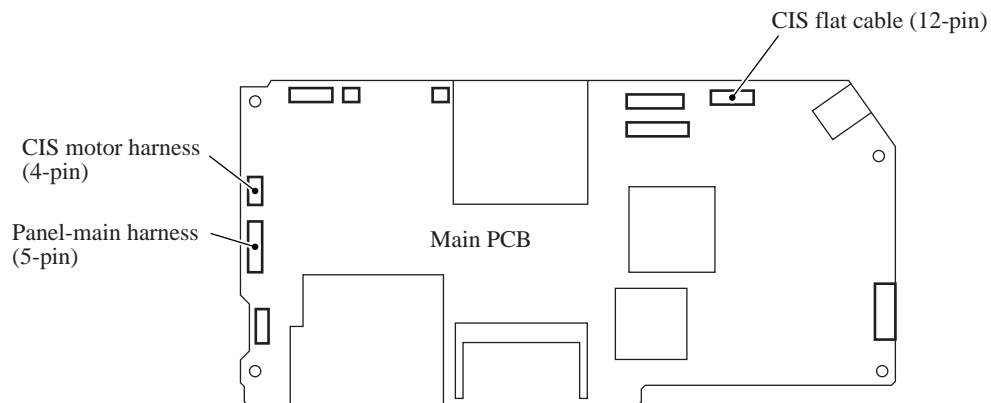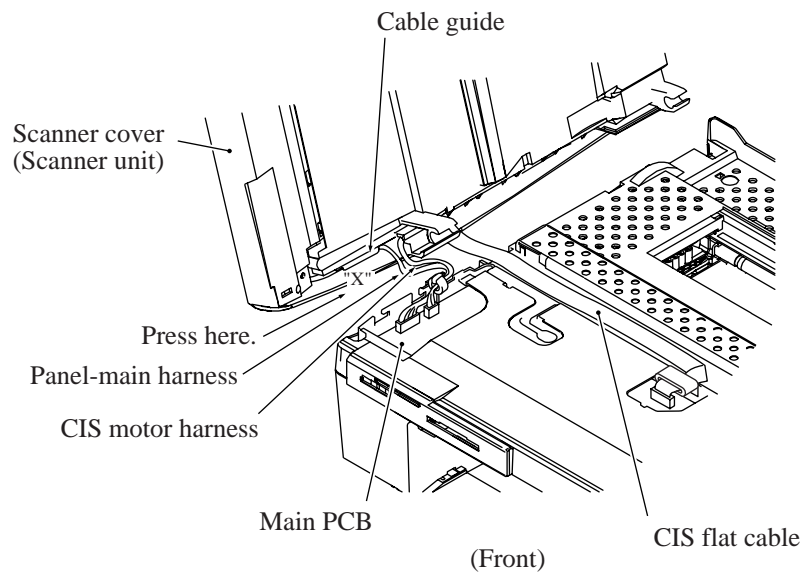
(7) Press section "X" on the left edge of the scanner cover outwards to provide enough gap and pull out the panel-main harness from the cable guide.

(8) Open the scanner cover at approx. 90° and pull it to the left and off the machine.

NOTE: When replacing the scanner cover, remove the ferrite core from the CIS motor harness of the old scanner cover and set it to that of the new scanner cover. Wind the CIS motor harness round the ferrite core by one turn.

Scanner cover
(Scanner unit)

Ferrite core

CIS motor harness

Panel-main harness

CIS flat cable

Flat core
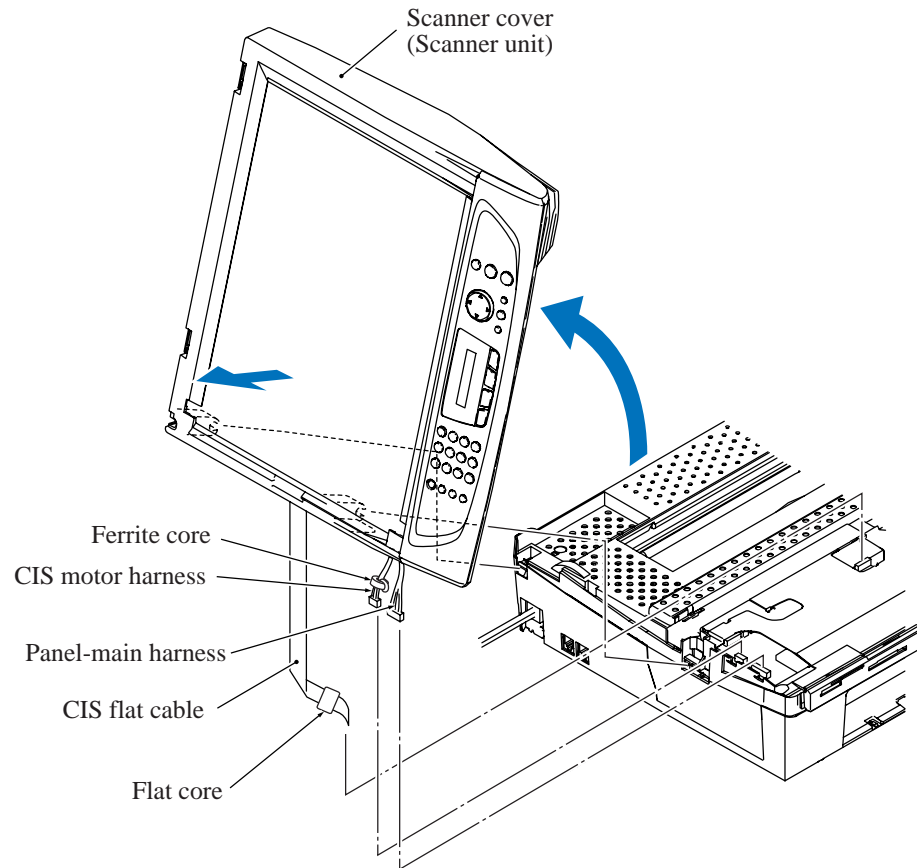
(9) As shown below, remove the scanner cover damper from the scanner cover stopper.

Scanner cover stopper

Scanner cover damper

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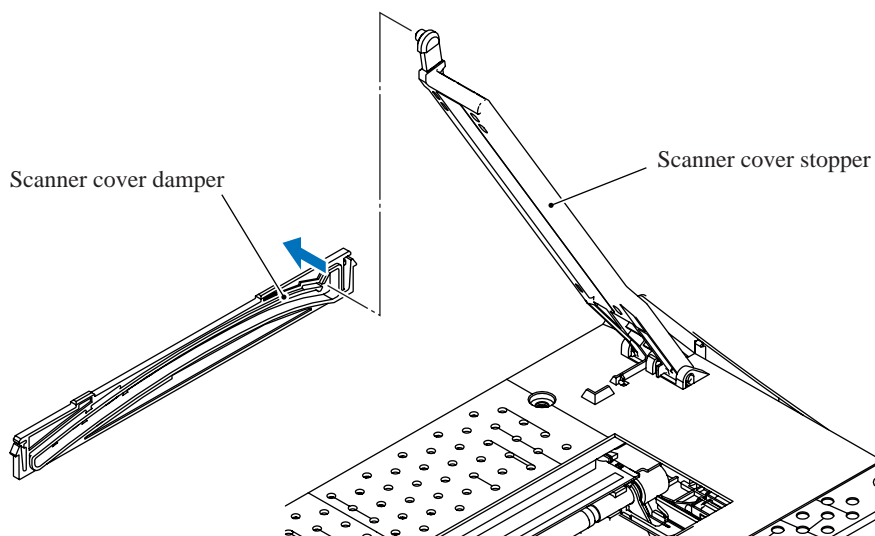
(10) Turn the scanner cover stopper upright and remove it from the upper cover by pressing the front and rear locks.

Scanner cover stopper

Upper cover
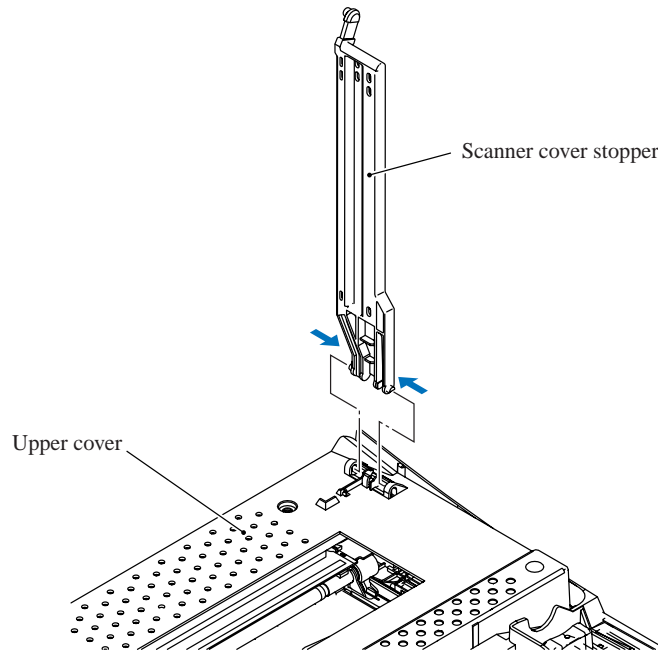
■ **Reassembling Notes**

• When replacing the scanner cover:

  1) Remove the ferrite core from the CIS motor harness of the old scanner unit and set it to that of the new scanner cover. Wind the CIS motor harness round the ferrite core by one turn.

  2) In the case of the MFC210C U.S.A./Canadian models, check the CIS type (see below) used in the old scanner cover and write the firmware suited for that CIS type onto the flash ROM. (Refer to Appendix 2.) To check the CIS type, travel the CIS unit to the scanning end position (with Function code 59) by pressing the **5**, **9**, and **3** keys and see whether the CIS unit is CCI or ROHM type. (For details about Function code 59, refer to Chapter 8, Section 8.5.12.)

  Installing unsuited firmware causes error A7.

CCI   ROHM

CIS Type
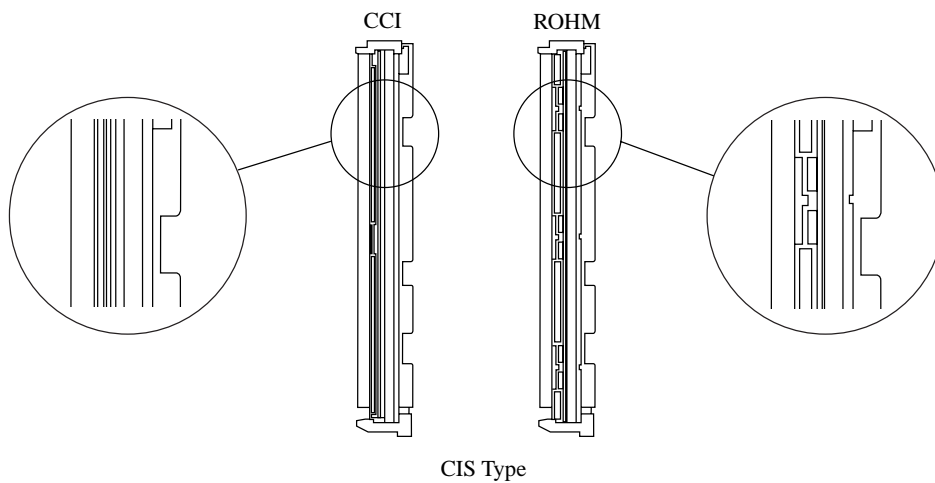
• Before connecting the panel-main harness to the main PCB, press section "X" on the left edge of the scanner cover outwards to provide enough gap and route the panel-main harness through the cable guide on the underside of the scanner cover as shown on pages 5-11 and 5-12.

5-14   *Confidential*

5.1.5 ADF & Document Cover ASSY (MFC620CN/420CN and FAX2440C)

(1) As shown below, press the hatched section on the left edge of the scanner cover outwards to provide enough gap and pull out the ADF harness, CIS motor harness, and grounding wire from the cable guide.

The harness spacer (gray tube) sandwiched between the ADF harness and CIS motor harness also comes off.

Panel-main harness

Grounding wire

CIS motor harness

ADF harness

CIS flat cable

Scanner cover (Scanner unit)

Harness spacer (gray tube)
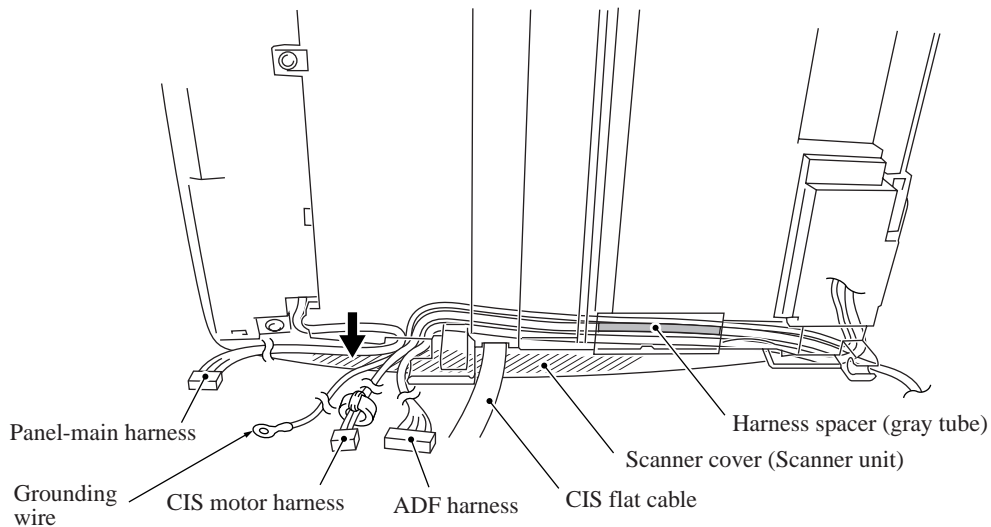
(2) Turn the ADF & document cover ASSY upright, unlatch two hinges from the underside of the scanner cover with a flat screwdriver, and lift up the ASSY.

Slightly turn those hinges and remove them from the ASSY.

ADF & document cover ASSY

Hinge

Scanner cover (Scanner unit)

Hinge

Grounding wire

ADF harness

Groove

CIS motor harness

Panel-main harness

Confidential
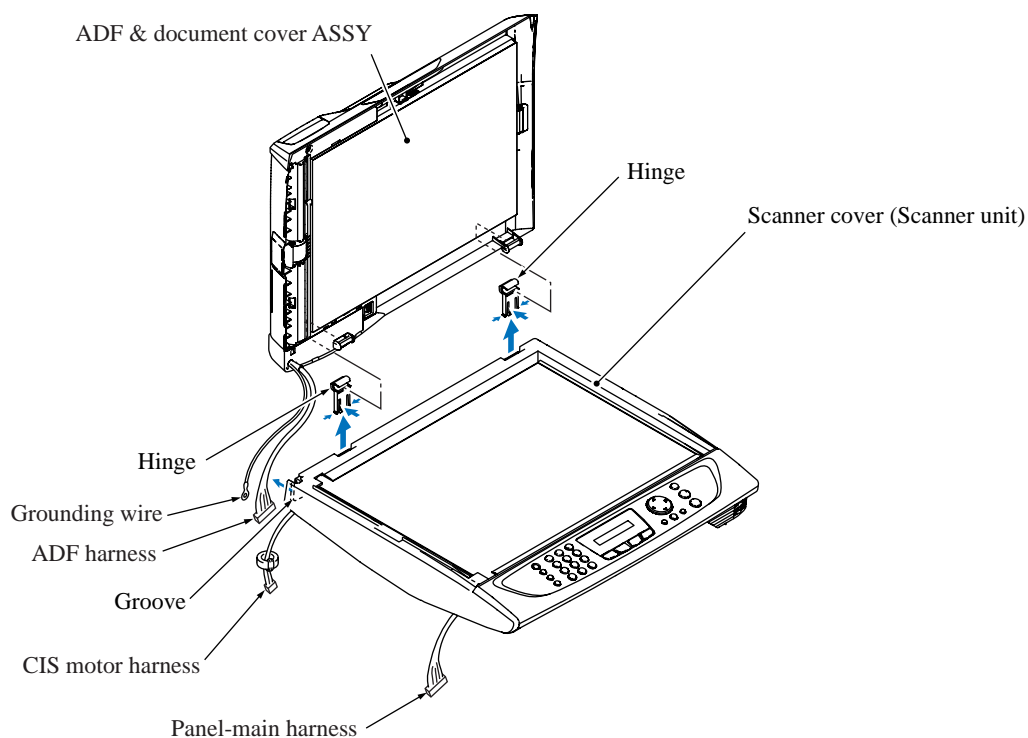
< Disassembly of the ADF & document cover ASSY >

ADF cover ASSY

1) Slightly warp the ADF cover ASSY and remove it from the bosses provided on the front and rear side of the ADF & document cover ASSY.

Hole

ADF cover ASSY

Hole

ADF & document cover ASSY

Boss

Boss
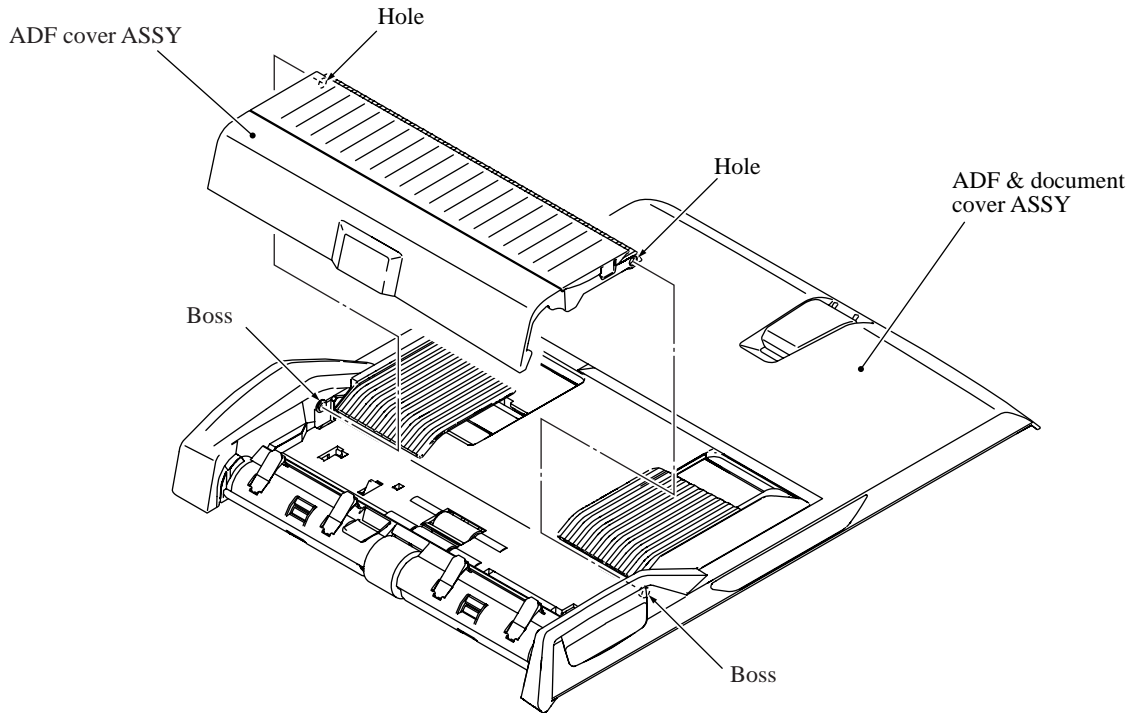
2) Unlatch the document ejection cover from the ADF cover.

Document ejection cover

Latch

Latch

ADF cover

Confidential
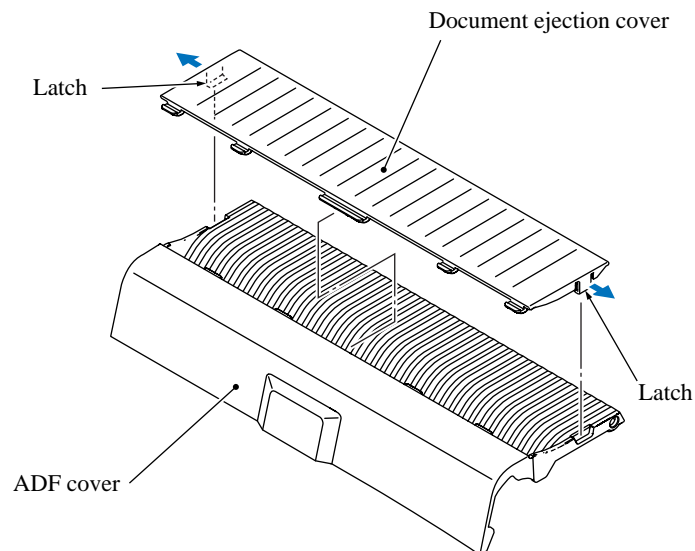
3) Remove the ADF pull-in piece and its spring from the ADF cover.

ADF cover

ADF pull-in piece

ADF pull-in spring
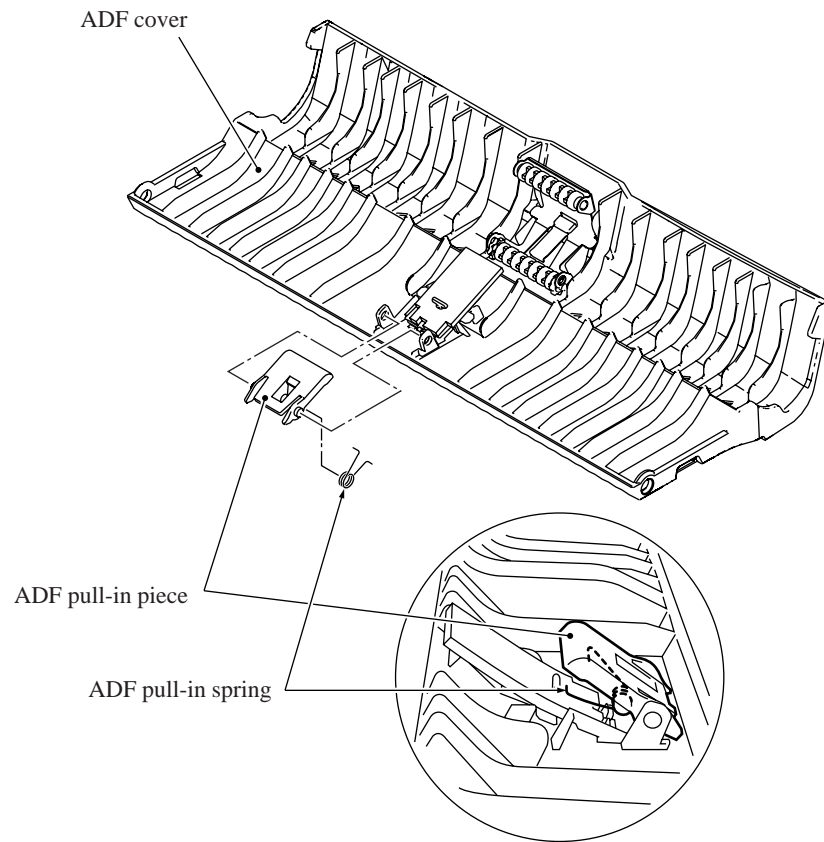
4) Remove the separation pad from the ADF cover.

ADF cover
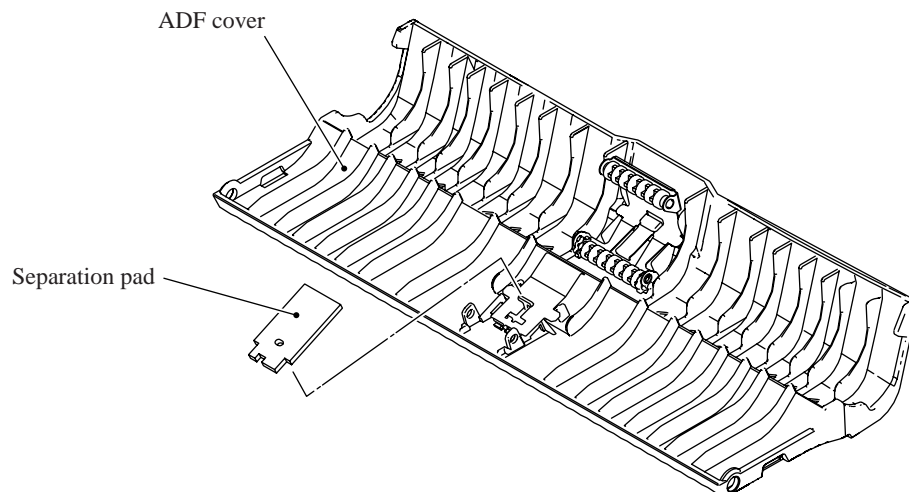
Separation pad

Document stopper and document ejection films

5) Remove the document stopper.

6) Remove the document ejection films.

NOTE: Once removed, the document ejection films will become unusable and new parts will have to be put back in.

Document stopper

Document ejection films

ADF & document
cover ASSY
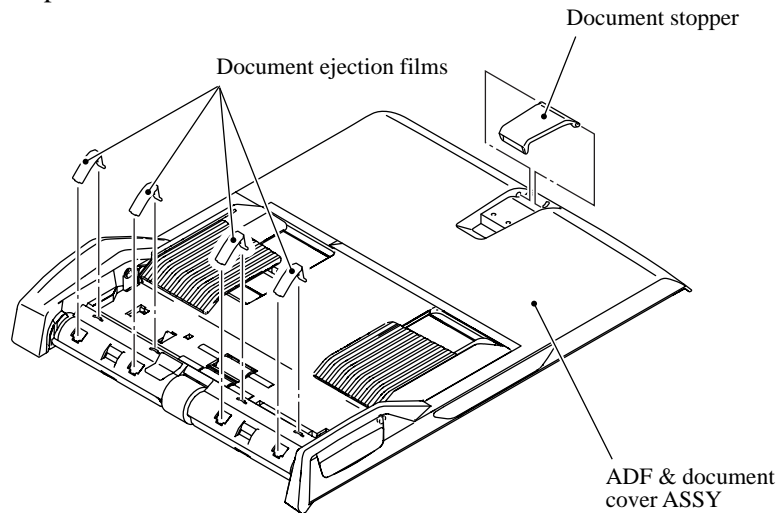
Separating the document cover and the ADF unit

7) Remove the two screws from the ADF unit and unhook the six latches on the ADF unit from the document cover. Slide the document cover to the right to release it from the two tabs on the right end of the ADF unit.

Document cover

Tab

Tab

6 latches

ADF unit

Taptite, bind B M4x12

Confidential
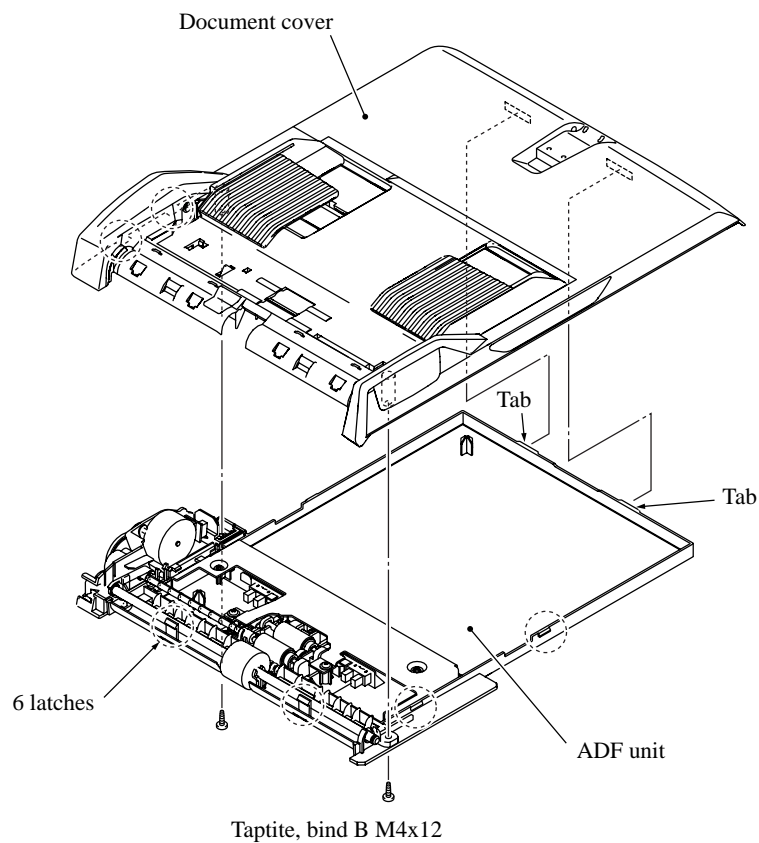
Document guides (F and R)

8) Remove the screw from the document guide gear. Take the document guide gear and its spring out of the document cover.

9) As shown below, slide each of the document guides F and R inwards (①), pull down the bottom end (②), slide it inwards further, and take it up (③).

Document guide R

Document guide F

Document cover

Fit the spring end here.

Spring end

Document guide spring

Document guide gear

Taptite, B M3x6
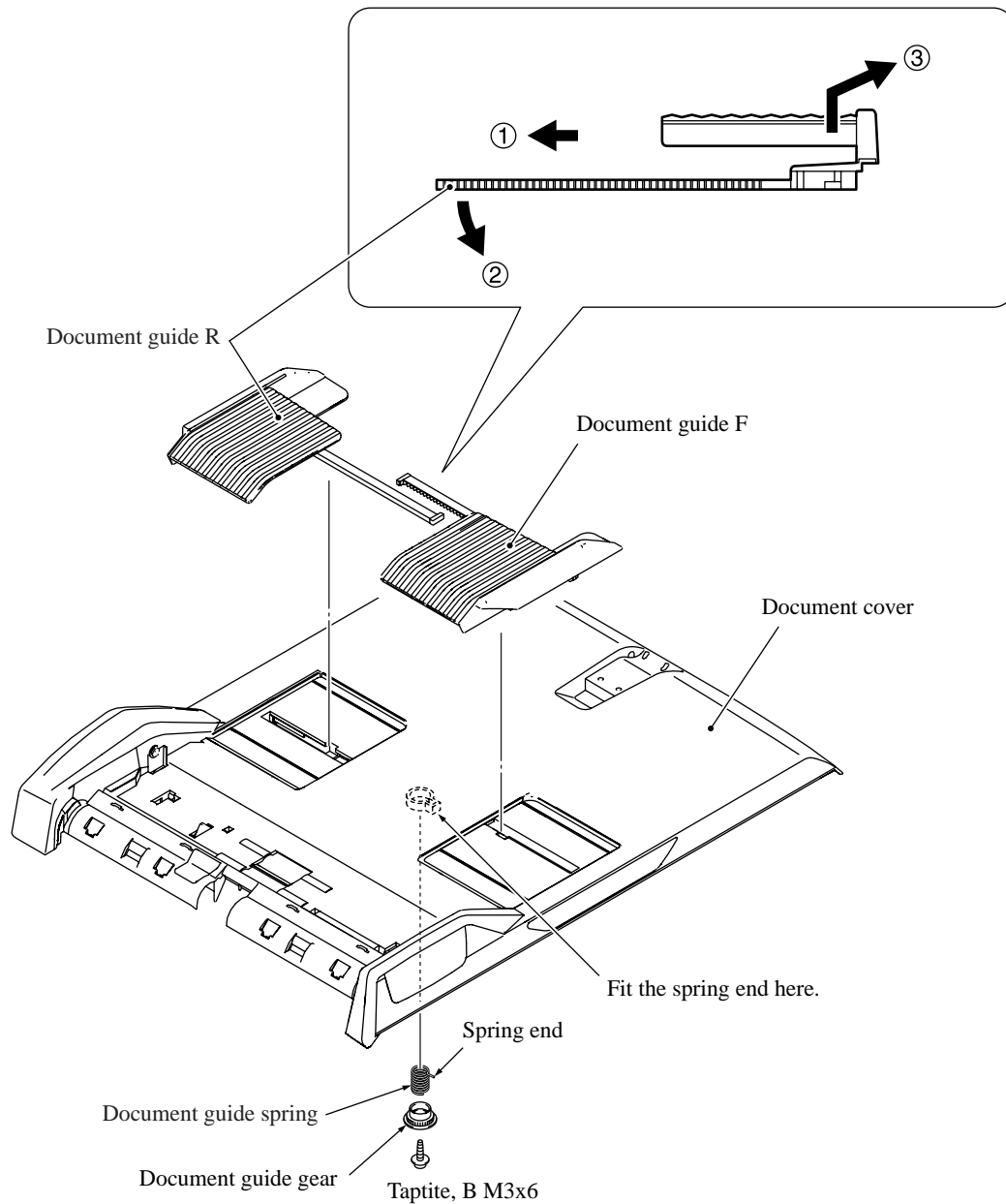
Document front and rear sensor actuators

10) Lightly press the locking arm for each of the document front and rear sensor actuators, slide the actuator towards the locking arm, and remove it in the direction of the arrow shown below.

The actuator springs also come off.

Locking arm

Actuator spring

Document front sensor actuator

Document cover

Actuator spring

Document front sensor actuator

(Front)

Actuator spring

Document rear sensor actuator

Locking arm
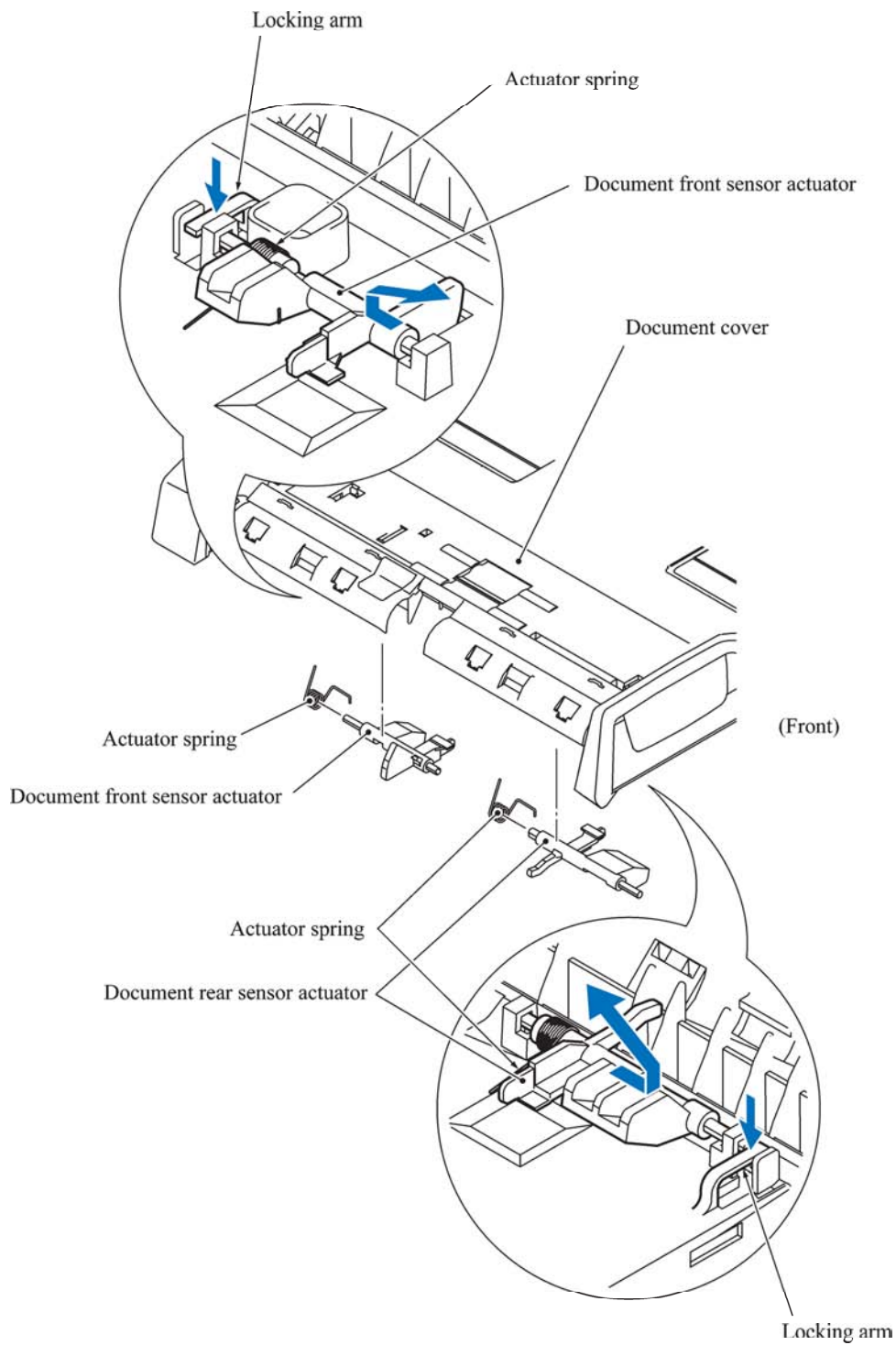
ADF motor and document feed roller

11) Take the ADF harness and grounding wire out of the harness guide provided on the ADF unit.

12) Remove the screw that secures the grounding wire and ADF motor together.
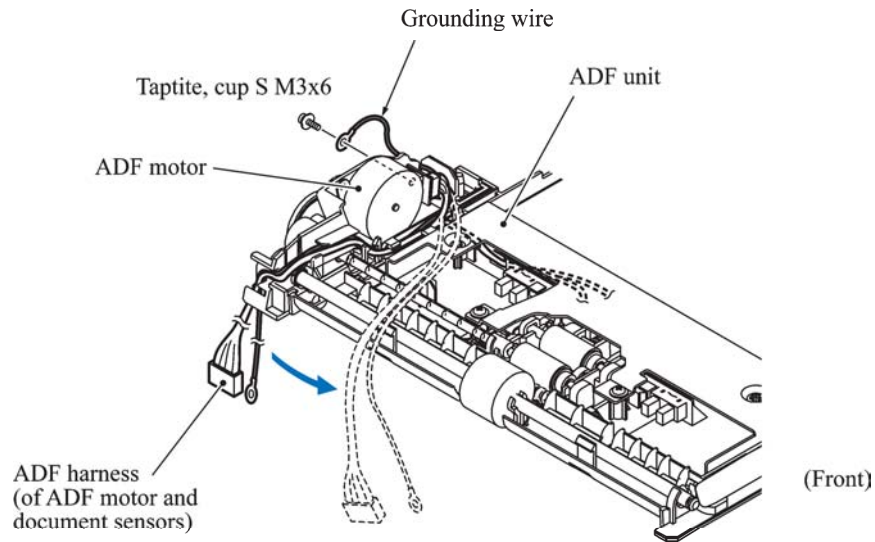
13) Remove the screw from the ADF motor and disconnect the ADF harness from the motor.

14) Remove the pawl bushing from the front end of the document feed roller shaft and remove the document feed roller gear from the read end. Take the document feed roller out of the ADF unit.

Confidential
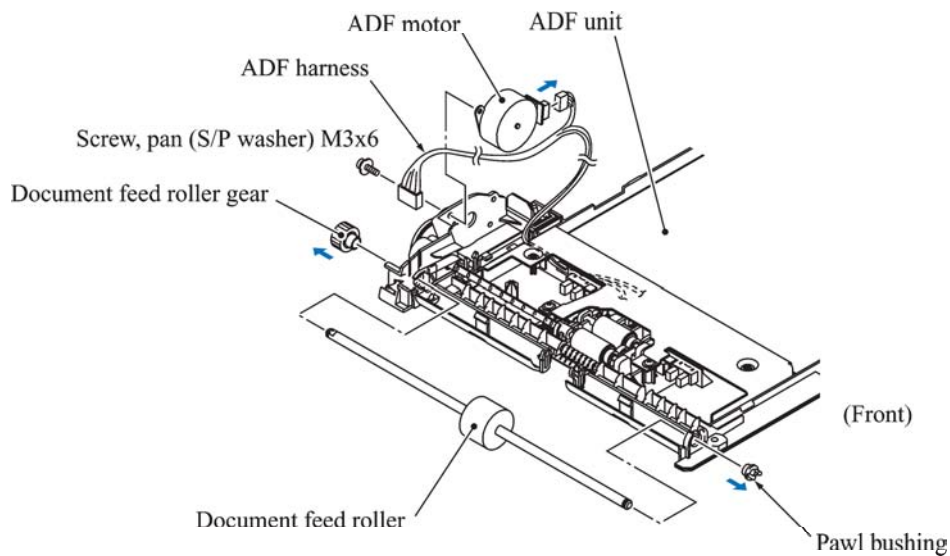
Document front and rear sensors, document pull-in roller, and document separation roller

15) Remove the two screws and take the ADF reinforcement plate off the ADF unit.

16) Remove the document front and rear sensors by unhooking the three latches each. Disconnect the ADF harness from each sensor.

17) Remove the document pull-in roller by lightly pressing the corresponding locking arm and sliding the roller to the rear.

Remove the document separation roller by lightly pressing the corresponding locking arm and sliding the separation roller gear shaft to the rear.

(The document pull-in roller and separation roller are compatible with each other.)

Taptite, cup B M3x10

ADF reinforcement plate

Document front sensor

Document pull-in roller

Document separation roller

Document rear sensor

ADF harness

To ADF motor

Separation roller gear shaft

Locking arms
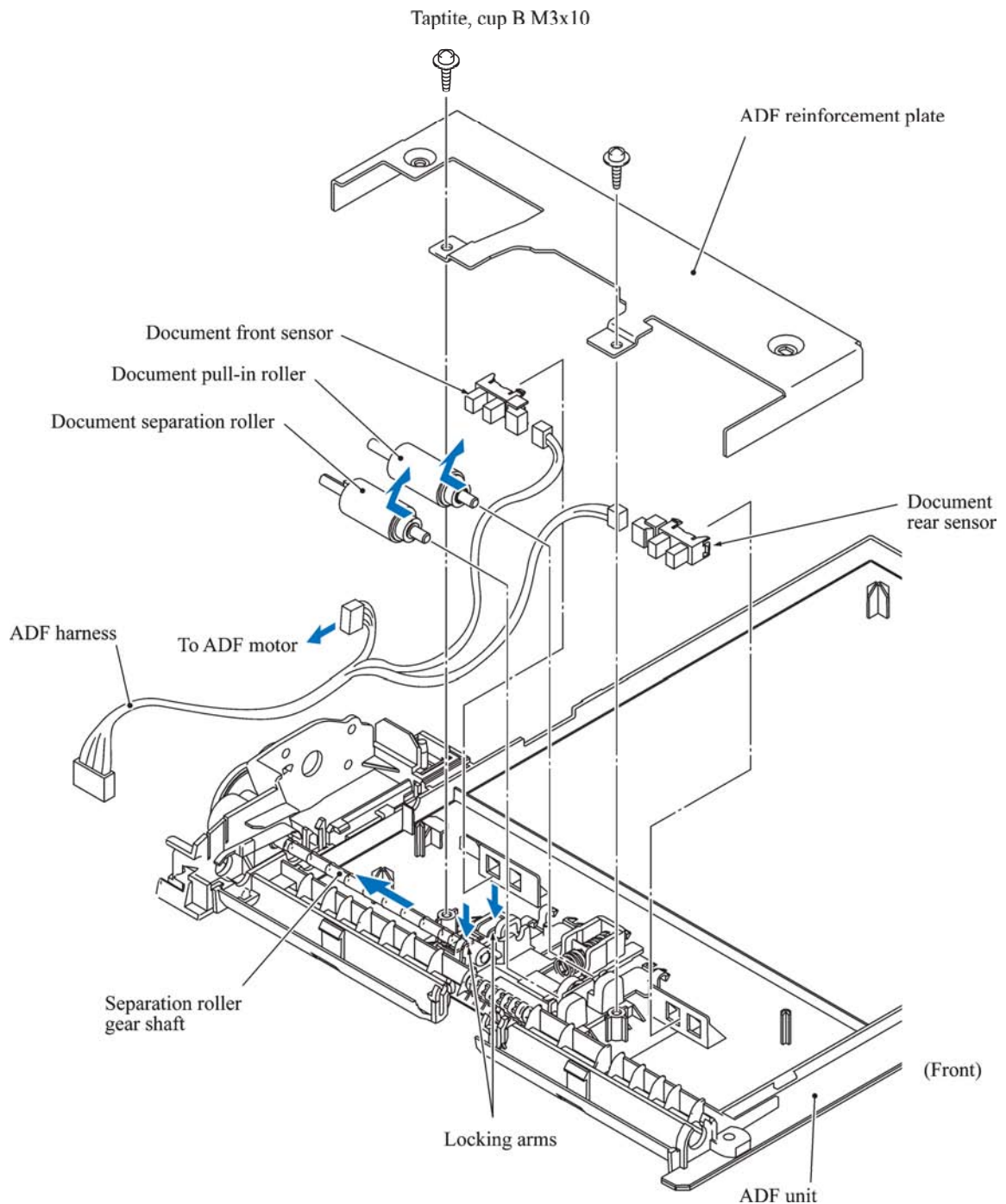
(Front)

ADF unit

■ **Reassembling Notes**

- Route the ADF harness (consisting of the ADF motor harness and document front and rear sensor harnesses) on the ADF unit as shown below.

Routing of the document rear
sensor harness (of the ADF harness)

Document rear sensor

Document front sensor

(Front)

Routing of the document front
sensor harness (of the ADF harness)

ADF unit
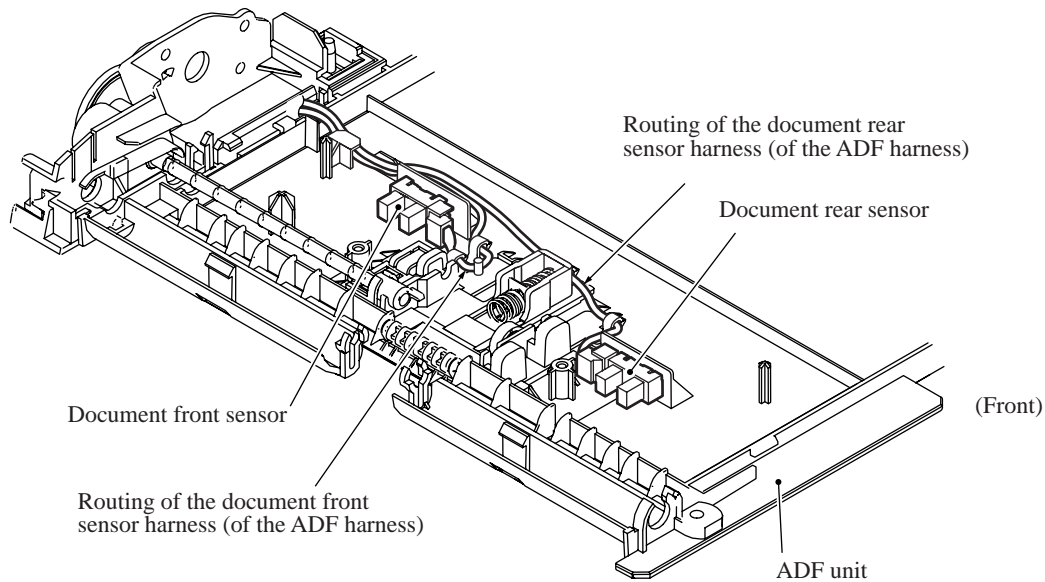
- When installing the ADF & document cover ASSY to the scanner cover (scanner unit), route the ADF harness and grounding wire through the groove provided in the left rear corner of the scanner cover (see the illustration at the bottom of page 5-15).

  After installation, route the ADF harness, grounding wire, and CIS motor harness on the underside of the scanner cover. Sandwich the harness spacer between the ADF harness and CIS motor harness (see the illustration at the top of page 5-15).

Confidential

5.1.6 Control Panel ASSY

(1) Turn the scanner cover (scanner unit) upside down, push the left side outwards, and take out the panel-main harness.

(2) Remove the three screws from the underside of the scanner cover.

(3) Pull up the rear end of the control panel ASSY and take it off the scanner cover.

Scanner cover (Scanner unit)

Control panel ASSY

Square opening

Panel-main harness

Taptite, cup B M3x10

MFC620CN/FAX2440C

Control panel ASSY placed upside down

Cable guides

Rib

MFC420CN/410CN/210C and DCP310CN/110C

Control panel ASSY placed upside down

Cable guides

Routing the panel-main harness on the underside of the control panel ASSY

Ribs

Confidential
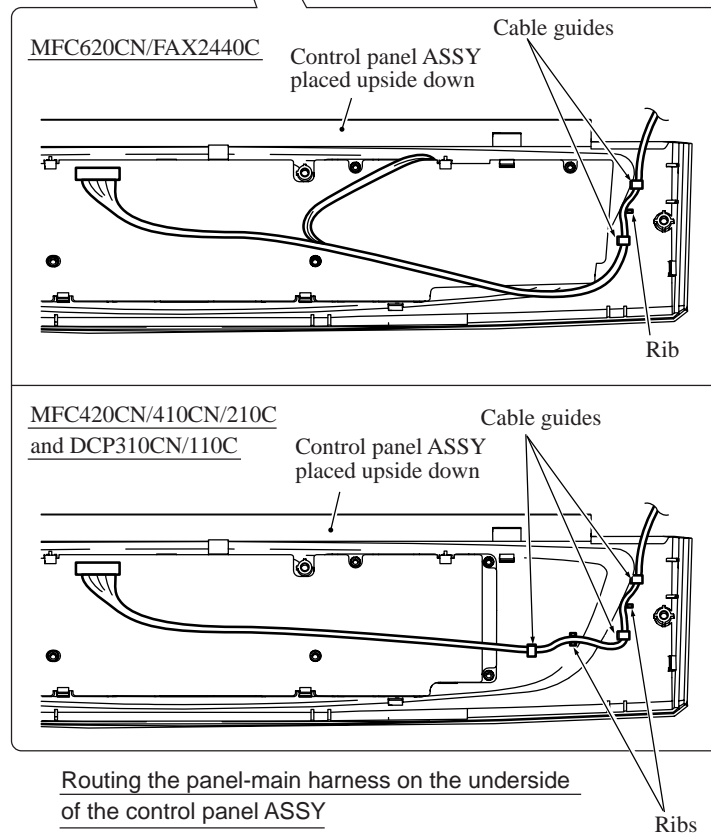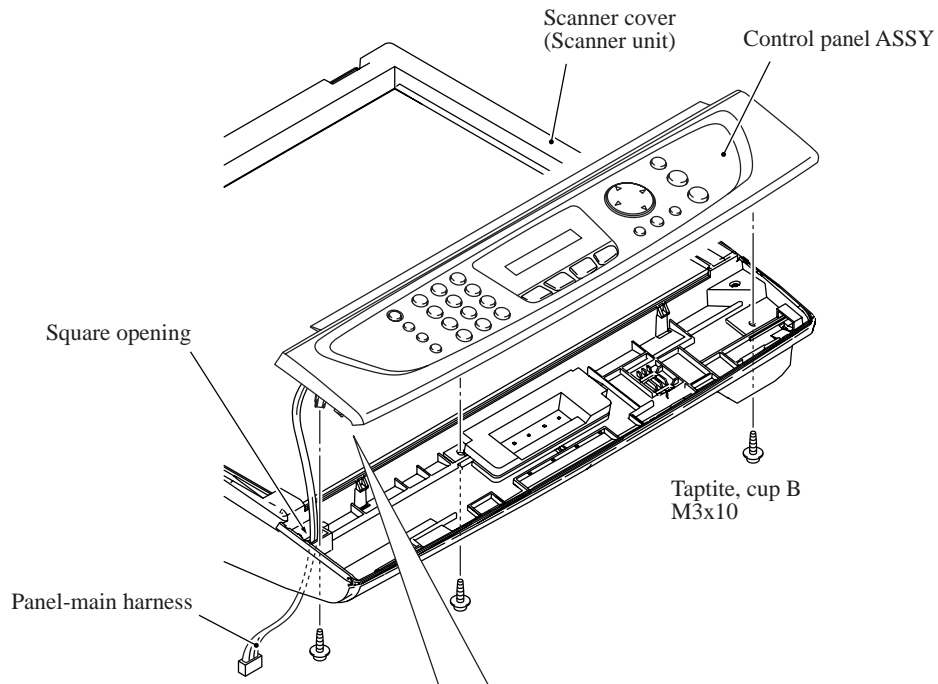
Disassembly of the control panel ASSY

1) Place the control panel ASSY upside down. Pull the two "X" latches outwards to release the front edge of the control panel PCB and remove it to the front.

2) Unlock the connector on the control panel PCB and disconnect the LCD flat cable.

3) Remove the rubber keypad.

4) Press the two "Y" latches inwards to release the scanner open sensor actuator. The actuator spring also comes off.

5) MFC620CN/FAX2440C: Remove the microphone from the control panel.

6) Pull the locking arms outwards and take out the LCD while pulling the LCD flat cable gently. (The illustration given below is based on the MFC210C.)
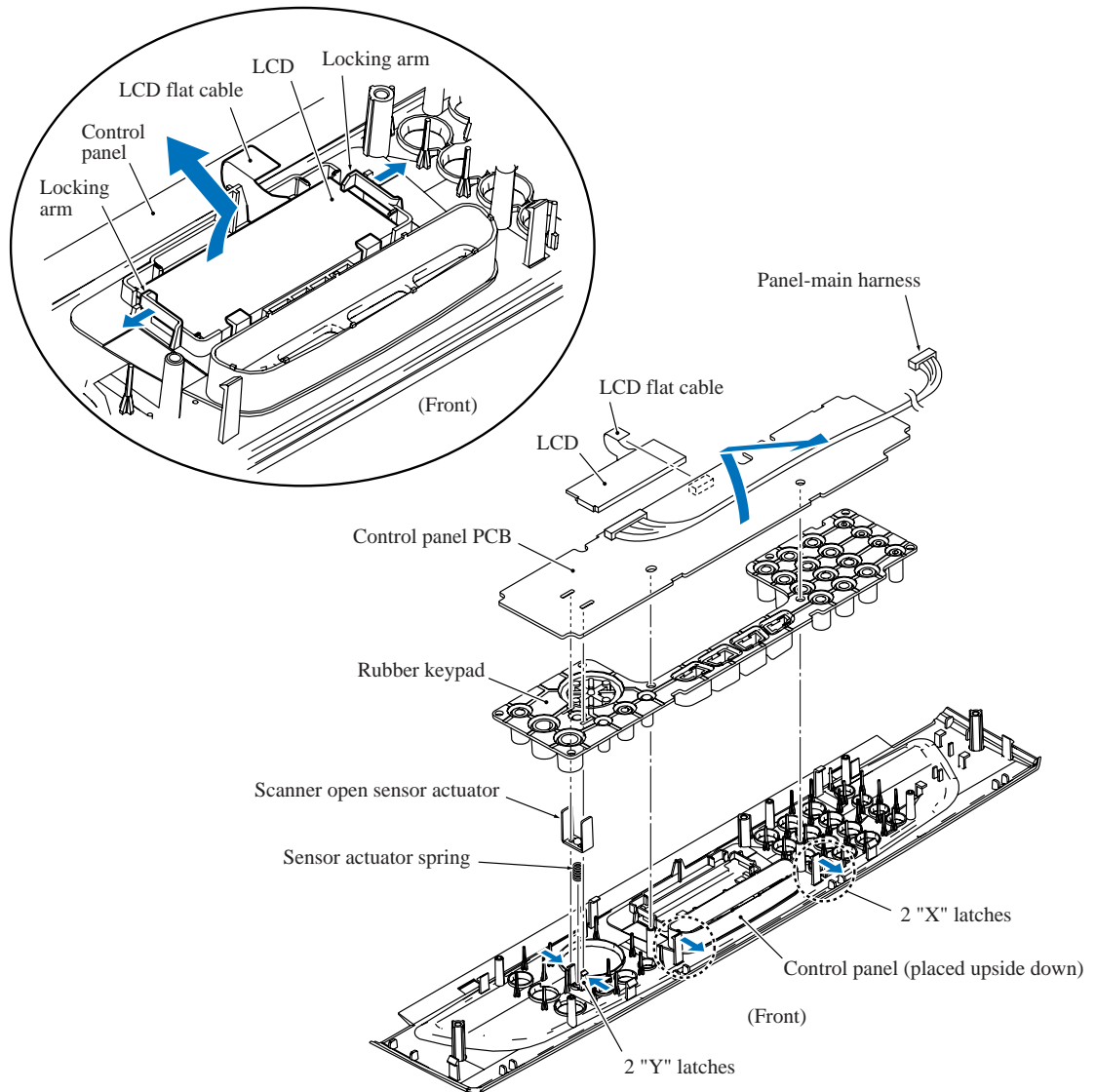
■ **Reassembling Notes**

- Before setting the LCD back to the control panel, wipe fingerprints or dust off the LCD surface and control panel window with a soft cloth.
- A new LCD is covered with a protection sheet. Before setting it, remove the protection sheet.
- When setting the control panel ASSY back to the scanner cover, pass the panel-main harness through the square opening provided in the scanner cover (see the illustration on the previous page.)

Confidential

5.1.7 Upper Cover

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

(2) Release the five retainers provided on the upper cover and lift up the upper cover.
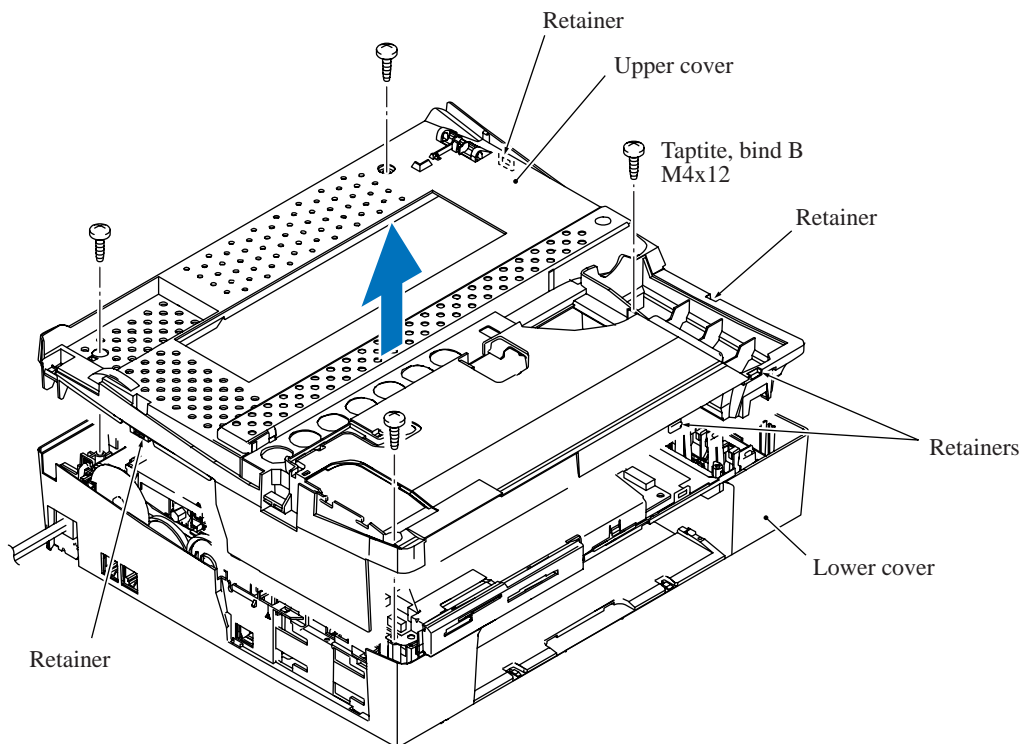
■ **Reassembling Notes**

• When mounting the upper cover:

Make sure that the head/carriage unit is placed in the head capping position to prevent the ink supply tubes from getting crushed between the upper and lower covers.

Take care not to deform the PF encoder disk.

Be careful not to pinch the ink absorber box. If pinched, the ink absorber box presses down the paper pressure holder (shown on page 5-64), resulting in a paper jam.

Confidential

5.1.8 Hook Switch Actuator and Hook Switch PCB (MFC620CN U.S.A./Canadian models and FAX2440C)

(1) Pull the hook switch actuator outwards, turn it counterclockwise to release it from the boss, and take it up and out of the lower cover.

The actuator spring also comes off.

Confidential
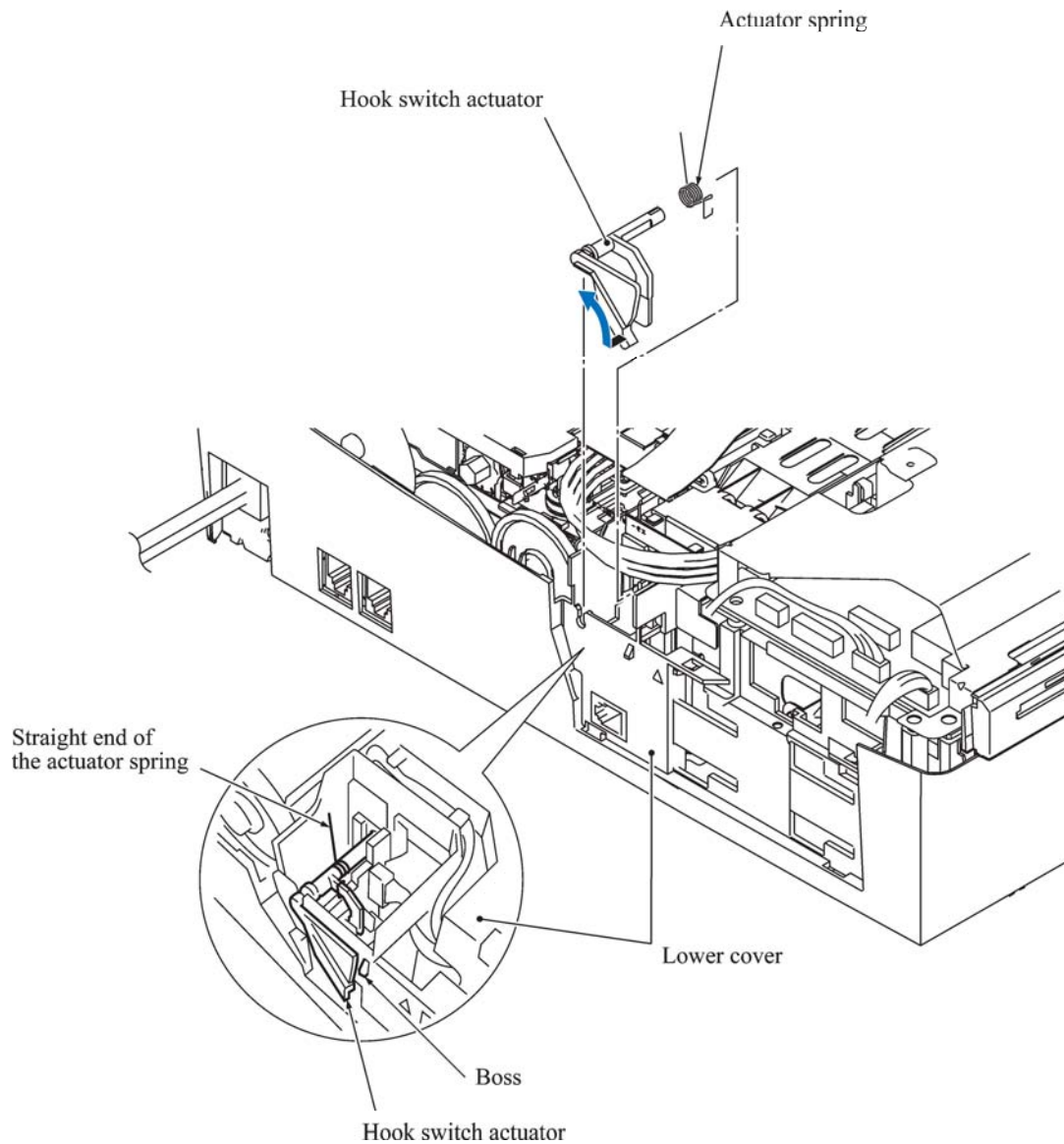
(2) Disconnect the hook switch harness from the main PCB.

(3) Insert the tip of a flat screwdriver through the square cutout provided in the bottom of the machine, release the latch to the front, and lift up the hook switch PCB.
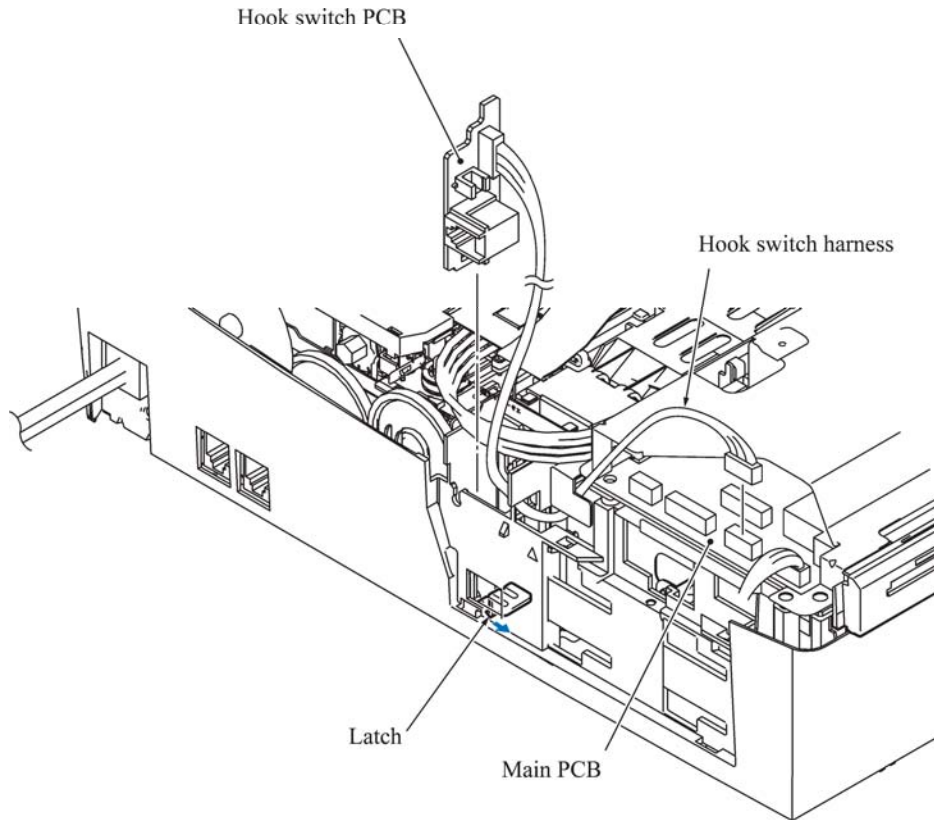
5.1.9 Head/Carriage Unit

During disassembly jobs, except when removing the ink refill ASSY or engine unit (including the maintenance unit), leave the head/carriage unit and all four ink cartridges in the machine.

Before removing the head/carriage unit, ink refill ASSY or engine unit, you need to replace the current ink cartridges with dummy ones and drain ink from the ink refill ASSY and head/carriage unit (see Section 5.1.1). After ink draining, be sure to set protective cartridges instead of dummy ones.

The machine is available with two types of the head/carriage units--old type with FFC sponge and new type with FFC support. For the former one, see Section 5.1.9.1; for the latter one, see Section 5.1.9.2.

NOTE: When replacing the head/carriage unit, put on a grounding wrist band and perform the job on a static mat. Also take care not to touch the conductor sections on the flat cables.

NOTE: To replace the head/carriage unit, you need to turn the machine on and let the head/carriage unit travel to the head replacement position as described in Section 5.1.1 (Function code 63). Do not move the head/carriage unit by hand when the machine is turned off. However, if the head/carriage unit fails to move in Section 5.1.1, rotate the ejection idle gear shown on the next page counterclockwise (viewed from the left) by hand to unlock the head/carriage unit and move it to the head replacement position.

NOTE: If you replace the head/carriage unit, also replace the ink cartridges. This is because sufficient ink volume is necessary for refilling the ink supply tubes after replacement of the head/carriage unit.

5.1.9.1 Old Type of Head/Carriage Unit

Draining the ink from the ink supply tubes and moving the head/carriage unit to the head replacement position (Refer to Section 5.1.1.)

(1) Make sure that:

- the ink in the ink refill ASSY and head/carriage unit has been drained,

- all four ink cartridges have been replaced with protective cartridges,

- the head/carriage unit is placed in the head replacement position, and

- the power cord is unplugged from the electrical outlet.

Removing the head cover

(2) Unlatch the head cover from the head/carriage unit and pull it up.

Head cover

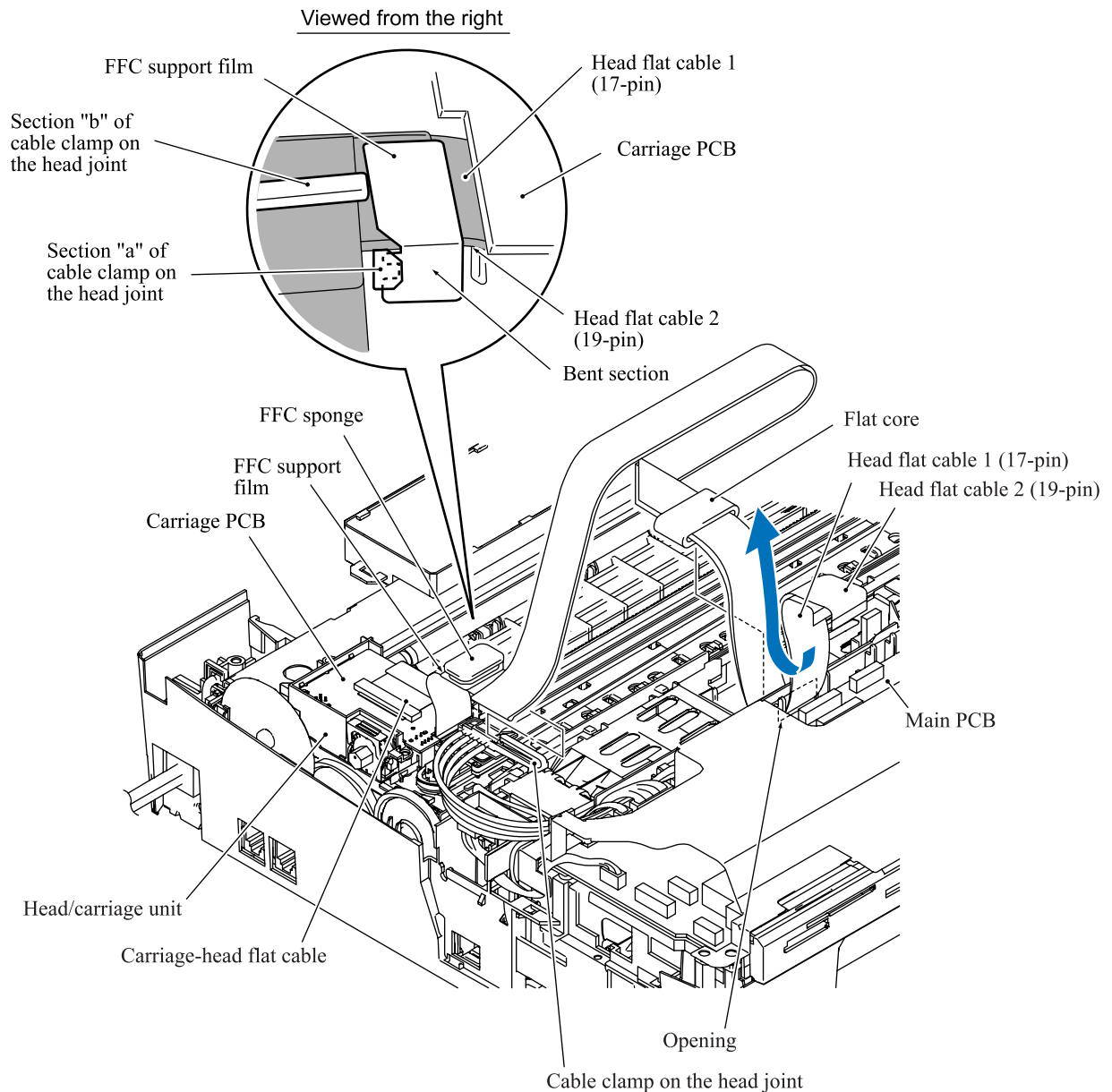Latches

Latches

Head/carriage unit

Ejection idle gear
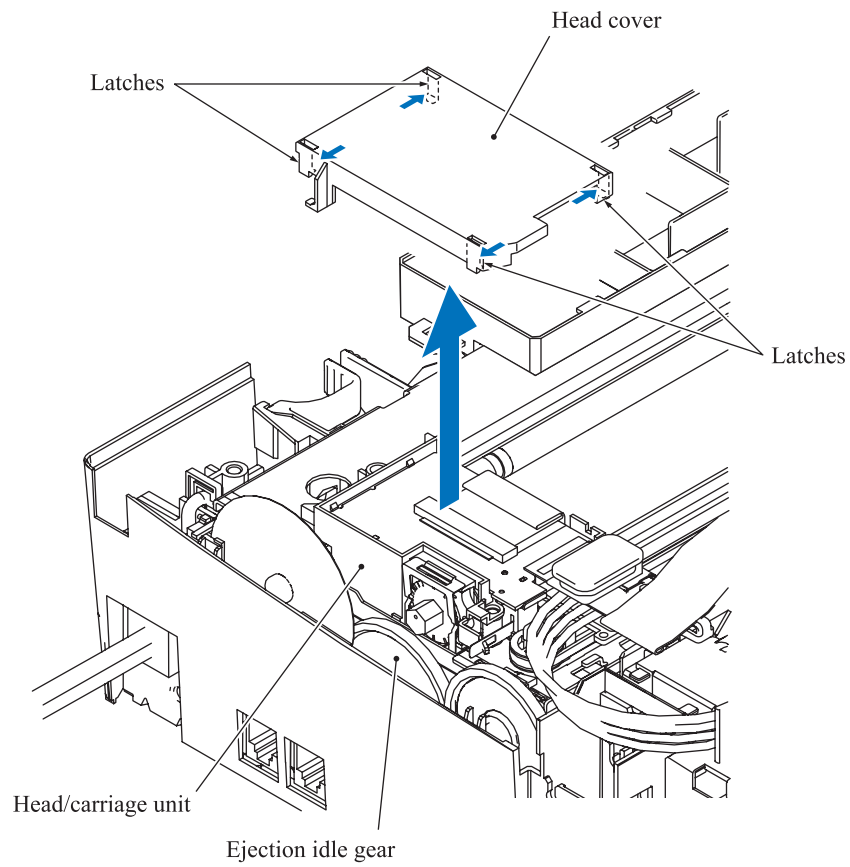
Releasing the head flat cables from the head joint

(3) Disconnect the head flat cables 1 and 2 from the main PCB and pull them out to the rear through the opening provided in the lower cover as shown below.

NOTE: Take care not to drop the flat core from the head flat cables.

(4) Peel the right-hand bent section of the FFC support film off section "a" of the cable clamp on the head joint and take the head flat cables out of section "b."

Viewed from the right

FFC support film

Section "b" of cable clamp on the head joint

Section "a" of cable clamp on the head joint

Head flat cable 1 (17-pin)

Carriage PCB

Head flat cable 2 (19-pin)

Bent section

FFC sponge

FFC support film

Carriage PCB

Flat core

Head flat cable 1 (17-pin)

Head flat cable 2 (19-pin)

Main PCB

Head/carriage unit

Carriage-head flat cable

Opening

Cable clamp on the head joint

Removing the head joint from the head/carriage unit

(5) While turning up the head flat cables, pull the joint leaf spring to the right to release the head joint.

(6) Pull the head joint up and off the head/carriage unit, taking care not to contaminate the head flat cables with ink remaining on the section where the head joint was mounted.

(7) Remove the head joint rubber (that is a part of the head/carriage unit but may be attached to the head joint) and put it on a clean vinyl sheet while taking care not to contaminate it.

NOTE: Wipe off the ink remaining on the section where the head joint was mounted with a clean, lint-free cloth.

NOTE: Wrap the head joint in a clean, lint-free cloth to prevent ink remaining in the ink supply tubes from leaking and the machine from getting stained with leaked ink.

Removing the head/carriage unit and CR timing belt

NOTE: During the removal or installation job for the head/carriage unit, take care not to contaminate the CR encoder strip or PF encoder disk with grease applied to the head/carriage unit.

NOTE: Do not disassemble the old type of the head/carriage unit. Always handle it together with the carriage PCB and head flat cables.

(8) While pressing the idle pulley to the right, remove the CR timing belt from the carriage motor pulley and idle pulley.

(9) Move the head/carriage unit to the left end of its travel.

(10) Align the bosses on the head/carriage unit with the cutouts in the engine unit and lift the head/carriage unit up and off the engine unit.

> **NOTE:** Do not touch the print nozzles (the printing ends) or ink supply ports (to which ink supply tubes are connected) of the head/carriage unit; doing so will not only stain your hands with ink but also damage the nozzles and supply ports. If you do touch them though, clean them with a special-purpose cleaning stick and liquid.

(11) Remove the CR timing belt from the head/carriage unit.

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(12) A head/carriage unit is assigned a property code that represents the properties unique to that head/carriage unit. The property code is printed on a property label that is attached to the carriage-head flat cable and the machine.

When you remove the head/carriage unit and store it separately from the machine, remove the property label from the machine and store it together with the head/carriage unit.

If you replace the head/carriage unit, attach the property label that comes with the new head/carriage unit to the machine as shown below.

Viewed from the bottom

Property label for
head/carriage unit

J776601D00009
HC4101063   0021

Property code
(13-digit)

Bosses

Head/carriage unit

Confidential

NOTE: When storing the head/carriage unit for a long period, be sure to put an air buffer cap on the head/carriage unit and store the unit in the head casing, as shown below. Leaving the head/carriage unit out of the casing will cause the print nozzles and ink supply ports to dry up, resulting in a damaged head.

Latch

Head casing (upper)

Air buffer cap

Head/carriage unit

Head casing (lower)

■ **Reassembling Notes**

- When replacing the old type of the head/carriage unit with a new type, also replace the current upper cover and head cover with a new type. For the mounting procedure of the new type of the head/carriage unit, see page 5-43.

- When handling the head/carriage unit, put on a grounding wrist band and perform the job on a static mat. Also take care not to touch the conductor sections on the flat cables.

- When you set a <u>new</u> head/carriage unit to the machine, apply lubricant to the 5 points specified in Section 5.2.

- After replacement of the head/carriage unit, check that the CR encoder strip and PF encoder disk are free of grease. If they are stained with grease, replace them.

- If you replace the head/carriage unit, make adjustments specified in Chapter 6, Section 6.2.

- When mounting the head/carriage unit, route the head flat cables and attach the FFC support film and FFC sponge, using the following procedure. (See the illustration on the next page.)

  1) Attach a piece of double-sided adhesive tape, which is used to secure the head flat cable 1 to the lower cover, to the position shown on the next page.

  2) Attach the CR timing belt to the head/carriage unit, then mount the head/carriage unit to the engine unit.

  3) Make sure that the head joint rubber is set on the head/carriage unit. Then secure the head joint to the head/carriage unit with the joint leaf spring.

  4) Set the head flat cables to section "b" of the cable clamp on the head joint.

Confidential

5) Route the head flat cable 1 as shown on page 5-31 and secure it to the lower cover with the double-sided adhesive tape attached in 1) above.

6) Attach the FFC support film to the head flat cable 2 as shown below, bend it at the right-hand position to fit it into section "a" of the cable clamp, and attach it to the right side of the joint leaf spring.

7) Mount the head cover.

8) Attach the FFC sponge at a place 1 ±1 mm apart from the head cover as shown below.

Head cover

Section "b" of cable clamp on the head joint

Section "a" of cable clamp on the head joint

FFC support film

Head flat cable 1 (17-pin)

Carriage PCB

1±1 mm

FFC support film

FFC sponge

Viewed from the top

Viewed from the right

Viewed from the right

Head flat cable 2 (19-pin)

FFC sponge

FFC support film

Bosses

Flat core

Head/carriage unit

Head flat cable 1 (17-pin)
Head flat cable 2 (19-pin)

Cutouts

Main PCB

Opening

Double-sided adhesive tape

Double-sided adhesive tape for securing the head flat cable 1

Lower cover

5.1.9.2 New Type of Head/Carriage Unit

Draining the ink from the ink supply tubes and moving the head/carriage unit to the head replacement position (Refer to Section 5.1.1.)

(1) Make sure that:

- the ink in the ink refill ASSY and head/carriage unit has been drained,

- all four ink cartridges have been replaced with protective cartridges,

- the head/carriage unit is placed in the head replacement position, and

- the power cord is unplugged from the electrical outlet.

Removing the head cover

(2) Unlatch the head cover from the head/carriage unit and pull it up.

Routing the ink supply tubes above the tube support.

Confidential
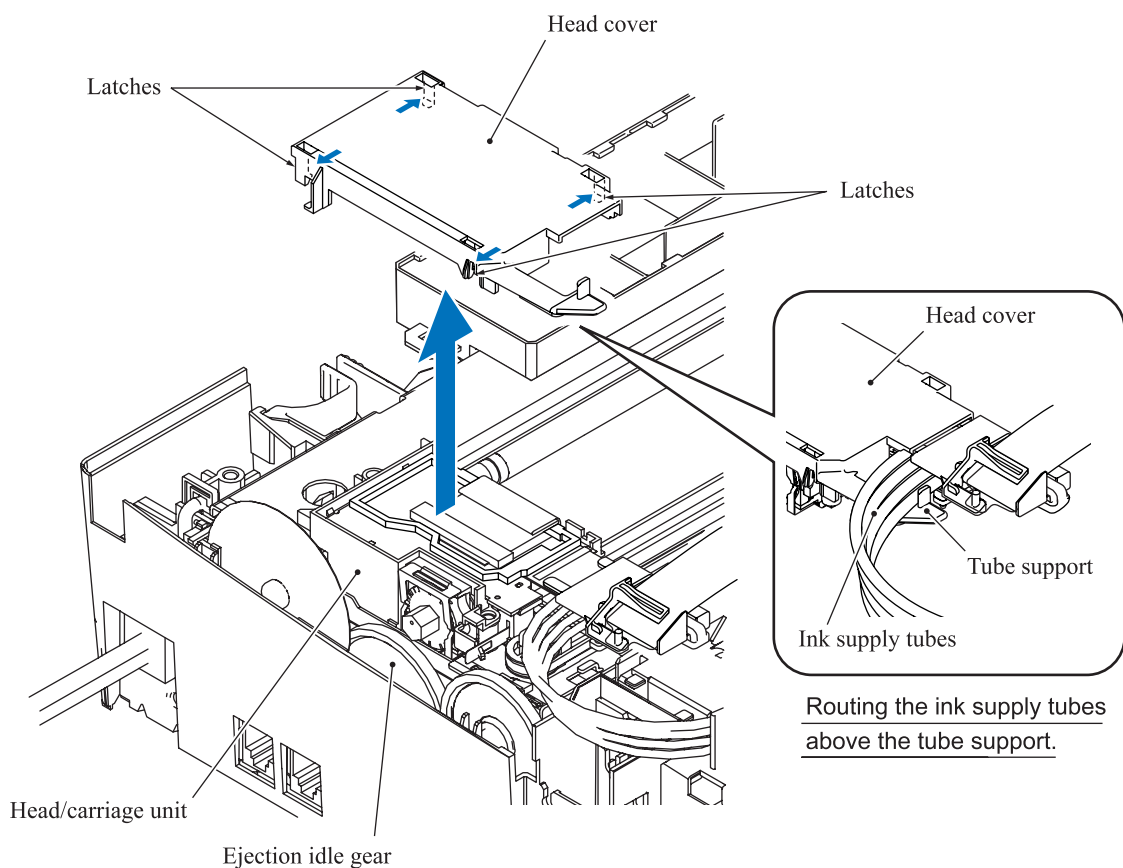
Removing the carriage PCB and head flat cables

(3) Disconnect the head flat cables 1 and 2 from the main PCB and pull them out to the rear through the opening provided in the lower cover as shown below.

NOTE: Take care not to drop the flat core from the head flat cables.

(4) Slide the FFC support to the rear and lightly pull up the cable clamp to release the support from the cable clamp.

(5) Remove the head flat cables from the FFC support.

NOTE: For easier removal, first release the left end of the FFC support film from the boss on the FFC support and turn the head flat cables clockwise.

Removing the head flat cables from the FFC support

Carriage PCB

Head flat cable 1 (17-pin)

Head flat cable 2 (19-pin)

FFC support

FFC support film

Boss

FFC support

Flat core

Head flat cable 1 (17-pin)

Head flat cable 2 (19-pin)

Carriage-head flat cable

Carriage PCB

Main PCB

Head/carriage unit

Opening

Cable clamp on the head joint
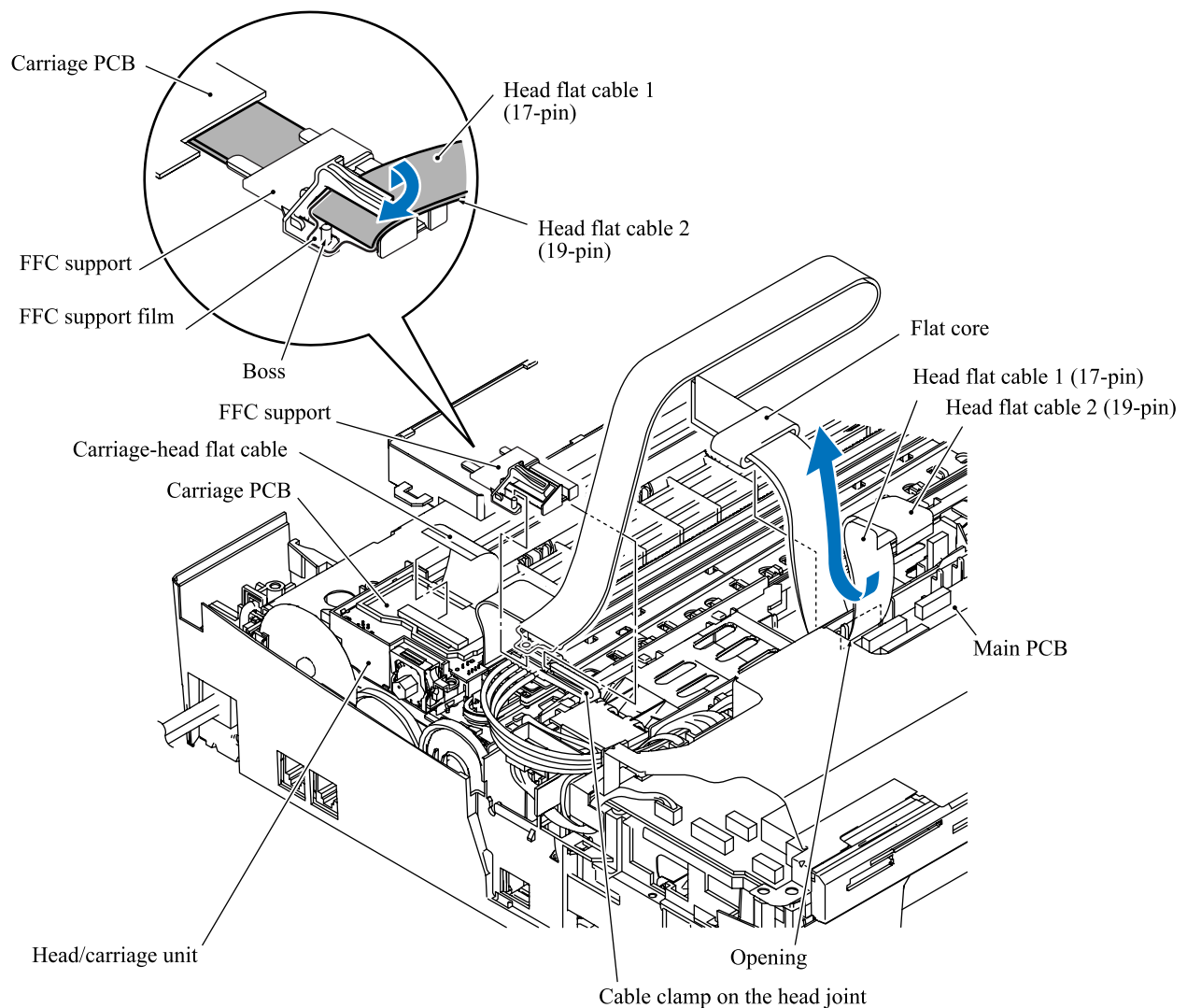
(6) Unlock the connector on the carriage PCB and disconnect the carriage-head flat cable.

Confidential

(7) Pull up the front edge of the carriage PCB to release the rear edge from the two latches provided on the head/carriage unit. Then lift the carriage PCB up and out of the head/carriage unit.

Carriage PCB

Flat core

Latches

Head/carriage unit

Carriage-head flat cable

Cable clamp on the head joint
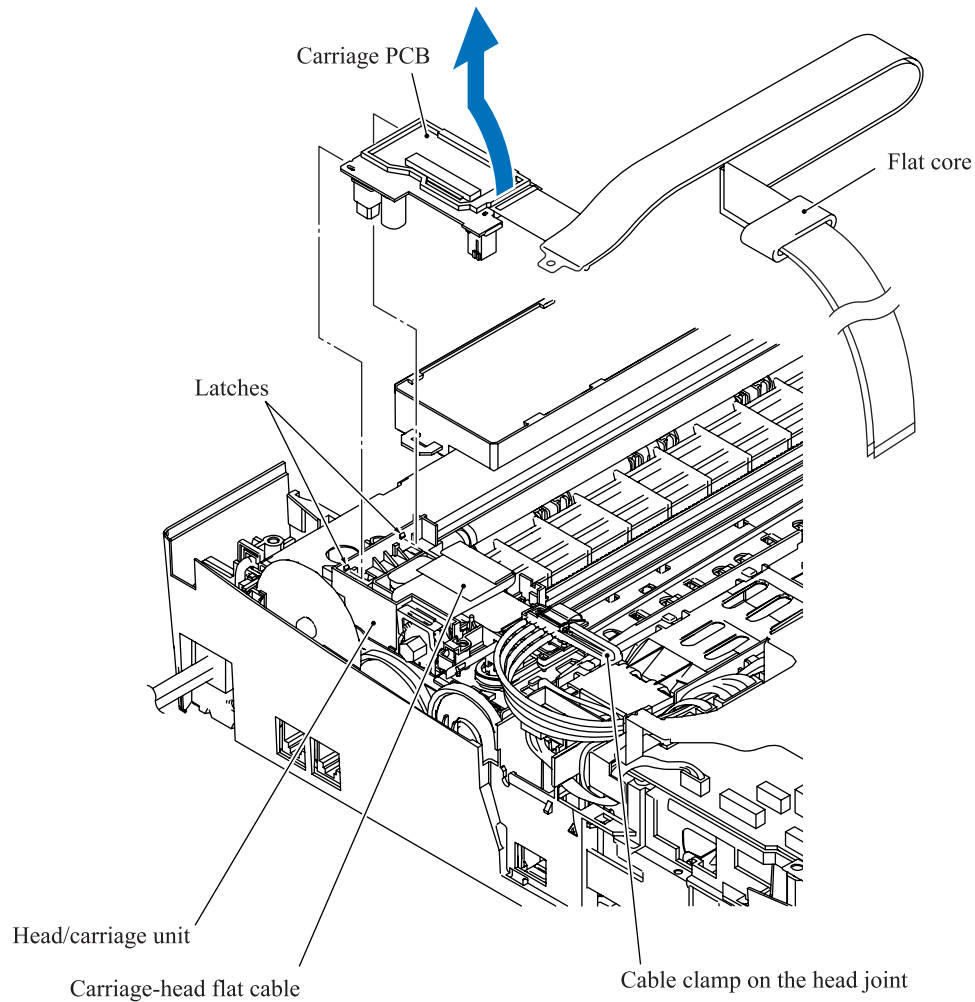
Removing the head joint

(8) Pull the joint leaf spring to the right to release the head joint.

(9) Pull the head joint up and off the head/carriage unit.

Remove the head joint rubber (that is a part of the head/carriage unit but may be attached to the head joint) and put it on a clean vinyl sheet while taking care not to contaminate it.

NOTE: Wipe off the ink remaining on the section where the head joint was mounted with a clean, lint-free cloth.

NOTE: Wrap the head joint in a clean, lint-free cloth to prevent ink remaining in the ink supply tubes from leaking and the machine from getting stained with leaked ink.

Removing the head/carriage unit and CR timing belt

NOTE: During the removal or installation job for the head/carriage unit, take care not to contaminate the CR encoder strip or PF encoder disk with grease applied to the head/carriage unit.

(10) While pressing the idle pulley to the right, remove the CR timing belt from the carriage motor pulley and idle pulley.

(11) Move the head/carriage unit to the left end of its travel.

(12) Align the bosses on the head/carriage unit with the cutouts in the engine unit and lift the head/carriage unit up and off the engine unit.

    NOTE: Do not touch the print nozzles (the printing ends) or ink supply ports (to which ink supply tubes are connected) of the head/carriage unit; doing so will not only stain your hands with ink but also damage the nozzles and supply ports. If you do touch them though, clean them with a special-purpose cleaning stick and liquid.

(13) Remove the CR timing belt from the head/carriage unit.

(14) A head/carriage unit is assigned a property code that represents the properties unique to that head/carriage unit. The property code is printed on a property label that is attached to the carriage-head flat cable and the machine.
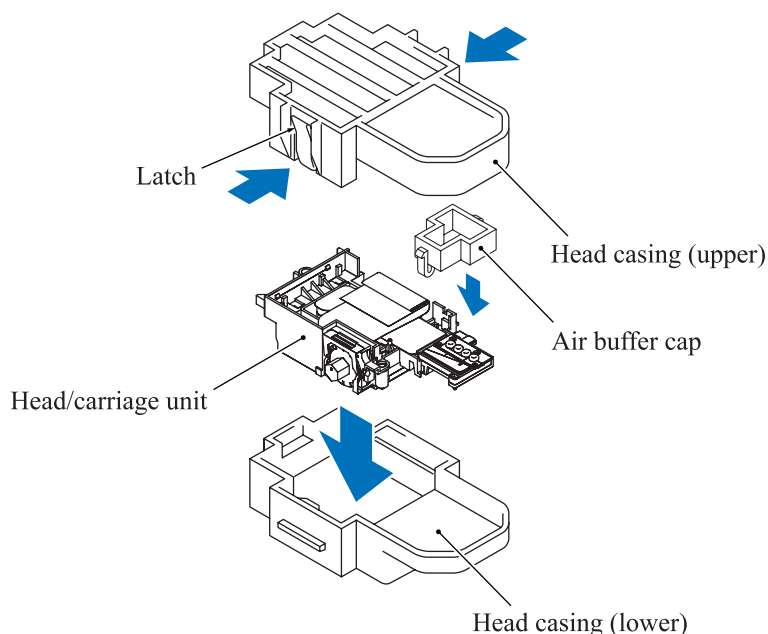
When you remove the head/carriage unit and store it separately from the machine, remove the property label from the machine and store it together with the head/carriage unit.

If you replace the head/carriage unit, attach the property label that comes with the new head/carriage unit to the machine as shown below.

Viewed from the bottom

Property label for
head/carriage unit

J776601D00009
HC4101063 0021

Property code
(13-digit)

Bosses

Head/carriage unit

Confidential

NOTE: When storing the head/carriage unit for a long period, be sure to put an air buffer cap on the head/carriage unit and store the unit in the head casing, as shown below. Leaving the head/carriage unit out of the casing will cause the print nozzles and ink supply ports to dry up, resulting in a damaged head.

Latch

Head casing (upper)

Air buffer cap

Head/carriage unit

Head casing (lower)

■ **Reassembling Notes**

- When handling the head/carriage unit, put on a grounding wrist band and perform the job on a static mat. Also take care not to touch the conductor sections on the flat cables.

- When you set a <u>new</u> head/carriage unit to the machine, apply lubricant to the 5 points specified in Section 5.2.

- After replacement of the head/carriage unit, check that the CR encoder strip and PF encoder disk are free of grease. If they are stained with grease, replace them.

- If you replace the head/carriage unit, make adjustments specified in Chapter 6, Section 6.2.

- When mounting the head/carriage unit, route the head flat cables and attach the FFC support, using the following procedure. (See the illustration on the next page.)

  1) Attach a piece of double-sided adhesive tape, which is used to secure the head flat cable 1 to the lower cover, to the position shown on the next page.

  2) Attach the CR timing belt to the head/carriage unit, then mount the head/carriage unit to the engine unit.

  3) Make sure that the head joint rubber is set on the head/carriage unit. Then secure the head joint to the head/carriage unit with the joint leaf spring.

  4) Set the FFC support to the head flat cables. (See the illustration on page 5-38.)

  5) Mount the carriage PCB with head flat cables onto the head/carriage unit.

Confidential

6) Fit the FFC support to the head joint, sliding it along the joint's cable clamp.

7) Route the head flat cable 1 as shown on page 5-38 and secure it to the lower cover with the double-sided adhesive tape attached in 1) above.

8) Mount the head cover.

FFC support

Carriage PCB

Flat core

Head flat cable 1 (17-pin)
Head flat cable 2 (19-pin)

Main PCB

Opening

Cable clamp on the head joint

Double-sided adhesive tape

Double-sided adhesive tape for securing the head flat cable 1
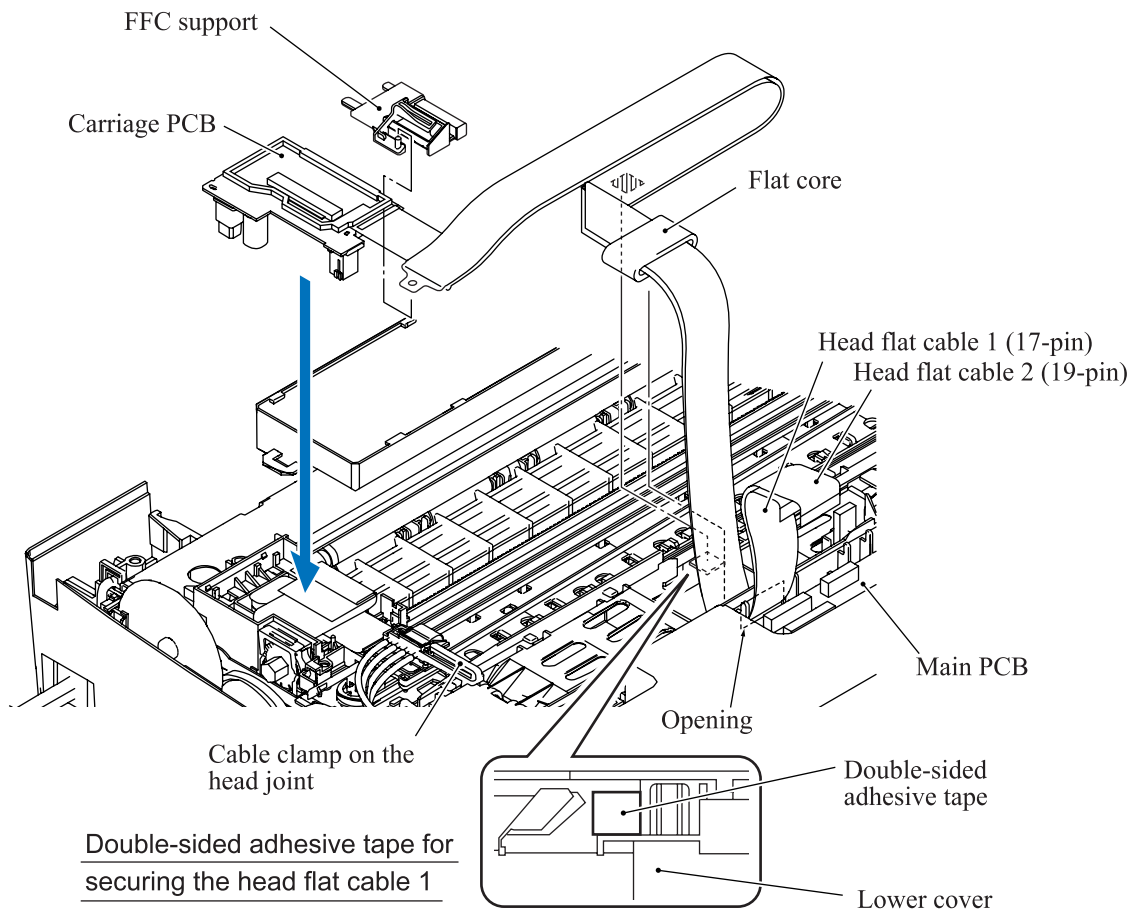
Lower cover

5.1.10 Backup Battery (MFC620CN/FAX2440C)

(1) Disconnect the battery harness from the main PCB.

(2) Release the ink supply tubes routed on the lower cover from the tube guides.

   NOTE: Releasing those tubes makes it easy to release the battery harness from the hook provided on the lower cover since the battery harness is routed beneath those tubes. (See Section 5.1.17, Routing D.)

(3) Release the battery harness from the hook and remove the backup battery.

Confidential
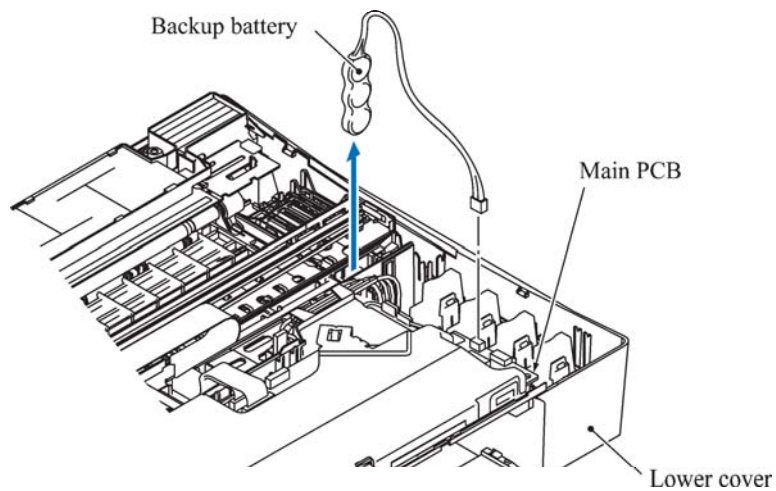
■ **Reassembling Notes**

• Route the battery harness (MFC620CN/FAX2440C) and large-volume ink cartridge harness (FAX2440C) beneath the ink supply tubes as shown below.

Backup battery

Ink supply tubes

Cable guides

Main PCB

Battery harness
(MFC620CN/FAX2440C)

Large-volume ink cartridge harness
(FAX2440C)

Confidential
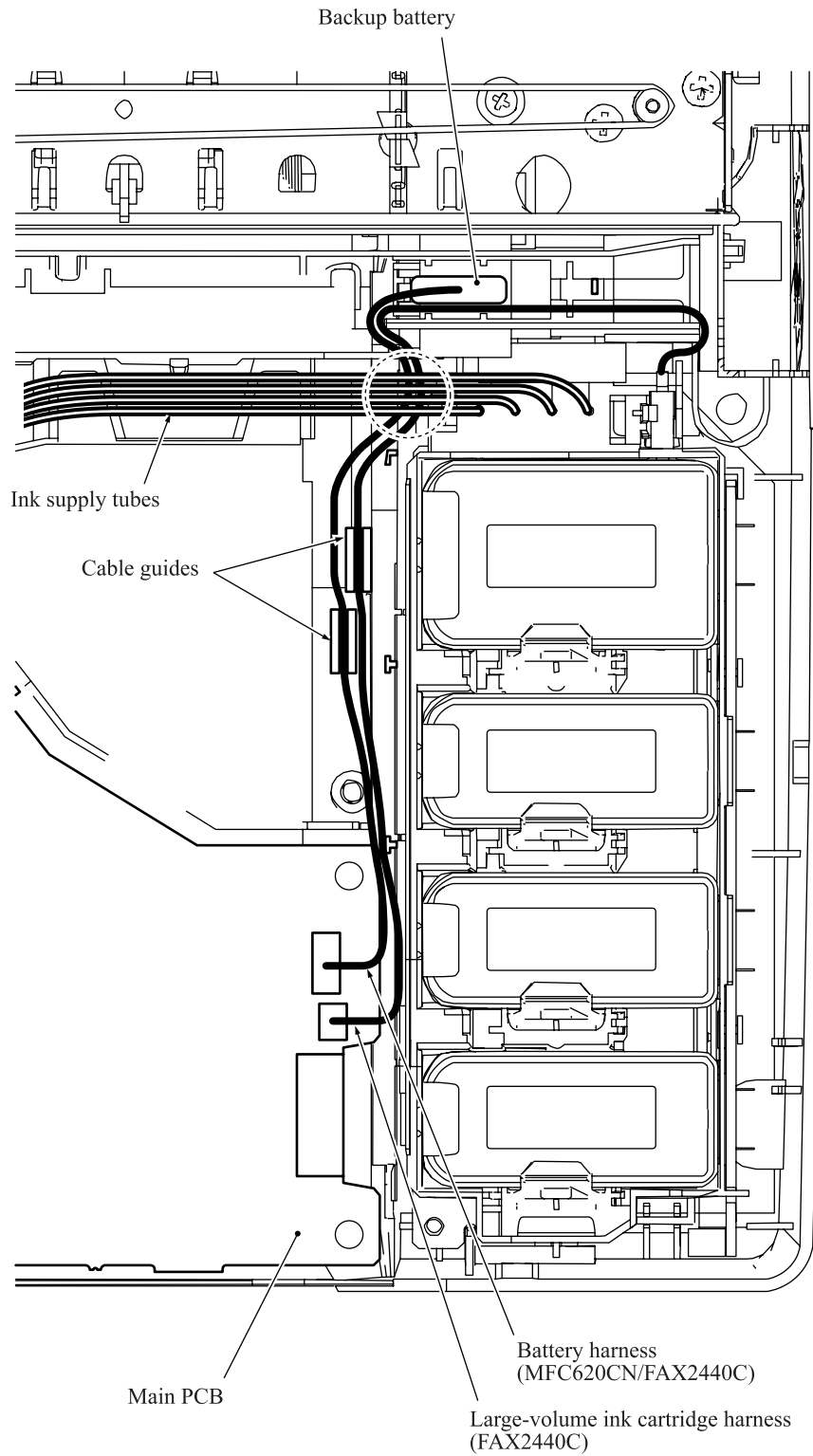
5.1.11 Ink Refill ASSY

(1) Take the ink supply tubes routed on the lower cover out of the machine.

(2) Press the latch provided on the front side of the ink cartridge base inwards with a flat screwdriver and lift the ink cartridge base up and out of the lower cover.

   NOTE: Inside the ink cartridge base is an ink absorber foam that may be stained with ink. If it is excessively stained, replace the ink refill ASSY.

(3) Disconnect the ink cartridge/purge cam switch harness from the main PCB and the ink cartridge PCB.

(4) FAX2440C: Disconnect the large-volume ink cartridge sensor harness from the ink cartridge PCB and remove the sensor from the ink refill ASSY.
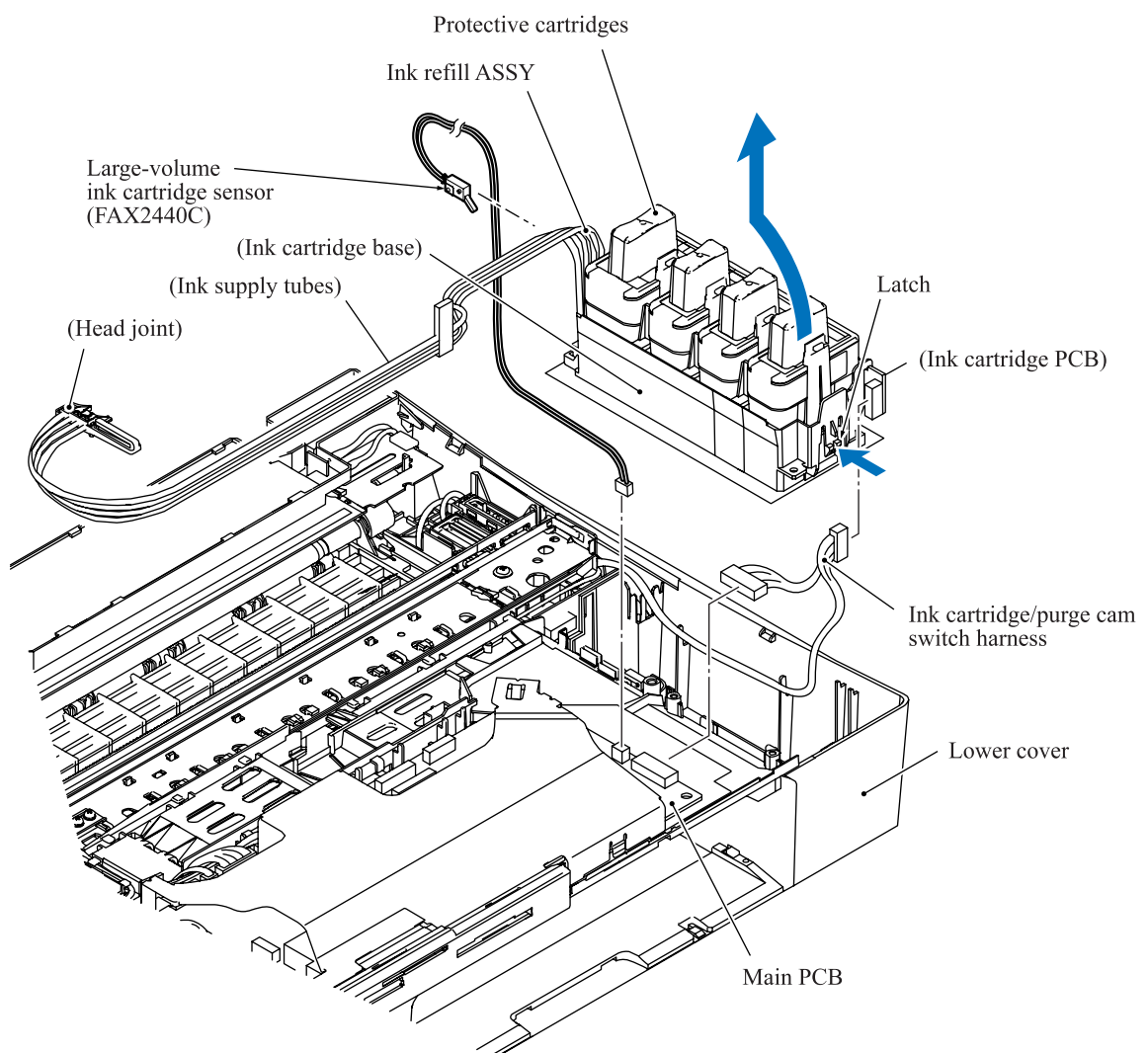
5.1.12 Media Module Cover and Main PCB

CAUTION: Before accessing the main PCB, make sure that the <u>power cord</u> is unplugged from the electrical outlet and the <u>telephone line</u> is disconnected; otherwise, an electric shock could occur.

CAUTION: At the time of removal of the main PCB, untightening screws should be preceded by disconnection of the harnesses and flat cables, and at the time of installation, connection of the harnesses and flat cables, by tightening of screws. Observing this sequence prevents harnesses and flat cables from getting crushed or damaged by screws or screwdrivers.

The following procedure is for the MFC620CN/MFC420CN/410CN/FAX2440C and DCP310CN. In the MFC210C and DCP110C, the number of screws and the shapes of the main PCB and its shield differ.

(1) Remove the media module cover towards you.

(2) Remove three screws "b1" through "b3" (two screws in the MFC210C and DCP110C) from the main PCB shield and lift it up.

"b1" and "b3": Taptite, cup B M3x8
"b2":   Taptite, cup S M3x6
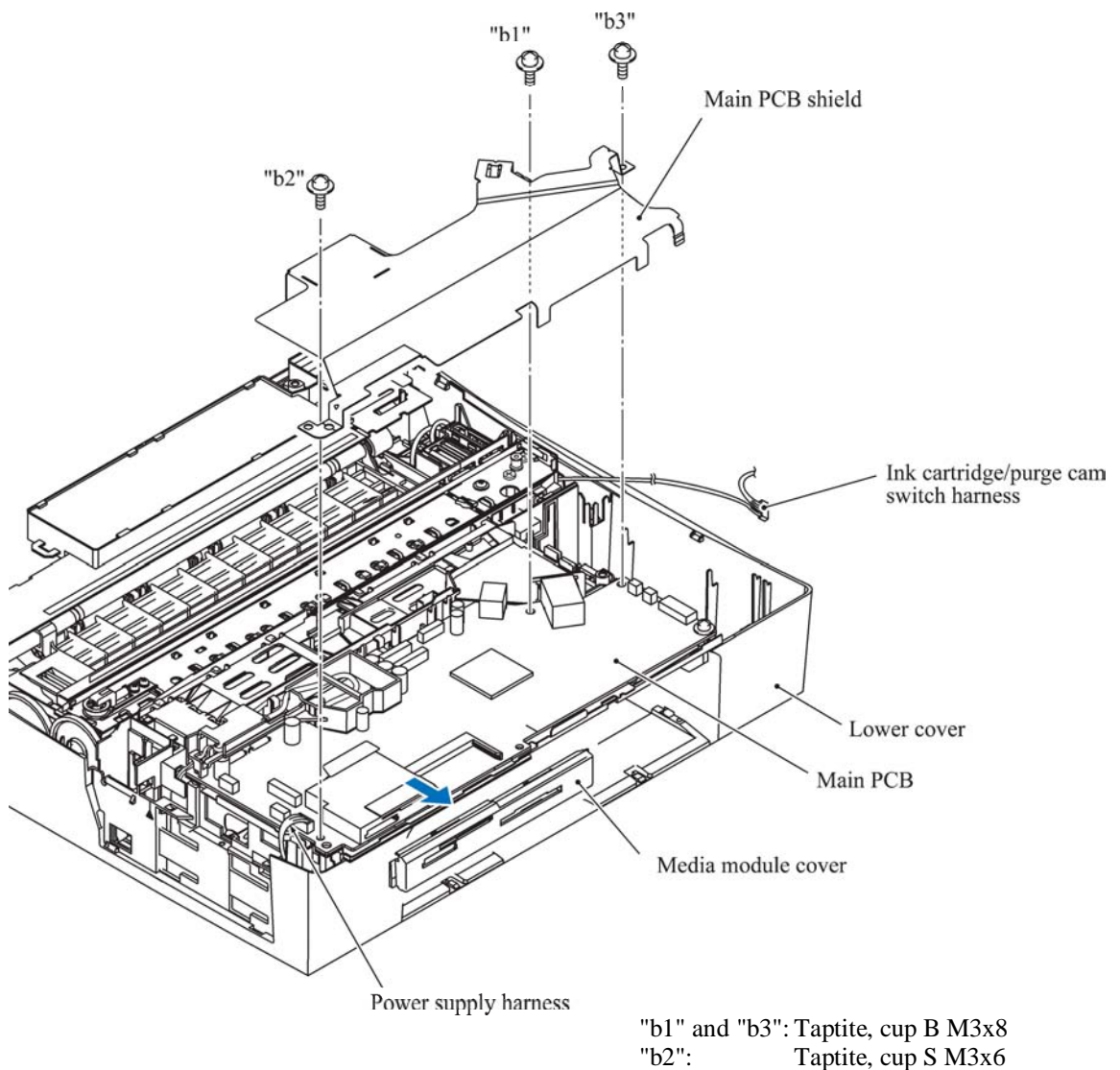
(3) Disconnect the MJ-line harness from the main PCB.

(4) Remove the SDAA enclosure from the main PCB.

MJ-line harness

SDAA enclosure
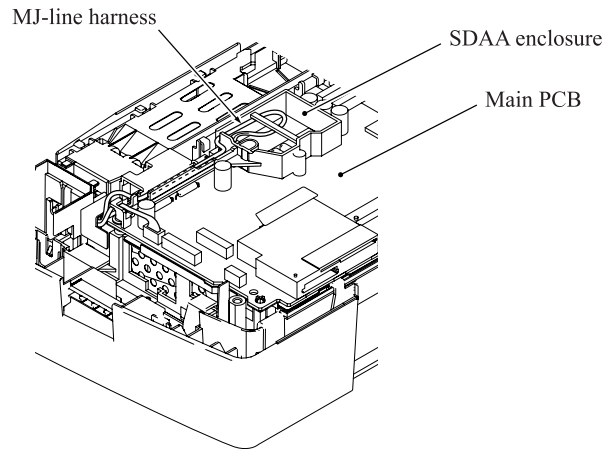
Main PCB

(5) Disconnect the following harnesses and flat cables from the main PCB.
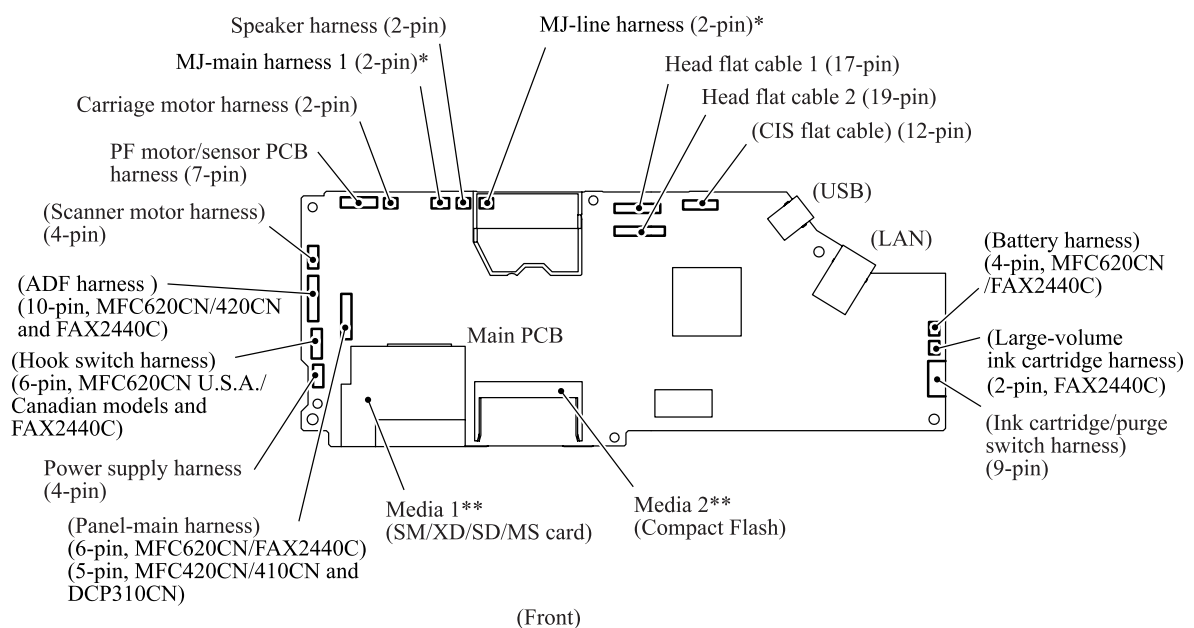
CAUTION: Do not remove the screws from the main PCB before disconnecting harnesses and flat cables.

MFC620CN/420CN/410CN, FAX2440C and DCP310CN

- Power supply harness (4-pin)
- PF motor/sensor PCB harness (7-pin)
- Carriage motor harness (2-pin)
- MJ-main harness 1 (2-pin)*
- Speaker harness (2-pin)
- Head flat cable 1 (17-pin)
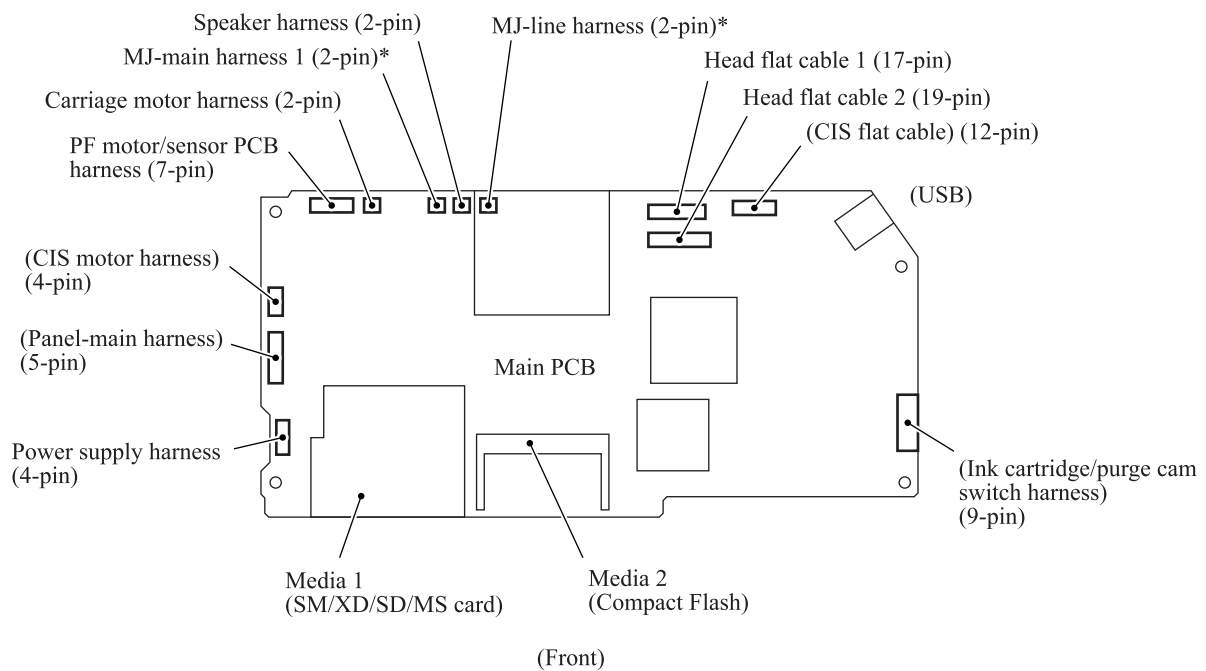- Head flat cable 2 (19-pin)

* Not provided on the DCP310CN.
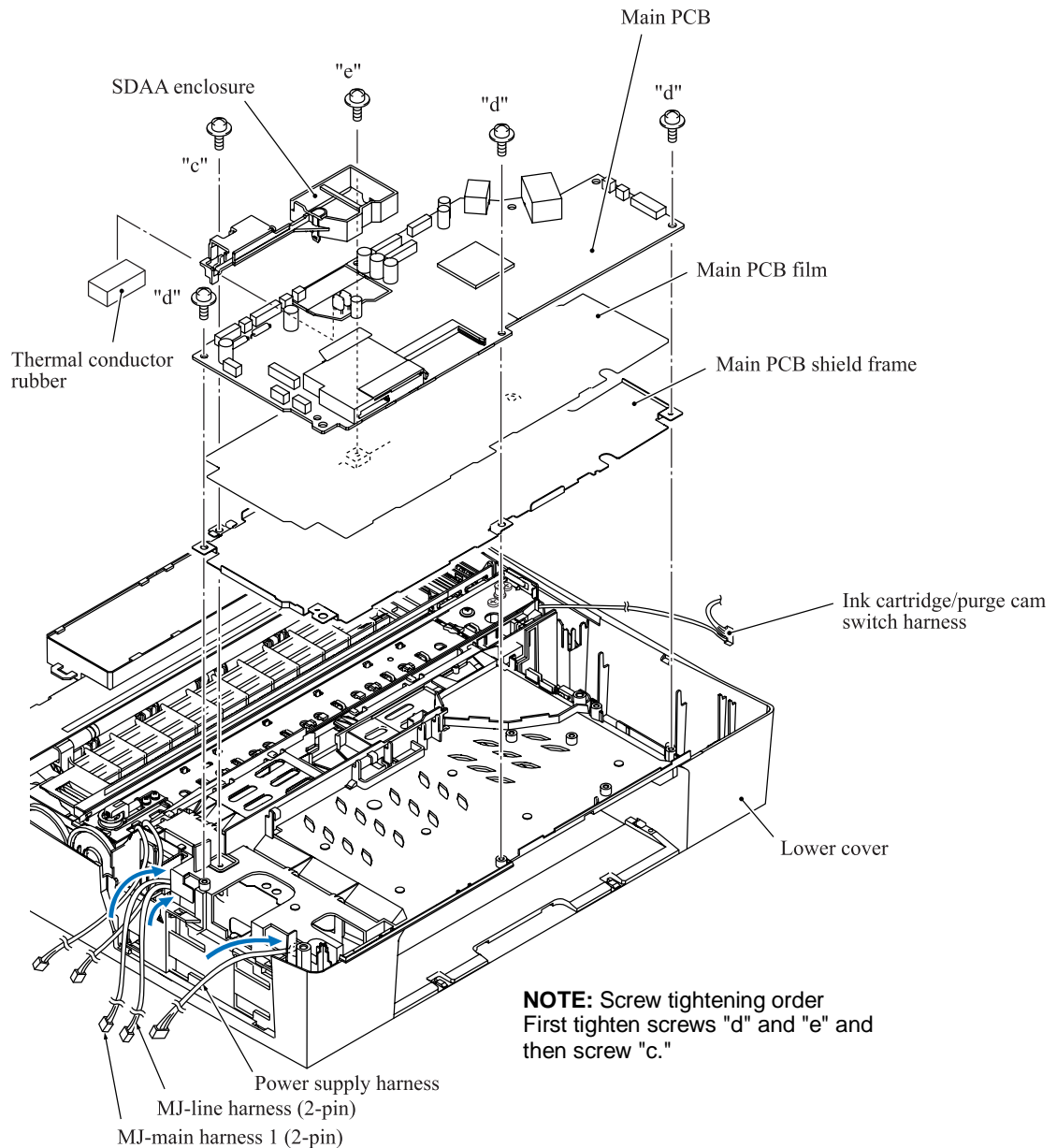** Not provided on the FAX2440C.

Speaker harness (2-pin)

MJ-line harness (2-pin)*

MJ-main harness 1 (2-pin)*

Head flat cable 1 (17-pin)

Carriage motor harness (2-pin)

Head flat cable 2 (19-pin)

PF motor/sensor PCB harness (7-pin)

(CIS flat cable) (12-pin)

(Scanner motor harness) (4-pin)

(USB)

(LAN)

(Battery harness) (4-pin, MFC620CN /FAX2440C)

(ADF harness) (10-pin, MFC620CN/420CN and FAX2440C)

Main PCB

(Large-volume ink cartridge harness) (2-pin, FAX2440C)

(Hook switch harness) (6-pin, MFC620CN U.S.A./ Canadian models and FAX2440C)

(Ink cartridge/purge switch harness) (9-pin)

Power supply harness (4-pin)

Media 1** (SM/XD/SD/MS card)

Media 2** (Compact Flash)

(Panel-main harness) (6-pin, MFC620CN/FAX2440C) (5-pin, MFC420CN/410CN and DCP310CN)

(Front)

MFC210C and DCP110C

- Power supply harness (4-pin)
- PF motor/sensor PCB harness (7-pin)
- Carriage motor harness (2-pin)
- MJ-main harness 1 (2-pin)*
- Speaker harness (2-pin)
- Head flat cable 1 (17-pin)
- Head flat cable 2 (19-pin)

*Not provided on the DCP110C.

Speaker harness (2-pin)

MJ-line harness (2-pin)*

MJ-main harness 1 (2-pin)*

Carriage motor harness (2-pin)

Head flat cable 1 (17-pin)

Head flat cable 2 (19-pin)

PF motor/sensor PCB harness (7-pin)

(CIS flat cable) (12-pin)

(USB)

(CIS motor harness) (4-pin)

(Panel-main harness) (5-pin)

Main PCB

Power supply harness (4-pin)

(Ink cartridge/purge cam switch harness) (9-pin)

Media 1 (SM/XD/SD/MS card)

Media 2 (Compact Flash)

(Front)

(6) Remove four screws (three "d" and one "e" screws) from the main PCB, then lift up the PCB.

(7) Remove screw "c" from the main PCB shield frame.

(8) Remove the main PCB film and shield frame.

Main PCB

SDAA enclosure

"e"

"d"

"d"

"c"

"d"

Main PCB film

Thermal conductor
rubber

Main PCB shield frame

Ink cartridge/purge cam
switch harness

Lower cover

NOTE: Screw tightening order
First tighten screws "d" and "e" and
then screw "c."

Power supply harness
MJ-line harness (2-pin)
MJ-main harness 1 (2-pin)

"c": Screw, pan (s/p washer) M3x8
"d": Taptite, cup B M3x8
"e": Taptite, cup S M3x6

(9) The thermal conductor rubber is attached to the solder side of the main PCB. When replacing
the main PCB, gently remove the thermal conductor rubber from the main PCB and attach it to
a new PCB. (For details, refer to the next page.)
NOTE: Thermal conductor rubber is not attached to the DCP models.

Confidential

■ **Reassembling Notes**

- If the main PCB is replaced, attach the thermal conductor rubber removed from the old PCB to a new one as specified below.

The thermal conductor rubber should not protrude from the edge of the PCB.

The thermal conductor rubber should be out of contact with these connector leads.

0 to 2 mm

0 to 2 mm

Soldered

Thermal conductor rubber
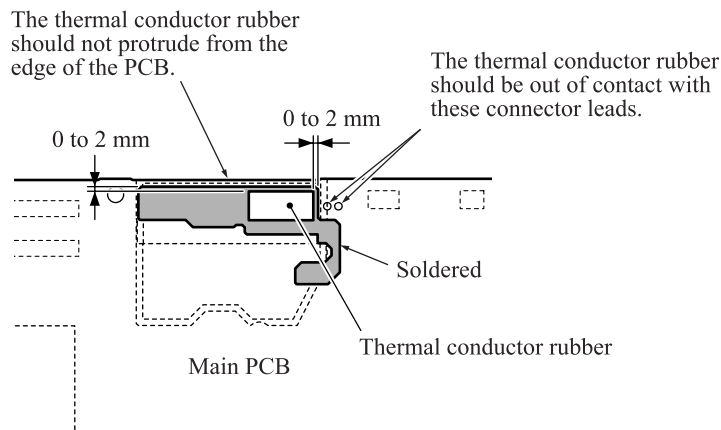
Main PCB

- When securing the main PCB and its shield frame, first tighten four screws "d" and "e" and then screw "c." See the previous page.

- Before securing the main PCB shield, connect the MJ-line harnesses to the main PCB and route it through the SDAA enclosure as shown below.

CIS motor harness and Panel-main harness

MJ-main harness

Speaker harness

MJ-line harness

Main PCB

SDAA enclosure
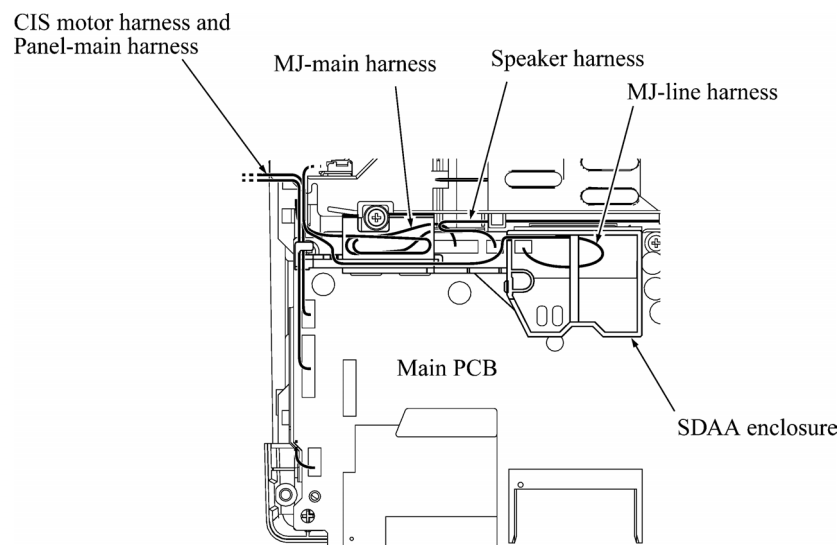
- If you replace the main PCB, also replace the ink absorber box. Otherwise, drained ink may overflow after long-term use.

- If you replace the main PCB, you need to make the specified adjustments and updating of settings stored in the flash ROM while referring to Chapter 6, Section 6.3. Before starting, make sure that the head/carriage unit is installed.

Confidential

5.1.13 MJ/PS Shield Box, MJ PCB* and Power Supply PCB

*Not provided on the DCP310CN/110C

(1) Remove the two screws.

(2) Insert the tip of a flat screwdriver through square cutout "x" and push boss "X" inwards to release the MJ/PS shield box.

Taptite, cup S M3x6

Lower cover

Boss "X"

Cutout "x"

MJ-main harness 1

MJ-line harness

Power supply harness

MJ/PS shield box

Cutout "x"

Latch

Confidential
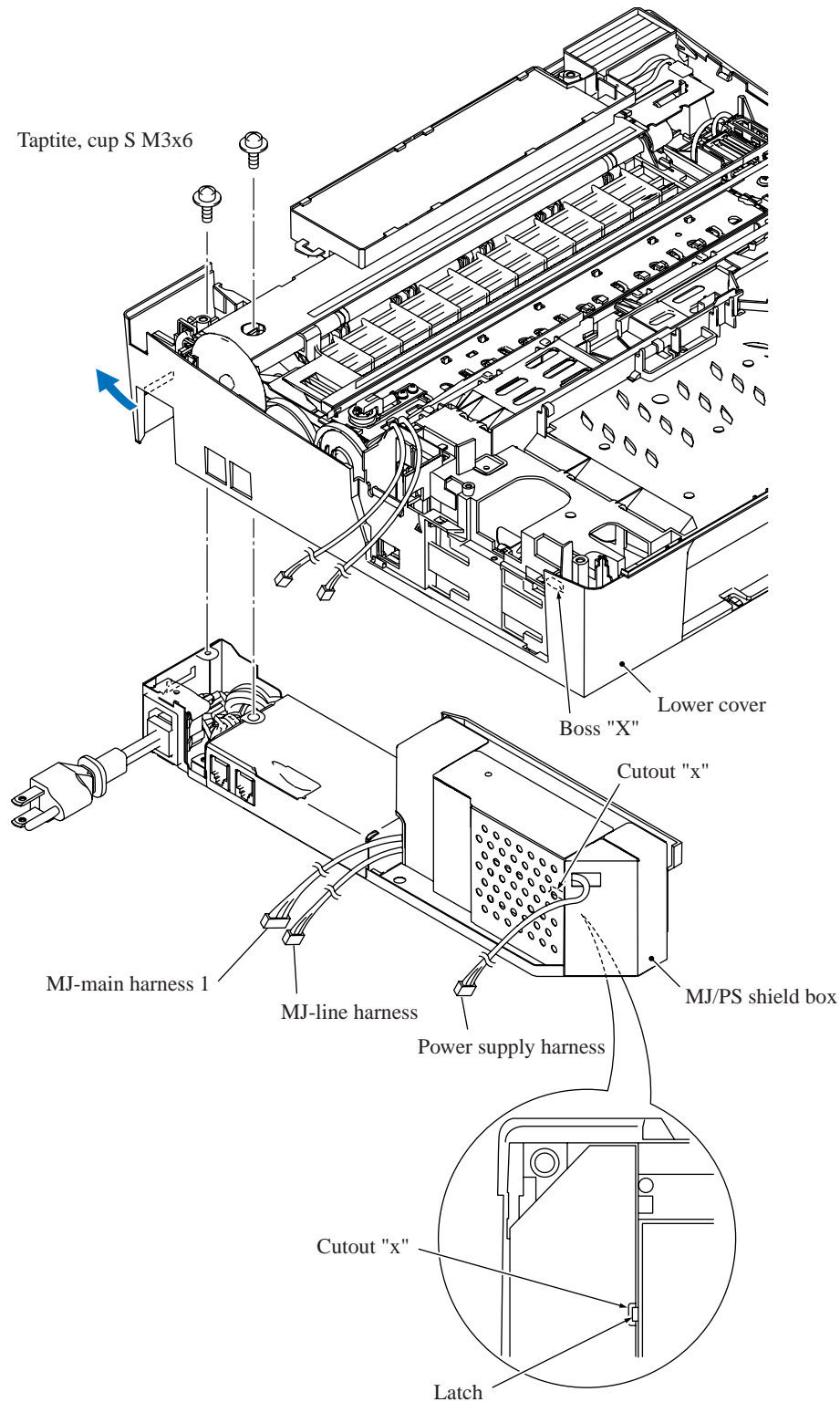
(3) Remove screw "a" from the MJ shield and take it off the lower MJ/PS shield.

(4) Remove the power supply shield.

(5) Remove five screws ("c" and "d1" through "d4" screws) from the grounding terminal and power supply PCB.

(6) Remove screw "b" from the MJ PCB and take it off the lower MJ/PS shield.

"a"

MJ shield

MJ-line harness (2-pin)

MJ PCB

"b"

MJ-main harness 1 (2-pin)

Grounding terminal

Lower MJ/PS shield

"c"

"d3"

"d2"

"d4"

Power supply PCB

"d1"

NOTE: Tighten "d1" through "d4" screws in this order.

Power supply shield

Power cord

MJ-main harness

MJ-line harness

Power supply PCB

MJ/PS shield box
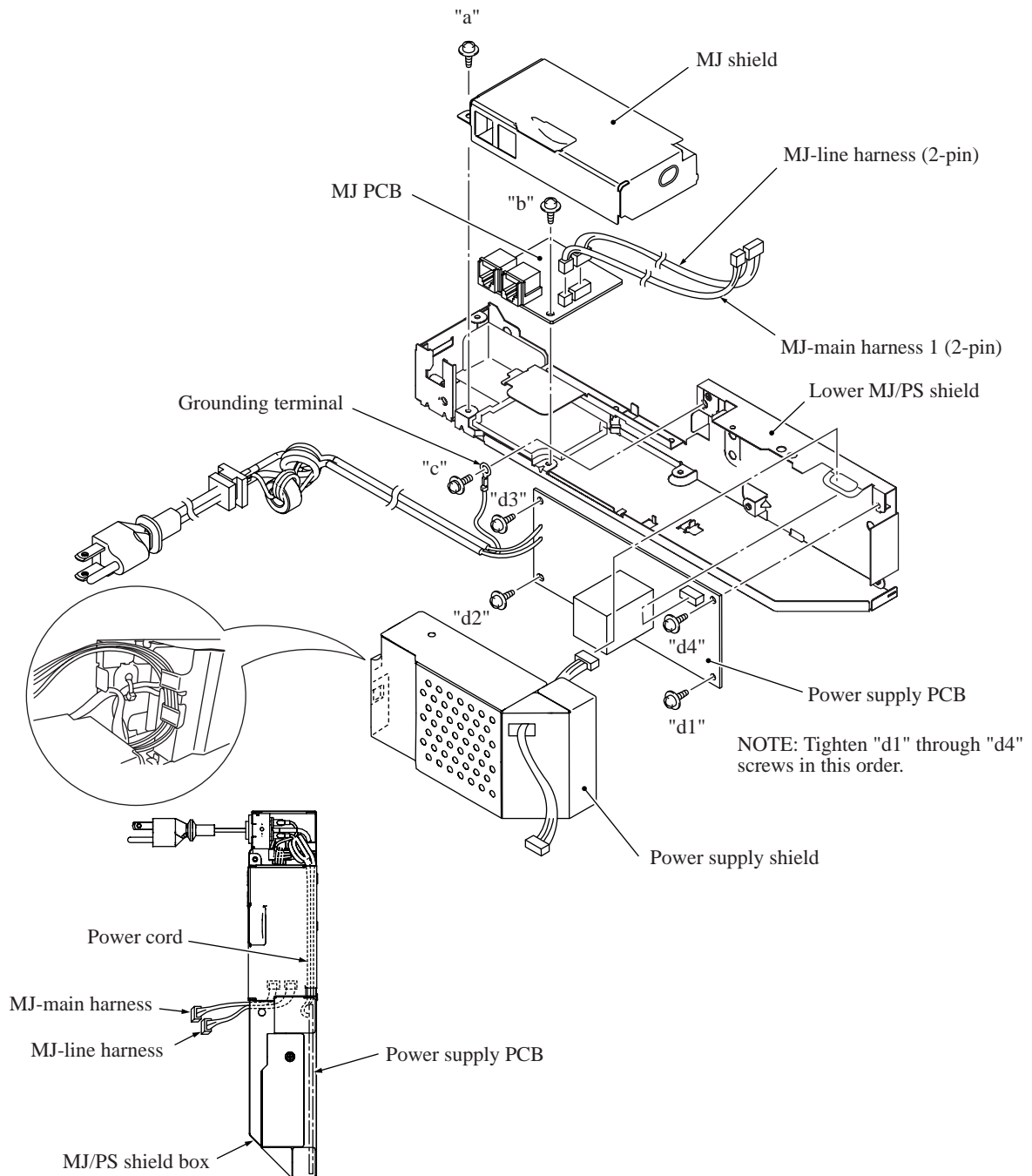
"a": Screw, pan (washer) M3x8DB
"b" and "d1" through "d4": Taptite, cup S M3x6
"c": Screw, bind M4x6

■ **Reassembling Notes**

• When securing the power supply PCB, tighten "d1," "d2," "d3," and "d4" screws in this order.

Confidential

5.1.14 Ink Absorber Box

(1) Pull out the two tubes (main drain tube and opening tube to the atmospheric air) from the ink absorber box.

   NOTE: Pinch the end of the main drain tube with a clip to prevent drained ink from leaking and the machine from getting stained with leaked ink.

   NOTE: Wrap the end of the opening tube to the atmospheric air in tissue paper to prevent drained ink from leaking and the machine from getting stained with leaked ink.

(2) Lift the ink absorber box up and out of the lower cover.

   NOTE: Do not remove the ink absorber box unless it needs to be replaced. When replacing it, set a new one immediately to prevent the machine from getting stained with drained ink.

   NOTE: If the ink absorber box or its surroundings are stained with ink, wipe them off with a cloth.

Ink absorber box

Opening tube to the atmospheric air

Main drain tube

Lower cover
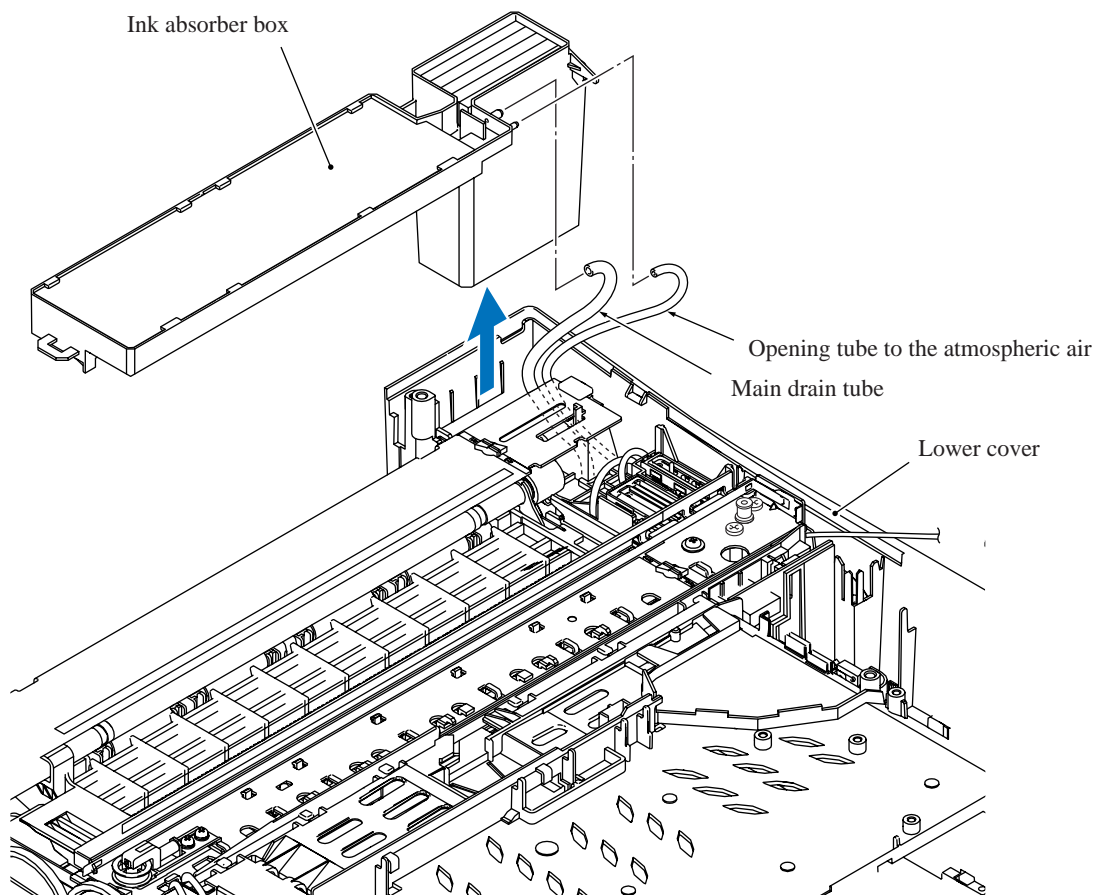
■ **Reassembling Notes**

• If you replace the ink absorber box (without replacing the main PCB), you need to reset the purge counter in the EEPROM to zero according to the procedure below.

MFC620CN/420CN/410CN/210C and FAX2440C

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

The "∎∎ MAINTENANCE ∎∎∎" appears on the LCD.

TIP: FAX models equipped with numerical keypads can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu/Set**, *****, **2**, **8**, **6** and **4** keys in this sequence.

2) Press the **8** and **0** keys in this order to display the equipment's log. (Function code 80 described in Chapter 8, Section 8.5.20.)

3) Press the **Black Start** key several times until the purge count appears on the LCD.

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

5) Press the **9** key twice to return to the standby state.

DCP310CN/110C

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

The "∎∎ MAINTENANCE ∎∎∎" appears on the LCD.

2) Display the equipment's log (with Function code 80) by using the ▲ and **Set** keys as follows:

Press the ▲ key several times to display 8 on the LCD and press the **Set** key. Again press the ▲ key several times to display 0 and press the **Set** key.

3) Press the **Mono Start** key several times to display the purge count on the LCD.

4) Reset the purge count to zero by using the ▲ and **Set** keys as follows:

Press the ▲ key several times to display 2 on the LCD and then press the **Set** key. In the same way, enter 7, 8, and 3.

5) Exit from the maintenance mode by using the ▲ and **Set** keys as follows:

Press the ▲ key several times to display 9 on the LCD and then press the **Set** key. Again press the ▲ key several times to display 9 and press the **Set** key.

5.1.15 Engine Unit and Maintenance Unit

During disassembly jobs, except when removing the ink refill ASSY or engine unit (including the maintenance unit), leave the head/carriage unit and all four ink cartridges in the machine.

Before removing the head/carriage unit, ink refill ASSY or engine unit, you need to replace the current ink cartridges with dummy ones and drain ink from the ink refill ASSY and head/carriage unit (see Section 5.1.1). After ink draining, be sure to set protective cartridges instead of dummy ones.

Removing the engine unit

(1) Lift the engine unit up and out of the lower cover.

　　NOTE: When handling the engine unit, hold it at the both ends with both hands taking care not to touch the PF encoder disk. Do not hold it with one hand at the center, particularly at the carriage rail section.

　　NOTE: Do not place the engine unit directly on a flat surface; doing so may break the PF encoder disk and gears. Be sure to place a support pad under the engine unit as illustrated below.
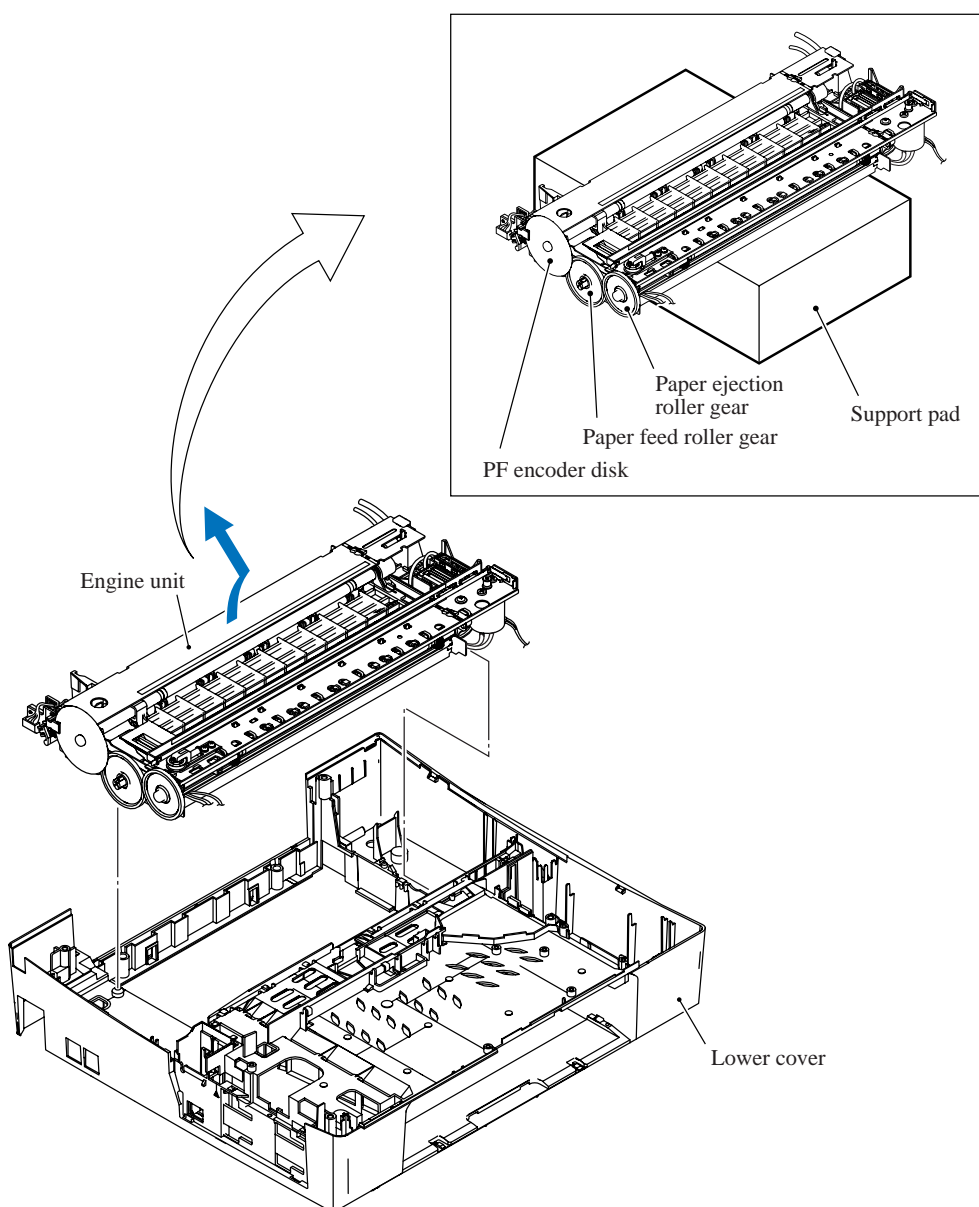
Removing the maintenance unit and related parts

(2) Remove two screws, "e" from the top of the engine unit and "f" from the right side of the maintenance unit.

(3) Remove the maintenance unit.

(4) Unlatch the purge cam switch from the maintenance unit.

(5) Remove the purge-related parts from the engine unit as shown below.

　　NOTE: Take care not to let the springs bounce off.
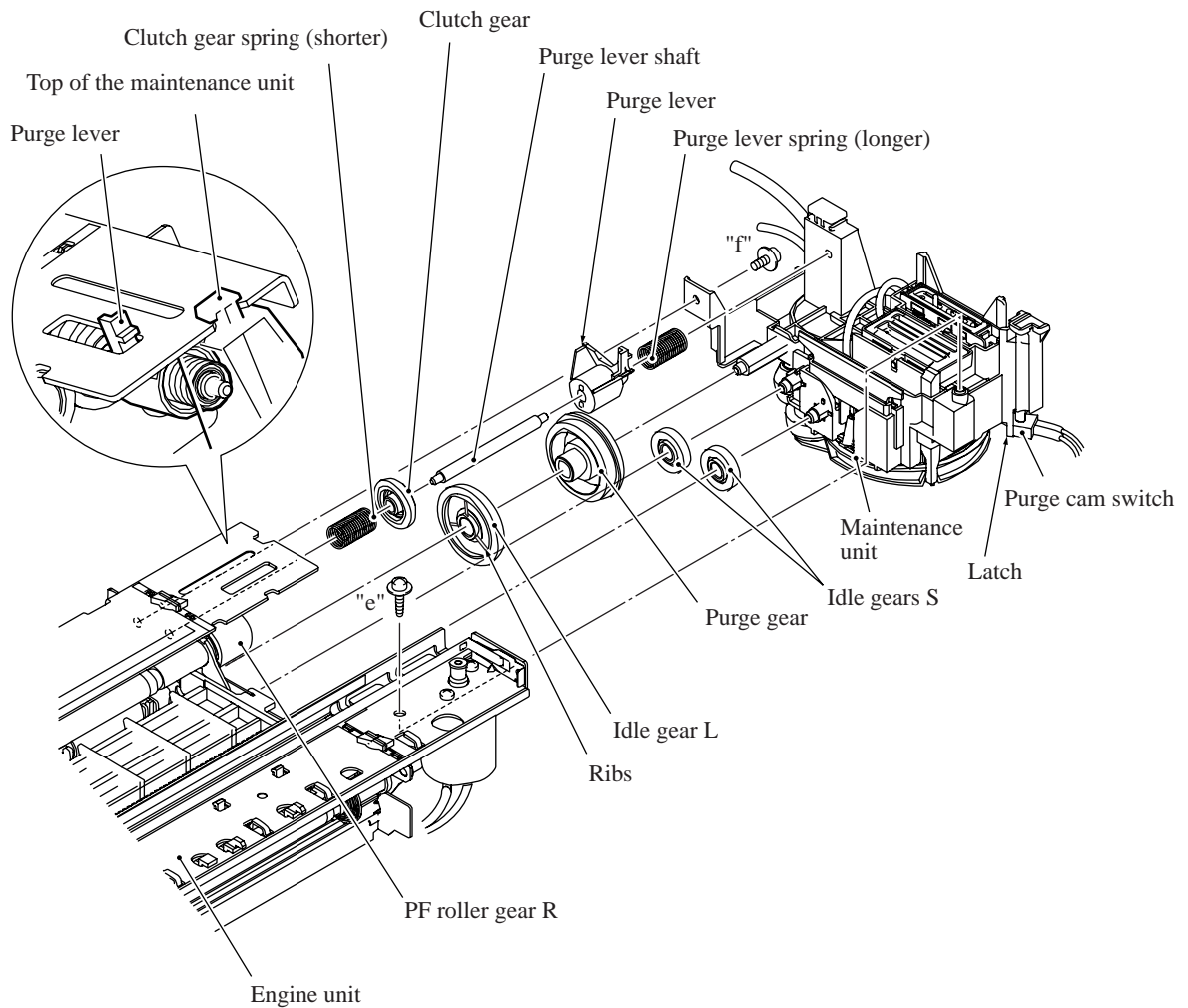
"e": Taptite, cup B M3x8
"f": Taptite, cup S M3x6

Reassembling Note: When setting the idle gear L back into place, face its ribs inwards.

Reassembling Note: If you replace the engine unit, make adjustments specified in Chapter 6, Section 6.2.

Confidential

5.1.16 Components on the Engine Unit

<u>**Removing the CR encoder strip**</u>

(1) Unhook the CR encoder strip from the engine unit.

> **NOTE:** Take care not to scratch or damage the encoder strip. If it becomes dirty, wipe it with a soft, dry cloth. If it is stained with ink, replace it.

This should point up.

CR encoder strip

Hook

Carriage motor

(Front)

Engine unit

Hook
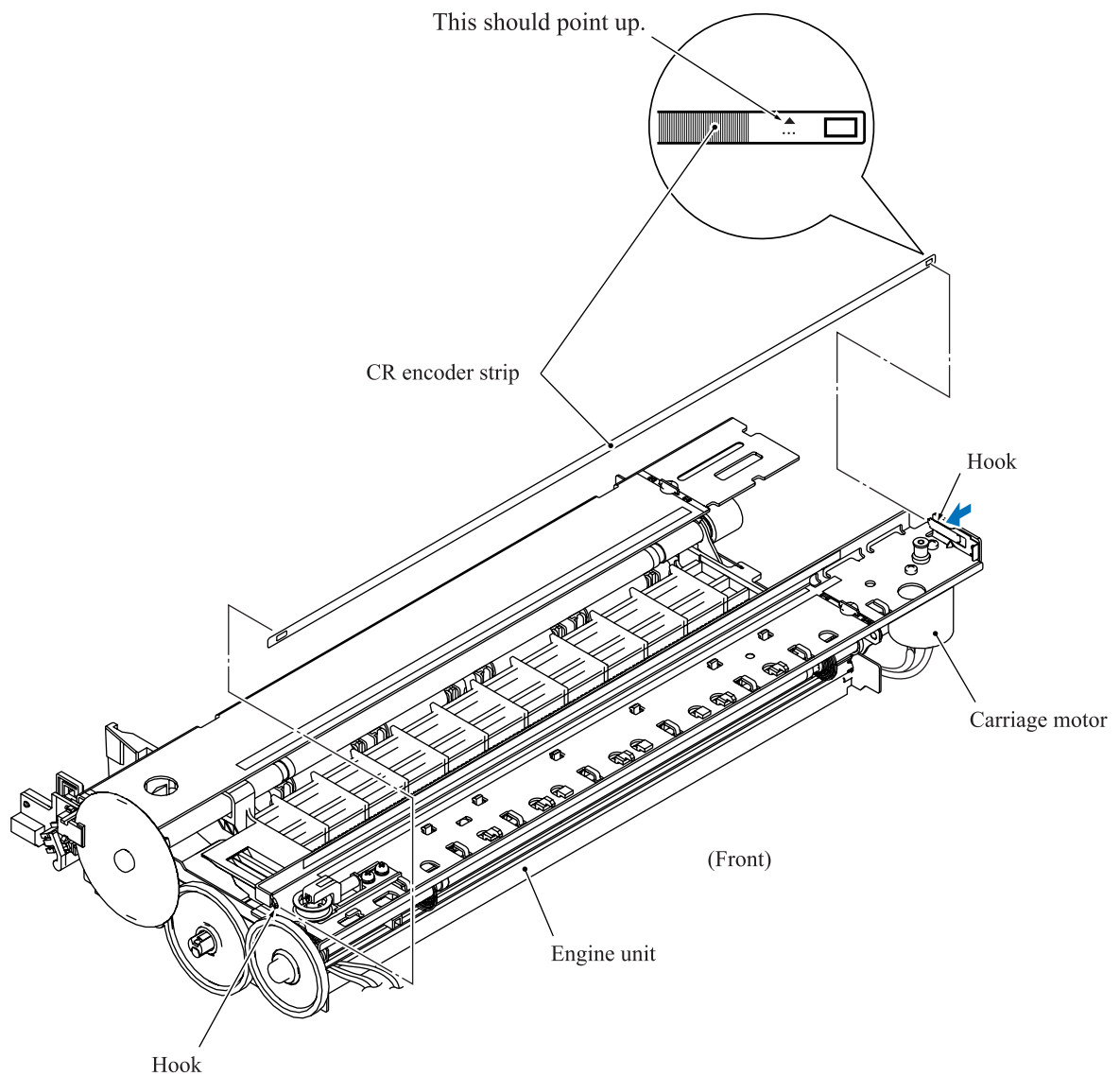
> **Reassembling Note:** Pass the CR encoder strip through the CR encoder sensor located at the back of the head/carriage unit so that the ▲-marked end is to the right (carriage motor side) and the ▲ mark points upwards.

Removing the paper pull-in gear shaft and roller holder

(2) Press the locking arm and pull out the paper pull-in gear shaft to the right.

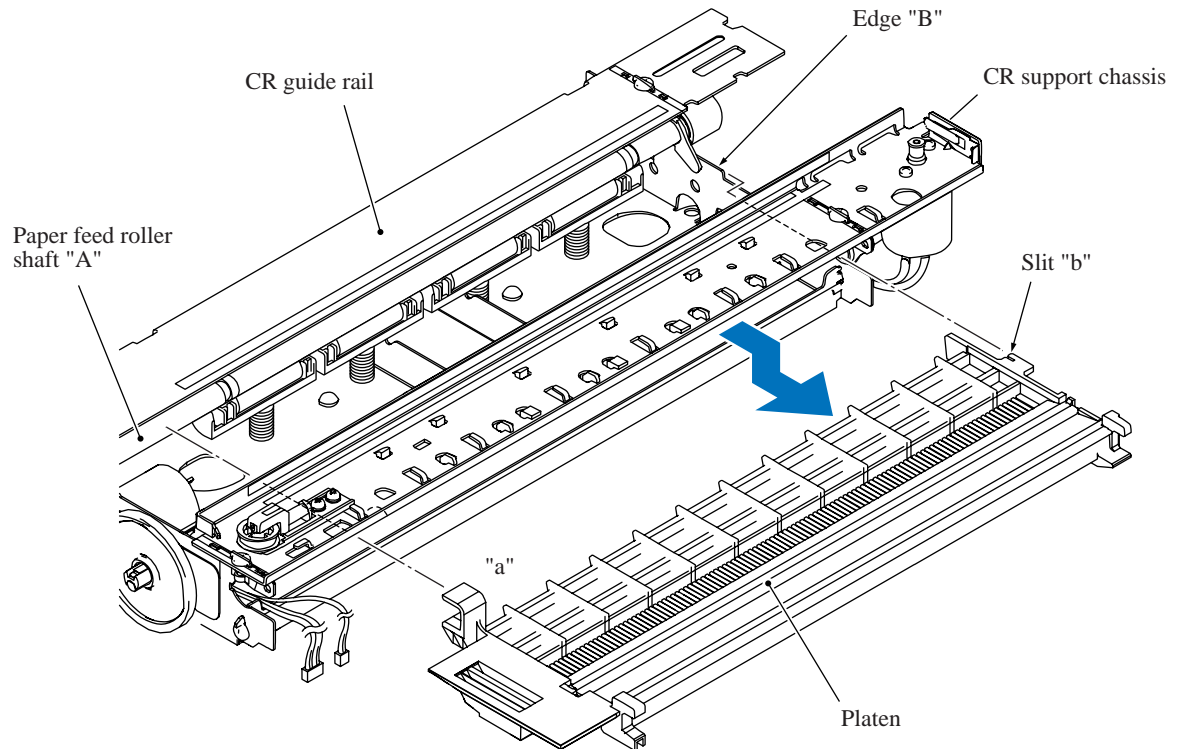(3) Remove the paper pull-in roller holder.

Engine unit

Paper pull-in gear shaft

Paper pull-in roller holder

Locking arm

Viewed from the bottom

Paper pull-in gear shaft

Paper pull-in roller holder

Confidential
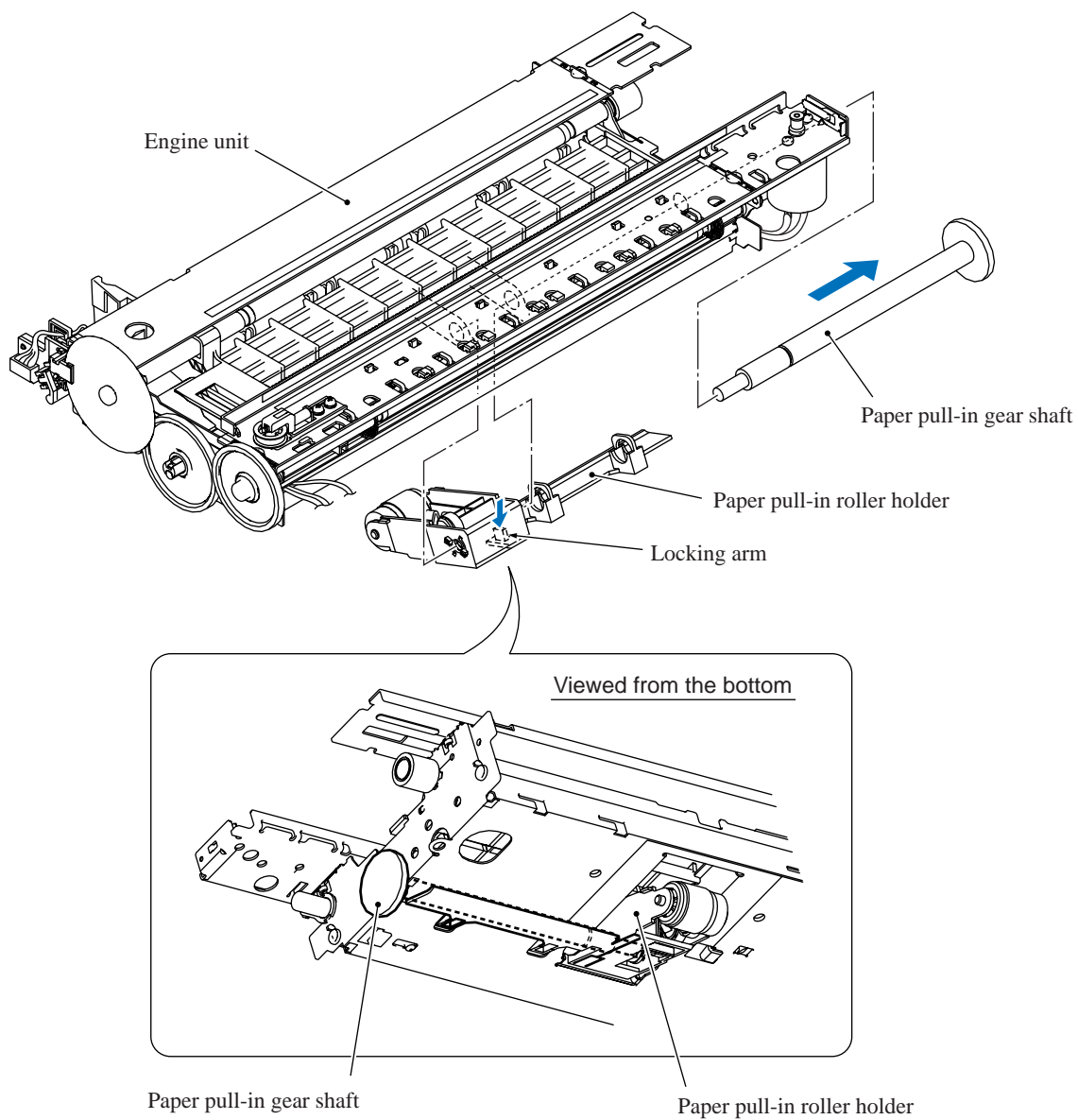
Removing the paper ejection roller

(4) At the left end of the paper ejection roller, release the lock arm of bushing L from the hole provided in the chassis of the engine unit and turn bushing L clockwise (viewed from the right).

At the right end, release the lock arm of bushing R from the chassis and turn it clockwise to the horizontal position, then remove the paper ejection roller towards you.

Lock arm of bushing R

Engine unit

Lock arm of bushing R

Paper ejection roller

Lock arm of bushing L

Lock arm of bushing L

Confidential
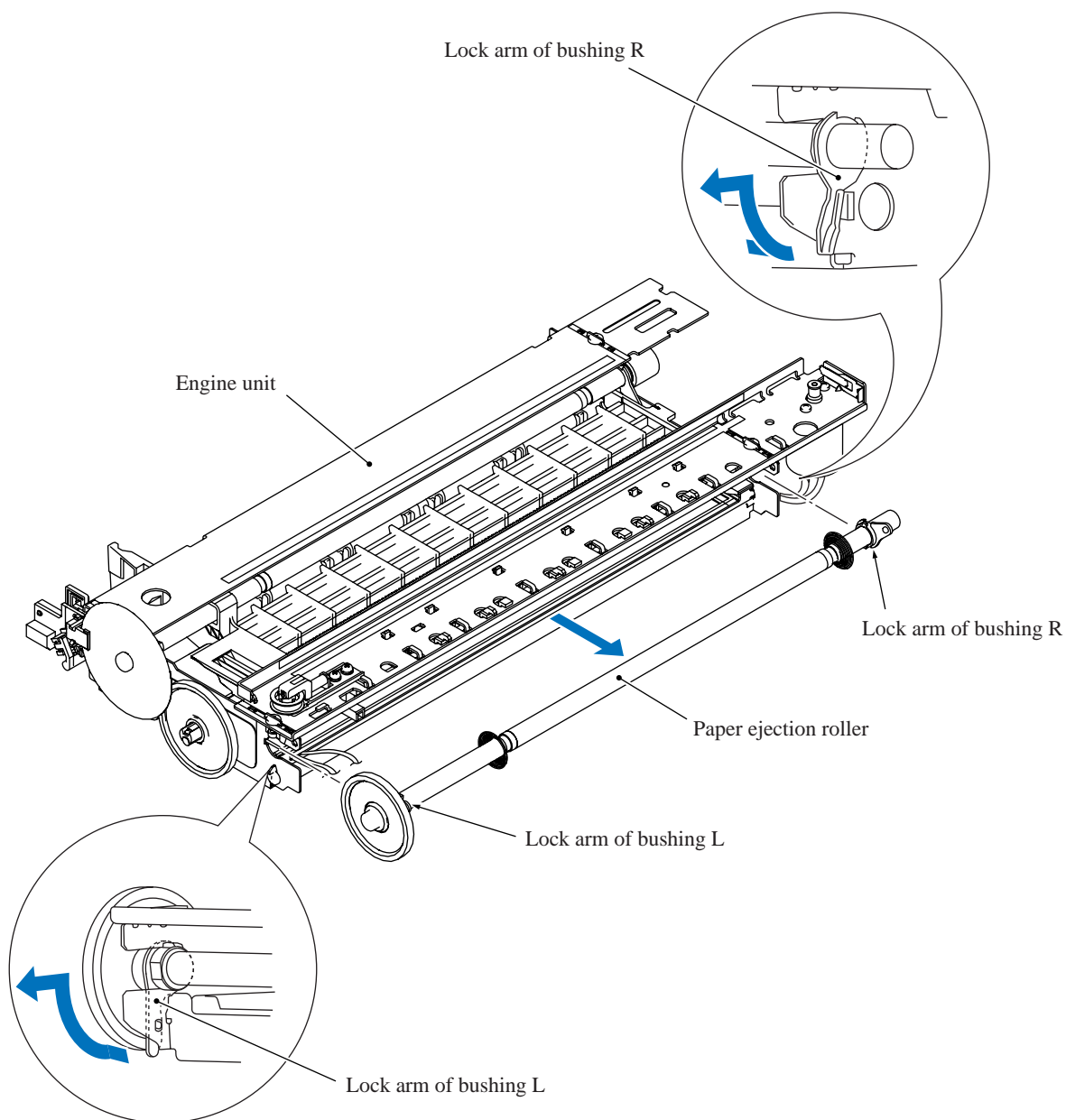
Removing the platen

(5) Pull out the platen towards you.

Edge "B"

CR guide rail

CR support chassis

Paper feed roller
shaft "A"

Slit "b"

"a"

Platen

Reassembling Note: Make sure that section "a" and slit "b" on the platen are fitted over paper
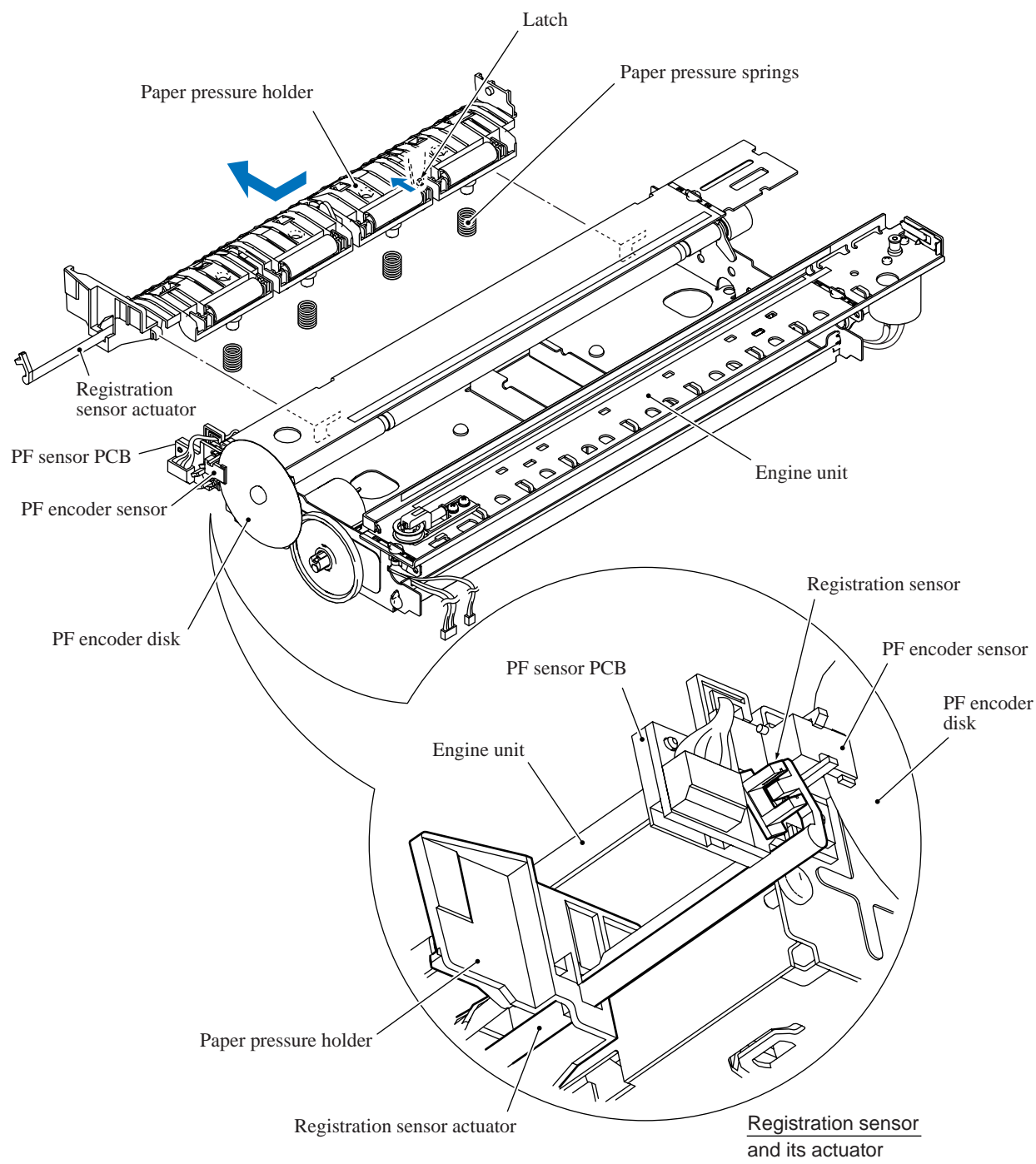feed roller shaft "A" and edge "B," respectively.

Removing the star wheel holder ASSY

(6) Release the two latches provided on the star wheel holder ASSY from the CR support chassis and take the ASSY out of the engine unit.

Latches

Star wheel holder ASSY

CR guide rail

CR support chassis

Carriage motor harness
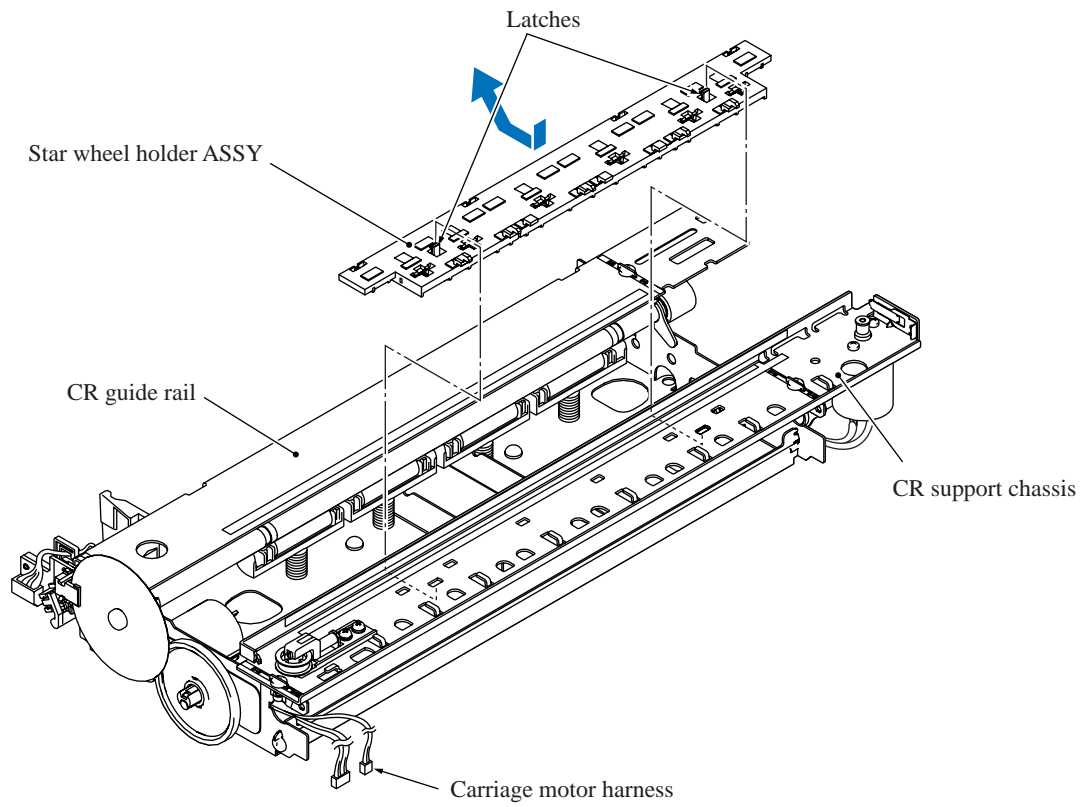
Removing the paper pressure holder and registration sensor actuator

(7) Release the latch provided on the paper pressure holder from the engine unit and remove the holder to the left and rear. The four paper pressure springs also come off.
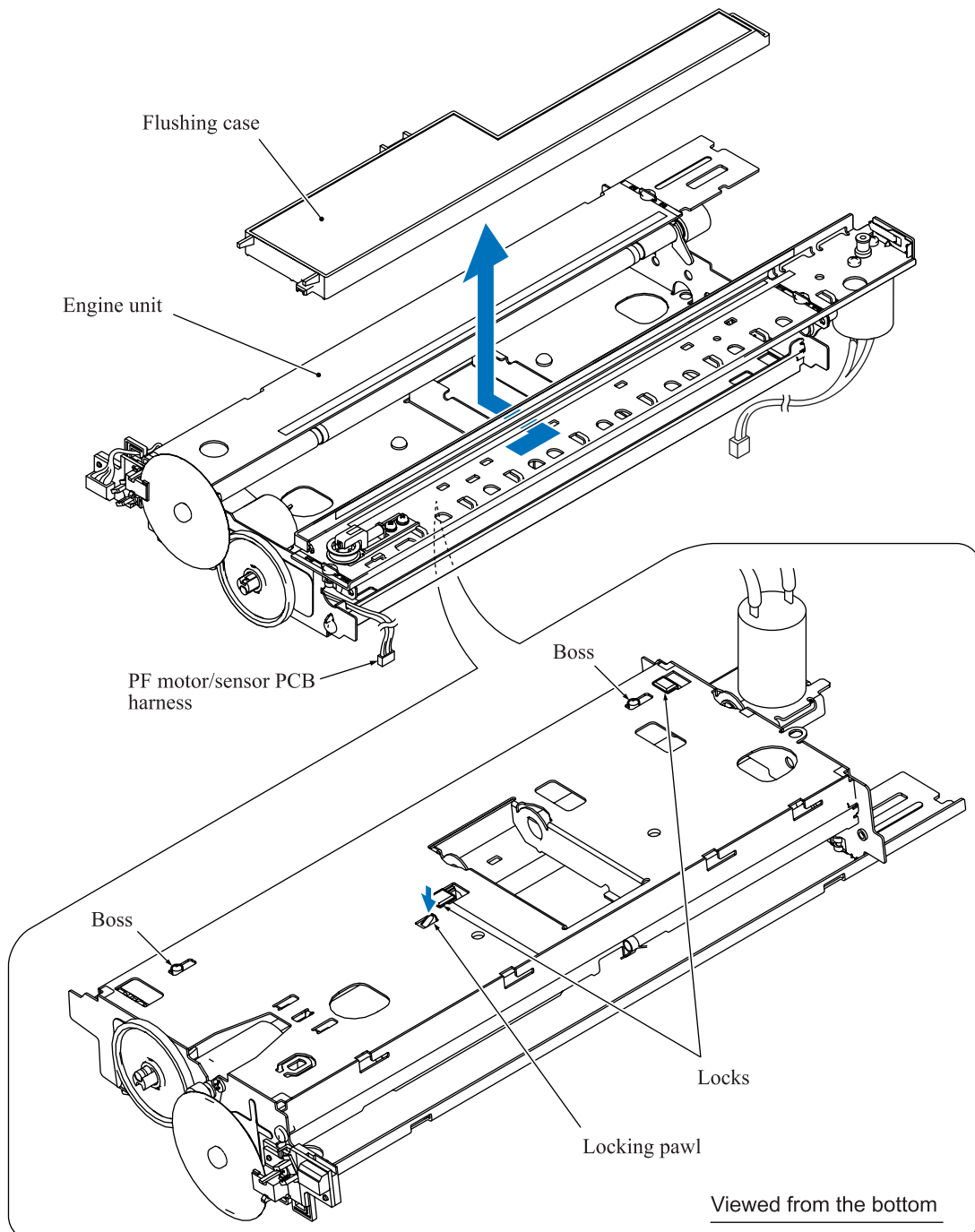
Latch

Paper pressure holder

Paper pressure springs

Registration sensor actuator

PF sensor PCB

PF encoder sensor

Engine unit

PF encoder disk

Registration sensor

PF sensor PCB

PF encoder sensor

PF encoder disk

Engine unit

Paper pressure holder

Registration sensor actuator

Registration sensor and its actuator

Confidential

(8) Unhook the sensor actuator spring from the paper pressure holder and turn the registration sensor actuator in the direction of the arrow as shown below to release it.

Sensor actuator spring

Registration sensor actuator

Registration sensor actuator

Paper pressure holder

Sensor actuator spring

Hooking the sensor actuator spring

Confidential
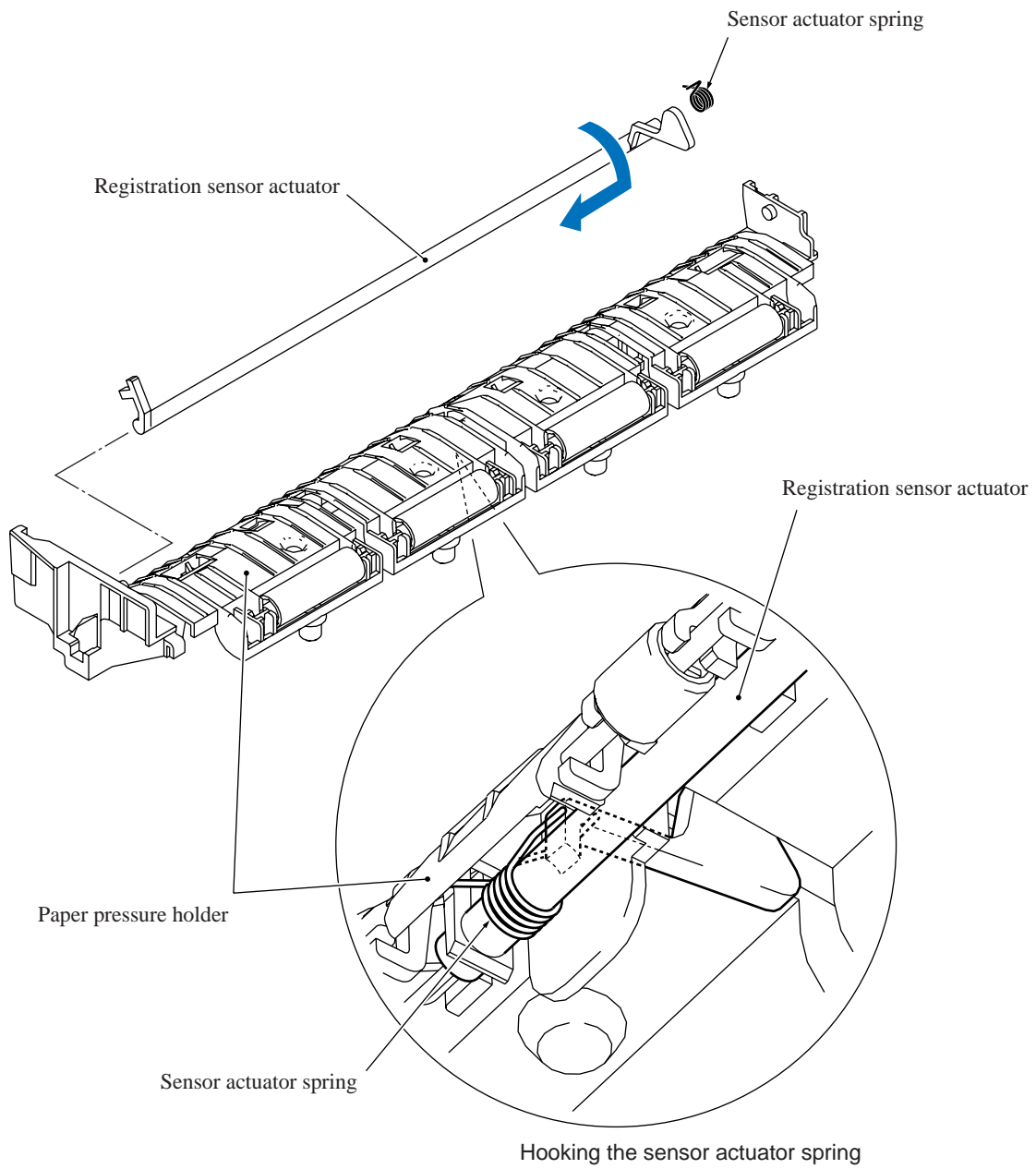
Removing the flushing case

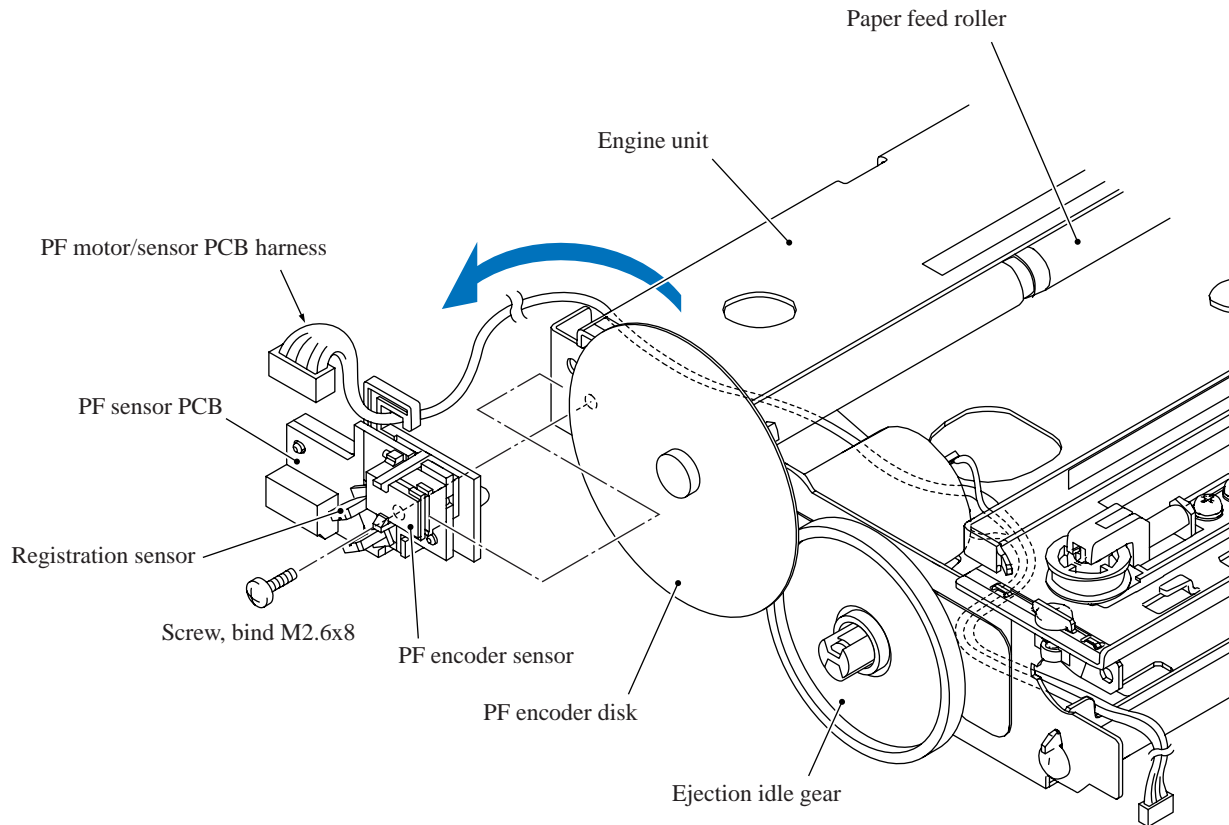(9) Press the locking pawl from the bottom of the flushing case and slide the case to the right and rear.

Flushing case

Engine unit

PF motor/sensor PCB harness

Boss

Boss

Locks

Locking pawl

Viewed from the bottom

Confidential

Removing the carriage motor

(10) Release the carriage motor from the engine unit by removing the two screws.

Screw, bind M3x3

CR guide rail

CR support chassis

Carriage motor

Confidential
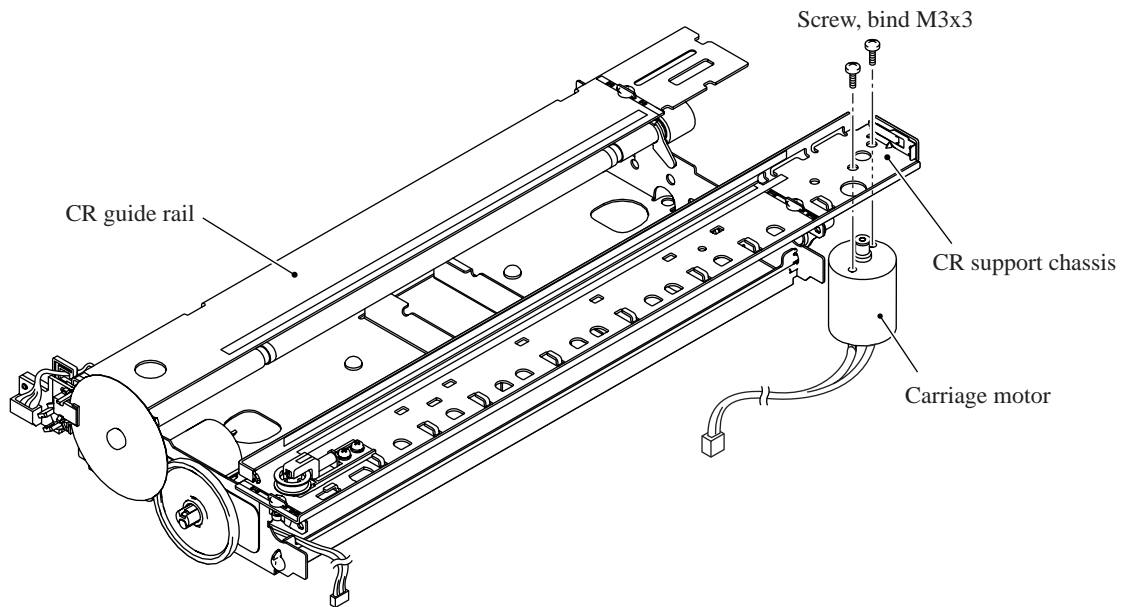
Removing the PF sensor PCB

(11) Disconnect the PF motor/sensor PCB harness from the PF sensor PCB.

(12) Remove the screw from the PF sensor PCB and release the PCB from the engine unit, taking care not to touch the PF encoder disk.

Paper feed roller

Engine unit

PF motor/sensor PCB harness

PF sensor PCB

Registration sensor

Screw, bind M2.6x8

PF encoder sensor

PF encoder disk

Ejection idle gear

Removing the PF encoder disk, ejection idle gear and paper feed motor

(13) Peel off the PF encoder disk from the PF roller gear only when it should be replaced.

NOTE: Once removed, the PF encoder disk will become unusable and a new disk will have to be put back in.

NOTE: Remove any adhesive remaining left on the PF roller gear.
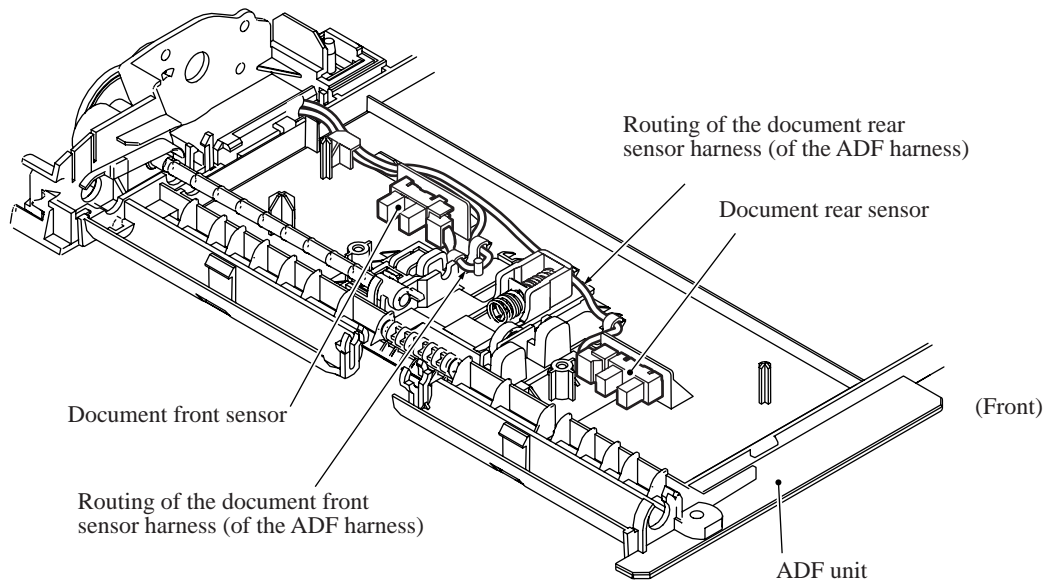
(14) Remove the ejection idle gear.

Engine unit

PF roller gear L

Paper feed roller

PF encoder disk

PF motor/sensor PCB harness

Ejection idle gear
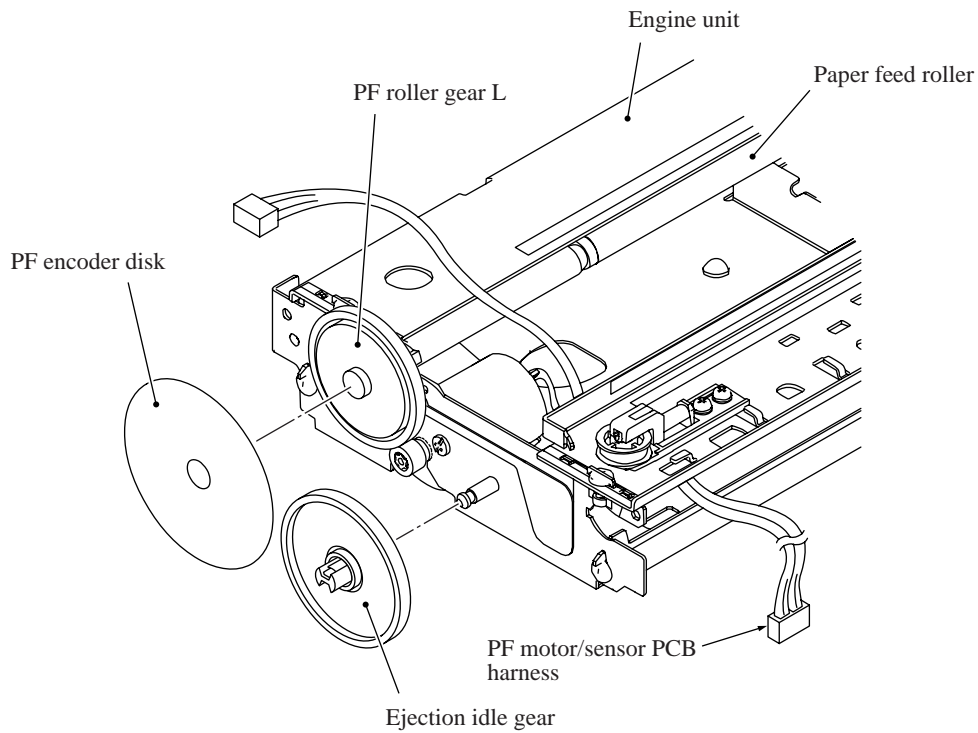
(15) Remove the two screws and release the paper feed motor from the engine unit.

To the PF sensor PCB

Paper feed motor

Paper feed roller

Engine unit

PF roller gear L

Screw, bind M3x3

PF motor/sensor PCB harness
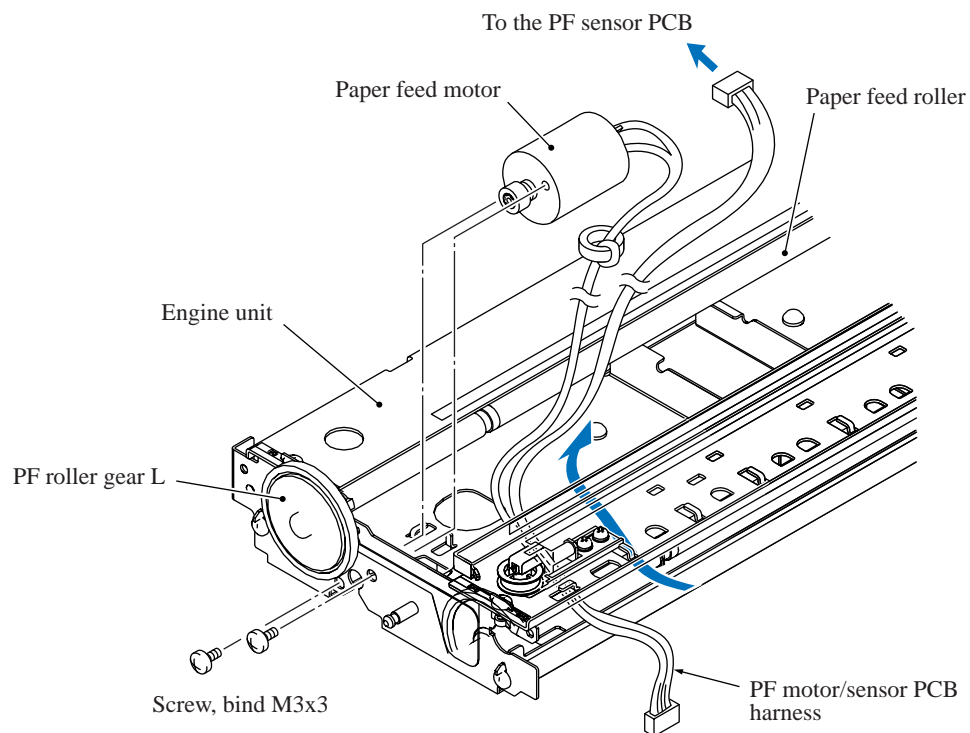
Reassembling Note: When attaching the PF encoder disk to the PF roller gear, put on clean gloves to protect the disk surface from dust or fingerprints.
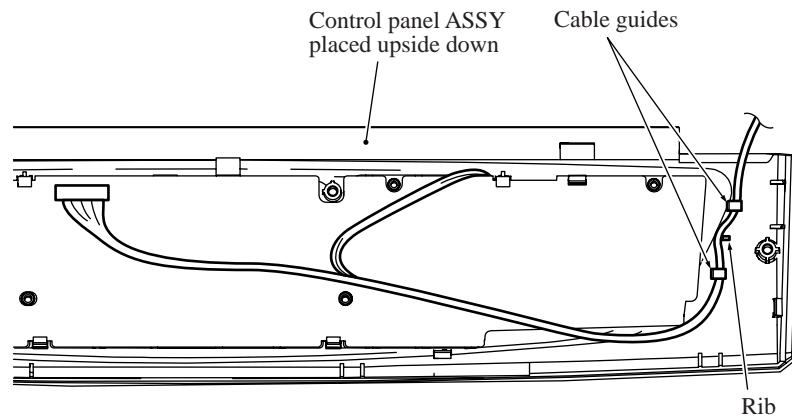
5.1.17　Routing of the Harnesses and Flat Cables

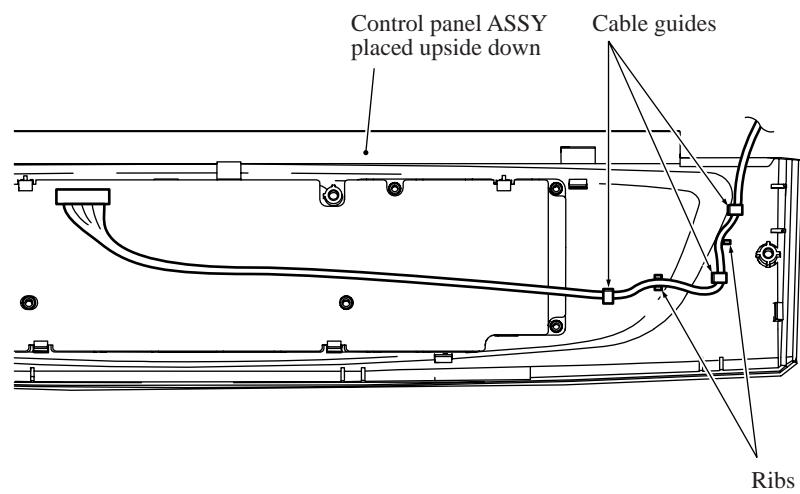<u>**Routing A:**</u>　<u>ADF harness on the ADF unit (MFC620CN/420CN and FAX2440C)</u>

Routing of the document rear
sensor harness (of the ADF harness)

Document rear sensor

Document front sensor

Routing of the document front
sensor harness (of the ADF harness)

(Front)

ADF unit

Routing B: Panel-main harness on the underside of the control panel ASSY

MFC620CN/FAX2440C

Control panel ASSY placed upside down   Cable guides

Rib

MFC420CN/410CN/210C and DCP310CN/110C

Control panel ASSY placed upside down   Cable guides

Ribs

Confidential

Routing C: Backup battery harness and ink supply tubes (MFC620CN and FAX2440C)

Backup battery

Ink supply tubes

Cable guides

Main PCB

Battery harness
(MFC620CN/FAX2440C)

Large-volume ink cartridge harness
(FAX2440C)
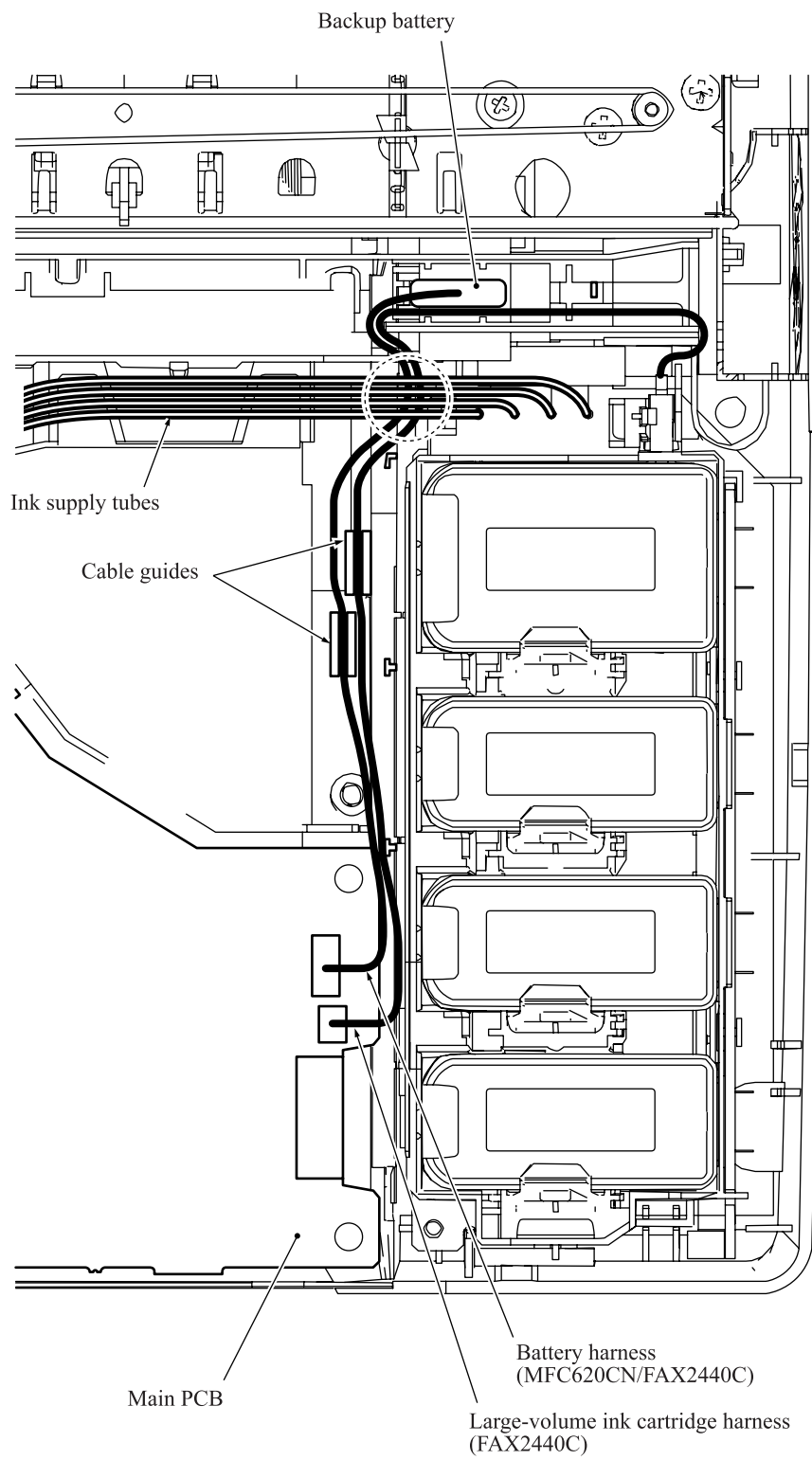
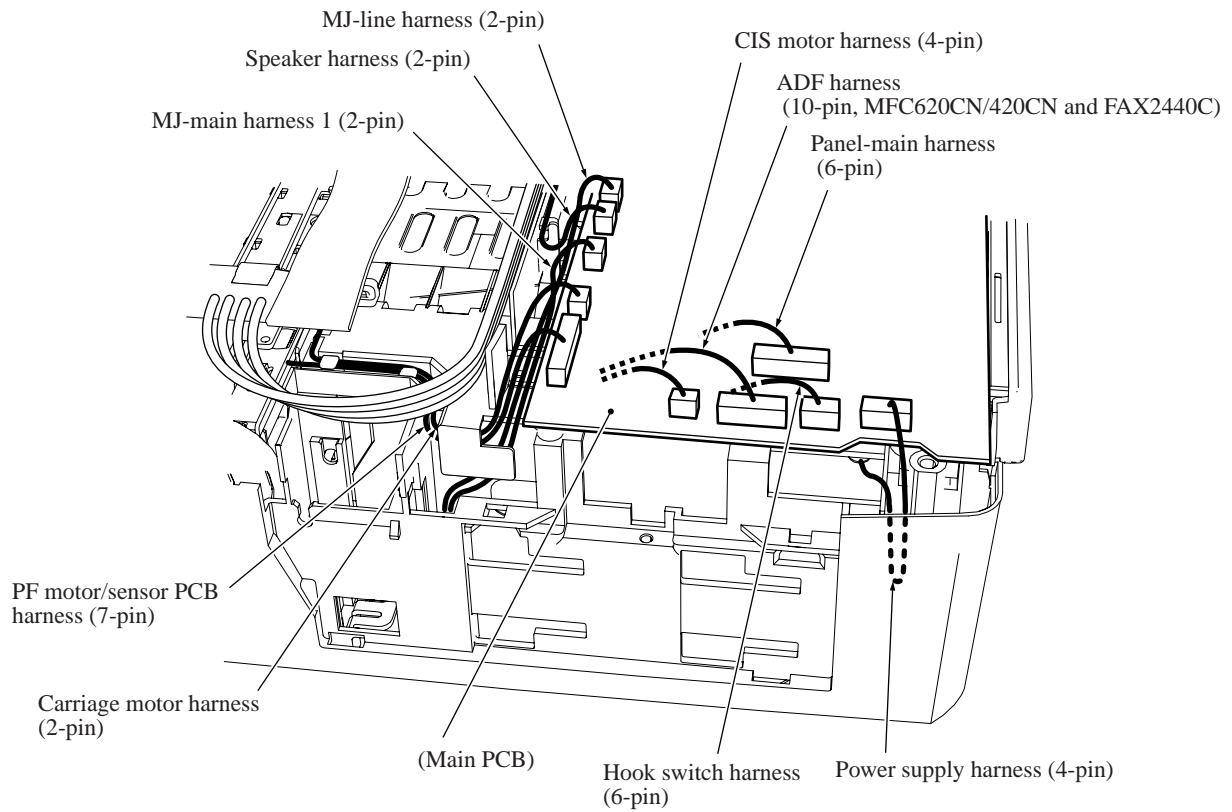**Routing D:** Harnesses, flat cables and ink tubes on the lower cover
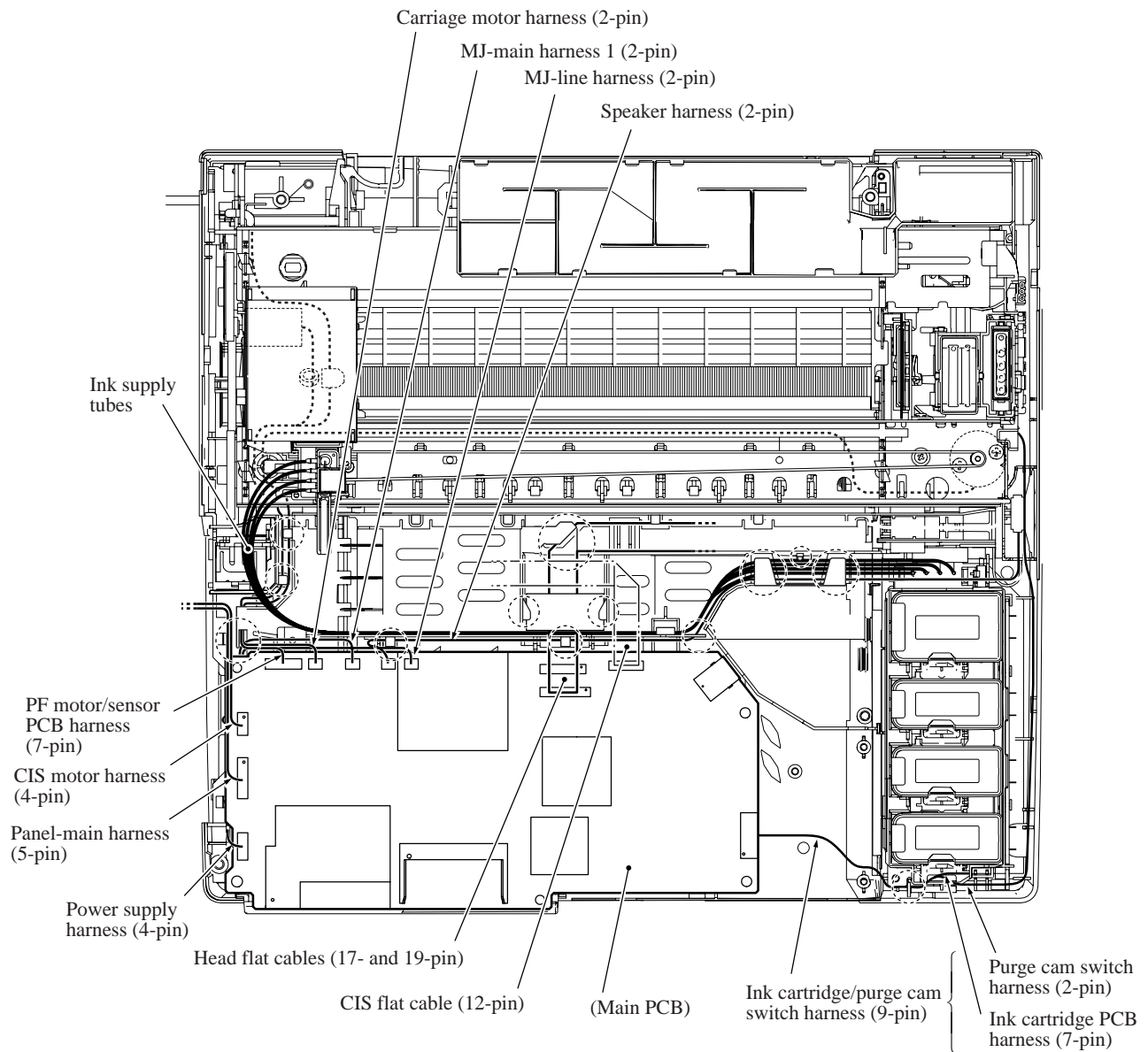
MFC620CN/420CN/410CN, FAX2440C, and DCP310CN

Top view

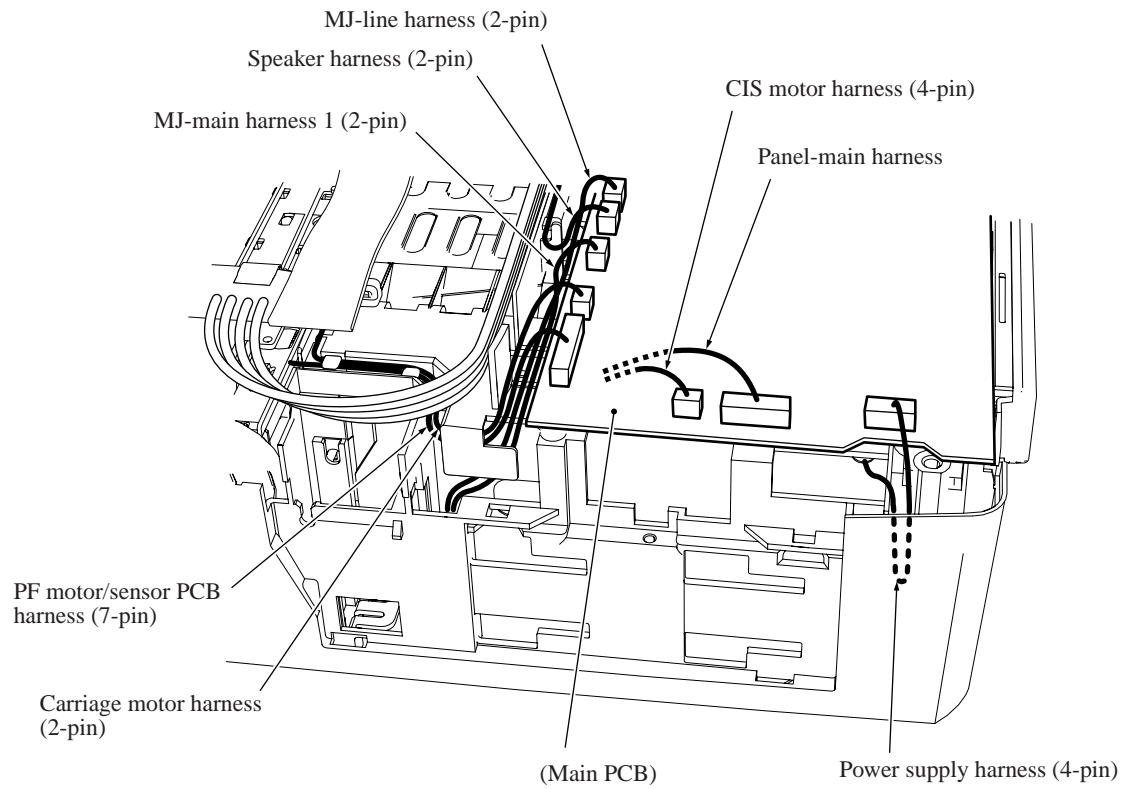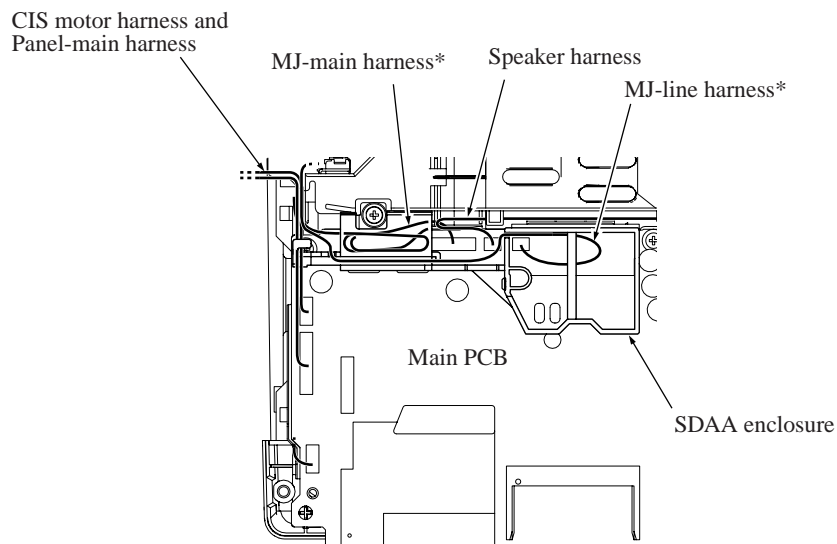Carriage motor harness (2-pin)

CL-main harness (11-pin)

MJ-main harness 1 (2-pin)

MJ-line harness (2-pin)

Speaker harness (2-pin)

Ink supply tubes

PF motor/sensor PCB harness (7-pin)

CIS motor harness (4-pin)

ADF harness (10-pin) (MFC620CN/ 420CN and FAX2440C)

Power supply harness (4-pin)

Head flat cables (17- and 19-pin)

CIS flat cable (12-pin)

(Main PCB)

Ink cartridge/purge cam switch harness (9-pin)

Large-volume ink cartridge harness (FAX2440C)

Battery harness (4-pin) (MFC620CN/ FAX2440C)

Purge cam switch harness (2-pin)

Ink cartridge PCB harness (7-pin)

Viewed from the left

MJ-line harness (2-pin)

Speaker harness (2-pin)

MJ-main harness 1 (2-pin)

CIS motor harness (4-pin)

ADF harness
 (10-pin, MFC620CN/420CN and FAX2440C)

Panel-main harness
 (6-pin)

PF motor/sensor PCB
harness (7-pin)

Carriage motor harness
(2-pin)

(Main PCB)

Hook switch harness
(6-pin)

Power supply harness (4-pin)

Confidential

Top view

Carriage motor harness (2-pin)

MJ-main harness 1 (2-pin)

MJ-line harness (2-pin)

Speaker harness (2-pin)

Ink supply tubes

PF motor/sensor PCB harness (7-pin)

CIS motor harness (4-pin)

Panel-main harness (5-pin)

Power supply harness (4-pin)

Head flat cables (17- and 19-pin)

CIS flat cable (12-pin)

(Main PCB)

Ink cartridge/purge cam switch harness (9-pin)

Purge cam switch harness (2-pin)

Ink cartridge PCB harness (7-pin)

Confidential

Viewed from the left

MJ-line harness (2-pin)

Speaker harness (2-pin)

CIS motor harness (4-pin)

MJ-main harness 1 (2-pin)

Panel-main harness

PF motor/sensor PCB
harness (7-pin)

Carriage motor harness
(2-pin)

(Main PCB)

Power supply harness (4-pin)

Confidential

Routing E: MJ-main harness* and MJ-line harness* through the SDAA enclosure

*Not provided in the DCP310CN/110C

CIS motor harness and
Panel-main harness

MJ-main harness*

Speaker harness

MJ-line harness*

Main PCB

SDAA enclosure

Routing F: Power cord, MJ-main harness* and MJ-line harness* in the MJ/PS shield box

*Not provided in the DCP310CN/110C

Power supply shield

Power cord

MJ-main harness

MJ-line harness

Power supply PCB

MJ/PS shield box

Confidential
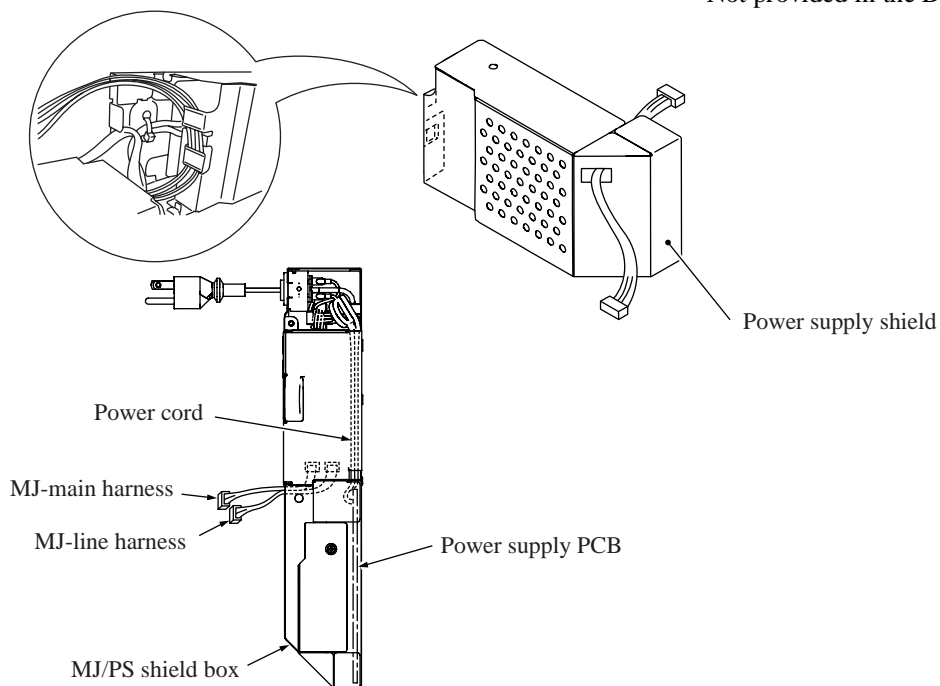
5.2 LUBRICATION

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

Lubricant type (Manufacturer)	Lubrication points	Lubricant amount
Molykote EM-60L (Dow Corning)	Head/carriage unit	3 mm dia. ball
Molykote EM-30LG (Dow Corning)	Document pull-in roller Document separation roller	4 mm dia. ball

■ Head/carriage unit

Apply a 3 mm dia. ball of grease (Molykote EM-60L) to each of the following lubrication points.
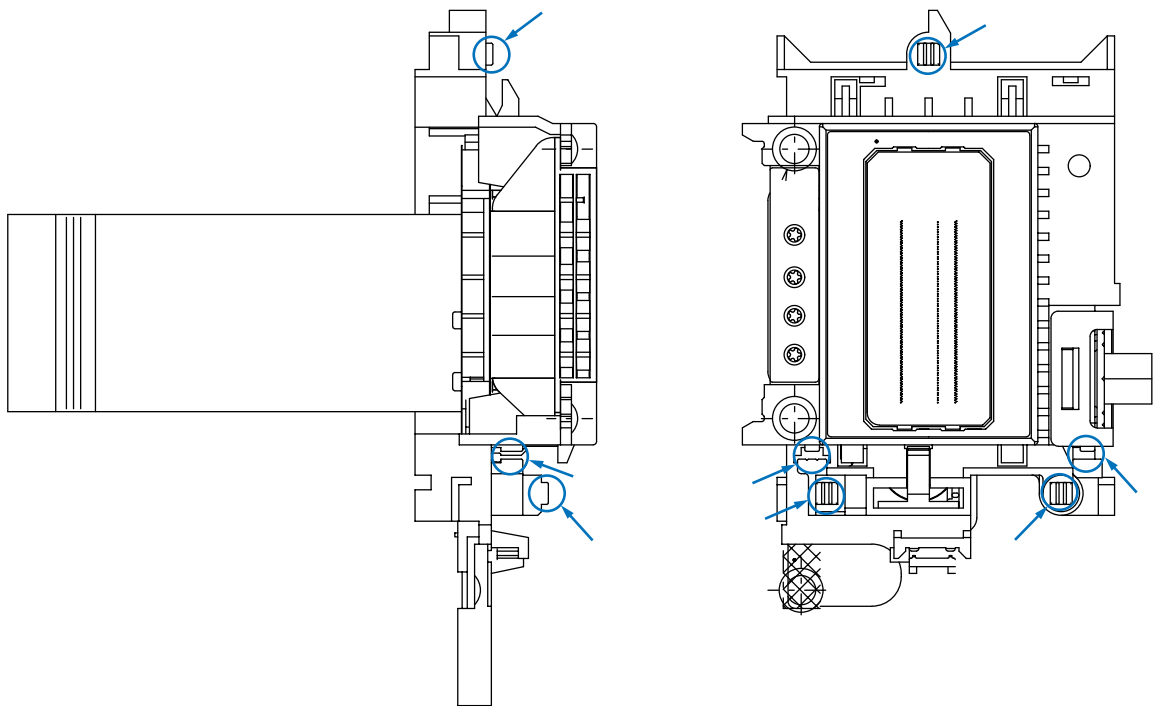
■ Document pull-in roller and document separation roller

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

Confidential
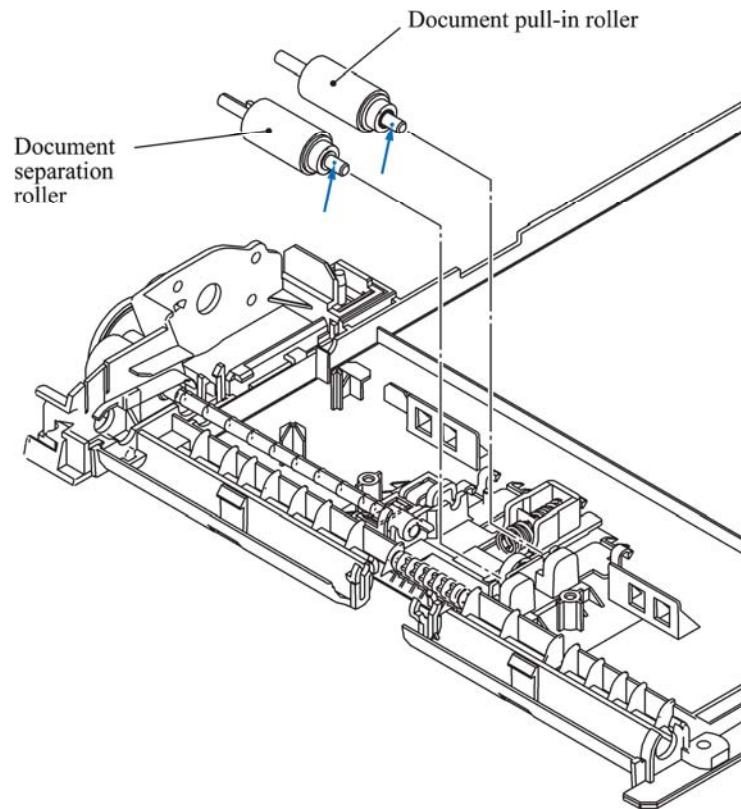
CHAPTER 6

ADJUSTMENTS AND UPDATING OF SETTINGS, REQUIRED AFTER PARTS REPLACEMENT

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

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

CONTENTS

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6.1 PREPARATION

6.1.1 Requirements

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

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

Executables and Files Required for Adjustments and Updating of Settings

	BHL2-Maintenance Printer driver	Full maintenance program (LZ****.upd) (See Note below.)	BrUsbsn.exe	brusbsn.ini	FILEDG32.exe
Head/carriage unit Engine unit (Section 6.2)	√	√	√	√	√
Main PCB (Section 6.3)	√	√	√	√	√
Ink absorber box (Section 6.4)					
Control panel PCB (for models with backlights) (Section 6.5)					

Note: The full maintenance program is required for the MFC210C U.S.A./Canadian models.

	INCLINE.PRN	PFROLL.PRN	EDGE_CHECK.PRN
Head/carriage unit Engine unit (Section 6.2)	√	√	√
Main PCB (Section 6.3)	√	√	√
Ink absorber box (Section 6.4)			
Control panel PCB (for models with backlights) (Section 6.5)			

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	Ink cartridges	Dummy cartridges
Head/carriage unit Engine unit (Section 6.2)	√	√	√
Main PCB (Section 6.3)	√	√	
Ink absorber box (Section 6.4)			
Control panel PCB (for models with backlights) (Section 6.5)			

Confidential

6.1.2 Loading the Update Programs/Data to the 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, load the update programs/data to the flash ROM.

Loading requires a PC/AT-compatible computer running Windows 98/98SE, Windows Me, Windows 2000 Professional, or Windows XP Home/Professional.

CAUTION: During loading, do not turn the power off, interrupt loading, or load invalid data. If you do so, loading will fail, causing the PCB to be unusable. You will need to replace the main PCB and load update programs/data to a new PCB.

Preparation

You need to have the BHL2-Maintenance Printer driver and FILEDG32.exe (provided by Brother Industries) on hand. Save them in an arbitrary folder in your PC.

Installing the BHL2-Maintenance Printer driver

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

NOTE: Once this installation procedure is carried out for a PC, no more driver/software installation will be required for that PC to identify machines. If the BHL2-Maintenance Printer driver has been already installed to your PC according to this procedure, skip this section.

NOTE: Before proceeding to the procedure given below, make sure that the BHL2-Maintenance Printer driver (listed in Chapter 6, Section 6.1.1) is stored in your PC.

(1) Make sure that the machine's power cord is unplugged from an electrical outlet.

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

(2) Switch on your PC.

(3) Plug the machine's power cord into an electrical outlet.

(4) Enter the maintenance mode.

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

   The following window appears.

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

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

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

Confidential

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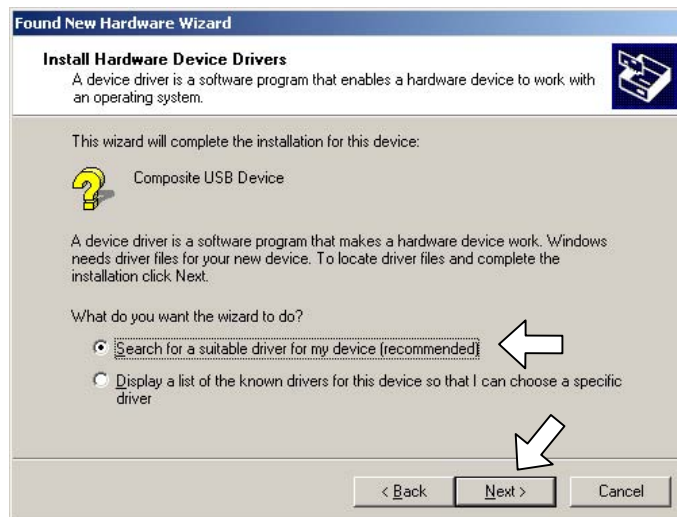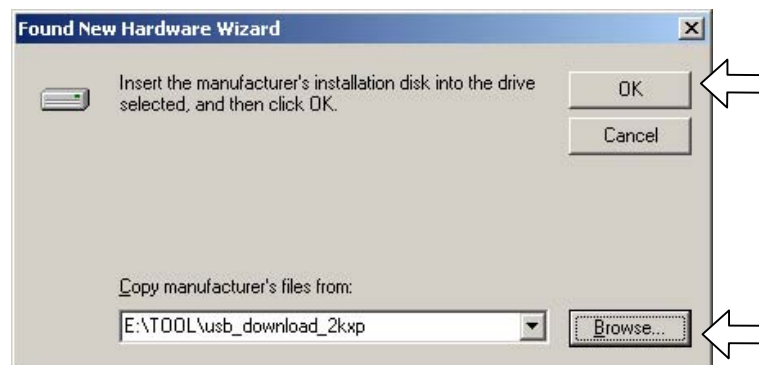
(This sample screen is captured on the Windows 2000 desktop.)

Found New Hardware Wizard

Insert the manufacturer's installation disk into the drive selected, and then click OK.

OK

Cancel

Copy manufacturer's files from:

E:\TOOL\usb_download_2kxp

Browse...

(10) Click **Next**.

Found New Hardware Wizard

Driver Files Search Results
The wizard has finished searching for driver files for your hardware device.

The wizard found a driver for the following device:

Printer

Windows found a driver for this device. To install the driver Windows found, click Next.

e:\tool\usb_download_2kxp\brboot02.inf

< Back   Next >   Cancel

(11) To proceed, click **Yes**.

Digital Signature Not Found

The Microsoft digital signature affirms that software has been tested with Windows and that the software has not been altered since it was tested.

The software you are about to install does not contain a Microsoft digital signature. Therefore, there is no guarantee that this software works correctly with Windows.

Printers

If you want to search for Microsoft digitally signed software, visit the Windows Update Web site at http://windowsupdate.microsoft.com to see if one is available.

Do you want to continue the installation?

Yes   No   More Info

Confidential

(12) If the driver is successfully installed, the following message window appears. Click **Finish** to return to Windows.

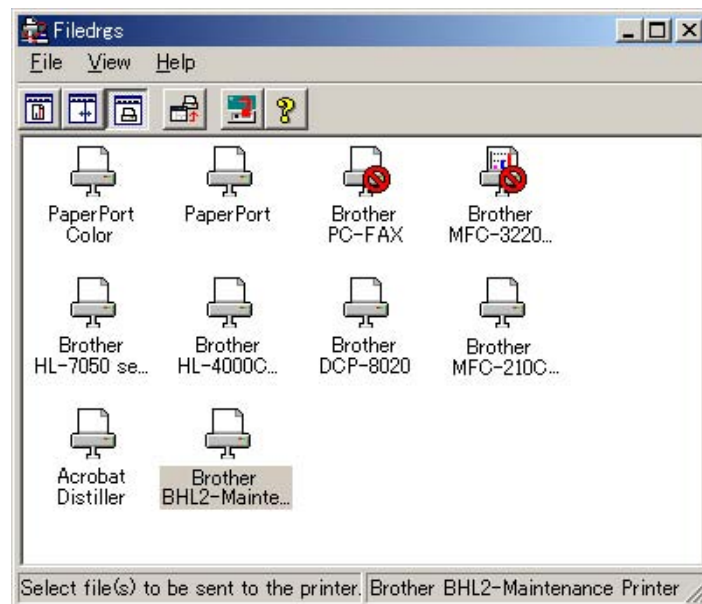**NOTE:** After completion of the driver installation, if the machine exits the maintenance mode, the "Found New Hardware Wizard" screen in step (6) appears again. Click **Cancel**.

NOTE: To check that the printer driver is successfully installed, click **Start|Settings|Printers** to call up the Printers window as shown below and confirm that the BHL2-Maintenance Printer icon is displayed.

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6.1.3 Embedded and Full Maintenance Programs

The maintenance program embedded in some models (MFC210C U.S.A./Canadian models only) is a part of the full maintenance program as shown in the table below.

If you need to use functions not supported by the embedded maintenance program (e.g., 09, 12, 54, ...), *temporarily* load the full maintenance program via the work PC to the flash ROM of the machine to be repaired.

NOTE: After repair, be sure to load the latest version of the firmware designed for the corresponding model to the machine.

Maintenance-mode functions	01	05	09	10	11	12	13	32	53	54	55	58	59
"Embedded maintenance program" supports:	√			√	√	√	√	√	√		√		
(User-accessible)				(√)	(√)	(√)			(√)				

Maintenance-mode functions	63	65	66	68	69	74	76	80	82	87	91	99
"Embedded maintenance program" supports:	√		√	√		√	√	√	√	√	√	√
(User-accessible)			(√)				(√)	(√)	(√)	(√)	(√)	

# 6.2 IF YOU REPLACE THE HEAD/CARRIAGE UNIT OR ENGINE UNIT

[1] Load the full maintenance program temporarily (Required for the MFC210C U.S.A./Canadian models)

NOTE: Before proceeding the program loading procedure, install the printer driver to the work PC. (Refer to Appendix 2.)

NOTE: The full maintenance program file (LZ****. upd) should be saved in an arbitrary folder in the work PC beforehand.

(1) Make sure that the machine's power cord is unplugged from an electrical outlet.

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

(2) Switch on the work PC.

(3) While holding down the **5** key, plug the machine's power cord into an electrical outlet.

   NOTE: This step is not required if the main PCB is replaced with a new one. Just turning on the machine automatically switches to program loading.

(4) Connect the machine to the work PC using the USB cable.

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

   The Filedrgs window appears as shown below.
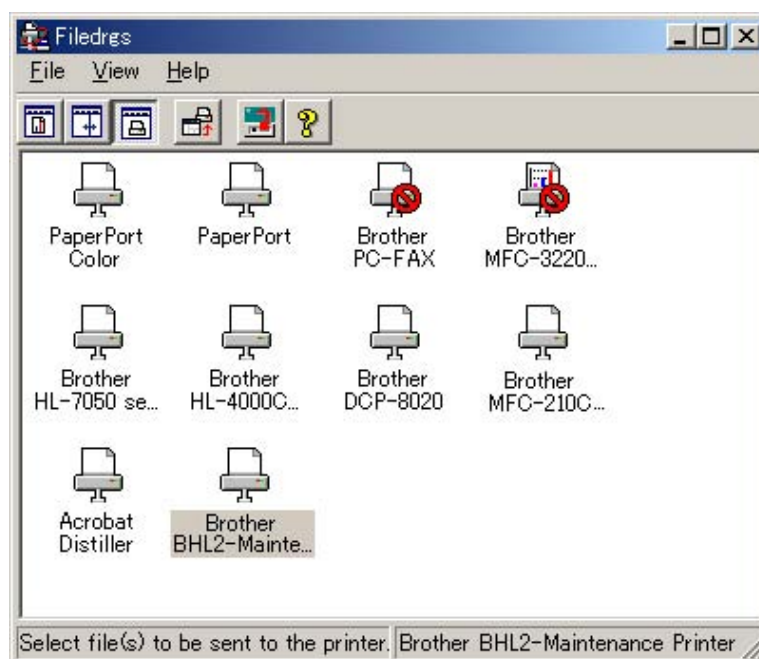
(6) Drag and drop the full maintenance program icon onto the BHL2-Maintenance Printer icon in the Filedrgs window shown above.

   When the work PC starts loading the full maintenance program to the flash ROM in the machine, the machine beeps intermittently.

   Loading terminates in approx. one minute. Before the machine automatically switches to standby, disconnect the USB cable.
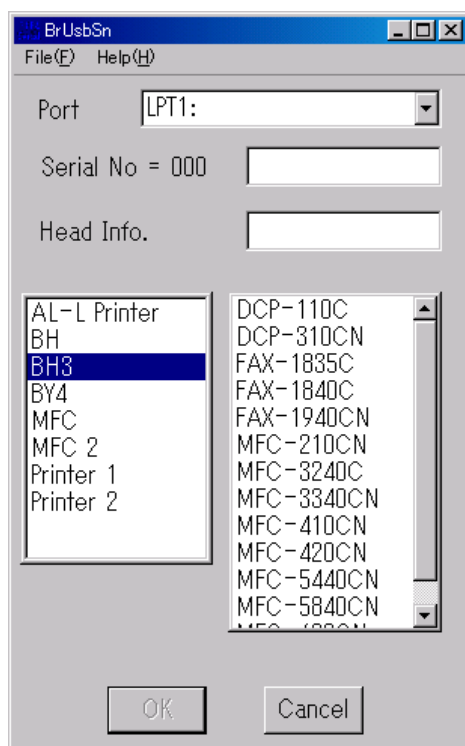
Confidential

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

For the MFC210C U.S.A./Canadian models, skip steps (1) through (3) below.

(1)   Make sure that the machine's power cord is unplugged from an electrical outlet.

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

(2)   Switch on the PC.

(3)   Plug the machine's power cord into an electrical outlet.

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

TIP: Models equipped with numerical keypads can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu/Set**, *****, **2**, **8**, **6** and **4** keys in this sequence.

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

(6)   On the PC, run the ID/head property setup utility (BrUsbsn.exe) in the folder created. The following window appears.

```
BrUsbSn                              _ □ ×
File(F)   Help(H)

  Port       LPT1:                        ▼

  Serial No = 000    [                    ]

  Head Info.         [                    ]

  ┌─────────────┐  ┌──────────────┐
  │AL-L Printer │  │DCP-110C    ▲ │
  │BH           │  │DCP-310CN     │
  │BH3          │  │FAX-1835C     │
  │BY4          │  │FAX-1840C     │
  │MFC          │  │FAX-1940CN    │
  │MFC 2        │  │MFC-210CN     │
  │Printer 1    │  │MFC-3240C     │
  │Printer 2    │  │MFC-3340CN    │
  │             │  │MFC-410CN     │
  │             │  │MFC-420CN     │
  │             │  │MFC-5440CN    │
  │             │  │MFC-5840CN  ▼ │
  └─────────────┘  └──────────────┘

        [  OK  ]      [ Cancel ]
```
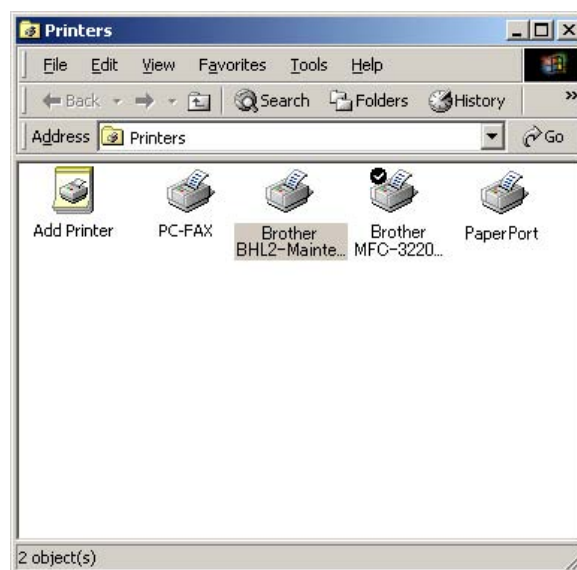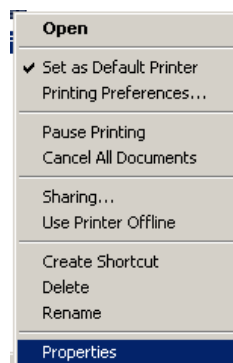
(7)   On the **Model** menu, click **BH3**.

(8) In **Port**, select the port number assigned to the BHL2-Maintenance Printer.

To confirm the port number, follow the instructions below.

Click **Start | Settings | Printers**.
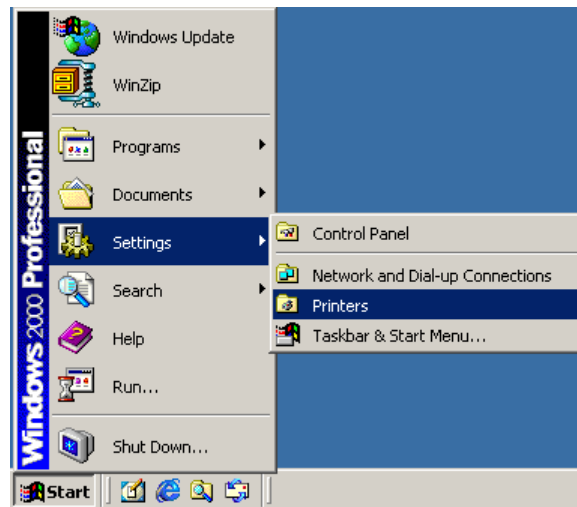
The Printers window appears as shown below.

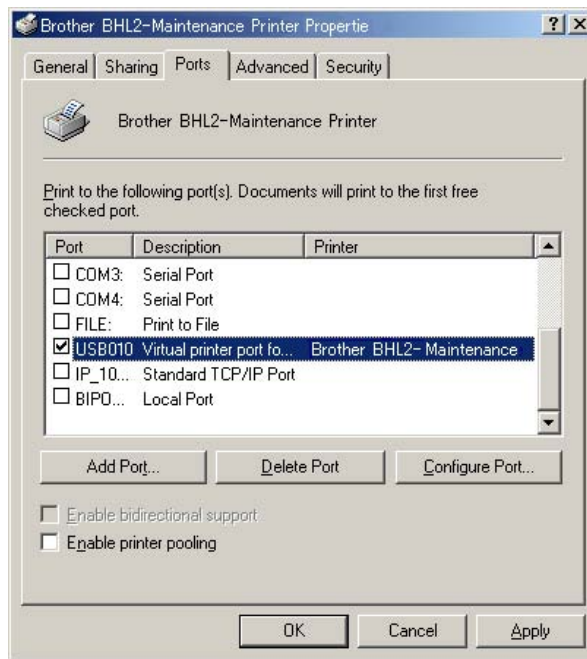Right-click the BHL2-Maintenance Printer icon.

Click **Properties**.

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

Click the **Ports** tab.

The port number assigned to the Brother BHL2-Maitenance Printer, USB010 in this example, is one that has been selected in **Port** on the BrUsbSn screen (page 6-8).

(9) In the **Head Info.** box on the BrUsbSn screen (page 6-8), type 12 digits (e.g., 776601D00009) out of the 13-digit property code (enclosed with asterisks, e.g., *J776601D00009*) which is printed on the bar code label attached to the head/carriage unit. Click the **OK** button.

(10) To check that the entered head property is correct (using Function code 68 in Chapter 8, Section 8.5.16.):

MFC620CN/420CN/410CN/210C and FAX2440C

Press the **6** and **8** keys in this order. Then press the **2**, **5**, **8**, **0** keys in this order.

DCP310CN/110C

Enter 6, 8, 2, 5, 8, and 0 by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The LCD shows the current head property information (12-digit code) stored in the EEPROM on the main PCB.

(11) Check that the character string entered in step (9) 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 machine and go back to step (6).

Confidential

[3]   Clean the new head/carriage unit

MFC620CN/420CN/410CN/210C and FAX2440C

(1) Open the scanner unit (scanner cover), set new ink cartridges into the ink refill ASSY, and close the scanner unit.

(2) Carry out "Initial purge" (with Function code 76) using the steps below. (See Chapter 8, Section 8.5.19.)

Press the **7** and **6** keys in this order.

The machine displays "CLEANING ALL" on the LCD and enters the purge mode.

Press the **4** and **Black Start** keys in this order.

The machine starts an initial purge that refills the ink supply tubes and the new print head with fresh ink.

DCP310CN/110C

(1) Open the scanner unit (scanner cover), set new ink cartridges into the ink refill ASSY, and close the scanner unit.

(2) Carry out "Initial purge" (with Function code 76) using the steps below. (See Chapter 8, Section 8.5.19.)

Enter 7 and 6 by using the ▲ and **Set** keys.*

The machine displays "CLEANING ALL" on the LCD and enters the purge mode.

Enter 4 by using the ▲ and **Set** keys.*

The machine starts an initial purge that refills the ink supply tubes and the new print head with fresh ink.

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

Confidential

[4]   Correct the positioning error of the head/carriage unit

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

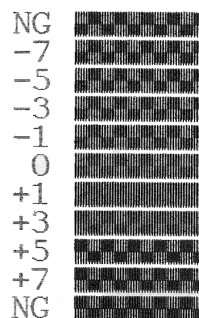   The Filedrgs window appears as shown below.
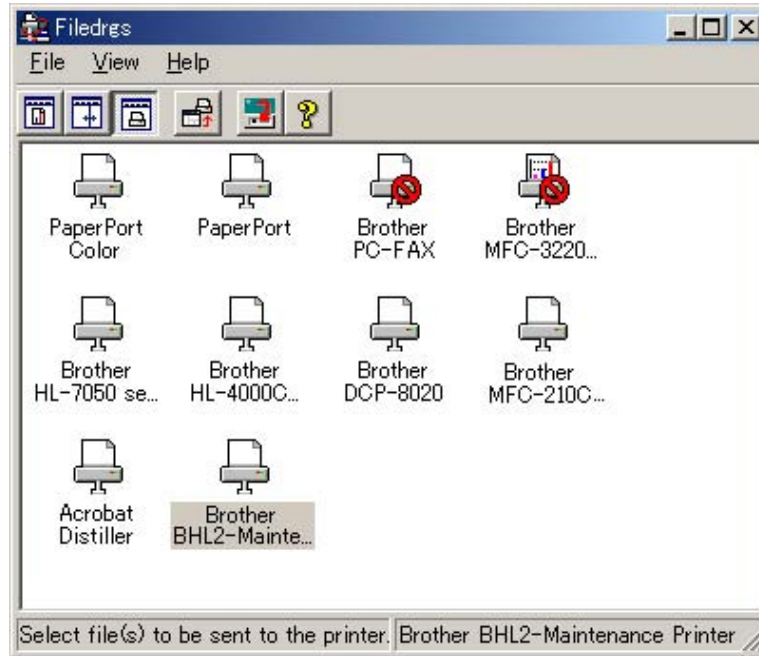
    (2)   Drag and drop the "INCLINE.PRN" icon onto the BHL2-Maintenance Printer icon in the Filedrgs window shown above.

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

    (3)   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

Confidential

(4) Move the head/carriage unit to the head replacement position (with Function code 63) using the following key operation.

MFC620CN/420CN/410CN/210C and FAX2440C

Press the **6**, **3**, and ***** keys in this order.

DCP310CN/110C

Enter 6, 3, and * by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

For details, refer to Chapter 8, Section 8.5.13 "Travel Check of the Head/Carriage Unit and Initial Setup Mode."

(5) Turn the head skew adjuster knob by the number of divisions specified by the pattern number you recorded in step (3), using a spanner.

If pattern +1 is the least uneven print, for example, turn the head skew adjuster knob to the front by one division; if pattern -1, turn the lever to the rear by one division.

Head skew adjuster knob

Confidential

[5]   Update the paper feeding correction value

    (1) Run "FILEDG32.exe" in the folder created in Section 6.1.1.

         The Filedrgs window appears as shown below.

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

         The machine displays the "RECEIVING DATA" on the LCD and prints out "PF adjust check" patterns (see page 6-16 for a sample printout).

    (3) MFC620CN/420CN/410CN/210C and FAX2440C

         Press the **5** and **8** keys on the machine.
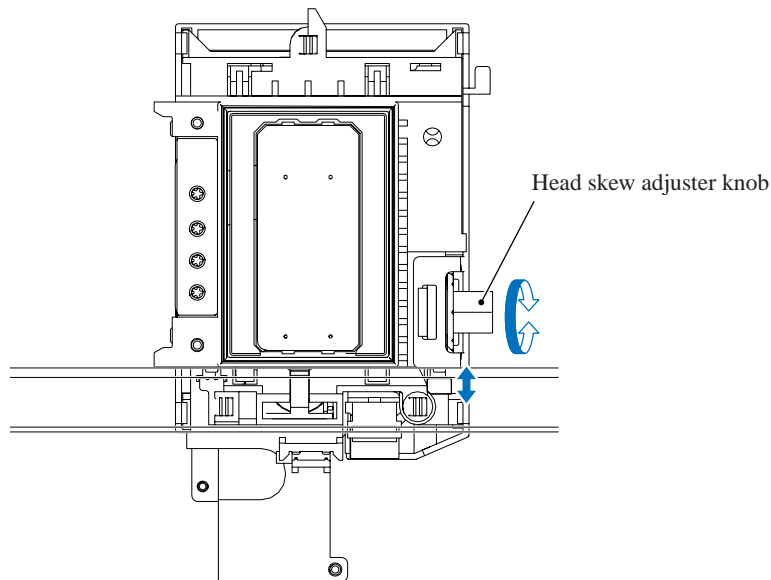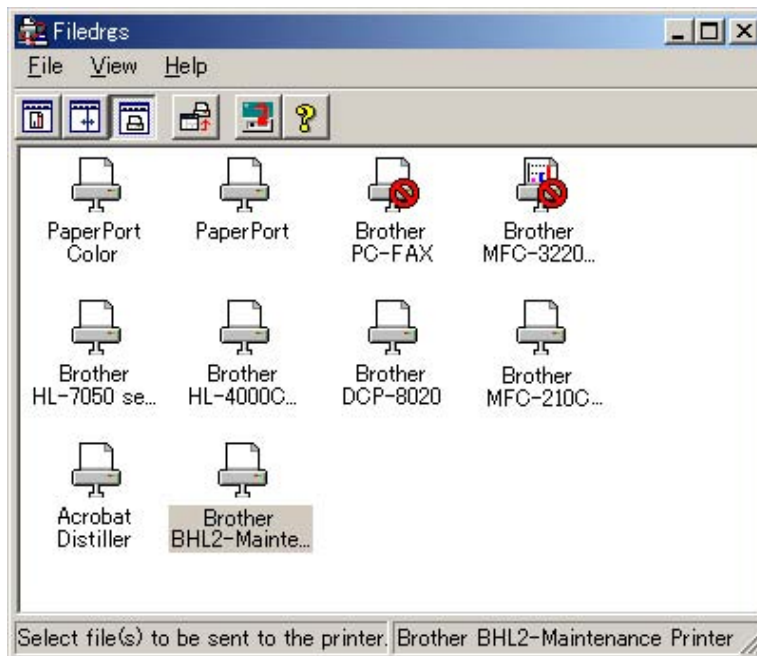
         DCP310CN/110C

         Enter 5 and 8 by using the ▲ and **Set** keys on the machine.*

         (*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

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

    (4) MFC620CN/420CN/410CN/210C and FAX2440C

         To select the paper feed roller adjustment, press the **1** key.

         DCP310CN/110C

         To select the paper feed roller adjustment, enter 1 by using the ▲ and **Set** keys.*

         The "PF ADJ NO. +0" appears on the LCD.

Confidential

(5) Check PF adjust check pattern "A" (on the next page) 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 -8, regard it as -8; if it is far to the right of check pattern +8, regard it as +8. In this case, you need to check whether the paper feed roller and head/carriage unit are set into place.

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

<u>MFC620CN/420CN/410CN/210C and FAX2440C</u>
For example, if the number of the least uneven check pattern is +4, press the ▲ and **4** keys; if - 4, press the ▼ and **4** keys. (To enter +, use the ▲ key; to enter -, use the ▼ key.)

<u>DCP310CN/110C</u>
For example, if the number of the least uneven check pattern is +4, enter + and 4; if -4, enter - and 4 by using the ▲ and **Set** keys.*

(*To enter a plus/minus symbol or numerical code on models having no numerical keypad, press the ▲ key several times to display the ▲/▼ or numerical code to be entered, respectively, and then press the **Set** key. Repeat this operation for each symbol or numerical code.)

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

(7) <u>MFC620CN/420CN/410CN/210C and FAX2440C</u>
Press the **5** and **8** keys on the machine.

<u>DCP310CN/110C</u>
Enter 5 and 8 by using the ▲ and **Set** keys on the machine.*
(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

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

(8) <u>MFC620CN/420CN/410CN/210C and FAX2440C</u>
To select the paper ejection roller adjustment, press the **2** key.

<u>DCP310CN/110C</u>
To select the paper ejection roller adjustment, enter 2 by using the ▲ and **Set** keys.*

The "EXIT ADJ NO. +0" appears on the LCD.

(9) Check PF adjust check pattern "B" (on the next page) and select the one that is the least uneven print. Make a note of that pattern number.

(10) Enter the number of the least uneven check pattern found in step (9) in the same way as in step (6).

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

Confidential

```
* BH3 PF adjust check - Ver 007c *
```

```
        -8    -6    -4    -2    0    +2    +4    +6    +8
"A" ⇒   ▨▨  ▨▨  ▨▨  ▨▨  ▮▮  ▮▮  ▨▨  ▨▨  ▨▨
```

```
         600dpi              1200dpi               750dpi

1    | |▨▨▨| | |      | |▨▨▨| | |       | |▨▨▨| |
2    | |▨▨▨| | |      | |▨▨▨| | |       | |▨▨▨| |
3    | |▨▨▨| | |      | |▨▨▨| | |       | |▨▨▨| |
4    | |▨▨▨| | |      | |▨▨▨| | |       | |▨▨▨| |
5    | |▨▨▨| | |      | |▨▨▨| | |       | |▨▨▨| |
6    | |▨▨▨| | |      | |▨▨▨| | |       | |▨▨▨| |
7    | |▨▨▨| | |      | |▨▨▨| | |       | |▨▨▨| |
8    | |▨▨▨| | |      | |▨▨▨| | |       | |▨▨▨| |
9    | |▨▨▨| | |      | |▨▨▨| | |       | |▨▨▨| |
```

```
        -8    -6    -4    -2    0    +2    +4    +6    +8
"B" ⇒   ▨▨  ▨▨  ▨▨  ▮▮  ▮▮  ▨▨  ▨▨  ▨▨  ▨▨
```
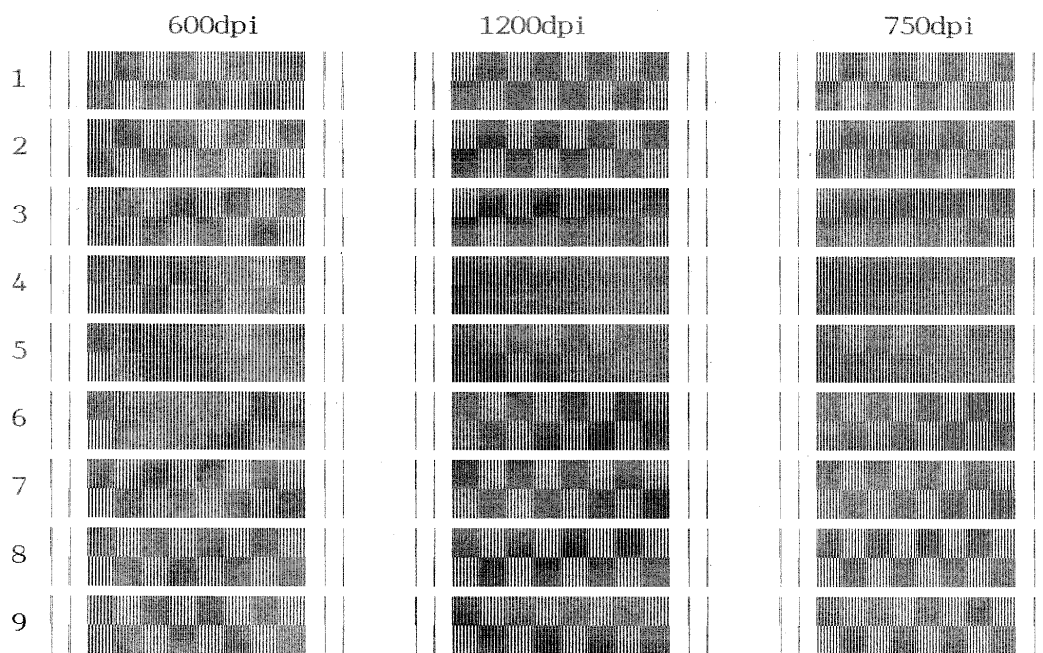
Paper Feeding Check Patterns for the Paper Feed Roller and Paper Ejection Roller

Confidential

[6] Align vertical print lines

(1) MFC620CN/420CN/410CN/210C and FAX2440C

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

DCP310CN/110C

Enter 6,5, and 1 by using the ▲ and **Set** keys on the machine.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The machine prints out a set of vertical alignment check patterns (see the next page) which consist of #0 to #8 lines for each of the 600 dpi and 1200 dpi, and #1 to #8 for 750 dpi.

If the vertical alignment is ON, #0 line (each in the 600 dpi and 1200 dpi printouts) shows vertically aligned lines as given on the next page.

The "600DPI NO.(1-8)" appears on the LCD.

(2) Check the printed vertical alignment check patterns for the 600 dpi and find which number line shows full alignment.

MFC620CN/420CN/410CN/210C and FAX2440C

If the line is other than No. 5, enter that line number by using the numerical keys.

DCP310CN/110C

If the line is other than No. 5, enter that line number by using the ▲ and **Set** keys.*

The "1200DPI NO.(1-8)" appears.

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

The "750DPI NO.(1-8)" appears.

(4) For the 750 dpi, perform the same operation as in step (2).

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

NOTE: If #1 or #8 line is fully aligned so that you press the **1** or **8** key (or you enter 1 or 8 and press the **Set** key) in the above procedure, then go back to step (1) to confirm that #0 line becomes aligned.

Confidential
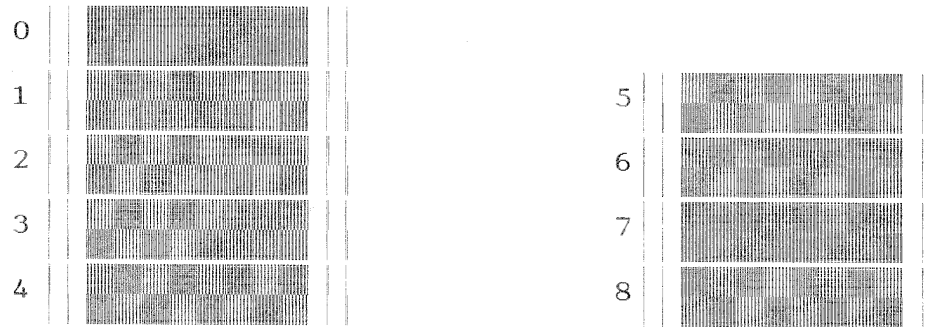
600DPI

1200DPI

750DPI

Vertical Alignment Check Patterns

Confidential

[7] Margin adjustment in near-edge printing

(1) On the PC, run "FILEDG32.exe" in the folder created in Section 6.1.1.

The Filedrgs window appears as shown below.
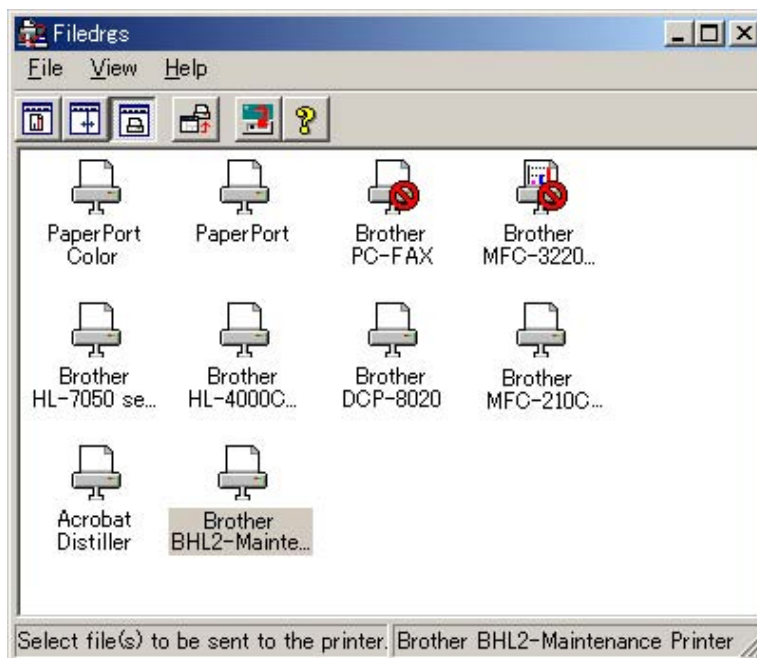
(2) Drag and drop the "EDGE_CHECK.PRN" onto the BHL2-Maintenance Printer icon in the Filedrgs window shown above.

The machine displays the "RECEIVING DATA" on the LCD and prints out the margin check pattern (see page 6-21 for a sample printout).

(3) Measure the left and right margins on the printout.

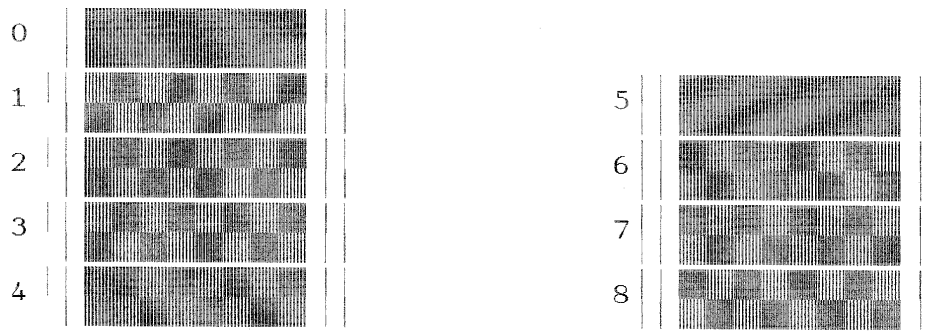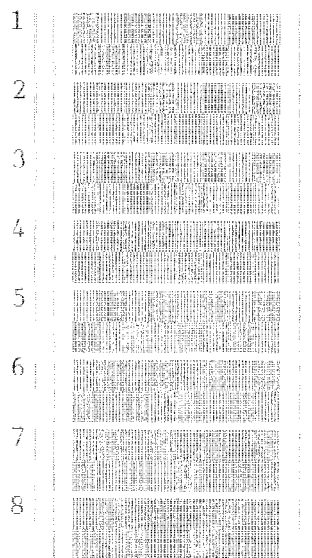(Example) Left: 1.0 mm, Right: 1.3 mm

If both margins are within the range from 0.9 to 1.1 mm, no adjustment is required.

(4) <u>MFC620CN/420CN/410CN/210C and FAX2440C</u>

If either margin is out of the specified range, press the **6** key twice on the machine.

<u>DCP310CN/110C</u>

If either margin is out of the specified range, enter 6 twice by using the ▲ and **Set** keys on the machine.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The "MEDIA SENSOR ADJ" appears again.

(5) <u>MFC620CN/420CN/410CN/210C and FAX2440C</u>

To make the machine ready for data entry, press the **＊** key.

<u>DCP310CN/110C</u>

To make the machine ready for data entry, enter * by using the ▲ and **Set** keys.*

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(6) Enter the measured value (in units of 0.1 mm) multiplied by 10.

(Example) Left: 10, Right: 13

<u>MFC620CN/420CN/410CN/210C and FAX2440C</u>
In this example, press the **1**, **0**, **Menu/Set**, **1**, **3**, and **Menu/Set** keys.

<u>DCP310CN/110C</u>
In this example, enter 1, 0, 1, and 3 by using the ▲ and **Set** keys.*
(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

(7) Upon completion of the entry, the machine automatically returns to the initial stage of the maintenance mode.

Go back to step (2) and print out the margin check pattern again.

(8) Measure the left and right margins on the printout.

If both margins are within the range from 0.9 to 1.1 mm, the adjustment is completed.

TIP: To reset the newly entered values to defaults, press the **Black Start** key or **Mono Start** key.

```
*  BH3 MEDIA CHECK - Version 0.02  *
```

```
LEFT:O.9-1.1mm                              RIGHT:O.9-1.1mm
```

Margin Check Pattern

```
*  BH3 MEDIA CHECK - Version 0.02  *
```

[8]   Print out a test pattern

    MFC620CN/420CN/410CN/210C and FAX2440C

    Press the **0** and **9** keys in this order.

    DCP310CN/110C

    Enter 0 and 9 by using the ▲ and **Set** keys.*

    (*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

    Refer to Chapter 8, Section 8.5.3.

[9]   Load the firmware designed for the FAX model to the flash ROM (Required for the MFC210C U.S.A./Canadian models)

    (1) On the machine, press the **9** key twice to exit from the maintenance mode.

    (2) After the head/carriage unit returns to the home position, unplug the machine's power cord from the electrical outlet.

    (3) While holding down the **5** key, plug the power cord of the machine into an electrical outlet.

    (4) On the PC, run "FILEDG32.exe" in the folder created in Section 6.1.1.

        The Filedrgs window appears as shown below.
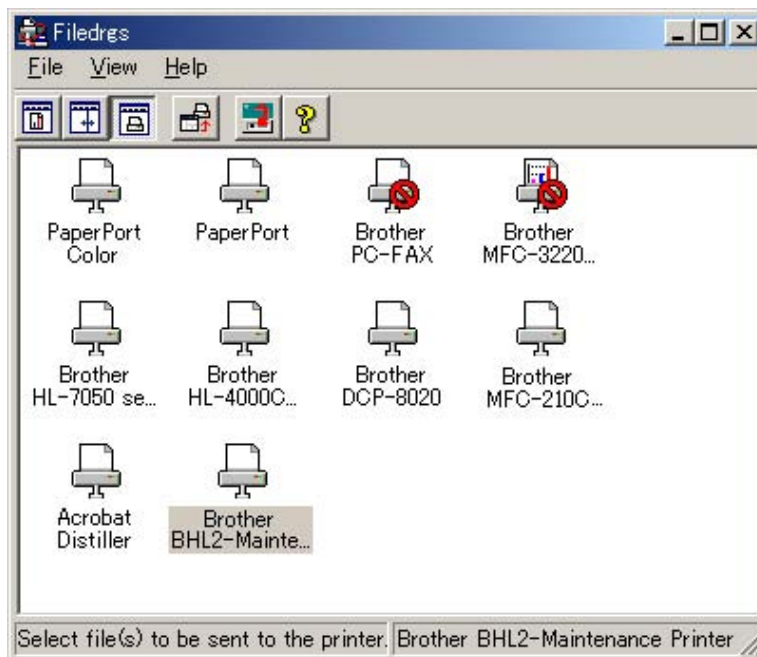
    (5) Drag and drop the firmware file that has been designed for the FAX model repaired onto the BHL2-Maintenance Printer icon in the Filedrgs window shown above.

        When the work PC starts loading the firmware file to the flash ROM of the machine, the machine beeps intermittently. Loading terminates in approx. one minute.

Confidential

After that, the machine automatically restarts and switches back to standby.

NOTE: Use the firmware file after extracting. It is a self-extracting file having the extension .exe. Double-click the exe file to extract it.

NOTE: When the machine reboots, the PC system automatically runs "Found New Hardware Wizard" to start USB driver installation (as described in Section 6.1.2). Click **Cancel** on the wizard screen.

[10] Switch back to standby

MFC620CN/420CN/410CN/210C and FAX2440C

After completion of the adjustment, <u>disconnect the USB cable</u> and then press the **9** key twice to return to the standby state.

DCP310CN/110C

After completion of the adjustment, <u>disconnect the USB cable</u> and then enter 9 twice by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

NOTE: Be sure to disconnect the USB cable first. Returning to the standby state without disconnecting the USB cable runs "Found New Hardware Wizard" that starts USB driver installation (as described in Section 6.1.2). Enable the initial setup mode (see Chapter 8, Section 8.5.13).

[11] Replace the ink cartridges with protective ones

Replace the ink cartridges with protective ones.

Protective cartridge
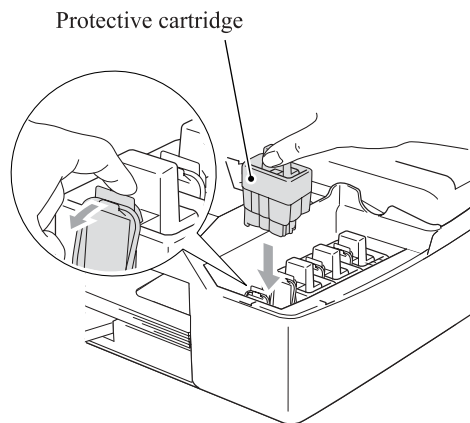
6.3 IF YOU REPLACE THE MAIN PCB

NOTE: If you replace the main PCB, also replace the ink absorber box. Using the machine without replacing the ink absorber box for a long period may cause an overflow of drained ink from the ink absorber box, thereby staining the machine.

**[1]   Load the full maintenance program temporarily (MFC210C U.S.A./Canadian models)
          Load update programs/data (Other models)**

MFC210C U.S.A./Canadian models

   Load the full maintenance program temporarily. Refer to Section 6.2, [1].

Other models

■ If the main PCB is replaced with a new one, load the update programs/data onto the flash ROM. Refer to Appendix 2, page App. 2-5.

■ If the main PCB is replaced with the one used for other machines, follow the steps below.

   (1) Update the firmware stored in the flash ROM. Refer to Appendix 2, page App. 2-7.

   (2) Reset the purge counter to zero with the following procedure.

      MFC620CN/420CN/410CN/210C (except U.S.A./Canadian models) and FAX2440C

      1) Press the **8** and **0** keys in this order in the initial stage of the maintenance mode.
         NOTE: Make a note of the log information displayed on the LCD on the machine's repair log sheet as well as leaving a comment that the log information stored in the EEPROM is different from the actual record.

      2) Press the **Black Start** key several times until the purge count appears on the LCD.

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

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

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

      DCP310CN/110C

      1) Enter 8 and 0 by using the ▲ and **Set** keys.*
         NOTE: Make a note of the log information displayed on the LCD on the machine's repair log sheet as well as leaving a comment that the log information stored in the EEPROM is different from the actual record.
         (*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

      2) Press the **Mono Start** key several times until the purge count appears on the LCD.

      3) Enter 2, 7, 8, and 3 by using the ▲ and **Set** keys.*
         This resets the purge counter to zero.

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

      5) Enter 9 twice by using the ▲ and **Set** keys to exit the maintenance mode.*

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

   Refer to Chapter 8, Section 8.5.1.

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

Refer to Chapter 8, Section 8.5.18.

[4] Check the control panel PCB for normal operation (Function code 13)

Refer to Chapter 8, Section 8.5.6.

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

Refer to Chapter 8, Section 8.5.7.

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

Refer to Chapter 8, Section 8.5.10.

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

NOTE: Make sure that the BHL2-Maintenance Printer driver has been installed to your PC. To do it, click **Start|Settings|Printers** to call up the Printers window and confirm that the BHL2-Maintenance Printer icon (shown on the sample window on page 6-12) is displayed. If the driver has not been installed, install it referring to Section 6.1.2.

(1) Make sure that your PC is turned off, then connect the 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 6.1.1. The following window appears.
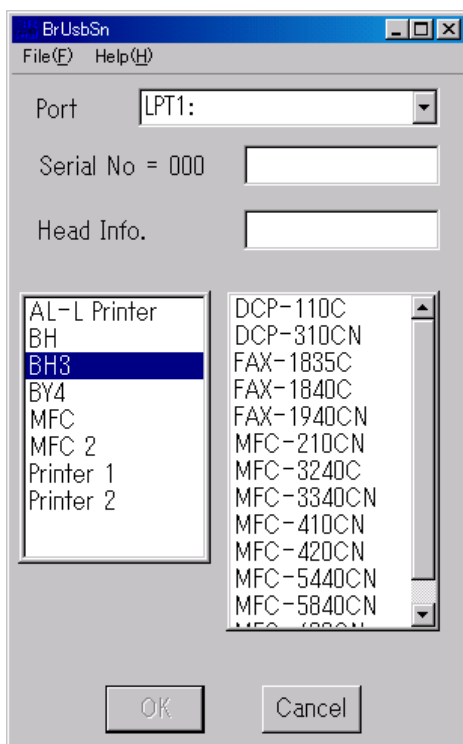
(4) On the **Model** menu, click **BH3**.

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(5) In **Port**, select the port number assigned to the BHL2-Maintenance Printer driver.

To confirm the port number, follow the instructions below.

Click **Start|Settings|Printers**.
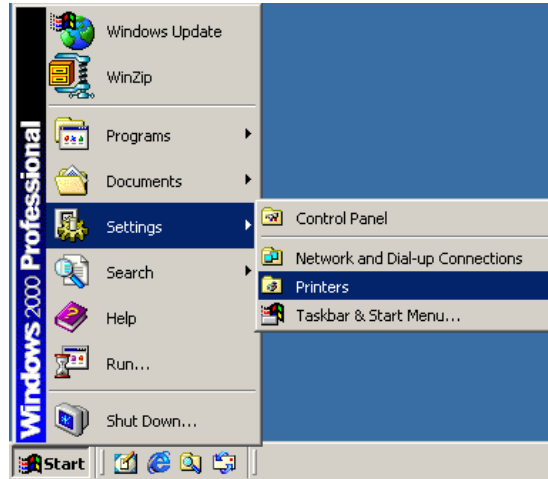
The Printers window appears as shown below.

Right-click the BHL2-Maintenance Printer driver icon.

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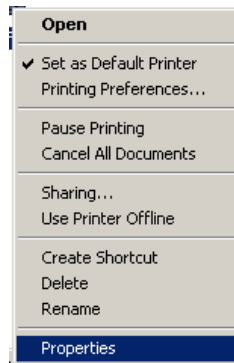
Click **Properties**.

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

Click the **Ports** tab.
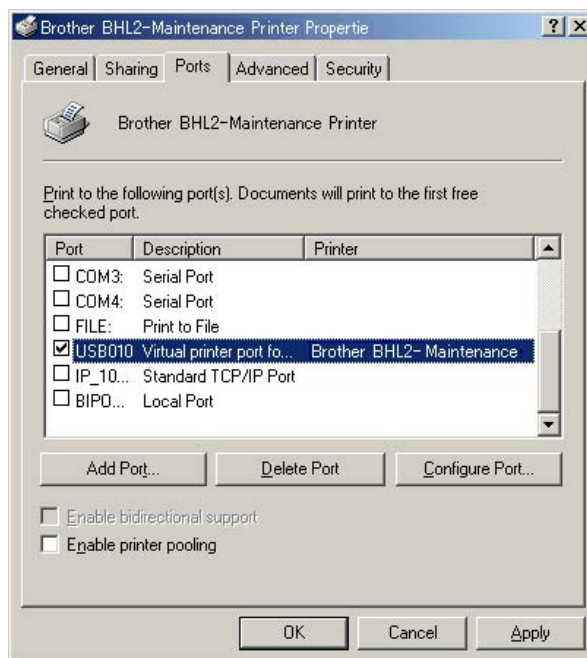
The port number assigned to the BHL2-Maintenance Printer, USB010 in this example, is one that has been selected in **Port** on the BrUsbSn screen .

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

(7) In the **Head Info.** box, type 12 digits (e.g., 776601D00009) out of the 13-digit property code (enclosed with asterisks, e.g., *J776601D00009*) which is printed on the bar code label attached to the head/carriage unit. Click the **OK** button.

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(8) Check whether the entered character strings (ID code and head property information) are correct with the following procedure.

MFC620CN/420CN/410CN/210C and FAX2440C

Press the **8** and **0** keys in this order. Then press the **Black Start** key several times, and the ID code appears on the LCD. Check that the displayed code is that string entered in step (6).

Next, press the **6** and **8** keys in this order. Then press the **2**, **5**, **8**, **0** keys in this order, and the head property code appears on the LCD. Check that the displayed code is that string entered in step (7).

DCP310CN/110C

Enter 8 and 0 by using the ▲ and **Set** keys.* Then press the **Mono Start** key several times, and the ID code appears on the LCD. Check that the displayed code is that string entered in step (6).

Next, enter 6, 8, 2, 5, 8, and 0 by using the ▲ and **Set** keys*, and the head property code appears on the LCD. Check that the displayed code is that string entered in step (7).

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

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

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

[8] Update the paper feeding correction value

Refer to Section 6.2, [5].

[9] Align vertical print lines

Refer to Section 6.2, [6].

[10] Margin adjustment in near-edge printing

Refer to Section 6.2, [7].

[11] Adjust the light intensity of the LCD backlight (for models with backlights)

Refer to Chapter 8, Section 8.5.5.

[12] Load the firmware designed for the corresponding model to the flash ROM (Required for the MFC210C U.S.A./Canadian models)

Refer to Section 6.2, [9].

[13] Switch back to standby (Required for the MFC620CN/420CN/410CN)

Refer to Section 6.2, [10].

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6.4 IF YOU REPLACE THE INK ABSORBER BOX

Reset the purge counter to zero with the following procedure.

MFC620CN/420CN/410CN/210C and FAX2440C

(1) Press the **Menu/Set** and **Black Start** keys. Next press ▲ key four times 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.

(3) Press the **Black Start** key several times until the purge count appears 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.

DCP310CN/110C

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

(2) Enter 8 and 0 by using the ▲ and **Set** keys.*

   (*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

(3) Press the **Mono Start** key several times until the purge count appears on the LCD.

(4) Enter 2, 7, 8, and 3 by using the ▲ and **Set** keys to reset the purge count to zero.*

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

(6) Enter 9 twice by using the ▲ and **Set** keys to exit from the maintenance mode.*

6.5 IF YOU REPLACE THE CONTROL PANEL PCB (MODELS WITH BACKLIGHTS)

Adjust the light intensity of the backlight.

Refer to Chapter 8, Section 8.5.5.

CHAPTER 7

CLEANING

CHAPTER 7 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 head/carriage unit, scanner, and platen, refer to the User's Guide.

7.1 CLEANING THE MAINTENANCE UNIT

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

(2) Plug the power cord again. After you hear the head/carriage unit moving out of the home position for initialization, unplug the power cord again. The head/carriage unit 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 maintenance 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 maintenance unit will affect the print performance.

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

(6) Hear the head/carriage unit moving. After the moving sound stops, unplug the machine's power cord from the wall socket.

Rubycel stick

Head wiper

Head caps
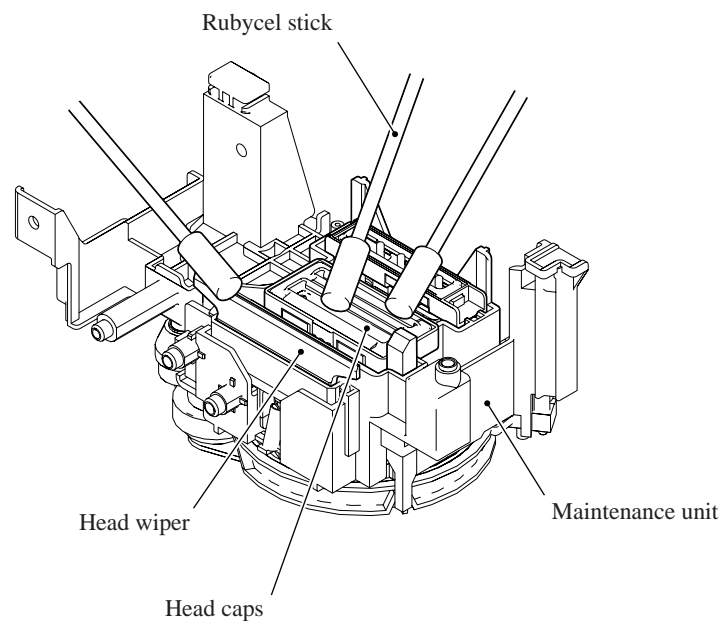
Maintenance unit

CHAPTER **8**

MAINTENANCE MODE

CHAPTER 8 MAINTENANCE MODE

This chapter describes the maintenance mode which is exclusively designed for the purpose of checks, settings and adjustments using the keys on the control panel.

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

CONTENTS

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8.1 EMBEDDED AND FULL MAINTENANCE PROGRAMS

[1] Outline

The maintenance program embedded in some FAX models (e.g., MFC210C for U.S.A./Canadian models) is a part of the full maintenance program as shown in the table below.

If you need to use functions not supported by the embedded maintenance program (e.g., 09, 12, 54, ...), *temporarily* load the full maintenance program (LZ****.upd) via the work PC to the flash ROM of the machine to be repaired.

NOTE: After repair, be sure to load the latest version of the firmware designed for that FAX model to the machine.

Maintenance-mode functions	01	05	09	10	11	12	13	32	53	54	55	58	59
"Embedded maintenance program" supports:	√			√	√	√	√	√	√		√		
(User-accessible)				(√)	(√)	(√)			(√)				

Maintenance-mode functions	63	65	66	68	69	74	76	80	82	87	91	99
"Embedded maintenance program" supports:	√		√	√		√	√	√	√	√	√	√
(User-accessible)			(√)				(√)	(√)	(√)	(√)	(√)	

[2] Loading the full maintenance program temporarily

NOTE: Before proceeding the program loading procedure, install the printer driver to the work PC. (Refer to Appendix 2.)

NOTE: The full maintenance program file (LZ****.upd) should be saved in an arbitrary folder in the work PC beforehand.

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

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

(2) Switch on the work PC.

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

(4) Enter the maintenance mode.

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

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

The Filedrgs window appears as shown below.
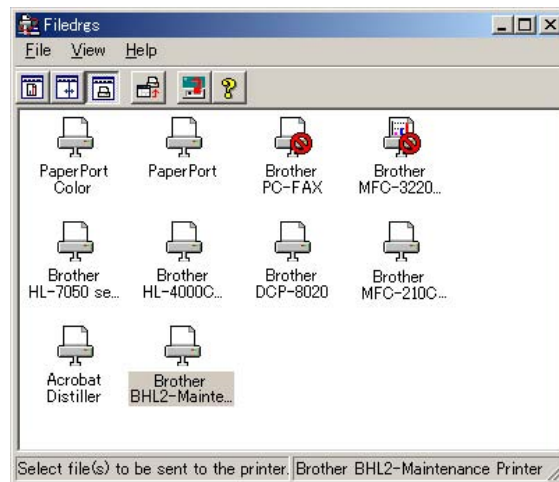
(7) Drag and drop the full maintenance program icon onto the BHL2-Maintenance Printer icon in the Filedrgs window shown above.

When the work PC starts loading the full maintenance program to the flash ROM of the machine, the machine beeps intermittently. Loading terminates in approx. one minute.

[3]   Loading the latest version of the firmware designed for the FAX model

If the full maintenance program has been installed onto the machine, you need to load the latest version of the firmware designed for that FAX model after repair.

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8.2 ENTRY INTO THE MAINTENANCE MODE

MFC620CN/420CN/410CN/210C and FAX2440C

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

TIP: FAX models equipped with numerical keypads can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu/Set**, *****, **2**, **8**, **6** and **4** keys in this sequence.

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

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

To select one of the maintenance-mode functions listed in Section 8.3, enter the corresponding 2-digit function code with the numerical keys on the control panel. (The details of each maintenance-mode function are described in Section 8.5.)

NOTES: • MFC620CN/420CN/410CN/210C and FAX2440C

To exit from the maintenance mode and switch to standby, press the **9** key twice in the initial stage of the maintenance mode.

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To exit from the maintenance mode and switch to standby, enter 9 twice by using the ▲ and **Set** keys in the initial stage of the maintenance mode.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

• Pressing the **Stop/Exit** key after entering only one digit restores the machine to the initial stage of the maintenance mode.

• If an invalid function code is entered, the machine resumes the initial stage of the maintenance mode.

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8.3 LIST OF MAINTENANCE-MODE FUNCTIONS

Maintenance-mode Functions

Function Code	Function	Reference Section (Page)
01	EEPROM Parameter Initialization	8.5.1 (8-7)
05	Printout of Scanning Compensation Data	8.5.2 (8-8)
09	Test Pattern	8.5.3 (8-10)
10	Firmware Switch Setting	8.5.4 (8-12)
11	Printout of Firmware Switch Data	8.5.4 (8-15)
12	Operational Check of LCD	8.5.5 (8-17)
13	Operational Check of Control Panel PCB (Check of Keys)	8.5.6 (8-19)
32	Sensor Operational Check	8.5.7 (8-21)
53	Transfer of Received FAX Data and/or Equipment's Log	8.5.8 (8-23)
54	Fine Adjustment of Scanning Start/End Position	8.5.9 (8-25)
55	Acquisition of White Level Data and CIS Scanner Area Setting	8.5.10 (8-26)
58	Updating of Paper Feeding Correction Value	8.5.11 (8-27)
59	CIS Travel Check	8.5.12 (8-31)
63	Travel Check of Head/Carriage Unit and Initial Setup Mode	8.5.13 (8-33)
65	Alignment of Vertical Print Lines in Monochrome	8.5.14 (8-34)
66	Margin Adjustment in Near-edge Printing	8.5.15 (8-37)
68	Updating of Property Data	8.5.16 (8-40)
69	Initial Adjustment of PWM Value (Aging of the Head/Carriage Unit)	8.5.17 (8-42)
74	EEPROM Customizing	8.5.18 (8-43)
76	Purging Operation	8.5.19 (8-44)
80	Display of the Equipment's Log	8.5.20 (8-47)
82	Equipment Error Code Indication	8.5.21 (8-50)
87	Output of Transmission Log to the Telephone Line	8.5.22 (8-50)
91	EEPROM Parameter Initialization (except the telephone number storage area)	8.5.1 (8-7)
99	Exit from the Maintenance Mode	----- (8-3)
(**Menu/Set** + **#**, **2**, **7**, **9**, **0**, **0**)	Cancellation of the Pin TX Lock Mode (Not applicable to U.S.A. models)	8.5.23 (8-51)

8.4 USER-ACCESS TO THE MAINTENANCE MODE

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

The user-accessible functions (codes 10, 11, 12, 53, 66, 76, 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 can allow them to access user-accessible selectors which are *shaded* in the firmware switch tables in Appendix 4.

The service personnel should instruct end users to follow the procedure given below.

MFC620CN/420CN/410CN/210C and FAX2440C

(1) Press the **Menu/Set**, **Black Start**, **Menu/Set**, and **Black Start** keys in this order.

   TIP: For the FAX models equipped with numerical keypads, you may press the **Menu/Set**, **Black Start**, and **0** keys instead in the same way as conventional models.

   The "MAINTENANCE 10" appears on the LCD.

(2) To access function code 10, press the **Menu/Set** key.

   To access any other function code, call up the desired code using the ▲ and ▼ keys or numerical keys.

   Then press the **Menu/Set** key.

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

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

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MFC420CN/410CN/210C

▲ and ▼ keys

Stop/Exit key

Menu/Set key **Black Start** key

FAX2440C

▲ and ▼ keys

Stop/Exit key

Menu/Set key **Black Start** key
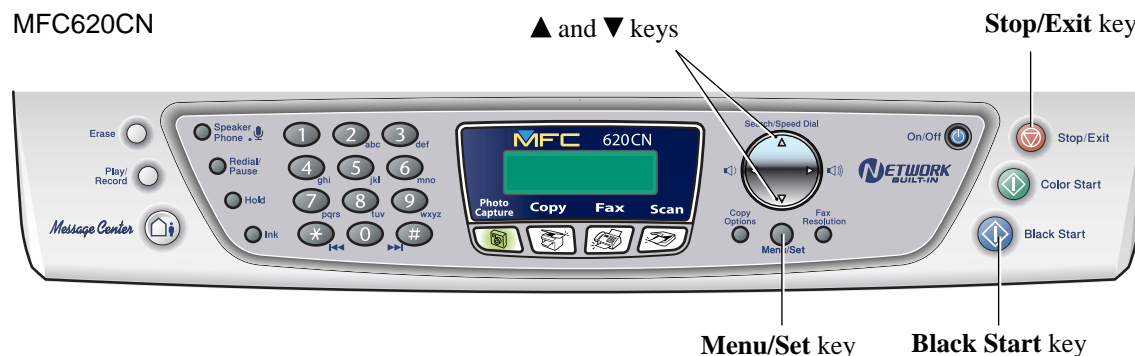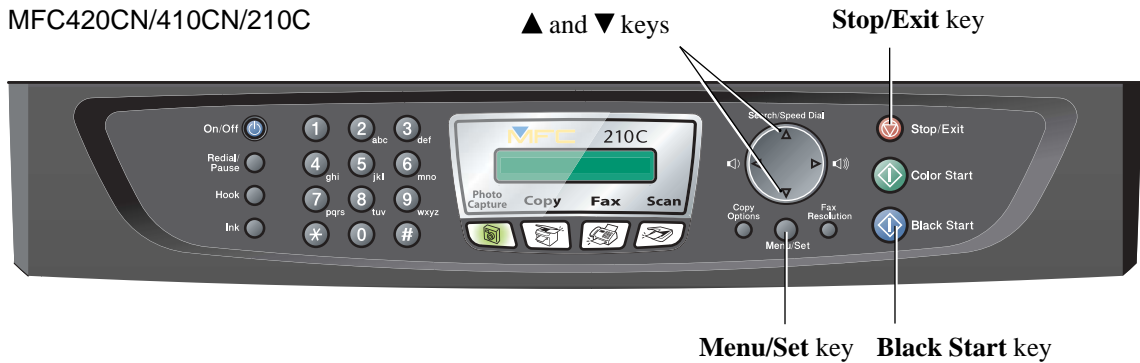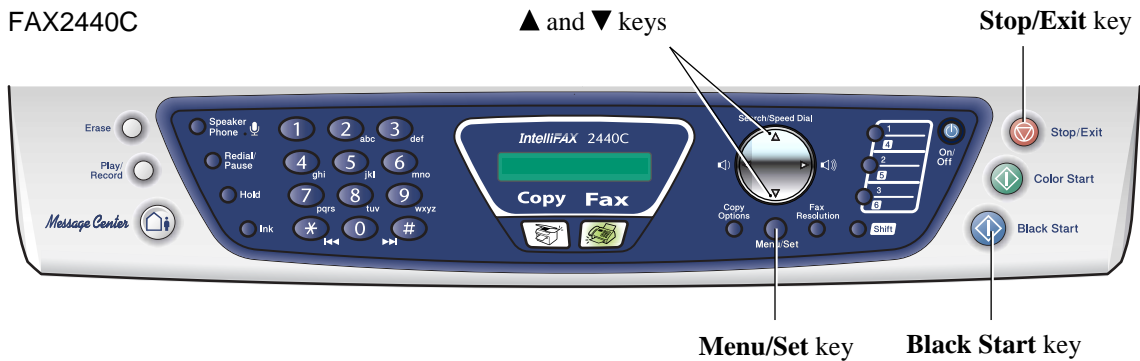
DCP310CN/110C

(1) Press the **Menu**, **Mono Start**, **Menu,** and **Mono Start** keys in this order.

The "MAINTENANCE 10" appears on the LCD.

(2) To access the function code 10, press the **Set** key.

To access any other function code, press the **Mono Start** key several times until the desired code appears. Then press the **Set** key.

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

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

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Menu key

Set key **Mono Start** key

Stop/Exit key

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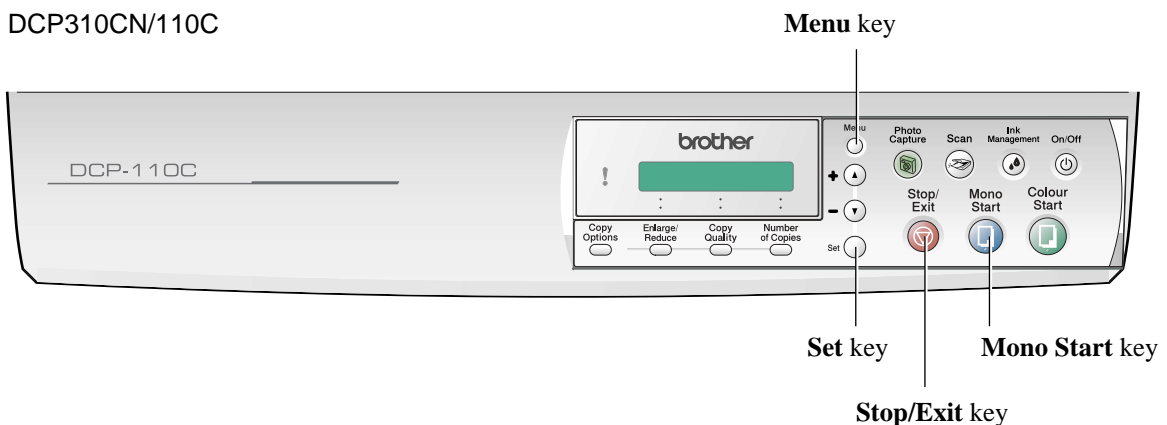
8.5 DETAILED DESCRIPTION OF MAINTENANCE-MODE FUNCTIONS

8.5.1 EEPROM Parameter Initialization (Function code 01, 91)

■ **Function**

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

Function code / Data item	01	91

Maintenance-mode functions
  User switches
  Firmware switches
  Remote activation code*
	All of these will be initialized.	These will be initialized.

Activity report*
Station ID data*
Outside line number*
Telephone function registration*
  One-touch dialing
  Speed dialing
  Group dialing
		These will <u>not</u> be initialized.

EEPROM customizing code (4-digit)	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.)	

*Not provided in the DCP310CN/110C.

NOTE: If you replace the main PCB with the one used for any other machine, carry out this procedure and then customize the EEPROM (maintenance-mode function code 74 in Section 8.5.18).

■ **Operating Procedure**

(1) MFC620CN/420CN/410CN/210C and FAX2440C

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.

DCP310CN/110C

Enter 0 and 1 by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The "PARAMETER INIT" will appear on the LCD.

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

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8.5.2 Printout of Scanning Compensation Data (Function code 05)

Function code 05 is not supported in the maintenance program embedded in the flash ROM of the MFC210C U.S.A./Canadian models. To use Function code 05 in these models, you need to temporarily load the full maintenance program onto the flash ROM. Refer to Section 8.1.

■ **Function**

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

■ **Operating Procedure**

Do not start this function merely after powering on the machine but start it after carrying out a sequence of scanning operation. Unless the machine 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 machine initializes white and black level data and takes in the scanning compensation reference data.

(1) MFC620CN/420CN/410CN/210C and FAX2440C
Press the **0** and **5** keys in this order in the initial stage of the maintenance mode.

DCP310CN/110C
Enter 0 and 5 by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The "PRINT" will appear on the LCD.

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

a) Black/white data graph
b) LED light intensity pulse data for green image (2 bytes)
c) LED light intensity pulse data for blue image (2 bytes)
d) LED light intensity pulse data for red image (2 bytes)
e) Compensation data for background color (1 byte)
f) Black level data (4970 bytes)
g) White level data for red image (4970 bytes)
h) White level data for green image (4970 bytes)
i) White level data for blue image (4970 bytes)

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

NOTE: When the machine 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.

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a)

b) 400f87b6 : 0739
c) 400f87b8 : 062b
d) 400f87ba : 05e1
e) 400f87c6 : ff

```
5076f200 : 33 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f220 : 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f240 : 34 34 34 34 34 34 34 34 33 34 34 34 34 34 34 34
5076f260 : 33 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f280 : 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f2a0 : 34 33 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f2c0 : 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f2e0 : 34 33 34 34 33 34 34 34 34 34 34 34 34 34 34 34
5076f300 : 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f320 : 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f340 : 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f360 : 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f380 : 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f3a0 : 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f3c0 : 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f3e0 : 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f400 : 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f420 : 34 34 34 34 34 34 34 34 34 35 34 34 34 34 34 34
5076f440 : 34 34 34 34 34 34 34 32 32 34 34 34 34 34 34 34
5076f460 : 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f480 : 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34 34
5076f4a0 : 34 34 34 34 34 34 33 35 35 34 35 35 35 35 35 35
5076f4c0 : 35 35 35 35 35 35 35 34 35 35 36 35 33 33 33 33
5076f4e0 : 33 33 33 33 33 33 32 33 33 33 33 33 33 33 33 33
5076f500 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f520 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f540 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f560 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f580 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f5a0 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f5c0 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f5e0 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f600 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f620 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f640 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f660 : 33 33 33 33 33 33 33 33 33 33 33 33 32 33 33 33
5076f680 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f6a0 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f6c0 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f6e0 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f700 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f720 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f740 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f760 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f780 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f7a0 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f7c0 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f7e0 : 33 33 33 33 33 33 33 33 33 33 31 31 33 33 33 33
5076f800 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f820 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f840 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 34 34
5076f860 : 34 34 34 34 34 34 34 34 34 34 33 34 34 35 33
5076f880 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f8a0 : 33 33 33 33 33 33 32 33 33 33 33 33 33 33 33 33
5076f8c0 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f8e0 : 33 33 33 33 33 33 32 33 33 33 33 33 33 33 33 33
5076f900 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
5076f960 : 33 33          33 33 33 33 33 33 33 33 33 33
5076f980 : 33 33 33 33          33 33 33 33 33 33
5076f9a0 : 33 33 33 33 33
5076f9c0 : 33 33 33 33 32 33 33                    33
5076f9e0 : 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33 33
```

f)
|
i)

Scanning Compensation Data List

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8.5.3 Test Pattern (Function code 09)

Function code 09 is not supported in the maintenance program embedded in the flash ROM of the MFC210C U.S.A./Canadian models. To use Function code 09 in these models, you need to temporarily load the full maintenance program onto the flash ROM. Refer to Section 8.1.

■ **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 print quality.

■ **Operating Procedure**

MFC620CN/420CN/410CN/210C and FAX2440C
Press the **0** and **9** keys in this order in the initial stage of the maintenance mode.

DCP310CN/110C
Enter 0 and 9 by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)
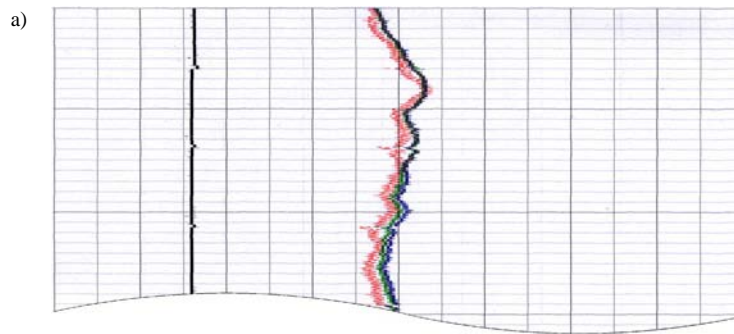
The figure on the next page shows a test pattern which is printed on the PRINT QUALITY CHECK SHEET. According to the instructions printed on the sheet, you can check or correct the print quality.

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Check that the dotted line forming the four color blocks are all visible with no gaps. If OK select (Yes) at the control panel.
If gaps are visible select (No) at the control panel to start the cleaning process and follow the prompts at the LCD.
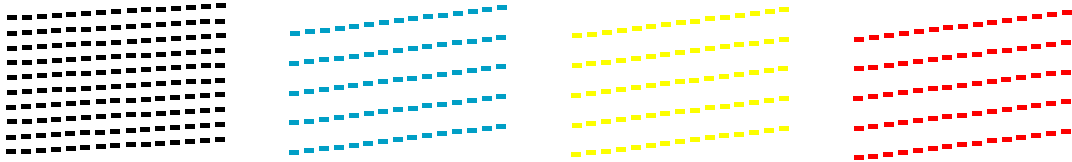
Test Pattern

8.5.4 Firmware Switch Setting and Printout (Function codes 10 and 11)

[A] Firmware switch setting

■ Function

The machine incorporates the following firmware switch functions which can be activated with the procedures using the control panel keys.

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 WSW51)

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	Function setting 8
WSW31	Function setting 9
WSW32	Function setting 10
WSW33	Function setting 11

Firmware Switches (WSW01 through WSW51) *Continued*

WSW No.	Function
WSW34	Function setting 12
WSW35	Function setting 13
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 the scanning light source
WSW42	Internet mail settings
WSW43	Function setting 21
WSW44	Speeding up scanning-1
WSW45	Speeding up scanning-2
WSW46	Monitor of power ON/OFF state and parallel port kept at high
WSW47	Switching between high- and full-speed USB
WSW48	USB setup latency
WSW49	End-of-copying beep and print in black
WSW50	SDAA settings
WSW51	Function setting 16

■ **Operating Procedure**

MFC620CN/420CN/410CN/210C and FAX2440C

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

The machine displays the "WSW00" on the LCD and becomes ready to accept a firmware switch number.

(2) Enter the desired number from the firmware switch numbers (01 through 51).

The following appears on the LCD:

$$\text{Selector 1} \qquad \text{Selector 8}$$
$$\downarrow \qquad\qquad \downarrow$$
$$\text{WSWXX} = \underline{0}\ 0\ 0\ 0\ 0\ 0\ 0\ 0$$

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

(4) Enter the desired number using the **0** and **1** keys.

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

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

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

NOTES: • To cancel this operation and return the machine to the initial stage of the maintenance mode during the above procedure, press the **Stop/Exit** key.

• If there is a pause of more than one minute after a single-digit number is entered for double-digit firmware switch numbers, the machine will automatically return to the initial stage of the maintenance mode.

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(1) Enter 1 and 0 by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The machine displays the "WSW00" on the LCD and becomes ready to accept a firmware switch number.

(2) Enter the numbers at the ten's place and unit's place of the desired number from the firmware switch numbers (01 through 51) by using the ▲ and **Set** keys.*

The following appears on the LCD:

$$\begin{array}{cc} \text{Selector 1} & \text{Selector 8} \\ \downarrow & \downarrow \\ \text{WSWXX} = \underline{0}\ 0\ 0\ 0\ 0\ 0\ 0\ 0 \end{array}$$

(3) To move the cursor to the right (left) by one position, press the ▲ key several times to display ▶ (◀) on the LCD and press the **Set** key. Repeat this operation to move the cursor to the selector position to be modified.

(4) Enter 1 and 0 by using the ▲ and **Set** keys.*

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

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

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

NOTES: • To cancel this operation and return the machine to the initial stage of the maintenance mode during the above procedure, press the **Stop/Exit** key.

• If there is a pause of more than one minute after a single-digit number is entered for double-digit firmware switch numbers, the machine will automatically return to the initial stage of the maintenance mode.

■   **Details of Firmware Switches**

The details of the firmware switches are described in Appendix 4 in which the user-accessible selectors of the firmware switches are *shaded*.

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[B] Printout of firmware switch data

■ **Function**

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

■ **Operating Procedure**

(1) MFC620CN/420CN/410CN/210C and FAX2440C
Press the **1** key twice in the initial stage of the maintenance mode.

DCP310CN/110C
Enter 1 twice by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The "PRINTING" will appear on the LCD.

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

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

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```
┌─────────────────────┐
│ CONFIGURATION LIST  │
└─────────────────────┘
```

MODEL : 8CA-811
TIME : 01/04/2004 02:51
REV. : U0403222132VER.0
PCI   : 5.00
SUM   : 8674
SER.# : G01234567890

```
WSW01 = 00000000
WSW02 = 11111010
WSW03 = 10000000
WSW04 = 00010111
WSW05 = 00000110
WSW06 = 00101100
WSW07 = 01001100
WSW08 = 01100100
WSW09 = 00000000
WSW10 = 00010100
WSW11 = 01011000
WSW12 = 10011001
WSW13 = 00011010
WSW14 = 01100110
WSW15 = 00000100
WSW16 = 01100010
WSW17 = 00100011
WSW18 = 10001010
WSW19 = 11100000
WSW20 = 10011111
WSW21 = 00101000
WSW22 = 00000000
WSW23 = 00001110
WSW24 = 01000010
WSW25 = 00011010
WSW26 = 00110100
WSW27 = 00100001
WSW28 = 00000000
WSW29 = 01101001
WSW30 = 10000000
WSW31 = 11100101
WSW32 = 01010000
WSW33 = 10000010
WSW34 = 00010000
WSW35 = 01000000
WSW36 = 00000000
WSW37 = 10000101
WSW38 = 00010100
WSW39 = 11110000
WSW40 = 00000000
WSW41 = 00000111
WSW42 = 11110100
WSW43 = 00000001
WSW44 = 00000010
WSW45 = 00000000
WSW46 = 00000000
WSW47 = 00000000
WSW48 = 00000000
WSW49 = 00000000
WSW50 = 00000000
WSW51 = 00000000
```

Configuration List

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8.5.5 Operational Check of LCD (Function code 12)

■ **Function**

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

For models with backlights, the light intensity also can be adjusted.

■ **Operating Procedure**

Checking the display state of the LCD:

(1) MFC620CN/420CN/410CN/210C and FAX2440C

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

DCP310CN/110C

Enter 1 and 2 in the initial stage of the maintenance mode by using the ▲ and **Set** keys.*

The LCD shows the screen given at right.

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

Each time you press the **Black Start (Mono 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 machine beeps for one second and returns to the initial stage of the maintenance mode.

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

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Adjusting the light intensity of the backlight:

(1) <u>MFC620CN</u>

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

<u>DCP310CN</u>

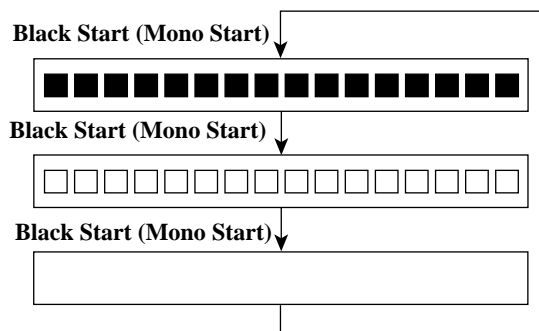Enter 1 and 2 in the initial stage of the maintenance mode by using the ▲ and **Set** keys.*
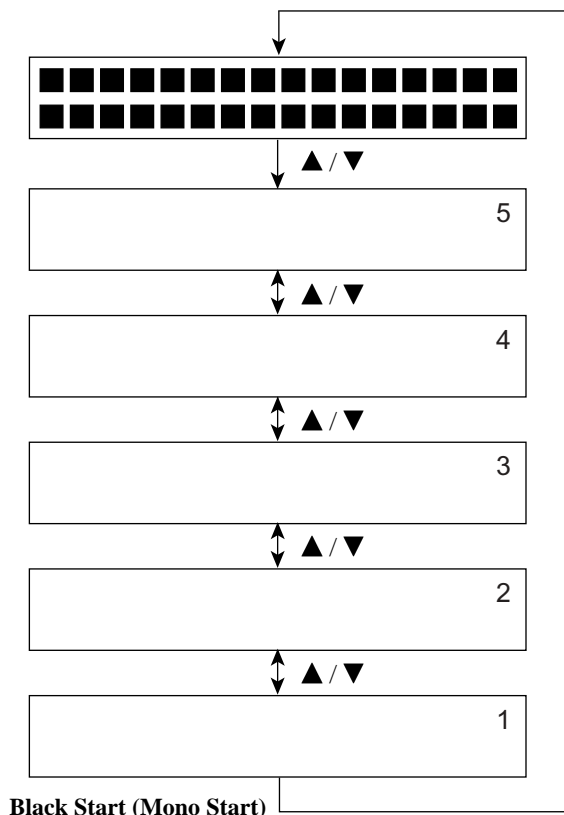
(2) <u>MFC620CN</u>

To increase the intensity, press the ▲ key; to decrease it, press the ▼ key.

<u>DCP310CN</u>

Enter ▲ or ▼ by using the ▲ and **Set** keys.*

NOTE: The light intensity can be adjusted to five levels.

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

```
                              ┌──────────────────────┐
                              ▼                      │
     ████████████████████████████████               │
     ████████████████████████████████               │
                              │ ▲ / ▼               │
     ┌──────────────────────────────┐               │
     │                            5 │               │
     └──────────────────────────────┘               │
                              ↕ ▲ / ▼               │
     ┌──────────────────────────────┐               │
     │                            4 │               │
     └──────────────────────────────┘               │
                              ↕ ▲ / ▼               │
     ┌──────────────────────────────┐               │
     │                            3 │               │
     └──────────────────────────────┘               │
                              ↕ ▲ / ▼               │
     ┌──────────────────────────────┐               │
     │                            2 │               │
     └──────────────────────────────┘               │
                              ↕ ▲ / ▼               │
     ┌──────────────────────────────┐               │
     │                            1 │               │
     └──────────────────────────────┘               │
  Black Start (Mono Start) └─────────────────────────┘
```

(4) No key operation for one minute returns the machine to the initial stage of the maintenance mode.

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

Confidential

8.5.6 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) MFC620CN/420CN/410CN/210C and FAX2440C
Press the **1** and **3** keys in this order in the initial stage of the maintenance mode.

DCP310CN/110C
Enter 1 and 3 in the initial stage of the maintenance mode by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The "00   " will appear on the LCD.

(2) Press the keys in the order designated in the illustration shown below.

The LCD shows the corresponding number in decimal notation each time a key is pressed. Check that the displayed number is correct by referring to the illustration below.

If a key is pressed out of order, the machine beeps and displays the "INVALID OPERATE" on the LCD. To return to the status ready to accept key entry for operational check, press the **Stop/Exit** key.

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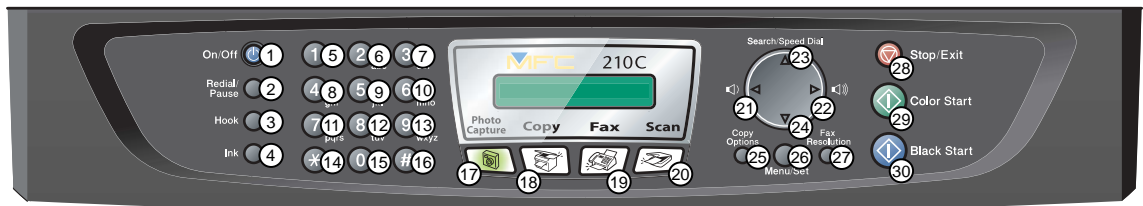
To terminate this operation, press the **Stop/Exit** key. The machine returns to the initial stage of the maintenance mode.

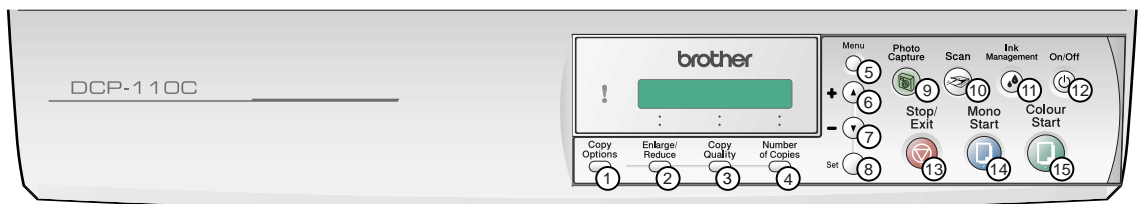MFC620CN

Key Entry Order (1)

MFC420CN/410CN/210C

FAX2440C

DCP310CN/110C

Key Entry Order (2)

Confidential

8.5.7 Sensor Operational Check (Function code 32)

■ **Function**

This function allows you to check the following:

- Document front sensor (MFC620CN/420CN and FAX2440C)
- Document rear sensor (MFC620CN/420CN and FAX2440C)
- Scanner open sensor
- Registration sensor
- Purge cam switch
- Black ink cartridge sensor
- Yellow ink cartridge sensor
- Cyan ink cartridge sensor
- Magenta ink cartridge sensor
- Head driver chip temperature sensor
- Hook switch (MFC620CN U.S.A./Canadian models and FAX2440C)
- Large-volume ink cartridge sensor (FAX2440C)

■ **Operating Procedure**

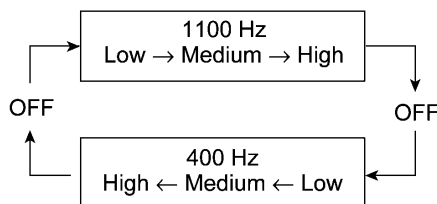(1) MFC620CN/420CN/410CN/210C and FAX2440C
Press the **3** and **2** keys in this order in the initial stage of the maintenance mode.

DCP310CN/110C
Enter 3 and 2 in the initial stage of the maintenance mode by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The machine sounds 1100 Hz and 400 Hz tones cyclically through the following volumes for testing the speaker:

```
                    ┌─────────────────────────┐
              ┌────▶│       1100 Hz           │────┐
              │     │  Low → Medium → High    │    │
              │     └─────────────────────────┘    │
            OFF                                    OFF
              │     ┌─────────────────────────┐    │
              └─────│       400 Hz            │◀───┘
                    │  High ← Medium ← Low    │
                    └─────────────────────────┘
```

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

Confidential

If the sensing status are as listed below, the LCD will show "DFDRCVRS   P1   " and "IKIYICIMVTHKLK   ," which can be switched by pressing the **Black Start (Mono Start)** key.

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 unit closed.
RS	Registration sensor	No recording paper detected.
P1	Purge cam switch	Purge cam switch ON.
IK	Black ink cartridge sensor	Black ink cartridge loaded (Black ink present).
IY	Yellow ink cartridge sensor	Yellow ink cartridge loaded (Yellow ink present).
IC	Cyan ink cartridge sensor	Cyan ink cartridge loaded (Cyan ink present).
IM	Magenta ink cartridge sensor	Magenta ink cartridge loaded (Magenta ink present).
VT	Head driver chip temperature sensor	Driver chip temperature within the allowable range.
HK	Hook switch**	On-hook state.
LK	Large-volume ink cartridge sensor***	Large volume ink cartridge loaded.

   *   MFC620CN/420CN and FAX2440C
   **   MFC620CN U.S.A./Canadian models and FAX2440C
  *** FAX2440C

The DF, DR, HK, and LK are displayed even on those models not equipped with their related sensors.

(2) Change the detecting conditions (e.g., open the scanner unit or insert paper through the registration sensor or remove the ink cartridges), and then check that the indication on the LCD changes according to the sensor states.

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

Confidential

8.5.8 Transfer of Received FAX Data and/or Equipment's Log (Function code 53)

■ **Function**

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

NOTE: This function is available in the MFC620CN/420CN/410CN/210C and FAX2440C.

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

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

■ **Operating Procedure**

(1) Press the **5** and **3** keys in this order in the initial stage of the maintenance mode.

The "FAX TRANSFER" appears on the LCD.

(2) <u>To check the number of received files</u>, press the **1** key.

The "1.NO. OF JOBS" appears on the LCD.

Press the **Menu/Set** key, and the number of received files appears, just as "NO. OF. JOBS: 10."

(3) <u>To transfer the activity report only</u>, press the **2** key.

The "2.ACTIVITY" appears.

<u>To transfer received files (together with the activity report)</u>, press the **3** key.

The "3.DOCUMENTS" appears. Note that if there is no received file, the "NO DOCUMENTS" appears.

(4) <u>To transfer the communication list for the latest communication</u>, press the **4** key.

The "4.COM.LIST (NEW)" appears.

<u>To transfer the communication list for last three errors</u>, press the **5** key.

The "5.COM.LIST (ERR3)" appears.

(5) With the "2.ACTIVITY," "3.DOCUMENTS," "4.COM.LIST (NEW)," or "5.COM.LIST (ERR3)" being displayed, press the **Menu/Set** key.

The "ENTER NO. &SET" appears.

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

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

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

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

Cover page sample

```
=== FAX TRANSFER COVER PAGE ===

NO. OF JOBS    :001                    ←————— Job number
TOTAL PAGE[S] :001                     ←————— Total number of pages to be transferred
NAME           :BROTHER                ←————— Station ID registered in the sender equipment
FAX            :052 824 2330           ←————— FAX number of the sender equipment
TEL            :                       ←————— Telephone number of the sender equipment
TIME           :01/02/2004 22:21       ←————— Transfer start date

8CA-811                    ←————— Model code
B0403261602                ←————— Boot ROM info
U0404221449 VER.0          ←————— ROM info
G01234567890               ←————— Serial number
```

End page sample

```
=== FAX TRANSFER END PAGE ===

NO. OF JOBS    :001                    ←————— Job number
TOTAL PAGE[S] :001                     ←————— Total number of pages transferred
NAME           :BROTHER                ←————— Station ID registered in the sender equipment
FAX            :052 824 2330           ←————— FAX number of the sender equipment
TEL            :                       ←————— Telephone number of the sender equipment

MACHINE STATUS 1    AF:0401022216  ←
MACHINE STATUS 2    43:0401022216  ←
MACHINE STATUS 3    48:0401022216  ←
MACHINE STATUS 4    AF:0401022017  ←
MACHINE STATUS 5    43:0401022017  ←   } Error codes
MACHINE STATUS 6    48:0401022017  ←
MACHINE STATUS 7    AF:0401011756  ←
MACHINE STATUS 8    43:0401011756  ←
MACHINE STATUS 9    48:0401011756  ←
```

Confidential

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

This function is available in models with ADFs.

■ **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." appears on the LCD.

(2) Press the **Black Start** key. The "1.ADF 2.FB" appears on the LCD.

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

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

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

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

(5) Press the **Menu/Set** key.
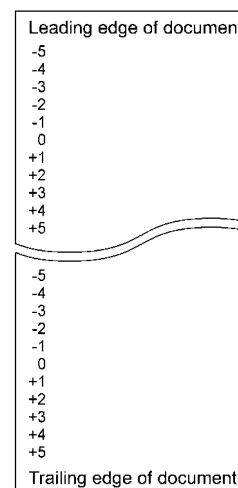
The "ACCEPTED" appears on the LCD. After one second, the machine returns to the initial stage of the maintenance mode.
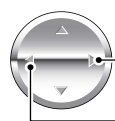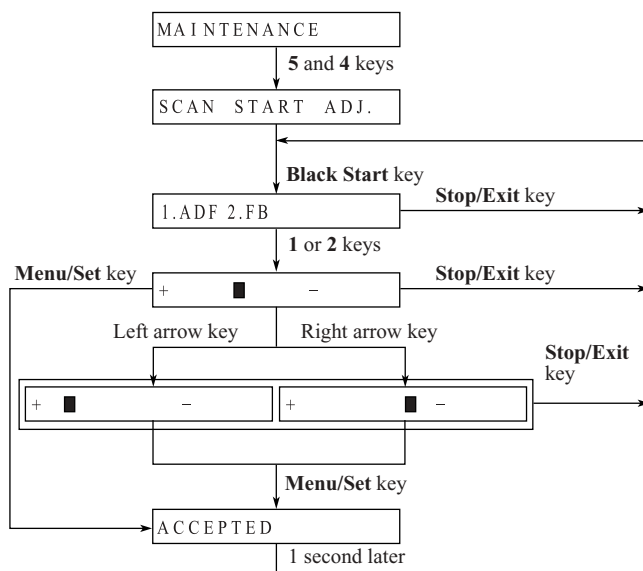
NOTE: The relationship between the scanning start/end positions and their correction values is shown below.

Confidential

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

■ **Function**

This function allows the machine to obtain white level data for the CIS scanner and save it together with the CIS scanner area into the EEPROM on the main PCB.

■ **Operating Procedure**

(1) MFC620CN/420CN/410CN/210C and FAX2440C
Press the **5** key twice in the initial stage of the maintenance mode.

DCP310CN/110C
Enter 5 twice in the initial stage of the maintenance mode by using the ▲ and **Set** keys.*
(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The "SCANNER AREA SET" will appear on the LCD.

The machine automatically obtains white level data.

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

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

Confidential

8.5.11 Updating of Paper Feeding Correction Value (Function code 58)

Function code 58 is not supported in the maintenance program embedded in the flash ROM of the MFC210C U.S.A./Canadian models. To use Function code 58 in these models, you need to temporarily load the full maintenance program onto the flash ROM. Refer to Section 8.1.

■ Function

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

If you replace the engine unit, paper ejection roller, or head/carriage unit, you need to update the paper feeding correction value according to the procedure given here.

■ Operating Procedure

(1) Switch on your PC.

(2) Place the machine in the maintenance mode. (See Section 8.2.)

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

(4) Run "FILEDG32.exe" in the folder created in Section 6.1.1.

The Filedrgs window appears as shown below.
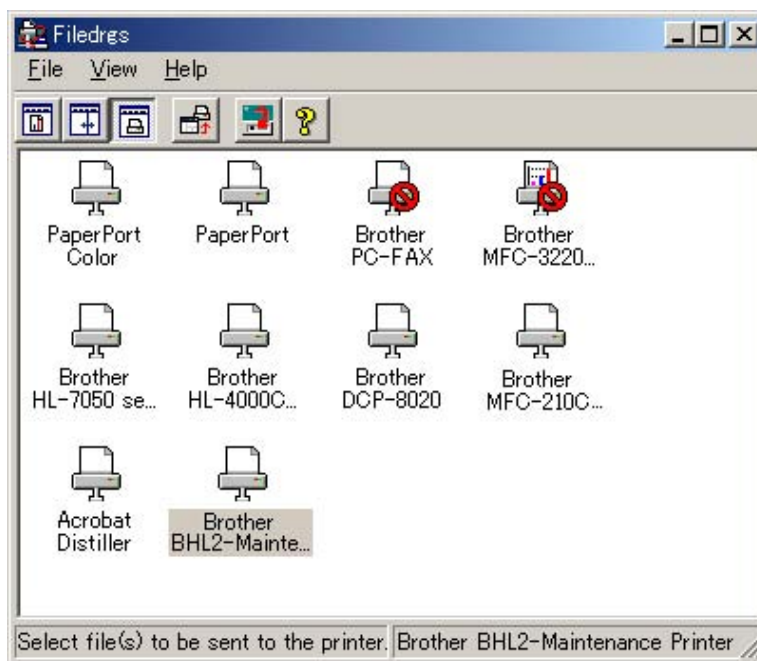
(5) Drag and drop the "PFROLL.PRN" onto the BHL2-Maintenance Printer icon in the Filedrgs window shown above.

The machine displays the "RECEIVING DATA" on the LCD and prints out "PF adjust check" patterns (see page 8-30 for a sample printout).

Confidential

(6) MFC620CN/420CN/410CN/210C and FAX2440C

Press the **5** and **8** keys on the machine.

DCP310CN/110C

Enter 5 and 8 by using the ▲ and **Set** keys on the machine.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

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

(7) MFC620CN/420CN/410CN/210C and FAX2440C

To select the paper feed roller adjustment, press the **1** key.

DCP310CN/110C

To select the paper feed roller adjustment, enter 1 by using the ▲ and **Set** keys.*

The "PF ADJ NO. +0" appears on the LCD.

(8) Check the PF adjust check patterns ("A" on) 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 -8, regard it as -8; if it is far to the right of check pattern +8, regard it as +8. In this case, you need to check whether the paper feed roller and head/carriage unit are set into place.

(9) Enter the number of the least uneven check pattern found in step (7).

MFC620CN/420CN/410CN/210C and FAX2440C

For example, if the number of the least uneven check pattern is +4, press the ▲ and **4** keys; if -4, press the ▼ and **4** keys. (To enter +, use the ▲ key; to enter -, use the ▼ key.)

DCP310CN/110C

For example, if the number of the least uneven check pattern is +4, enter + and 4; if -4, enter - and 4 by using the ▲ and **Set** keys.*

(*To enter a plus/minus symbol or numerical code on models having no numerical keypad, press the ▲ key several times to display the ▲/▼ or numerical code to be entered, respectively, and then press the **Set** key. Repeat this operation for each symbol or numerical code.)

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

(10) MFC620CN/420CN/410CN/210C and FAX2440C

Press the **5** and **8** keys on the machine.

DCP310CN/110C

Enter 5 and 8 by using the ▲ and **Set** keys on the machine.*

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

(11) MFC620CN/420CN/410CN/210C and FAX2440C

To select the paper ejection roller adjustment, press the **2** key.

DCP310CN/110C

To select the paper ejection roller adjustment, enter 2 by using the ▲ and **Set** keys.*

Confidential

The "EXIT ADJ NO. +0" appears on the LCD.

(12) Check the PF adjust check patterns ("B" on) and select the one that is the least uneven print. Make a note of that pattern number.

(13) Enter the number of the least uneven check pattern found in step (11).

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

Confidential

```
        -8    -6    -4    -2    0    +2    +4    +6    +8
"A" ⇒
```

```
           600dpi              1200dpi              750dpi
1
2
3
4
5
6
7
8
9
```

```
        -8    -6    -4    -2    0    +2    +4    +6    +8
"B" ⇒
```
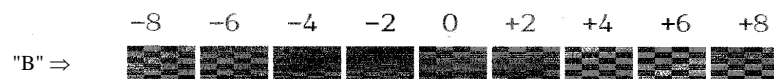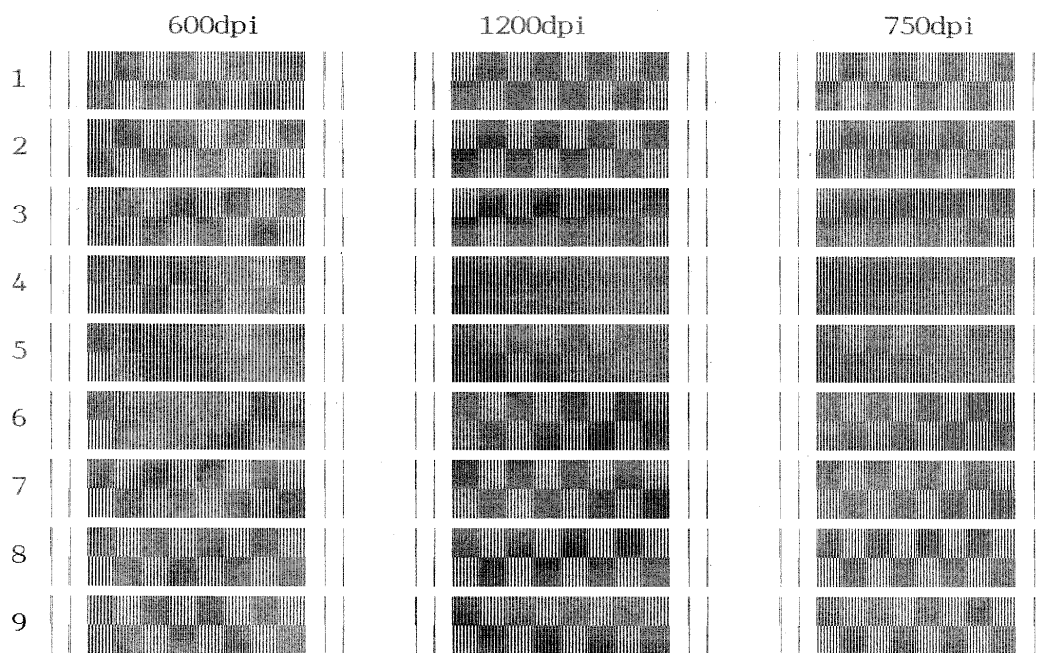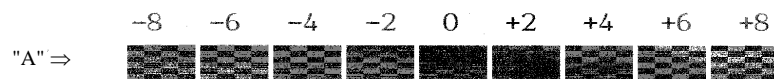
Paper Feeding Check Pattern for the Paper Feed Roller and Paper Ejection Roller

Confidential

8.5.12 CIS Travel Check (Function code 59)

Function code 59 is not supported in the maintenance program embedded in the flash ROM of the MFC210C U.S.A./Canadian models. To use Function code 59 in these models, you need to temporarily load the full maintenance program onto the flash ROM. Refer to Section 8.1.

■ **Function**

This procedure moves the CIS unit to the white-level reference film position, the scanning start position, and the scanning end position, allowing you to check the travelling state of the CIS unit. Only the travel to the scanning end position is necessary at the service site.

■ **Operating Procedure**

MFC620CN/420CN/410CN/210C and FAX2440C

(1) Press the **5** and **9** keys in this order in the initial stage of the maintenance mode.

The "1:MONO 2:COLOR?" appears on the LCD. This menu is for checking scanning clocks at the factory. Skip this menu and call up the CIS travel check menu by performing steps (2) through (5).

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

(Pressing the **1** key requires the **Menu/Set** key to be pressed three times to call up the CIS travel check menu; pressing the **2** key requires it more than three times.)

The "0:30 1:60 2:12 " appears.

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

The "LED PWM: " appears.

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

The "G PULSE: " appears.

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

The "1:WHT 2:FRT 3:MV" appears on the LCD. This is the CIS travel check menu.

NOTE: Pressing the **1** key may call up the debug screen to be used at the factory. Press the **Menu/Set** key to display the "1:WHT 2:FRT 3:MV."

(6) Press the **3** and **Menu/Set** keys in this order to move the CIS unit to the scanning end position.

Pressing the **1** (or **2**) and **Menu/Set** keys moves the CIS unit to the white-level reference film position (or the scanning start position).

(7) To exit the CIS travel check operation, press the **Stop/Exit** key.

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

Confidential

DCP310CN/110C

(1) Enter 5 and 9 in the initial stage of the maintenance mode by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The "1:MONO 2:COLOR?" appears on the LCD. This menu is for checking scanning clocks at the factory. Skip this menu and call up the CIS travel check menu by performing steps (2) through (5).

(2) Enter 1 by using the ▲ and **Set** keys.*

The "0:30 1:60 2:12 " appears.

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

The "LED PWM: " appears.

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

The "G PULSE: " appears.

(5) Press the **Set** key.

The "1:WHT 2:FRT 3:MV" appears on the LCD.

NOTE: Entering 1 may call up the debug screen to be used at the factory. Display the "1:WHT 2:FRT 3:MV."

(6) Enter 3 by using the ▲ and **Set** keys.*

Press the **Set** key to move the CIS unit to the scanning end position.

Entering 1 or 2 moves the CIS unit to the white-level reference film position or the scanning start position, respectively.

(7) To stop the CIS unit, press the **Stop/Exit** key.

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

8.5.13 Travel Check of the Head/Carriage Unit and Initial Setup Mode (Function code 63)

■ **Function**

This procedure moves the head/carriage unit to the head replacement position (Function code 63 + *).

It can also enable or disable the initial setup mode when the power is applied at the next time (Function code 63 + 1 or Function code 63 +3).

■ **Operating Procedure**

MFC620CN/420CN/410CN/210C and FAX2440C

(1) Press the **6** and **3** keys in this order in the initial stage of the maintenance mode.

The "MAINTENANCE 63" will appear on the LCD.

(2) To make the head/carriage unit travel to the head replacement position, press the * key.

After completion of head replacement or adjustment jobs, press the **Stop/Exit** key. The head/carriage unit returns to the home position where the head/carriage unit will be locked.

(3) To enable or disable the initial setup mode when the power is applied at the next time, press the **1** or **3** key, respectively.

If you enable the initial setup mode, wait until the "INIT" appears on the LCD and the head/carriage unit becomes locked. When the "HEAD LOCKED" appears, turn the power off.

NOTE: Enabling the initial setup mode resets all counts which can be displayed with Function code 80 (described in Section 8.5.20 "Display of the Equipment's Log") to zero.

If you disable the initial setup mode, the machine displays the "NOT INIT" on the LCD and returns to the initial stage of the maintenance mode.

DCP310CN/110C

(1) Enter 6 and 3 in the initial stage of the maintenance mode by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The "MAINTENANCE 63" will appear on the LCD.

(2) To make the head/carriage unit travel to the head replacement position, enter * by using the ▲ and **Set** keys.*

After completion of head replacement or adjustment jobs, press the **Stop/Exit** key. The head/carriage unit returns to the home position where the head/carriage unit will be locked.

(3) To enable or disable the initial setup mode when the power is applied at the next time, enter 1 or 3 by using the ▲ and **Set** keys, respectively.

If you enable the initial setup mode, wait until the "INIT" appears on the LCD and the head/carriage unit becomes locked. When the "HEAD LOCKED" appears, turn the power off.

NOTE: Enabling the initial setup mode resets all counts which can be displayed with Function code 80 (described in Section 8.5.20 "Display of the Equipment's Log") to zero.

If you disable the initial setup mode, the machine displays the "NOT INIT" on the LCD and returns to the initial stage of the maintenance mode.

Confidential

8.5.14 Alignment of Vertical Print Lines in Monochrome (Function code 65)

Function code 65 is not supported in the maintenance program embedded in the flash ROM of the MFC210C U.S.A./Canadian models. To use Function code 65 in these models, you need to temporarily load the full maintenance program onto the flash ROM. Refer to Section 8.1.

■ **Function**

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

If the head/carriage unit or main PCB is replaced with a new one, you need to make the adjustment given in this section.

NOTE: If the head/carriage unit is replaced with a new one, you need to make other adjustments in addition. Refer to Chapter 6, Section 6.2.

■ **Operating Procedure**

(1) MFC620CN/420CN/410CN/210C and FAX2440C

Press the **6** and **5** keys in this order in the initial stage of the maintenance mode. Then press the **1** key.

DCP310CN/110C

Enter 6, 5, and 1 in the initial stage of the maintenance mode by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The machine displays the "MAINTENANCE 65" on the LCD and prints two sheets of check patterns as shown on page 8-36.

On the 1st sheet, two sets of vertical alignment check patterns in monochrome are printed for 600 dpi and 1200 dpi, each of which consists of #1 through #8 blocks. If the vertical alignment is ON, #5 block (each in the 600 and 1200 dpi printouts) shows vertically aligned lines.

On the 2nd sheet, the vertical alignment check pattern is printed for 750 dpi.

The "600DPI NO. (1-8)" appears on the LCD.

(2) On the 1st sheet, check the printed vertical alignment check patterns for 600 dpi in monochrome and find which number block shows full alignment.

MFC620CN/420CN/410CN/210C and FAX2440C

If the block is other than #5, enter that block number by using the numerical keys.

DCP310CN/110C

If the block is other than #5, enter that block number by using the ▲ and **Set** keys.*.

The "1200DPI NO.(1-8)" appears on the LCD.

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

The "750DPI NO.(1-8)" appears on the LCD.

(4) <u>On the 2nd sheet</u>, check the printed vertical alignment pattern for 750 dpi and perform the same operation as in step (2).

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

NOTE: If #1 or #8 block is fully aligned so that you press the **1** or **8** key (or you enter 1 or 8) in the above procedure, then go back to step (1) to confirm that #5 block becomes aligned.

1st sheet
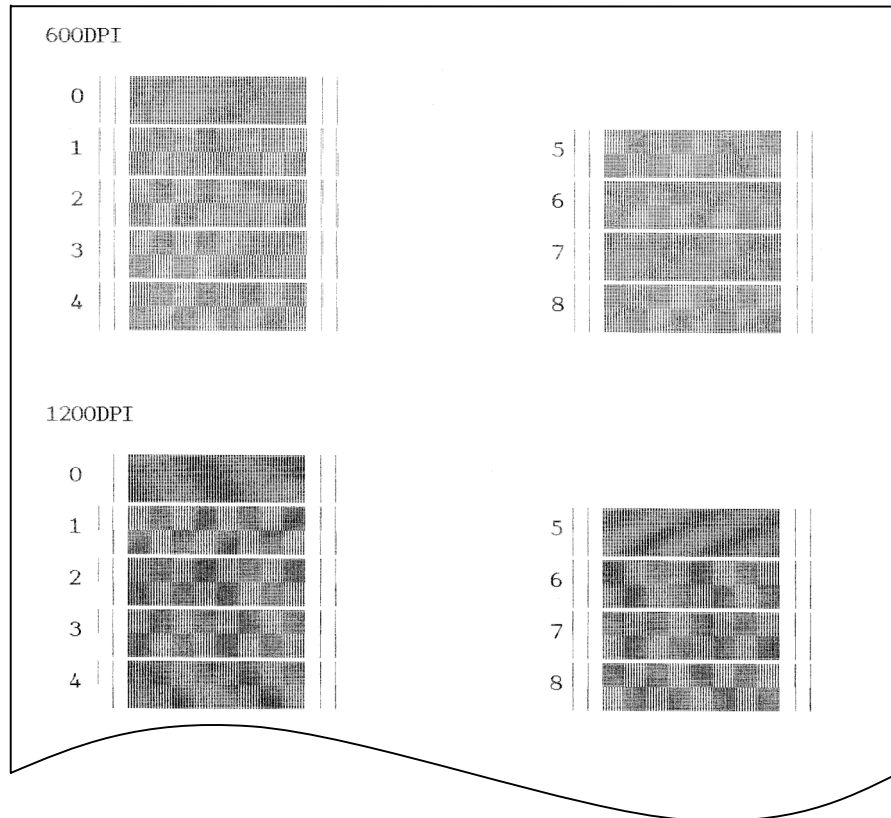
2nd sheet

Vertical Alignment Check Patterns

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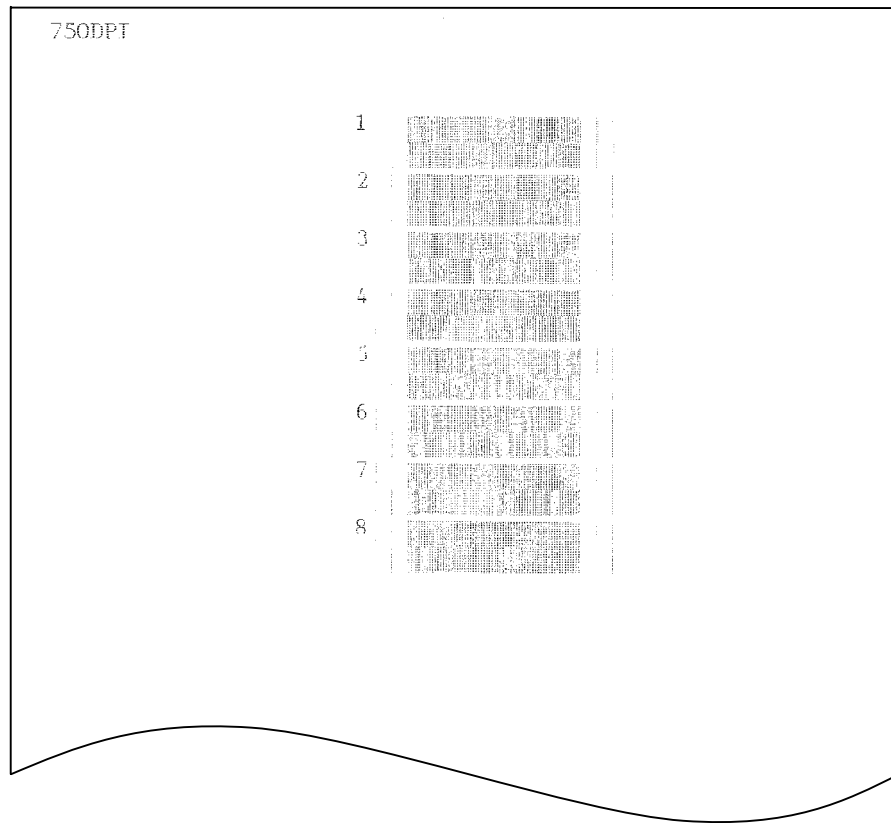
8.5.15 Margin Adjustment in Near-edge Printing (Function code 66)

■ **Function**

This function allows you to adjust the left and right margins for near-edge printing. You print out a set of margin check patterns, measure the margins, and enter the correction values.

■ **Operating Procedure**

(1) Switch on your PC.

(2) Place the machine in the maintenance mode.

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

(4) On the PC, run "FILEDG32.exe" in the folder created in Section 6.1.1.

The Filedrgs window appears as shown below.
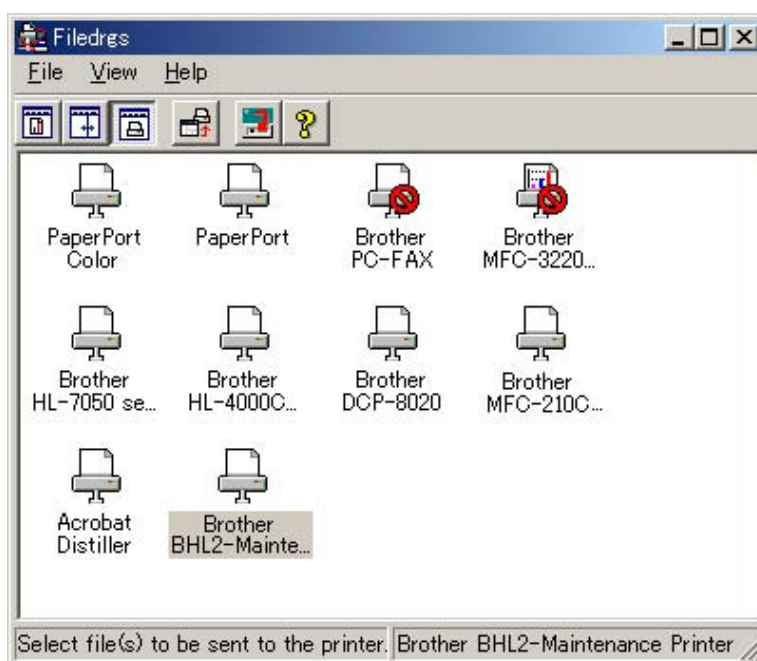
(5) Drag and drop the "EDGE_CHECK.PRN" onto the BHL2-Maintenance Printer icon in the Filedrgs window shown above.

The machine displays the "RECEIVING DATA" on the LCD and prints out the margin check pattern (see page 8-39 for a sample printout).

(6) Measure the left and right margins on the printout.

(Example) Left: 1.0 mm, Right: 1.3 mm

If both margins are within the range from 0.9 to 1.1 mm, no adjustment is required.

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(7) MFC620CN/420CN/410CN/210C and FAX2440C

If either margin is out of the specified range, press the **6** key twice on the machine.

DCP310CN/110C

If either margin is out of the specified range, enter 6 twice by using the ▲ and **Set** keys on the machine.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The "MEDIA SENSOR ADJ" appears again.

(8) MFC620CN/420CN/410CN/210C and FAX2440C

To make the machine ready for data entry, press the ***** key.

DCP310CN/110C

To make the machine ready for data entry, enter * by using the ▲ and **Set** keys.*

(9) Enter the measured value (in units of 0.1 mm) multiplied by 10.

(Example) Left: 10, Right: 13

MFC620CN/420CN/410CN/210C and FAX2440C

In this example, press **1**, **0**, **Menu/Set**, **1**, **3**, and **Menu/Set** keys.

DCP310CN/110C

In this example, enter 1, 0, 1, and 3 by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

(10) Upon completion of the entry, the machine automatically returns to the initial stage of the maintenance mode.

Go back to step (5) and print out the margin check pattern again.

(11) Measure the left and right margins on the printout.

If both margins are within the range from 0.9 to 1.1 mm, the adjustment is completed.

TIP: To reset the newly entered values to defaults, press the **Black Start** or **Mono Start** key.

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```
* BH3 MEDIA CHECK - Version 0.02 *




LEFT:0.9-1.1mm                                          RIGHT:0.9-1.1mm
```

Margin Check Pattern

8.5.16 Updating of Property Data (Function code 68)

■ **Function**

To keep the print quality, the controller optimizes the drive conditions of individual head/carriage units according to the property data. For instance, the controller optimizes the head drive strength, ink jet-out timing and other drive conditions according to the electromechanical properties unique to individual head/carriage units and ambient temperature.

The property data is stored in the EEPROM on the main PCB and its property code is printed on the property label which is attached to the machine.

If you replace the head/carriage unit with a new spare part, you need to enter its property code printed on the property label (that comes with the new spare part) and replace the old property label on the bottom of the machine with the new one. If the old part may be used in future, store the old property label also with the old part.

■ **Operating Procedure**

(1) MFC620CN/420CN/410CN/210C and FAX2440C

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

DCP310CN/110C

Enter 6 and 8 in the initial stage of the maintenance mode by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

(2) MFC620CN/420CN/410CN/210C and FAX2440C

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

DCP310CN/110C

Enter 2, 5, 8, and 0 by using the ▲ and **Set** keys.*

The current property data stored in the EEPROM appears on the LCD and the machine is ready for entry.

(3) Check the property label that comes with a new head/carriage unit and then enter the property code.

The code to be entered is <u>12 digits</u> excluding the heading alphabet.
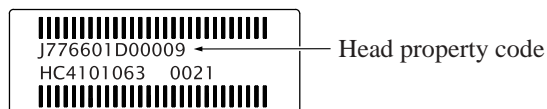
Head property code

MFC620CN/420CN/410CN/210C and FAX2440C

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

DCP310CN/110C

To enter letters "A" through "F," enter A through F by using the ▲ and **Set** keys.*

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

The machine beeps, shows the "INPUT ACCEPTED" on the LCD, and writes the entered property code into the EEPROM. Then it 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).

8.5.17 Initial Adjustment of PWM Value (Aging of the Head/Carriage Unit) (Function code 69)

Function code 69 is not supported in the maintenance program embedded in the flash ROM of the MFC210C U.S.A./Canadian models. To use Function code 69 in these models, you need to temporarily load the full maintenance program onto the flash ROM. Refer to

■ **Function**

This function obtains the initial value of the PWM by aging the head/carriage unit 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 head/carriage unit, carriage motor, or CR encoder strip or if you loosen the timing belt.

NOTE: Opening the scanner unit during the aging procedure will result in an error. If you perform this aging procedure with the scanner unit opened, the machine will slowly age the head/carriage unit resulting in an error after completion of the aging.

■ **Operating Procedure**

(1) MFC620CN/420CN/410CN/210C and FAX2440C
Press the **6** and **9** keys in this order in the initial stage of the maintenance mode.

DCP310CN/110C
Enter 6 and 9 in the initial stage of the maintenance mode by using ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The machine starts aging the head/carriage unit, showing the "CR AGING" on the LCD.

In each of travel speeds 40, 33.3, 32.0 and 20, the machine checks whether the maximum and minimum speeds are within the specified range.

If both are within the range, the machine automatically returns to the initial stage of the maintenance mode.

If either one is out of the range, the machine beeps and shows some message, e.g., "40O 30X 32X 20O" on the LCD. This sample message indicates that the speed variation is within the allowable range when the head/carriage unit travels at 40 or 20 inches/sec.; however, it is out of the range at 30 or 32 inches/sec.

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

8.5.18 EEPROM Customizing (Function code 74)

Customizing codes comes with the firmware data provided by Brother Industries.

■ **Function**

This function allows you to customize the EEPROM according to language, function settings, and firmware switch settings.

NOTE: If you replace the main PCB, be sure to carry out this procedure.

■ **Operating Procedure**

(1) MFC620CN/420CN/410CN/210C and FAX2440C

Press the **7** and **4** keys in this order in the initial stage of the maintenance mode.

DCP310CN/110C
Enter 7 and 4 in the initial stage of the maintenance mode by using ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The current customizing code (e.g., 0001 in the case of MFC210C U.S.A. model) appears.

(2) Enter the desired customizing code (e.g., 0002 in the case of MFC210C Canadian model).

MFC620CN/420CN/410CN/210C and FAX2440C
To enter letters "A" through "F," press the **1** through **6** keys while holding down the **#** key, respectively.

DCP310CN/110C
To enter letters "A" through "F," enter A through F by using the ▲ and **Set** keys.*

The newly entered code appears.

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

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

The machine saves the setting and returns to the initial stage of the maintenance mode.

If you press the **Stop/Exit** key or no keys are pressed for one minute in the above procedure, the machine stops the procedure and returns to the initial stage of the maintenance mode.

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8.5.19   Purging Operation (Function code 76)

■   **Function**

The machine can carry out several types of purging operations--normal purge, power purge, initial purge, reset purge, engine setup purge, cartridge replacement purge, ink drain purge, and initial liquid substitute purge. This function allows you to select the desired purge type and carry it out.

TIP: The purge types and their details are described on the next page.

■   **Operating Procedure**

(1)   MFC620CN/420CN/410CN/210C and FAX2440C

Press the **7** and **6** keys in this order in the initial stage of the maintenance mode.

DCP310CN/110C

Enter 7 and 6 in the initial stage of the maintenance mode by using ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The machine displays the "CLEANING ALL" on the LCD and enters the purge mode.

(2)   MFC620CN/420CN/410CN/210C and FAX2440C

Press the ◄ or ► key to select all colors, black, magenta, cyan, or yellow. Any color choice performs all color purge.

DCP310CN/110C

Enter ◄ or ► by using the ▲ and **Set** keys to select all colors, black, magenta, cyan, or yellow. Any color choice performs all color purge.

(3)   Select the purge type according to the table on the next page.

(4)   Press the **Black Start** or **Mono Start** key.

Upon completion of purging, the machine automatically returns to the initial stage of the maintenance mode.

Purge types, ink used, purge counts, and purge trigger keys

Purge Types	Description	Ink Used	Purge Counts (See Note 2.)	Keys to trigger the purge, to be followed by **Black Start** key (See Note 1 for the DCP310CN/110C.)
Normal purge	This purge operation removes dried ink sticking to the head nozzles.	Black: 0.3 cc Color: 0.15 cc	Black: 15 Color: 22	**1** key
Power purge	More powerful than a reset purge, this purge operation is for removing stubborn clogging from the head nozzles and ink supply tubes.	Black: 0.85 cc Color: 0.55 cc	Black: 43 Color: 86	**3** key
Initial purge	Run automatically when the user powers up this machine for the first time, this purge operation refills the ink supply tubes and print head with fresh ink.	Black: 3.63 cc Color: 2.61 cc	Black: 187 Color: 420	**4** key
Reset purge	This purge operation removes any bubbles that have accumulated in the ink supply tubes.	Black: 0.55 cc Color: 0.4 cc	Black: 28 Color: 63	**5** key
Engine setup purge	This purge operation refills the ink supply tubes with ink when there is no ink in those tubes.	Black: 3.93 cc Color: 2.76 cc	Black: 202 Color: 443	**6** key
Cartridge replacement purge	This purge operation must follow ink cartridge replacement.	Black: 0.3 cc Color: 0.15 cc	Black: 15 Color: 22	**7** key
Ink drain purge (not used)	This purge operation drains all ink from the supply system, permitting repairs without the risk of scattering ink all over the surroundings.	--	--	
Initial liquid substitute purge (not used)	This purge operation substitutes ink in the ink supply tubes and print head with initial liquid.	--	--	--

(Note 1) To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. After that, press the **Mono Start** key.

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(Note 2) This machine counts all purge operations performed since produced in order to prevent the ink absorber box from overflowing with drained ink. An initial purge, for example, advances the counter by 187 + 420 = 607. When the counter approaches 6400, "MACHINE ERROR 46" appears, and further purge operations are prohibited. Replace the ink absorber box and reset the purge counter with the following procedure.

■ Resetting purge counter

<u>MFC620CN/420CN/410CN/210C and FAX2440C</u>

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

   TIP: FAX models equipped with numerical keypads can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu/Set**, *, **2**, **8**, **6** and **4** keys in this sequence.

2) Press the **8** and **0** keys in this order in the initial stage of the maintenance mode to call up the machine's log information. (Function code 80. Refer to Chapter 8, Section 8.5.20.)

3) Press the **Black Start** key several times until the purge count appears 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 return to the standby state.

<u>DCP310CN/110C</u>

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

2) Press the ▲ key several times to display 8 on the LCD and then press the **Set** key. Again press the ▲ key several times to display 0 and then press the **Set** key

3) Press the **Mono Start** key several times until the purge count appears on the LCD.

4) Reset the purge count to zero by using the ▲ and **Set** keys as follows:

   Press the ▲ key several times to display 2 on the LCD and then press the **Set** key. In the same way, enter 7, 8 and 3.

5) Exit from the maintenance mode by using the ▲ and **Set** keys as follows:

   Press the ▲ key several times to display 9 on the LCD and then press the **Set** key. Again press the ▲ key several times to display 9 and press the **Set** key.

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

■ Function

The machine can display its log information on the LCD.

This procedure allows you to reset the purge count. It is necessary to reset the purge count when the ink absorber box is replaced with a new one without replacing the main PCB.

■ Operating Procedure

(1) MFC620CN/420CN/410CN/210C and FAX2440C

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

DCP310CN/110C
Enter 8 and 0 in the initial stage of the maintenance mode by using ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The calendar clock appears on the LCD.

(2) Press the **Black Start** key. Each time the key is pressed, one of the following log information items appears on the LCD in the order given below.

10th) Head property code

14th) Ink drop count, indicating how many droplets have been jetted out from each of the ink cartridges[1]

15th) Ink drop count after near-empty, indicating how many droplets have been jetted out from each of the ink cartridges[1] after the ink cartridge sensor detects near-empty.

16th) Total ink drop count, indicating how many droplets the machine has been jetted out from each of the ink cartridges[1] since produced

17th) Ink cartridge change count, indicating how many times ink cartridge replacement has been made for each color[1]

18th) Jam count, indicating how many times a paper jam has been occurred

19th) Total page count, indicating how many pages have been printed since the machine was produced

20th) PC print page count, indicating how many pages the machine has been printed as an output device of the connected PC

21st) Color copy page count, indicating how many copies in color have been made

22nd) Black copy page count, indicating how many copies in monochrome have been made

23rd) Media card print page count, indicating how many pages have been printed from the media card data

24th) FAX page count, indicating how many received FAX pages have been printed

25th) 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.

26th) Wiper count, indicating how many times the wiper operation has been carried out

27th) Total power-ON time

28th) Error code of the most recent machine error[2]

29th) Flat-bed page count, indicating how many documents have been scanned

30th) Error code of the most recent communications error*[3]

If you press the **Black Start** key, the screen goes back to the calendar clock in step (1) above.

(3) To stop this operation and return to the machine 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 cycles through recent nine errors that have occurred.

*[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.

DCP310CN/110C

(1) Enter 8 and 0 in the initial stage of the maintenance mode by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The calendar clock appears on the LCD.

(2) Press the **Mono Start** key. Each time the key is pressed, one of the following log information items appears on the LCD in the order given below.

10th) Head property code

14th) Ink drop count, indicating how many droplets have been jetted out from each of the ink cartridges*[1]

15th) Ink drop count after near-empty, indicating how many droplets have been jetted out from each of the ink cartridges*[1] after the ink cartridge sensor detects near-empty.

16th) Total ink drop count, indicating how many droplets the machine has been jetted out from each of the ink cartridges*[1] since produced

17th) Ink cartridge change count, indicating how many times ink cartridge replacement has been made for each color*[1]

18th) Jam count, indicating how many times a paper jam has been occurred

19th) Total page count, indicating how many pages have been printed since the machine was produced

20th) PC print page count, indicating how many pages the machine has been printed as an output device of the connected PC

21st) Color copy page count, indicating how many copies in color have been made

22nd) Black copy page count, indicating how many copies in monochrome have been made

23rd) Media card print page count, indicating how many pages have been printed from the media card data

24th) Purge count, indicating how many times the purge operation has been carried out

With the purge count displayed, entering 2, 7, 8, and 3 by using the ▲ and **Set** keys resets the purge count to zero.

25th) Wiper count, indicating how many times the wiper operation has been carried out

26th) Total power-ON time

27th) Error code of the most recent machine error*[2]

28th) Flat-bed page count, indicating how many documents have been scanned

29th) Error code of the most recent communications error*[3]

If you press the **Mono Start** key, the screen goes back to the calendar clock in step (1) above.

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

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

*[2] When a machine error code is displayed, pressing the **Set** key cycles through recent nine errors that have occurred.

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

8.5.21 Equipment Error Code Indication (Function code 82)

■ **Function**

This function displays an error code of the last error on the LCD.

■ **Operating Procedure**

(1) MFC620CN/420CN/410CN/210C and FAX2440C
Press the **8** and **2** keys in this order in the initial stage of the maintenance mode.

DCP310CN/110C
Enter 8 and 2 in the initial stage of the maintenance mode by using the ▲ and **Set** keys.*

(*To enter a numerical code on models having no numerical keypad, press the ▲ key several times to display the numerical code to be entered and then press the **Set** key. Repeat this operation for each numerical code.)

The LCD shows the "MACHINE ERROR X X."

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

8.5.22 Output of Transmission Log to the Telephone Line (Function code 87)
(Not applicable to DCP310CN/110C)

■ **Function**

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

■ **Operating Procedure**

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

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

1) Press the **Menu/Set**, **Redial/Pause**, and **0** keys in this order.

2) Press the **8** and **7** keys in this order.

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

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

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

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8.5.23 Cancellation of the Pin TX Lock Mode (Not applicable to U.S.A. 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 machine returns to the calendar clock screen.

CHAPTER 9

ERROR INDICATION AND TROUBLESHOOTING

CHAPTER 9 ERROR INDICATION AND TROUBLESHOOTING

This chapter details error messages and codes that the incorporated self-diagnostic functions display if any error or malfunction occurs. If any error message appears, refer to this chapter to find which components should be checked or replaced.

The latter half of this chapter provides sample problems that could occur in the main sections of the machine and related troubleshooting procedures. This will help service personnel pinpoint and repair defective components.

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9.1 ERROR INDICATION

To help the user or the service personnel promptly locate the cause of a problem (if any), the machine incorporates the self-diagnostic functions which display error messages for equipment errors and communications errors.

For the communications errors, the machine also prints out the transmission verification report and the communications list.

9.1.1 Equipment Errors

If an equipment error occurs, the machine emits an audible alarm (continuous beeping) for approximately 4 seconds and shows the error message on the LCD. For the error messages, see [1] below.

To display detailed error information, use maintenance-mode function code 82 described in Chapter 8, Section 8.5.21 (that is, make the machine 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
Comm.Error	Poor phone line quality caused a communication error.
Connection Fail	You tried to poll a machine that is not in Polled Waiting mode. (This message does not appear on the MFC210C)
Cover is Open	The scanner cover is not closed completely.
Data Remaining	Print data remains in the MFC's memory. Print data remains in the MFC's memory. The USB cable was unplugged while the computer was sending the data to the MFC.
Disconnected	The other person or other person's machine stopped the call.
Document Jam (Not available for the MFC210CN)	The document fed from ADF was longer than the specified length. The document is jammed in the MFC.
DR Mode in Use	The MFC is set to Distinctive Ring mode. You can not change the Receive Mode from Manual to another mode.

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Messages on the LCD	Probable Cause
High Temperature	The temperature inside the machine is high.
Ink Empty	One or more of the ink cartridges is empty. The MFC will stop all print operations. While memory is available, black and white faxes will be received into memory. If a sending machine has a color fax, the MFC's 'handshake' will request that the fax be sent as black and white. If the sending machine has the ability to convert it, the color fax will be received into memory as a black and white fax.
Low Temperature	The temperature inside the machine is low.
Media Error	The media card is either bad formatted or it contains data damaged.
Near Empty	One or more of the ink cartridges are running out of ink. If a sending machine has a color fax, the MFC's 'handshake' will request that the fax be sent as black and white. If the sending machine has the ability to convert it, the color fax will be received into memory as a black and white fax.
No Cartridge	This message appears when the power is first turned on by the user after purchase. After that, it no longer appears.
No File	The media card in the media drive does not contain a .JPG file.
No Paper Fed	The MFC is out of paper. The paper is jammed in the MFC.
No Response/Busy	The number you dialed does not answer or is busy.
Not Registered	You tried to access a Speed Dial number that is not programmed.
Out of Memory	The amount of memory is insufficient to store data.
Paper Jam	The paper is jammed in the machine.
Unable to Change Unable to Clean Unable to Init. Unable to Print Unable to Scan	The MFC has a mechanical problem. OR A foreign obstacle, such as a clip or ripped paper, is in the MFC.
Wrong Paper Size	At the start of FAX reception, the paper size is set to less than A4 size on the function menu. This message prompts the user to set correct paper size for preventing FAX image loss.

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

If the LCD shows the "UNABLE TO PRINT" message, you can display the detailed error code following the MACHINE ERROR by using maintenance-mode function code 82 described in Chapter 8, Section 8.5.21.

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 8, Section 8.5.7 (that is, press the **3** and **2** keys in the maintenance mode).

Error Code (Hex)	Symptom	Probable Cause	Solution
25	Not used.		
26 27 28 29	Cannot detect ink cartridges.	The ink has run out or the ink cartridge is not set into place. 26: Black ink 27: Yellow ink 28: Cyan ink 29: Magenta ink	Reload ink cartridges, referring to the Owner's Manual.
		Ink cartridge PCB defective	Replace the ink refill ASSY.
		Main PCB defective	Replace the main PCB.
2A-2F	Not used.		
3*	Head/carriage unit travel error	Any obstacles on the travel path of the head/carriage unit	Clean the CR guide rail and CR support chassis.
		Carriage PCB broken	Replace the carriage PCB.
		Head/carriage unit broken	Replace the head/carriage unit.
		CR encoder strip stained or scratched	Replace the CR encoder strip.
		Carriage motor broken	Replace the carriage motor.
		Main PCB defective	Replace the main PCB.
		Power supply PCB defective	Replace the power supply PCB.
		Maintenance unit defective	Replace the maintenance unit.

Error Code (Hex)	Symptom	Probable Cause	Solution
40	Not used.		
41	The head drive voltage has dropped from the high to low level in an abnormally short period.	Piezoelectric (PZT) ceramic actuator defective (Cracks or rare short)	Replace the head/carriage unit.
42	The head drive voltage has not dropped from the high to low level within the specified period.	Piezoelectric (PZT) ceramic actuator defective	Replace the head/carriage unit.
43	The head thermistor has been opened or shorted abnormally.	Head flat cables broken	Replace the head flat cables.
		Head flat cables and carriage-head flat cable not connected correctly	Correct those flat cables.
		Carriage PCB defective	Replace the carriage PCB.
		Main PCB defective	Replace the main PCB.
44	The temperature of the print head driver has risen abnormally. The head driver chip temperature sensor in the COF detect abnormally high temperature.	Head property parameters incorrect in the EEPROM	Enter the correct parameter values.
		Head/carriage unit broken	Replace the head/carriage unit.
		Head flat cables and carriage-head flat cable not connected correctly	Correct those flat cables.
		Head flat cables broken	Replace the carriage PCB.
		Carriage-head flat cable broken	Replace the head/carriage unit.
		Main PCB defective	Replace the main PCB.
45	Not used.		
46	The number of performed purge sequences has reached the limit.	Purge counter overflown	Replace the ink absorber box and reset the purge counter to zero.
47	Not used.		

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Error Code (Hex)	Symptom	Probable Cause	Solution
48	Weak connection of the head flat cables.	Head flat cables or carriage-head flat cable broken or not connected	Replace those cables or correct their connection.
49	The head drive voltage has not risen to the specified level.	Head flat cables and carriage-head flat cable not connected correctly	Correct those flat cables.
		Main PCB defective	Replace the main PCB.
		Power supply PCB defective	Replace the power supply PCB.
4A-4E	Not used.		
4F	The head drive voltage has dropped from the high to low level in an abnormally short period.	Piezoelectric (PZT) ceramic actuator defective (Cracks or rare short)	Replace the head/carriage unit.
50 51	The purge cam switch does not come ON or OFF even after the purge cam has been driven by the specified number of pulses.	Switching arm assembly not engaged correctly	If the switching arm does not move smoothly, clean it.
		Ink cartridge/purge switch harness not connected correctly	Correct the connection.
		Purge cam switch broken	Replace the purge cam switch.
		Gear(s) on the maintenance unit broken	Replace the maintenance unit.
		Paper feed motor broken	Replace the paper feed motor.
		Main PCB defective.	Replace the main PCB.
52	The purge cam switch does not come ON at each detection point.	Switching arm assembly not engaged correctly	If the switching arm does not move smoothly, clean it.
		Gear(s) on the maintenance unit broken Abnormal load applied to the purge cam	Replace the maintenance unit.
		Paper feed motor broken	Replace the paper feed motor.
		Main PCB defective	Replace the main PCB.

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Error Code (Hex)	Symptom	Probable Cause	Solution
53-56	Not used.		
57	After a purging operation, the head/carriage unit will not return to the home position (capping position).	Head cap unit, head wiper or other parts on the maintenance unit interfering with the head/carriage unit	Set these parts back into place. If any part on the maintenance unit does not operate smoothly, replace the unit.
		CR encoder strip stained	Clean the CR encoder strip.
		Any obstacles on the travel path of the head/carriage unit	Clean the CR guide rail and CR support chassis.
		Carriage motor defective	Replace the carriage motor.
		Head/carriage unit defective	Replace the head/carriage unit.
		Main PCB defective	Replace the main PCB.
		Power supply PCB defective	Replace the power supply PCB.
58, 59	Not used.		
5A	The purge cam stops abnormally when it is in operation.	Purge cam gear broken Abnormal load applied to the purge cam	Replace the maintenance unit.
5B	The pump stops abnormally during air ventilation.	PF encoder disk being in contact with the upper cover and deformed	Replace the PF encoder disk.
		PF roller gear L broken	Replace the engine unit.
		Switching arm assembly broken	Replace the maintenance unit.
5C	The pump stops abnormally during purging operation.	Foreign materials in the machine	Remove foreign materials.
		Clutch gear broken	Replace the clutch gear.
		PF sensor PCB defective	Replace the PF sensor PCB.
		Main PCB defective	Replace the main PCB.
		Power supply PCB defective	Replace the power supply PCB.
		Paper feed motor defective	Replace the paper feed motor.

Error Code (Hex)	Symptom	Probable Cause	Solution
5D-5F	Not used.		
60 61 62	Paper width sensor (media sensor) error.	Paper width sensor broken	Replace the carriage PCB ASSY.
		Head flat cables or carriage-head flat cable broken	Replace the carriage PCB ASSY.
		Main PCB defective	Replace the main PCB.
63-7C	Not used.		
7D	Any of the ink dot counters has counted up to the specified number of dots, meaning the end of the head service life. (Not used.)	The service life of the head/carriage unit has been expired.	Replace the head/carriage unit.
7E	No head parameters stored in the EEPROM. (This code may appear only in the maintenance mode.)	No head property data has been entered	Enter the head property data.
		Main PCB defective	Replace the main PCB.
7F	Print engine error. (Not used.)		
80	At the start of FAX message printing, the controller detects that paper is smaller than A4 size in width.	Paper smaller than the specified size loaded in the paper tray	Load the correct size of paper.
		Platen stained	Clean the platen.
		Paper width sensor broken	Replace the carriage PCB ASSY.
		Paper width sensor not adjusted	Adjust the margin for near-edge printing with Function code 66 in the maintenance mode.
		Main PCB defective	Replace the main PCB.

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Error Code (Hex)	Symptom	Probable Cause	Solution
81	Recording paper jam. (The paper width sensor stays ON even after completion of paper ejection operation.)	Foreign materials in the paper path	Remove foreign materials.
		The paper ejection roller does not rotate correctly	Replace the paper ejection roller. (Engine unit)
		Paper width sensor broken	Replace the carriage PCB ASSY.
		Main PCB defective	Replace the main PCB.
82	Recording paper jam in paper pull-in operation (The paper width sensor fails to detect the leading edge of paper.)	Foreign materials in the paper path.	Remove foreign materials.
		Paper not loaded correctly in the paper tray	Reload paper.
		Head flat cable connection failure	Insert the head flat cables correctly.
		Paper width sensor defective	Replace the carriage PCB ASSY.
		Main PCB defective	Replace the main PCB.
83	Recording paper jam. (The registration sensor comes ON too early in the paper feeding operation.)	Paper is not correctly set in the paper tray	Reload paper.
		Separation pad damaged	Replace the paper tray.
		Registration sensor actuator unhooked	Set the registration sensor actuator into place.
		Main PCB defective	Replace the main PCB.
		PF encoder sensor defective	Replace the PF sensor PCB.

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Error Code (Hex)	Symptom	Probable Cause	Solution
84	Recording paper jam. (The registration sensor stays ON after completion of paper ejection operation.)	The paper ejection roller does not rotate correctly	Replace the paper ejection roller. (Engine unit)
		Foreign materials in the paper path.	Remove foreign materials.
		Registration sensor actuator caught on the surrounding parts	Correct the surrounding parts on which the actuator caught.
		Registration sensor broken	Replace the PF sensor PCB.
		Main PCB defective	Replace the main PCB.
85, 86	Not used.		
87	The paper feed motor has not stopped at the correct position. (Not used.)	Abnormal load applied to the paper feed roller	Check the PF roller gear and its related gears.
		PF encoder disk stained or scratched	Replace the PF encoder disk.
		PF encoder sensor defective	Replace the PF sensor PCB.
		Paper feed motor broken	Replace the paper feed motor.
		Main PCB defective	Replace the main PCB.

Error Code (Hex)	Symptom	Probable Cause	Solution
88	Recording paper jam. (Even after paper pulling-in operation, the registration sensor is still OFF.)	Recording paper not loaded correctly	Instruct the user to load the recording paper correctly.
		Registration sensor broken	Replace the registration sensor.
		Separation pad damaged	Replace the paper tray.
		Objects, such as bits of paper or chips, are in the paper tray	Remove the objects from the paper tray.
		Paper pull-in roller holder defective	Replace the paper pull-in roller holder.
		Purge lever at the right end of the paper feed roller shaft not slid smoothly	Clean the purge lever.
		Any one of the gears at the both side of the paper feed roller shaft are damaged	Replace the paper feed roller ASSY with a normal part.
		Paper feed motor broken	Replace the paper feed motor ASSY.
		Main PCB defective.	Replace the main PCB.
89	Not used.		

Error Code (Hex)	Symptom	Probable Cause	Solution
8A	The paper feed motor does not rotate.	Abnormal load applied to the paper feed roller PF-related gear(s) broken	Replace the PF-related gear(s).
		PF encoder disk stained or scratched	Replace the PF encoder disk.
		PF encoder sensor defective	Replace the PF sensor PCB.
		Paper feed motor defective	Replace the paper feed motor.
		Main PCB defective	Replace the main PCB.
8B	The paper feed motor stops suddenly.	Abnormal load applied to the paper feed roller PF-related gear(s) broken	Replace the PF-related gear(s).
		PF encoder disk stained or scratched	Replace the PF encoder disk.
		PF encoder sensor defective	Replace the PF sensor PCB.
		Paper feed motor defective	Replace the paper feed motor.
		Main PCB defective	Replace the main PCB.
8C	Not used.		
8D	The paper feed motor rotates in the reverse direction.	PF encoder disk stained or scratched	Replace the PF encoder disk.
		PF encoder disk dislocated	Replace the PF encoder disk.
		PF encoder sensor defective	Replace the PF sensor PCB.
		Abnormal load applied to the paper feed roller	Check the PF roller gear and its related gears.
		Paper feed motor broken	Replace the paper feed motor.
		Main PCB defective	Replace the main PCB.

Error Code (Hex)	Symptom	Probable Cause	Solution
8E	Max. speed error in the paper feed motor. (Not used.)	Abnormal load applied to the paper feed roller	Check the PF roller gear and its related gears.
		PF encoder disk stained or scratched	Replace the PF encoder disk.
		PF encoder sensor defective	Replace the PF sensor PCB.
		Paper feed motor broken	Replace the paper feed motor.
		Main PCB defective	Replace the main PCB.
8F-A0	Not used.		
A1	Scanner cover (scanner unit) opened.	Scanner open sensor broken	Replace the rubber keypad.
		Scanner open sensor actuator unhooked	Set the scanner open sensor actuator into place.
		Control panel PCB defective	Replace the control panel PCB.
A2	Document length exceeding the scan limitation. During scanning, 90 cm or longer of a document is detected. During document feeding or ejecting, 400 cm or longer of a document is detected.	Document jam	Remove the jammed document.
		Document rear sensor actuator caught on the surrounding parts	Correct the surrounding parts on which the actuator caught.
		Document rear sensor broken	Replace the document rear sensor.
A3	The document rear sensor does not come ON during document pull-in operation.	Document jam	Remove the jammed document.
		Document rear sensor actuator caught on the surrounding parts	Correct the surrounding parts on which the actuator caught.
		Document rear sensor broken	Replace the document rear sensor.

Error Code (Hex)	Symptom	Probable Cause	Solution
A4	50% or more faulty of white level data. (Not used.)	CIS flat cable not connected properly	Correct the connection.
		CIS defective	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.
A5	FAX scanning failure (1st time)	CIS defective White-level reference film stained in the scanner cover	Replace the scanner cover (scanner unit).
A6	FAX scanning failure (retry)		
		Main PCB defective	Replace the main PCB.
A7	Mismatch between the CIS type and ROM data (Only for the MFC210C)	Scanner cover containing the improper CIS type installed at repair	Correct the ROM data.
A8-AB	Not used.		
AC	Less than 50% faulty of white level data. (Not used.)	CIS defective	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.
AD-AE	Not used.		
AF	CIS positioning error.	CIS flat cable broken or not connected	Correct the cable connection. Replace the scanner cover (scanner unit).
		CIS motor harness not connected properly	Correct the harness connection.
		CIS defective	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.
B0	Not used.		
B1	Dark level offset data level error for scanning. (Not used.)	CIS defective	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.

Error Code (Hex)	Symptom	Probable Cause	Solution
B2	Gain control data level error for scanning. (Not used.)	CIS defective	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.
B3	Scan area left edge detection error. (Not used.)	CIS defective	Replace the scanner cover (scanner unit).
		White film stained in the scanner unit.	Replace the scanner cover (scanner unit).
B4	Scan area right edge detection error. (Not used.)	CIS defective	Replace the scanner cover (scanner unit).
		White film stained in the scanner unit.	Replace the scanner cover (scanner unit).
B5	Horizontal scanning edge reduction detection error in scanning area setting (Not used.)	−	−
B6	Horizontal scanning edge enlargement detection error in scanning area setting (Not used.)	−	−
B7	A/D converter reference voltage error (at High level). (Not used.)	Main PCB defective	Replace the main PCB.
B8	A/D converter reference voltage error (at Low level). (Not used.)	Main PCB defective	Replace the main PCB.
B9	Light emission intensity error of the LED array (Exceeding the upper limit).	CIS defective	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.
BA	Not used.		
BB	White level data error.	CIS defective	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.

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Error Code (Hex)	Symptom	Probable Cause	Solution
BC	Not used.		
BD	Black level data error.	CIS defective	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.
BE	Scan starting edge detection error.	CIS defective	Replace the scanner cover (scanner unit).
		CIS flat cable broken or not connected	Correct the cable connection. Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.
		White film stained in the scanner unit.	Replace the scanner cover (scanner unit).
BF-CF	Not used.		
D*	Modem error.	Main PCB defective	Replace the main PCB.
E0-E3	Not used.		
E4	Out of recording paper. (Not used.)	The paper tray cannot feed paper	Replace the paper tray.
		Registration sensor actuator unhooked	Set the registration sensor actuator into place.
		Main PCB defective	Replace the main PCB.
		Clutch gear not switched between the idle gear L and purge gear	Check the engagement of the clutch gear and clean it.
E5	Not used.		
E6	Write error in EEPROM.	Main PCB defective	Replace the main PCB.
E7	Not used.		
E8	Data scanning error during transmission.	CIS defective	Replace the scanner cover (scanner unit).
		Main PCB defective	Replace the main PCB.

Error Code (Hex)	Symptom	Probable Cause	Solution
E9	Not used.		
EA	Document removed at phase B.	Document front sensor actuator caught on the surrounding parts	Correct the surrounding parts on which the actuator caught.
		Document front sensor defective	Replace the document front sensor.
		Main PCB defective	Replace the main PCB.
EB-ED	Not used.		
EE	Playback IC error.	Main PCB defective	Replace the main PCB.
EF-F2	Not used.		
F3, F5	Internal software error.	Main PCB defective	Replace the main PCB.
F4	Not used.		
F6	PC interface error.	Main PCB defective	Replace the main PCB.
F7	Media module connection error.	Main PCB defective	Replace the main PCB.
		The media module cover is deformed or warped.	Replace the media module cover.
F8	Battery harness connection failure	Battery harness not inserted correctly.	Correct the connection.
F9-FE	Not used.		
FF	Memory management error.	Main PCB defective	Replace the main PCB.

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9.1.2 Communications Errors

If a communications error occurs, the machine:

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 machine is in sending operation.

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■ **Definition of Error Codes on the Communications List**

(1) Calling

Code 1	Code 2	Causes
10	08	Wrong number called.
11	01	No dial tone detected before start of dialing.
11	02	Busy tone detected before dialing.
11	03	2nd dial tone not detected.
11	05	No loop current detected.*
11	06	Busy tone detected after dialing or called.
11	07	No response from the remote station in sending.
11	10	Unobtainable tone detected after dialing.
17	07	No response from the calling station in receiving.

*Available in German models only.

(2) Command reception

Code 1	Code 2	Causes
20	01	Unable to detect a flag field.
20	02	Carrier was OFF for 200 ms or longer.
20	03	Abort detected ("1" in succession for 7 bits or more).
20	04	Overrun detected.
20	05	A frame for 3 seconds or more received.
20	06	CRC error in answerback.
20	07	Error command received.
20	08	Invalid command received.
20	09	Command ignored once for document setting or for dumping-out at turn-around transmission.
20	0A	T5 time-out error
20	0B	CRP received.
20	0C	EOR and NULL received.

(3) Compatibility [checking the NSF and DIS]

Code 1	Code 2	Causes
32	01	Remote terminal only with V.29 capability in 2400 or 4800 bps transmission.
32	02	Remote terminal not ready for polling.
32	10	Remote terminal not equipped with password function or its password switch OFF.
32	11	Remote terminal not equipped with or not ready for confidential mailbox function.
32	12	Remote terminal not equipped with or not ready for relay broadcasting function.
32	13	No confidential mail in the remote terminal.
32	14	The available memory space of the remote terminal is less than that required for reception of the confidential or relay 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.

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(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.

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(9) Signal isolation

Code 1	Code 2	Causes
90	01	Unable to detect video signals and commands within 6 seconds after CFR is transmitted.
90	02	Received PPS containing invalid page count or block count.

(10) Video signal reception

Code 1	Code 2	Causes
A0	03	Error correction sequence not terminated even at the final transmission speed for fallback.
A0	11	Receive buffer empty. (5-second time-out)
A0	12	Receive buffer full during operation except receiving into memory.
A0	13	Decoding error continued on 500 lines.
A0	14	Decoding error continued for 10 seconds.
A0	15	Time-out: 13 seconds or more for one-line transmission.
A0	16	RTC not found and carrier OFF signal detected for 6 seconds.
A0	17	RTC found but no command detected for 60 seconds.
AA	18	Receive buffer full during receiving into memory.
A0	19	No video data to be sent
A0	20	Unable to continue to receive color FAX (Remaining ink insufficient)
A8	01	RTN, PIN, or ERR received at the calling terminal.*
A9	01	RTN, PIN, or ERR received at the called terminal.*

* Available in German models only

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(11) General communications-related

Code 1	Code 2	Causes
B0	02	Unable to receive the next-page data.
B0	03	Unable to receive polling even during turn-around transmission due to call reservation.
B0	04	PC interface error.

(12) Maintenance mode

Code 1	Code 2	Causes
E0	01	Failed to detect 1300 Hz signal in burn-in operation.
E0	02	Failed to detect PB signals in burn-in operation.

(13) Equipment error

Code 1	Code 2	Causes
FF	X X	Equipment error (For X X, refer to Section 9.1.1 [2].)

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9.2 TROUBLESHOOTING

9.2.1 Introduction

This section gives the service personnel some of the troubleshooting procedures to be followed if an error or malfunction occurs with the machine. It is impossible to anticipate all of the possible problems which may occur in future and determine the troubleshooting procedures, so this section covers some sample problems. However, those samples will help service personnel pinpoint and repair other defective elements if he/she analyzes and examines them well.

9.2.2 Precautions

Be sure to observe the following to prevent the secondary troubles from happening:

(1) Always unplug the AC power cord from the outlet when removing the covers and PCBs, adjusting the mechanisms, or conducting continuity testing with a circuit tester.

(2) When disconnecting the connectors, do not pull the lead wires but hold the connector housings.

(3) • Before handling the PCBs, touch a metal portion of the machine to discharge static electricity charged in your body.

   • When repairing the PCBs, handle them with extra care.

After repairing the defective section, be sure to check again if the repaired section works correctly. Also record the troubleshooting procedure so that it would be of use for future trouble occurrence.

9.2.3 Checking prior to Troubleshooting

Prior to proceeding to the troubleshooting procedures given in Section 9.2.4, make the following initial checks:

Environmental conditions

Check that:

(1) The machine is placed on a flat, firm surface.

(2) The machine is used in a clean environment at or near normal room temperature (10°C to 35°C) with normal relative humidity (20 to 80%).

(3) The machine is not exposed to direct sunlight or harmful gases.

Power requirements

Check that:

(1) The power supply specified on the rating plate on the machine is used. The supply voltage stays within the rating ±10%.

(2) Each voltage level on AC input lines and DC lines 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.

Head/carriage unit

(1) Check that the carriage-head flat cable is connected to the carriage PCB.

(2) Repeat the head purging operation several times.

(3) Clean the print surface of the head/carriage unit. (Refer to the User's Guide.)

9.2.4 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 • Main PCB • MJ PCB
(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 • Main PCB • MJ PCB

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[3] Communications problems

Problem	Check:
(1) No tone is transmitted.	• Main PCB • MJ PCB

[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 8, Section 8.5.7.) • 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
(3) Document double feeding	• ADF parts*
(4) Document jam	• ADF motor* • Document rear sensor actuator* • Main PCB
(5) Recording paper not fed.	• PF-related gears • Main PCB • Paper feed motor • Paper tray
(6) Recording paper jam	• Paper feeding mechanism • Check that the carriage-head flat cable is connected to the carriage PCB.
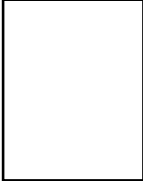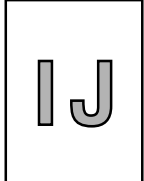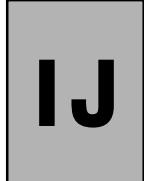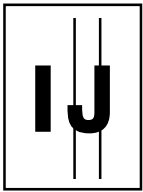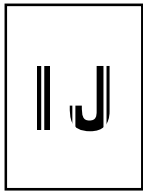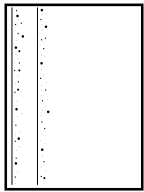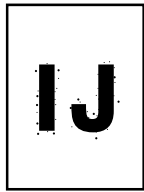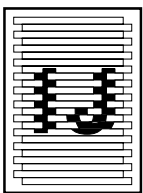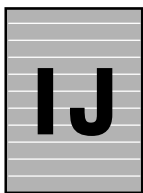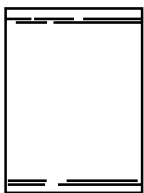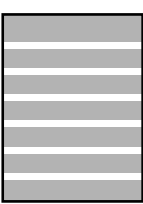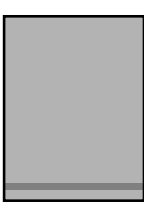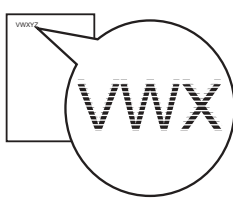
*Provided on models equipped with ADF units
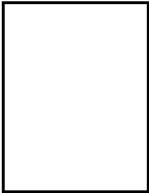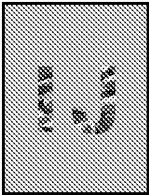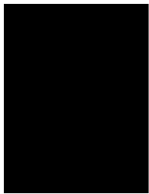
[5] Print-image problems
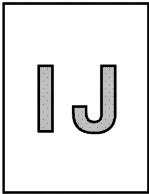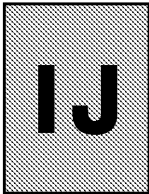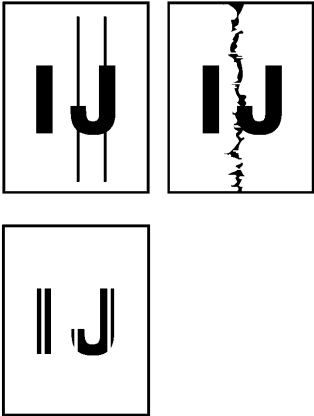
If there is any problem with any image received or sent, first make a copy of it using the machine.
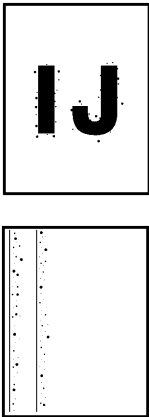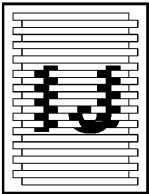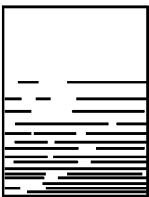
If the copied image is normal, the cause of the problem may be the remote terminal; if it is abnormal, proceed with the following checks:
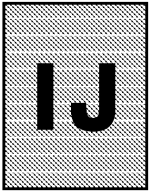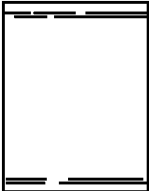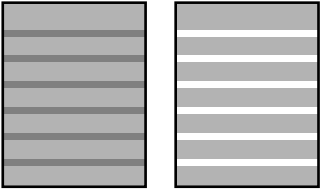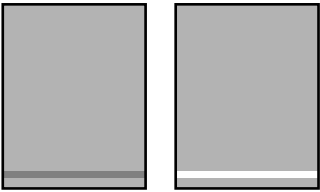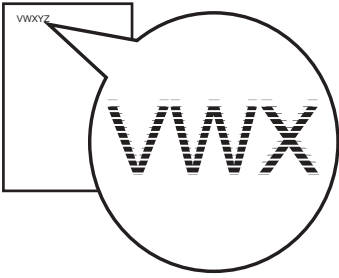
Examples of Defective Images

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

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Problem	Action to be taken

(1) Completely blank	<u>At the scanner</u>
	
	Check that the document is placed facing in the correct direction.
	
	In ADF scanning (available only in models with ADF units), is the document placed _face down_ in the document tray?
	
	In flat-bed scanning also, is the document placed _face down_ on the scanner glass?
	
	Check the following components:
	  - CIS flat cable
	  - Main PCB
	  - CIS unit

(2) Random color	<u>At the printer</u> • Check the ink cartridges. If any cartridges have run out of ink, replace them. • 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 maintenance unit with a Rubycel stick. For the cleaning procedure, refer to Chapter 7, Section 7.1 "CLEANING THE MAINTENANCE UNIT." • Replace the maintenance unit. • Check that the drain tubes are not bent.

(3) All black	<u>At the scanner</u>
	
	Check the following components:
	  - CIS flat cable
	  - CIS unit
	  - Main PCB
	
	<u>At the printer</u>
	
	Check the following components:
	  - Head/carriage unit
	  - Main PCB

Problem	Action to be taken

(4) Light	**At the scanner**
	
	Check the following components:
	
	  - CIS unit
	  - Main PCB
	
	At the printer
	
	Check the following components:
	
	  - Ink cartridges
	  - Head/carriage unit
	  - Main PCB
	  - Power supply PCB
	  - Head property info (to be installed to the main PCB from the connected PC. Refer to Chapter 8, Section 8.5.16.)
	  - Maintenance unit

(5) Dark	**At the scanner**
	
	Check the following components:
	
	  - CIS unit
	  - Main PCB
	
	At the printer side
	
	• Perform the head purging operation several times to remove dust or air bubbles from its nozzles. If the problem persists, replace the head/carriage unit.
	
	Check the following components:
	
	  - Ink cartridges
	  - Head/carriage unit
	  - Main PCB
	  - Power supply PCB
	  - Head property info (to be installed to the main PCB from the connected PC. Refer to Chapter 8, Section 8.5.16.)
	  - Maintenance unit

(6) Straight or blurred vertical stripes	**Scanner**
	
	Check the following components:
	
	  - CIS unit
	  - Scanner glass
	
	Printer
	
	• Check whether paper is coming into contact with any components other than the ones it should during ejecting.
	
	• Check the CR encoder strip for stains or scratches. (If the CR encoder strip is not hooked properly, correct it.)

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Problem	Action to be taken
(7) Ink splash	**Printer** • 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 head/carriage unit. • Replace the main PCB. • Replace the power supply PCB. • Replace the maintenance unit.
(8) Print edges not aligned	**Printer** • Check the alignment of vertical print lines using maintenance-mode function code 65. (Refer to Chapter 8, Section 8.5.14.) • Check the head/carriage unit. • Check the CR encoder strip for stains or scratches. (If the CR encoder strip is not hooked properly, correct it.) • Correct the positioning error of the head/carriage unit. (Refer to Chapter 6, Section 6.2, [4].)
(9) Random missing dots	**Printer** • 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 that the carriage-head flat cable is connected to the carriage PCB. • Replace the head/carriage unit. • 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 maintenance unit with a Rubycel stick. For the cleaning procedure, refer to Chapter 7, Section 7.1 "CLEANING THE MAINTENANCE UNIT." • Replace the maintenance unit.

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Problem	Action to be taken
(10) White horizontal streaks	• Perform the head purging operation several times to remove dust or air bubbles from its nozzles. • Replace the head/carriage unit. • Check the paper feed-related rollers. • Perform the print head skew compensation with the head screw adjuster knob. Refer to Chapter 3, Section 3.2.2.4. • Clean the head caps and wiper of the maintenance unit with a Rubycel stick. For the cleaning procedure, refer to Chapter 7, Section 7.1 "CLEANING THE MAINTENANCE UNIT."
(11) Stained leading edge of recording paper	Printer • Press the **Ink** button to perform a head cleaning operation. • Check that the head/carriage unit is set into place.
(12) Overlapping or separated lines over the whole page	• Adjust the paper feeding correction value of the paper feed roller. (Refer to Chapter 6, Section 6.2, [5].)
(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 6, Section 6.2, [5].)
(14) Ghost	• Adjust the paper feeding correction value of the paper feed roller and paper ejection roller. (Refer to Chapter 8, Section 8.5.11.) • Correct the positioning error of the head/carriage unit. (Refer to Chapter 6, Section 6.2, [4].) • Replace the PF encoder disk. • Replace the PF sensor PCB.

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[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

[7] Memory card driven printing (SmartMedia, Compact Flash, Memory Stick, SD card, or XD)

Trouble	Action to be taken

(1) No image data can be read.	• Insertion direction of memory cards
	  - Insert a SmartMedia or Memory Stick card with the cutout corner leading and facing up.
	  - Insert a Compact Flash card with the label side facing towards the left.
	• Memory cards
	  - Formatted?
	  - Any data in the media?
	  - Images stored in the media are in EXIF2.0-compliant JPEG file format (having extension .JPG)?
	• Media PCB
	• Media flat cables
	• Main PCB

(2) More than one media card cannot be recognized.	• The machine can recognize only a single media card at a time even if it has two cards in the two slots. Only the first inserted one can be recognized. If only a single media card is inserted, refer to item (1) above.
(3) Media printing is impossible.	• Check whether the memory is full.

[8] Others

Trouble	Action to be taken
(1) When the power is turned on (when the power cord is plugged into an outlet), the scanner makes a grating noise.	Check the following components: - CIS flat cable - Scanner cover (Scanner unit) - Main PCB

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9.2.5 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 (applicable to models with ADF units)

[1] Paper jams
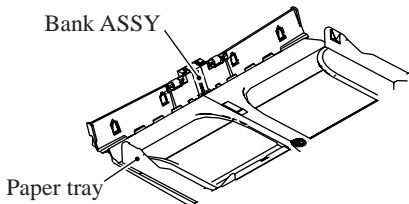
A paper jam may occur not only due to machine malfunction but also to the user's actions.

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.
Bank ASSY	The bank ASSY has worn thin. Bank ASSY Paper tray	A worn section on the bank ASSY can cause double-feeding.
CR encoder strip	The CR encoder strip is stained.	A stained CR encoder strip can cause a carriage drive error during printing that will stop the printing operation.

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[2] "MACHINE ERROR 41" error message

The error message "MACHINE ERROR 41" appears if the head drive voltage drops from the high to low level in an abnormally short period. The source of the problem is either the head/carriage unit or power supply PCB.

Check	Possible causes	Problems that may result
Head/carriage unit	- The carriage-head flat cable is disconnected from the carriage PCB. - Piezoelectric (PZT) ceramic actuator defective (Cracks or rare short)	At the start of printing or head cleaning operation, correct voltage will not be applied to the electrodes on the surface of the PZT ceramic actuator (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.
Main PCB	Voltage detection circuit defective	The head drive voltage becomes too high or low.

[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 ink refill ASSY. - One or more of the ink cartridges are not loaded. - One or more of the ink cartridges has run out of ink.	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
Head/carriage unit	- Air bubbles, high viscosity ink, or foreign materials have found their way into the head/carriage unit. - Head flat cables are broken. - Head flat cables have not been inserted into the carriage PCB.	Dot missing occurs on the printout. The machine will not be able to print or drive the head/carriage unit.
Maintenance unit	- Air bubbles, high viscosity ink, or foreign materials get into the maintenance unit. - Torque not transmitted - Drain tube bent or pinched	Head cleaning operation will not be possible and/or the maintenance 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 (Applicable to models with ADF units)

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 is Open" message will appear and the machine will no longer operate.

Problems due to machine malfunction

Check	Possible causes	Problems that may result
Main 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.

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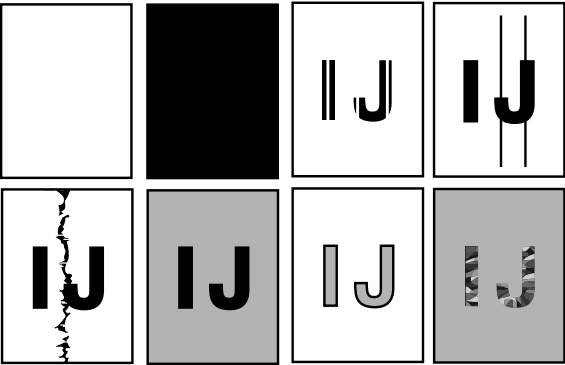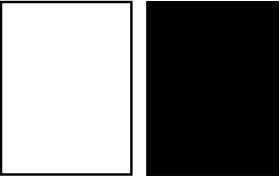
9.2.6 Possible component defects and resulting problems

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.
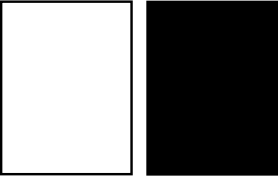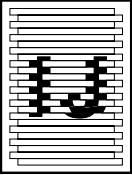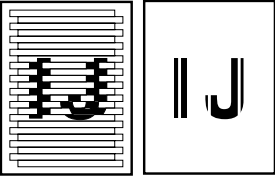
[1] ADF mechanism (Applicable to models with ADF units)
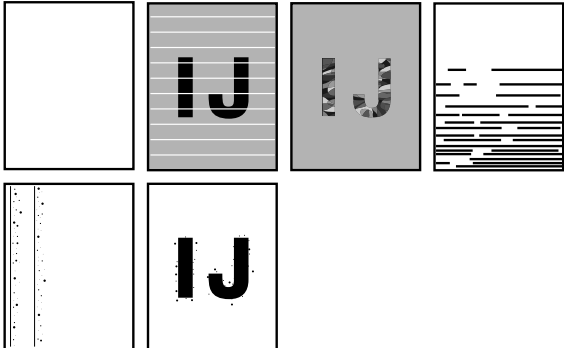
Defective component	Result	Error codes
Pressure rollers	- Documents will jam.	A2, A3
ADF motor	- Document will not be able to be fed.	---
Document feed roller	- Documents will jam. - Documents will skew. - Documents will not be able to be fed.	A2, A3
Separation rubber	- Two or more sheets of documents 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

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[2]　Scanner mechanism
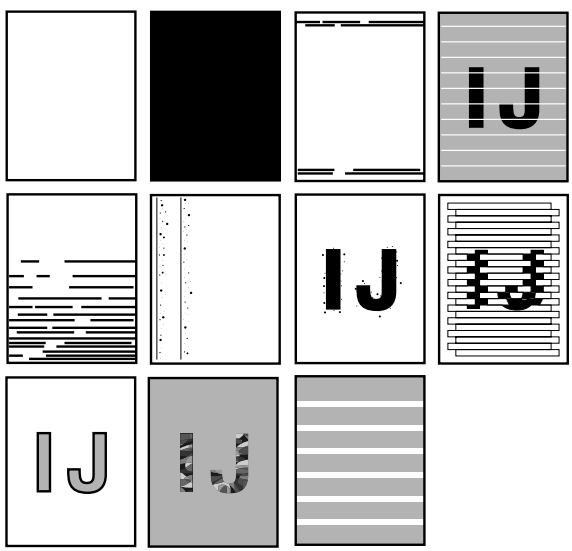
Defective component	Result	Error codes
CIS unit	- Any of the following images may appear on the printout of sent, copied, or scanned data: - When the power is turned on, abnormal noises will be heard from the machine. - Any of the following errors occurs: 　- Dark level offset data level error for scanning 　- 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 sent, copied, or scanned data: 	---
Scanner drive unit	- When the power is turned on, abnormal noises will be heard from the machine.	---

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[3] Head/carriage unit drive and purge mechanisms

Defective component	Result	Error codes
Head/carriage unit	- Any of the following images may appear on the printout of sent, copied, or scanned data:	---
Carriage motor	- The head/carriage unit will not be able to travel normally. - The following image may appear on the printout of sent, copied, or scanned data:	30, 31, 32, 33
CR encoder strip	- The head/carriage unit will not be able to travel normally. - Any of the following images may appear on the printout of sent, copied, or scanned data:	30, 31, 32, 33
Ink cartridge PCB	- 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.	26, 27, 28, 29
Paper width sensor	- A paper jam will occur.	81
	- Print on the platen without paper.	80

Defective component	Result	Error codes
Maintenance unit Head caps or wiper	- Any of the following images may appear on the printout of sent, copied, or scanned data:	---
Purge pump	- The purge pump will not draw out ink from the head nozzles.	---
Purge cam switch	- The purge cam switch will not detect the purge cam ON/OFF timing.	50, 51, 52
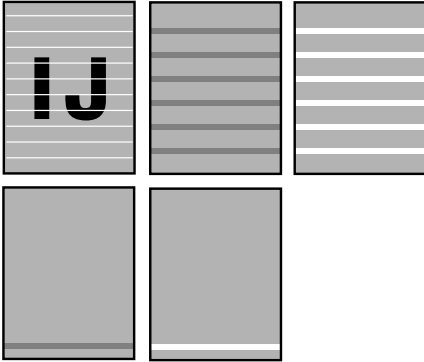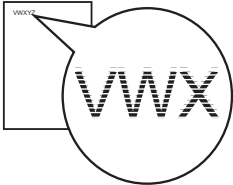
[4] Print head mechanism

Defective component	Result	Error codes
Head/carriage unit	- Any of the following images may appear on the printout of sent, copied, or scanned data:	---

[5] ASF mechanism

Defective component	Result	Error codes
Bank ASSY (shown on page 9-35)	- Two or more sheets of paper will be fed at once. - Paper will jam.	82, 83, 88

[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 sent, copied, or scanned data: 	---
PF encoder disk PF encoder sensor	- The following image may appear on the printout of sent, copied, or scanned data: 	---
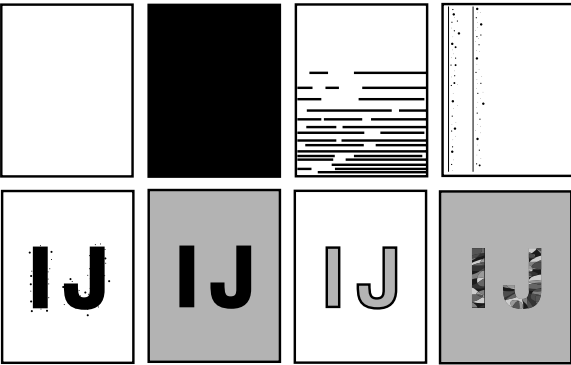
[7] Speaker

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.	---
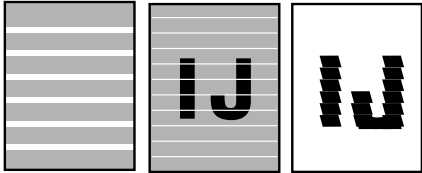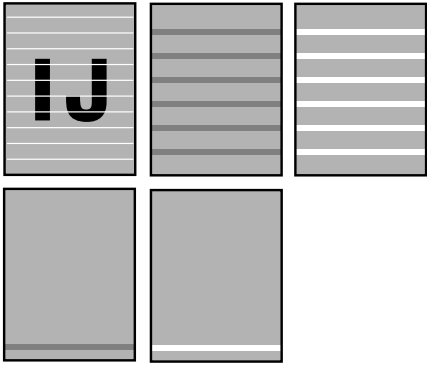
[8] Control panel
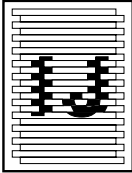
Defective component	Result	Error codes
Rubber keypad	- Keys will not work.	---
Control panel PCB	- The LCD will show nothing. - Keys will not work.	---

[9] PCBs

Defective component	Result	Error codes
Main PCB	- 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 sent, copied, or scanned data: - The telephone will not ring. - No tone will be detected. - The machine will not be able to switch to the external telephone.	---
MJ PCB	- 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 in 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 8, Section 8.5.18 - 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 6, Section 6.3, [7]	
Head property data (in the EEPROM)	- The print quality will deteriorate.	- Chapter 6, Section 6.2, [2] - Chapter 8, Section 8.5.16	
Correction of head positioning error	- Any of the following images may appear on the printout of sent, copied, or scanned data: 	- Chapter 6, Section 6.2, [4]	
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 sent, copied, or scanned data: 	- Chapter 6, Section 6.2, [5] - Chapter 8, Section 8.5.11	
Setting of the CIS scanner area	- The white and black level data will not be compensated properly. - The scanning center position will not be centered.	- Chapter 8, Section 8.5.10	B3, B4, B5, B6

Confidential

Adjustment/data setting not performed	Result	Refer to:	Error codes
Alignment of vertical print lines	- The following image may appear on the printout of sent, copied, or scanned data: 	- Chapter 6, Section 6.2, [6] - Chapter 8, Section 8.5.14	

MFC620CN
MFC420CN/410CN
MFC210C
FAX2440C
DCP310CN/110C

Appendix 1. Serial Numbering System

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

SERIAL NUMBERING SYSTEM

Individual machines have a serial number label for the machine itself and a property label for the head/carriage unit. Individual ink cartridges also have a serial number label.

This section lists the coding information for those serial numbers and property codes.

(1) Serial number label for the machine itself

Product item code

Serial number → ✻✻✻✻✻✻F4F111101

Serial number (6-digit)

Barcode

Factory

Machine SN

Production year
(Example) 4 : 2004
          5 : 2005

Production month
A : January   G : July
B : February   H : August
C : March   J : September
D : April   K : October
E : May   L : November
F : June   M : December

Location

Serial number label

Lower cover

Confidential
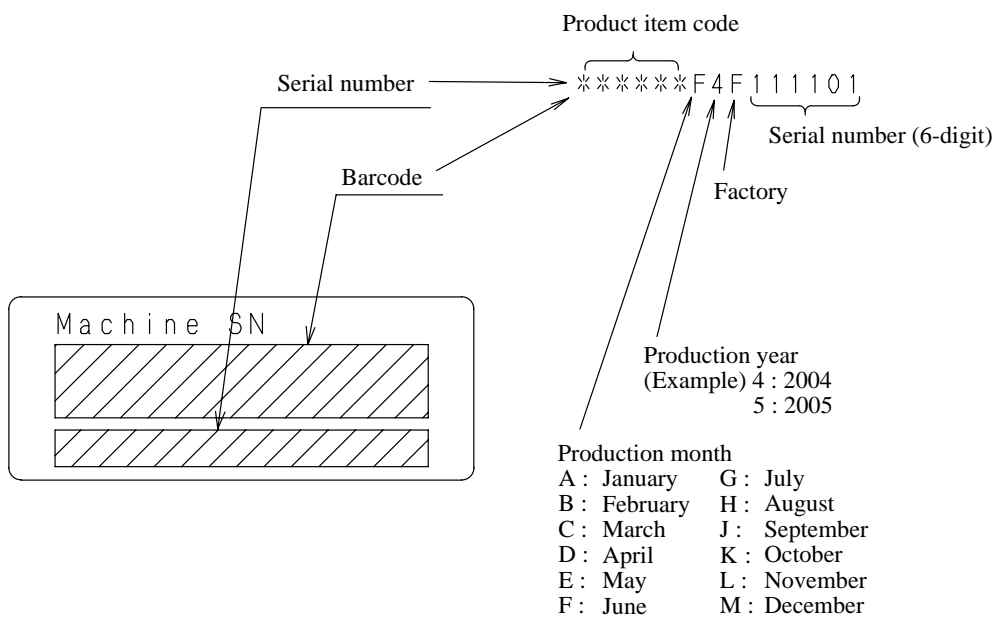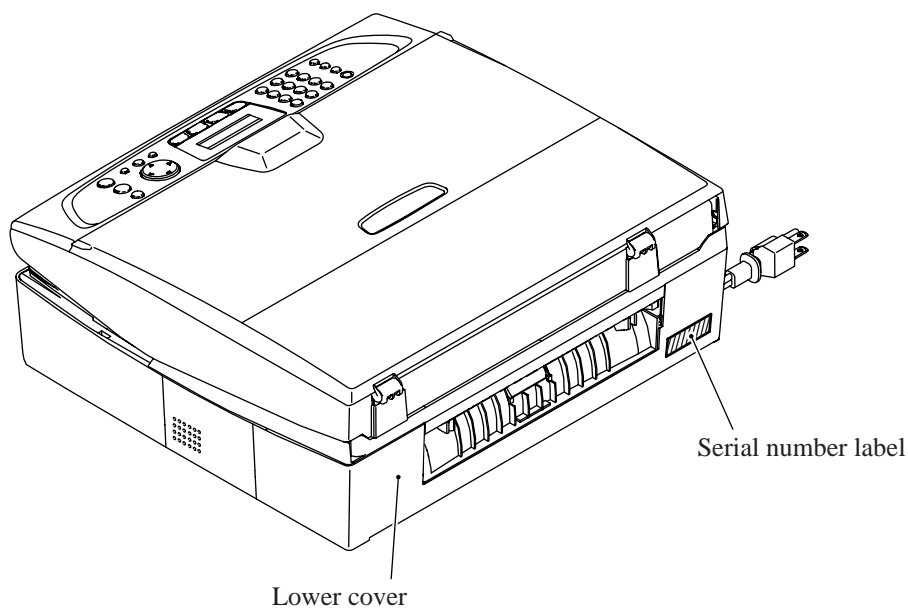
(2) Head property label

■ Property label for the head/carriage unit

Head property code   Production lot number

```
||||||||||||||||||||||||||||
J776601D00009
HC4101063  0021
|||||||||||||||||||||||||||
```

Serial number (6-digit)

Production year
(Example) 4 : 2004
              5 : 2005

Production month
A : January   G : July
B : February   H : August
C : March   J : September
D : April   K : October
E : May   L : November
F : June   M : December

Location

Head property label
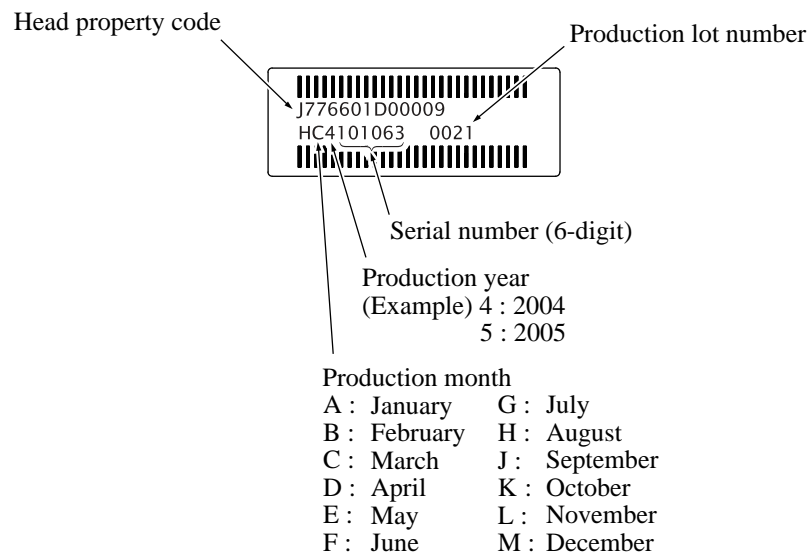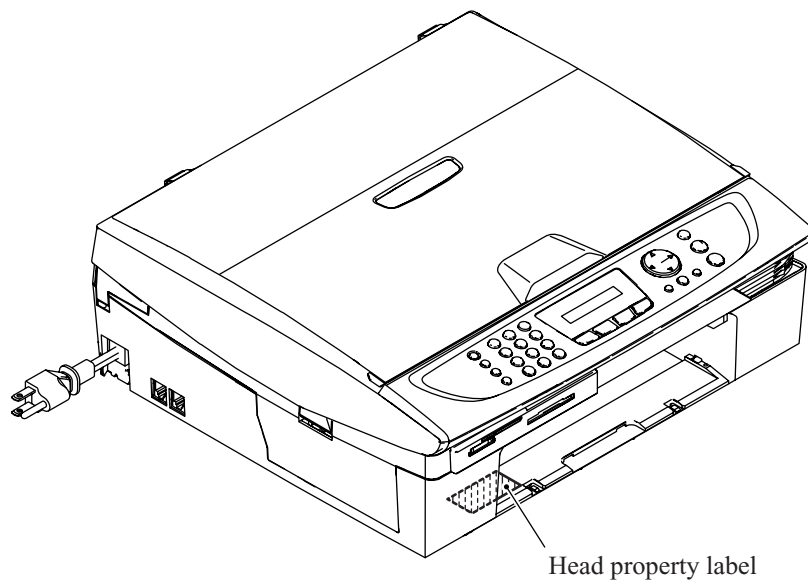
(3) Serial number label for ink cartridges

Product code ———————→ F 11 04 01

Barcode

Line ID code

Production year
(Example) 04 : 2004
05 : 2005

Production date
(Example) 11 : 11th
20 : 20th

Production month
A : January   G : July
B : February   H : August
C : March   J : September
D : April   K : October
E : May   L : November
F : June   M : December

Location

Serial number label
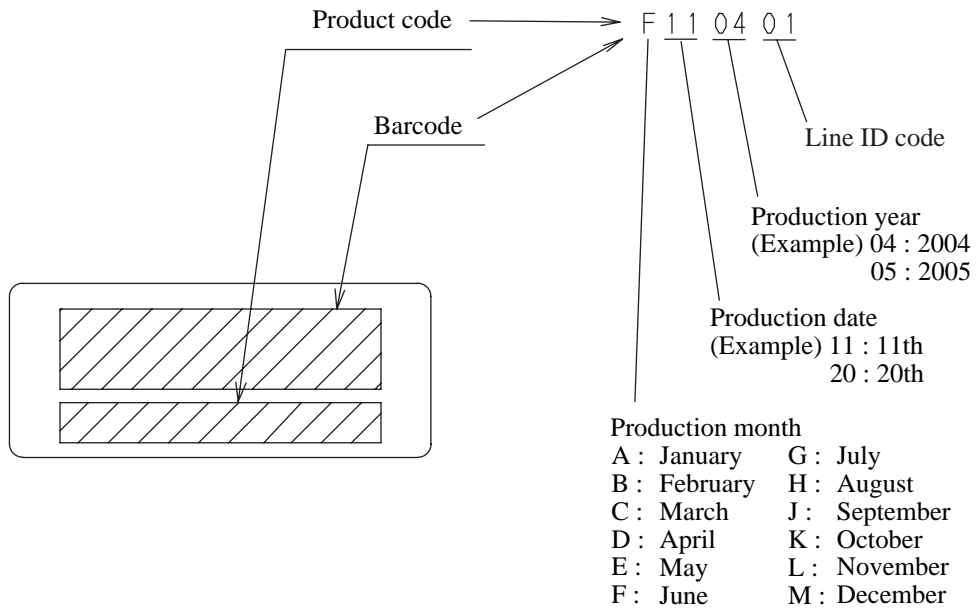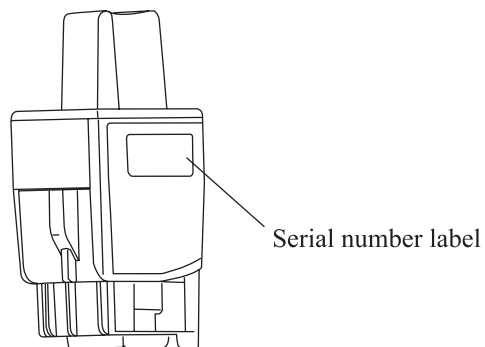
MFC620CN
MFC420CN/410CN
MFC210C
FAX2440C
DCP310CN/110C

Appendix 2. Firmware Installation

This appendix provides instructions on how to update firmware stored in the flash ROM on the main PCB or load firmware to a new main PCB from the host PC.

No hardware replacement is required for updating.

A2.1 Loading the Update Programs/Data to the Flash ROM

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, load the update programs/data to the flash ROM.

Loading requires a PC/AT-compatible computer running Windows 98/98SE, Windows Me, Windows 2000 Professional, or Windows XP Home/Professional.

CAUTION: During loading, do not turn the power off, interrupt loading, or load invalid data. If you do so, loading will fail, causing the PCB to be unusable. You will need to replace the main PCB and load update programs/data to a new PCB.

Preparation

You need to have the BHL2-Maintenance Printer driver and FILEDG32.exe (provided by Brother Industries) on hand. Save them in an arbitrary folder in your PC.

Installing the BHL2-Maintenance Printer driver

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

NOTE: Once this installation procedure is carried out for a PC, no more driver/software installation will be required for that PC to identify machines. If the BHL2-Maintenance Printer driver has been already installed to your PC according to this procedure, skip this section.

NOTE: Before proceeding to the procedure given below, make sure that the BHL2-Maintenance Printer driver (listed in Chapter 6, Section 6.1.1) is stored in your PC.

(1) Make sure that the power cord of the machine is unplugged from the electrical outlet.

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

(2) Switch on your PC.

(3) Plug the power cord of the machine into an electrical outlet.

(4) Press the **Menu/Set** and **Black Start** keys. Next press the ▲ key four times to make the machine enter the maintenance mode. (Refer to Chapter 8.)

TIP: FAX models equipped with numerical keypads can enter the maintenance mode in the same way as conventional models; that is, by pressing the **Menu/Set**, *****, **2**, **8**, **6** and **4** keys in this sequence.

(5) Connect the machine to your PC using a 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**.

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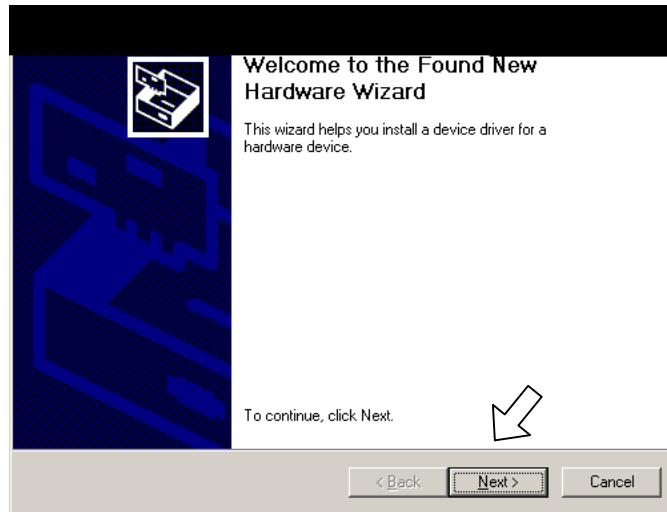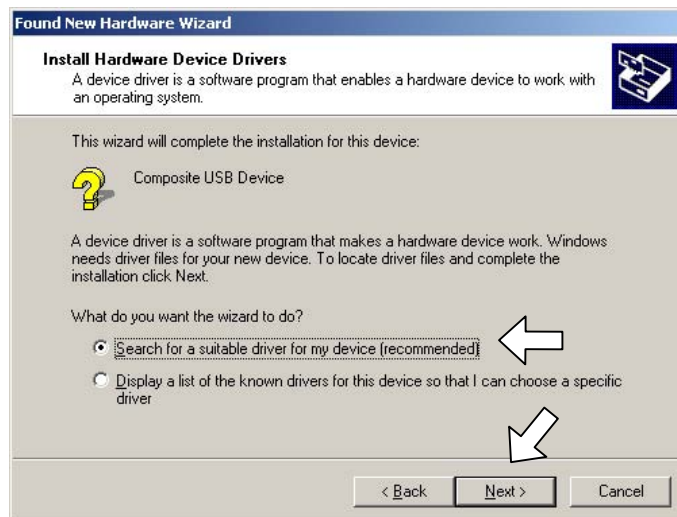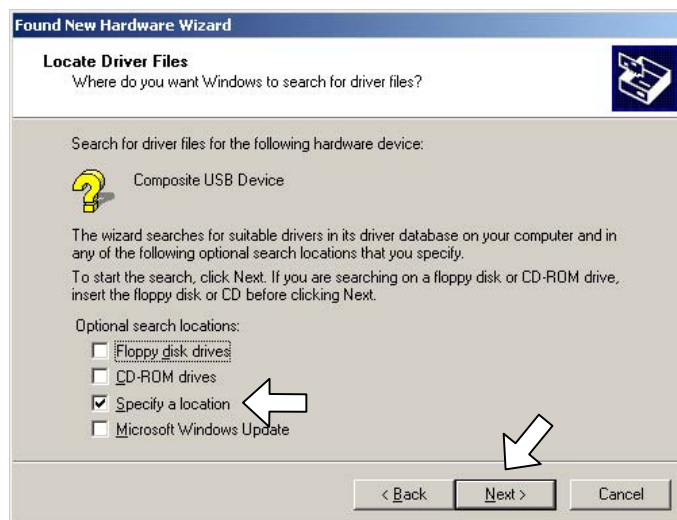
(9) Select the folder where the copy of the BHL2-Maintenance Printer driver is located (or click **Browse** to specify it), then click **OK**.

(This sample screen is captured on the Windows 2000 desktop.)

(10) Click **Next**.
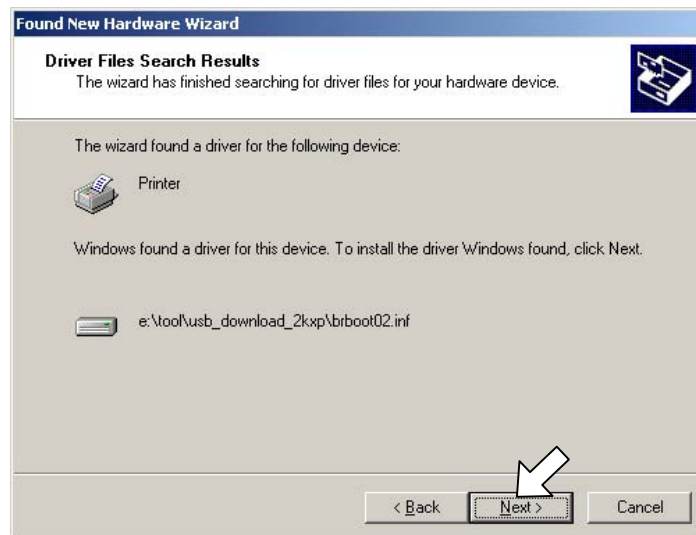
(11) To proceed, click **Yes**.

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(12) If the driver is successfully installed, the following message window appears. Click **Finish** to return to Windows.
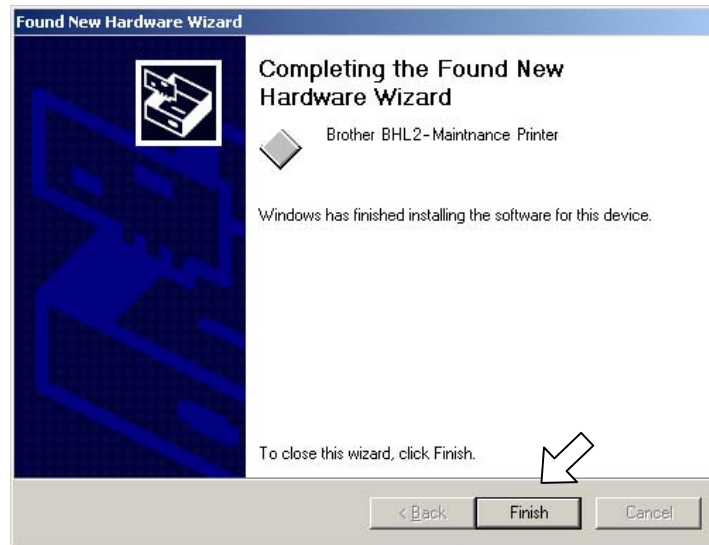
NOTE: After completion of the driver installation, if the machine exits the maintenance mode, the "Found New Hardware Wizard" screen in step (6) appears again. Click **Cancel**.

NOTE: To check that the printer driver is successfully installed, click **Start|Settings|Printers** to call up the Printers window as shown below and confirm that the Brother BHL2-Maintenance Printer icon is displayed.
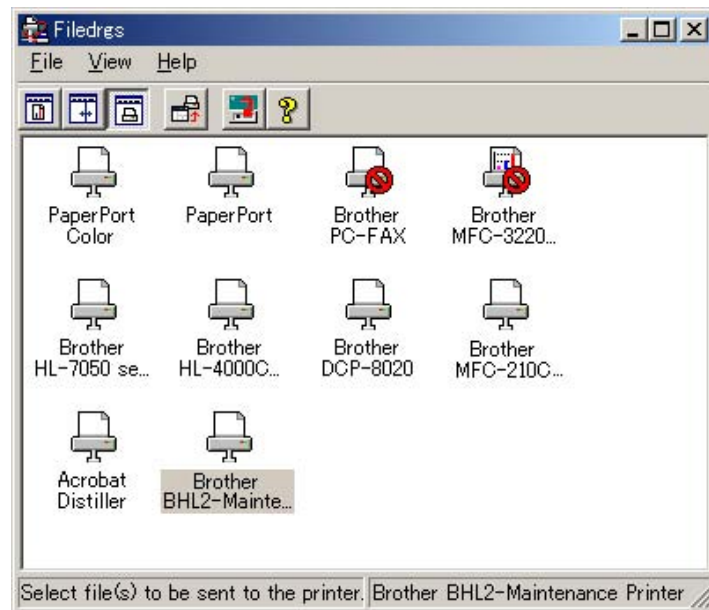
Confidential

■ **After replacing the main PCB with a new one**

After the installation procedure of the printer driver, proceed to the firmware loading operation.

When the power is first applied to the FAX machine equipped with a new main PCB, the machine automatically enters the maintenance mode.

Make sure that the machine is connected with your PC using a USB cable.

NOTE: Never turn off the machine or PC or unplug the USB cable during loading.

(1) Run "FILEDG32.exe."

The Filedrgs window will appear as shown below.
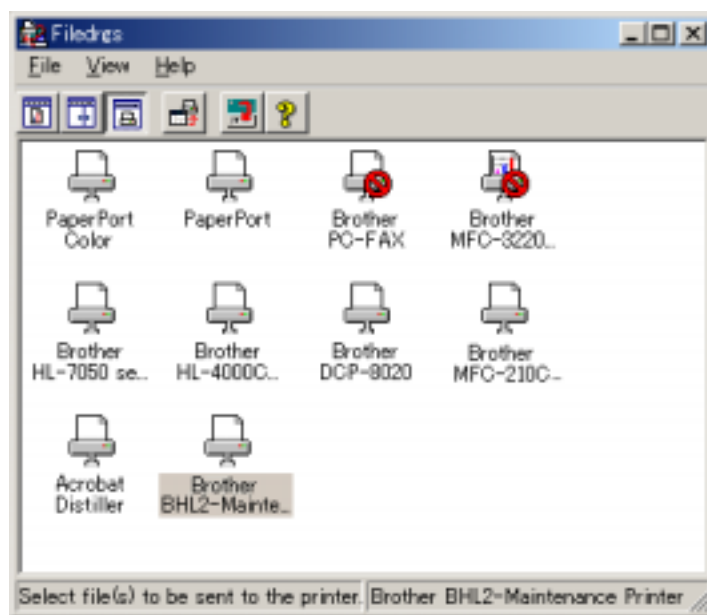
(2) Drag and drop the firmware (e.g., LZ0023_A.pjl) onto the BHL2-Maintenance Printer icon in the Filedrgs window shown above.

NOTE: Use a firmware file after extracting. It is a self-extracting file having the extension .exe. Double-click the exe file to extract it.

NOTE: New main PCB doesn't accept the file having the extension .upd.

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

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(3) <u>MFC620/420CN/410CN/210C and FAX2440C</u>

Press the ***** and **#** keys at the same time when the machine is on standby. The firmware version appears on the LCD.

<u>DCP310CN/110C</u>

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

Press the ▲ key several times to display 8 on the LCD and then press the **Set** key. Again press the ▲ key several times to display 0 and press the **Set** key. (See Chapter 8, Section 8.5.20.)

Press the **Mono Start** key several times to display the firmware version.

In this example, if "A0307252244:CF30" appears, it means that the loading operation has been successfully finished.

(4) If loading operation finishes abnormally, turn the machine off and on. The machine automatically enters the load mode and emits a large beep. Perform the loading procedure above again.

Confidential

■ **After replacing the main PCB with the one used for other machines or when updating program/data**

> After the installation procedure of the printer driver, proceed to the firmware loading operation.
>
> If the printer driver has been installed so that you start from loading firmware, unplug the power cord from the electrical outlet.
>
> Make sure that the machine is connected with your PC using a USB cable.
>
> MFC620CN/420CN/410C/210C and FAX2440C
> While holding down the **5** key, plug the power cord into an electrical outlet.
>
> DCP310CN/110C
> While holding down the **Number of Copies** key, plug the power cord into an electrical outlet.
>
> The machine should show the black and white pattern on the LCD.
>
> **NOTE:** Never unplug the machine's or PC's power cord or the USB cable during loading.
>
> (1) Run "FILEDG32.exe."
>
>> The Filedrgs window will appear as shown below.
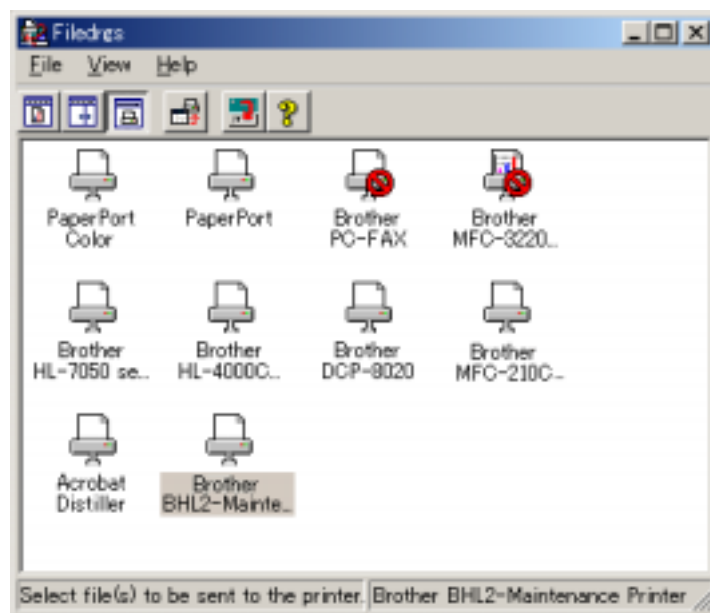
> (2) Drag and drop the firmware (e.g., LZ0023_A.upd) onto the BHL2-Maintenance Printer icon in the Filedrgs window shown above.
>
>> **NOTE:** Use a firmware file after extracting. It is a self-extracting file having the extension .exe. Double-click the exe file to extract it.
>>
>> **NOTE:** If the main PCB isn't new or blank, use the file having the extension. upd. It prevents from writing the wrong program which the PCB doesn't accept.
>>
>> When loading operation starts, the machine beeps intermittently. After approx. 2 to 5 minutes, the loading operation is complete and the machine automatically reboots and returns to the standby state.

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(3) <u>MFC620/420CN/410CN/210C and FAX2440C</u>

Press the **∗** and **#** keys at the same time when the machine is on standby. The firmware version appears on the LCD.

<u>DCP310CN/110C</u>

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

Press the ▲ key several times to display 8 on the LCD and then press the **Set** key. Again press the ▲ key several times to display 0 and press the **Set** key. (See Chapter 8, Section 8.5.20.)

Press the **Mono Start** key several times to display the firmware version.

In this example, if "A0307252244:CF30" appears, it means that the loading has been successfully finished.

NOTE: The latest firmware will display its version on the LCD by pressing the Stop and ▲ keys at the same time.

(4) If loading finishes abnormally, turn the machine off and on. The machine automatically enters the load mode and emits a large beep. Perform the loading procedure above again.

MFC620CN
MFC420CN/410CN
MFC210C
FAX2440C
DCP310CN/110C

Appendix 3. Customizing Codes According to Shipping Destination

This appendix provides instructions on how to set up the customizing codes for the various preferences exclusively designed for each destination (e.g. language). Those codes are stored in the memory (EEPROM) mounted on the main PCB. If the main PCB is replaced, therefore, you need to set up the proper customizing code with the machine in the maintenance mode.

Note: Customizing codes customize firmware for individual models, enabling the common firmware to be used for various models. They come with the firmware data provided by Brother Industries.

EEPROM CUSTOMIZING CODES

This function allows you to customize the EEPROM according to language, function settings, and firmware switch settings.

Customizing codes come with the firmware data provided by Brother Industries.

■ Operating Procedure

MFC620CN/420CN/410CN/210C and FAX2440C

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

The machine beeps for approx. one second and displays " ▮▮ MAINTENANCE ▮▮▮ " on the LCD.

(2) Press the **7** and **4** keys in this order in the initial stage of the maintenance mode.

The current customizing code appears (e.g., 0001 in the case of MFC210C U.S.A. model).

(3) Enter the desired customizing code (e.g., 0002 in the case of MFC210C Canadian model).

The newly entered code appears.

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

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

The machine saves the setting and returns to the initial stage of the maintenance mode.

If you press the **Stop/Exit** key or no keys are pressed for one minute in the above procedure, the machine stops the procedure and returns to the initial stage of the maintenance mode.

DCP310CN/110C

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

The machine beeps for approx. one second and displays " ▮▮ MAINTENANCE ▮▮▮ " on the LCD.

(2) Start customizing the EEPROM (with Function code 74) by using the ▲ and **Set** keys as follows:

Press the ▲ key several times to display 7 on the LCD and then press the **Set** key. Again press the ▲ key several times to display 4 and then press the **Set** key

The current customizing code appears (e.g., 0004 in the case of DCP110C).

(3) Enter the desired customizing code by using the ▲ and **Set** keys as follows:

To enter 0007, for example, press the ▲ key several times to display 0 on the LCD and then press the **Set** key. In the same way, enter 0, 0, and 7.

The newly entered code appears.

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

(4) Press the **Mono Start** key.

The machine saves the setting and returns to the initial stage of the maintenance mode.

If you press the **Stop/Exit** key or no keys are pressed for one minute in the above procedure, the machine stops the procedure and returns to the initial stage of the maintenance mode.

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MFC620CN
MFC420CN/410CN
MFC210C
FAX2440C
DCP310CN/110C

Appendix 4. Firmware Switches (WSW)

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

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.)
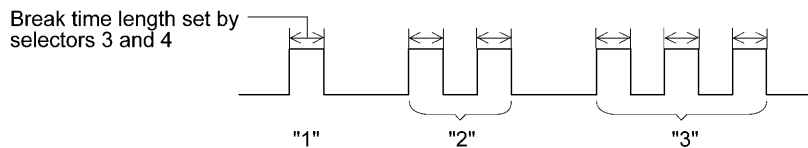
- **Selectors 5 and 6:   Inter-digit pause**

  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.)

Confidential
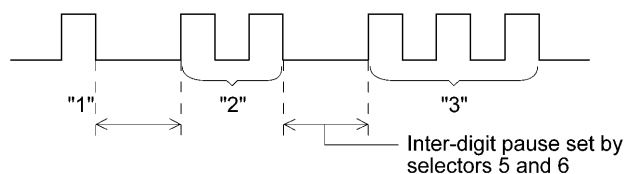
● **Selector 7:   Switching between pulse (DP) and tone (PB) dialing, by the function switch**

This selector determines whether or not the dialing mode can be switched between the pulse (DP) and tone (PB) dialing by using the function switch.

● **Selector 8:   Default dialing mode, pulse (DP) or tone (PB) dialing**

This selector sets the default dialing mode (pulse dialing or tone dialing) which can be changed by the function switch. If the user switches it with the function switch when selector 7 is set to "0," the setting specified by this selector will also be switched automatically.

WSW02 (Tone signal setting)

Selector No.	Function	Setting and Specifications

1
 	
 2
	Tone signal transmission time length	No. 1 2
		    0 0 : 70 ms
		    0 1 : 80 ms
		    1 0 : 90 ms
		    1 1 : 100 ms

3
 	
 4
	Min. pause in tone dialing	No. 3 4
		    0 0 : 70 ms
		    0 1 : 80 ms
		    1 0 : 90 ms
		    1 1 : 140 ms

5 | 8	Attenuator for pseudo ring backtone to the line (selectable in the range of 0-15 dB, in 1 dB increments)	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

● **Selectors 1 through 4:   Tone signal transmission time length and Min. pause in tone dialing**

These selectors set the tone signal transmission time length and minimum pause in tone dialing. (Example: If "1," "2," "3," "4," and "5" are dialed.)
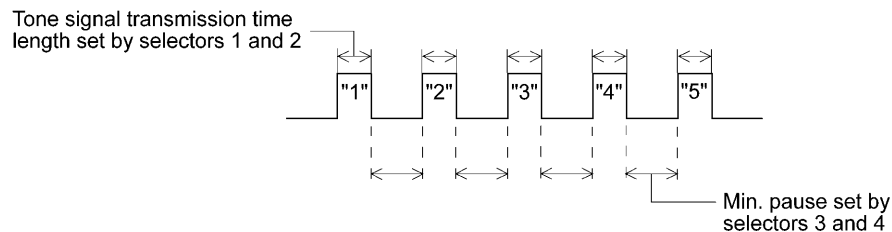
● **Selectors 5 through 8:   Attenuator for pseudo ring backtone to the line**

These selectors are used to adjust the sound volume of a ring backtone in the F/T mode, an on-hold sound, or a beep generated as a signal during remote control operation or at the start of ICM recording.

The larger the value specified by these selectors, the greater the attenuation.

WSW03 (PABX* mode setting)

Selector No.	Function	Setting and Specifications
1	CNG detection when sharing a modular wall socket with a telephone	0: A 1: B

2
|
4
	Detection time length of PABX* dial tone, required for starting dialing
	(Not used.)
		No. 2 3 4
		     0 0 0 : 50 ms
		     0 0 1 : 210 ms
		     0 1 0 : 500 ms
		     0 1 1 : 800 ms
		     1 0 0 : 900 ms
		     1 0 1 : 1.5 sec.
		     1 1 0 : 2.0 sec.
		     1 1 1 : 2.5 sec.

5	CNG detection when sharing a modular wall socket with a telephone	0: A 1: B

6
 	
7
	Dial tone detection in PABX*
	(Not used.)
		No. 6 7
		     0 0 : No detection
		              (3.5 sec. WAIT)
		     0 1 : No detection
		              (5 sec. WAIT)
		     1 0 : No detection
		              (7 sec. WAIT)
		     1 1 : Detection
		              (Frequency only)

8	Not used.	

* PABX: Private automatic branch exchange

NOTE: Selectors 2 through 4, 6 and 7 are not applicable where no PABX is installed.

● **Selectors 1 and 5:   CNG detection when sharing a modular wall socket with a telephone**

These selectors determine whether or not the machine detects a CNG signal when a line is connected to a telephone sharing a modular wall socket with the machine. Upon detection of CNG signals by the number of cycles specified by these selectors, the machine interprets CNG as an effective signal and then starts FAX reception.

Selector No. 1 No. 5	Cycle
0 (A) 0 (A)	0.5 cycle
0 (A) 1 (B)	1.0 cycle
1 (B) 0 (A)	1.5 cycles
1 (B) 1 (B)	2.0 cycles

● **Selectors 2 through 4:   Detection time length of PABX dial tone, required for starting dialing**
                             (Not used.)

Upon detection of the PABX dial tone for the time length set by these selectors, the machine starts dialing.

These selectors are effective only when both selectors 6 and 7 are set to "1" (Detection).

● **Selectors 6 and 7: Dial tone detection in PABX (Not used.)**

These selectors activate or deactivate the dial tone detection function which detects a dial tone when a line is connected to the PABX.

Setting both of these selectors to "1" activates the dial tone detection function so that the machine starts dialing upon detection of a dial tone when a line is connected.

Other setting combinations deactivate the dial tone detection function so that the machine starts dialing after the specified WAIT (3.5, 5.0, or 7.0 sec.) without detection of a dial tone when a line is connected.

WSW04 (TRANSFER facility setting)

Selector No.	Function	Setting and Specifications
1	Earth function in transfer facility (Not used.)	0: Provided 1: Not provided
2 3	Dual tone detection frequency in ICM recording	No. 2 3 0 0 : 350 and 440 Hz (A) 0 1 : 440 and 480 Hz (B) 1 0 : } 1 1 : } 480 and 620 Hz (C)
4	Dual tone detection sensitivity in ICM recording	0: Normal 1: High
5 6	Earth time length for earth function	No. 5 6 0 0 : 200 ms 0 1 : 300 ms 1 0 : 500 ms 1 1 : 700 ms
7 8	Break time length for flash function	No. 7 8 0 0 : 80 ms 0 1 : 110 ms 1 0 : 250 ms 1 1 : 500 ms

NOTE: Selectors 1 and 5 through 8 are not applicable in those countries where no transfer facility is supported.

NOTE: Selectors 2 through 4 are applicable to models equipped with built-in TADs.

● **Selector 1: Earth function in transfer facility (Not used.)**

This selector determines whether or not the earth function is added to the transfer setting menu to be accessed by the function switch.

● **Selectors 2 and 3: Dual tone detection frequency in ICM recording**

If the machine detects either of the frequencies set by these selectors in ICM recording, it disconnects the line. For example, if these selectors are set to "0, 0," the machine disconnects the line upon detection of 350 Hz or 440 Hz.

- **Selector 4: Dual tone detection sensitivity in ICM recording**

  Setting this selector to "1" increases the tone detection sensitivity in ICM recording.

- **Selectors 5 and 6: Earth time length for earth function (Not used.)**

  These selectors set the short-circuiting time length of the telephone line (La or Lb) to ground.

  This setting is effective only when the earth function is selected for the R key by using the function switch.

- **Selectors 7 and 8: Break time length for flash function**

  These selectors set the break time length.

  This setting is effective only when the flash function is selected for the 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.

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- **Selectors 1 through 3: 1st dial tone detection**

  These selectors activate or deactivate the 1st dial tone detection function which detects the 1st dial tone issued from the PSTN when a line is connected to the PSTN.

  Setting all of these selectors to "1" activates the dial tone detection function so that the machine starts dialing upon detection of a dial tone when a line is connected. (However, in those countries which support no dial tone detection function, e.g., in the U.S.A., setting these selectors to "1" makes the machine start dialing after a WAIT of 3.5 seconds.) For the detecting conditions of the 1st dial tone, refer to WSW07 and WSW08.

  Other setting combinations deactivate the dial tone detection function so that the machine starts dialing after the specified WAIT (3.5, 7.0, 10.5, 14.0, 17.5, 21.0, or 24.5 seconds) without detection of a dial tone when a line is connected to the PSTN.

- **Selector 4: Max. pause time allowable for remote ID code detection**

  This selector sets the maximum pause time allowable for detecting the second digit of a remote ID code after detection of the first digit in remote reception.

  If selector 4 is set to "0" (2 seconds), for instance, only a remote ID code whose second digit is detected within 2 seconds after detection of the first digit will become effective so as to activate the remote function.

- **Selectors 5 and 6: Busy tone detection in automatic sending mode**

  These selectors determine whether or not the machine automatically disconnects a line upon detection of a busy tone in automatic sending mode.

  Setting selector 6 to "0" ignores a busy tone so that the machine does not disconnect the line.

  Setting selectors 5 and 6 to "0" and "1," respectively, makes the machine detect a busy tone only after dialing and disconnect the line.

  Setting both of selectors 5 and 6 to "1" makes the machine detect a busy tone before and after dialing and then disconnect the line.

- **Selector 7: Busy tone detection in automatic receiving mode**

  This selector determines whether or not the machine automatically disconnects the line upon detection of a busy tone in automatic receiving mode.

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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.

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● **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 1 0 1 0 0 1 1 1 0 0	If you press the **Pause** key during dialing, the machine will insert WAIT as defined in the above table. If the **Pause** key is pressed repeatedly, the machine inserts the specified WAIT multiplied by the number of depressions. It applies also in hook-up dialing.
1 0 1 1 1 0 1 1 1	When these selectors are set to "1, 0, 1": Each time you press the **Pause** key in dialing, the machine will wait for the 2nd dial tone to be sent via the communications line regardless of pulse dialing or tone dialing. When these selectors are set to "1, 1, 0": If you press the **Pause** key in pulse dialing, the machine will first wait for the 2nd dial tone to be sent via the communications line. After that, pressing the **Pause** key will cause the machine to insert a WAIT of 3.5 seconds. In tone dialing, the machine will insert a WAIT of 3.5 seconds. When these selectors are set to "1, 1, 1": If you press the **Pause** key, the machine will first wait for the 2nd dial tone to be sent via the communications line regardless of pulse dialing or tone dialing. After that, pressing the **Pause** key will cause the machine to insert a WAIT of 3.5 seconds. (In those countries where no dial tone detection function is supported, setting these selectors to "1, 0, 1," "1, 1, 0," or "1, 1, 1" inserts a WAIT of 3.5 seconds.)

● **Selectors 4 through 6:   Detection of international tone**

Upon detection of the 2nd dial tone for the time length specified by these selectors, the machine starts dialing.

This setting is effective only when the 2nd dial tone detection function is activated by selectors 1 through 3 (Setting 101, 110, or 111).

This function does not apply in those countries where no dial tone detection function is supported.

● **Selector 7:   No. of 2nd dial tone detection cycles**

This selector sets the number of dial tone detection cycles required for starting dialing.

● **Selector 8:   Allowable instantaneous interrupt during reception of 2nd dial tone**

This selector sets the allowable instantaneous interrupt period that should be ignored during reception of the 2nd dial tone.

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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
	$(Z = 600\ \Omega)$
		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 to detect a line current before starting dialing.

● **Selectors 4 through 6: 2nd dial tone detection level**

These selectors set the detection level of the 2nd dial tone.

● **Selector 7: Allowable instantaneous interrupt during reception of 1st dial tone**

This selector sets the allowable instantaneous interrupt period that should be ignored during reception of the 1st dial tone.

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WSW08 (Dial tone setting 2)

Selector No.	Function	Setting and Specifications
1 | 3	1st dial tone detection time length	No. 1 2 3 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
4 5	Time-out length for 1st and 2nd dial tone detection	No. 4 5 0 0 : 10 sec. 0 1 : 20 sec. 1 0 : 15 sec. 1 1 : 30 sec.
6 | 8	Detection level of 1st dial tone and busy tone before dialing	No. 6 7 8 0 0 0 : -21 dBm 0 0 1 : -24 dBm 0 1 0 : -27 dBm 0 1 1 : -30 dBm 1 0 0 : -33 dBm 1 0 1 : -36 dBm 1 1 0 : -39 dBm 1 1 1 : -42 dBm

NOTE: The WSW08 is not applicable in those countries where no dial tone detection is supported, e.g., U.S.A.

● **Selectors 1 through 3: 1st dial tone detection time length**

Upon detection of the 1st dial tone for the time length set by these selectors, the machine starts dialing.

This setting is effective only when selectors 1 through 3 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 machine waits dial tone input for the specified time length and disconnects itself from the line when no dial tone is inputted.

WSW09 (Protocol definition 1)

Selector No.	Function	Setting and Specifications
1	Frame length selection	0: 256 octets 1: 64 octets
2	Use of non-standard commands	0: Allowed 1: Prohibited

3
 	
4
	No. of retries	No. 3 4
		   0 0 : 4 times
		   0 1 : 3 times
		   1 0 : 2 times
		   1 1 : 1 time

5	T5 timer	0: 300 sec. 1: 60 sec.
6	T1 timer	0: 35 sec. 1: 40 sec.

7
 	
8
	Timeout for response from the called station in automatic sending mode	No. 7 8
		   0 0 : 55 sec. (in U.S.A. and Canadian models)
		            60 sec. (in other models)
		   0 1 : 140 sec.
		   1 0 : 90 sec.
		   1 1 : 35 sec.

NOTE: Selectors 1 through 5 are not applicable in those models which do not support ECM.

- **Selector 1: Frame length selection**

  Usually a single frame consists of 256 octets (1 octet = 8 bits). For communications lines with higher bit error rate, however, set selector 1 to "1" so that the machine can divide a message into 64-octet frames.

  Remarks: The error correction mode (ECM) is a facsimile transmission manner in which the machine divides a message into frames for transmission so that if any data error occurs on the transmission line, the machine retransmits only those frames containing the error data.

- **Selector 2: Use of non-standard commands**

  If this selector is set to "0," the machine can use non-standard commands (the machine's native-mode commands, e.g., NSF, NSC, and NSS) for communications. If it is set to "1," the machine will use standard commands only.

- **Selectors 3 and 4: No. of retries**

  These selectors set the number of retries in each specified modem transmission speed.

- **Selector 5: T5 timer**

  This selector sets the time length for the T5 timer.

- **Selector 6: T1 timer**

  This selector sets the time length for the T1 timer.

- **Selectors 7 and 8: Timeout for response from the called station in automatic sending mode**

  If the machine (calling station) receives no response (no G3 command) from the called terminal in automatic sending mode for the period specified by these selectors, it disconnects the line.

WSW10 (Protocol definition 2)

Selector No.	Function		Setting and Specifications
1	Not used.		
2	Time length from transmission of the last dial digit to CML ON		0: 100 ms 1: 50 ms
3	Time length from CML ON to CNG transmission		0: 2 sec. 1: 4 sec.
4	Time length from CML ON to CED transmission (except for facsimile-to-telephone switching)		0: 0.5 sec. 1: 2 sec.

5
6
	No. of training retries		No. 5 6
			     0 0 : 1 time
			     0 1 : 2 times
			     1 0 : 3 times
			     1 1 : 4 times

7	Encoding system (Compression)	MR	0: Allowed 1: Not allowed
8		MMR	0: Allowed 1: Not allowed

- **Selector 2:   Time length from transmission of the last dial digit to CML ON**

This selector sets the time length from when the machine transmits the last dial digit until the CML relay comes on.

- **Selector 3:   Time length from CML ON to CNG transmission**

This selector sets the time length until the machine transmits a CNG after it turns on the CML relay.

- **Selector 4:   Time length from CML ON to CED transmission**

This selector sets the time length until the machine transmits a CED after it turns on the CML relay. This setting does not apply to switching between facsimile and telephone.

- **Selectors 5 and 6:   No. of training retries**

These selectors set the number of training retries to be repeated before automatic fallback.

- **Selectors 7 and 8:   Encoding system (Compression)**

This selector determines whether or not to allow the use of the MR/MMR coding system.

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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.

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WSW12 (Signal detection condition setting)

Selector No.	Function	Setting and Specifications		
1 2	Min. detection period required for interpreting incoming calling signal (CI) as OFF	No. 1 2 0 0 : 1500 ms 0 1 : 500 ms 1 0 : 700 ms 1 1 : 900 ms		
3 4	Max. detection period for incoming calling signal (CI) being OFF	No. 3 4 0 0 : 6 sec. 0 1 : 7 sec. 1 0 : 9 sec. 1 1 : 11 sec.		
5 6	Min. detection period required for acknowledging incoming calling signal (CI) as ON	No. 5 6 0 0 : 800 ms (1000 ms*) 0 1 : 200 ms 1 0 : 250 ms 1 1 : 150 ms		
7	Line connection timing	0: Ringer-OFF period (default) 1: Ringer-ON period		
8	Not used.			

*1000 ms in Chinese models.

● **Selectors 1 through 4:**   **Min. detection period required for interpreting incoming calling signal (CI) as OFF**
                                    Max. detection period for incoming calling signal (CI) being OFF

If the machine detects the OFF state of a CI signal for the period greater than the value set by selectors 1 and 2 and less than the value set by selectors 3 and 4, it interprets the CI signal as OFF.

● **Selectors 5 and 6:**   **Min. detection period required for acknowledging incoming calling signal (CI) as ON**

These selectors set the period required to make the machine acknowledge itself to be called. That is, if the machine continuously detects a CI signal with the frequency set by selectors 1 through 4 of WSW14 during the period set by these selectors 5 and 6, then it acknowledges the call.

● **Selector 7:**   **Line connection timing**

If a line is connected in a ringer-ON period, FAX models equipped with SDAA circuits may malfunction due to the ringer voltage. To make the line connection stable, this selector should be set to "0" so that a line is connected in a ringer-OFF period.

WSW13 (Modem setting)

Selector No.	Function	Setting and Specifications

1
2
	Cable equalizer	No. 1 2
		    0 0 : 0 km
		    0 1 : 1.8 km
		    1 0 : 3.6 km
		    1 1 : 5.6 km

3
4
	Reception level	No. 3 4
		    0 0 : -43 dBm
		    0 1 : -47 dBm
		    1 0 : -49 dBm
		    1 1 : -51 dBm

5 | 8	Modem attenuator	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

The modem should be adjusted according to the user's line conditions.

- **Selectors 1 and 2: Cable equalizer**

  These selectors are used to improve the pass-band characteristics of analogue signals on a line. (Attenuation in the high-band frequency is greater than in the low-band frequency.)

  Set these selectors according to the distance from the telephone switchboard to the machine.

- **Selectors 3 and 4: Reception level**

  These selectors set the optimum receive signal level.

- **Selectors 5 through 8: Modem attenuator**

  These selectors are used to adjust the transmitting level attenuation of the modem when the reception level at the remote station is improper due to line loss. This function applies for G3 protocol signals.

  Setting two or more selectors to "1" produces addition of attenuation assigned to each selector.

  If selector 8 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 8 of WSW23 is set to "0."

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WSW14 (AUTO ANS facility setting)

Selector No.	Function	Setting and Specifications
1 2	Frequency band selection (lower limit) for incoming calling signal (CI)	No. 1 2 0 0 : 13 Hz 0 1 : 15 Hz 1 0 : 23 Hz 1 1 : 20 Hz
3 4	Frequency band selection (upper limit) for incoming calling signal (CI)	No. 3 4 0 0 : 30 Hz 0 1 : 55 Hz 1 0 : 70 Hz 1 1 : 200 Hz
5 | 8	No. of rings in AUTO ANS mode	No. 5 6 7 8 0 0 0 0 : Fixed to once 0 0 0 1 : Fixed to 2 times 0 0 1 0 : Fixed to 3 times 0 0 1 1 : Fixed to 4 times 0 1 0 0 : 1 to 2 times 0 1 0 1 : 1 to 3 times 0 1 1 0 : 1 to 4 times 0 1 1 1 : 1 to 5 times 1 0 0 0 : 2 to 3 times 1 0 0 1 : 2 to 4 times 1 0 1 0 : 2 to 5 times 1 0 1 1 : 2 to 6 times 1 1 0 0 : 1 to 10 times 1 1 0 1 : 2 to 10 times 1 1 1 0 : 3 to 5 times 1 1 1 1 : 4 to 10 times

- **Selectors 1 through 4:   Frequency band selection for incoming calling signal (CI)**

  These selectors are used to select the frequency band of CI for activating the AUTO ANS facility.

  In the French models, if the user sets the PBX to OFF from the control panel, the setting made by selectors 1 and 2 will take no effect and the frequency's lower limit will be fixed to 32 Hz. (Even if the setting made by these selectors does not apply, it will be printed on the configuration list.)

- **Selectors 5 through 8:   No. of rings in AUTO ANS mode**

  These selectors set the number of rings to initiate the AUTO ANS facility.

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WSW15 (REDIAL facility setting)

Selector No.	Function	Setting and Specifications

1
 	
2
	Redial interval	No. 1 2
		   0 0 : 5 minutes
		   0 1 : 1 minute
		   1 0 : 2 minutes
		   1 1 : 3 minutes

3
|
6
	No. of redialings	No. 3 4 5 6
		   0 0 0 0 : 16 times
		   0 0 0 1 : 1 times
		   0 0 1 0 : 2 times
		   0 0 1 1 : 3 times
		       | |
		   1 1 1 1 : 15 times

7	Not used.	
8	CRP option	0: Disable 1: Enable

● **Selectors 1 through 6:   Redial interval and No. of redialings**

The machine redials by the number of times set by selectors 3 through 6 at intervals set by selectors 1 and 2.

● **Selector 8:   CRP option**

If a command error occurs in the machine (calling station), the machine usually waits for three seconds and then makes a retry three times. This CRP option is a request command that can be sent from the called station for requesting the calling station to retry the failed command immediately.

WSW16 (Function setting 1)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	ITU-T (CCITT) superfine recommendation	0: OFF 1: ON
3 | 6	Not used.	
7	Max. document length limitation	0: 400 cm 1: 90 cm
8	**Stop** key pressed during reception	0: Not functional 1: Functional

NOTE: Selector 7 is applicable to models equipped with ADF units.

- **Selector 2:   ITU-T (CCITT) superfine recommendation**

  If this selector is set to "1," the machine communicates in ITU-T (CCITT) recommended superfine mode (15.4 lines/mm). If it is set to "0," it communicates in native superfine mode.

- **Selector 7:   Max. document length limitation**

  This selector is used to select the maximum length of a document to be sent.

- **Selector 8:   Stop key pressed during reception**

  If this selector is set to "1," pressing the **Stop** key can stop the current receiving operation. The received data will be lost.

WSW17 (Function setting 2)

Selector No.	Function	Setting and Specifications
1 2	Off-hook alarm	No. 1　2 　　0　0　　:　　No alarm 　　0　1　　:　　Always valid 　　1　X　　:　　Valid except when 　　　　　　　　　'call reservation' 　　　　　　　　　is selected.
3 4	Not used.	
5	Calendar clock type	0:　U.S.A. type　　1:　European type
6	Not used.	
7	Non-ring reception	0:　OFF　　　　　1:　ON
8	Not used.	

● **Selectors 1 and 2:　Off-hook alarm**

These selectors activate or deactivate the alarm function which sounds an alarm when the communication is completed with the handset being off the hook.

● **Selector 5:　Calendar clock type**

If this selector is set to "0" (USA), the MM/DD/YY hh:mm format applies; if it is set to "1" (Europe), the DD/MM/YY hh:mm format applies: DD is the day, MM is the month, YY is the last two digits of the year, hh is the hour, and mm is the minute.

● **Selector 7:　Non-ring reception**

Setting this selector to "1" makes the machine receive calls without ringer sound if the Ring Delay is set to 0.

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WSW18 (Function setting 3)

Selector No.	Function	Setting and Specifications
1	Not used.	
2 3	Detection enabled time for CNG and no tone	No. 2 3 　　0　0　:　　40 sec. 　　0　1　:　　　0 sec.　(No detection) 　　1　0　:　　　5 sec. 　　1　1　:　　80 sec.
4 5	Not used.	
6	Registration of station ID	0:　Permitted　　1:　　Prohibited
7 8	Tone sound monitoring	No. 7　8 　　0　X　:　No monitoring 　　1　0　:　Up to phase B at the calling station only 　　1　1　:　All transmission phases both at the calling and called stations

- **Selectors 2 and 3: Detection enabled time for CNG and no tone**

  After the line is connected via the external telephone or by picking up the handset of the machine, the machine can detect a CNG signal or no tone for the time length specified by these selectors. The setting specified by these selectors becomes effective only when selector 8 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 models.

- **Selectors 7 and 8: Tone sound monitoring**

  These selectors set monitoring specifications of the tone sound inputted from the line.

　　　　　　　　　　　　　　　　　　　　　Confidential

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

4 | 6	Last transmission speed choice for fallback	0 1 1 : 9,600 bps
		   1 0 0 : 12,000 bps
		   1 0 1 : ⎫
		   1 1 0 : ⎬ 14,400 bps
		   1 1 1 : ⎭

7	V.34 mode	0: Permitted 1: Prohibited
8	V.17 mode	0: Permitted 1: Prohibited

NOTE: Selector 7 takes effect only in models supporting V.34 mode.

- **Selectors 1 through 6: First and last choices of transmission speed for fallback**

These selectors are used to set the MODEM speed range. With the first transmission speed choice specified by selectors 1 through 3, the machine attempts to establish the transmission link via the MODEM. If the establishment fails, the machine automatically steps down to the next lowest speed and attempts to establish the transmission link again. The machine repeats this sequence while stepping down the transmission speed to the last choice specified by selectors 4 through 6.

If the MODEM always falls back to a low transmission speed (e.g., 4,800 bps), set the first transmission speed choice to the lower one (e.g., modify it from 12,000 bps to 7,200 bps) in order to deactivate the high-speed MODEM function and reduce the training time for shorter transmission time.

Generally, to save the transmission time, set the last transmission speed choice to a higher one.

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WSW20 (Overseas communications mode setting)

Selector No.	Function	Setting and Specifications
1	EP* tone prefix	0: OFF 1: ON
2	Overseas communications mode (Reception)	0: 2100 Hz 1: 1100 Hz
3	Overseas communications mode (Transmission)	0: OFF 1: Ignores DIS once.
4 5	Min. time length from reception of CFR to start of transmission of video signals	No. 4 5 0 0 : 100 ms 0 1 : 200 ms 1 0 : 300 ms 1 1 : 400 ms
6 7	At CNG detection, elimination of chattering noise	No. 6 7 0 0 : Yes, at both ON/OFF timings 0 1 : Yes, at OFF timing 1 X : No
8	Limitation on CNG detection	0: OFF 1: ON

* EP: Echo protection

NOTE: Selectors 6 and 7 are applicable to models equipped with SDAA circuits.

- **Selector 1:   EP tone prefix**

  Setting this selector to "1" makes the machine transmit a 1700 Hz echo protection (EP) tone immediately preceding training in V.29 modulation system to prevent omission of training signals.

  Prefixing an EP tone is useful when the machine fails to transmit at the V.29 modem speed and always has to fall back to 4800 bps transmission.

  The setting made by this selector takes effect only when the Overseas Mode is set to ON.

- **Selectors 2 and 3:   Overseas communications mode**

  These selectors should be used if the machine malfunctions in overseas communications. According to the communications error state, select the signal specifications.

  Setting selector 2 to "1" allows the machine to use 1100 Hz CED signal instead of 2100 Hz in receiving operation. This prevents malfunctions resulting from echoes, since the 1100 Hz signal does not disable the echo suppressor (ES) while the 2100 Hz signal does.

  Setting selector 3 to "1" allows the machine to ignore a DIS signal sent from the called station once in sending operation. This operation suppresses echoes since the first DIS signal immediately follows a 2100 Hz CED (which disables the ES) so that it is likely to be affected by echoes in the disabled ES state. However, such a disabled ES state will be removed soon so that the second and the following DIS signals are not susceptible to data distortion due to echoes. Note that some models when called may cause error by receiving a self-outputted DIS.

  The setting made by selector 3 takes effect only when the Overseas Communications Mode is set to ON. (The setting made by selector 2 is always effective.)

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● **Selectors 8: Limitation on CNG detection**

If this selector is set to "1," the machine detects a CNG signal according to the condition preset by selectors 2 and 3 of WSW18 after a line is connected. If it is set to "0," the machine detects a CNG signal as long as the line is connected.

WSW21 (TAD setting 1)

Selector No.	Function	Setting and Specifications
1 | 5	Max. waiting time for voice signal	No. 1 2 3 4 5 　　0 0 0 0 0　：No detection 　　0 0 0 0 1　：1 sec. 　　0 0 0 1 0　：2 sec. 　　0 0 0 1 1　：3 sec. 　　　　　|　　　　　| 　　0 1 0 0 0　：8 sec. 　　　　　|　　　　　| 　　1 1 1 1 1　：31 sec.
6 7	Taping the call	No. 6 7 　　0 0 ： Enable (signaling for U.S.A.) 　　0 1 ： Enable (signaling for countries except U.S.A.) 　　1 0 ： Enable (without signaling) 　　1 1 ： Disable
8	Erasure of message stored in the memory after the message transfer	0: Yes　　　　　1: No

NOTE: Selectors 1 through 5 are applicable to models equipped with ICM recorders.

NOTE: Selectors 6 and 7 are applicable to models with internal TADs.

NOTE: Selector 8 is applicable to models equipped with TADs.

● **Selectors 1 through 5:   Max. waiting time for voice signal**

In the TAD mode, the machine waits for voice signal for the time length specified by these selectors before it automatically shifts to the facsimile message receive mode or disconnects the line.

● **Selectors 6 and 7:   Taping the call**

These selectors select whether or not to tape the call. Setting them to "1, 0" enables taping the call without signaling to the calling station that the call is being taped.

● **Selector 8:   Erasure of message stored in the memory after the message transfer**

Setting this selector to "0" will erase the message recorded in the memory after the document retrieval feature transfers the message.

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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% 0: 0% 0: 0% 0: 0%	1: 8% 1: 4% 1: 2% 1: 1%

* ECM: Error correction mode

NOTE: Selector 3 is applicable to the American models only.

NOTE: Selectors 5 through 8 are applicable to the Chinese, Taiwanese and Asian models only.

● **Selector 3:   Call Waiting Caller ID**

Setting this selector to "0" allows the user to decide whether or not to interrupt the current call when a new call comes in. If Call Waiting Caller ID service is available in the area and the user subscribes to it, he/she can see information about his/her incoming call on the LCD.

● **Selectors 5 through 8:   Acceptable TCF bit error rate (%) (Not used.)**

Setting two or more selectors to "1" produces addition of percent assigned to each selector. If you set selectors 7 and 8 to "1," the acceptable TCF bit error rate will be 3%.

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WSW23 (Communications setting)

Selector No.	Function	Setting and Specifications
1	Starting point of training check (TCF)	0: From the head of a series of zeros 1: From any arbitrary point

2
 	
3
	Allowable training error rate	No. 2 3
		    0 0 : 0%
		    0 1 : 0.5%
		    1 0 : 1%
		    1 1 : 2%

4
 	
5
	Decoding error rate for transmission of RTN	No. 4 5
		    0 0 : 16%
		    0 1 : 14%
		    1 0 : 10%
		    1 1 : 8%

6 7	Not used.	
8	Limitation of attenuation level	0: Yes 1: No

NOTE: Selector 8 is not applicable to the French models.

- **Selector 1:   Starting point of training check (TCF)**

  At the training phase of receiving operation, the called station detects for 1.0 second a training check (TCF) command, a series of zeros which is sent from the calling station for 1.5 seconds to verify training and give the first indication of the acceptability of the line.

  This selector sets the starting point from which the called station should start counting those zeros. If this selector is set to "0," the called station starts counting zeros 100 ms after the head of a series of zeros is detected.

  If it is set to "1," the called station starts counting zeros upon detection of 10-ms successive zeros 50 ms after the head of a series of zeros is detected. In this case, if the detection of 10-ms successive zeros is too late, the data counting period will become less than 1.0 second, making the called station judge the line condition unacceptable.

- **Selectors 2 and 3:   Allowable training error rate**

  The called station checks a series of zeros gathered in training (as described in Selector 1) according to the allowable training error rate set by these selectors. If the called station judges the line condition to be accepted, it responds with CFR; if not, it responds with FTT.

- **Selectors 4 and 5:   Decoding error rate for transmission of RTN**

  The machine checks the actual decoding errors and then transmits an RTN according to the decoding error rate (Number of lines containing an error per page ÷ Total number of lines per page) set by these selectors.

- **Selector 8:   Limitation of attenuation level**

  Setting this selector to "0" limits the transmitting level of the modem to 10 dB (1 dB in France).

  This setting has priority over the settings selected by WSW02 (selectors 5 through 8) and WSW13 (selectors 5 through 8).

WSW24 (TAD setting 2)

Selector No.	Function	Setting and Specifications

1
2
	Maximum OGM recording time	No. 1 2
		     0 0 : 15 sec.
		     0 1 : 20 sec.
		     1 0 : 30 sec.
		     1 1 : 50 sec.

3
4
	Time length from CML ON to start of pseudo ring backtone transmission	No. 3 4
		     0 0 : 4 sec.
		     0 1 : 3 sec.
		     1 0 : 2 sec.
		     1 1 : 1 sec.

5 | 8	Attenuator for playback of ICM/OGM to the line (Selectable from the range of 0-15 dB)	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

● **Selectors 1 and 2: Maximum OGM recording time**

These selectors set the allowable maximum recording time for an OGM.

● **Selectors 3 and 4: Time length from CML ON to start of pseudo ring backtone transmission**

These selectors set the length of time from CML-ON up to the start of pseudo ring backtone transmission.

In models with OGM facilities, the settings made by these selectors also apply to the length of time from CML-ON up to the start of OGM transmission.

● **Selectors 5 through 8: Attenuator for playback of ICM/OGM to the line**

Setting two or more selectors to "1" produces addition of attenuation assigned to each selector.

This setting is not limited by selector 8 of WSW23.

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WSW25 (TAD setting 3)

Selector No.	Function	Setting and Specifications
1 | 4	Not used.	
5 | 7	Pause between paging number and PIN	No. 5 6 7 0 0 0 : 2 sec. 0 0 1 : 4 sec. 0 1 0 : 6 sec. 0 1 1 : 8 sec. 1 0 0 : 10 sec. 1 0 1 : 12 sec. 1 1 0 : 14 sec. 1 1 1 : 16 sec.
8	Not used.	

NOTE: Selectors 5 through 7 are applicable to the U.S.A. models only.

● **Selectors 5 through 7:   Pause between paging number and PIN**

These selectors set the pause time between a telephone number being paged and PIN (personal identification number) for the paging feature.

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WSW26 (Function setting 4)

Selector No.	Function	Setting and Specifications
1 2	Not used.	
3	Dialing during document reading into the temporary memory in in-memory message transmission	0: Disable 1: Enable

4 5	No. of CNG cycles to be detected (when the line is connected via the external telephone except in the external TAD mode or via the built-in telephone)	No. 4 5
		  0 0 : 0.5 (A)
		  0 1 : 1 (B)
		  1 0 : 1.5 (C)
		  1 1 : 2 (D)

6 7	No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode, via the built-in telephone in the TAD mode, or via the machine in the automatic reception of the F/T mode)	No. 6 7
		  0 0 : 0.5 (A)
		  0 1 : 1 (B)
		  1 0 : 1.5 (C)
		  1 1 : 2 (D)

8	Not used.	

● **Selector 3: Dialing during document reading into the temporary memory in in-memory message transmission**

If this selector is set to "0," the machine waits for document reading into the memory to complete and then starts dialing. This enables the machine to list the total number of pages in the header of the facsimile message.

● **Selectors 4 and 5: No. of CNG cycles to be detected (when the line is connected via the external telephone except in the external TAD mode or via the built-in telephone)**

The machine interprets a CNG as an effective signal if it detects the CNG by the number of cycles specified by these selectors when the line is connected via the external telephone except in the external TAD mode or via the built-in telephone.

● **Selectors 6 and 7: No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode, via the built-in telephone in the TAD mode, or via the machine in the automatic reception of the F/T mode)**

The machine interprets a CNG as an effective signal if it detects the CNG by the number of cycles specified by these selectors when the line is connected via the external telephone in the external TAD mode, via the built-in telephone in the TAD mode, or via the machine in the automatic reception of the F/T mode.

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WSW27 (Function setting 5)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	Ringer OFF setting	0: Yes 1: No
3	Automatic playback of OGM when switched to the TAD mode	0: No 1: Yes
4 5	Detection of distinctive ringing pattern (Not used.)	0: Yes 1: No
6	Recording quality	0: Normal 1: High
7	Recording time for high recording quality	0: Short 1: Long (9.6 kbps) (8.8 kbps)
8	Not used.	

NOTE: Selectors 4 and 5 are applicable to the U.S.A. models only.

- **Selector 2: Ringer OFF setting**

This selector determines whether or not the ringer can be set to OFF.

- **Selector 3: Automatic playback of OGM when switched to the TAD mode**

This selector determines whether or not to automatically play back an OGM the moment the machine switches to the TAD mode.

- **Selectors 4 and 5: Detection of distinctive ringing pattern (Not used.)**

If this selector is set to "1," the machine detects only the number of rings; if it is set to "0," the machine detects the number of rings and the ringing time length to compare the detected ringing pattern with the registered distinctive one.

- **Selector 6: Recording quality**

This selector determines the recording quality for the OGM and ICM. Selecting "1" (High) increases the quality, sacrificing the recording time.

- **Selector 7: Recording time for high recording quality**

This setting takes effect when selector 6 is set to "1" (High). Setting this selector to "0" (Short) further increases the recording quality, sacrificing the recording time.

The recording quality and time to be applied when this selector is set to "1" (Long) are higher and shorter than the ones to be applied when selector 6 is set to "0" (Normal).

The recording quality and time determined by this selector being set to "1" (Long) are higher and shorter than the ones determined by selector 6 being set to "0" (Normal).

WSW28 (Function setting 6)

Selector No.	Function	Setting and Specifications
1 | 3	Transmission level of DTMF high-band frequency signal	No. 1 2 3 0 0 0 : 0 dB 0 0 1 : +1 dB 0 1 0 : +2 dB 0 1 1 : +3 dB 1 0 0 : 0 dB 1 0 1 : -1 dB 1 1 0 : -2 dB 1 1 1 : -3 dB
4 | 6	Transmission level of DTMF low-band frequency signal	No. 4 5 6 0 0 0 : 0 dB 0 0 1 : +1 dB 0 1 0 : +2 dB 0 1 1 : +3 dB 1 0 0 : 0 dB 1 0 1 : -1 dB 1 1 0 : -2 dB 1 1 1 : -3 dB
7 8	Not used.	

● **Selectors 1 through 6: Transmission level of DTMF high-/low-band frequency signal**

These selectors are intended for the manufacturer who tests the machine for the Standard. Never access them.

WSW29 (Function setting 7)

Selector No.	Function	Setting and Specifications

1 | 3	Compression threshold level for voice signals inputted via the telephone line in the built-in TAD operation	No. 1 2 3
		   0 0 0 : -47.0 dBm (A)
		   0 0 1 : -48.5 dBm (B)
		   0 1 0 : -50.0 dBm (C)
		   0 1 1 : -51.5 dBm (D)
		   1 0 0 : -53.0 dBm (E)
		   1 0 1 : -54.5 dBm (F)
		   1 1 0 : -56.0 dBm (G)
		   1 1 1 : OFF (H)

4 | 6	Compression threshold level for voice signals inputted via the handset in the built-in TAD operation	No. 4 5 6
		   0 0 0 : -44.0 dBm (A)
		   0 0 1 : -45.5 dBm (B)
		   0 1 0 : -47.0 dBm (C)
		   0 1 1 : -48.5 dBm (D)
		   1 0 0 : -50.0 dBm (E)
		   1 0 1 : -51.5 dBm (F)
		   1 1 0 : -53.0 dBm (G)
		   1 1 1 : OFF (H)

7	Impedance switching control in pulse dialing	0: OFF 1: ON
8	Prompt beep when the memory area for the activity report becomes full	0: No 1: Yes

NOTE: Selectors 1 through 6 are applicable to models equipped with built-in TADs.

NOTE: Selectors 7 and 8 are applicable only to the European versions.

● **Selectors 1 through 6:** **Compression threshold level for voice signals inputted via the telephone line in the built-in TAD operation**

If voice signals inputted via the telephone line are below the level specified by these selectors, the TAD interprets those received voice signals as no signal, compressing the recording time.

● **Selector 8:** **Prompt beep for activity report**

This selector determines whether or not to beep if the memory area for the activity report becomes full, for prompting you to print out the report. (Printing it out will clear the memory area.)

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WSW30 (Function setting 8)

Selector No.	Function	Setting and Specifications

1 | 3	Dial tone/busy tone detection level during recording of ICM (Not used.)	No. 1 2 3
		      0 0 0 : -38.0 dBm (A)
		      0 0 1 : -39.5 dBm (B)
		      0 1 0 : -41.0 dBm (C)
		      0 1 1 : -42.5 dBm (D)
		      1 0 0 : -44.0 dBm (E)
		      1 0 1 : -45.5 dBm (F)
		      1 1 0 : -47.0 dBm (G)
		      1 1 1 : -48.5 dBm (H)

4 | 8	Not used.	

NOTE: Selectors 1 through 3 are applicable to models equipped with internal TADs.

● **Selectors 1 through 3:   Dial tone/busy tone detection level during recording of ICM (Not used.)**

If the machine (called station) detects dial tone (400 Hz continuously) or busy tone (400 Hz intermittently) exceeding the detection level specified by these selectors for the period specified by selectors 1 through 4 of WSW35, then it interprets the calling station as being disconnected. The machine stops TAD recording and disconnects the line.

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WSW31 (Function setting 9)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	Default reduction rate for failure of automatic reduction during recording	0: 100% 1: 70%
3	Not used.	
4	(Do not disturb this selector.)	
5	Minimum ON and OFF duration of ringer signals effective in distinctive ringing	0: 130 ms 1: 90 ms
6 | 8	Not used.	

NOTE: Selector 5 is applicable only to the U.S.A. models.

● **Selector 2:   Default reduction rate for failure of automatic reduction during recording**

This selector sets the default reduction rate to be applied if the automatic reduction function fails to record one-page data sent from the calling station in a single page of the current recording paper.

If it is set to "0," the machine records one-page data at full size (100%) without reduction; if it is set to "1," the machine records it at 70% size.

● **Selector 5:   Minimum ON and OFF duration of ringer signals effective in distinctive ringing**

The ringer pattern consists of short and long rings, e.g., short-short-long rings. This selector sets the minimum ON and OFF duration of ringer signals that are required for the machine to interpret ringer signals as being ON or OFF. This is to prevent components of a ringer pattern from being misinterpreted due to chattering in distinctive ringing.

The machine monitors ringer signals at 10-ms intervals. If the signal is ON, the machine counts +1; if it is OFF, it counts -1. If the counter increments up to +5 or +13 when this selector is set to "1" (50 ms) or "0" (130 ms), respectively, the machine interprets the current signal as being ON.

If the counter returns to zero, the machine interprets the signal as being OFF.

If the Distinctive Ring is set to OFF, this selector is not effective.

WSW32 (Function setting 10)

Selector No.	Function	Setting and Specifications
1 | 4	Not used.	

5
 	
6
	Default resolution	No. 5 6
		   0 0 : Standard
		   0 1 : Fine
		   1 0 : Super fine
		   1 1 : Photo

7
 	
8
	Default contrast	No. 7 8
		   0 X : Automatic
		   1 0 : Super light
		   1 1 : Super dark

● **Selectors 5 and 6: Default resolution**

These selectors set the default resolution which applies when the machine is turned on or completes a transaction.

● **Selectors 7 and 8: Default contrast**

These selectors set the default contrast which applies when the machine is turned on or completes a transaction.

WSW33 (Function setting 11)

Selector No.	Function	Setting and Specifications
1 | 3	Detection threshold level of "no tone" during recording of ICM	No. 1 2 3 　　0 0 0 : -42.5 dBm (A) 　　0 0 1 : -44.0 dBm (B) 　　0 1 0 : -45.5 dBm (C) 　　0 1 1 : -47.0 dBm (D) 　　1 0 0 : -48.5 dBm (E) 　　1 0 1 : -50.0 dBm (F) 　　1 1 0 : -51.5 dBm (G) 　　1 1 1 : -53.0 dBm (H)
4 5	FAX receiving speed to be kept within the transmission speed limit to the PC	No. 4 5 　　0 0 : 14,400 bps 　　0 1 : 12,000 bps 　　1 0 : 9,600 bps 　　1 1 : 7,200 bps
6	Report output of polled transmission requests	0: Yes 1: No
7 8	Comfortable noise level (Not used.)	No. 7 8 　　0 0 : OFF 　　0 1 : Low (A) 　　1 0 : Medium (B) 　　1 1 : High (C)

NOTE: Selectors 1 through 3 are applicable to models equipped with internal TADs.

● **Selectors 1 through 3:   Detection threshold level of "no tone" during recording of ICM**

If the tone level during recording of ICM is less than the threshold setting made by these selectors, the tone is interpreted as "no tone." When the "no tone" state is kept for the period specified by selectors 1 through 5 of WSW21, the machine disconnects the line.

● **Selectors 4 and 5:   FAX receiving speed to be kept within the transmission speed limit to the PC**

To transmit FAX data being received from other machine to the connected PC, you may need to keep the FAX receiving speed within the transmission speed limit specified for the PC. In an initial negotiation sequence for transmission, the machine responds to the calling station with the allowable FAX receiving speed specified by these selectors.

● **Selectors 7 and 8:   Comfortable noise level (Not used.)**

These selectors set the level of noise to be added during playing-back of voice signals recorded with no-signal compression.

If they are set to "0, 0," no noise will be added.

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WSW34 (Function setting 12)

Selector No.	Function	Setting and Specifications

1 | 3	Erasing time length of ICM tone recorded preceding the tone detection starting point in the case of automatic line disconnection due to no voice signal received	No. 1 2 3
		  0 0 0 : 0 sec.
		  0 0 1 : 1 sec.
		  0 1 0 : 2 sec.
		  0 1 1 : 3 sec.
		  1 0 0 : 4 sec.
		  1 0 1 : 5 sec.
		  1 1 0 : 6 sec.
		  1 1 1 : 7 sec.

4 5	No. of CNG cycles to be detected
	(when the line is connected via the external telephone in the external TAD mode or via the machine in F/T mode)
		No. 4 5
		  0 0 : 0.5 (A)
		  0 1 : 1 (B)
		  1 0 : 1.5 (C)
		  1 1 : 2 (D)

6 7	Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation	No. 6 7
		  0 0 : 3
		  0 1 : 2
		  1 0 : 1
		  1 1 : OFF

8	Not used.	

NOTE: Selectors 1 through 5 are applicable to models equipped with built-in TADs.

- **Selectors 1 through 3:** **Erasing time length of ICM tone recorded preceding the tone detection starting point in the case of automatic line disconnection due to no voice signal received**

If the machine has disconnected the line after detection of disconnection tone in ICM recording, it erases tone recorded preceding the tone detection starting point for the time length set by these selectors.

- **Selectors 4 and 5:** **No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode or via the machine in F/T mode)**

The machine interprets a CNG as an effective signal if it detects a CNG signal by the number of cycles specified by these selectors when the line is connected via the external telephone in the external TAD mode or via the machine in F/T mode.

- **Selectors 6 and 7:** **Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation**

If the machine receives this specified number of DTMF tone signals during external TAD operation, it will not detect CNG afterwards.

If these selectors are set to "1, 1," the CNG detection will not be inhibited.

WSW35 (Function setting 13)

Selector No.	Function	Setting and Specifications
1 | 4	Max. detection period of dial tone/busy tone during recording of ICM	No. 1 2 3 4 0 0 0 0 : No detection 0 0 0 1 : 1 sec. 0 0 1 0 : 2 sec. 0 1 0 0 : 4 sec. | | 1 1 1 1 : 15 sec.
5 | 8	Not used.	

NOTE: Selectors 1 through 4 are applicable to models equipped with internal TADs.

● **Selectors 1 through 4:   Max. detection period of dial tone/busy tone during recording of ICM**

If the machine (called station) detects dial tone or busy tone exceeding the detection level specified by selectors 1 through 3 of WSW30 for the period specified by these selectors, then it disconnects the line.

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WSW36 (Function setting 14)

Selector No.	Function	Setting and Specifications
1	ECP mode* (Not used.)	0: ON 1: OFF
2	Recovery from Inactive PC Interface (Not used.)	0: Disable 1: Enable
3	PC Power-off Recognition Time (Not used.)	0: Normal 1: Long
4	Not used.	
5	Escape from phase C	0: Yes 1: No

6
|
8
	Extension of incoming calling signal (CI) frequency band specified by selectors 1 through 4 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 (Not used.)**

The ECP mode enhances the normal bidirectional communications between the machine and the connected PC for higher transmission speed.

● **Selector 2: Recovery from Inactive PC Interface (Not used.)**

If the machine recognizes via the STB signal line that the connected PC is powered off, it will turn the PC interface outputs Low to protect the PC from hazards that could be caused by weak electric current accidentally flown from the machine.

This selector determines whether or not the machine should recover from the inactive PC interface to normal interfacing state upon receipt of data from the PC.

● **Selector 3: PC Power-off Recognition Time (Not used.)**

This selector sets the time length from when the machine detects the PC powered off until it recognizes the detected state as power-off.

If selector 2 is set to "0," it is recommended that selector 3 be set to "1"; otherwise, the machine may mistakenly detect PC powered off.

● **Selector 5: Escape from phase C**

This selector determines whether or not the machine will escape from phase C when it detects an RTC (Return to Control) in non-ECM mode or an RCP (Return to Control Partial page) in ECM mode.

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● **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 machine detects the frequency of a CI signal specified by selectors 1 through 4 of WSW14, it starts the ringer sounding. However, the machine may fail to detect the CI signal normally due to noise superimposed at the time of reception. To prevent it, use selectors 6 through 8 of WSW36.

If the machine detects higher frequencies than the setting made here, it regards them as noise and interprets the detecting state as being normal, allowing the ringer to keep sounding according to the preset number of ringers (until it starts automatic reception of FAX data in the FAX mode or enters the TAD mode in the TEL mode).

WSW37 (Function setting 15)

Selector No.	Function	Setting and Specifications
1	Printout of the stored image data of an unsent document onto an error report	0: No 1: Yes
2	Erasure of the stored image data of an unsent document at the time of the subsequent in-memory message transmission	0: No 1: Yes
3 | 8	Not used.	

● **Selector 1: Printout of the stored image data of an unsent document onto an error report**

This selector determines whether or not to print out the 1st-page image data of a document onto the error report if the document image data stored in the temporary memory cannot be transmitted normally.

● **Selector 2: Erasure of the stored image data of an unsent document at the time of the subsequent in-memory message transmission**

If in-memory message transmission fails repeatedly when selector 1 is set to "1," the temporary memory will be occupied with image data. Setting selector 2 to "1" will automatically erase the stored 1st-page image data of an unsent document at the time of the subsequent in-memory message transmission only when recording paper or toner runs out.

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WSW38 (V.34 transmission settings)

Selector No.	Function	Setting and Specifications

1 2	Setting of the equalizer	No. 1 2
		   0 X : Automatic
		   1 0 : Fixed to 4 points
		   1 1 : Fixed to 16 points

3	Sending level of guard tone at phase 2	0: Normal - 7 db 1: Normal
4	Stepping down the transmission speed at fallback each	0: 2400 bps 1: 4800 bps

5 6	Automatic control of modem's EQM gain for proper transmission speed choice	No. 5 6
		   0 0 : For higher transmission speed than the current setting
		   0 1 : No change from the current setting
		   1 0 : For lower transmission speed than the current setting
		   1 1 : For further lower transmission than the setting made by 1, 0

7	Redialing when a communications error occurs	0: ON 1: OFF
8	Detection of CED for stopping CNG	0: ON 1: OFF

NOTE: WSW38 takes effect only when the V.34 mode is permitted (WSW19, selector 7) in models supporting V.34 mode.

- **Selectors 1 and 2:   Setting of the equalizer**

  These selectors set the equalizer's training level to be applied if the machine fails to send training due to weak line connection. If these selectors are set to "0, X," the modem will automatically set the appropriate training level.

- **Selector 3:   Sending level of guard tone at phase 2**

  This selector sets the sending level of guard tone for 1800 Hz to be sent at Phase 2 in the V. 34 mode.

- **Selector 4:   Stepping down the transmission speed at fallback each**

  This selector determines how much the modem steps down the transmission speed at fallback when called by the remote station. If this selector is set to "1," the modem may step down the transmission speed from 33600 bps to 28800 bps by one-time fallback.

- **Selectors 5 and 6:   Automatic control of modem's EQM gain for proper transmission speed choice**

  These selectors determine how the modem controls the EQM (Eye Quality Monitor) gain for proper choice of the transmission speed, which applies if the modem selects higher transmission speed than the possible speed so that it always repeats falling back.

- **Selector 8:   Detection of CED for stopping CNG**

  If this selector is set to "0," the detection time of CED specified by WSW43, selectors 4 and 5 will apply.

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WSW39 (V.34 transmission speed)

Selector No.	Function	Setting and Specifications
1 | 4	First transmission speed choice for fallback	No. 1 2 3 4 No. 5 6 7 8 0 0 0 0 : 2400 bps 0 0 0 1 : 4800 bps 0 0 1 0 : 7200 bps 0 0 1 1 : 9600 bps 0 1 0 0 : 12000 bps 0 1 0 1 : 14400 bps 0 1 1 0 : 16800 bps 0 1 1 1 : 19200 bps
5 | 8	Last transmission speed choice for fallback	1 0 0 0 : 21600 bps 1 0 0 1 : 24000 bps 1 0 1 0 : 26400 bps 1 0 1 1 : 28800 bps 1 1 0 0 : 31200 bps 1 1 0 1 : 33600 bps 1 1 1 0 : 33600 bps 1 1 1 1 : 33600 bps

NOTE: WSW39 takes effect only when the V.34 mode is permitted (WSW19, selector 7) in models supporting V.34 mode. For the transmission speed setting in other modes, refer to WSW19.

● **Selectors 1 through 8:   First and last choices of transmission speed for fallback**

These selectors are used to set the modem speed range. With the first transmission speed choice specified by selectors 1 through 4, the machine attempts to establish the transmission link via the modem. If the establishment fails, the machine automatically steps down to the next highest speed and attempts to establish the transmission link again. The machine repeats this sequence while stepping down the transmission speed to the last choice specified by selectors 5 through 8.

If the modem always falls back to a low transmission speed (e.g., 24,000 bps), set the first transmission speed choice to the lower one (e.g., modify it from 31,200 bps to 26,400 bps) in order to deactivate the high-speed modem function and reduce the training time for shorter transmission time.

WSW39 will be limited by selectors 3 through 8 of WSW40.

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WSW40 (V.34 modem settings)

Selector No.	Function	Setting and Specifications
1 2	Not used.	
3 | 8	Masking of symbol rate(s)	<table><tr><td></td><td>Not masking</td><td>Masking</td><td></td></tr><tr><td>No. 3</td><td>0</td><td>1</td><td>3429 symbols/sec</td></tr><tr><td>No. 4</td><td>0</td><td>1</td><td>3200 symbols/sec</td></tr><tr><td>No. 5</td><td>0</td><td>1</td><td>3000 symbols/sec</td></tr><tr><td>No. 6</td><td>0</td><td>1</td><td>2800 symbols/sec</td></tr><tr><td>No. 7</td><td>-</td><td>-</td><td>Not used.</td></tr><tr><td>No. 8</td><td>0</td><td>1</td><td>2400 symbols/sec</td></tr></table>

NOTE: WSW40 takes effect only when the V.34 mode is permitted (WSW19, selector 7) in models supporting V.34 mode.

- **Selectors 3 through 8: Masking of symbol rate(s)**

These selectors allow you to limit the transmission speed range in V.34 mode by masking the desired symbol rate(s). Transmission speeds assigned to the symbol rates are listed on the next page. The setting made by these selectors will limit the setting made by selectors 1 through 4 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.

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Symbol rate	Transmission speed (bps)	Symbol rate	Transmission speed (bps)	Symbol rate	Transmission speed (bps)
2400	2400	3000	4800	3429	4800
	4800		7200		7200
	7200		9600		9600
	9600		12000		12000
	12000		14400		14400
	14400		16800		16800
	16800		19200		19200
	19200		21600		21600
	21600		24000		24000
2800	4800		26400		28800
	7200		28800		31200
	9600	3200	4800		33600
	12000		7200		
	14400		9600		
	16800		12000		
	19200		14400		
	21600		16800		
	24000		19200		
	26400		21600		
			24000		
			26400		
			28800		
			31200		

WSW41 (ON-duration of the scanning light source)

Selector No.	Function	Setting and Specifications

1 | 3	ON-duration of the scanning light source at room temperature (Not used.)	No. 1 2 3
		      0 0 0 : 16 hours
		      0 0 1 : 24 hours
		      0 1 0 : 12 hours
		      0 1 1 : 8 hours
		      1 0 0 : 4 hours
		      1 0 1 : 2 hours
		      1 1 0 : 10 minutes
		      1 1 1 : 0 minute

4	Not used.	

5 | 8	Modem attenuator	No. 5 6 7 8
		      0 0 0 0 : -10 dBm
		      0 0 0 1 : -11 dBm
		      0 0 1 0 : -12 dBm
		      0 0 1 1 : -13 dBm
		      0 1 0 0 : -14 dBm
		          | |
		      1 1 1 1 : -25 dBm

- **Selectors 1 through 3: ON-duration of the scanning light source at room temperature (Not used.)**

  If the scanning operation is started when the scanning light source is off, then it will come on for scanning. These selectors determine how long the light source is ON after scanning.

  If these selectors are set to "1, 1, 1," the light source goes off immediately after the scanning sequence.

- **Selectors 5 through 8: Modem attenuator**

  These selectors are used to adjust the transmitting level of the modem when the reception level at the remote station is improper due to line loss. This function applies to super G3 protocol signals.

Confidential

WSW42 (Internet mail settings)

Selector No.	Function	Setting and Specifications
1	Access to the incoming mail (POP3) server (Periodical or on-demand)	0: Disable 1: Enable
2	Access to the outgoing mail (SMTP) server	0: Disable 1: Enable
3	I-FAX relay	0: Disable 1: Enable
4 | 8	Not used.	

NOTE: WSW42 is applicable to models equipped with LAN interface.

WSW43 (Function setting 21)

Selector No.	Function	Setting and Specifications
1	Not used.	

2 3	Wait time for PC-Fax reception (Class 2) and FPTS command transmission	No. 2 3
		   0 0 : 50 ms
		   0 1 : 100 ms
		   1 0 : 150 ms
		   1 1 : 0 ms

4 5	Detection time of 2100 Hz CED or ANSam	No. 4 5
		   0 0 : 200 ms
		   0 1 : 300 ms
		   1 0 : 400 ms
		   1 1 : 500 ms

6	Not used.	
7	Automatic start of remote maintenance	0: No 1: Yes
8	JPEG coding	0: Disable 1: Enable

● **Selector 8: JPEG coding**

Setting this selector to "0" disables the machine from sending/receiving JPEG color images and from receiving JPEG monochrome images.

WSW44 (Speeding up scanning-1)

Selector No.	Function	Setting and Specifications
1 | 5	Not used.	

6 | 8	Effective time length of the white level compensation data obtained beforehand (Not used.)	No. 6 7 8
		   0 0 0 : Obtained compensation data ineffective
		   0 0 1 : 1 min.
		   0 1 0 : 3 min.
		   0 1 1 : 5 min.
		   1 0 0 : 10 min.
		   1 0 1 : 15 min.
		   1 1 0 : 20 min.
		   1 1 1 : 30 min.

NOTE: Selectors 6 through 8 are applicable only to models equipped with ADF units.

● **Selectors 6 through 8:** **Effective time length of the white level compensation data obtained beforehand (Not used.)**

If you set documents in the ADF and the document front sensor detects them, the controller will make correction of the reference voltage to be applied to white level compensation for document scanning before the **Copy** key is pressed.

These selectors determine how long compensation data obtained beforehand will keep effective.

Confidential

WSW45 (Speeding up scanning-2)

Selector No.	Function	Setting and Specifications

1 | 3	Delay time from when documents are set until the ADF starts drawing them in (Not used.)	No. 1 2 3
		   0 0 0 : No automatic drawing-in
		   0 0 1 : 1 sec.
		   0 1 0 : 2 sec.
		   0 1 1 : 3 sec.
		   1 0 0 : 4 sec.
		   1 0 1 : 5 sec.
		   1 1 0 : 6 sec.
		   1 1 1 : 7 sec.

4 | 6	Periodical correction intervals of the reference voltage to be applied to white level compensation for document scanning, during standby (Not used.)	No. 4 5 6
		   0 0 0 : No correction of reference
		                   voltage during standby
		   0 0 1 : 10 sec.
		   0 1 0 : 30 sec.
		   0 1 1 : 1 min.
		   1 0 0 : 3 min.
		   1 0 1 : 5 min.
		   1 1 0 : 10 min.
		   1 1 1 : 30 min.

7	Standby position of the CIS unit (Not used.)	0: CIS home position 1: Location of
		                                  the white-level
		                                  reference film

8	Not used.	

NOTE: WSW45 is applicable only to models equipped with ADF units.

- **Selectors 1 through 3: Delay time from when documents are set until the ADF starts drawing them in (Not used.)**

These selectors determine how long the ADF will delay automatic drawing-in of documents (to the scanning standby position) after you set them in the ADF, as well as determining whether or not the ADF automatically draws in documents.

- **Selectors 4 through 6: Periodical correction intervals of the reference voltage applied to white level compensation for document scanning, during standby (Not used.)**

These selectors set the correction intervals (in seconds) of the reference voltage to be applied to white level compensation for document scanning during standby, as well as determining whether or not the controller makes the reference voltage correction during standby. (Conventionally, the correction has been made immediately before the start of actual scanning)

This function takes effect in copying. Making the correction during standby may shorten the preparation time for copying.

NOTE: Do not access these selectors.

- **Selector 7: Standby position of the CIS unit (Not used.)**

This selector determines whether the standby position of the CIS unit should be the home position or the location of the white-level reference film (attached to the inside of the scanner top cover). If the location of the reference film is selected, the CIS unit will not return to the home position so as to shorten the travel time, decreasing the preparation time for copying.

                             Confidential

WSW46 (Monitor of power ON/OFF state and parallel port kept at high)

Selector No.	Function	Setting and Specifications

1
2
	Monitoring the PC ON/OFF state
	(Not used.)
		No. 1 2
		  0 0 : Disable
		  0 1 : Monitor SELECT IN
		  1 0 : Monitor STROBE
		  1 1 : Monitor both SELECT IN and STROBE

3	Parallel port output pins kept at high level (Not used.)	0: Enable 1: Disable
4	Previous filtering parameters for white level compensation (Not used.)	0: Enable 1: Disable
5 | 8	Not used.	

NOTE: Selector 4 is not applicable to models equipped with flat-bed scanners.

● **Selectors 1 and 2:   Monitoring the PC ON/OFF state (Not used.)**

For the related functions, refer to WSW36, selectors 2 and 3.

● **Selector 3:   Parallel port output pins kept at high level (Not used.)**

Setting this selector to "0" will keep all parallel output pins of the machine at high level. Use this setting if Resource Manager (bundled with MFC models) installed to WindowsNT running on the connected PC fails to monitor the power ON/OFF state of the machine.

● **Selector 4:   Previous filtering parameters for white level compensation (Not used.)**

At the start of scanning operation, the machine usually initializes white and black level data stored in the EEPROM by scanning the while-level reference film attached to the inside of the scanner top cover. After long use of the machine, however, the film may be contaminated with dust or dirt. Accordingly, incorrect white level data will be set up so that white vertical streaks will be brought on the scanning result.

Setting this selector to "0" (Enabled) will apply previously saved white level data instead of new incorrect compensation.

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WSW47 (Switching between high- and full-speed USB)

Selector No.	Function	Setting and Specifications
1	Handling paper at the occurrence of a paper feed timing error	0: Eject paper w/o print 1: Print on the current paper
2	Not used.	

3
4
	Delay of FAX line disconnection when switching to the pseudo-ringing external telephone	No. 3 4
		    0 0 : 200 ms
		    0 1 : 400 ms
		    1 0 : 700 ms
		    1 1 : 1000 ms

5	Disable the ringer of external telephone at non-ring reception	0: No 1: Yes
6	Not used.	
7	Disable the ringer of external telephone with CAR signal when caller ID service is available	0: No 1: Yes

8	Switching between high-speed USB and full-speed USB	0: Auto switching between 1: Fixed to full-speed
		    high-speed USB (ver. 2.0) USB (ver. 1.1)
		    and full-speed USB (ver. 1.1)

NOTE: Selector 1 is applicable only to models equipped with flat-bed scanners.

NOTE: Selectors 3 and 4 are applicable only to models supporting pseudo-ringing of a connected external telephone.

● **Selector 1: Handling paper at the occurrence of a paper feed timing error**

When feeding paper to the print start position, the machine might cause a feed timing error so that the registration sensor goes ON signaling the presence of paper. This selector determines whether the machine prints on the current paper or ejects the current paper without printing and prints on the next paper.

● **Selectors 3 and 4: Delay of FAX line disconnection when switching to the pseudo-ringing external telephone**

When the machine receives a phone call, it can make the connected external telephone ring (so called pseudo-ringing). During pseudo-ringing, if you pick up the handset of the external telephone, the line might be disconnected due to cut-off of the line current.

To hold the line, the machine may supply line current by making use of the pulse generator circuit that forms a parallel loop. This way the FAX line disconnection may be delayed. These selectors determine the delay period.

WSW48 (USB setup latency)

Selector No.	Function	Setting and Specifications
1 | 5	Not used.	

6 | 8	USB setup latency	No. 6 7 8
		    0 0 0 : Default period
		    0 0 1 : Shorter 1
		    0 1 0 : Longer 1
		    0 1 1 : Longer 2
		    1 0 0 : Longer 3
		    1 0 1 : Longer 4
		    1 0 0 : Shorter 2
		    1 1 1 : Shorter 3

● **Selectors 6 through 8: USB setup latency**

These selectors should not be disturbed.

WSW49 (End-of-copying beep and print in black)

Selector No.	Function	Setting and Specifications
1 2	Not used.	
3	End-of-copying beep	0: Yes 1: No

4 5	Command flag detection time	No. 4 5
		    0 0 : 150 ms
		    0 1 : 350 ms
		    1 0 : 550 ms
		    1 1 : 750 ms

6 7	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 machine 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 so that the machine can continue printing even if any color ink cartridge sensor detects empty. That is, the machine can be used as a monochrome machine.

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: 600Ω 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 SDAA circuits.

- **Selectors 5 and 6: Current control to be applied immediately after connection of the line**

FAX models equipped with an SDAA circuit (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 unstable connection problem.

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WSW51 (Function setting 16)

Selector No.	Function	Setting and Specifications
1	Output of communications error report when transmission verification report is disabled	0: Enable 1: Disable
2	CR motor control for reducing torque fluctuation	0: Activate 1: Deactivate
3 | 7	Not used.	
8	Switching from ink near-empty to ink empty when opening the scanner cover	0: Yes 1: No (No change from ink near-empty)

● **Selector 2: CR motor control for reducing torque fluctuation**

When the CR motor runs, the motor torque may vary so as to cause the head/carriage unit travel velocity to fluctuate, affecting the print quality. Setting this selector to "0" activates the CR motor control that regulates the motor drive current to reduce torque fluctuation, running the CR motor smoothly.

● **Selector 8: Switching from ink near-empty to ink empty when opening the scanner cover**

If this selector is set to "0," opening the scanner cover switches from ink near-empty (if detected) to ink empty state, prompting the user to replace the near-empty ink cartridge(s) immediately.

MFC620CN
MFC420CN/410CN
MFC210C
FAX2440C
DCP310CN/110C

Appendix 5. Wiring Diagram

This appendix provides the wiring diagram that helps you understand the connections between PCBs.

n MFC620CN
MFC420CN/410CN
FAX2440C
DCP310C

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n MFC210C
  DCP110C

Head PCB

Carriage PCB

Ink cartridge PCB

Maintenance unit

MFC210C

MJ PCB

CN5
LINE

CN4
EXT

CN22
Media 1
SM/xD
/MS/SD

CN7
Media 2
CF

Main PCB

CN2
USB

Speaker

Power supply PCB

CIS unit

CIS motor

Control panel PCB

Carriage motor

PF sensor PCB

Paper feed motor

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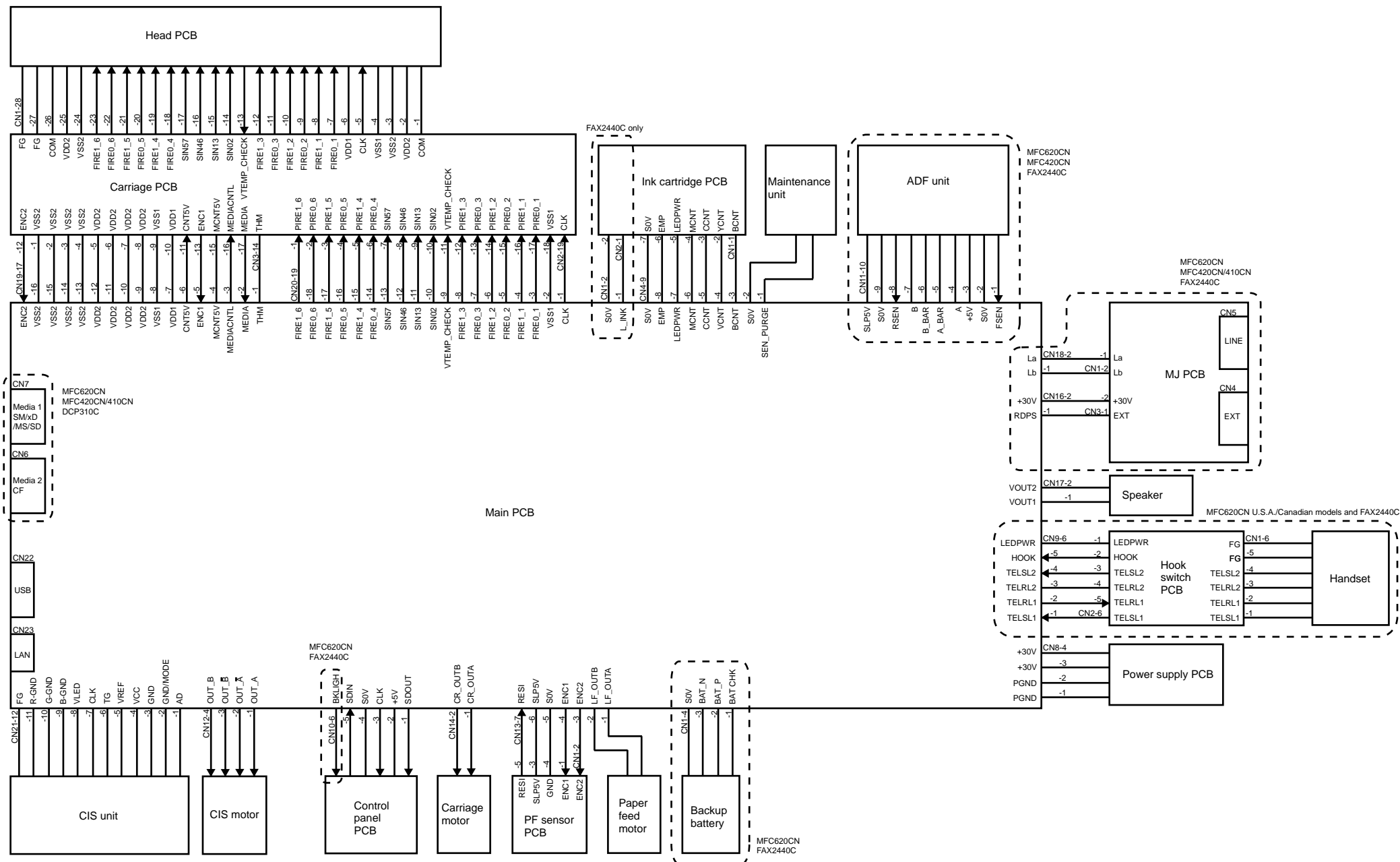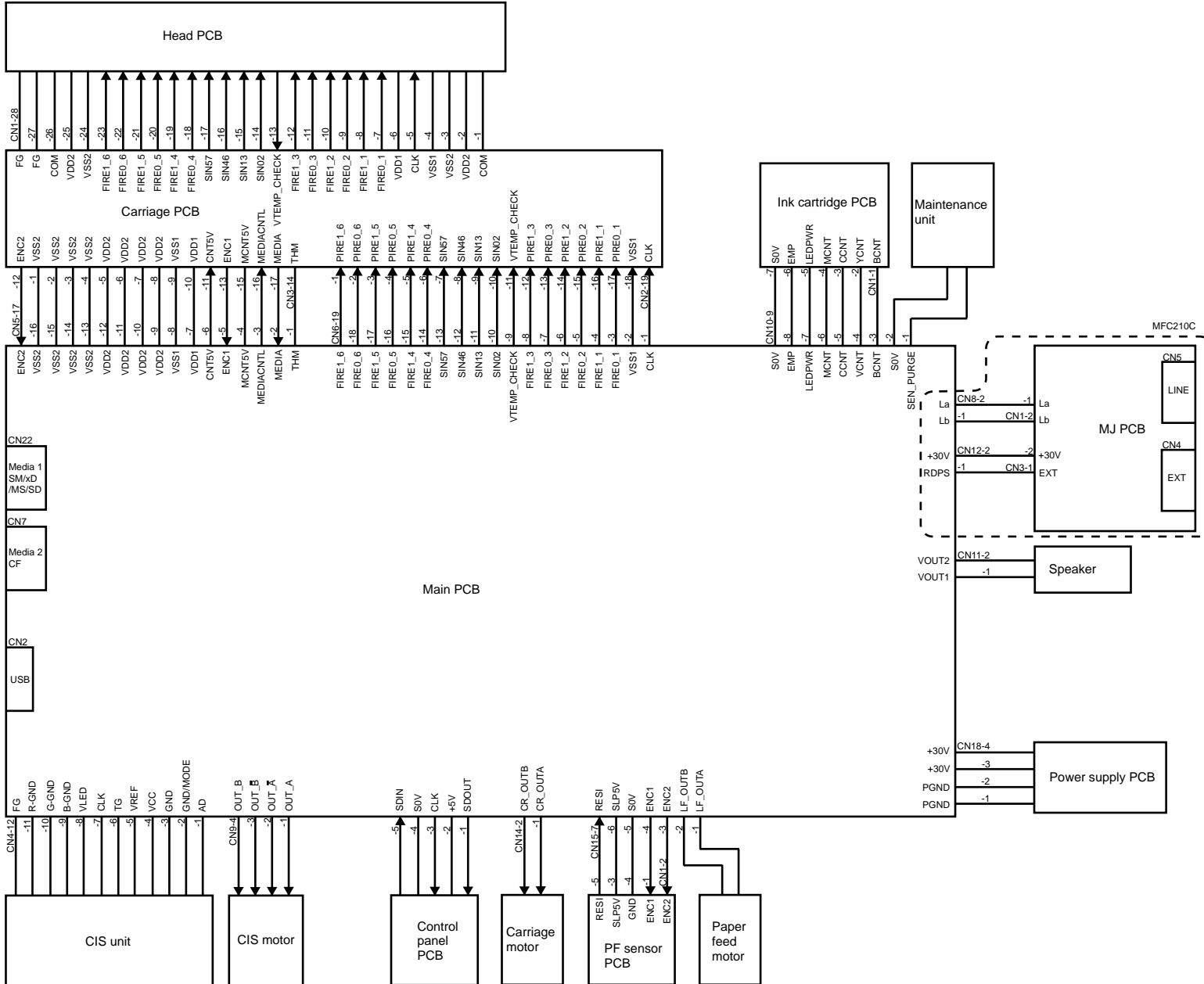
MFC620CN
MFC420CN/410CN
MFC210C
FAX2440C
DCP310CN/110C

Appendix 6. Circuit Diagrams

This appendix provides the circuit diagrams of the MJ PCB and power supply PCB.

Confidential

to Line

to MAIN SDAA

to EXT

to Main PCB

MPW6723/J

MPW6623/N
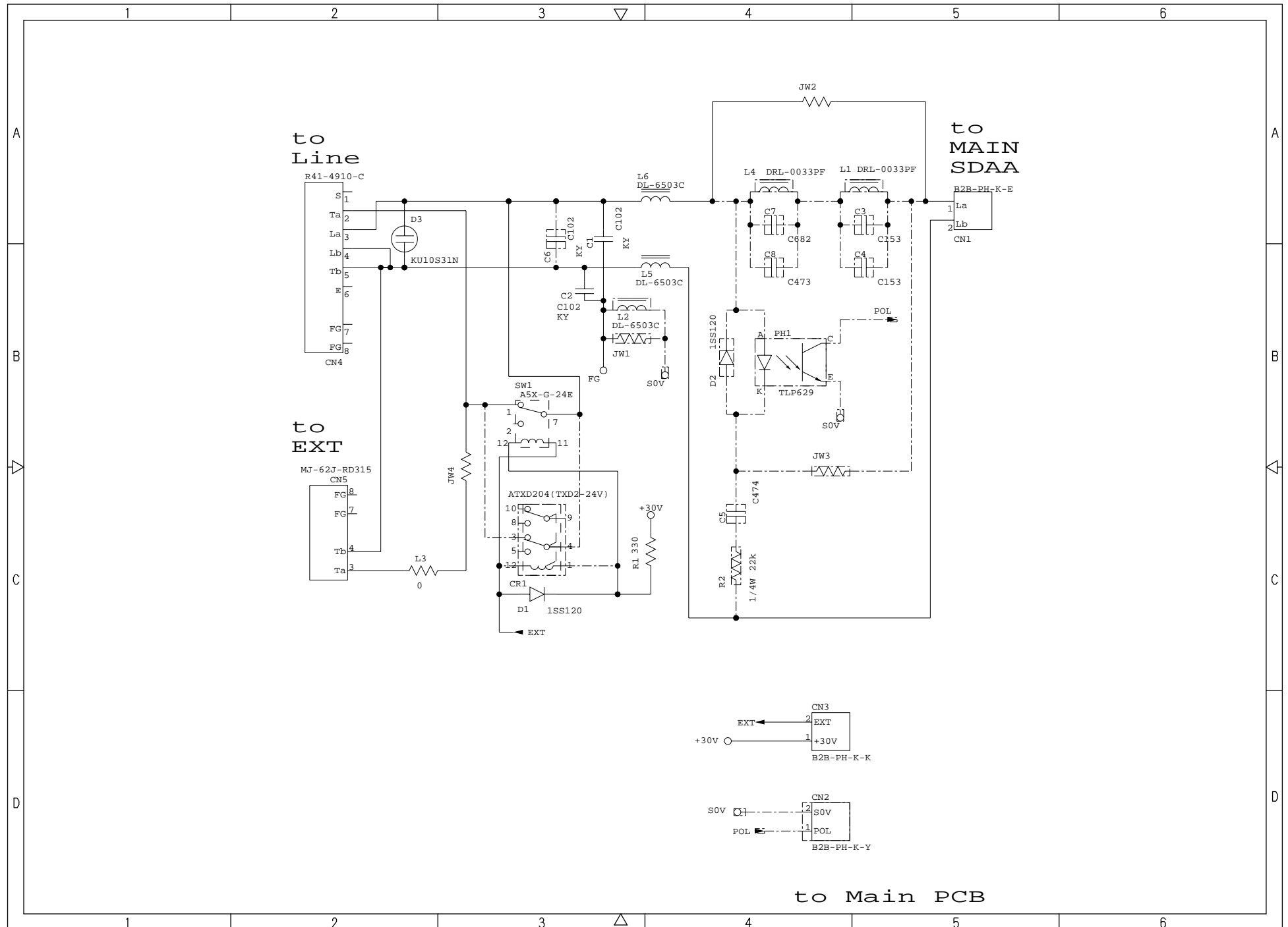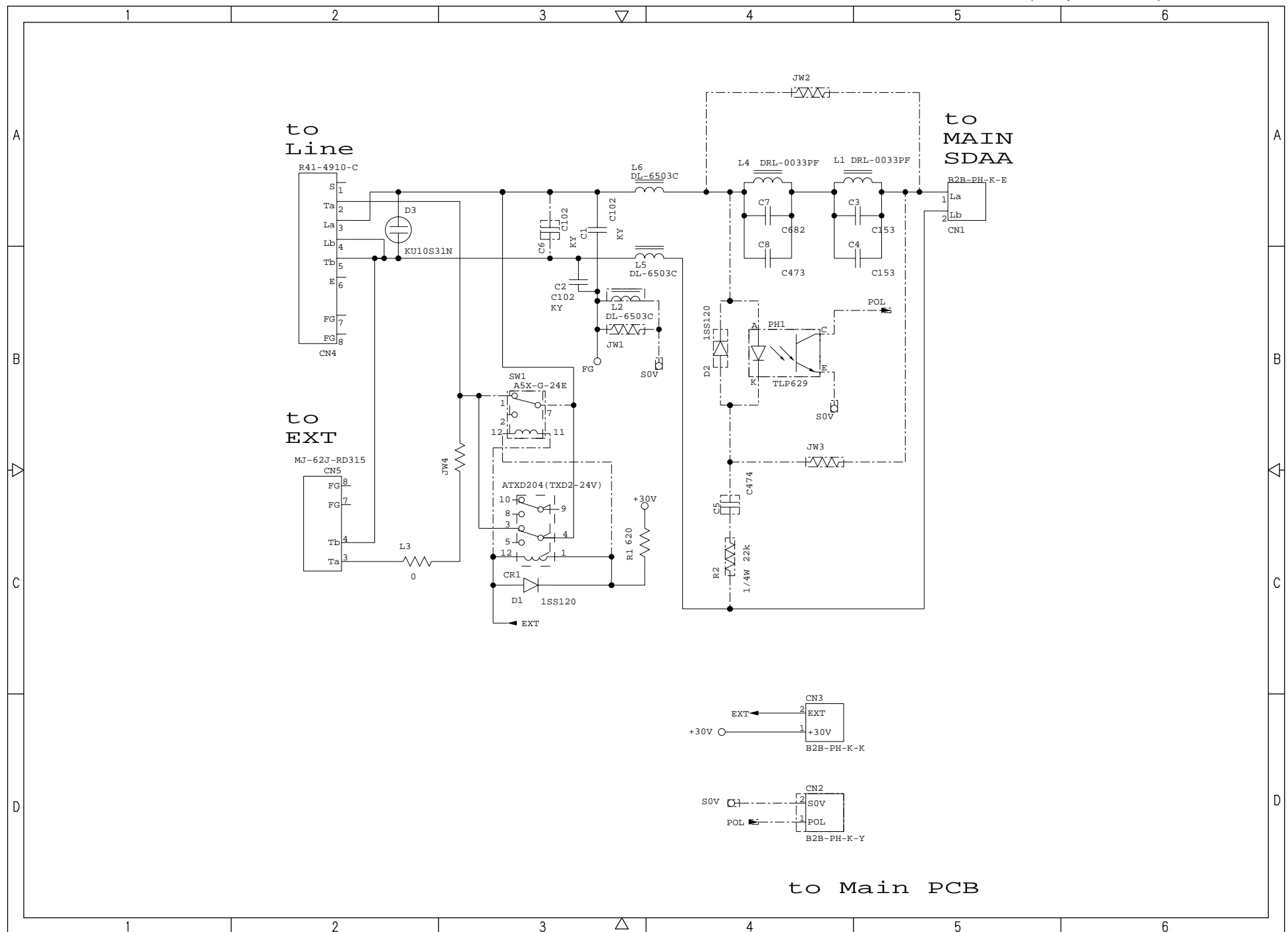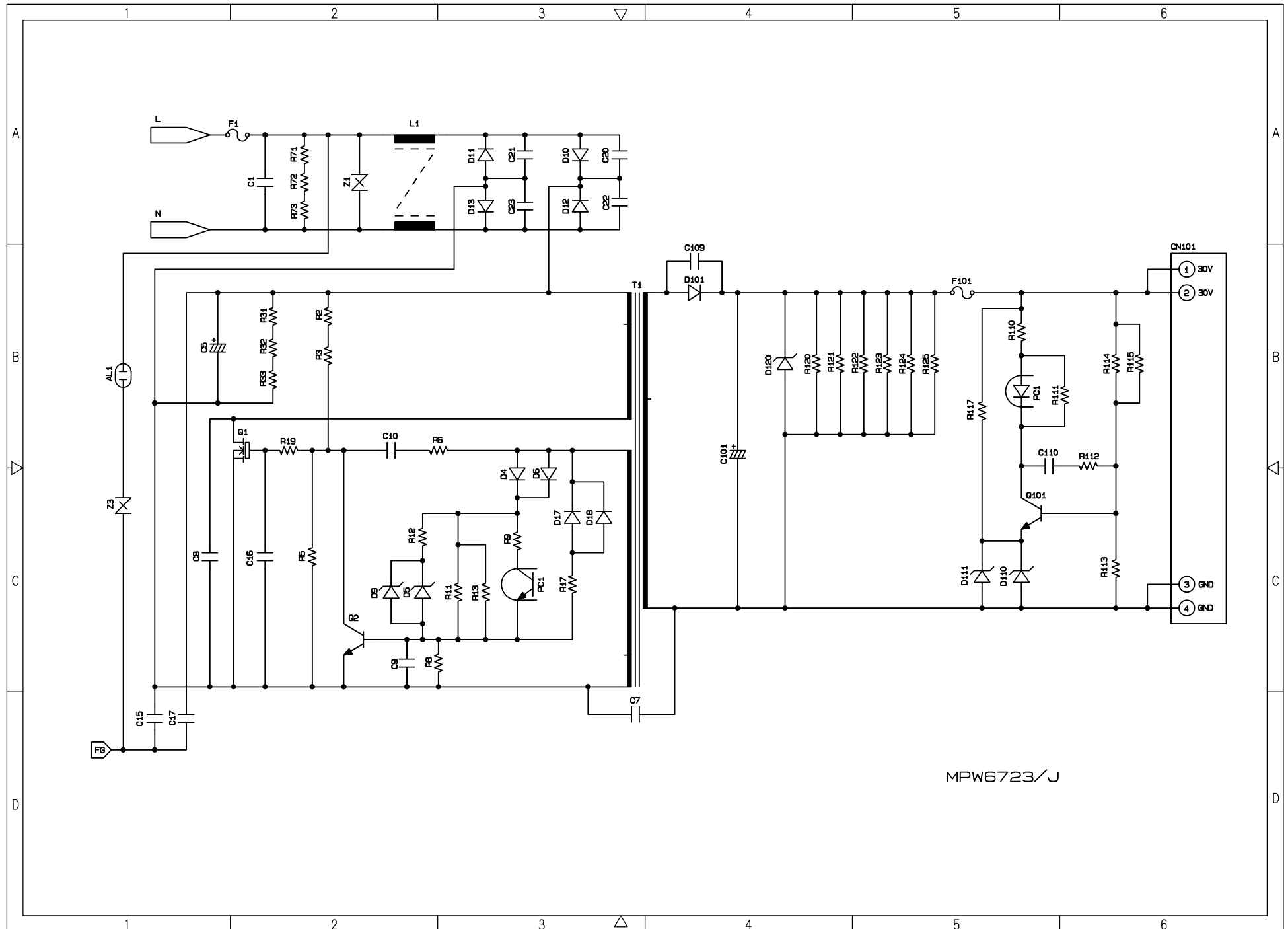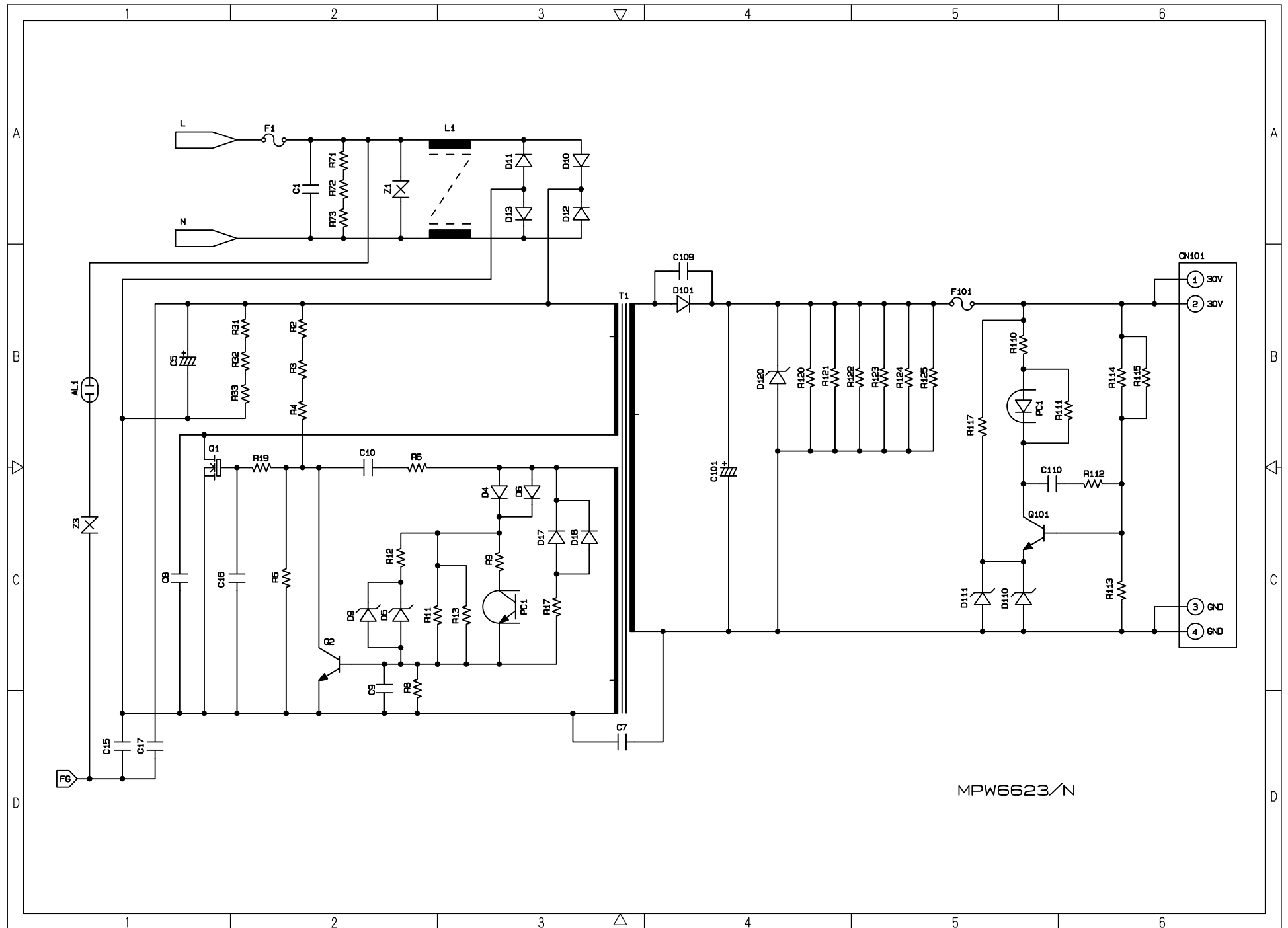
MFC620CN
MFC420CN/410CN
MFC210C
FAX2440C
DCP310CN/110C

Appendix 7. Viewing the Event Log File

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

BH3 installation log file
C:\Documents and Settings\All Users\Application Data\Brother\BrLog\BrtINSTL.log

```
****************Debug Write Start 2004/07/25 19:28:44****************
Brother(R) Debug Output DLL Version 1.1
Copyright(c) 2004 Brother Industries, Ltd. All Rights Reserved.

*********************** SYSTEM INFORMATION ***********************       [1]
Function Name: INSTL
CPU Vender: GenuineIntel
Cpu Name: Intel Pentium III
FPU: Suppprted
TSC: Suppprted
MSR: Suppprted
CMOV: Suppprted                                                         [2]
MMX: Suppprted
3DNow!: Not Suppprted
SSE_INT: Suppprted
SSE_FP: Suppprted
3DNow! Ext: Not Suppprted
FCMOV: Suppprted
OS Informations:
 Windows 2000 Professional Service Pack 2  OS version 5.0.2195
Memory Informations:
 Current memory load 28%  Total physical memory    = 255MB
 Available physical memory = 181MB
 Total pagefile        = 618MB
 Available pagefile    = 553MB
 Total virtual memory     = 2047MB
 Available virtual memory  = 2022MB
*********************** SYSTEM INFORMATION ***********************
[00325207] 040000 INF: InstallationIniFilePath = C:\Program Files\Brother\Brmfl04b\Brmfinfo.ini
[00325207] 040000 INF: Function Data ----------------------------------------------------------------
[00325207] 040000 INF: INIDATA  PRT     = 1                            [6]
[00325207] 040000 INF: INIDATA  SCN     = 1
[00325207] 040000 INF: INIDATA  FAXTX    = 1
[00325207] 040000 INF: INIDATA  FAXRX    = 1
[00325207] 040000 INF: INIDATA  RSP     = 1
[00325217] 040000 INF: INIDATA  MEDIA
[00325217] 040000 INF: INIDATA  COM
[00325217] 040000 INF: INIDATA  USBID     = USB\VID_04f9&PID_016E
[00325217] 040000 INF: INIDATA  LPTID     = LPTENUM\BrotherMFC-584  85F4
[00325217] 040000 INF: INIDATA  PRTNAME   = Brother MFC-5840CN USB Printer
[00325217] 040000 INF: INIDATA  SCNNAME   = Brother MFC-5840CN USB
[00325217] 040000 INF: INIDATA  FAXNAME   = Brother PC-FAX #2
[00325217] 040000 INF: INIDATA  INSTPATH  = C:\Program Files\Brother\  fl04b
[00325217] 040000 INF: INIDATA  PORTNAME  = USB006
[00325217] 040000 INF: INIDATA  MODELNAME = MFC-5840CN
[00325217] 040000 INF: INIDATA  INTERFACE = U
[00325217] 040000 INF: ---------------------------------------------------------------------------
```

*1 Header Information
   Each start-up creates a new set of information

*2 PC System Information

*3 OS Start-up Time
*4 Error Level
*5 INF: Information / ERR: Error

*6 Information to be checked
   (Functions set up by integrated installer)
 PRT: Printer driver
 SCN: Scanner driver
 FAXTX: FAX sending driver
 FAXRX: FAX receiving software
 RSP: Remote Setup software
 MEDIA: Media Drive driver

*7 All models indicate "0" because BH3 doesn't check Media Drive
*8 COM Port Number
*9 Brother ID
*10 MODEL ID (! Machine ID is serial number, not obtained here)
*11 USB connection also requires LPTID
*12 Printer Driver Name
*13 Scanner Driver Name
*14 PC-FAX Sending Driver Name
*15 Folder Name to be installed
*16 USB Port Number
*17 Model Name
*18 Connection Mode (USB / LPT / LAN)

USB Normal

Confidential

```
[00325217] 040000 INF: Win2K
[00325217] 040000 INF: ----- Printer Driver Check Start -----
[00325217] 040000 INF: PARAM MODEL NAME        MFC-5840CN
[00325217] 040000 INF: PARAM CMP PRINTER NAME   Brother MFC-5840CN USB Printer
[00325217] 040000 INF: PARAM INTERFACE        USB
[00325217] 040000 INF: PARAM PRINTER ID
[00325217] 040000 INF: PARAM MODE            0
[00325227] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5840CN USB Printer
[00325227] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5840CN USB Printer
[00325227] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5840CN USB Printer
[00325227] 040000 INF: EXIST DRIVER NAME       = Brother MFC-5840CN USB Printer
[00325227] 040000 INF: LOCAL PORT NAME        = USB006
[00325227] 040000 INF: ----- Printer Driver Check End   -----

[00325227] 040000 INF: ----- Scanner Driver Check Start -----
[00325497] 040000 INF: Initialize() Result = 0
[00325497] 040000 INF: Scanner Install        = OK
[00325497] 040000 INF: ----- Scanner Driver Check End -----

[00325497] 040000 INF: ----- FAXTX Driver Check Start -----
[00325497] 040000 INF: PARAM MODEL NAME        PC-FAX
[00325497] 040000 INF: PARAM CMP PRINTER NAME   Brother PC-FAX #2
[00325497] 040000 INF: PARAM INTERFACE        USB
[00325497] 040000 INF: PARAM PRINTER ID
[00325497] 040000 INF: PARAM MODE            0
[00325507] 040000 INF: EXIST DRIVER NAME       = Brother PC-FAX #2
[00325507] 040000 INF: PC-FAX PORT NAME       = USB006
[00325507] 040000 INF: ----- FAXTX Driver Check End   -----

[00325507] 040000 INF: ----- FAXRX Check Start -----
[00325507] 040000 INF: FAXRX FILE CHECK       =
[00325507] 040000 INF: ----- FAXRX Check End   -----

[00325507] 040000 INF: ----- RSP Check Start   -----
[00325507] 040000 INF: RSP FILE CHECK       = O
[00325507] 040000 INF: ----- RSP Check End   -----

[00325507] 040000 INF: ----- Serial Port Check Start -----
[00326508] 040000 INF: FAXRX Connect OK
[00326508] 040000 INF: RSP   Connect OK
[00326528] 040000 INF: ----- Serial Port Check End   -----
```

19

20

21

*19 Installation Check Detail
*20 Printer Driver Installation Check

*21 If there is EXIST DRIVER NAME, the printer driver is properly installed.

22 23 24

*22 Scanner Driver Installation Check
*23 Scanner Error Code
*24 If Scanner Install =OK, Scanner Driver is properly installed.

25

*25 FAX(Tx) Driver Installation Check

26

*26 If there is EXIST DRIVER NAME, PC-FAX sending driver is properly installed.

27 28

*27 FAX(Rx) File Check
*28 If FAXRX FILE CHECK =OK, FAX receiving file is properly copied.

29 30

*29 Remote Setup File Check
*30 If RSP FILE CHECK =OK, RSP file is properly copied.

31 32

*31 Serial Port (COM Port Driver Check)
*32 FAX receiving and RSP are communicating properly with COM port.

```
[00326528] 040000 INF: ----- Enumerate Host Controllers Check Start -----
[00326649] 040000 INF: USB Host Controler:    \\.\HCD0    = Intel 82371AB/EB PCI to USB Universal Host Controller

[00327280] 040000 INF: ----- Connect Device Information Start -----
[00327280] 040000 INF: Port1:  Dev1 = USB Composite Device
[00327280] 040000 INF: ----- Connect Device Information End  -----

[00328181] 040000 INF: ----- Printer Connect Check Start -----
[00328181] 040000 INF: PARAM MODEL NAME        MFC-5840CN
[00328181] 040000 INF: PARAM CMP PRINTER NAME   Brother MFC-5840CN USB Printer
[00328181] 040000 INF: PARAM INTERFACE         USB
[00328181] 040000 INF: PARAM PRINTER ID        7&19fa3abd&0&USB006
[00328181] 040000 INF: PARAM MODE              1
[00328191] 040000 INF: Get Printer ID  = USBPRINT\BROTHERMFC-5840CN\7&19FA3ABD&0&USB006
[00328191] 040000 INF: Printer ID is agreement!
[00328191] 040000 INF: REAL PORT    = USB006
[00328191] 040000 INF: ----- Printer Port Check Start -----
[00328191] 040000 INF: PRINTER PORT CHECK      = USB006
[00328191] 040000 INF: INTERFACE    = USB
[00328191] 040000 INF: PORT CHECK       = OK
[00328191] 040000 INF: ----- Printer Port Check End  -----
[00328191] 040000 INF: PARAM MODEL NAME        PC-FAX
[00328191] 040000 INF: PARAM CMP PRINTER NAME    Brother PC-FAX #2
[00328191] 040000 INF: PARAM INTERFACE         USB
[00328191] 040000 INF: PARAM PRINTER ID        7&19FA3ABD&0&USB006
[00328191] 040000 INF: PARAM MODE              1
[00328191] 040000 INF: ----- Fax Port Check Start -----
[00328191] 040000 INF: FAX PORT CHECK          = USB006
[00328191] 040000 INF: INTERFACE    = USB
[00328191] 040000 INF: PORT CHECK       = OK
[00328191] 040000 INF: ----- Fax Port Check End   -----
[00328191] 040000 INF: ----- Printer Connect Check End   -----

[00328191] 040000 INF: ----- Connect Device Information Start -----
[00328191] 040000 INF: Port1:  Dev1 = Brother MFC-5840CN USB Printer
[00328191] 040000 INF: ----- Connect Device Information End   -----

[00328621] 040000 INF: ----- Scanner Connect Check Start -----
[00328872] 040000 INF: Initialize() Result = 0
[00329302] 040000 INF: ChkStiDevice() Result = 0
[00329302] 040000 INF: ChkWiaDevice() Result = 3
[00331215] 040000 INF: ChkTwainDs() Result = 0
[00331215] 040000 INF: Get ScannerName = Brother MFC-5840CN USB
[00331656] 040000 INF: GetDefaultTwds() Result = 0
[00331656] 040000 INF: Get DefaultDS = TWAIN_32 Brother MFL Pro Scanner
[00332177] 040000 INF: GetPortName() Result = 0
[00332177] 040000 INF: Get PortName = \\.\BrUsca
[00332617] 040000 INF: ChkDevCommunication() Result
[00332617] 040000 INF: Scanner Connect        = OK
[00332617] 040000 INF: ----- Scanner Connect Check End   -----
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*33 Communication Check
*34 USB device is connected to USB Port1.
   If other USB devices are connected to USB Port2, it will be also indicated.
   ! If no device is recognized, HUB might be connected to the port. In
     this case, displace it.

*35 Printer Driver Communication Check

*36 Port Name created by installer

*37 Communication Check to this port
*38 Port Type (USB/LPT/LAN)
*39 Communication Check Result

*40 PC-FAX Sending Driver Check

*41 Communication Check to this port
*42 Port Type (USB/LPT/LAN)
*43 Communication Check Result

*44 No meaning (Ignore)

*45 Scanner Driver Communication Check
*46 Scanner Error Code (Refer to the Scanner Error Code List

*47 Port Name the scanner is using
*48 ! If USB ID is not correct, it indicates "6"

USB Normal

Confidential

[00334049] 040000 INF: ----- Media Connect Check Start ----- 49
[00334049] 040000 INF: ----- Media Connect Check End   -----

[00334049] 040000 INF: ----- Connect Device Information Start -----
[00334049] 040000 INF: Port1: Dev1 = Brother MFC-5840CN USB Device 50
[00334049] 040000 INF: ----- Connect Device Information End   -----

[00334049] 040000 INF: ----- Connect Device Information Start -----
[00334049] 040000 INF: Port1: Dev1 = USB Printing Support 51
[00334049] 040000 INF: Port1: Dev2 = Brother MFC-5840CN USB
[00334049] 040000 INF: Port1: Dev3 = Brother MFC-5840CN USB Remote Setup Port 52 (COM5)
[00334049] 040000 INF: Port1: Dev4 = USB Mass Storage Device
[00334049] 040000 INF: ----- Connect Device Information End   -----

[00334049] 040000 INF: USB Hub Information: [Port1] DeviceConnected   = USB Composite Device
53
[00334049] 040000 INF: USB Hub Information: [Port2] NoDeviceConnected   = NoDeviceConnected

[00334049] 040000 INF: ----- Enumerate Host Controllers Check End   -----

[00334510] 040000 INF: ----- USB Chip information Check Start -----
[00334510] 040000 INF: USB Chip0(Device25)   = Intel 82371AB/EB PCI to ISA bridge (ISA mode)
[00334510] 040000 INF: USB Chip1(Device26)   = Intel(r) 82371AB/EB PCI Bus Master IDE Controller
[00334510] 040000 INF: USB Chip2(Device27)   = Intel 82371AB/EB PCI to USB Universal Host Co 54 roller
[00334510] 040000 INF: USB Chip3(Device28)   = Intel 82443BX Pentium(r) II Processor to PCI Bridge
[00334510] 040000 INF: USB Chip4(Device29)   = Intel 82443BX Pentium(r) II Processor to AGP Controller
[00334510] 040000 INF: ----- USB Chip information Check End   -----

[00334510] 040000 INF: ----- ADD/REMOVE APPLICATION Check Start -----
[00334510] 040000 INF: AddRemove Display Name: DisplayName1   = Brother HL-5070
[00334510] 040000 INF: AddRemove Display Name: DisplayName2   = NVIDIA Windows 2000 Display Drivers
[00334510] 040000 INF: AddRemove Display Name: DisplayName3   = Microsoft Visual Studio 6.0 Enterprise Edition
[00334510] 040000 INF: AddRemove Display Name: DisplayName4   = Microsoft Web Publishing Wizard 1.53
[00334510] 040000 INF: AddRemove Display Name: DisplayName5   = Microsoft Office 2000 Premium 55
[00334510] 040000 INF: AddRemove Display Name: DisplayName6   = Brother MFL-Pro Suite
[00334510] 040000 INF: AddRemove Display Name: DisplayName7   = Brother Drivers
[00334510] 040000 INF: AddRemove Display Name: DisplayName8   = WebFldrs
[00334510] 040000 INF: AddRemove Display Name: DisplayName9   = Brother Drivers
[00334510] 040000 INF: ----- ADD/REMOVE APPLICATION Check End   -----

*49 BH3 doesn't check the media drive driver.

*50 No meaning (Ignore)

*51 It indicates connected devices
     (A connected device can be indicated including other company's products)
*52 If another device is connected to USB Port2, it is also indicated.

*53 It indicates that each port is connected to devices or not.

*54 USB Chip Information

*55 Add/Remove Application Information

USB Normal

```
[00341109] 040000 57 : ----- Process Information Start -----
[00341109] 010000 ERR: Process1=
[00341109] 010000 ERR: Process2=
[00341109] 010000 ERR: Process3=\SystemRoot\System32\smss.exe
[00341109] 010000 ERR: Process4=
[00341109] 010000 ERR: Process5=\??\C:\WINNT\system32\winlogon.exe
[00341109] 010000 ERR: Process6=C:\WINNT\system32\services.exe
[00341109] 010000 ERR: Process7=C:\WINNT\system32\lsass.exe
[00341109] 010000 ERR: Process8=C:\WINNT\system32\svchost.exe
[00341109] 010000 ERR: Process9=C:\WINNT\system32\spoolsv.exe
[00341109] 010000 ERR: Process10=C:\WINNT\System32\svchost.exe
[00341109] 010000 ERR: Process11=C:\WINNT\system32\regsvc.exe
[00341109] 010000 ERR: Process12=C:\WINNT\system32\MSTask.exe
[00341109] 010000 ERR: Process13=C:\WINNT\System32\WBEM\WinMgmt.exe
[00341109] 010000 ERR: Process14=C:\WINNT\Explorer.EXE
[00341109] 010000 ERR: Process15=C:\Program Files\Brownie\brstswnd.exe
[00341109] 010000 ERR: Process16=C:\Program Files\Brownie\Brcdcmon.exe
[00341109] 010000 ERR: Process17=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[00341109] 010000 ERR: Process18=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[00341109] 010000 ERR: Process19=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Diagnosis\BR_collect.exe
[00341109] 040000 INF: ----- Process Information End   -----

[00341109] 040000 INF: ----- Startup Information Start -----
[00341109] 040000 INF: STARTUP:  = Microsoft Office.lnk      58
[00341109] 040000 INF: STARTUP:  = Status Monitor.lnk
[00341109] 040000 INF: ----- Startup Information End   -----

[00347739] 040000 INF: ----- Installation Diagnostics Result Start -----
[00347739] 040000 INF: PRT        = OK          60
[00347739] 040000 INF: PRT_INST    = OK         61
[00347739] 040000 INF: PRT_PORT    = USB006     62

[00347739] 040000 INF: SCN        = OK          63
[00347739] 040000 INF: SCN_INST    = OK         64
[00347739] 040000 INF: SCN_PORT    = \\.\BrUscan0  65

[00347739] 040000 INF: FAXTX       = OK         66
[00347739] 040000 INF: FAXTX_INST  = OK         67
[00347739] 040000 INF: FAXTX_PORT  = USB006     68

[00347739] 040000 INF: FAXRX       = OK         69
[00347739] 040000 INF: FAXRX_INST  = OK         70
[00347739] 040000 INF: FAXRX_PORT  = COM5:      71

[00347739] 040000 INF: RSP        = OK          72
[00347739] 040000 INF: RSP_INST    = OK         73
[00347739] 040000 INF: RSP_PORT    = COM5:      74

[00347739] 040000 INF: ----- Installation Diagnostics Result End   -----
****************Debug Write End 2004/07/25 19:29:10***************
```

56   *56 Process Information which is running
          ! If you failed to install and virus checker was running, displace it.

      *57 ERRs are just a bug. Fix with ALL

*58 Startup Registration
   ! If you failed to install and virus checker was running, displace it.

59   *59 Installation Diagnostics Result (OK / NG(Installation) / NG(Communication)
*60 Printer Driver Integrated Diagnostic Result
*61 Printer Driver Installation Result
*62 Printer Driver Port

*63 Scanner Driver Integrated Diagnostic Result
*64 Scanner Driver Installation Result
*65 Scanner Driver Port

*66 PC-FAX Sending Driver Integrated Diagnostic Result
*67 PC-FAX Sending Driver Installation Result
*68 PC-FAX Sending Driver Port

*69 PC-FAX Receiving Driver Integrated Diagnostic Result
*70 PC-FAX Receiving Driver Installation Result
*71 PC-FAX Receiving Driver Port

*72 RSP Software Integrated Diagnostic Result
*73 RSP Software Installation Result
*74 RSP Software Port

USB Normal

Confidential

BH3 installation log file
C:\Documents and Settings\All Users\Application Data\Brother\BrLog\BrtINSTL.log

```
****************Debug Write Start 2004/07/25 19:26:59****************
Brother(R) Debug Output DLL Version 1.1
Copyright(c) 2004 Brother Industries, Ltd. All Rights Reserved.

************************ SYSTEM INFORMATION ************************   [1]
Function Name: INSTL
CPU Vender: GenuineIntel
Cpu Name: Intel Pentium III
FPU: Suppprted
TSC: Suppprted
MSR: Suppprted
CMOV: Suppprted                                              [2]
MMX: Suppprted
3DNow!: Not Suppprted
SSE_INT: Suppprted
SSE_FP: Suppprted
3DNow! Ext: Not Suppprted
FCMOV: Suppprted
OS Informations:
  Windows 2000 Professional Service Pack 2  OS version 5.0.2195
Memory Informations:
  Current memory load 28%  Total physical memory     = 255MB
  Available physical memory = 183MB
  Total pagefile          = 618MB
  Available pagefile       = 557MB
  Total virtual memory     = 2047MB
  Available virtual memory = 2022MB
************************ SYSTEM INFORMATION ************************
[00220757] 040000 INF: InstallationIniFilePath = C:\Program Files\Brother\Brmfl04b\Brmfinfo.ini
[00220787] 040000 INF: Function Data -------------------------------------------------------------
[00220787] 040000 INF: INIDATA  PRT      = 1      [3] [4] [5]
[00220787] 040000 INF: INIDATA  SCN      = 1
[00220787] 040000 INF: INIDATA  FAXTX    = 1                      [6]
[00220787] 040000 INF: INIDATA  FAXRX    = 1
[00220787] 040000 INF: INIDATA  RSP      = 1
[00220787] 040000 INF: INIDATA  MEDIA    = [7]
[00220787] 040000 INF: INIDATA  COM      = [8] [9]  [10]
[00220787] 040000 INF: INIDATA  USBID    = USB\VID_04F9&PID_016E
[00220787] 040000 INF: INIDATA  LPTID    = LPTENUM\BrotherMFC-5840[11]35F4
[00220787] 040000 INF: INIDATA  PRTNAME  = Brother MFC-5840CN USB Pr[12]
[00220787] 040000 INF: INIDATA  SCNNAME  = Brother MFC-5840CN USB  [13]
[00220787] 040000 INF: INIDATA  FAXNAME  = Brother PC-FAX #2       [14]
[00220787] 040000 INF: INIDATA  INSTPATH = C:\Program Files\Brother\B[15]l04b
[00220787] 040000 INF: INIDATA  PORTNAME = USB006        [16]
[00220787] 040000 INF: INIDATA  MODELNAME = MFC-5840CN  [17]
[00220787] 040000 INF: INIDATA  INTERFACE = U[18]
[00220787] 040000 INF: -------------------------------------------------------------
```

*1 Header Information
    Each start-up creates a new set of information

*2 PC System Information

*3 OS Start-up Time
*4 Error Level
*5 INF: Information / ERR: Error

*6 Information to be checked
    (Functions set up by integrated installer)
  PRT: Printer driver
  SCN: Scanner driver
  FAXTX: FAX sending driver
  FAXRX: FAX receiving software
  RSP: Remote Setup software
  MEDIA: Media Drive driver

*7 All models indicate "0" because BH3 doesn't check Media Drive
*8 COM Port Number
*9 Brother ID
*10 MODEL ID (! Machine ID is serial number, not obtained here)
*11 USB connection also requires LPTID
*12 Printer Driver Name
*13 Scanner Driver Name
*14 PC-FAX Sending Driver Name
*15 Folder Name to be installed
*16 USB Port Number
*17 Model Name
*18 Connection Mode (USB / LPT / LAN)

USB Communication Error

Confidential

```
[00220787] 040000 INF: Win2K
[00220837] 040000 INF: ----- Printer Driver Check Start -----
[00220847] 040000 INF: PARAM MODEL NAME        MFC-5840CN
[00220847] 040000 INF: PARAM CMP PRINTER NAME   Brother MFC-5840CN USB Printer
[00220847] 040000 INF: PARAM INTERFACE          USB
[00220847] 040000 INF: PARAM PRINTER ID
[00220847] 040000 INF: PARAM MODE              0
[00220857] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5840CN USB Printer
[00220857] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5840CN USB Printer
[00220857] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5840CN USB Printer
[00220857] 040000 INF: EXIST DRIVER NAME         = Brother MFC-5840CN USB Printer
[00220857] 040000 INF: LOCAL PORT NAME           = USB006
[00220857] 040000 INF: ----- Printer Driver Check End   -----

[00220857] 040000 INF: ----- Scanner Driver Check Start -----
[00221158] 040000 INF: Initialize() Result = 5
[00221158] 040000 INF: Scanner Install      = OK
[00221158] 040000 INF: ----- Scanner Driver Check End   -----

[00221158] 040000 INF: ----- FAXTX Driver Check Start -----
[00221158] 040000 INF: PARAM MODEL NAME         PC-FAX
[00221158] 040000 INF: PARAM CMP PRINTER NAME   Brother PC-FAX #2
[00221158] 040000 INF: PARAM INTERFACE          USB
[00221158] 040000 INF: PARAM PRINTER ID
[00221158] 040000 INF: PARAM MODE              0
[00221158] 040000 INF: EXIST DRIVER NAME        = Brother PC-FAX #2
[00221158] 040000 INF: PC-FAX PORT NAME     = USB006
[00221158] 040000 INF: ----- FAXTX Driver Check End   -----

[00221168] 040000 INF: ----- FAXRX Check Start -----
[00221168] 040000 INF: FAXRX FILE CHECK     = OK
[00221168] 040000 INF: ----- FAXRX Check End   -----

[00221168] 040000 INF: ----- RSP Check Start   -----
[00221168] 040000 INF: RSP FILE CHECK       = OK
[00221168] 040000 INF: ----- RSP Check End     -----

[00221168] 040000 INF: ----- Serial Port Check Start -----
[00221168] 010000 ERR: Open Serial Port Failure
[00221168] 010000 ERR: Port Name            = \\.\COM5
[00221168] 040000 INF: ----- Serial Port Check End   -----

[00221168] 040000 INF: ----- Enumerate Host Controllers Check Start -----
[00221288] 040000 INF: USB Host Controler:    \\.\HCD0    = Intel 82371AB/EB PCI to USB Universal Host Controller

[00221288] 040000 INF: USB Hub Information:     [Port1] NoDeviceConnected   = NoDeviceConnected

[00221288] 040000 INF: USB Hub Information:     [Port2] NoDeviceConnected   = NoDeviceConnected

[00221288] 040000 INF: ----- Enumerate Host Controllers Check End   -----
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*19 Installation Check Detail
*20 Printer Driver Installation Check

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23
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*22 Scanner Driver Installation Check
*23 Scanner Error Code:5 = The specified device is not connected (only USB connection).
*24 If Scanner Install =OK, Scanner Driver is properly installed.

25
26

*25 FAX(Tx) Driver Installation Check

*26 If there is EXIST DRIVER NAME, PC-FAX sending driver is properly installed.

27
28

*27 FAX(Rx) File Check
*28 If FAXRX FILE CHECK =OK, FAX receiving file is properly copied.

29
30

*29 Remote Setup File Check
*30 If RSP FILE CHECK =OK, RSP file is properly copied.

31
32

*31 Serial Port (COM Port Driver Check)
*32 PC-FAXRX is not available due to serial port failure. .

33
34

*33 Communication Check
*34 No device is connected to USB or no device is recognized because of HUB.
    Communication check is not attempted because the connection is not recognizable.

[00221669] 040000 INF: ----- USB Chip information Check Start -----
[00221669] 040000 INF: USB Chip0(Device25)   = Intel 82371AB/EB PCI to ISA bridge (ISA mode)
[00221669] 040000 INF: USB Chip1(Device26)   = Intel(r) 82371AB/EB PCI Bus Master IDE Controller
[00221669] 040000 INF: USB Chip2(Device27)   = Intel 82371AB/EB PCI to USB Universal Host C 54 oller   *54 USB Chip Information
[00221669] 040000 INF: USB Chip3(Device28)   = Intel 82443BX Pentium(r) II Processor to PCI Bridge
[00221669] 040000 INF: USB Chip4(Device29)   = Intel 82443BX Pentium(r) II Processor to AGP Controller
[00221669] 040000 INF: ----- USB Chip information Check End   -----

[00221669] 040000 INF: ----- ADD/REMOVE APPLICATION Check Start -----
[00221669] 040000 INF: AddRemove Display Name: DisplayName1   = Brother HL-5070
[00221669] 040000 INF: AddRemove Display Name: DisplayName2   = NVIDIA Windows 2000 Display Drivers
[00221669] 040000 INF: AddRemove Display Name: DisplayName3   = Microsoft Visual Studio 6.0 Enterprise Edition
[00221669] 040000 INF: AddRemove Display Name: DisplayName4   = Microsoft Web Publishing Wizard 1.53
[00221679] 040000 INF: AddRemove Display Name: DisplayName5   = Microsoft Office 2000 Premium 55   *55 Add/Remove Application Information
[00221679] 040000 INF: AddRemove Display Name: DisplayName6   = Brother MFL-Pro Suite
[00221679] 040000 INF: AddRemove Display Name: DisplayName7   = Brother Drivers
[00221679] 040000 INF: AddRemove Display Name: DisplayName8   = WebFldrs
[00221679] 040000 INF: AddRemove Display Name: DisplayName9   = Brother Drivers
[00221679] 040000 INF: ----- ADD/REMOVE APPLICATION Check End   -----

[00235399] 040000 57 ----- Process Information Start -----
[00235429] 010000 ERR: Process1=
[00235429] 010000 ERR: Process2=
[00235429] 010000 ERR: Process3=\SystemRoot\System32\smss.exe
[00235429] 010000 ERR: Process4=
[00235429] 010000 ERR: Process5=\??\C:\WINNT\system32\winlogon.exe
[00235429] 010000 ERR: Process6=C:\WINNT\system32\services.exe
[00235429] 010000 ERR: Process7=C:\WINNT\system32\lsass.exe
[00235429] 010000 ERR: Process8=C:\WINNT\system32\svchost.exe   56   *56 Process Information running now
[00235429] 010000 ERR: Process9=C:\WINNT\system32\spoolsv.exe
[00235429] 010000 ERR: Process10=C:\WINNT\System32\svchost.exe
[00235429] 010000 ERR: Process11=C:\WINNT\system32\regsvc.exe   *57 ERRs are just a bug. Fix with ALL
[00235429] 010000 ERR: Process12=C:\WINNT\system32\MSTask.exe
[00235429] 010000 ERR: Process13=C:\WINNT\System32\WBEM\WinMgmt.exe
[00235429] 010000 ERR: Process14=C:\WINNT\Explorer.EXE
[00235429] 010000 ERR: Process15=C:\Program Files\Brownie\brstswnd.exe
[00235429] 010000 ERR: Process16=C:\Program Files\Brownie\Brcdcmon.exe
[00235429] 010000 ERR: Process17=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[00235429] 010000 ERR: Process18=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[00235429] 010000 ERR: Process19=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Diagnosis\BR_collect.exe
[00235459] 040000 INF: ----- Process Information End   -----

[00235459] 040000 INF: ----- Startup Information Start -----
[00235459] 040000 INF: STARTUP: = Microsoft Office.lnk   58   *58 Startup Registration
[00235459] 040000 INF: STARTUP: = Status Monitor.lnk
[00235459] 040000 INF: ----- Startup Information End   -----

```
[00242088] 040000 INF: ----- Installation Diagnostics Result Start -----
[00242088] 010000 ERR: PRT        = NG (Communicat 60          59
[00242088] 010000 ERR: PRT_INST   = OK             61
[00242088] 010000 ERR: PRT_PORT   = USB006         62

[00242088] 010000 ERR: SCN        = NG (Communicat 63
[00242088] 010000 ERR: SCN_INST   = OK             64
[00242088] 010000 ERR: SCN_PORT   = ---            65

[00242088] 010000 ERR: FAXTX      = NG (Communic 66 n)
[00242088] 010000 ERR: FAXTX_INST = OK             67
[00242088] 010000 ERR: FAXTX_PORT = USB006         68

[00242088] 010000 ERR: FAXRX      = NG (Communic 69 n)
[00242088] 010000 ERR: FAXRX_INST = OK             70
[00242088] 010000 ERR: FAXRX_PORT = COM5:          71

[00242088] 010000 ERR: RSP        = NG (Communica 72 )
[00242088] 010000 ERR: RSP_INST   = OK             73
[00242088] 010000 ERR: RSP_PORT   = COM5:          74

[00242088] 040000 INF: ----- Installation Diagnostics Result End   -----

****************Debug Write End 2004/07/25 19:27:25***************
```

*59 Installation Diagnostics Result (OK / NG(Installation) / NG(Communication)
*60 Printer Driver Installation Failure (CANNOT Communicate)
*61 Printer Driver Installation Result
*62 Printer Driver Port

*63 Scanner Driver Installation Failure (CANNOT Communicate)
*64 Scanner Driver Installation Result
*65 Scanner Driver Port

*66 PC-FAX Sending Driver Installation Failure(CANNOT Communicate)
*67 PC-FAX Sending Driver Installation Result
*68 PC-FAX Sending Driver Port

*69 PC-FAX Receiving Software Installation Failure(CANNOT Communicate)
*70 PC-FAX Receiving Software Installation Result
*71 PC-FAX Receiving Software Port

*72 RSP Software Installation Failure (CANNOT Communicate)
*73 RSP Software Installation Result
*74 RSP Software Port

BH3 installation log file
C:\Documents and Settings\All Users\Application Data\Brother\BrLog\BrtINSTL.log

```
****************Debug Write Start 2004/07/25 19:33:41****************
Brother(R) Debug Output DLL Version 1.1
Copyright(c) 2004 Brother Industries, Ltd. All Rights Reserved.

************************ SYSTEM INFORMATION ************************    1
Function Name: INSTL
CPU Vender: GenuineIntel
Cpu Name: Intel Pentium III
FPU: Suppprted
TSC: Suppprted
MSR: Suppprted
CMOV: Suppprted                                         2
MMX: Suppprted
3DNow!: Not Suppprted
SSE_INT: Suppprted
SSE_FP: Suppprted
3DNow! Ext: Not Suppprted
FCMOV: Suppprted
OS Informations:
 Windows 2000 Professional Service Pack 2  OS version 5.0.2195
Memory Informations:
 Current memory load 28%  Total physical memory    = 255MB
 Available physical memory = 181MB
 Total pagefile         = 618MB
 Available pagefile     = 554MB
 Total virtual memory    = 2047MB
 Available virtual memory = 2022MB
************************ SYSTEM INFORMATION ************************
[00622414] 040000 INF: InstallationIniFilePath = C:\Program Files\Brother\Brmfl04b\Brmfinfo.ini
[00622414] 040000 INF: Function Data ----------------------------------------------------------------
[00 3 414] 4 00 5 NF: INIDATA  PRT     = 1                                6
[00622414] 040000 INF: INIDATA  SCN     = 1
[00622414] 040000 INF: INIDATA  FAXTX    = 1
[00622414] 040000 INF: INIDATA  FAXRX    = 1
[00622414] 040000 INF: INIDATA  RSP     = 1
[00622414] 040000 INF: INIDATA  MEDIA   - 7
[00622414] 040000 INF: INIDATA  COM    = 8   9      1
[00622414] 040000 INF: INIDATA  USBID   = USB\VID_04F9&PID_016F
[00622414] 040000 INF: INIDATA  LPTID   = LPTENUM\BrotherMFC-5840 11 85F5
[00622414] 040000 INF: INIDATA  PRTNAME  = Brother MFC-5555840CN USB 12 nter
[00622414] 040000 INF: INIDATA  SCNNAME  = Brother MFC-5555840CN USB  13
[00622424] 040000 INF: INIDATA  FAXNAME  = Brother PC-FAX #3      14
[00622424] 040000 INF: INIDATA  INSTPATH = C:\Program Files\Brother\E 15 l04c
[00622424] 040000 INF: INIDATA  PORTNAME = USB006      16
[00622424] 040000 INF: INIDATA  MODELNAME = MFC-5850CN   17
[00622424] 040000 INF: INIDATA  INTERFACE = U 18
[00622424] 040000 INF: ----------------------------------------------------------------
```

*1 Header Information
  Each start-up creates a new set of information

*2 PC System Information

*3 OS Start-up Time
*4 Error Level
*5 INF: Information / ERR: Error

*6 Information to be checked
  (Functions set up by integrated installer)
 PRT: Printer driver
 SCN: Scanner driver
 FAXTX: FAX sending driver
 FAXRX: FAX receiving software
 RSP: Remote Setup software
 MEDIA: Media Drive driver

*7 All models indicate "0" because BH3 doesn't check Media Drive
*8 COM Port Number
*9 Brother ID
*10 MODEL ID (! Machine ID is serial number, not obtained here)
*11 USB connection also requires LPTID
*12 Printer Driver Name
*13 Scanner Driver Name
*14 PC-FAX Sending Driver Name
*15 Folder Name to be installed
*16 USB Port Number
*17 Model Name
*18 Connection Mode (USB / LPT / LAN)

Insatallation Failure

Confidential

```
[00622424] 040000 INF: Win2K
[00622424] 040000 INF: ----- Printer Driver Check Start -----
[00622424] 040000 INF: PARAM MODEL NAME        MFC-5850CN                                              19      *19 Installation Check Detail
[00622424] 040000 INF: PARAM CMP PRINTER NAME   Brother MFC-5555840CN USB Printer      *20 Printer Driver Installation Check
[00622424] 040000 INF: PARAM INTERFACE          USB                                    20
[00622424] 040000 INF: PARAM PRINTER ID
[00622424] 040000 INF: PARAM MODE              0
[00622434] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5555840CN USB Printer
[00622434] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5555840CN USB Printer
[00622434] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5555840CN US 21 Printer   *21 If there is no EXIST DRIVER NAME, Driver is not properly installed.
[00622434] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5555840CN USB Printer
[00622434] 040000 INF: PARAM CMP NAME CHANGE     Brother MFC-5555840CN USB Printer
[00622434] 040000 INF: ----- Printer Driver Check End  -----

[00622434] 040000 INF: ----- Scanner Driver Check Start -----                                          *22 Scanner Driver Installation Check
[00622454] 040000 INF: Initialize() Result = 4      23                22                *23 Scanner Error ( 4= The specified device is not installed )
[00622454] 010000 ERR: Scanner Install       = N 24                                    *24 Scanner Driver is not properly installed.
[00622454] 040000 INF: ----- Scanner Driver Check End  -----

[00622454] 040000 INF: ----- FAXTX Driver Check Start -----          25                *25 FAX(Tx) Driver Installation Check
[00622454] 040000 INF: PARAM MODEL NAME        PC-FAX
[00622454] 040000 INF: PARAM CMP PRINTER NAME   Brother PC-FAX #3
[00622454] 040000 INF: PARAM INTERFACE          USB
[00622454] 040000 INF: PARAM PRINTER ID                    26                          *26 If there is no EXIST DRIVER NAME, PC-FAX sending driver is not properly installed.
[00622454] 040000 INF: PARAM MODE              0
[00622454] 040000 INF: ----- FAXTX Driver Check End  -----

[00622454] 040000 INF: ----- FAXRX Check Start -----                                   *27 FAX(Rx) File Check
[00622454] 040000 INF: FAXRX FILE CHECK       = 28          27                          *28 If FAXRX FILE CHECK =NG, FAX sending driver is not properly installed.
[00622454] 040000 INF: ----- FAXRX Check End  -----

[00622454] 040000 INF: ----- RSP Check Start -----                                     *29 Remote Setup File Check
[00622454] 040000 INF: RSP FILE CHECK        = 30          29                          *30 If RSP FILE CHECK =NG, Remote Setup is not properly installed.
[00622454] 040000 INF: ----- RSP Check End  -----

[00622454] 040000 INF: ----- Serial Port Check Start -----
[00623465] 040000 INF: FAXRX Connect OK                                                *31 Serial Port ( COM Port Driver Check )
[00623465] 040000 INF: RSP   Connect OK      32          31                            *32 FAX sending and RSP are not properly installed, but communication is available.
[00623485] 040000 INF: ----- Serial Port Check End  -----                                   FAX receiving and RSP can be used properly, if file exists

[00623485] 040000 INF: ----- Enumerate Host Controllers Check Start -----       33        *33 Communication Check
[00623605] 040000 INF: USB Host Controler:     \\.\HCD0    = Intel 82371AB/EB PCI to USB Universal Host Cor *34 The installation was not successful, and failed to check USB device.
                                                                                  34
[00623766] 040000 INF: USB Hub Information:     [Port1] DeviceConnected   = USB Composite Device

[00623766] 040000 INF: USB Hub Information:     [Port2] NoDeviceConnected   = NoDeviceConnected

[00623766] 040000 INF: ----- Enumerate Host Controllers Check End  -----
```

Insatallation Failure

[00624216] 040000 INF: ----- USB Chip information Check Start -----
[00624216] 040000 INF: USB Chip0(Device25)   = Intel 82371AB/EB PCI to ISA bridge (ISA mode)
[00624216] 040000 INF: USB Chip1(Device26)   = Intel(r) 82371AB/EB PCI Bus Master IDE Controller
[00624216] 040000 INF: USB Chip2(Device27)   = Intel 82371AB/EB PCI to USB Universal Host Co[54]ller   *54 USB Chip Information
[00624216] 040000 INF: USB Chip3(Device28)   = Intel 82443BX Pentium(r) II Processor to PCI Bridge
[00624216] 040000 INF: USB Chip4(Device29)   = Intel 82443BX Pentium(r) II Processor to AGP Controller
[00624216] 040000 INF: ----- USB Chip information Check End   -----

[00624216] 040000 INF: ----- ADD/REMOVE APPLICATION Check Start -----
[00624216] 040000 INF: AddRemove Display Name: DisplayName1 = Brother HL-5070
[00624216] 040000 INF: AddRemove Display Name: DisplayName2 = NVIDIA Windows 2000 Display Drivers
[00624216] 040000 INF: AddRemove Display Name: DisplayName3 = Microsoft Visual Studio 6.0 Enterprise Edition
[00624216] 040000 INF: AddRemove Display Name: DisplayName4 = Microsoft Web Publishing Wizard 1.53
[00624216] 040000 INF: AddRemove Display Name: DisplayName5 = Microsoft Office 2000 Premium [55] *55 Add/Remove Application Information
[00624216] 040000 INF: AddRemove Display Name: DisplayName6 = Brother MFL-Pro Suite
[00624216] 040000 INF: AddRemove Display Name: DisplayName7 = Brother Drivers
[00624216] 040000 INF: AddRemove Display Name: DisplayName8 = WebFldrs
[00624216] 040000 INF: AddRemove Display Name: DisplayName9 = Brother Drivers
[00624216] 040000 INF: ----- ADD/REMOVE APPLICATION Check End   -----

[00625218] 040000 INF: ----- Installation Diagnostics Result Start -----   *59 Installation Diagnostics Result (OK / NG(Installation) / NG(Communication)
[00625218] 010000 ERR: PRT   = NG (Insta[60]   [59]   *60 Printer Driver Installation Failure (Failure to install file)
[00625218] 010000 ERR: PRT_INST   = NG   [61]   *61 Scanner Driver Installation Result
[00625218] 010000 ERR: PRT_PORT   = ---   [62]   *62 Printer Driver Port

[00625218] 010000 ERR: SCN   = NG (Insta[63]   *63 Scanner Driver Installation Failure (Failure to install file)
[00625218] 010000 ERR: SCN_INST   = NG   [64]   *64 Scanner Driver Installation Result
[00625218] 010000 ERR: SCN_PORT   = ---   [65]   *65 Scanner Driver Port

[00625218] 010000 ERR: FAXTX   = NG (Inst[66]   *66 PC-FAX Sending Driver Installation Failure (Failure to install file)
[00625218] 010000 ERR: FAXTX_INST   = NG   [67]   *67 PC-FAX sending Driver Installation Result
[00625218] 010000 ERR: FAXTX_PORT   = ---   [68]   *68 PC-FAX Sending Driver Port

[00625218] 010000 ERR: FAXRX   = NG (Ins[69]   *69 PC-FAX Receiving Driver Installation Failure (Failure to install file)
[00625218] 010000 ERR: FAXRX_INST   = NG   [70]   *70 PC-FAX receiving Software Installation Result
[00625218] 010000 ERR: FAXRX_PORT   = COM5:   [71]   *71 PC-FAX Receiving Software Port

[00625218] 010000 ERR: RSP   = NG (Insta[72]   *72 RSP Software Installation Failure (Failure to install file)
[00625218] 010000 ERR: RSP_INST   = NG   [73]   *73 RSP Software Installation Result
[00625218] 010000 ERR: RSP_PORT   = COM5:   [74]   *74 RSP Software Port

[00625218] 040000 INF: ----- Installation Diagnostics Result End -----

****************Debug Write End 2004/07/25 19:33:50***************

```
****************Debug Write Start 2004/07/25 19:49:04***************
Brother(R) Debug Output DLL Version 1.1
Copyright(c) 2004 Brother Industries, Ltd. All Rights Reserved.

*********************** SYSTEM INFORMATION ***********************    1
Function Name: INSTL
CPU Vender: GenuineIntel
Cpu Name: Intel Pentium III
FPU: Suppprted
TSC: Suppprted
MSR: Suppprted
CMOV: Suppprted                              2
MMX: Suppprted
3DNow!: Not Suppprted
SSE_INT: Suppprted
SSE_FP: Suppprted
3DNow! Ext: Not Suppprted
FCMOV: Suppprted
OS Informations:
 Windows 2000 Professional Service Pack 2  OS version 5.0.2195
Memory Informations:
 Current memory load 34%  Total physical memory    = 255MB
 Available physical memory = 167MB
 Total pagefile        = 618MB
 Available pagefile      = 538MB
 Total virtual memory     = 2047MB
 Available virtual memory  = 2022MB
*********************** SYSTEM INFORMATION ***********************
[00318407] 040000 INF: InstallationIniFilePath = C:\Program Files\Brother\Brmfl04b\Brmfinfo.ini
[00318407] 040000 INF: Function Data -------------------------------------------------------------
[00  3  407]  4   00  5  NF: INIDATA  PRT     = 1                                    6
[00318407] 040000 INF: INIDATA  SCN     = 1
[00318407] 040000 INF: INIDATA  FAXTX    = 1
[00318407] 040000 INF: INIDATA  FAXRX    = 0
[00318407] 040000 INF: INIDATA  RSP     = 0
[00318407] 040000 INF: INIDATA  MEDIA    =  7
[00318407] 040000 INF: INIDATA  COM     = 0
[00318407] 040000 INF: INIDATA  USBID    =
[00318407] 040000 INF: INIDATA  LPTID    =                      11
[00318407] 040000 INF: INIDATA  PRTNAME   = Brother MFC-5840CN Printer   12
[00318407] 040000 INF: INIDATA  SCNNAME   = Brother MFC-5840CN LAN      13
[00318407] 040000 INF: INIDATA  FAXNAME   = Brother PC-FAX #4         14
[00318407] 040000 INF: INIDATA  INSTPATH  = C:\Program Files\Brother\B  15  04b
[00318407] 040000 INF: INIDATA  PORTNAME  = BRN_600300           16
[00318407] 040000 INF: INIDATA  MODELNAME = MFC-5840CN           17
[00318407] 040000 INF: INIDATA  INTERFACE = LA  18
[00318407] 040000 INF: -----------------------------------------------------------------
```

*1 Header Information
   Each start-up creates a new set of information

*2 PC System Information

*3 OS Start-up Time
*4 Error Level
*5 INF: Information / ERR: Error

*6 Information to be checked
   (Functions set up by integrated installer)
   PRT: Printer driver
   SCN: Scanner driver
   FAXTX: FAX sending driver
   FAXRX: FAX receiving software
   RSP: Remote Setup software
   MEDIA: Media Drive driver

*7 All models indicate "0" because BH3 doesn't check Media Drive

*11 USB connection also requires LPTID
*12 Printer Driver Name
*13 Scanner Driver Name
*14 PC-FAX Sending Driver Name
*15 Folder Name to be installed (04a: BHmini2 / 04b: BHL3)
*16 USB Port Number
*17 Model Name
*18 Connection Mode (USB / LPT / LAN)

```
[00318407] 040000 INF: Win2K
[00318417] 040000 INF: ----- Printer Driver Check Start -----
[00318417] 040000 INF: PARAM MODEL NAME        MFC-5840CN                          19    *19 Installation Check Detail
[00318417] 040000 INF: PARAM CMP PRINTER NAME   Brother MFC-5840CN Printer    20         *20 Printer Driver Installation Check
[00318417] 040000 INF: PARAM INTERFACE         LAN
[00318417] 040000 INF: PARAM PRINTER ID
[00318417] 040000 INF: PARAM MODE            0
[00318427] 040000 INF: EXIST DRIVER NAME        = Brother MFC-5840CN Prt  21              *21 If there is EXIST DRIVER NAME, printer driver is properly installed.
[00318427] 040000 INF: LAN PRINTER PORT NAME = BRN_600300
[00318427] 040000 INF: PARAM MODEL NAME        MFC-5840CN
[00318427] 040000 INF: PARAM CMP PRINTER NAME   Brother MFC-5840CN Printer
[00318427] 040000 INF: PARAM INTERFACE         LAN
[00318427] 040000 INF: PARAM PRINTER ID
[00318427] 040000 INF: PARAM MODE            1
[00318437] 040000 INF: ----- Network Port Check Start -----          75                  *75 Network Port Communication Check
[00318437] 040000 INF: NETWORK PORT CHECK       = BRN  76 300                             *76 Port Name created by installer
[00318437] 040000 INF: INTERFACE   = LAN
[00318437] 040000 INF: ----- Nework Connect Check Start -----                       77   *77 No meaning (Ignore)
[00320480] 010000 ERR: BrNetCloseDevice(): WSAWaitForMultipleEvents() timeout Error (code = 0)
[00322482] 010000 ERR: BrNetCloseDevice(): WSAWaitForMultipleEvents() timeout Error (code = 0)
[00322482] 040000 INF: Connect Device Name = Brother MFC-5840CN
[00322482] 040000 INF: ----- Nework Connect Check End   -----
[00322482] 040000 INF: PORT CHECK         = OK  78                                        *78 If OK, communication to network port is available.
[00322482] 040000 INF: ----- Network Port Check End   -----
[00322482] 040000 INF: ----- Printer Driver Check End   -----

[00322482] 040000 INF: ----- Scanner Driver Check Start -----        22                   *22 Scanner Driver Installation Check
[00322833] 040000 INF: Initialize() Result = 0            23                               *23 Scanner Error Code
[00322843] 040000 INF: Scanner Install        = OK  24                                     *24 If Scanner Install =OK, scanner driver is properly installed.
[00323183] 040000 INF: Initialize() Result = 0
[00324045] 040000 INF: ChkStiDevice() Result = 0
[00324045] 040000 INF: ChkWiaDevice() Result = 3
[00326909] 040000 INF: ChkTwainDs() Result = 0
[00326909] 040000 INF: Get ScannerName = Brother MFC-5840CN LAN
[00328501] 040000 INF: GetDefaultTwds() Result = 0
[00328501] 040000 INF: Get DefaultDS = TWAIN_32 Brother MFL Pro Scanner
[00329332] 040000 INF: GetPortName() Result = 0
[00329332] 040000 INF: Get PortName = AUTO
[00332827] 040000 INF: ChkDevCommunication() Result = 0
[00332827] 040000 INF: Scanner Connect        = OK
[00332827] 040000 INF: ----- Scanner Driver Check End   -----
```

Net Normal

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```
[00332827] 040000 INF: ----- FAXTX Driver Check Start -----
[00332827] 040000 INF: PARAM MODEL NAME       PC-FAX            25            *25 FAX(Tx) Driver Installation Check
[00332827] 040000 INF: PARAM CMP PRINTER NAME   Brother PC-FAX #4
[00332827] 040000 INF: PARAM INTERFACE        LAN
[00332827] 040000 INF: PARAM PRINTER ID
[00332827] 040000 INF: PARAM MODE          0
[00332827] 040000 INF: EXIST DRIVER NAME       = Brother PC-F 26 #4            *26 If there is EXIST DRIVER NAME, PC-FAX sending driver is properly installed.
[00332827] 040000 INF: PC-FAX PORT NAME      = BRN_600300
[00332827] 040000 INF: PARAM MODEL NAME       PC-FAX
[00332827] 040000 INF: PARAM CMP PRINTER NAME   Brother PC-FAX #4
[00332827] 040000 INF: PARAM INTERFACE        LAN
[00332827] 040000 INF: PARAM PRINTER ID
[00332827] 040000 INF: PARAM MODE          1
[00332827] 040000 INF: ----- Fax Port Check Start -----
[00332827] 040000 INF: FAX PORT CHECK          = BRN_600300
[00332827] 040000 INF: INTERFACE   = LAN
[00332827] 040000 INF: ----- Nework Connect Check Start -----
[00334850] 010000 ERR: BrNetCloseDevice(): WSAWaitForMultipleEvents() timeout Error (code = 0)
[00336853] 010000 ERR: BrNetCloseDevice(): WSAWaitForMultipleEvents() timeout Error (code = 0)
[00336853] 040000 INF: Connect Device Name = Brother MFC-5840CN
[00336853] 040000 INF: ----- Nework Connect Check End   -----
[00336853] 040000 INF: PORT CHECK        = OK
[00336853] 040000 INF: ----- Fax Port Check End   -----
[00336853] 040000 INF: ----- FAXTX Driver Check End   -----


[00336853] 040000 INF: ----- FAXRX Check Start -----
[00336853] 040000 INF: FAXRX FILE CHECK     = 28        27            *27 FAX(Rx) File Check
[00336853] 040000 INF: ----- FAXRX Check End   -----                 *28 If installation was done by network connection, it indicates NG.
                                                                          In this example,  installation is done by local connection in advance.
[00336853] 040000 INF: ----- RSP Check Start   -----
[00336853] 040000 INF: RSP FILE CHECK     = ( 30       29            *29 Remote Setup File Check
[00336853] 040000 INF: ----- RSP Check End   -----                   *30  If installation was done by network connection, it indicates NG
                                                                          In this example,  installation is done by local connection in advance.
[00336853] 040000 INF: ----- Serial Port Check Start -----
[00336853] 040000 INF: ----- Serial Port Check End 32 -    31        *31 Serial Port ( COM Port Driver Check )
                                                                     *32 Network connection doesn't support RSP, PC-FAXRx(COM Port Driver) and doesn't indicate.
```

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[00336853] 040000 INF: ----- Enumerate Host Controllers Check Start -----
[00336983] 040000 INF: USB Host Controler: \\.\HCD0   = Intel 82371AB/EB PCI to USB Universal Host Controller

[00337604] 040000 INF: ----- Connect Device Information Start -----   33   *33 Communication Check
[00337604] 040000 INF: Port1: Dev1 = USB Composite Device   34   (When connecting network, obtains local network connection)
[00337604] 040000 INF: ----- Connect Device Information End   -----   *34 USB device is connected to USB Port1
                                                                          If other USB devices are connected to USB Port2, it will be also indicated.
                                                                          ! If no device is recognized, HUB might be connected to the port. In this case, displace it.
[00338095] 040000 INF: ----- Connect Device Information Start -----
[00338095] 040000 INF: ----- Connect Device Information End   -----
                                                                   79   *79 No meaning (Ignore)
[00338586] 040000 INF: ----- Connect Device Information Start -----
[00338586] 040000 INF: ----- Connect Device Information End   -----

[00338586] 040000 INF: ----- Connect Device Information Start -----   51   *51 It indicates connected devices
[00338586] 040000 INF: Port1: Dev1 = USB Printing Support   (A connected device can be indicated including other company's products)
[00338586] 040000 INF: Port1: Dev2 = USB Mass Storage Device   52   *52 If another device is connected to USB Port2, it is also indicated.
[00338586] 040000 INF: ----- Connect Device Information End   -----

[00338586] 040000 INF: USB Hub Information: [Port1] DeviceConnected   = USB Composite Device
                                                                     53   *53 It indicates that each port is connected to devices or not.
[00338586] 040000 INF: USB Hub Information: [Port2] NoDeviceConnected   = NoDeviceConnected

[00338586] 040000 INF: ----- Enumerate Host Controllers Check End   -----

[00339036] 040000 INF: ----- USB Chip information Check Start -----
[00339036] 040000 INF: USB Chip0(Device25)   = Intel 82371AB/EB PCI to ISA bridge (ISA mode)
[00339036] 040000 INF: USB Chip1(Device26)   = Intel(r) 82371AB/EB PCI Bus Master IDE Controller
[00339036] 040000 INF: USB Chip2(Device27)   = Intel 82371AB/EB PCI to USB Universal Host Co 54 ller   *54 USB Chip Information
[00339036] 040000 INF: USB Chip3(Device28)   = Intel 82443BX Pentium(r) II Processor to PCI Bridge
[00339036] 040000 INF: USB Chip4(Device29)   = Intel 82443BX Pentium(r) II Processor to AGP Controller
[00339036] 040000 INF: ----- USB Chip information Check End   -----

[00339036] 040000 INF: ----- ADD/REMOVE APPLICATION Check Start -----
[00339036] 040000 INF: AddRemove Display Name: DisplayName1   = Brother HL-5070
[00339036] 040000 INF: AddRemove Display Name: DisplayName2   = NVIDIA Windows 2000 Display Drivers
[00339036] 040000 INF: AddRemove Display Name: DisplayName3   = Microsoft Visual Studio 6.0 Enterprise Edition
[00339036] 040000 INF: AddRemove Display Name: DisplayName4   = Microsoft Web Publishing Wizard 1.53
[00339036] 040000 INF: AddRemove Display Name: DisplayName5   = Microsoft Office 2000 Pr 55 um   *55 Add/Remove Application Information
[00339036] 040000 INF: AddRemove Display Name: DisplayName6   = Brother MFL-Pro Suite
[00339036] 040000 INF: AddRemove Display Name: DisplayName7   = Brother Drivers
[00339036] 040000 INF: AddRemove Display Name: DisplayName8   = WebFldrs
[00339036] 040000 INF: AddRemove Display Name: DisplayName9   = Brother Drivers
[00339036] 040000 INF: ----- ADD/REMOVE APPLICATION Check End   -----

```
[00345566] 040000 INF: ----- Process Information Start -----
[00345566] 010000 ERR: Process1=
[00345566] 010000 ERR: Process2=
[00345566] 010000 ERR: Process3=\SystemRoot\System32\smss.exe
[00345566] 010000 ERR: Process4=
[00345566] 010000 ERR: Process5=\??\C:\WINNT\system32\winlogon.exe
[00345566] 010000 ERR: Process6=C:\WINNT\system32\services.exe
[00345566] 010000 ERR: Process7=C:\WINNT\system32\lsass.exe
[00345566] 010000 ERR: Process8=C:\WINNT\system32\svchost.exe
[00345566] 010000 ERR: Process9=C:\WINNT\system32\spoolsv.exe
[00345566] 010000 ERR: Process10=C:\WINNT\System32\svchost.exe
[00345566] 010000 ERR: Process11=C:\WINNT\system32\regsvc.exe
[00345566] 010000 ERR: Process12=C:\WINNT\system32\MSTask.exe
[00345566] 010000 ERR: Process13=C:\WINNT\System32\WBEM\WinMgmt.exe
[00345566] 010000 ERR: Process14=C:\WINNT\Explorer.EXE
[00345566] 010000 ERR: Process15=C:\Program Files\Brownie\brstswnd.exe
[00345566] 010000 ERR: Process16=C:\Program Files\Brownie\Brcdcmon.exe
[00345566] 010000 ERR: Process17=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[00345566] 010000 ERR: Process18=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[00345566] 010000 ERR: Process19=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Diagnosis\BR_collect.exe
[00345566] 040000 INF: ----- Process Information End   -----

[00345566] 040000 INF: ----- Startup Information Start -----
[00345566] 040000 INF: STARTUP:  = Microsoft Office.lnk
[00345566] 040000 INF: STARTUP:  = Status Monitor.lnk
[00345566] 040000 INF: ----- Startup Information End   -----

[00352175] 040000 INF: ----- Installation Diagnostics Result Start -----
[00352175] 040000 INF: PRT         = OK
[00352175] 040000 INF: PRT_INST    = OK
[00352175] 040000 INF: PRT_PORT    = BRN_600300

[00352175] 040000 INF: SCN         = OK
[00352175] 040000 INF: SCN_INST    = OK
[00352175] 040000 INF: SCN_PORT    = AUTO

[00352175] 040000 INF: FAXTX       = OK
[00352175] 040000 INF: FAXTX_INST  = OK
[00352175] 040000 INF: FAXTX_PORT  = BRN_600300

[00352175] 040000 INF: ----- Installation Diagnostics Result End   -----

***************Debug Write End 2004/07/25 19:49:44***************
```

56
*56 Process Information which is running
   ! If you failed to install and virus checker was running, quit the software.

57
*57 ERRs are just a bug. Fix with ALL

58
*58 Startup Registration
   ! If you failed to install and virus checker was running, quit the software.

59
*59 Installation Diagnostics Result (OK / NG(Installation) / NG(Communication)

60
*60 Printer Driver Integrated Diagnostic Result

61
*61 Printer Driver Installation Result

62
*62 Printer Driver Port

63
*63 Scanner Driver Integrated Diagnostic Result

64
*64 Scanner Driver Installation Result

65
*65 Scanner Driver Port

66
*66 PC-FAX Sending Driver Integrated Diagnostic Result

67
*67 PC-FAX Sending Driver Installation Result

68
*68 PC-FAX Sending Driver Port

BH3 installation log file
C:\Documents and Settings\All Users\Application Data\Brother\BrLog\BrtINSTL.log

****************Debug Write Start 2004/07/25 20:44:21****************
Brother(R) Debug Output DLL Version 1.1
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************************ SYSTEM INFORMATION ************************   [1]   *1 Header Information
Function Name: INSTL   Each start-up creates a new set of information
CPU Vender: GenuineIntel
Cpu Name: Intel Pentium III
FPU: Suppprted
TSC: Suppprted
MSR: Suppprted
CMOV: Suppprted   [2]   *2 PC System Information
MMX: Suppprted
3DNow!: Not Suppprted
SSE_INT: Suppprted
SSE_FP: Suppprted
3DNow! Ext: Not Suppprted
FCMOV: Suppprted
OS Informations:
  Windows 2000 Professional Service Pack 2 OS version 5.0.2195
Memory Informations:
  Current memory load 34% Total physical memory   = 255MB   *3 OS Start-up Time
  Available physical memory = 167MB   *4 Error Level
  Total pagefile   = 618MB   *5 INF: Information / ERR: Error
  Available pagefile   = 539MB
  Total virtual memory   = 2047MB   *6 Information to be checked
  Available virtual memory = 2022MB   (Functions set up by integrated installer)
************************ SYSTEM INFORMATION ************************   PRT: Printer driver
[03635316] 040000 INF: InstallationIniFilePath = C:\Program Files\Brother\Brmfl04b\Brmfinfo.ini   SCN: Scanner driver
[03635316] 040000 INF: Function Data ---   FAXTX: FAX sending driver
[03[3]5316] 0[4]000 [5]NF: INIDATA PRT   = 1   [6]   FAXRX: FAX receiving software
[03635316] 040000 INF: INIDATA SCN   = 1   RSP: Remote Setup software
[03635316] 040000 INF: INIDATA FAXTX   = 1   MEDIA: Media Drive driver
[03635316] 040000 INF: INIDATA FAXRX   = 0
[03635316] 040000 INF: INIDATA RSP   = 0   *7 All models indicate "0" because BH3 doesn't check Media Drive.
[03635316] 040000 INF: INIDATA MEDIA   = [7]
[03635316] 040000 INF: INIDATA COM   = 0
[03635316] 040000 INF: INIDATA USBID   =   *11 USB connection also requires LPTID
[03635316] 040000 INF: INIDATA LPTID   =   [11]   *12 Printer Driver Name
[03635316] 040000 INF: INIDATA PRTNAME   = Brother MFC-5840CN Printer [12] *13 Scanner Driver Name
[03635316] 040000 INF: INIDATA SCNNAME   = Brother MFC-5840CN LAN   [13] *14 PC-FAX Sending Driver Name
[03635316] 040000 INF: INIDATA FAXNAME   = Brother PC-FAX #5   [14] *15 Folder Name to be installed (04a: BHmini2 / 04b: BHL3)
[03635316] 040000 INF: INIDATA INSTPATH = C:\Program Files\Brother\B[15]04b *16 USB Port Number
[03635316] 040000 INF: INIDATA PORTNAME = BRN_6007C0   [16]   *17 Model Name
[03635316] 040000 INF: INIDATA MODELNAME = MFC-5840CN   [17]   *18 Connection Mode (USB / LPT / LAN)
[03635316] 040000 INF: INIDATA INTERFACE = LA[18]
[03635316] 040000 INF: --

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```
[03635316] 040000 INF: Win2K
[03635326] 040000 INF: ----- Printer Driver Check Start -----                         19
[03635326] 040000 INF: PARAM MODEL NAME        MFC-5840CN              *19 Installation Check Detail
[03635326] 040000 INF: PARAM CMP PRINTER NAME   Brother MFC-5840CN Printer  *20 Printer Driver Installation Check
[03635326] 040000 INF: PARAM INTERFACE        LAN                20
[03635326] 040000 INF: PARAM PRINTER ID
[03635326] 040000 INF: PARAM MODE          0
[03635336] 040000 INF: EXIST DRIVER NAME      = Brother MFC-5840CN  21  ter    *21 Printer Driver is properly installed.
[03635336] 040000 INF: LAN PRINTER PORT NAME = BRN_6007C0
[03635336] 040000 INF: PARAM MODEL NAME        MFC-5840CN
[03635336] 040000 INF: PARAM CMP PRINTER NAME   Brother MFC-5840CN Printer
[03635336] 040000 INF: PARAM INTERFACE        LAN
[03635336] 040000 INF: PARAM PRINTER ID
[03635336] 040000 INF: PARAM MODE          1
[03635336] 040000 INF: ----- Network Port Check Start -----
[03635336] 040000 INF: NETWORK PORT CHECK     = BRN_6007C0  75        *75 Network Port Connection Check
[03635336] 040000 INF: INTERFACE   = LAN          76            *76 Port Name created by installer
[03635336] 040000 INF: ----- Nework Connect Check Start ----
[03635376] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03635376] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 0)
[03637389] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03637389] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 1)
[03639402] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03639402] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 2)
[03641415] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03641415] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 3)
[03643428] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03643428] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 4)
[03645440] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03645440] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 5)
[03647453] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03647453] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 6)
[03649466] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03649466] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 7)
[03651479] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03651479] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 8)
[03653492] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03653492] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 9)
[03655505] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03655505] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 10)
[03657518] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03657518] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 11)
[03659531] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03659531] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 12)
[03661544] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03661544] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 13)
[03663556] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03663556] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 14)
[03665559] 040000 INF: PORT CHECK     = 90        *90 There is no response from BRN_6007C0 (or IP address) assigned to the port.
[03665559] 040000 INF: ----- Network Port Check End  -----
[03670567] 040000 INF: PARAM MODEL NAME        MFC-5840CN
```

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[03670567] 040000 INF: PARAM CMP PRINTER NAME   Brother MFC-5840CN Printer
[03670567] 040000 INF: PARAM INTERFACE   LAN
[03670567] 040000 INF: PARAM PRINTER ID
[03670567] 040000 INF: PARAM MODE   1
[03670567] 040000 INF: ----- Network Port Check Start -----
[03670567] 040000 INF: NETWORK PORT CHECK   = BRN_6007C0
[03670567] 040000 INF: INTERFACE   = LAN
[03670567] 040000 INF: ----- Nework Connect Check Start -----   91
[03670577] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03670577] 010000 ERR: CheckNetwork() Error: Port Name iligal.(Time = 0)
[03672589] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03672589] 010000 ERR: CheckNetwork() Error: Port Name iligal.(Time = 1)
[03674602] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03674602] 010000 ERR: CheckNetwork() Error: Port Name iligal.(Time = 2)
[03676615] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03676615] 010000 ERR: CheckNetwork() Error: Port Name iligal.(Time = 3)
[03678628] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03678628] 010000 ERR: CheckNetwork() Error: Port Name iligal.(Time = 4)
[03680641] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03680641] 010000 ERR: CheckNetwork() Error: Port Name iligal.(Time = 5)
[03682654] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03682654] 010000 ERR: CheckNetwork() Error: Port Name iligal.(Time = 6)
[03684667] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03684667] 010000 ERR: CheckNetwork() Error: Port Name iligal.(Time = 7)
[03686680] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03686680] 010000 ERR: CheckNetwork() Error: Port Name iligal.(Time = 8)
[03688693] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03688693] 010000 ERR: CheckNetwork() Error: Port Name iligal.(Time = 9)
[03690706] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03690706] 010000 ERR: CheckNetwork() Error: Port Name iligal.(Time = 10)
[03692718] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03692718] 010000 ERR: CheckNetwork() Error: Port Name iligal.(Time = 11)
[03694731] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03694731] 010000 ERR: CheckNetwork() Error: Port Name iligal.(Time = 12)
[03696744] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03696744] 010000 ERR: CheckNetwork() Error: Port Name iligal.(Time = 13)
[03698757] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03698757] 010000 ERR: CheckNetwork() Error: Port Name iligal.(Time = 14)
[03700760] 040000 INF: PORT CHECK   = NG
[03700760] 040000 INF: ----- Network Port Check End   -----
[03700760] 040000 INF: ----- Printer Driver Check End   -----

*91 There is no response from BRN_6007C0(or IP address) assigned to the port and
    attempting again.

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```
[03700760] 040000 INF: ----- Scanner Driver Check Start -----          22
[03701110] 040000 INF: Initialize() Result = 0               23
[03701110] 040000 INF: Scanner Install      = OK             24
[03701461] 040000 INF: Initialize() Result = 0
[03702012] 040000 INF: ChkStiDevice() Result = 0
[03702012] 040000 INF: ChkWiaDevice() Result = 3
[03704906] 040000 INF: ChkTwainDs() Result = 0
[03704906] 040000 INF: Get ScannerName = Brother MFC-5840CN LAN
[03706498] 040000 INF: GetDefaultTwds() Result = 0
[03706498] 040000 INF: Get DefaultDS = TWAIN_32 Brother MFL Pro Scanner
[03707309] 040000 INF: GetPortName() Result = 0
[03707309] 040000 INF: Get PortName = AUTO
[03707860] 040000 INF: ChkDevCommunication() Result = 40
[03707860] 010000 ERR: Scanner Connect      = NG     92
[03713218] 040000 INF: Initialize() Result = 0
[03713759] 040000 INF: ChkStiDevice() Result = 0               93
[03713759] 040000 INF: ChkWiaDevice() Result = 3
[03716623] 040000 INF: ChkTwainDs() Result = 0
[03716623] 040000 INF: Get ScannerName = Brother MFC-5840CN LAN
[03718235] 040000 INF: GetDefaultTwds() Result = 0
[03718235] 040000 INF: Get DefaultDS = TWAIN_32 Brother MFL Pro Scanner
[03719046] 040000 INF: GetPortName() Result = 0
[03719046] 040000 INF: Get PortName = AUTO
[03719607] 040000 INF: ChkDevCommunication() Result = 40
[03719607] 010000 ERR: Scanner Connect      = NG
[03724965] 040000 INF: Initialize() Result = 0
[03725526] 040000 INF: ChkStiDevice() Result = 0
[03725526] 040000 INF: ChkWiaDevice() Result = 3
[03728390] 040000 INF: ChkTwainDs() Result = 0
[03728390] 040000 INF: Get ScannerName = Brother MFC-5840CN LAN
[03729992] 040000 INF: GetDefaultTwds() Result = 0
[03729992] 040000 INF: Get DefaultDS = TWAIN_32 Brother MFL Pro Scanner
[03730813] 040000 INF: GetPortName() Result = 0
[03730813] 040000 INF: Get PortName = AUTO
[03731364] 040000 INF: ChkDevCommunication() Result = 40
[03731364] 010000 ERR: Scanner Connect      = NG
[03736722] 040000 INF: Initialize() Result = 0
[03737262] 040000 INF: ChkStiDevice() Result = 0
[03737262] 040000 INF: ChkWiaDevice() Result = 3
[03740147] 040000 INF: ChkTwainDs() Result = 0
[03740147] 040000 INF: Get ScannerName = Brother MFC-5840CN LAN
[03741739] 040000 INF: GetDefaultTwds() Result = 0
[03741739] 040000 INF: Get DefaultDS = TWAIN_32 Brother MFL Pro Scanner
[03742540] 040000 INF: GetPortName() Result = 0
[03742540] 040000 INF: Get PortName = AUTO
[03743101] 040000 INF: ChkDevCommunication() Result = 40
[03743101] 010000 ERR: Scanner Connect      = NG
[03748459] 040000 INF: Initialize() Result = 0
[03748999] 040000 INF: ChkStiDevice() Result = 0
[03748999] 040000 INF: ChkWiaDevice() Result = 3
[03751863] 040000 INF: ChkTwainDs() Result = 0
```

*22 Scanner Driver Installation Check
*23 There is no error in scanner
*24 Driver is properly installed

*92 It cannot make a connection to Scanner Brother MFC-5840CN LAN.

*93 Attempting again because the first attempt was NG

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```
[03751863] 040000 INF: Get ScannerName = Brother MFC-5840CN LAN
[03753476] 040000 INF: GetDefaultTwds() Result = 0
[03753476] 040000 INF: Get DefaultDS = TWAIN_32 Brother MFL Pro Scanner
[03754297] 040000 INF: GetPortName() Result = 0
[03754297] 040000 INF: Get PortName = AUTO
[03754848] 040000 INF: ChkDevCommunication() Result = 40
[03754848] 010000 ERR: Scanner Connect        = NG
[03760205] 040000 INF: Initialize() Result = 0
[03760756] 040000 INF: ChkStiDevice() Result = 0
[03760756] 040000 INF: ChkWiaDevice() Result = 3
[03763630] 040000 INF: ChkTwainDs() Result = 0
[03763630] 040000 INF: Get ScannerName = Brother MFC-5840CN LAN
[03765223] 040000 INF: GetDefaultTwds() Result = 0
[03765223] 040000 INF: Get DefaultDS = TWAIN_32 Brother MFL Pro Scanner
[03766034] 040000 INF: GetPortName() Result = 0
[03766034] 040000 INF: Get PortName = AUTO
[03766605] 040000 INF: ChkDevCommunication() Result = 40
[03766605] 010000 ERR: Scanner Connect        = NG
[03771612] 040000 INF: ----- Scanner Driver Check End   -----

[03771612] 040000 INF: ----- FAXTX Driver Check Start -----          25
[03771612] 040000 INF: PARAM MODEL NAME       PC-FAX
[03771612] 040000 INF: PARAM CMP PRINTER NAME   Brother PC-FAX #5
[03771612] 040000 INF: PARAM INTERFACE        LAN
[03771612] 040000 INF: PARAM PRINTER ID
[03771612] 040000 INF: PARAM MODE          0
[03771612] 040000 INF: EXIST DRIVER NAME      = Brother PC-F  26  #5        *26 PC-FAX sending driver is properly installed.
[03771612] 040000 INF: PC-FAX PORT NAME     = BRN_6007C0
[03771612] 040000 INF: PARAM MODEL NAME       PC-FAX
[03771612] 040000 INF: PARAM CMP PRINTER NAME   Brother PC-FAX #5
[03771612] 040000 INF: PARAM INTERFACE        LAN
[03771612] 040000 INF: PARAM PRINTER ID
[03771612] 040000 INF: PARAM MODE          1
[03771612] 040000 INF: ----- Fax Port Check Start -----
[03771612] 040000 INF: FAX PORT CHECK        = BRN_6007C0
[03771612] 040000 INF: INTERFACE   = LAN
[03771612] 040000 INF: ----- Nework Connect Check Start -----
[03771632] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03771632] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 0)
[03773645] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03773645] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 1)
[03775658] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03775658] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 2)
[03777671] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03777671] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 3)
[03779683] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03779683] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 4)
[03781696] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03781696] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 5)
[03783709] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03783709] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 6)
```

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```
[03785722] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03785722] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 7)
[03787735] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03787735] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 8)
[03789748] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03789748] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 9)
[03791761] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03791761] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 10)
[03793774] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03793774] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 11)
[03795787] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03795787] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 12)
[03797800] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03797800] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 13)
[03799812] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03799812] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 14)
[03801815] 040000 INF: PORT CHECK          = NG   94
[03801815] 040000 INF: ----- Fax Port Check End  -----
[03806822] 040000 INF: PARAM MODEL NAME      PC-FAX
[03806822] 040000 INF: PARAM CMP PRINTER NAME   Brother PC-FAX #5
[03806822] 040000 INF: PARAM INTERFACE        LAN
[03806822] 040000 INF: PARAM PRINTER ID
[03806822] 040000 INF: PARAM MODE           1
[03806822] 040000 INF: ----- Fax Port Check Start -----
[03806822] 040000 INF: FAX PORT CHECK        = BRN_6007C0
[03806822] 040000 INF: INTERFACE   = LAN
[03806822] 040000 INF: ----- Nework Connect Check Start ----
[03806832] 010000 ERR: Cannot Get IP Address (ErrCode = 1100   95
[03806832] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 0)
[03808845] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03808845] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 1)
[03810858] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03810858] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 2)
[03812871] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03812871] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 3)
[03814884] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03814884] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 4)
[03816897] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03816897] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 5)
[03818910] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03818910] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 6)
[03820923] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03820923] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 7)
[03822936] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03822936] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 8)
[03824949] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03824949] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 9)
[03826961] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03826961] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 10)
[03828974] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03828974] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 11)
```

*94 There is no response from BRN_6007C0 (or IP address) assigned to the port
   and attempting again.

*95 Attempting again because the first attempt was NG

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```
[03830987] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03830987] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 12)
[03833000] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03833000] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 13)
[03835013] 010000 ERR: Cannot Get IP Address (ErrCode = 11001)
[03835013] 010000 ERR: CheckNetwork() Error:  Port Name iligal.(Time = 14)
[03837016] 040000 INF: PORT CHECK = NG
[03837016] 040000 INF: ----- Fax Port Check End   -----
[03837016] 040000 INF: ----- FAXTX Driver Check End   -----

[03837016] 040000 INF: ----- FAXRX Check Start -----
[03837016] 040000 INF: FAXRX FILE CHECK = OK        28    27
[03837016] 040000 INF: ----- FAXRX Check End   -----

[03837016] 040000 INF: ----- RSP Check Start   -----
[03837016] 040000 INF: RSP FILE CHECK = OK          30    29
[03837016] 040000 INF: ----- RSP Check End     -----

[03837016] 040000 INF: ----- Serial Port Check Start -----
[03837016] 040000 INF: ----- Serial Port Check End   --- 32      31

[03837016] 040000 INF: ----- Enumerate Host Controllers Check Start -----
[03837146] 040000 INF: USB Host Controler:     \\.\HCD0    = Intel 82371AB/EB PCI to USB Universal Host Controller
                                                                              33

[03837777] 040000 INF: ----- Connect Device Information Start -----
[03837777] 040000 INF: Port1:  Dev1 = USB Composite Device    34
[03837777] 040000 INF: ----- Connect Device Information End   -----

[03838278] 040000 INF: ----- Connect Device Information Start -----
[03838278] 040000 INF: ----- Connect Device Information End   -----
                                                              79
[03838748] 040000 INF: ----- Connect Device Information Start -----
[03838748] 040000 INF: ----- Connect Device Information End   -----

[03838748] 040000 INF: ----- Connect Device Information Start --- 51
[03838748] 040000 INF: Port1:  Dev1 = USB Printing Support
[03838748] 040000 INF: Port1:  Dev2 = USB Mass Storage Device
[03838748] 040000 INF: ----- Connect Device Information End   --- 52

[03838748] 040000 INF: USB Hub Information: [Port1] DeviceConnected    = USB Composite Device
                                                                        53
[03838748] 040000 INF: USB Hub Information: [Port2] NoDeviceConnected    = NoDeviceConnected

[03838748] 040000 INF: ----- Enumerate Host Controllers Check End   -----
```

*27 FAX(Rx) File Check
*28 If installation was done by network connection, it indicates NG.
    In this example, installation is done by local connection in advance.

*29 Remote Setup File Check
*30 If installation was done by network connection, it indicates NG.
     In this example, installation is done by local connection in advance.

*31 Serial Port (COM Port Driver Check)
*32 Network connection doesn't support RSP, PC-FAXRx(COM Port Driver) and
    doesn't indicate.

*33 Communication Check
   (It obtains the status of connecting to local network, even though it
    is connecting to network,)
*34 USB device is connected to USB Port1
   If other USB devices are connected to USB Port2, it will be also indicated.
   ! If no device is recognized, HUB might be connected to the port. In
      this case, displace it.
*79 No meaning (Ignore)

*51 It indicates connected devices
    USB Printing Support, USB Mass Storage Device is connected to Port 1.

*52 If another device is connected to USB Port2, it is also indicated.

[03839169] 040000 INF: ----- USB Chip information Check Start -----
[03839169] 040000 INF: USB Chip0(Device25)   = Intel 82371AB/EB PCI to ISA bridge (ISA mode)
[03839179] 040000 INF: USB Chip1(Device26)   = Intel(r) 82371AB/EB PCI Bus Master IDE Controller
[03839179] 040000 INF: USB Chip2(Device27)   = Intel 82371AB/EB PCI to USB Universal Host Controller   54   *54 USB Chip Information
[03839179] 040000 INF: USB Chip3(Device28)   = Intel 82443BX Pentium(r) II Processor to PCI Bridge
[03839179] 040000 INF: USB Chip4(Device29)   = Intel 82443BX Pentium(r) II Processor to AGP Controller
[03839179] 040000 INF: ----- USB Chip information Check End   -----

[03839179] 040000 INF: ----- ADD/REMOVE APPLICATION Check Start -----
[03839179] 040000 INF: AddRemove Display Name: DisplayName1 = Brother HL-5070
[03839179] 040000 INF: AddRemove Display Name: DisplayName2 = NVIDIA Windows 2000 Display Drivers
[03839179] 040000 INF: AddRemove Display Name: DisplayName3 = Microsoft Visual Studio 6.0 Enterprise Edition
[03839179] 040000 INF: AddRemove Display Name: DisplayName4 = Microsoft Web Publishing Wizard   55   *55 Add/Remove Application Information
[03839179] 040000 INF: AddRemove Display Name: DisplayName5 = Microsoft Office 2000 Premium
[03839179] 040000 INF: AddRemove Display Name: DisplayName6 = Brother MFL-Pro Suite
[03839179] 040000 INF: AddRemove Display Name: DisplayName7 = Brother Drivers
[03839179] 040000 INF: AddRemove Display Name: DisplayName8 = WebFldrs
[03839179] 040000 INF: AddRemove Display Name: DisplayName9 = Brother Drivers
[03839179] 040000 INF: ----- ADD/REMOVE APPLICATION Check End   -----

[03845718] 040000 INF: ----- Process Information Start -----
[03845718] 010000 ERR: Process1=   57
[03845718] 010000 ERR: Process2=
[03845718] 010000 ERR: Process3=\SystemRoot\System32\smss.exe
[03845718] 010000 ERR: Process4=
[03845718] 010000 ERR: Process5=\??\C:\WINNT\system32\winlogon.exe
[03845718] 010000 ERR: Process6=C:\WINNT\system32\services.exe
[03845718] 010000 ERR: Process7=C:\WINNT\system32\lsass.exe
[03845718] 010000 ERR: Process8=C:\WINNT\system32\svchost.exe   56   *56 Process Information which is running
[03845718] 010000 ERR: Process9=C:\WINNT\system32\spoolsv.exe   ! If you failed to install and virus checker was running, quit the software.
[03845718] 010000 ERR: Process10=C:\WINNT\System32\svchost.exe
[03845718] 010000 ERR: Process11=C:\WINNT\system32\regsvc.exe   *57 ERRs are just a bug. Fix with ALL
[03845718] 010000 ERR: Process12=C:\WINNT\system32\MSTask.exe
[03845718] 010000 ERR: Process13=C:\WINNT\System32\WBEM\WinMgmt.exe
[03845718] 010000 ERR: Process14=C:\WINNT\Explorer.EXE
[03845718] 010000 ERR: Process15=C:\Program Files\Brownie\brstswnd.exe
[03845718] 010000 ERR: Process16=C:\Program Files\Brownie\Brcdcmon.exe
[03845718] 010000 ERR: Process17=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[03845718] 010000 ERR: Process18=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Setup.exe
[03845718] 010000 ERR: Process19=\\apngo-sugi\SOFT1\PC-Appli\PCDisks\Debug2004\bh3\Install\Appli\BH3\Ver1.01\UsaEur\Data\Disk1\Diagnosis\BR_collect.exe
[03845718] 040000 INF: ----- Process Information End   -----

[03845718] 040000 INF: ----- Startup Information Start -----
[03845718] 040000 INF: STARTUP: = Microsoft Office.lnk   58   *58 Startup Registration
[03845718] 040000 INF: STARTUP: = Status Monitor.lnk   ! If you failed to install and virus checker was running, quit the software.
[03845718] 040000 INF: ----- Startup Information End   -----

[03852358] 040000 INF: ----- Installation Diagnostics Result Start -----
[03852358] 010000 ERR: PRT   = NG (Communicat|60| |59| *59 Installation Diagnostics Result (OK / NG(Installation) / NG(Communication)
[03852358] 010000 ERR: PRT_INST   = OK |61| *60 Printer Driver Installation Failure (cannot communicate)
[03852358] 010000 ERR: PRT_PORT   = BRN_6007C0 |62| *61 Scanner Driver Installation Result
                                                                  *62 Printer Driver Port

[03852358] 010000 ERR: SCN   = NG (Communicat|63| *63 Scanner Driver Installation Failure (cannot communicate)
[03852358] 010000 ERR: SCN_INST   = OK |64| *64 Scanner Driver Installation Result
[03852358] 010000 ERR: SCN_PORT   = AUTO |65| *65 Scanner Driver Port

[03852358] 010000 ERR: FAXTX   = NG (Communic|66|n)   *66 PC-FAX Sending Driver Installation Failure (cannot communicate)
[03852358] 010000 ERR: FAXTX_INST = OK |67| *67 PC-FAX Sending Driver Installation Result
[03852358] 010000 ERR: FAXTX_PORT = BRN_6007C0 |68| *68 PC-FAX Sending Driver Port

[03852358] 040000 INF: ----- Installation Diagnostics Result End -----

****************Debug Write End 2004/07/25 20:48:04***************

Net Cable Disconnected

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Scanner Error Code

Define name	Error Code	Contents
SCDIAG_OK	0	The processing is completed or confirmation is successful.
SCDIAG_FAIL	1	The system stopped processing due to errors which don't fall into ones above, such as the lack of memory.
SCDIAG_NOT_INITIALIZE	2	The system tried to run functions without the initialization processing.
SCDIAG_NOT_SUPPORT	3	This Scanner driver type doesn't support the function which is tried to run, This confirmation of the function is not necessary.
SCDIAG_NOT_INSTALL	4	The specified device is not installed.
SCDIAG_NOT_CONNECTED	5	The specified device is not connected. (only USB connection)
SCDIAG_NOT_FOUND_DEVICE	6	The specified device is not found, No device may be connected or may fail to install.
SCDIAG_NOT_FOUND_TWDS	10	The specified TWAIN Data Source is not found, No device may be connected or may fail to install.
SCDIAG_NOT_SELECT_TWDS	11	The TWAIN Data Source Manager fails to recognize the default TWAIN Data Source.
SCDIAG_TWAIN_SYSTEM_ERROR	12	The TWAIN Data Source Manager to use the TWAIN protocol is not available. The TWAIN Data Source Manager may not exist.
SCDIAG_STIDEVICE_CREATE_FAIL	20	The system failed to create the STI device. The STI/WIA service or the minidriver may have problems.
SCDIAG_STI_SYSTEM_ERROR	21	The STI Interface (IStillImage) is not available. The STI service may not start or the operation system may have problems.
SCDIAG_WIADEVICE_CREATE_FAIL	30	The system failed to create the WIA device. The WIA service or the minidriver may have problems.
SCDIAG_WIA_SYSTEM_ERROR	31	The WIA Service (IWiaDevMgr Interface and so on) is not available. The WIA service may not start or the operation system may have problems.
SCDIAG_OPEN_ERROR	40	The system failed to open the scanner device. The attempt may be rejected because the object device is running or so.
SCDIAG_WRITE_ERROR	41	The system failed to send the scanner command.
SCDIAG_READ_ERROR	42	The system failed to read the data from the device.
SCDIAG_TIMEOUT	43	The system failed to receive the response after the request has timed out.
SCDIAG_NO_RSM	44	The system failed to recognize the Resource Manager and failed to restart. The Resource Manager may not be installed or running incorrectly.