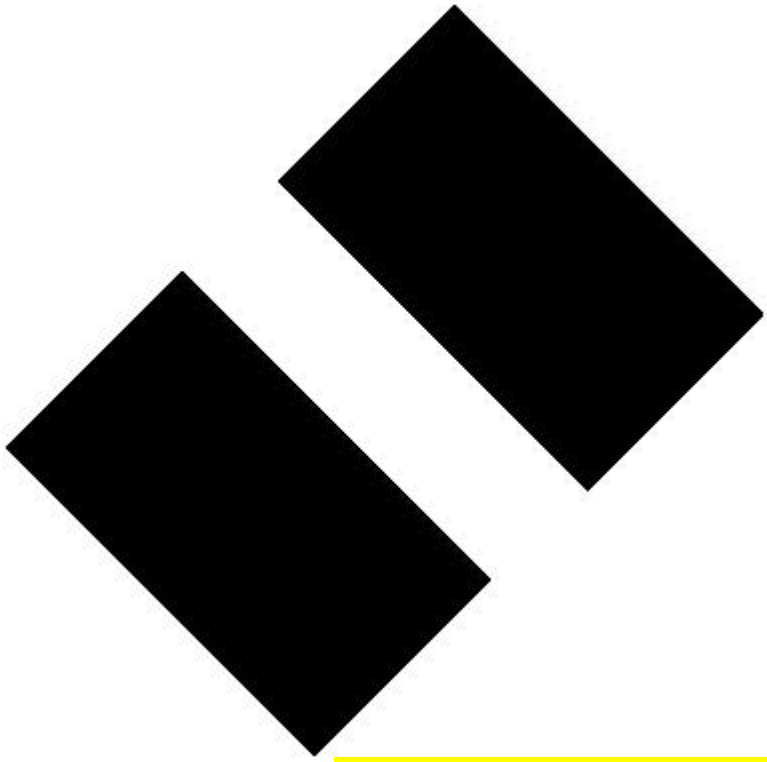
We're at your side.

brother

FACSIMILE EQUIPMENT SERVICE MANUAL

MODEL:MFC 7150C/MFC 7160C



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PREFACE

This publication is a Service Manual covering the specifications, construction, theory of operation, and maintenance of the Brother facsimile equipment. It includes information required for field troubleshooting and repair--disassembly, reassembly, and lubrication--so that service personnel will be able to understand equipment function, to rapidly repair the equipment and order any necessary spare parts.

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

This manual is made up of six chapters and appendices.

CHAPTER I. GENERAL DESCRIPTION

CHAPTER II. INSTALLATION

CHAPTER III. THEORY OF OPERATION

CHAPTER IV. DISASSEMBLY/REASSEMBLY, LUBRICATION AND ADJUSTMENT

CHAPTER V. MAINTENANCE MODE

CHAPTER VI. ERROR INDICATION AND TROUBLESHOOTING

APPENDICES CIRCUIT DIAGRAMS

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

CHAPTER I.

GENERAL DESCRIPTION

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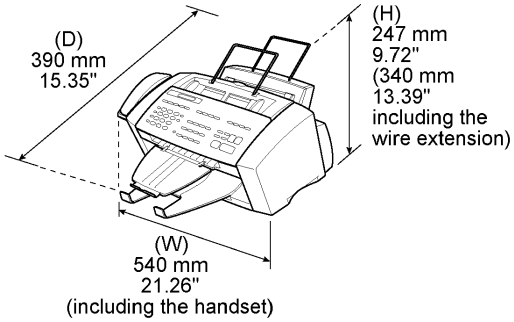
1. EQUIPMENT OUTLINE

1.1 External Appearance and Weight

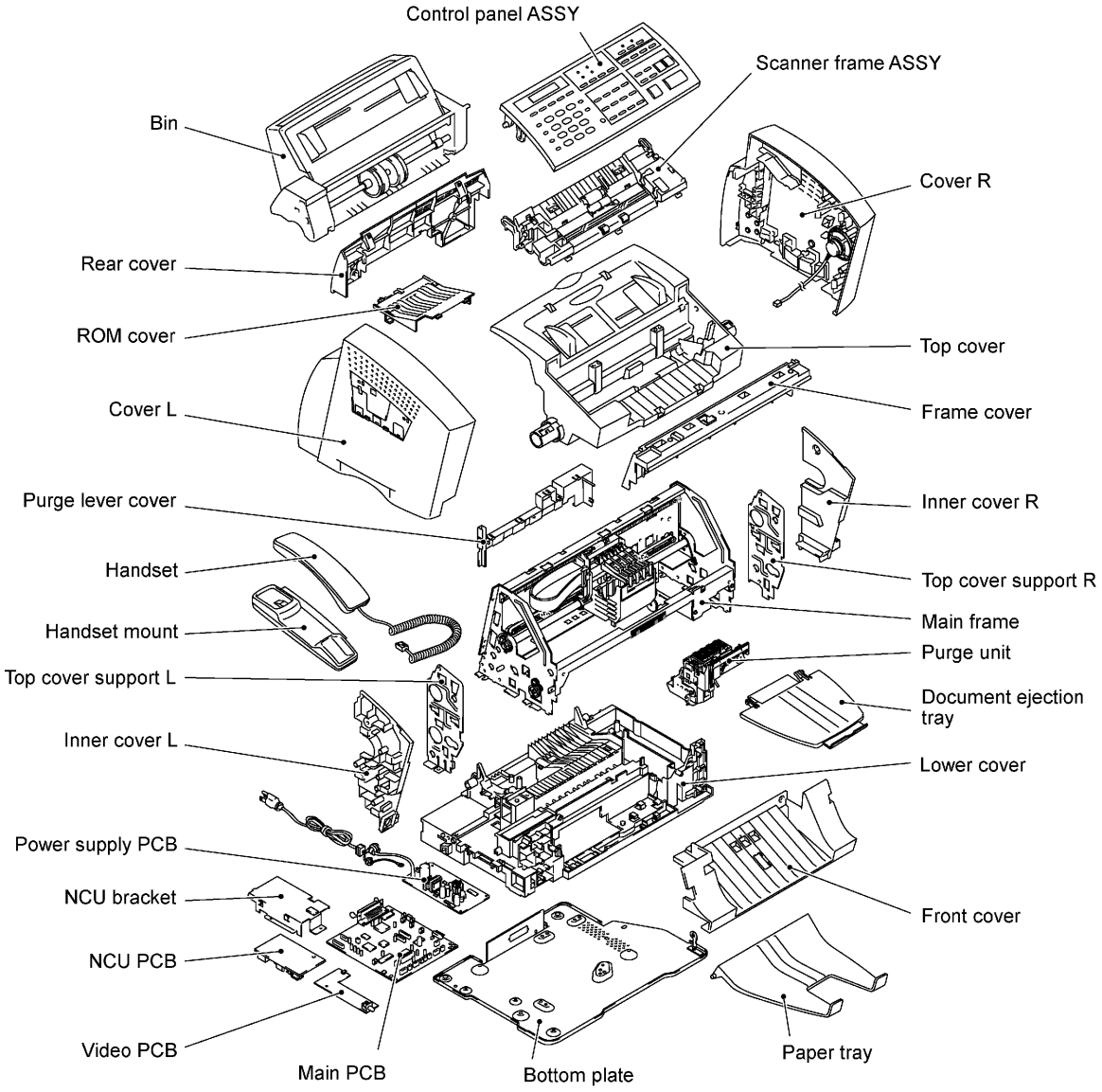
The figure below shows the equipment appearance and approximate dimensions.



Weight:	Machine proper	Approx. 9 kg
	In package	Approx. 14 kg

1.2 Components

The equipment consists of the following major components:



2. SPECIFICATIONS

(1/3)

Model	MFC7150C	MFC7160C
Color	White (1138)	White (1138)
PRINTER		
Engine/Type	BY2 / Liquid ink jet	BY2 / Liquid ink jet
PPM	Up to 6 ppm/Mono, Up to 4 ppm/Color (360x180)	Up to 6 ppm/Mono, Up to 4 ppm/Color (360x180)
Max. dpi (output resolution)	1440 x 720	1440 x 720
Emulation	Windows GDI, EPSON ESC/P	Windows GDI, EPSON ESC/P
Printer Driver	Windows 3.1/3.11, Windows 95, NT Driver with Auto Installer Program	Windows 3.1/3.11, Windows 95, NT Driver with Auto Installer Program
Fonts Resident	1 (10, 12, 15 cpi and Ps for each font)	1 (10, 12, 15 cpi and Ps for each font)
Fonts Disk Based	35	35
Paper Handling (See Note on p.I-5.)	LTR, LGL, B5, A5, OHP	LTR, LGL, B5, A5, OHP
Bin	Cut sheet: Min. 2.75" (W) x 5.0" (L) Max. 8.5" (W) X 14.0" (L) Envelope (BL/C5/CM10/Mona)	Cut sheet: Min. 2.75" (W) x 5.0" (L) Max. 8.5" (W) X 14.0" (L) Envelope (BL/C5/CM10/Mona)
Bin (Factory Std.)	1 (200 sheets)	1 (200 sheets)
Optional Bin	N/A	N/A
Bin Capacity (No. of sheets)	200	200
Number of Ink Cartridges	4	4
Ink Cartridge Life (5% duty)	Approx. 750 pages (black) Approx. 400 pages (color)	Approx. 750 pages (black) Approx. 400 pages (color)
Interface	IEEE1284 (Bidirectional)	IEEE1284 (Bidirectional)
Network Card	N/A	N/A
SCANNER		
Color/Mono	Color CIS	Color CIS
dpi	1200 x 1200 (Optical 300)	1200 x 1200 (Optical 300)
Gray Scale	256 shades	256 shades
Color Depth	24 bits	24 bits
Twain	Yes	Yes
Scanning Speed	6 ppm (Mono)/0.2-0.25 ppm (Color: 300 dpi)	6 ppm (Mono)/0.2-0.25 ppm (Color: 300 dpi)
Formats	Up to Visioneer	Up to Visioneer
ADF (pages)	20	20
Input Size	Letter/Legal/A4	Letter/Legal/A4
OCR	Yes (Xerox Textbridge)	Yes (Xerox Textbridge)
COPY		
Color Copy	Yes (Direct Single)	Yes (Direct)
dpi	(Mono) Min. 360 x 360, Max. 360 x 720 (Single color) Min. 360 x 360, Max. 720 x 720 (Multi-color) N/A	(Mono) Min. 360 x 360, Max. 360 x 720 (Single color) Min. 360 x 360, Max. 1440 x 720 (Multi-color) 360 x 360
Multi-copy Stack	99 (Mono)	99 (Mono & Color)
Sort	Color-No, Mono-Yes	Color-No, Mono-Yes
Reduction/Enlargement	Yes (Ratio 50%-200%)	Yes (Ratio 50%-200%)
Contrast Control	11 levels	11 levels
One Color Copy	Yes	Yes
FAX		
Modem Speed (bps)	14400	14400
ITU-T Group	G3	G3
Coding Method	MH/MR/MMR	MH/MR/MMR

Model	MFC7150C	MFC7160C
FAX		
Error Correction Mode (ECM)	Yes	Yes
Transmission Speed (sec)	6	6
Gray Scale	256 (Error Diffusion)	256 (Error Diffusion)
Super Fine	Yes (Send and Receive)	Yes (Send and Receive)
Multi-resolution TX	Yes	Yes
Handset	Yes	Yes
Speaker Phone	N/A	Yes - Full duplex
One-touch Dial	12 X 2	12 X 2
Speed Dial	56	100
Tel-Index	Yes	Yes
Chain Dialing	Yes	Yes
Contrast	SL/Auto/SD	SL/Auto/SD
FAX/TEL Switch	Yes	Yes
Distinctive Ringing	Yes	Yes
Caller ID	Yes (name or tel number)	Yes (name or tel number)
Call Waiting	N/A	N/A
TAD Interface	Yes	Yes
Next FAX Reservation	Yes (Dual Access)	Yes (Dual Access)
Coverpage	Yes - Super	Yes - Super
Polling Type	Std/Seq	Std/Seq
Password Check	N/A	N/A
Memory Reception	Yes	Yes
Delayed Timer	Yes, 1 timer	Yes, 1 timer
Broadcasting	Yes (Up to 130 locations)	Yes (Up to 174 locations)
Multi Resolution TX	Yes	Yes
Call Reservation	Yes	Yes
Call Back Message	Yes	Yes
ITU SUB Addressing	Yes	Yes
BFT Compatible (BY machine)	N/A	N/A
Color Fax Mode	N/A	N/A
Fax Edit Mode	N/A	N/A
Color File Transfer	Yes (via BFT from PC)	Yes (via BFT from PC)
Multi-Transmission	Yes	Yes
DUAL ACCESS	Yes	Yes
Input/Output Width	8.5" x 8.5"	8.5" x 8.5"
Help	Yes	Yes
Auto Reduction	Yes	Yes
ECM	Yes	Yes
Message Center	N/A	Yes
OGM	N/A	Yes
ICM Recording Time	N/A	Up to 99 min.
Paging	Yes	Yes
Toll Saver	N/A	Yes
Fax & Voice Mail Box	N/A	N/A
Fax-on-demand	N/A	N/A

Model	MFC7150C	MFC7160C
Message Center	N/A	Yes
Voice-on-demand	N/A	N/A
FAX Forwarding	Yes	Yes
FAX Retrieval	Yes	Yes
Message Center (PC MC)	N/A	N/A
OGM	N/A	N/A
ICM Recording Time	N/A	N/A
Fax-on-demand	N/A	N/A
Voice-on-demand	N/A	N/A
Fax & Voice Mail Box	N/A	N/A
FAX Forwarding	N/A	N/A
General/Additional Feature		
Energy Star Compliance	Yes	Yes
Memory (Standard)	2 MB	4 MB
Memory (Opt Upgrade)	N/A	2MB
Simultaneous Operation	Yes (PRINTER/FAX, PRINTER/SCAN, PRINTER/COPY)	Yes (PRINTER/FAX, PRINTER/SCAN, PRINTER/COPY)
PC-FAX Host Software Std.	Yes	Yes
Host Interface (Scan/Print/PC-fax)	Bi Centro/ECP	Bi Centro/ECP
Video Capture/Video Print	Yes (US: NTSC, EUR: PAL)	Yes (US: NTSC, EUR: PAL)
PC-Fax Protocol Compliance	CLASS 1, 2	CLASS 1, 2
Data Modem	N/A	N/A
Bundled Software Applications		
Bundled Application	Metatool Kai's Power Goo/ Corel Print & Photo House/My Marketing Materials	Metatool Kai's Power Goo/ Corel Print & Photo House/My Marketing Materials
PC-FAX (Send/Receive)	Yes (SMSI)	Yes (SMSI)
Internet Fax	Yes (Netcentric in Visioneer)	Yes (Netcentric in Visioneer)
Scanner Application	Visioneer	Visioneer
Color Viewer	Yes (Visioneer)	Yes (Visioneer)
Binary File Transfer	Yes (Compression in SMSI)	Yes (Compression in SMSI)

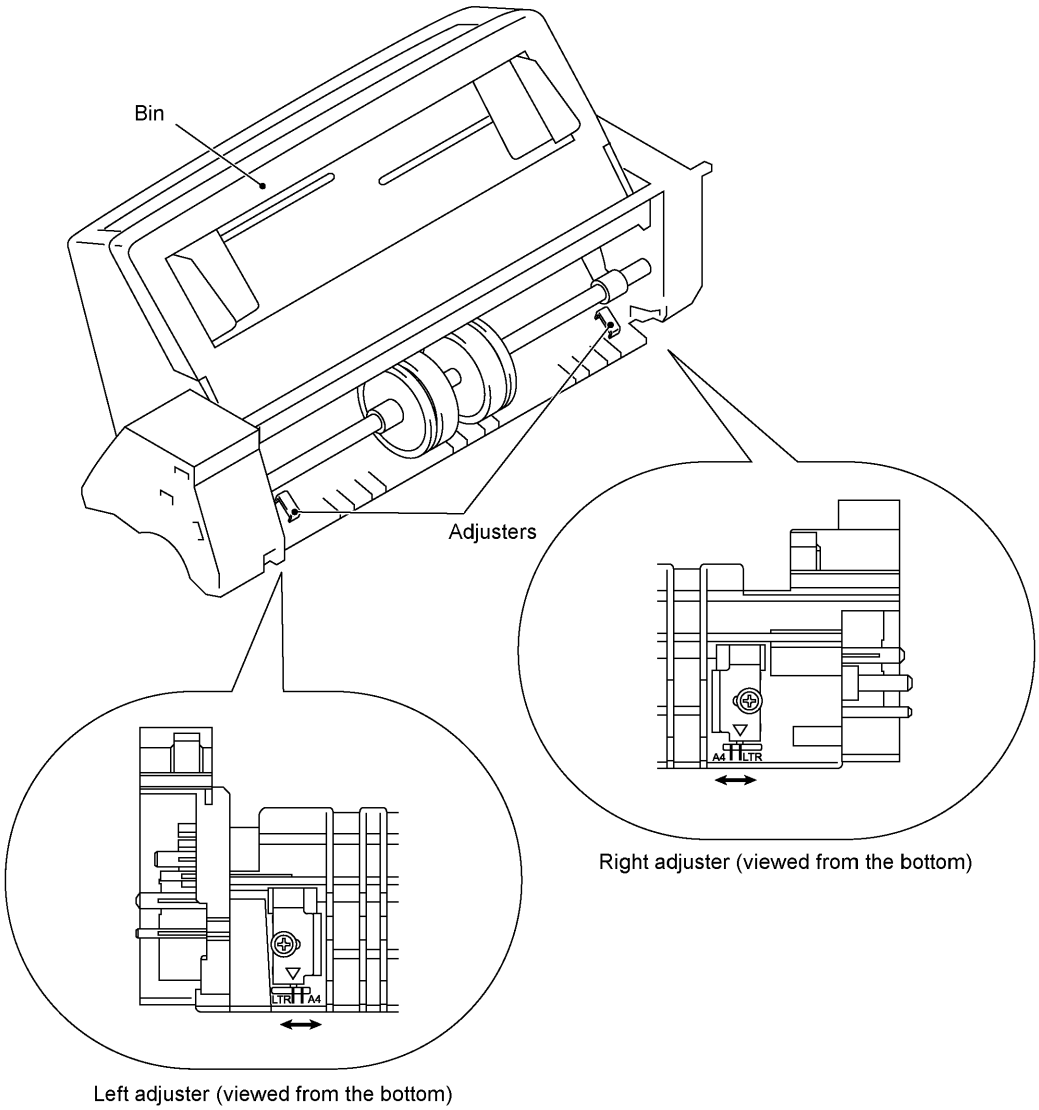
(Note) Paper Handling

If you move the adjusters as shown below, the MFC7150C/MFC7160C or MFC-740 becomes capable of handling A4-size paper or letter-size paper, respectively.

(1) Loosen screws on the bottom of the right and left adjusters.

(2) To use A-4 size or letter-size paper, align the ▼ mark on each of the adjusters with the A4 or LTR marking on the bottom of the bin, respectively.

(3) Tighten screws.



Right adjuster (viewed from the bottom)

Left adjuster (viewed from the bottom)

CHAPTER II.

INSTALLATION

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1. INSTALLING THE UPDATE DATA TO THE FACSIMILE EQUIPMENT

If the program version is updated or the main PCB is replaced, install the update program onto the flash ROM of the main PCB.

The program installation requires a host computer satisfying the following requirements:

- CPU Pentium 75 or higher
- RAM 8MB or greater (16MB recommended for Windows® 95)
- OS Windows® 3.1/3.11 or Windows® 95

Connecting the facsimile equipment to your computer

(1) Make sure that the equipment's power cord is unplugged from a wall socket.

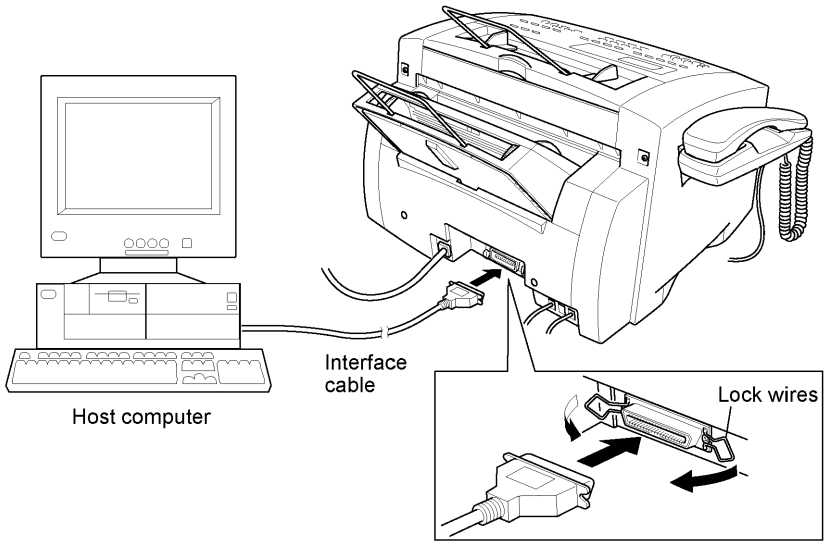
(2) Make sure that your computer is powered off.

(3) Connect the interface cable to the parallel interface port on the back of the equipment and secure it with the lock wires.

(4) Connect the other end of the interface cable to the printer port of your computer and secure it with the two screws.

(5) Power on your computer.

(6) Plug the equipment's power cord into a wall socket.



Installing the update data onto the flash ROM of the facsimile equipment

(1) Load the floppy disk which stores the update data and transfer utility into the floppy disk drive of your computer.

(Or, copy the update data and transfer utility onto the same directory of the hard disk.)

(2) Click the Start button, point to Programs, and then click MS-DOS Prompt to open an MS-DOS window.

(3) Type the drive letter where the update data and transfer utility are located. If it is a floppy disk drive, type `A:\` from the command line and press the **ENTER** key.

(4) Check that your computer is connected with the facsimile equipment correctly.

(5) To start the transfer utility transmitting the update data to the flash ROM of the facsimile equipment, type the following:

`A:\ICEN` *`filename`* `/b`

Then press the **ENTER** key.

The equipment beeps and shows the "CONNECTING" on the LCD for one second.

Then, the equipment shows the "DOWNLOADING" on the LCD and starts receiving data downloaded from the host computer.

During downloading, the equipment beeps *intermittently*.

Upon completion of the downloading, the equipment beeps *continuously*.

CHAPTER III.

THEORY OF OPERATION

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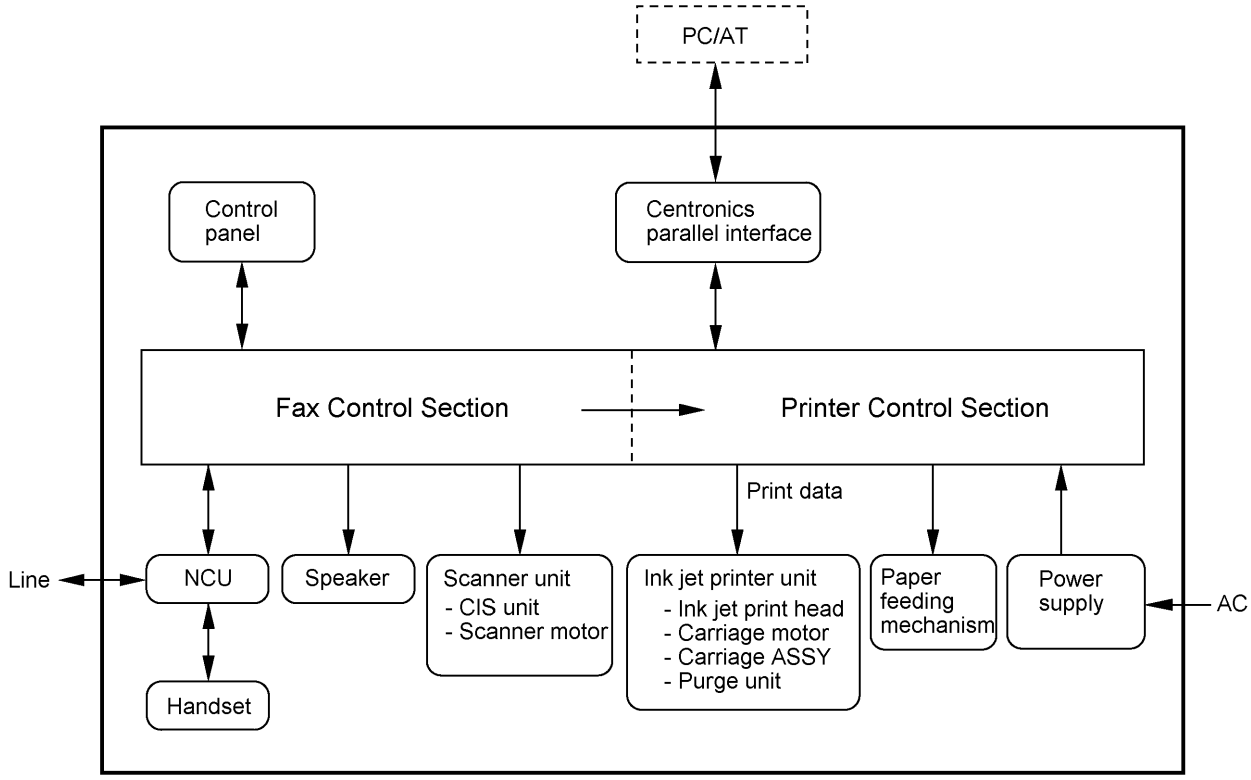
1. OVERVIEW


PC/AT
Control panel
Centronics parallel interface
Fax Control Section
Printer Control Section
Print data
Line
NCU
Speaker
Scanner unit
- CIS unit
- Scanner motor
Ink jet printer unit
- Ink jet print head
- Carriage motor
- Carriage ASSY
- Purge unit
Paper feeding mechanism
Power supply
AC
Handset

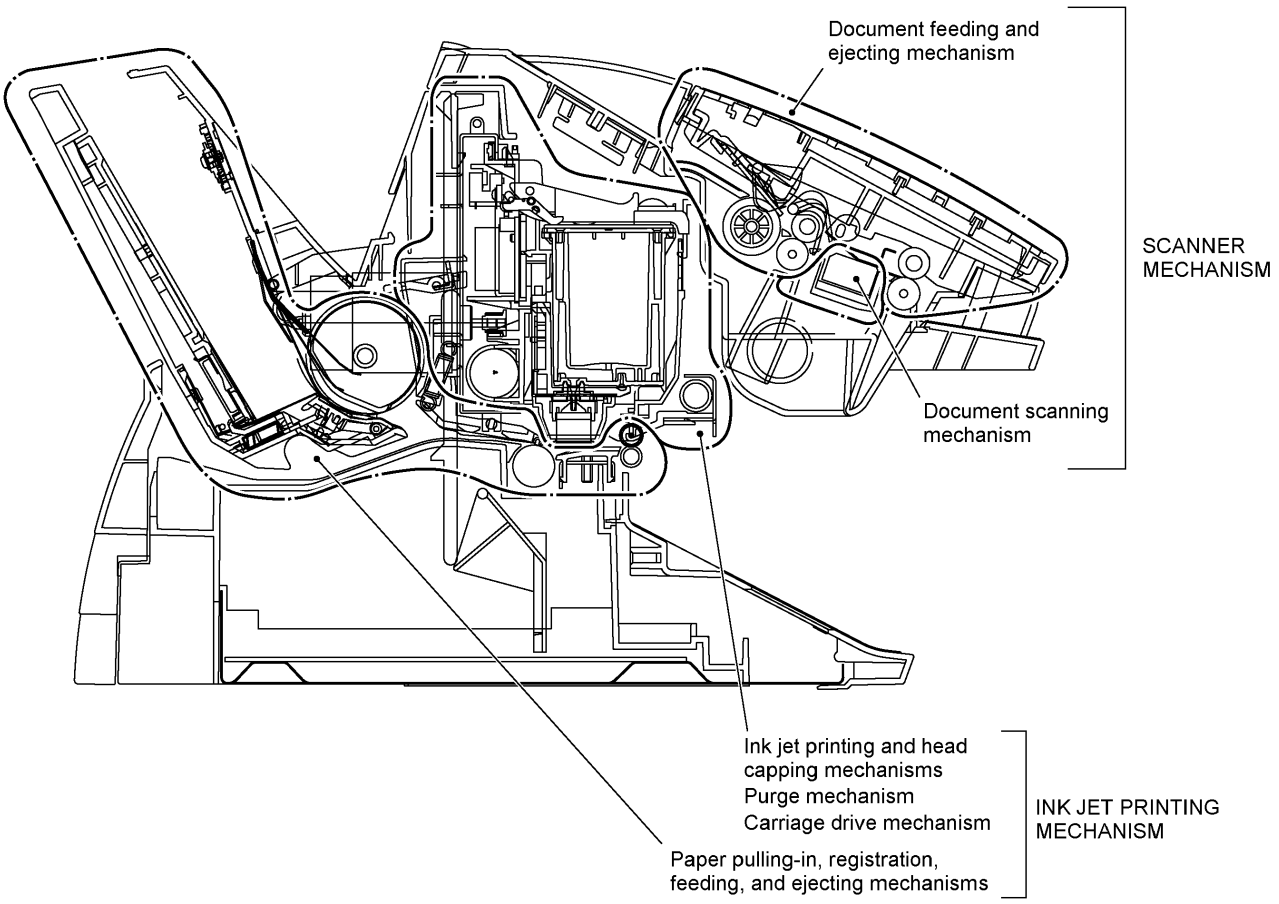
2. MECHANISMS

The equipment is classified into the following mechanisms:

n SCANNER MECHANISM
- – Document feeding and ejecting mechanism
- – Document scanning mechanism

n INK JET PRINTING MECHANISM
- – Paper pulling-in, registration, feeding, and ejecting mechanisms
- – Ink jet printing and head capping mechanisms
- – Purging mechanism
- – Carriage drive mechanism

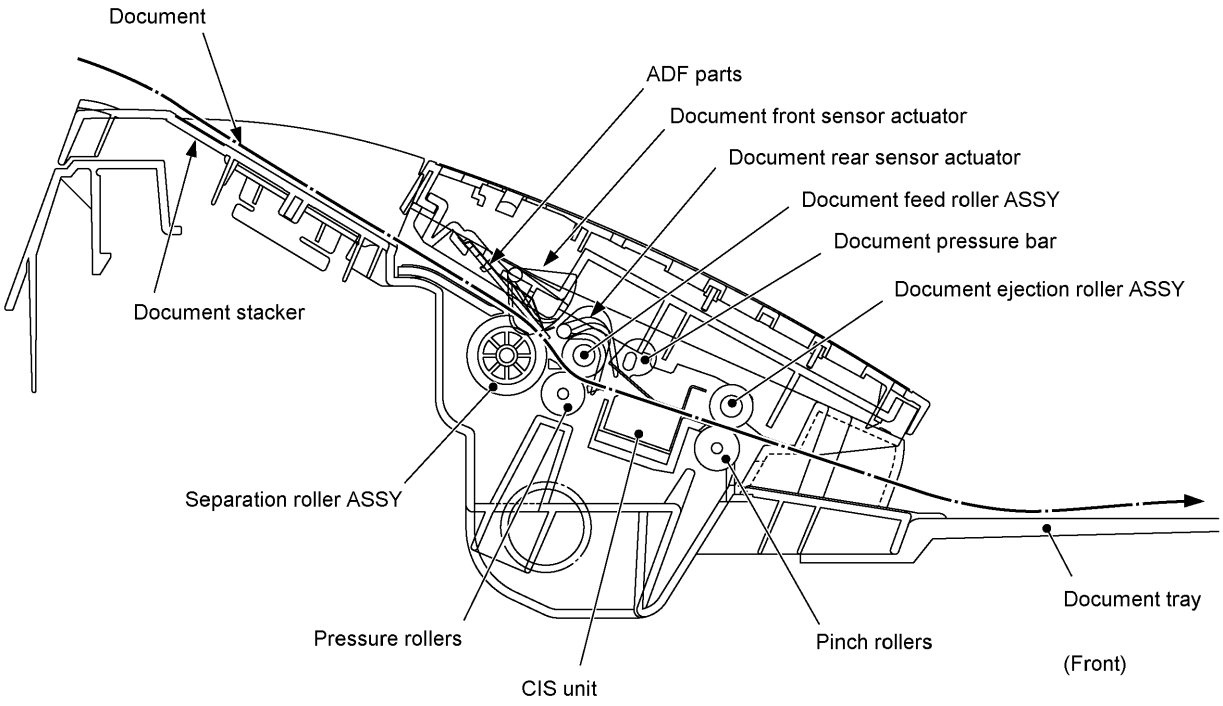
n SENSORS AND ACTUATORS



2.1 Scanner Mechanism

This mechanism consists of the document stacker, automatic document feeder (ADF), document feed roller ASSY, document ejection roller ASSY, and document sensors. (For details about the sensors, refer to Section 2.3.)

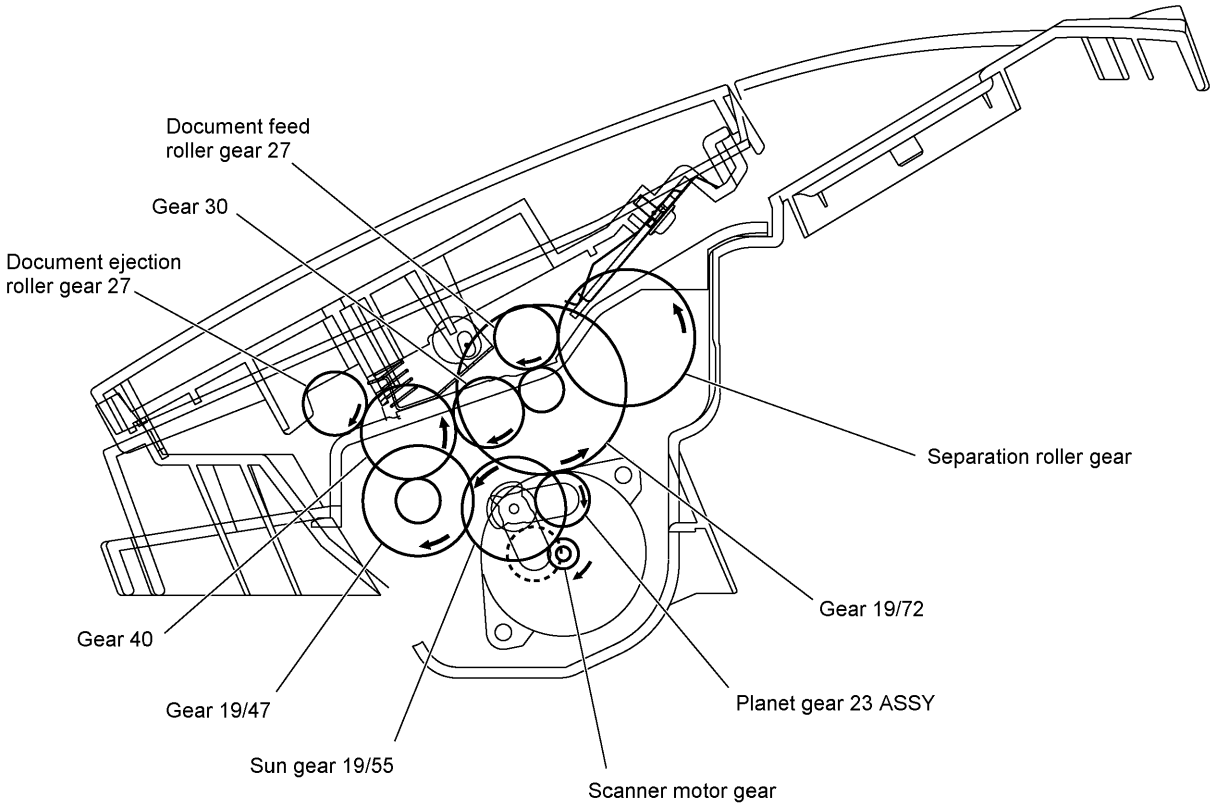
If the operator sets documents on the document stacker and starts the scanning operation, the scanner motor rotates so that the ADF (which consists of the separation roller ASSY and ADF parts) feeds those documents into the equipment, starting from the bottom sheet to the top, page by page. Each document advances with the document feed roller ASSY to the scanner, and then it is fed out of the equipment with the document ejection roller ASSY.



2.1.1 Document feeding and ejecting mechanism

To feed and eject documents, the scanner motor rotates clockwise. It rotates the sun gear 19/55 counterclockwise so that the planet gear 23 ASSY transmits the torque to the gear 19/72 and its gear train.

After completion of paper ejection, the scanner motor rotates counterclockwise in order to disengage the planet gear 23 ASSY from the gear 19/72. This allows you to pull back a document if jammed in the backward direction.



(Viewed from the right)

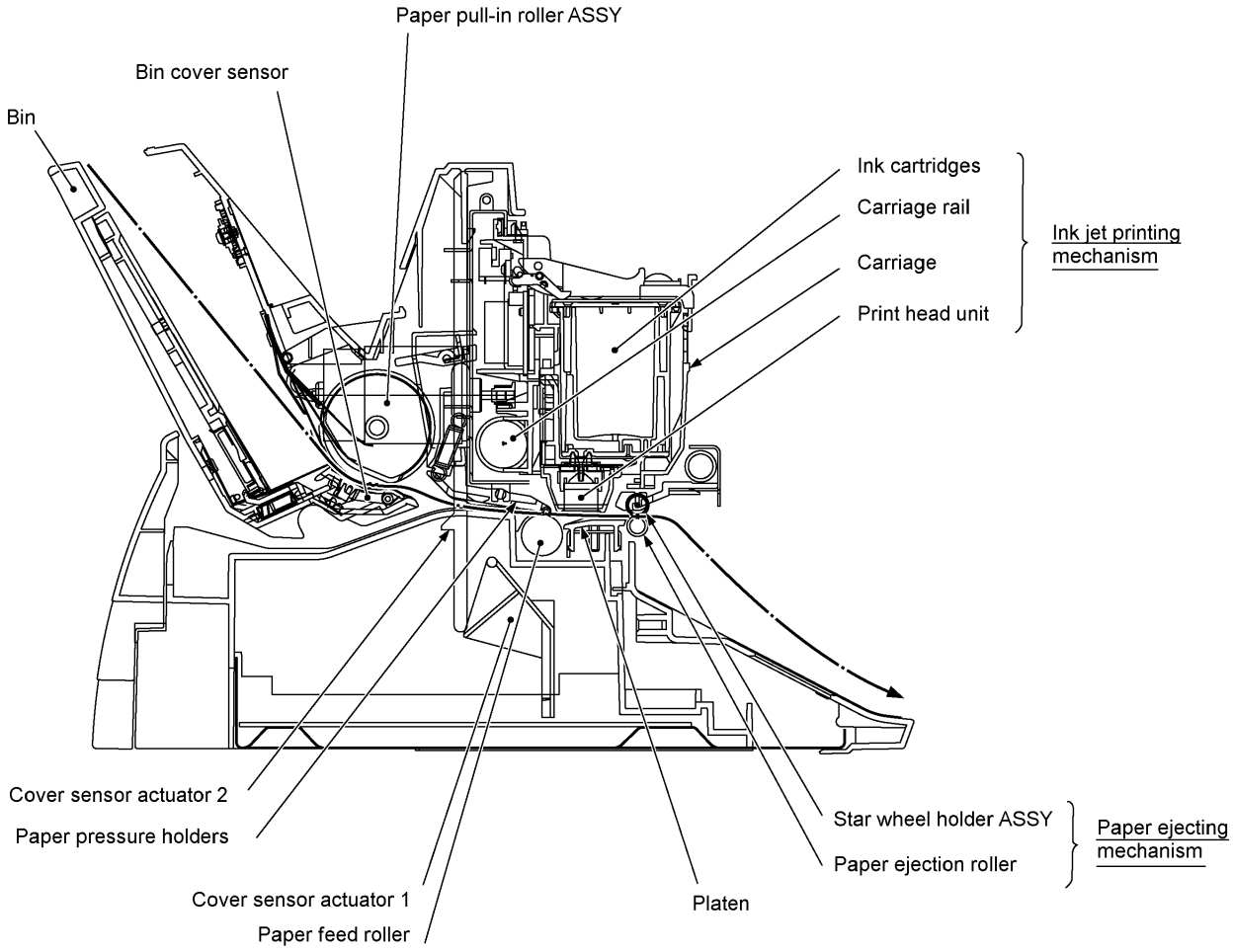
2.1.2 Scanner

The scanner uses a contact image sensor (CIS) unit which consists of an LED array illuminating documents, a self-focus lens array collecting the reflected light, a CIS PCB carrying out photoelectric conversion to output picture element data, and a cover glass on which a document advances. When the document passes between the document pressure bar and the cover glass, it is scanned.

2.2 Ink Jet Printing Mechanism

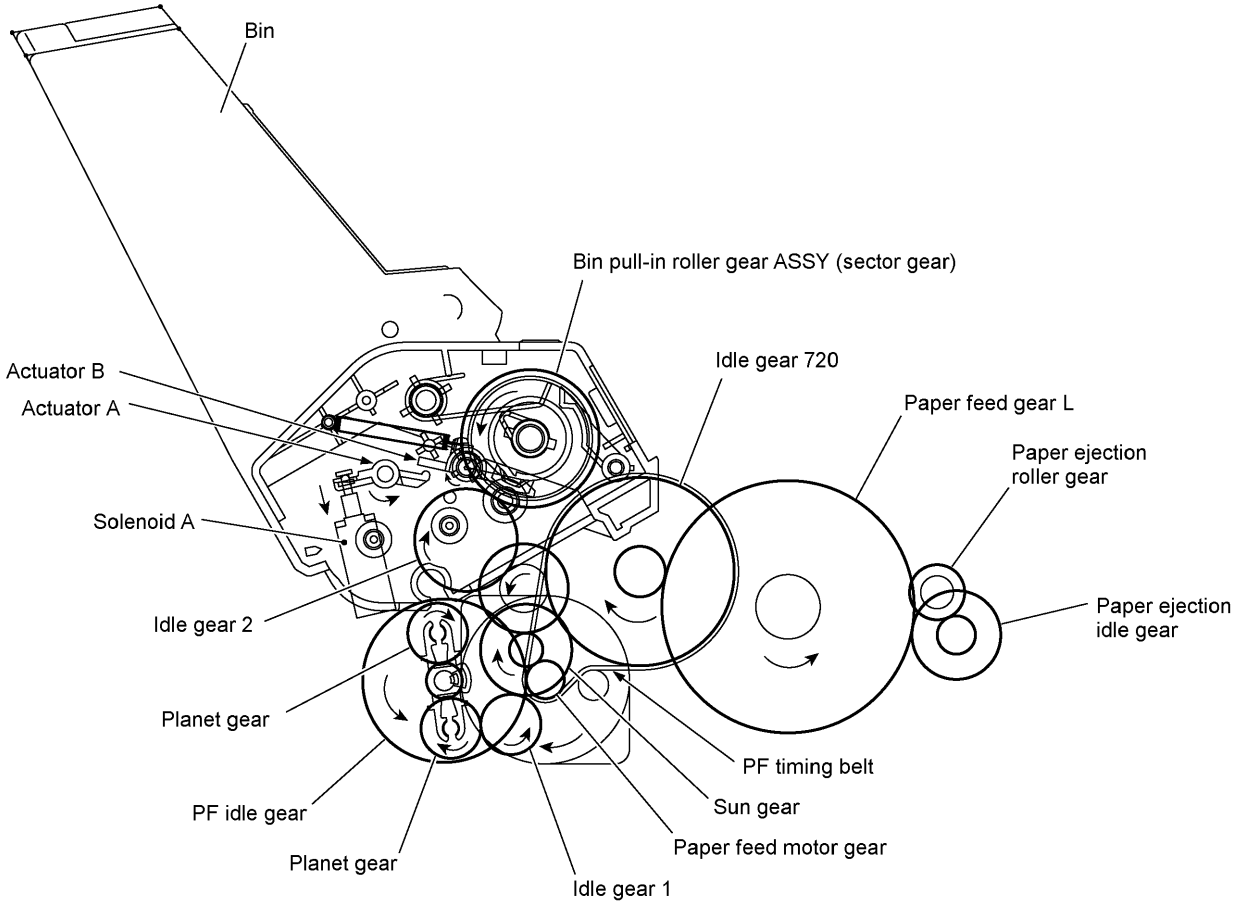
2.2.1 Paper pulling-in, registration, feeding, and ejecting mechanisms

The paper pulling-in, registration, feeding, and ejecting mechanisms are driven by a single paper feed motor which has two drive gears at both ends of the output shaft.



Paper pulling-in and registration mechanism

Paper pulling-in and registration mechanism



The inner end of the motor output shaft drives the paper pulling-in mechanism. If the motor rotates clockwise, the rotational torque is transmitted via the gear train to the bin pull-in roller gear. The bin pull-in roller gear rotates once to pull in paper from the bin, a sheet at a time. Since the gear is a sector gear, it will stop when the toothless section comes to the joint with the mating idle gear 2.

The motor continues to rotate clockwise and the outer end of the output shaft drives the registration mechanism. Via the PF timing belt, the idle gear 720 rotate clockwise to rotate the paper feed gear L counterclockwise. This registers the leading edge of the pulled-in paper.

To engage the bin pull-in roller gear with the idle gear 2 again, the controller energizes solenoid A so that actuator A rotates counterclockwise and actuator B rotates clockwise. The actuator B's latch releases the bin pull-in roller gear ASSY. Accordingly, the gear ASSY rotates counterclockwise by the specified amount by the mine spring integrated in the gear ASSY so that the gear ASSY engages with the idle gear 2 again.

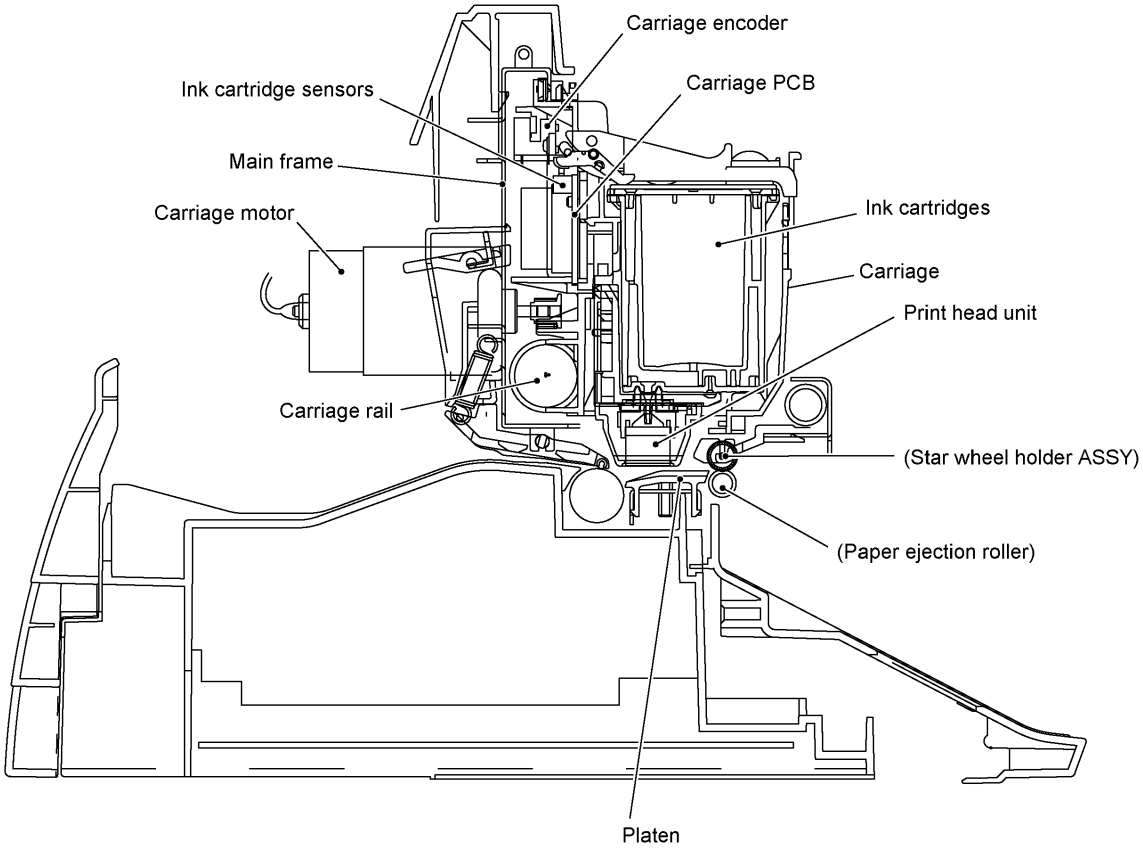
Paper feeding and ejecting mechanism

If the paper feed motor rotates counterclockwise, the outer end of the motor output shaft drives the idle gear 720 via the PF timing belt. The paper feed gear L rotates clockwise to feed paper.

The rotational torque is further transmitted via the paper ejection idle gear to the paper ejection roller gear.

After the paper passes through the print head, it will be ejected onto the paper tray.

2.2.2 Ink jet printing and capping mechanisms



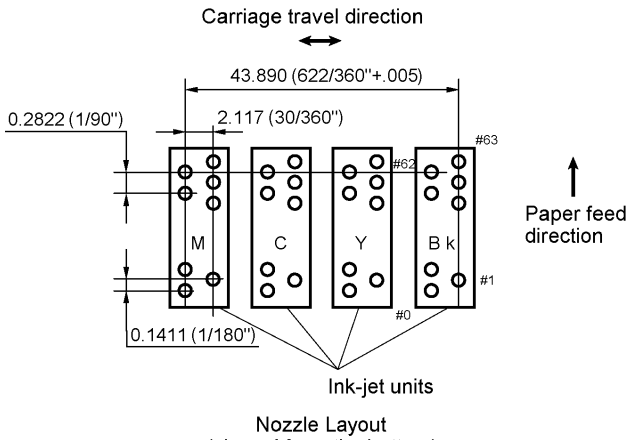
(1) Print head

This equipment uses drop-on-demand ink jet printing. The print head has four ink-jet units for four color inks, each of which consists of 64 nozzles, 64 channels sandwiched by a pair of piezoelectric ceramic actuators (PZT), manifold, and filter.

If a drive voltage* is applied to the electrodes formed on the surface of the piezoelectric actuators, those actuators will be distorted as shown with broken lines on the next page so that the ink in the manifold will be vacuumed out to the channel.

(*The controller switches the drive voltage between 28 levels within 13.7V to 29.4V ±3% depending upon the ambient temperature detected by the head thermister.)

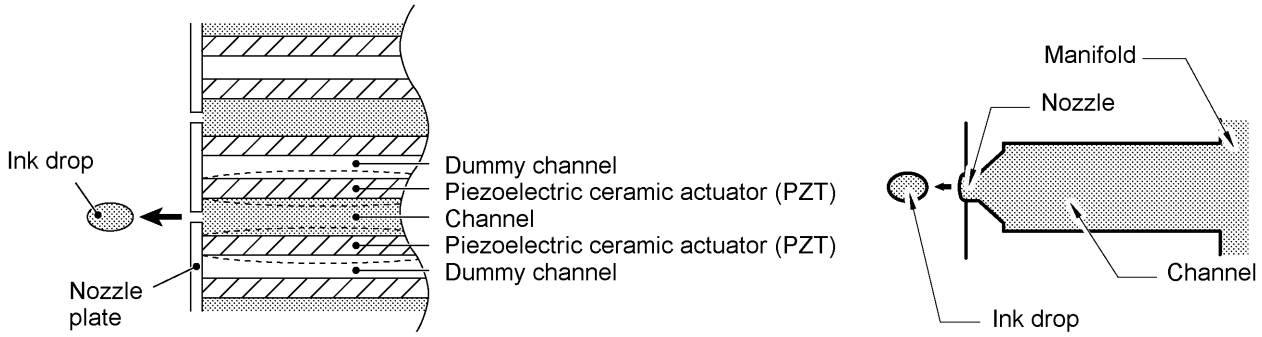
If deenergized, the piezoelectric actuators return to the previous form so as to apply pressure to the ink in the channel, causing the ink to jet out through the nozzle. The jetted-out ink drop will be splashed and produce a dot on paper held by the platen.



Nozzle Layout
(viewed from the bottom)

As the carriage holding the print head travels at the printing speed, the character generator sends print command pulses to the circuits driving the piezoelectric actuators embedded in the print head.

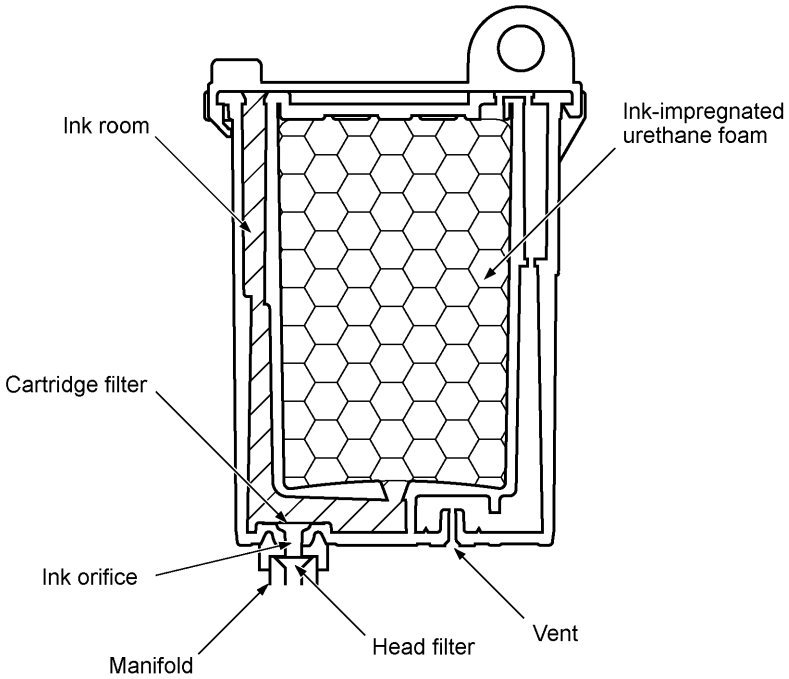
For the head thermister and the head property EEPROM, refer to Section 2.3.



(2) Ink cartridge

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

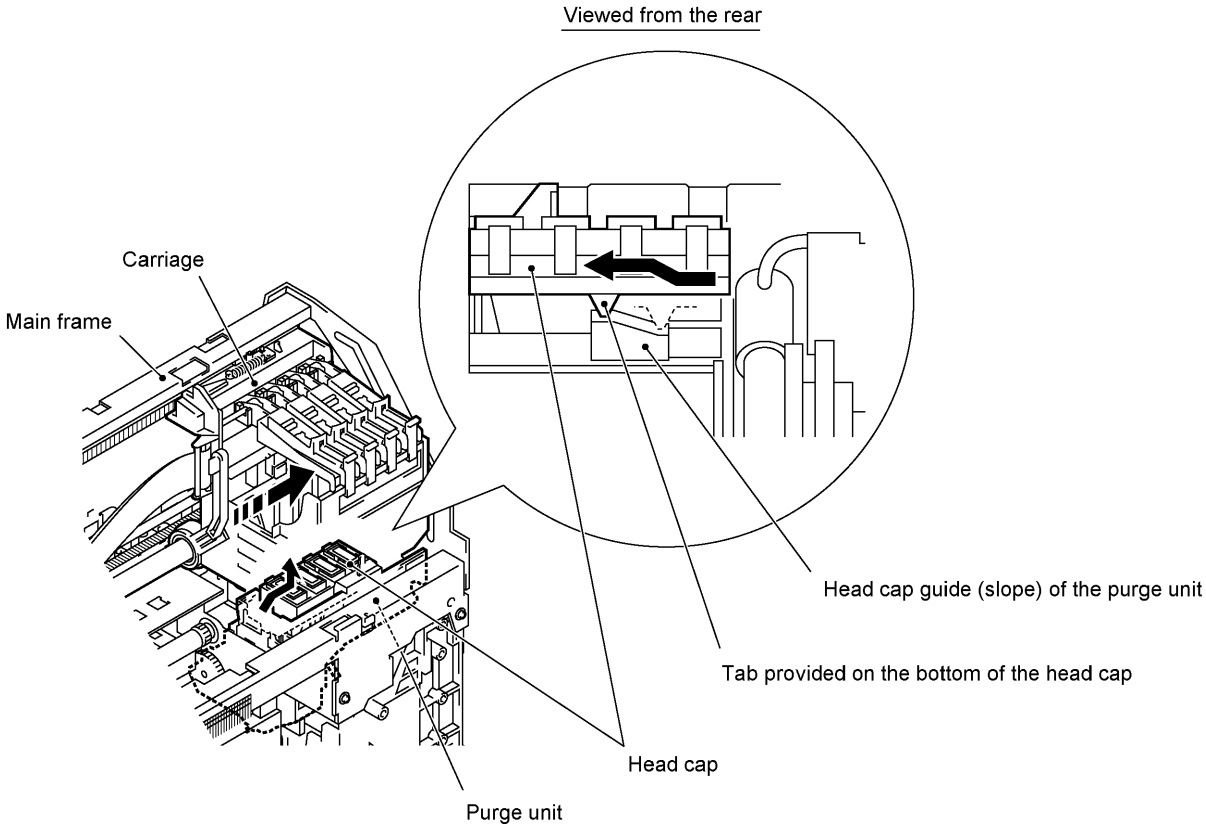
For the ink cartridge sensors on the carriage PCB, refer to Section 2.3.



(3) Head cap

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

Upon completion of printing, the carriage travels to the right and moves the head cap provided on the purge unit together. On the bottom of the head cap is a tab which is lead by the head cap guide of the purge unit. Accordingly, the rightward movement brings the head cap up to the position where the head cap comes into tight contact with the print head so as to cap the nozzles.



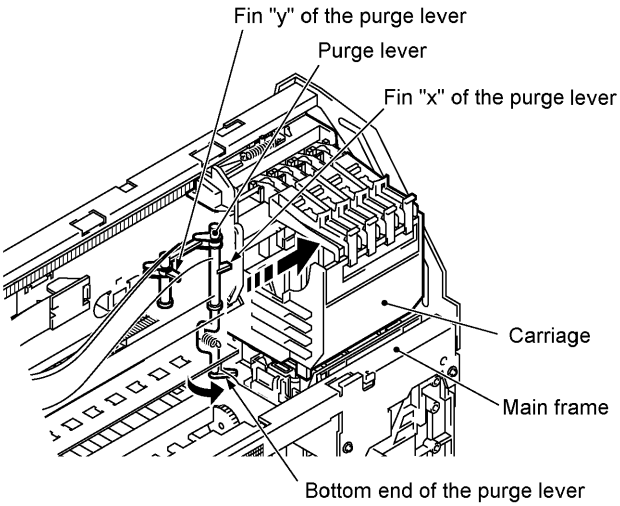
2.2.3 Purging mechanism

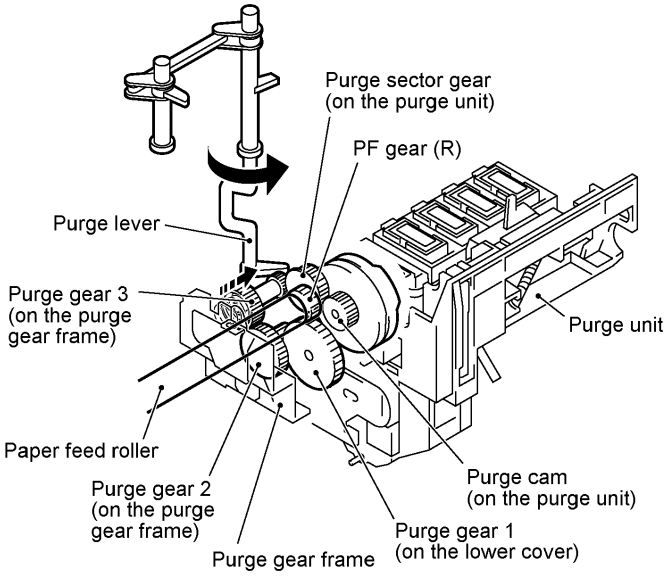
The purging mechanism is driven by the paper feed motor located at the left side of the main frame. The rotation of the paper feed motor is transmitted to the paper feed roller. At the right end of the paper feed roller is the PF gear (R) which is always engaged with the purge gear 1. The rotational torque is transmitted via the purge gear 2 to the purge gear 3. The purge gear 3 works as a clutch gear which engages with or disengages from the purge sector gear.

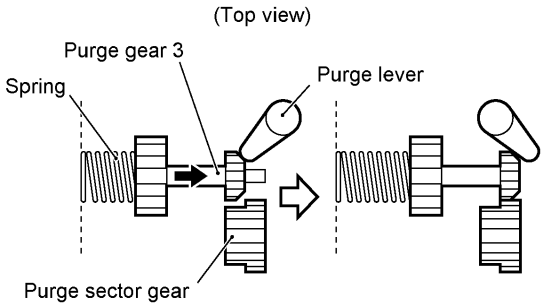
If the carriage travels from the left to right to reach the purge position, the lower left tab provided on the back of the carriage turns fin "x" of the purge lever counterclockwise (when viewed from the top). Accordingly, the purge gear 3 (which was shifted to the left by the purge lever's bottom end) will move to the right by the spring so that the right-side small gear of the purge gear 3 will be engaged with the purge sector gear* which drives the purge cam. (*The right half of the purge sector gear is fully toothed, but the left half is a sector gear.)

On the contrary, if the carriage travels from the purge position to the left, the upper right tab on the back of the carriage turns fin "y" of the purge lever clockwise. The purge lever's bottom end shifts the purge gear 3 to the left so that the right-side small gear of the purge gear 3 will be positioned into the toothless section of the purge sector gear, where the purge gear 3 will simply idle.

That is, when the carriage is in printing operation or the purge cam is in the home position, no rotation of the paper feed motor is transmitted to the purge sector gear; when the carriage is in the purge position, the motor rotation is transmitted to the purge sector gear which rotates the purge cam.







During printing:
The purge gear 3 is simply idle.

During purging:
The purge gear 3 is engaged with the purge sector gear.

The purge cam is so designed that:

- the carriage lock pops out to lock the carriage before purging and pops in before cleaning with the wiper,
- the purge cap comes out and becomes pressed against the nozzle ends of an ink-jet unit,
- the pump works to draw out ink from the head nozzles and drains it into the ink absorbers, and
- the head wiper comes out to clean the nozzle surface.

A sequence of the above operations is carried out by one rotation of the purge cam. The home position of the purge cam is detected by the HP switch. For the purge cam HP switch, refer to Section 2.3.

(1) Carriage lock

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

(2) Pressing the purge cap against the nozzle ends

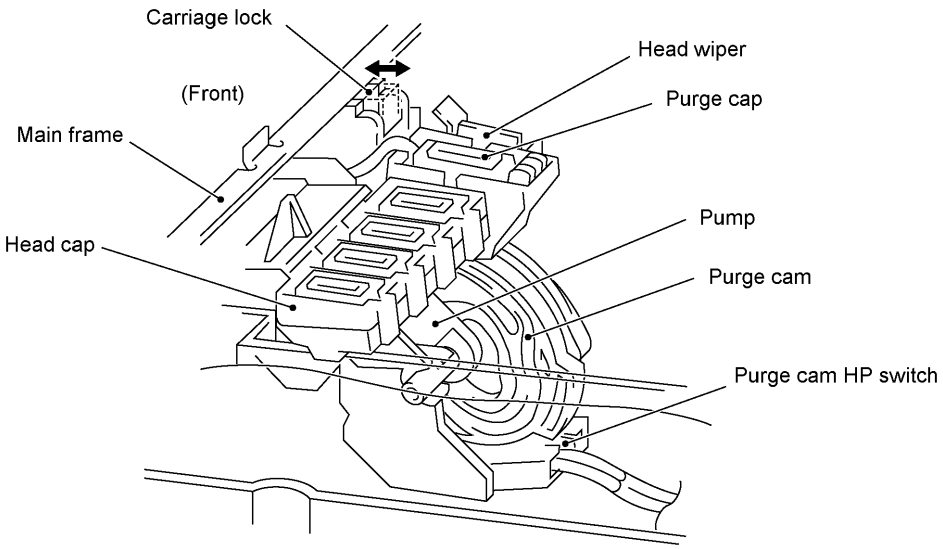
The purge cap comes out and becomes pressed against the nozzle ends of an ink-jet unit.

(3) Purging

If activated, the pump draws out ink from the head nozzles and drains it into the ink absorbers to remove air bubbles or dust from the inside of the nozzles and channels.

(4) Cleaning with the head wiper

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

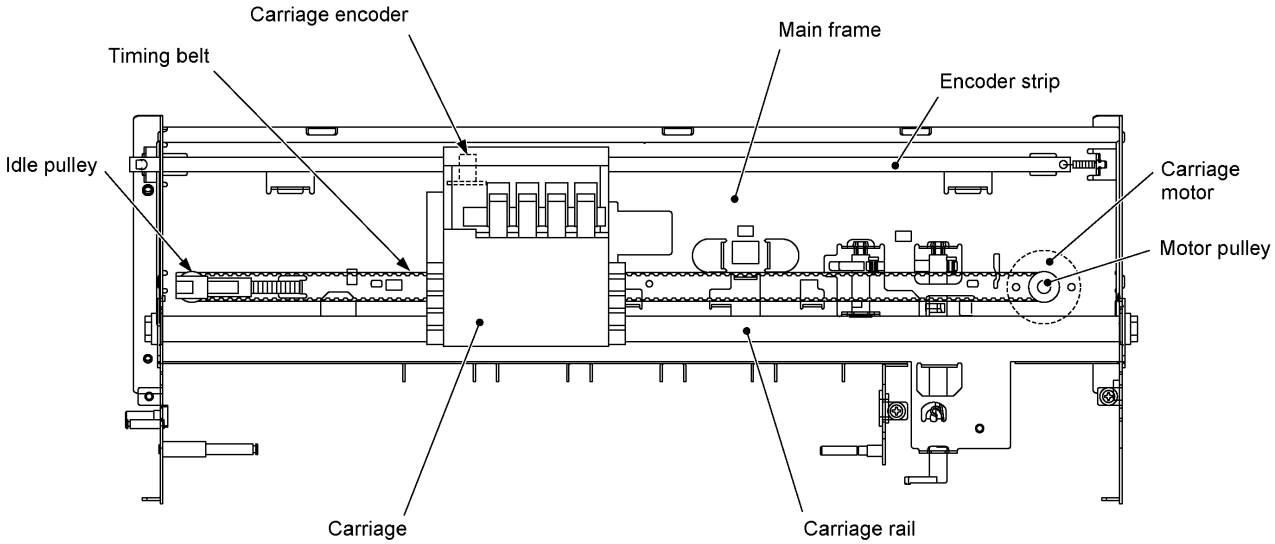


2.2.4 Carriage drive mechanism

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

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

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



2.3 Sensors and Actuators

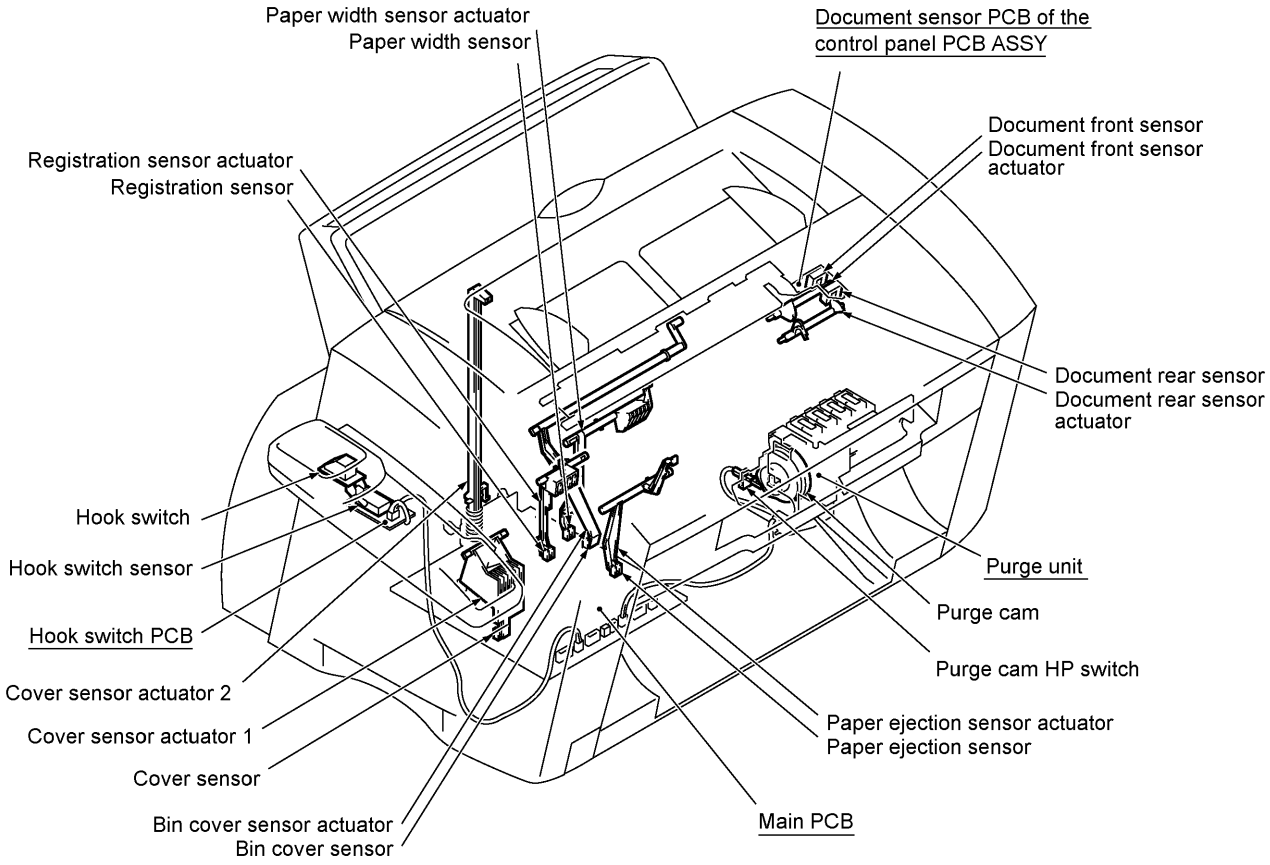
This equipment has the following sensors and thermister.

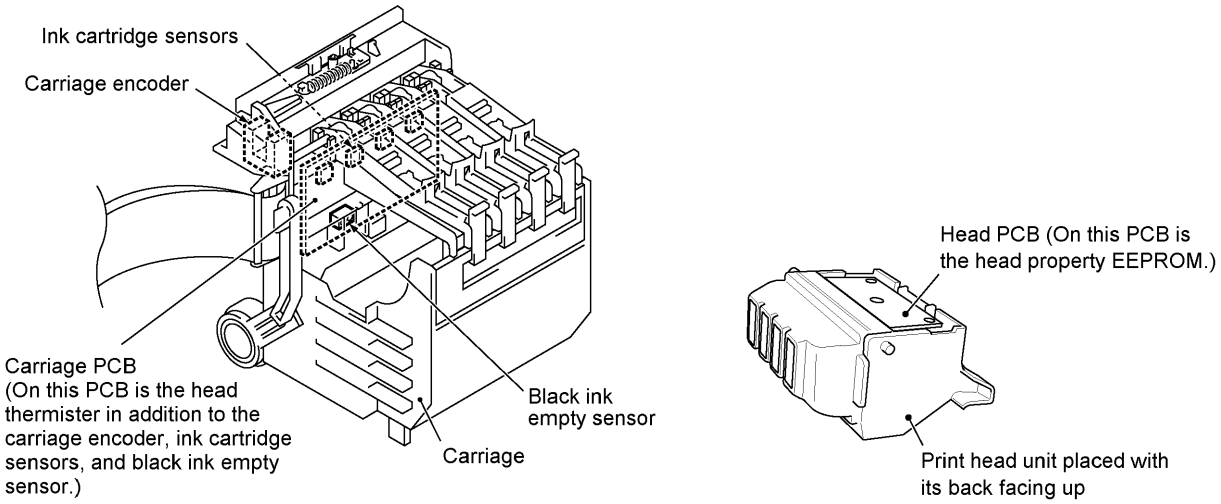
Sensor name	Type	Located on
Hook switch sensor	Mechanical switch	Hook switch PCB in the handset mount
Cover sensor	Photosensor	Main PCB
Bin cover sensor	Photosensor	Main PCB
Registration sensor	Photosensor	Main PCB
Paper width sensor	Photosensor	Main PCB
Paper ejection sensor	Photosensor	Main PCB
Document front sensor	Photosensor	Document sensor PCB of the control panel PCB ASSY
Document rear sensor	Photosensor	Document sensor PCB of the control panel PCB ASSY
Ink cartridge sensors	Mechanical switches	Carriage PCB
Black ink empty sensor	Photosensor	Carriage PCB
Carriage encoder	Photosensor	Carriage PCB
Head thermister	Thermister	Carriage PCB
Head property EEPROM	—	Print head unit (Head PCB)
Purge cam HP switch	Mechanical switch	Purge cam (→Main PCB)

- Hook switch sensor which detects whether the handset is placed on the handset mount.
- Cover sensor which detects whether the top cover is closed.
- Bin cover sensor which detects whether the bin front cover is closed, as well as detecting whether the bin is mounted.
- Registration sensor which detects the leading and trailing edges of paper, which allows the controller to determine the registration timing and check paper jam.
- Paper width sensor which detects whether the paper width is A4-size or wider.
- Paper ejection sensor which detects whether the paper goes out of the equipment.
- Document front sensor which detects the presence of documents.
- Document rear sensor which detects the leading and trailing edges of pages to tell the control circuitry when the leading edge of a new page has reached the starting position and when the scan for that page is over.
- Ink cartridge sensors, each of which detects whether an ink cartridge is loaded.
- Black ink empty sensor which detects whether the black ink cartridge is empty.
- Carriage encoder which detects the current carriage position and carriage travel speed. If the carriage travel speed varies abnormally, the controller regards it as a paper jam.

- Head thermister which detects the temperature of the print head. According to the signal from this thermister, the control circuitry regulates the drive voltage applied to the head's piezoelectric ceramic actuators since the viscosity of the ink varies depending upon the temperature. If the head thermister detects 5.5°C or below, or 48°C or higher after two hours of powering-on state, the equipment stops printing and stores print data into the DRAM.
- Head property EEPROM which stores the head property information. If you set the print head unit on the carriage, the control circuitry on the main PCB reads the information and regulates the drive voltage applied to the head's piezoelectric ceramic actuators.
- Purge cam HP switch which detects whether the purge cam is in the home position.

The above photosensors are a photointerrupter consisting of a light-emitting diode and a light-sensitive transistor. Each of them has an actuator separately arranged as shown on the next page.



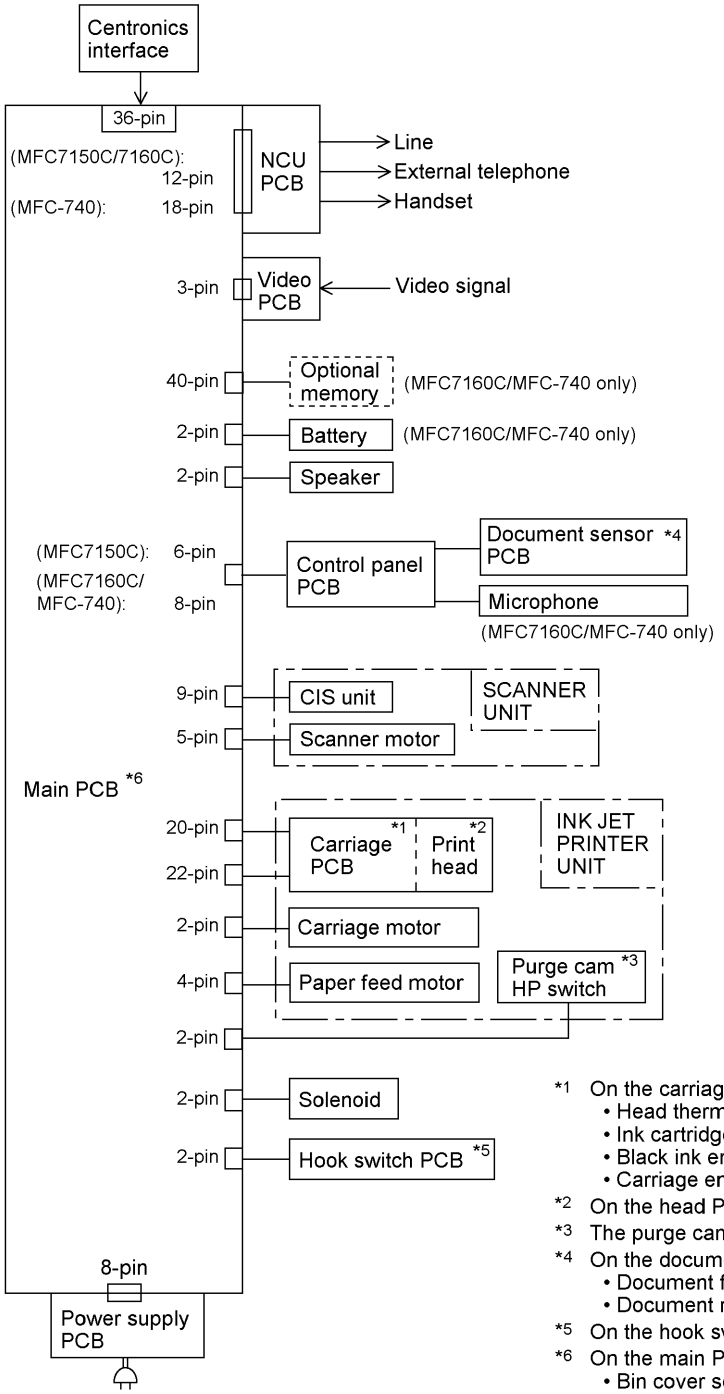


Location of Sensors and Actuators

3. CONTROL ELECTRONICS

3.1 Configuration

The hardware configuration of the facsimile equipment is shown below.



*1 On the carriage PCB are these sensors:
- Head thermister
- Ink cartridge sensors
- Black ink empty sensor
- Carriage encoder

*2 On the head PCB of the print head unit is a head property EEPROM.

*3 The purge cam HP switch is located on the purge unit.

*4 On the document sensor PCB are these sensors:
- Document front sensor (PH1)
- Document rear sensor (PH2)

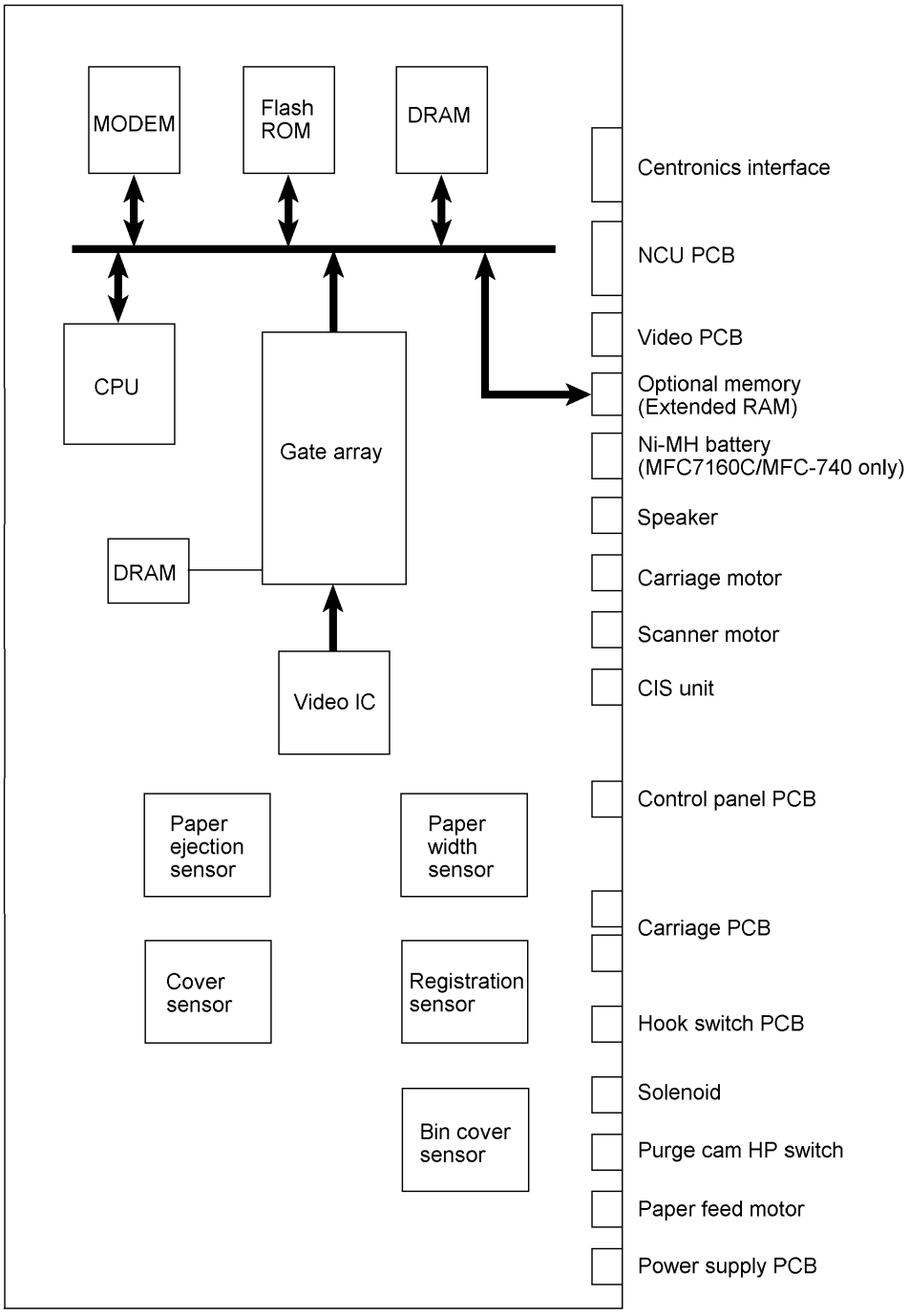
*5 On the hook switch PCB is the hook switch sensor.

*6 On the main PCB are these sensors:
- Bin cover sensor
- Cover sensor
- Registration sensor
- Paper width sensor
- Paper ejection sensor

Configuration of Facsimile Equipment

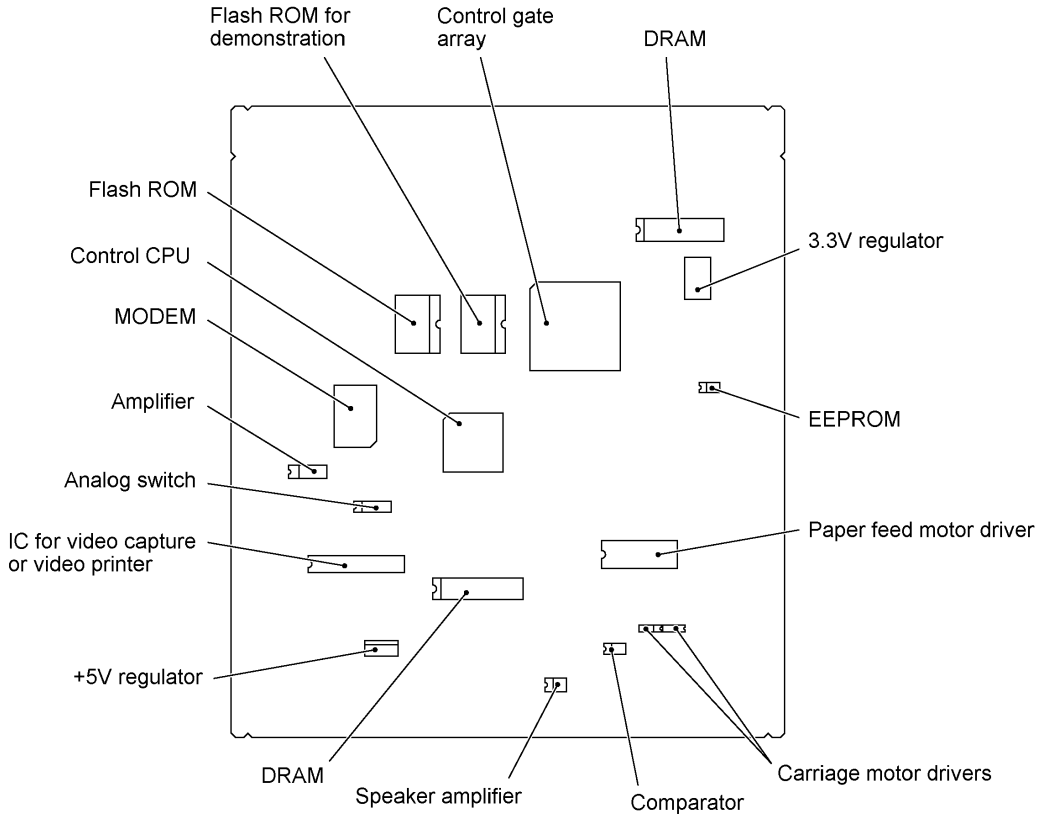
3.2 Main PCB

The main PCB, which is the nucleus controlling the entire operation of the equipment, consists of a CPU, gate array, memories, MODEM, motor drive circuitry, sensor detection circuitry, and analog circuits for scanning and printing.

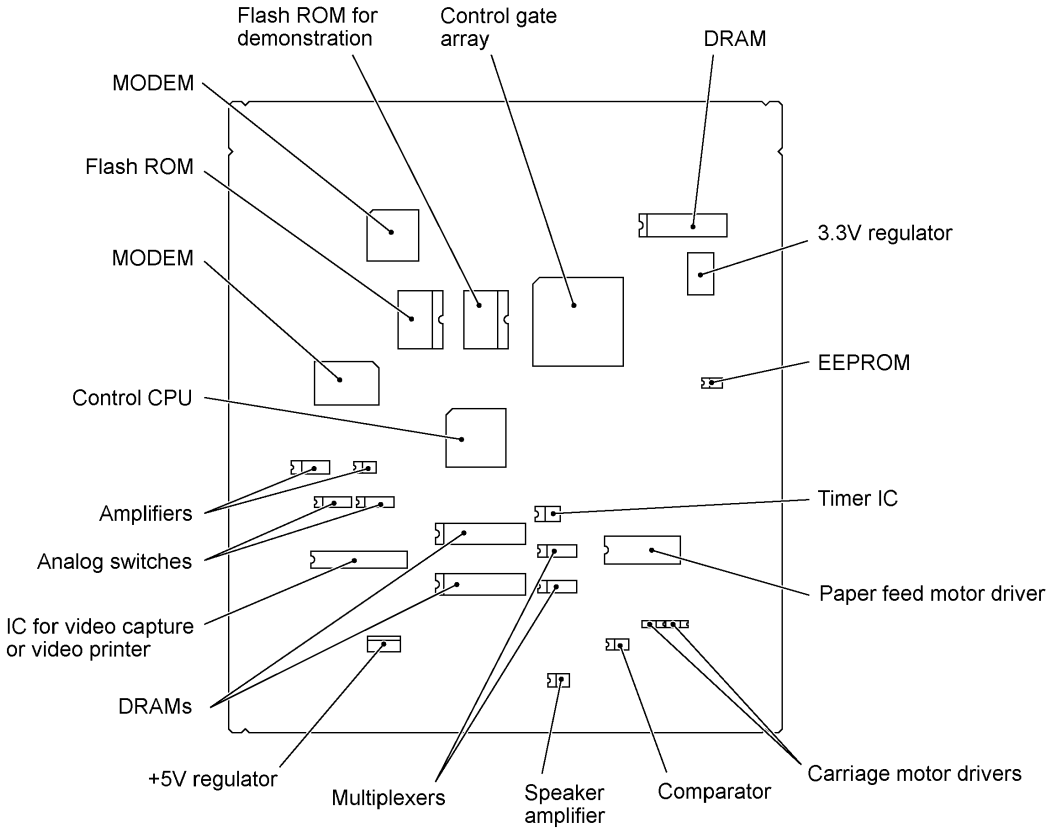


Block Diagram of Main PCB

MFC7150C



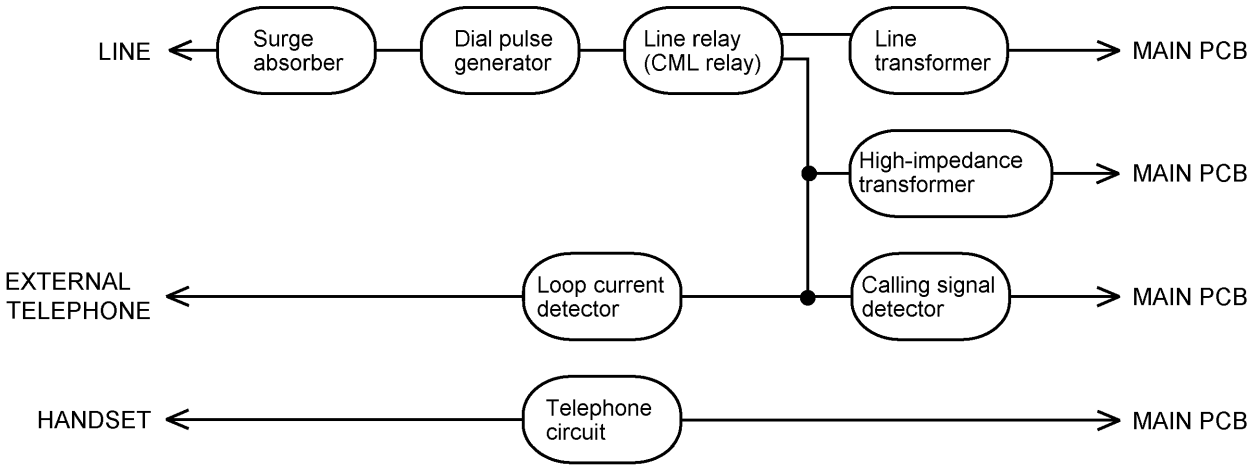
MFC7160C/MFC-740

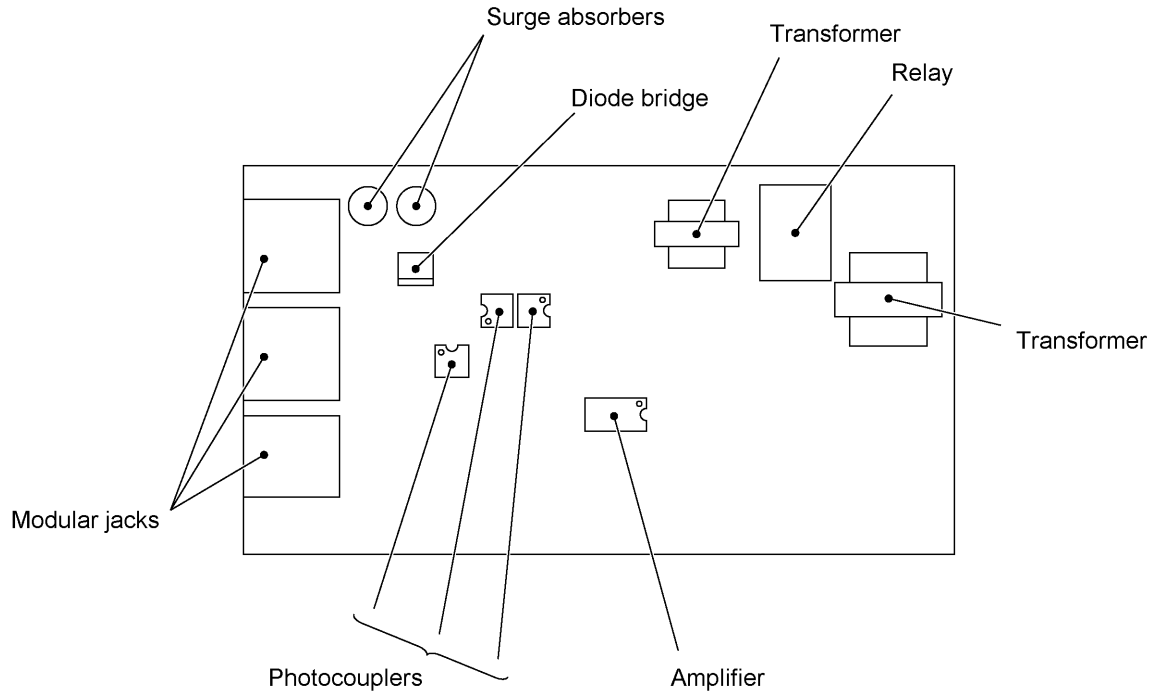


3.3 NCU PCB

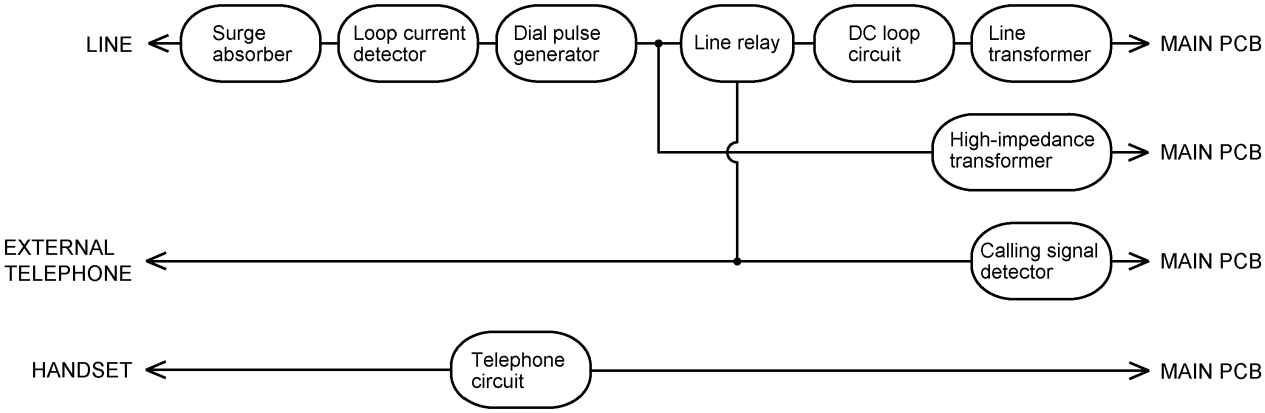
The NCU PCB switches the communications line to telephone or built-in MODEM, under the control of the main PCB.

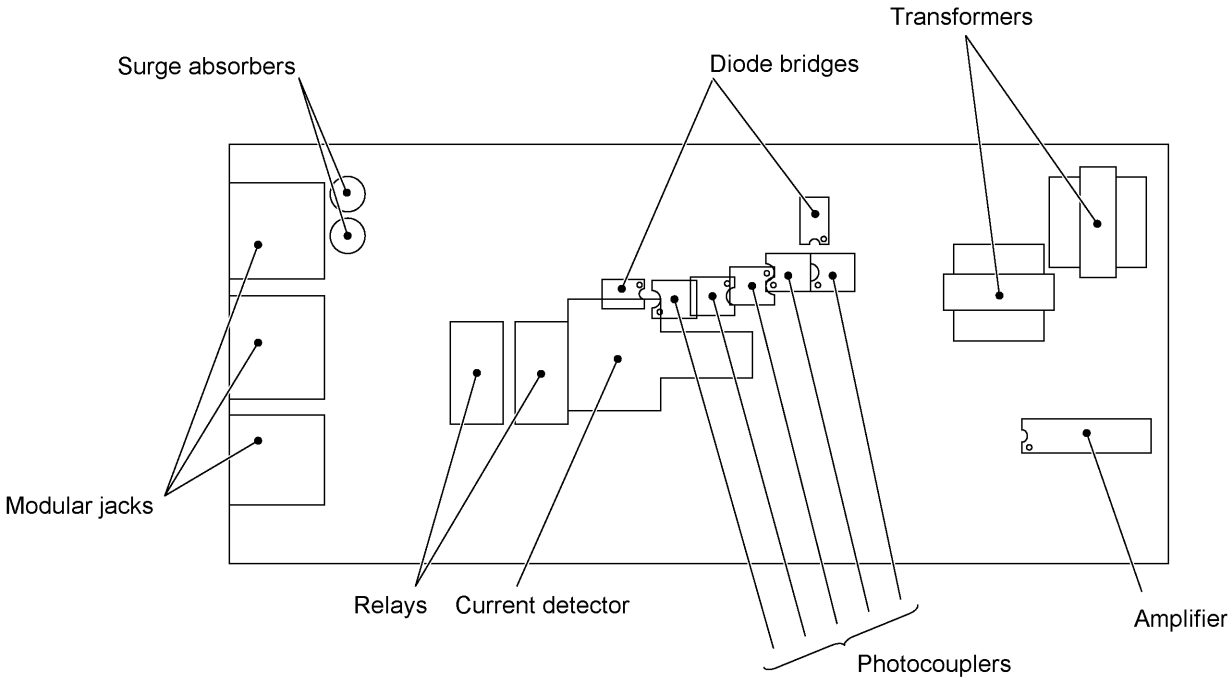
MFC7150C/MFC7160C





MFC-740


LINE
Surge absorber
Loop current detector
Dial pulse generator
Line relay
DC loop circuit
Line transformer
MAIN PCB
High-impedance transformer
MAIN PCB
EXTERNAL TELEPHONE
Calling signal detector
MAIN PCB
HANDSET
Telephone circuit
MAIN PCB


Transformers
Surge absorbers
Diode bridges
Modular jacks
Relays
Current detector
Photocouplers
Amplifier

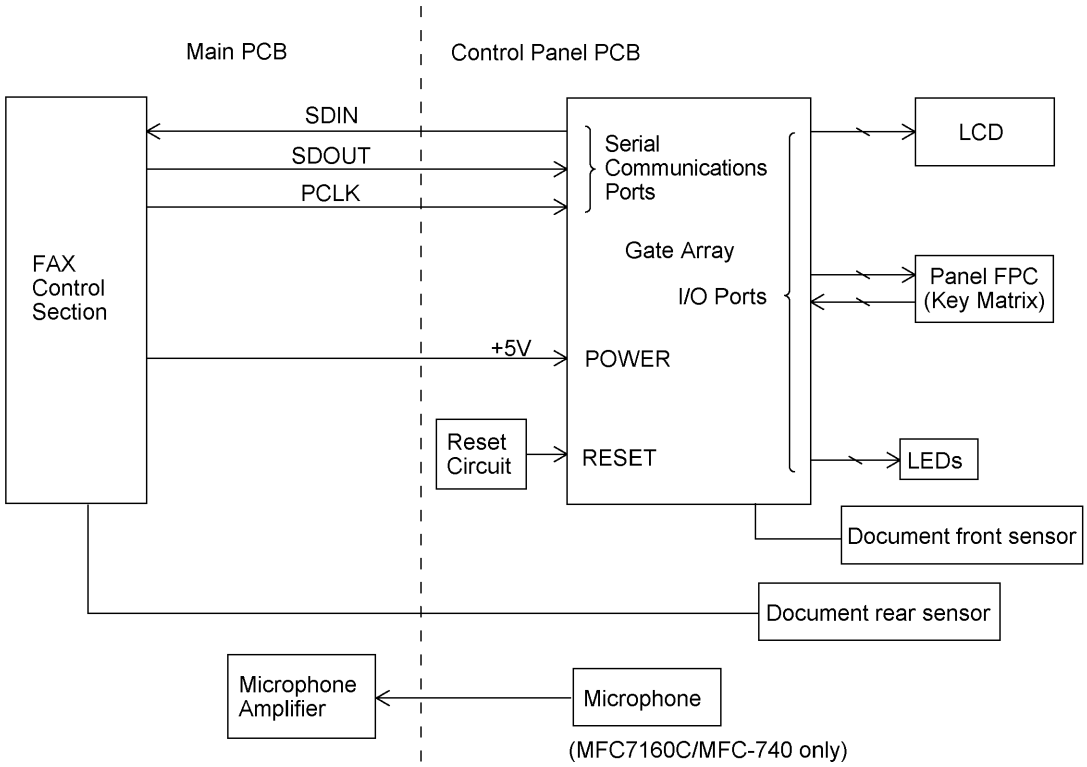
3.4 Control Panel PCB

The control panel PCB and the main PCB communicate with each other by serially transmitting commands and data.

The control panel unit consists of a gate array, an LCD and LEDs, which are controlled by the gate array according to commands issued from the control CPU on the main PCB.

The calendar clock is backed up by the backup circuit on the main PCB.

The panel FPC is a flexible keyboard PCB which integrates the key matrix having rubber keytops.



Control Panel PCB and its Related Circuit

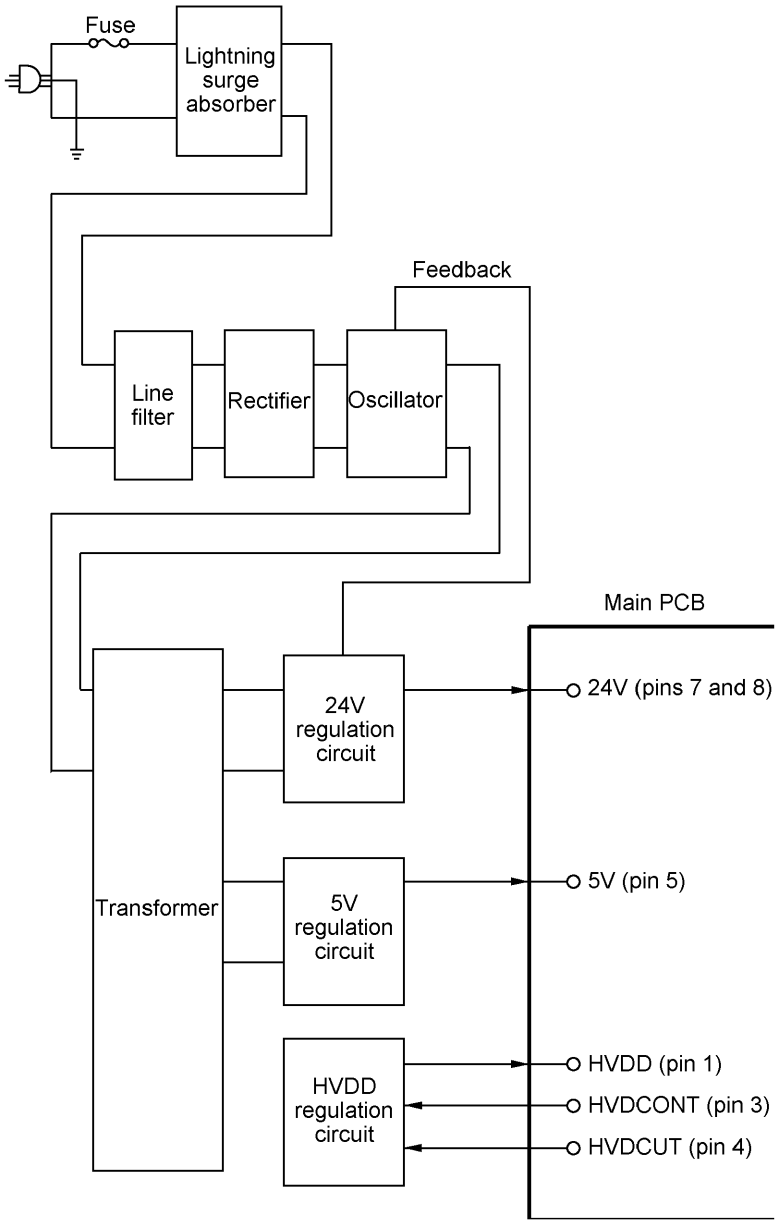
3.5 Power Supply PCB

The power supply uses the switching regulator to generate DC power (+24V, +5V, and HVDD) from a commercial AC power line.

The +24V source is stabilized and fed to the motors and solenoid for feeding documents and recording paper, as well as to the LED array of the CIS unit.

The +5V source is stabilized and fed to the logic, etc.

The HVDD is fed to the piezoelectric ceramic actuators embedded in the print head. It varies within 13.7V to 29.4V depending upon the temperature detected by the head thermister.



Power Supply Circuit

CHAPTER IV.

DISASSEMBLY/REASSEMBLY, LUBRICATION AND ADJUSTMENT

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1. DISASSEMBLY/REASSEMBLY

n Safety Precautions

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

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

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

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

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

(7) Tighten screws to the torque values listed on the following pages.

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

(9) Before reassembly, apply the specified lubricant to the specified points. (Refer to Section 2 in this chapter.)

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

(11) Once the print head 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 equipment completes the head locking operation; doing so will make the print head unusable and require replacement with a new print head.

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

Tightening Torque List

Location	Screw type	Q'ty	Tightening torque (kg•cm)	Loosening torque (kg•cm)
ADF parts	Taptite, pan B M3x6	1	4 ±1	2 to 6
Panel rear cover	Taptite, cup B M3x8	2	6 ±1	2 to 6
Front cover	Taptite, cup B M4x12	2	10 ±2	3 to 6
Cover R	Screw, pan (washer) M4x8DB	1	8 ±2	Min. 3
Speaker	Taptite, cup B M4x10	2	8 ±2	Min. 3
Cover L	Screw, pan (washer) M4x8DB	1	8 ±2	Min. 3
Handset mount	Taptite, cup B M3x10	2	7 ±2	Min. 2
Top cover support R	Taptite, cup B M4x12	2	10 ±2	Min. 3
	Taptite, cup S M3x6	2	8 ±2	Min. 2
Cable clip	Taptite, cup S M3x6	1	8 ±2	Min. 2
Scanner frame ASSY	Taptite, cup B M3x10	2	9 ±2	2 to 6
Scanner motor	Screw, pan (washer) M3x6DA	1	7 ±2	Min. 2
Scanner grounding leaf spring	Taptite, cup S M3x6	1	8 ±2	Min. 2
Scanner gear plate	Taptite, cup B M3x8	2	8 ±2	Min. 2
Control panel locks	Taptite, cup B M3x8	2	8 ±2	Min. 2
Pinch roller leaf spring	Taptite, cup B M3x8	1	8 ±2	Min. 2
Platen frame	Taptite, cup S M3x6	1	8 ±2	Min. 2
Rear cover	Taptite, cup B M4x12	2	10 ±2	Min. 3
Gear cover	Taptite, cup S M3x6	1	8 ±2	Min. 2
Gear frame ASSY	Taptite, cup B M3x10	2	9 ±2	Min. 2
Bottom plate	Taptite, cup S M3x6	3	9 ±1	Min. 2
	Taptite, cup B M3x10	5	9 ±2	Min. 2
Power supply PCB	Taptite, cup S M3x6	2	4 ±1	Min. 2
Grounding terminal	Screw, pan (washer) M4x8DB	1	6 ±2	Min. 2
Video PCB	Taptite, cup S M3x6	1	4 ±1	Min. 2
NCU bracket	Taptite, cup S M3x6	1	4 ±1	Min. 2
Shield plate B	Taptite, cup S M3x6	1	4 ±1	Min. 2
NCU PCB	Taptite, cup S M3x6	1	6 ±2	Min. 2
Main PCB	Taptite, cup S M3x6	2	4 ±1	Min. 2
Centronics interface connector	Machine screw, pan M3x6	2	7 ±2	Min. 2
Purge gear frame	Screw, pan (washer) M3x6DB	1	5 ±1	Min. 2
	Taptite, cup B M3x10	2	9 ±2	Min. 2
Paper feed motor	Screw, pan (washer) M3x8DB	2	7 ±2	Min. 2
Tension plate ASSY	Screw, pan (washer) M3x8DB	1	7 ±2	Min. 2
Grounding plate L	Taptite, cup S M3x6	1	8 ±2	Min. 2
Top cover support L	Taptite, cup B M4x12	2	10 ±2	Min. 3
	Taptite, cup S M3x6	1	8 ±2	Min. 2
Carriage motor enclosure	Taptite, cup S M3x6	2	8 ±2	Min. 2
	Taptite, cup B M4x12	1	10 ±2	Min. 3

Location	Screw type	Q'ty	Tightening torque (kg•cm)	Loosening torque (kg•cm)
Purge unit	Screw, pan (washer) M3x6DB	2	7 ±2	Min. 2
Paper ejection roller	Screw, pan (washer) M2.6x8DB	1	3 ±1	Min. 0.5
Main frame	Taptite, cup B M4x12	3	10 ±2	Min. 3
Cover lock (leaf spring)	Screw, pan (washer) M3x6DB	1	4 ±1	Min. 2
Idle pulley stopper	Screw, pan (washer) M3x8DB	1	7 ±2	Min. 2
Eccentric bearings	Screw, pan (washer) M3x8DB	2	7 ±2	Min. 2
Carriage motor	Screw, pan (washer) M3x6DB	2	7 ±2	Min. 2

n Preparation

Prior to proceeding to the disassembly procedure,

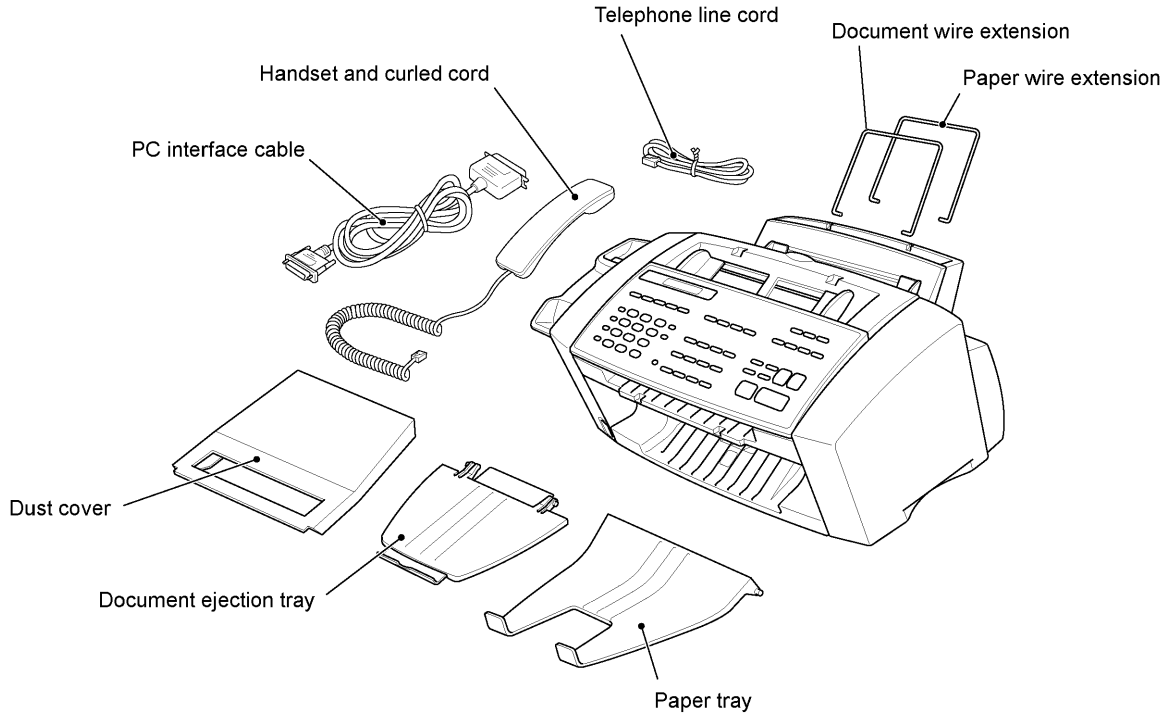
(1) Unplug

- the modular jack of the telephone line,
- the modular jack of the curled cord (and remove the handset),
- the PC interface cable, and
- the modular jack of an external telephone set if connected. (Not shown below.)

(2) Remove

- the dust cover,
- the paper wire extension
- the document wire extension
- the document ejection tray, and
- the paper tray.

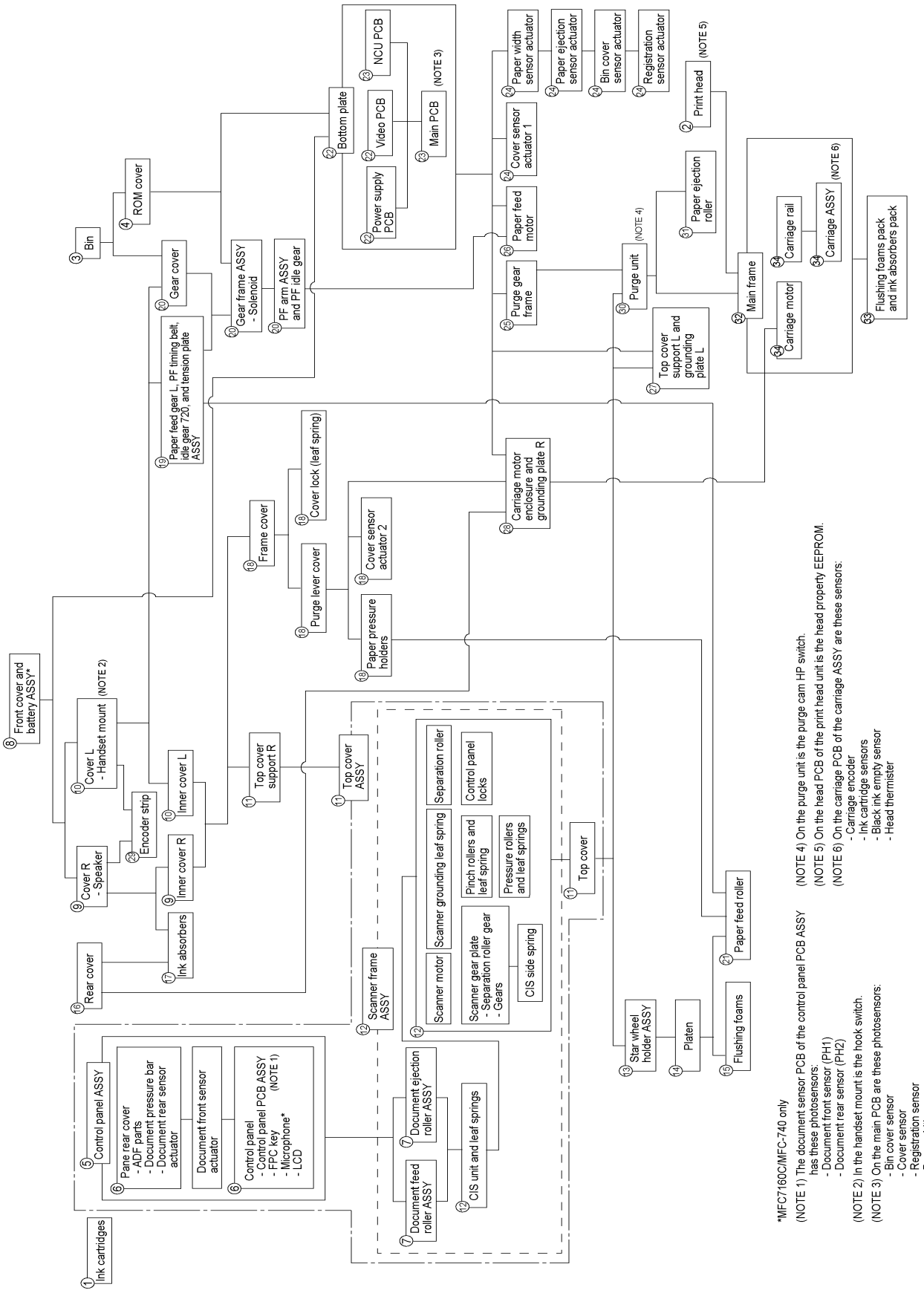
NOTE: Do not remove the ink cartridges when disassembling the equipment except when removing the print head.



n How to Access the Object Component

- On the next page is a disassembly order flow which helps you access the object components. To remove the paper feed motor, for example, first find it on the flow and learn its number (㉖ in this case). You need to remove parts numbered ③, ④, ⑧, ⑩, ⑲, ⑳, and ㉒ so as to access the paper feed motor.
- Unless otherwise specified, the disassembled parts or components should be reassembled in the reverse order of removal.

n Disassembly Order Flow



1.1 Ink Cartridges

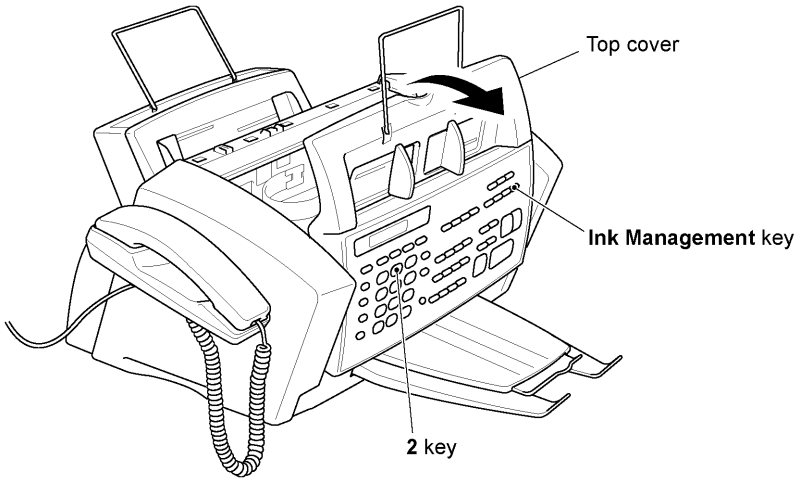
During disassembly jobs (except when removing the print head), all of the four ink cartridges should be kept in place. The following ink cartridge replacement procedure should apply only when you replace ink cartridges. When replacing the print head, do not apply this procedure but the procedure given in Section 1.2.

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

(2) If any ink empty message (INK EMPTY BLACK, CYAN, MAGENT, or YELLOW) and "PLS OPEN COVER" are displayed alternately on the LCD, open the top cover to place the equipment in the ink cartridge replacement mode.

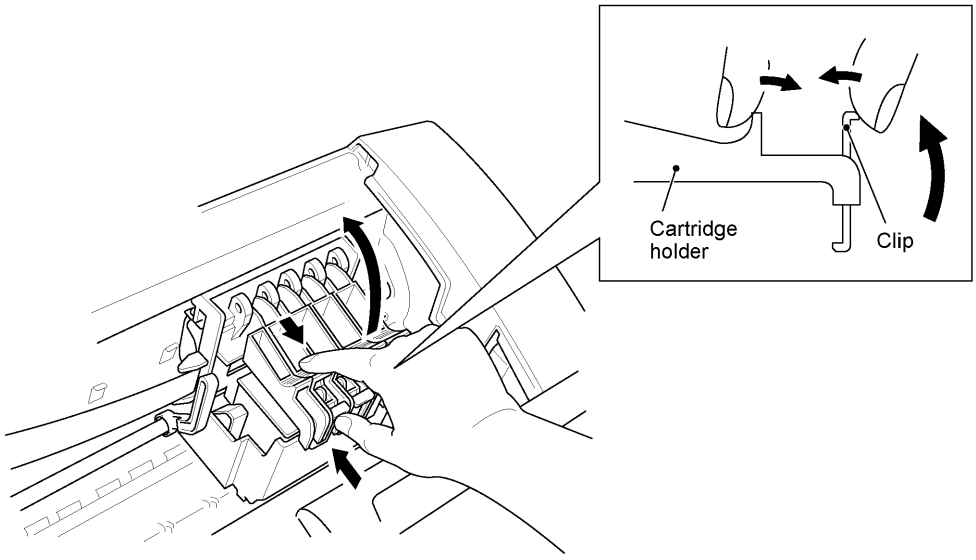
If any ink near-empty message (NEAR EMPTY BLACK, CYAN, MAGENT, or YELLOW) or no message is displayed on the LCD, follow the steps below in order to place the equipment in the ink cartridge replacement mode.

1) Press the **Ink Management** key.
2) Press the **2** key.
3) Open the top cover.



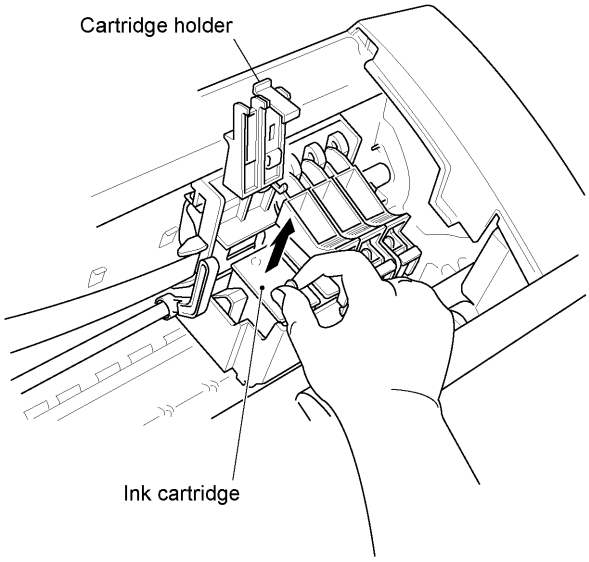
The carriage automatically moves left to the ink cartridge replacement position.

(3) Pull up the cartridge holder of the ink cartridge to be replaced by pinching its clip with your fingers.



(4) Take out the ink cartridge from the print head.

NOTE: When handling ink cartridges, do not touch their orifices which may stain your hands or clothing with ink.



(5) Load a new or removed ink cartridge. Be sure to snap it into place.

NOTE: When using a new cartridge, first open the cartridge bag, take out the cartridge, and remove the sealing tape gently.

(6) Close the cartridge holder until it clicks into place.

(7) Close the top cover.

For each of the ink cartridges loaded, the confirmation message will appear as shown below, asking you whether the ink dot counter should be reset to zero.

```
DID YOU CHANGE
CYAN? 1.YES 2.NO
```

In this area appears CYAN, BLCK, YELW, or MGTA.

If you have loaded a new ink cartridge in step (5), press the **1** key to reset the ink dot counter; if you have reloaded the removed one, press the **2** key.

NOTE: Pressing the **1** key although you have reloaded the removed one could cause inkless printing.

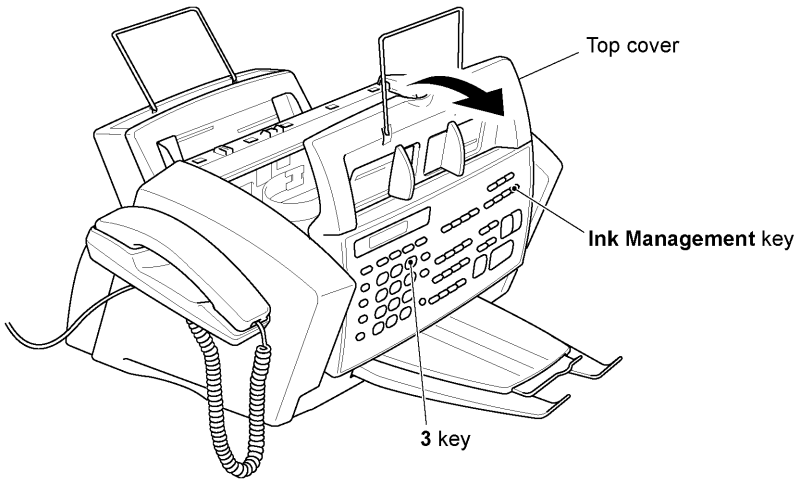
(8) The equipment automatically enters the purge mode. Select the related ink-jet unit(s) of the print head for purging air bubbles .

1.2 Print Head Unit

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

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

(2) Open the top cover and then press the **Ink Management** key.

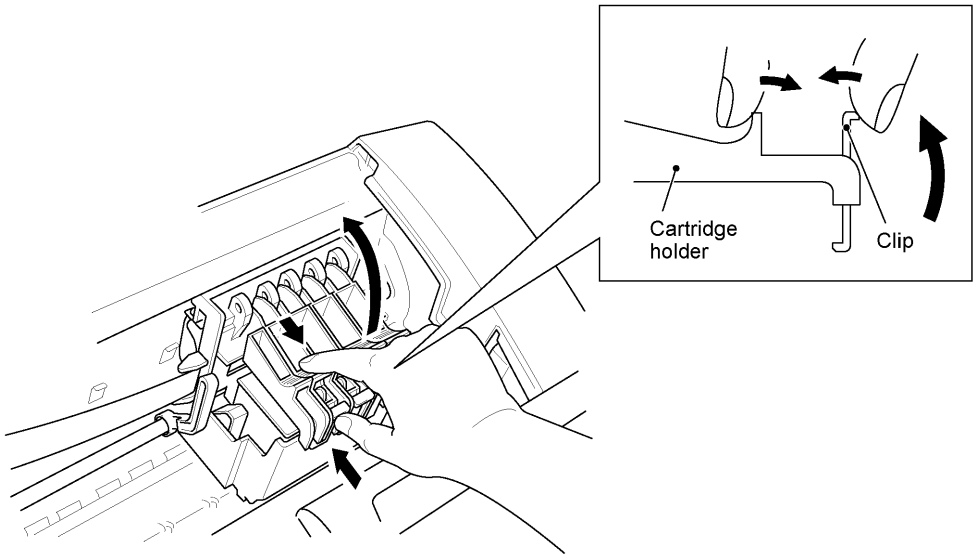


(3) Press the **3** key.

```
REMOVE ALL INKS
AND PRINT HEAD
```

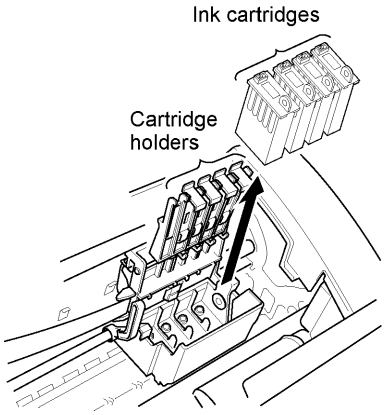
The carriage automatically moves to the head replacement position (to the left from the home position).

(4) Pull up all cartridge holders by pinching their clips with your fingers.



(5) Remove all ink cartridges, one at a time.

NOTE: When handling ink cartridges, do not touch their nozzles which may stain your hands or clothing with ink.



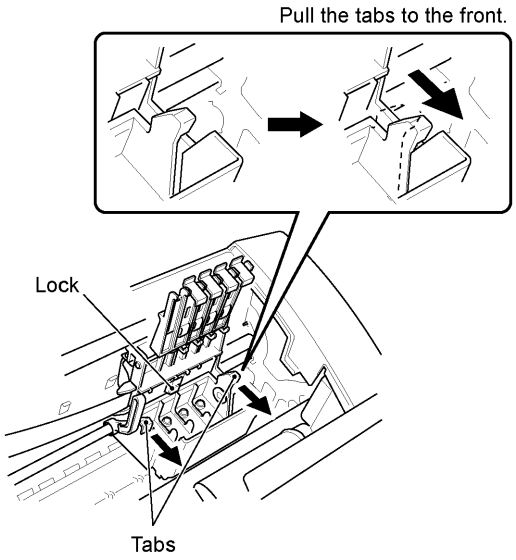
(6) Pull the tabs of the print head unit to the front in order to release the rear edge of the print head unit from the lock provided on the carriage. Then lift the print head unit up and out of the carriage.

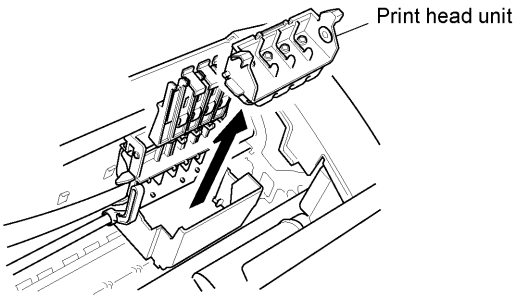
```
INSTALL HEAD
AND CARTRIDGES
```

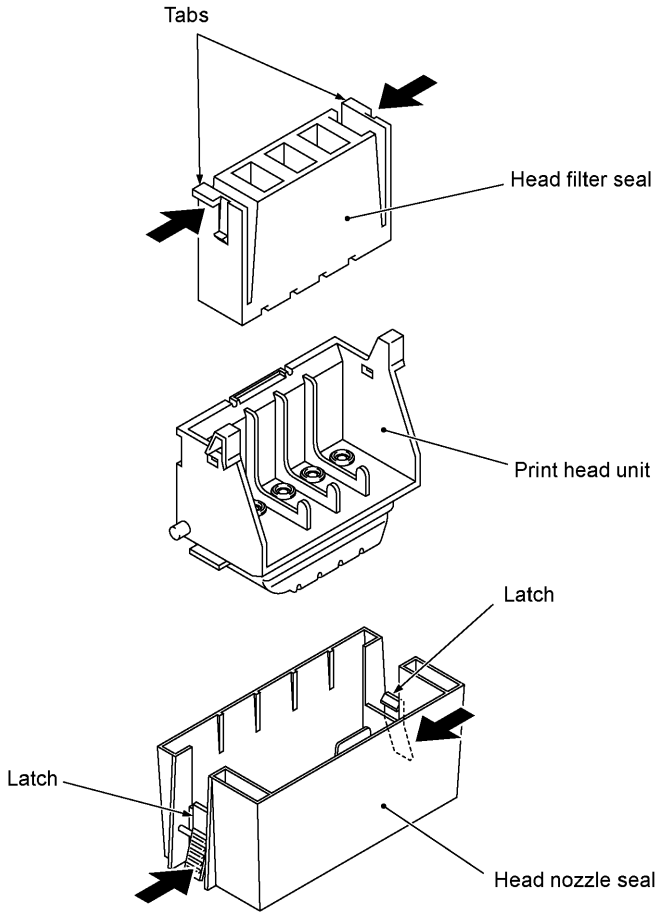
NOTE: Do not touch the printing ends (nozzles) of the print head; doing so will stain your hands with ink.

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

NOTE: Do not touch the control board provided on the rear side of the print head.







(7) If the head cap has collected ink, clean it with a head cleaner. If the surrounding parts are stained with ink, wipe them off with a clean cloth.

(8) To install a new (or removed) print head unit, take off the yellow head nozzle seal and then put the print head unit onto the carriage, taking care not to touch the control board provided on the rear side of the print head.

(9) Push the tabs of the print head unit to the rear until it locks into place.

(10) Remove the yellow head filter seal from the print head unit, then load ink cartridges in the order of black, yellow, cyan, and magenta. Be sure to snap them into place.

(11) Close the cartridge holders until they click into place.

(12) Close the top cover.

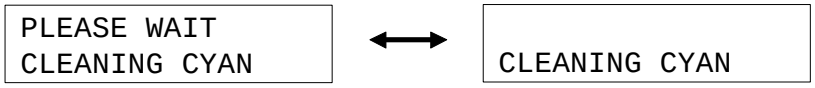
For each of the ink cartridges loaded, the confirmation message will appear as shown below, asking you whether you loaded a new cartridge.

```
DID YOU CHANGE
CYAN? 1.YES 2.NO
```

(13) If you have loaded a new cartridge, press the **1** key within one minute. The ink dot counter will be reset to zero.

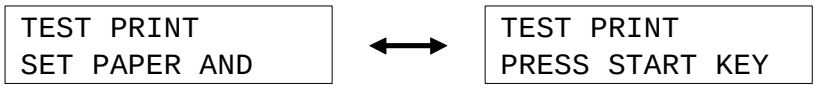
If you have reloaded the removed one, press the **2** key within one minute.

(14) The equipment automatically carries out purging operation for each ink-jet unit of the print head.



(Steps (15) through (18) given below will be skipped if you have reinstalled the removed print head unit.)

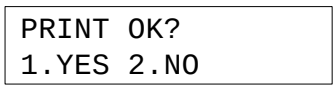
(15) Upon completion of purging operation, the following messages appear alternately:



Make sure that paper is loaded in the bin and the paper tray is set in place, then press the **Start** key.

NOTE: If you print without setting the paper tray, the leading edge of the printed paper will come into direct contact with the table top. This will hinder the printed paper from coming out of the facsimile equipment so that the trailing edge of the paper may rub against the print head unit resulting in a scratched or damaged head.

The equipment prints "Nozzle check pattern sheet" and then shows the following message:



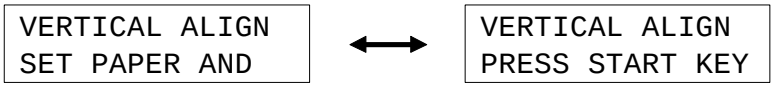
(16) Check the print quality, following the instructions given on "Nozzle check pattern sheet."

If the print quality is OK, press the **1** key and proceed to step (17).

If any of the horizontal lines are missing or no-print areas are found between color blocks, press the **2** key within one minute, and go back to step (14).

Pressing neither key within one minute makes the equipment proceed to step (17).

(17) The following messages appear alternately:



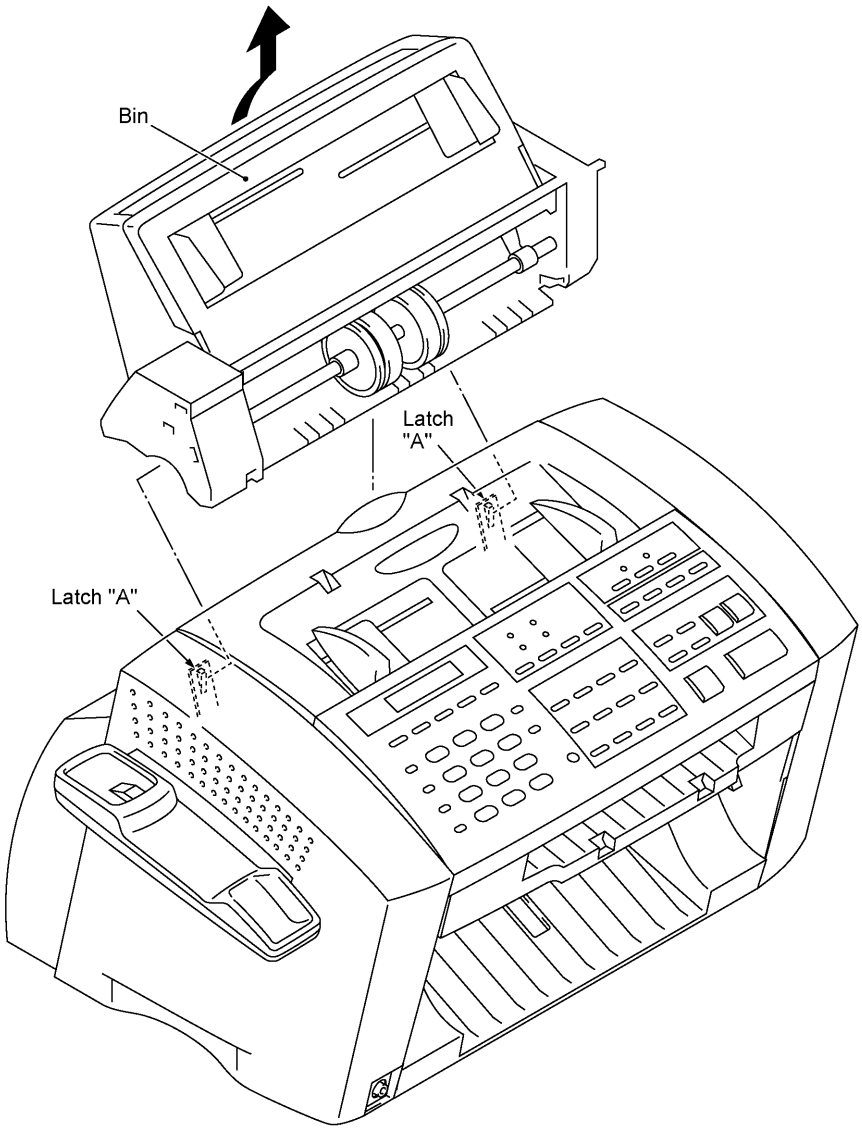
Make sure that paper is loaded in the bin, then press the **Start** key within one minute. The equipment prints "Vertical alignment check pattern sheet."

If the **Start** key is not pressed within one minute, the equipment automatically returns to the initial stage of the maintenance mode.

(18) According to the instructions given on "Vertical alignment check pattern sheet," adjust the alignment of vertical print lines.

1.3 Bin

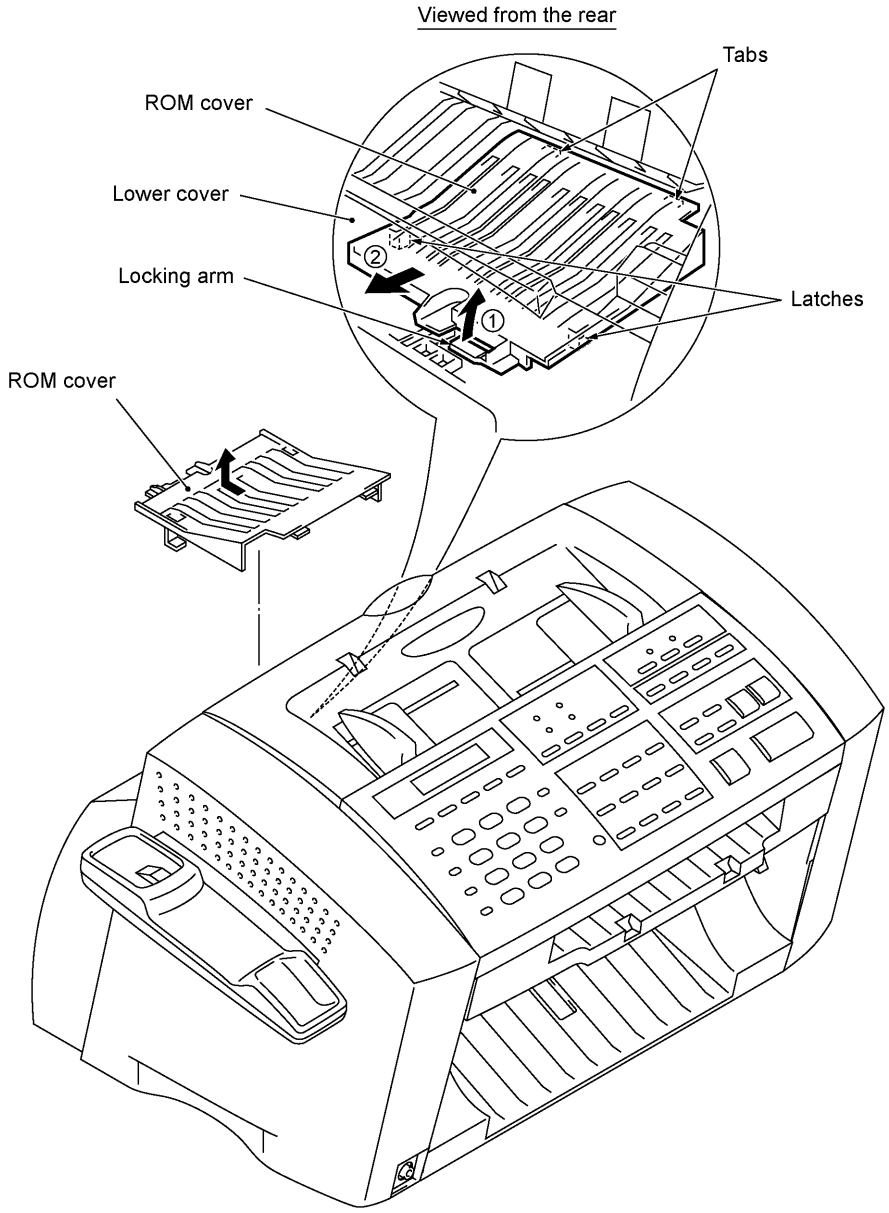
(1) Slightly pull up the rear of the bin to release it from two latches "A," then lift up the bin.



1.4 ROM Cover

(1) Lift up the locking arm with the tip of a flat screwdriver or spring hook and then slide the ROM cover to the rear.

(2) Take out the ROM cover.

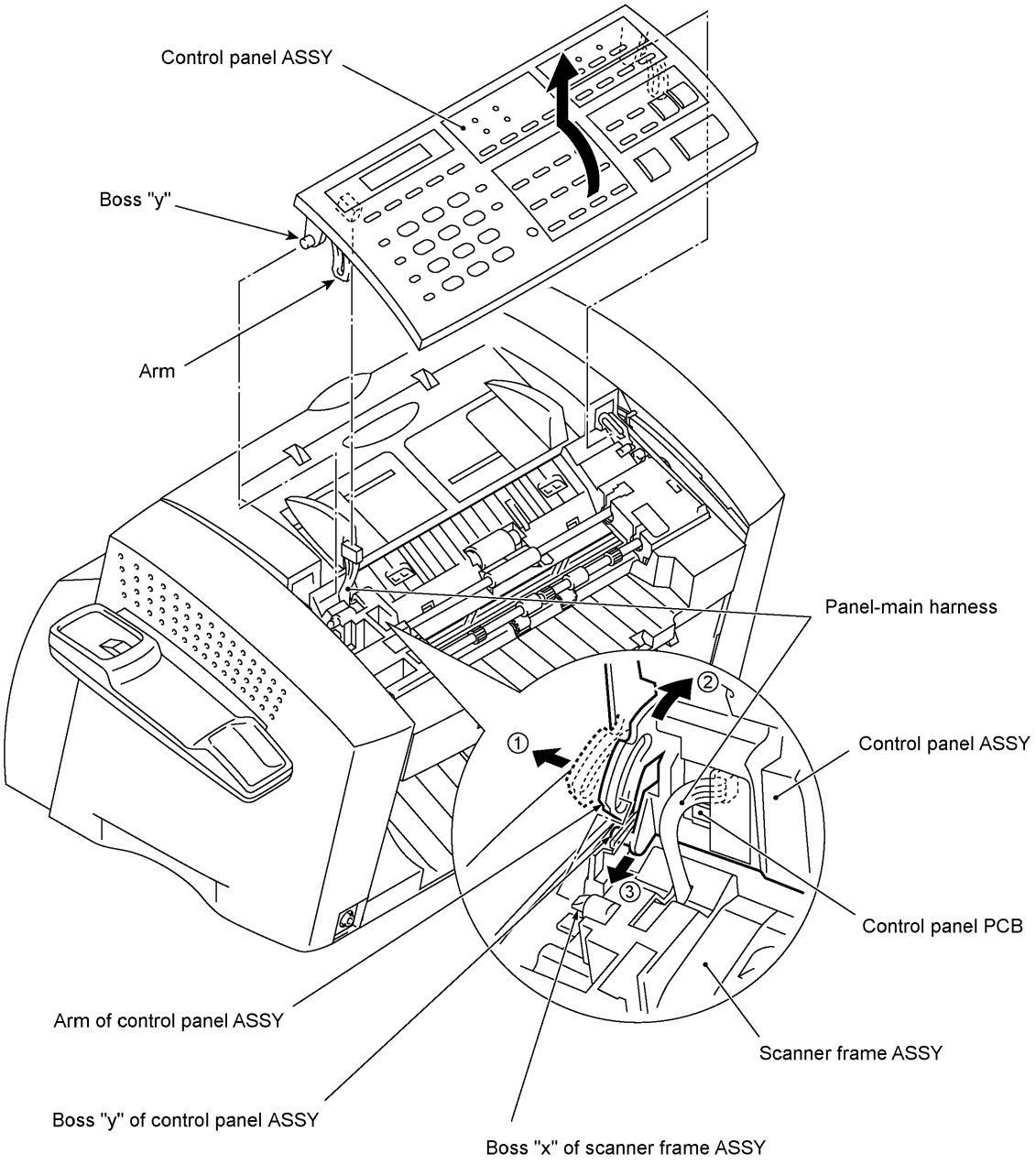


1.5 Control Panel ASSY

(1) Slightly open the control panel ASSY.

(2) Push the right and left arms of the control panel ASSY outwards (in the direction of arrow •) with your thumbs and open the control panel ASSY further (arrow ❟) to unhook those arms from bosses "x" provided on the scanner frame ASSY. Then slide the control panel ASSY to the front (arrow ***f***) to release its bosses "y" from the grooves of the scanner frame ASSY.

(3) Slightly lift up the control panel ASSY and disconnect the panel-main harness from the control panel PCB.



1.6 Panel Rear Cover and Control Panel

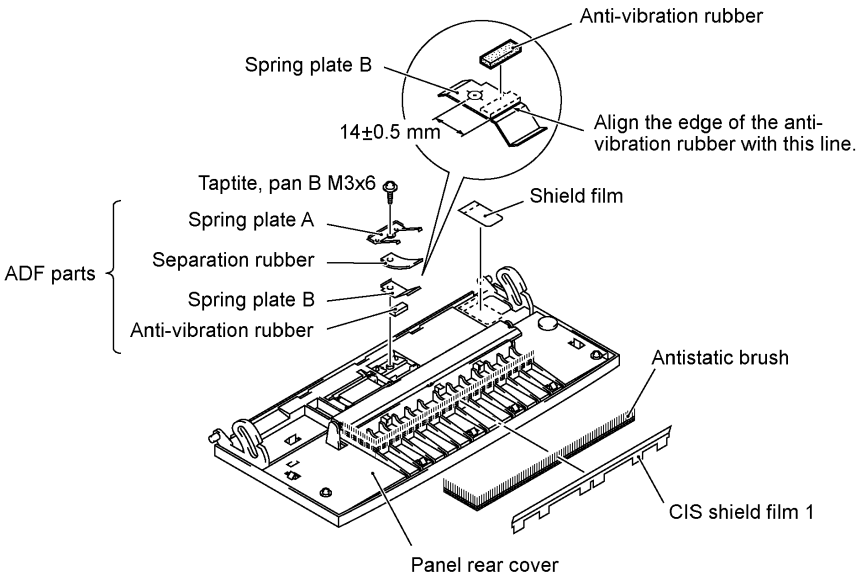
(1) Place the control panel ASSY upside down.

If you do not need to remove the ADF parts, CIS shield film 1, antistatic brush, shield film, document pressure bar, or document rear sensor actuator, skip to step (6),

(2) To remove the ADF parts (spring plates, separation rubber and anti-vibration rubber), remove the screw.

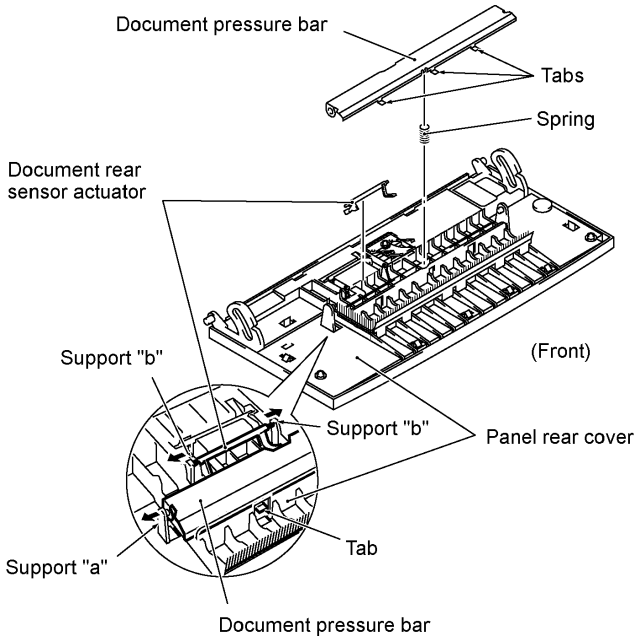
(3) To replace the CIS shield film 1, antistatic brush and shield film, remove them.

NOTE: Once removed, they will become unusable and new parts will have to be put back in.



(4) To remove the document pressure bar, pull either of supports "a" provided on the panel rear cover outwards and then lift the pressure bar up and towards the rear to release the three tabs from the cutouts provided in the panel rear cover. The spring also comes off.

(5) To remove the document rear sensor actuator, pull either of supports "b" on the panel rear cover outwards.



(6) Remove the two screws from the panel rear cover.

(7) Unhook the panel rear cover from eight "X" latches provided on the control panel and lift up the panel rear cover.

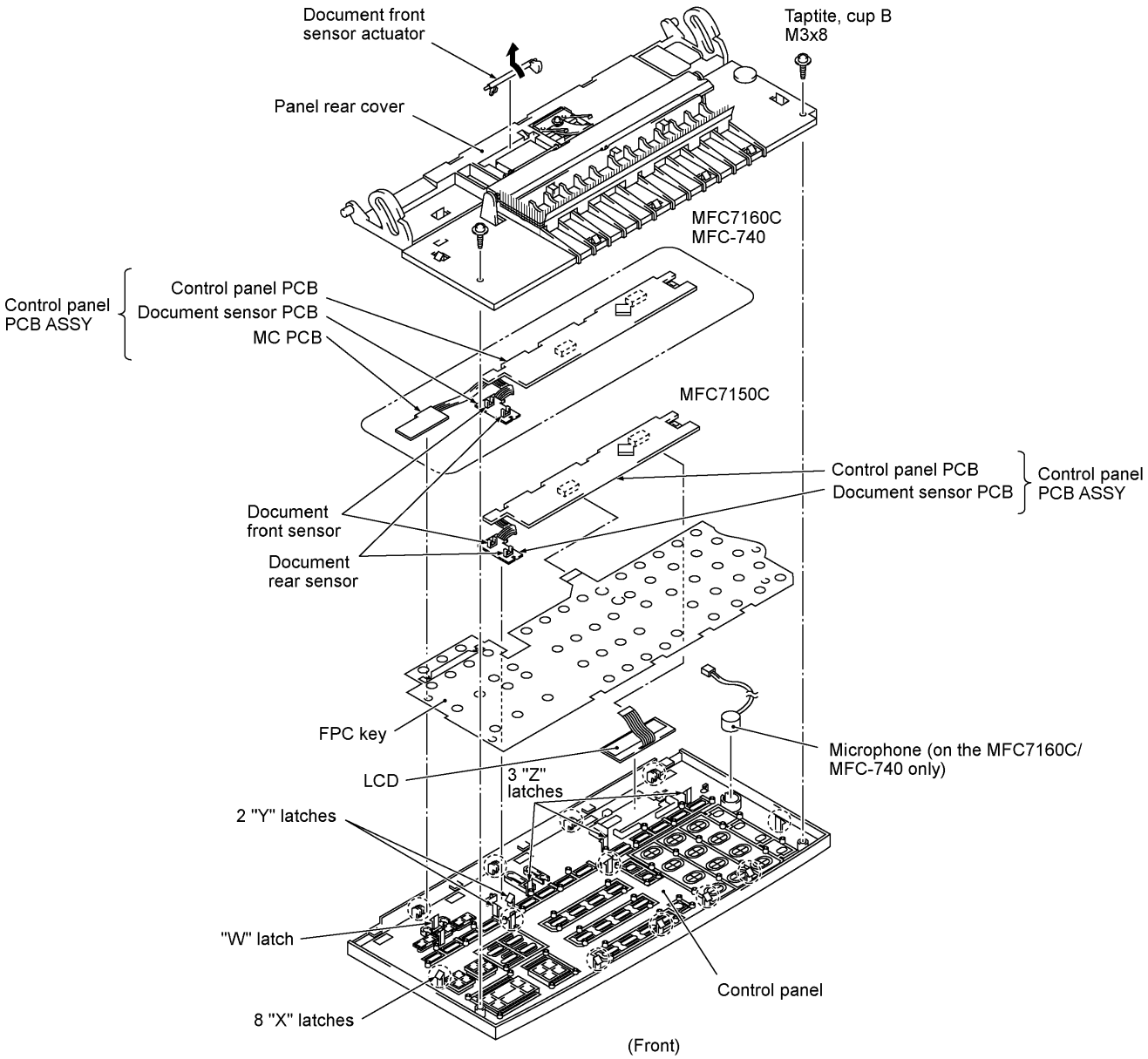
(8) Fully turn the document front sensor actuator to the rear and lift it up.

(9) Unhook the document sensor PCB from two "Y" latches.

(10) MFC7150C: Unhook the control panel PCB from three "Z" latches.

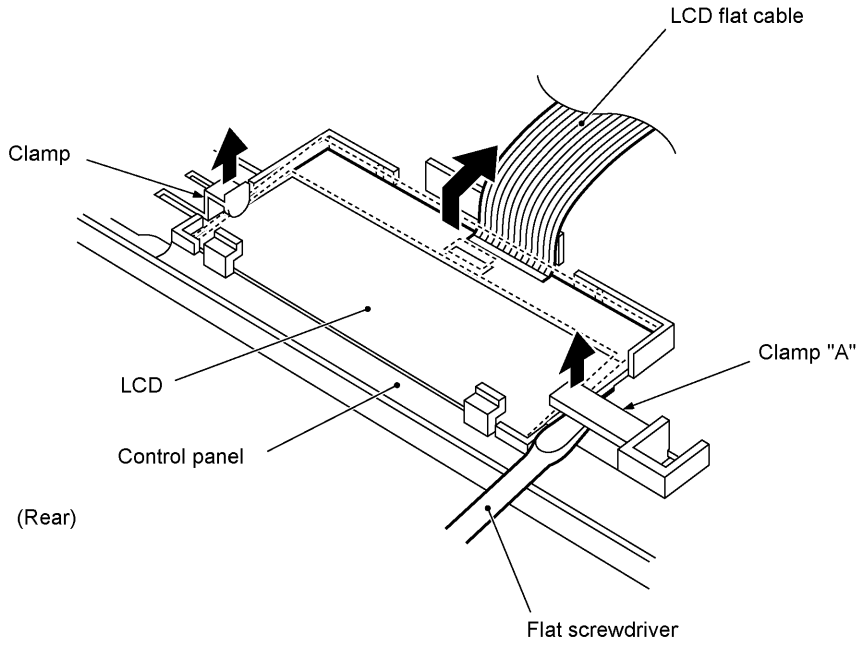
MFC7160C/MFC-740: Unhook the MC PCB from "W" latch and then unhook the control panel PCB from three "Z" latches.

(11) Slightly lift up the control panel PCB, then unlock the LCD cable connector and disconnect the LDC flat cable. Next, unlock the FPC key connector and disconnect the FPC key.



(12) As shown below, insert the tip of a flat screwdriver under clamp "A" from the rear and push up clamp "A" slightly to release the LCD, and then take out the LCD while pulling the LCD flat cable gently.

NOTE: Do not take out the LCD except when the LCD is defective and requires replacement.



n Reassembling Notes

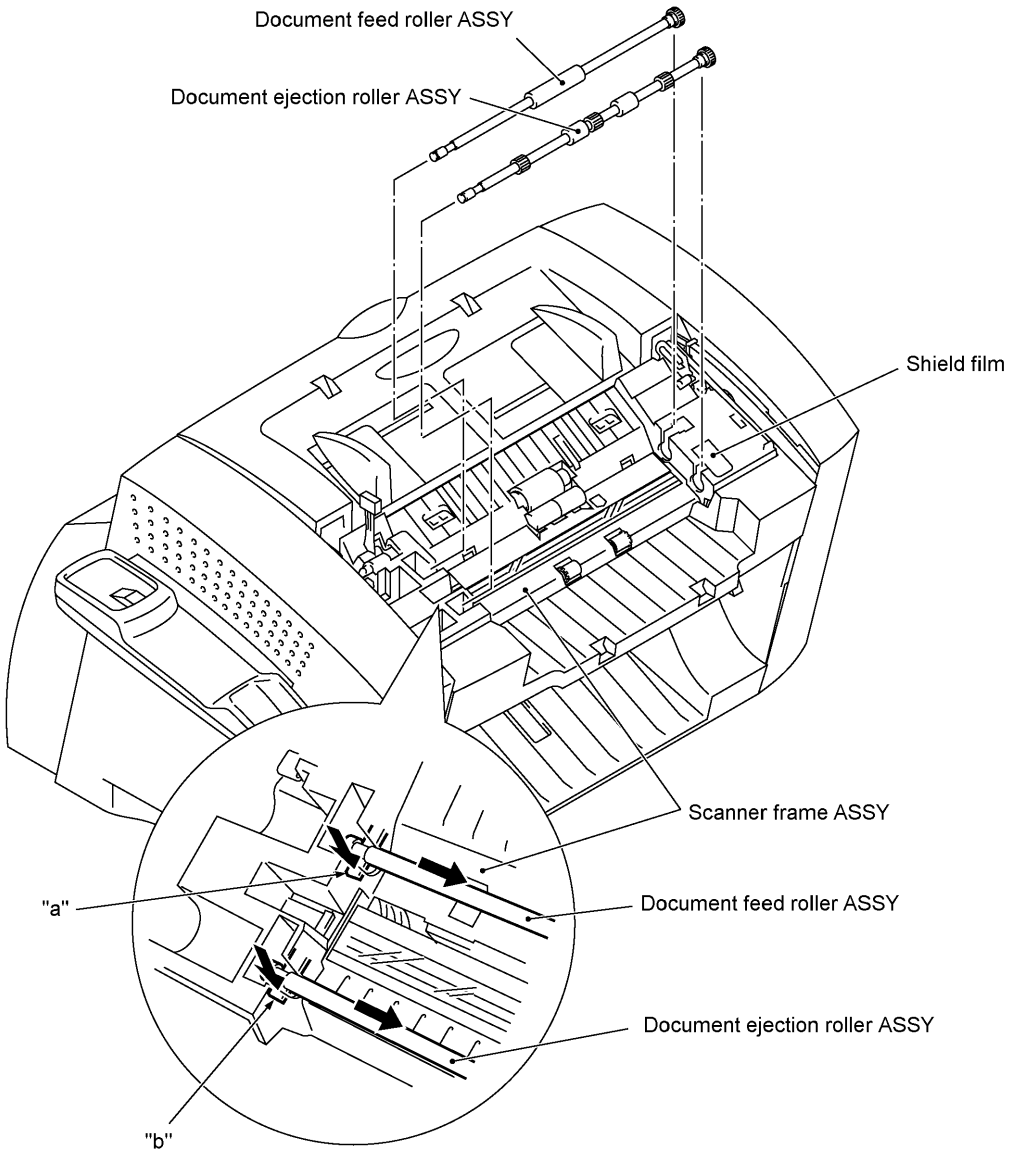
- Before reinstalling the LCD to the control panel, wipe fingerprints or dust off the LCD surface and control panel window with a soft cloth.
- A new LCD is covered with a protection sheet. Before installing it, remove the protection sheet.
- To put the LCD back into place, insert the tip of a flat screwdriver under clamp "A" from the rear, push up clamp "A" slightly, and then push the LCD to the rear with your thumbs.

1.7 Document Feed Roller ASSY and Document Ejection Roller ASSY

(1) Lightly push down arm rib "a" and shift the document feed roller ASSY to the right and upwards.

(2) Lightly push down arm rib "b" and shift the document ejection roller ASSY to the right and upwards, without removing the shield film.

NOTE: Take care not to break the arm ribs. They may easily break.



n Reassembling Notes

- Make sure that the shield film is on the document ejection roller gear and not bent down by that gear.
- Once removed, the shield film will become unusable and new one will have to be put back in.

1.8 Front Cover and Battery ASSY*

(*MFC7160C/MFC-740 only)

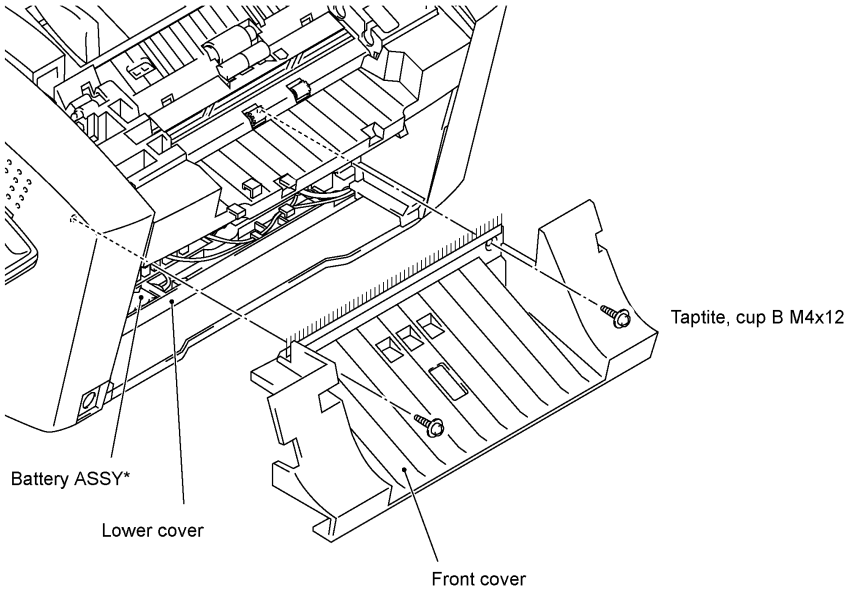
(1) Remove the two screws from the front cover.

(2) Pull out the front cover towards you.

(3) MFC7160C/MFC-740: To replace the battery ASSY (Ni-MH battery), plug the power cord of the facsimile equipment into a power outlet, disconnect the battery harness from the main PCB, and take out the battery ASSY from the lower cover. Set a new battery ASSY, connect the battery harness to the main PCB, and then unplug the power cord.

Disconnecting the battery harness with the power cord unplugged will lose the settings (e.g., calendar clock, voice messages, and received FAX data) stored in the RAM.

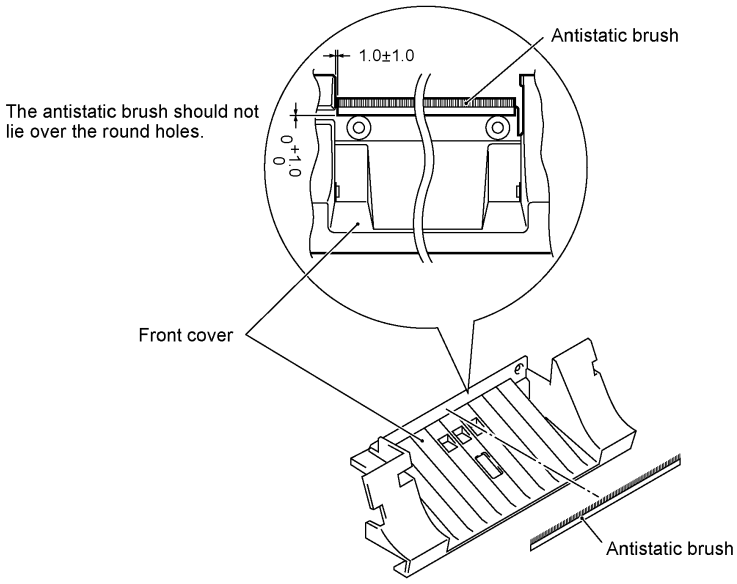
If you do not need to replace the battery ASSY but you will remove the main PCB in the following procedures, take out the battery ASSY from the lower cover and put it on the main PCB with the battery harness being connected.



(*MFC7160C/MFC-740 only)

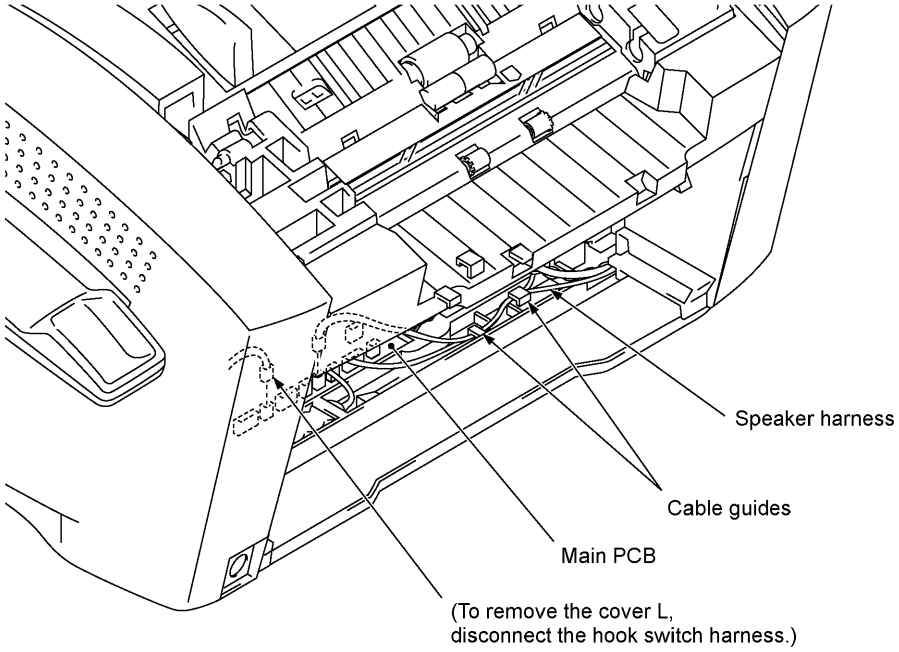
n Reassembling Notes

- Once removed, the antistatic brush will become unusable and a new one will have to be put back in. Attach a new one as instructed in the figure below.



1.9 Cover R, Speaker, and Inner Cover R

(1) Disconnect the speaker harness from the main PCB and take it out from the cable guides.

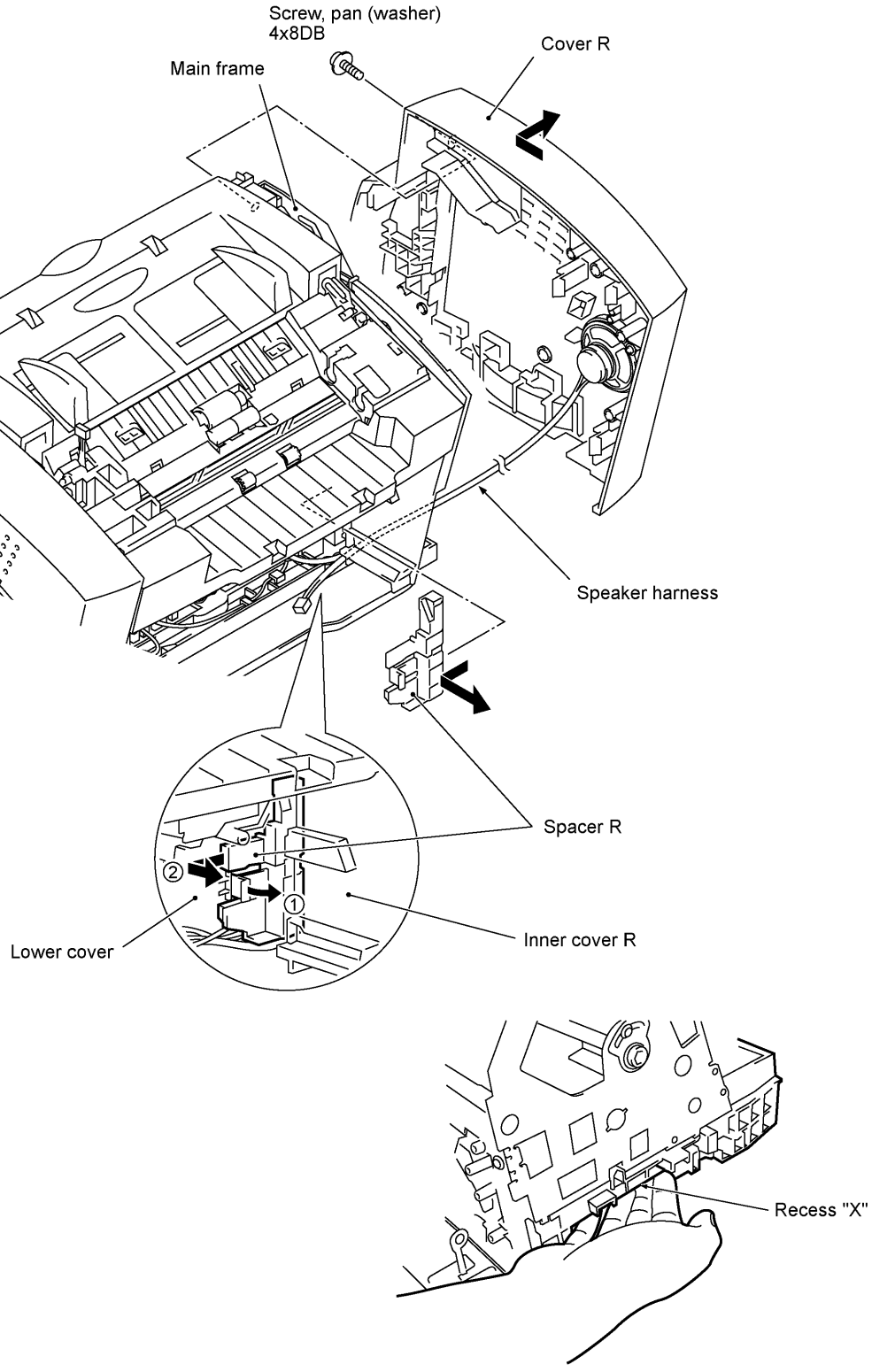


(2) Pull the tab of the spacer R towards you (in the direction arrow •), slide the spacer R to the left and take it out towards you (arrow ❟).

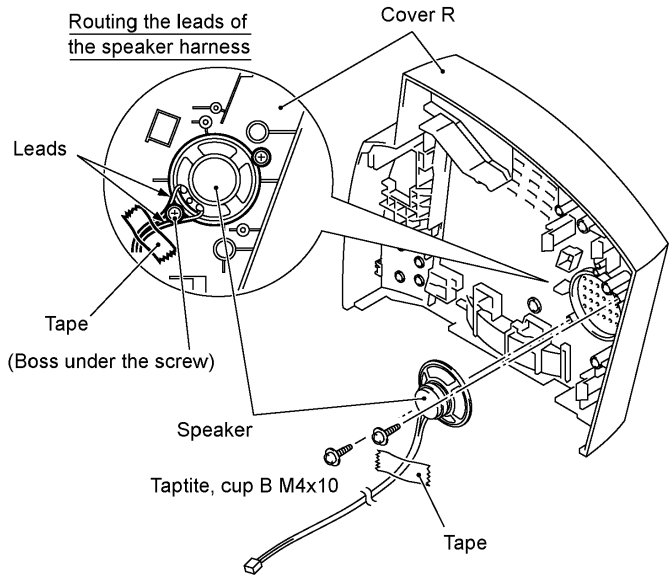
(3) Remove the screw from the rear side of the cover R.

(4) Push the cover R to the rear and then take it off to the right while pulling out the speaker harness.

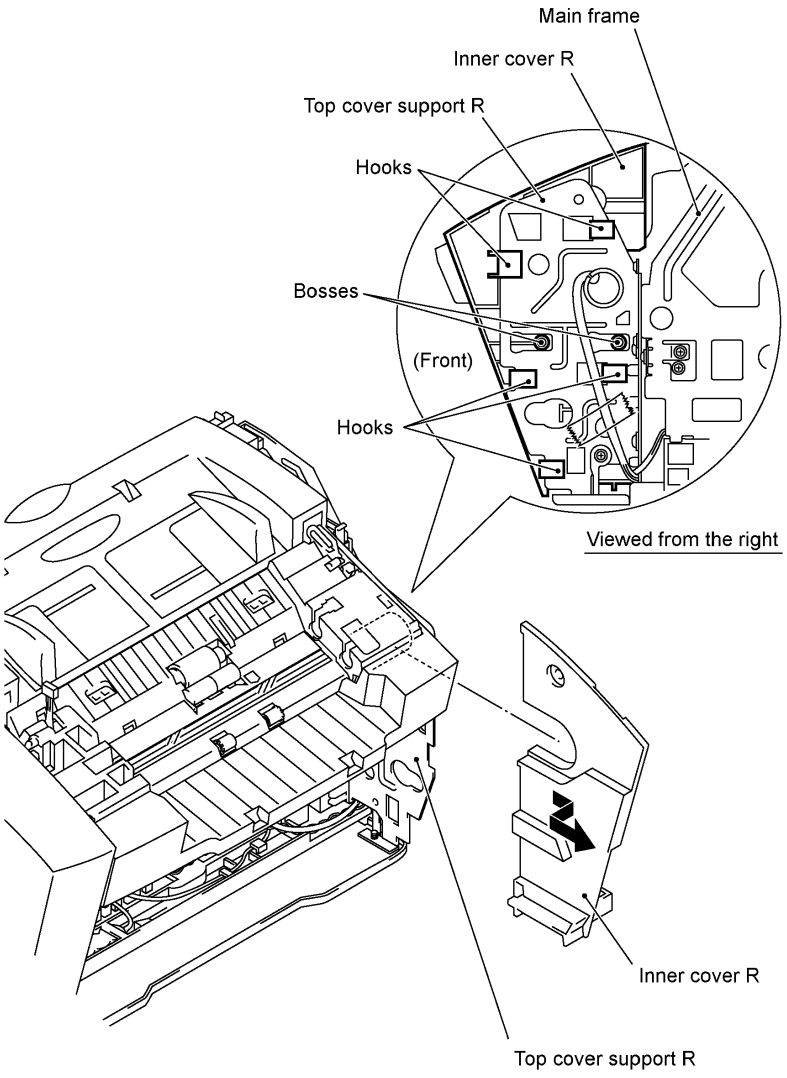
NOTE: When handling or transporting the facsimile equipment after removing the cover R, do not hold the top cover or frame cover but catch the recess "X" provided on the lower cover.



(5) Remove the two screws, remove the tape, and take out the speaker.



(6) Slide the inner cover R to the front to release its hooks from the top cover support R, pull it inwards, and then take it out while tilting it to the front.

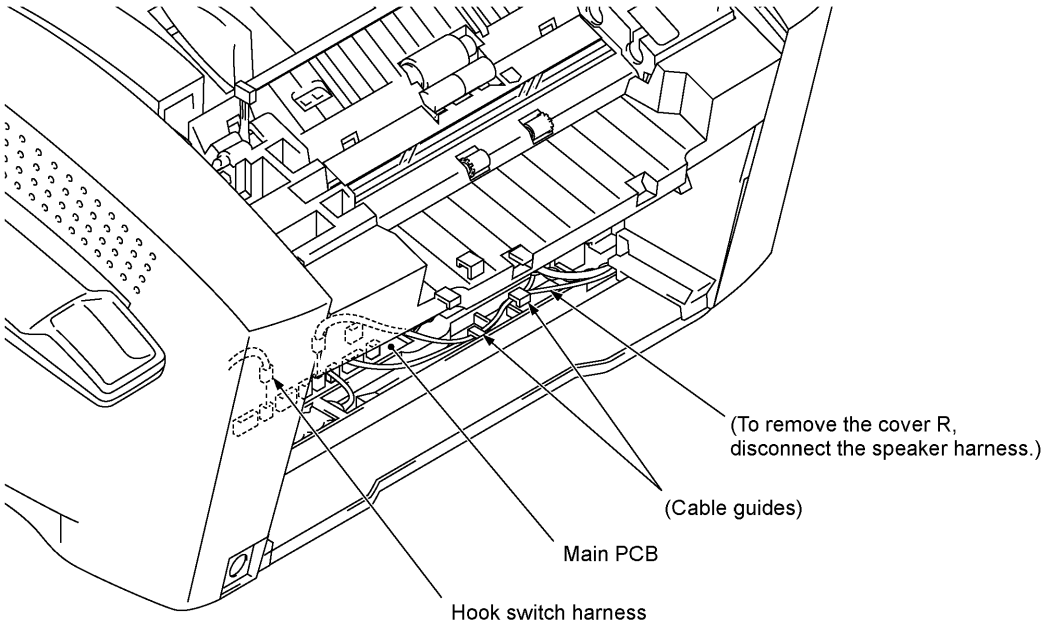


n Reassembling Notes

- Route the leads of the speaker harness so that they are separated by the boss as illustrated on the previous page.
- To reinstall the cover R, follow the steps below.
  1) Fit the inner cover R over the top cover support R and push it to the rear fully.
  2) Put the cover R into place and pull it to the front.
  3) Slide the inner cover R to the front.
  4) Set the spacer R between the inner cover R and main frame.
  5) Make sure that the front edge of the cover R catches that of the inner cover R.

1.10 Cover L, Handset Mount, and Inner Cover L

(1) Disconnect the hook switch harness from the main PCB.

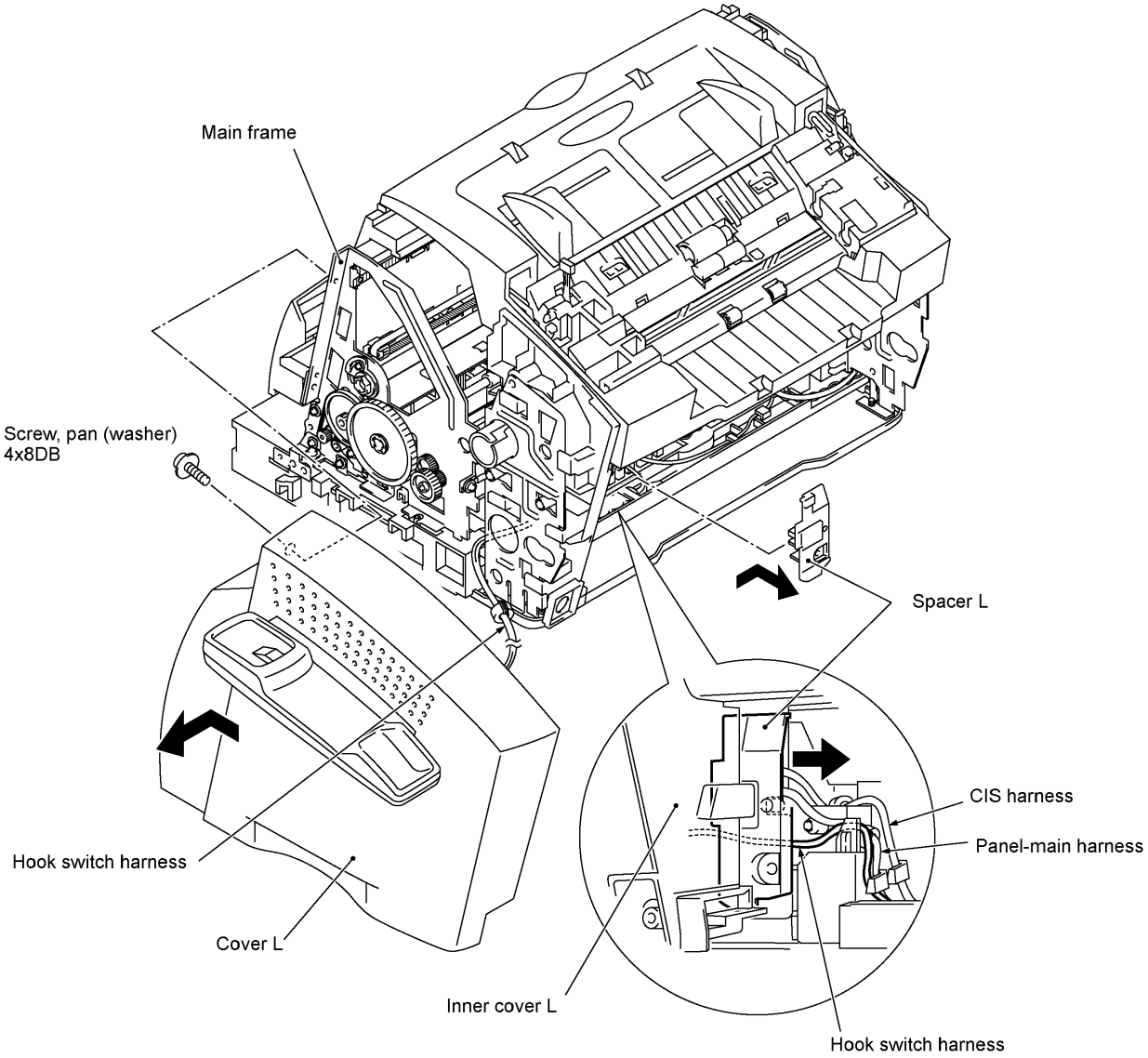


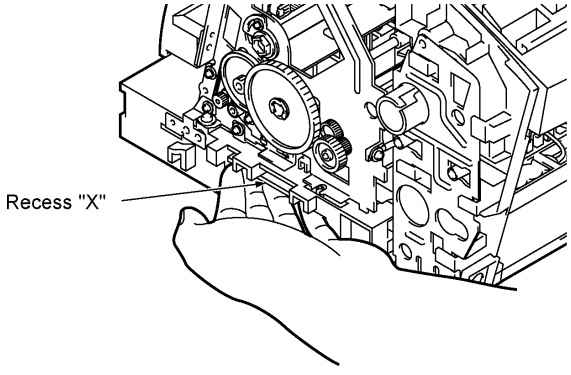
(2) Slide the spacer L to the right and take it out towards you.

(3) Remove the screw from the rear side of the cover L.

(4) Push the cover L to the rear and then take it off to the left while pulling out the hook switch harness.

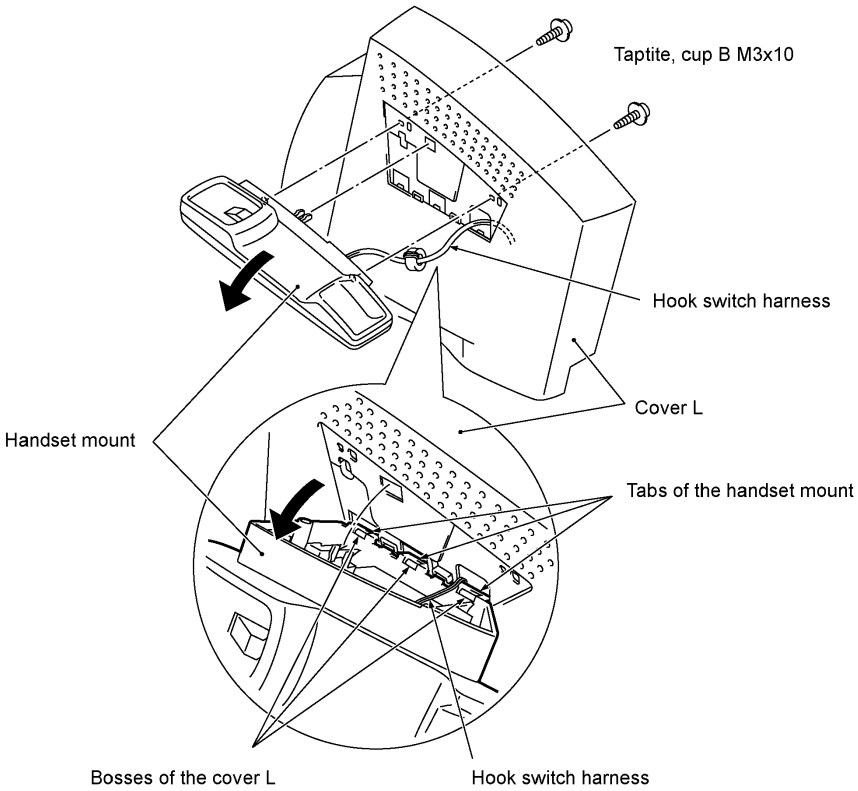
NOTE: When handling or transporting the equipment after removing the cover L, do not hold the top cover or frame cover but catch the recess "X" provided on the lower cover.



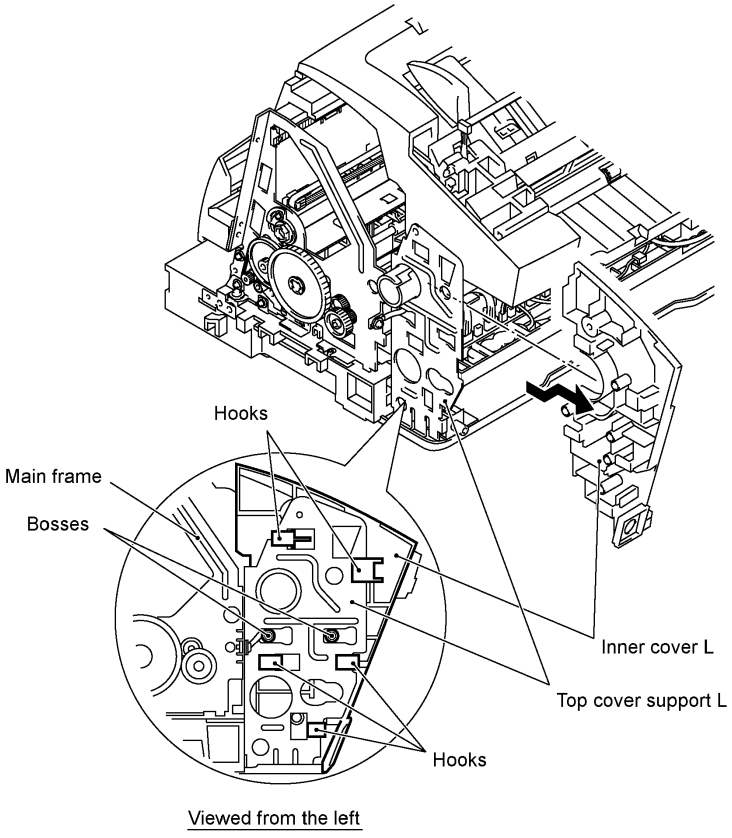


(5) Remove the two screws from the inside of the cover L.

(6) Twist the handset mount so that it tilts over to the left and its upper end works out of the cover L.



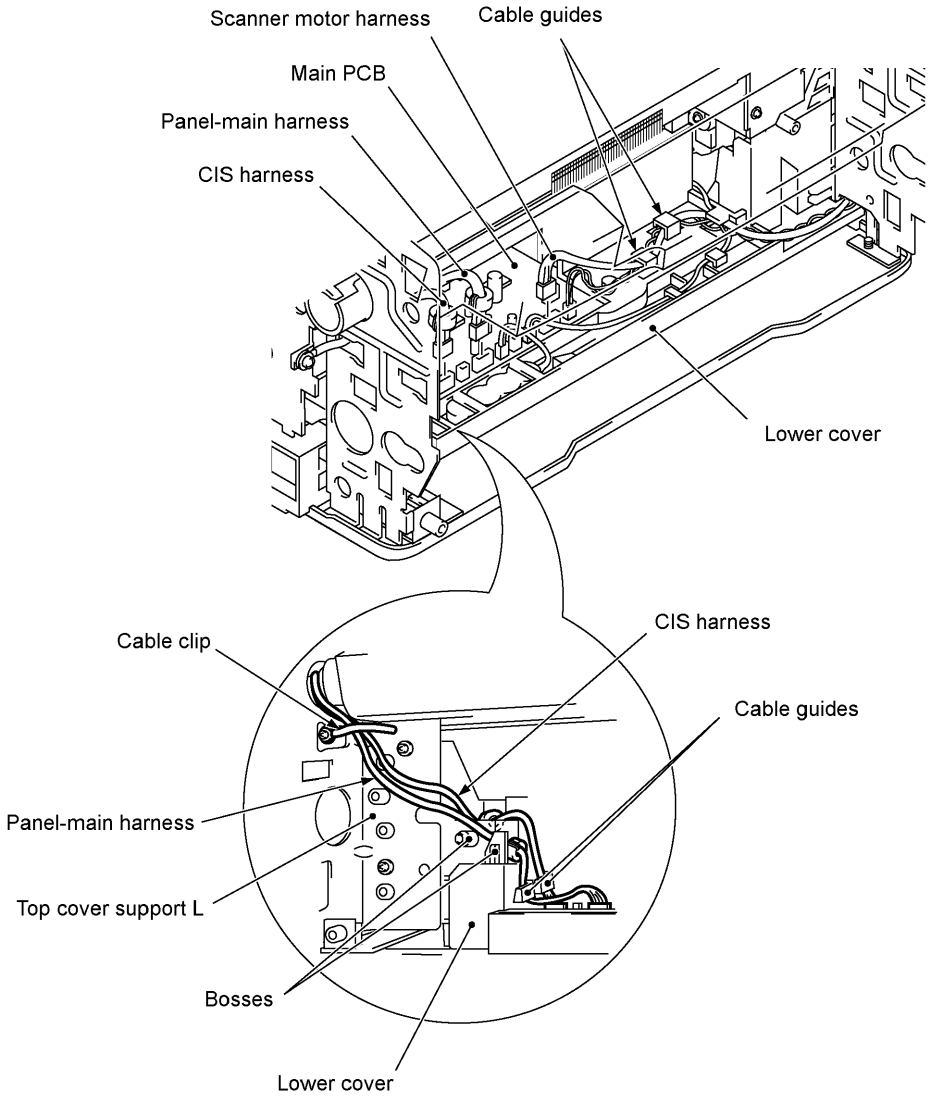
(7) Slide the inner cover L to the front to release its hooks from the top cover support L, pull it inwards, and then take it out.



1.11 Top Cover

(1) Disconnect the scanner motor harness from the main PCB and take it out from the cable guides.

(2) Disconnect the panel-main harness and CIS harness from the main PCB, then take them out from the cable guides, bosses, and cable clip.



Routing the CIS harness and panel-main harness (viewed from the front)

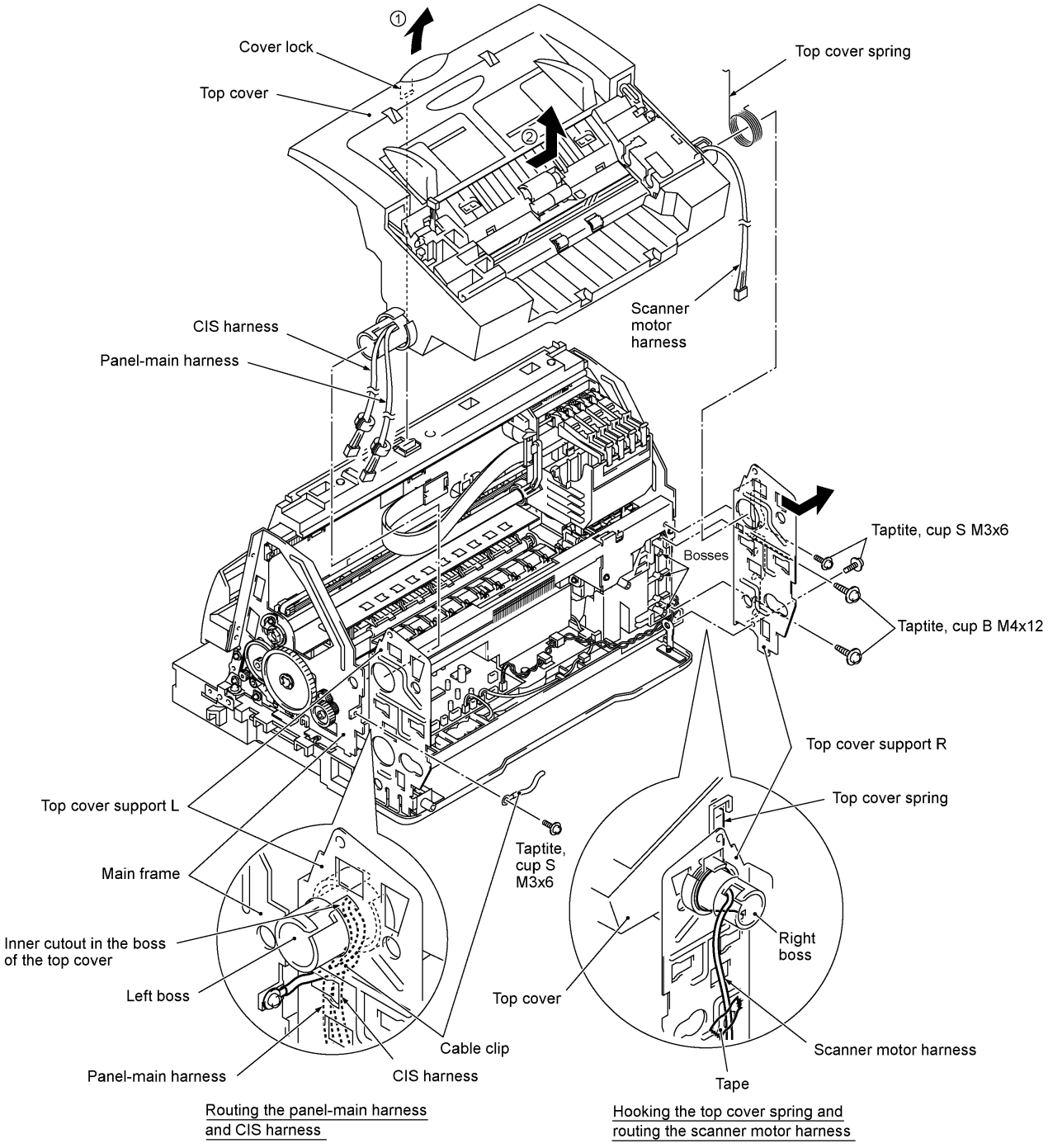
(3) Pull out the scanner motor harness and remove the tape at the right side of the equipment.

(4) Remove the four screws from the top cover support R.

(5) Lift up the rear edge of the top cover to release the lock.

(6) While holding the front edge of the top cover, slightly pull the top cover support R towards you to release it from the three bosses provided on the lower cover and then take it out to the right together with the top cover.

NOTE: The top cover support R will tilt to you by the top cover spring. The top cover spring also comes off.



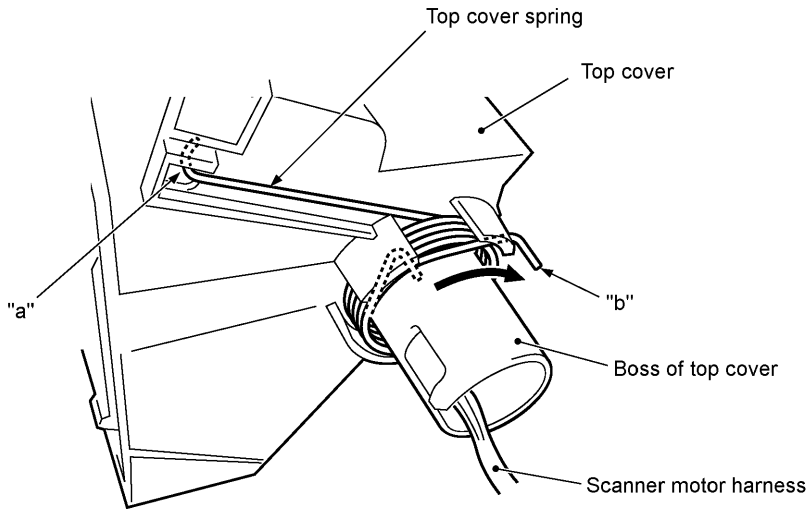
n Reassembling Notes

- When reinstalling the top cover, follow the steps below.

  1) Check that the panel-main harness, CIS harness, and scanner motor harness are correctly routed (see the illustration given on the previous page). That is, the upper end of the panel-main harness (and CIS harness if the scanner frame ASSY is removed) should come out through the cutout provided in the scanner frame. The lower ends of the panel-main harness and CIS harness should come out through the inner cutout provided in the left boss of the top cover.

  2) As shown below, hook top end "a" of the top cover spring in the cutout provided in the top cover and then turn the other end "b" clockwise (when viewed from the right) to hook it on the boss on the top cover.

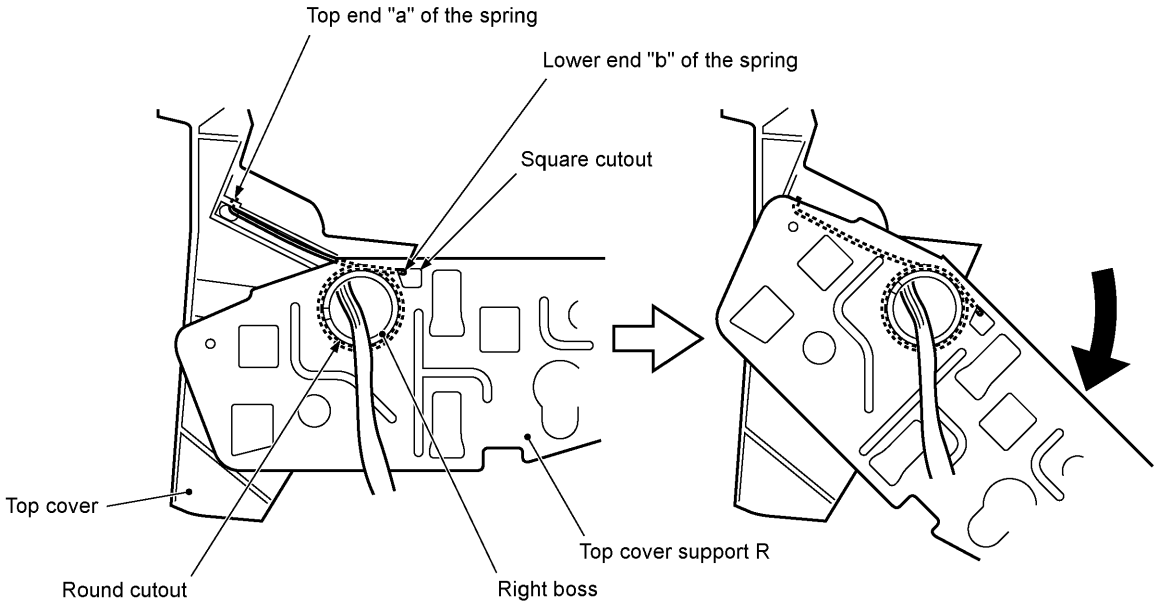
     The scanner motor harness should route as illustrated below.



  3) Apply grease to the right and left bosses of the top cover. (Refer to Section 2.)

  4) Fit the round and square cutouts provided in the top cover support R over the boss of the top cover and lower end "b" of the top cover spring, respectively, as shown on the next page.

  5) Hold the top cover with your left hand, turn the top cover support R clockwise (when viewed from the right) with your right hand, fit the left boss of the top cover in the top cover support L, and then fit the top cover support R over the bosses on the lower cover.



Viewed from the right

6) Secure the top cover support R with four screws. It should be inside the grounding plate of the bottom plate.

7) Route the scanner motor harness through the cutout provided in the right boss of the top cover and tape it down, as shown on the previous page.

8) Route the panel-main harness and CIS harness through the cable guides and hold them with the cable clip as shown on page IV-27. The cable clip should be in contact with the upper edge of the cutout provided in the top cover support L.

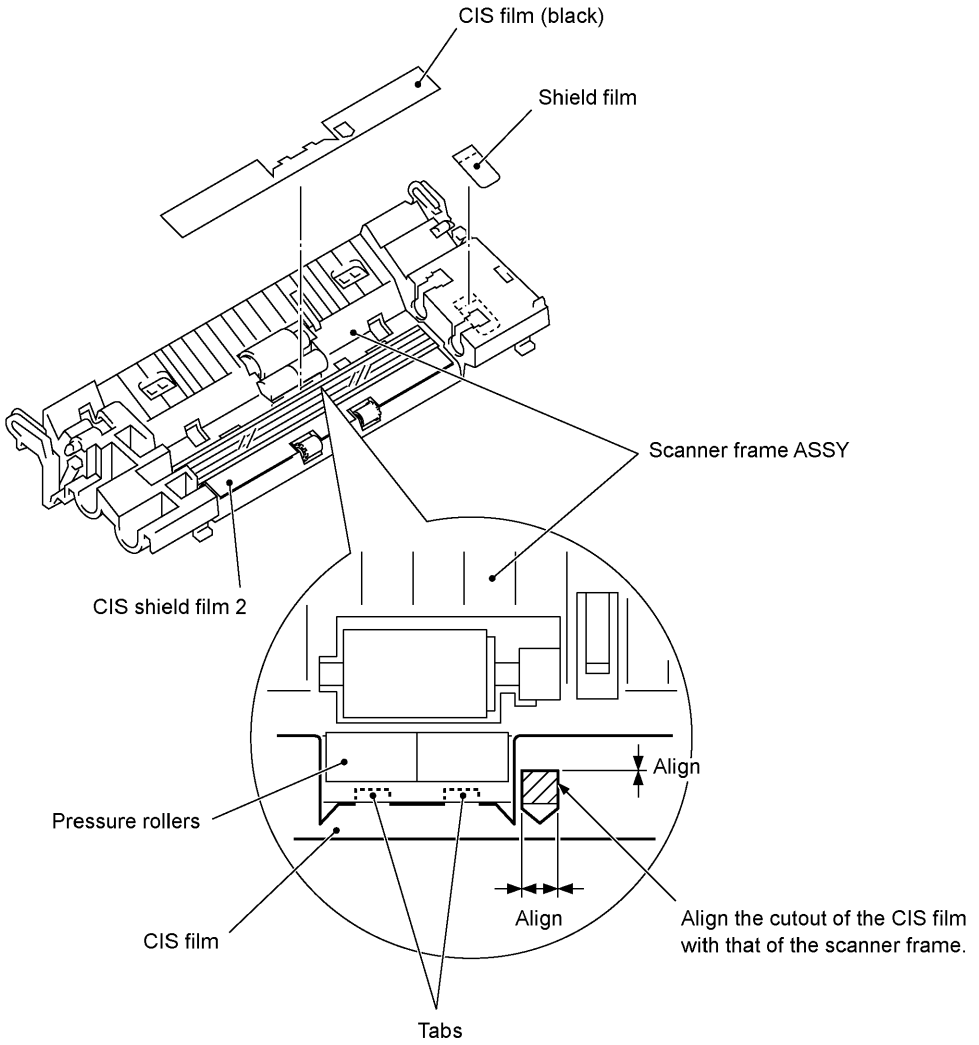
1.12 Scanner Frame ASSY

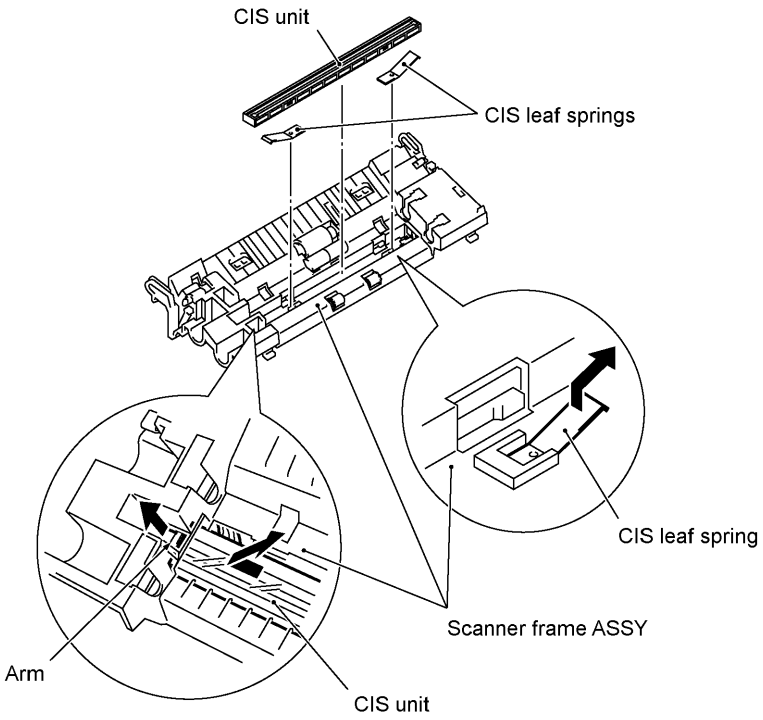
You may remove the scanner frame ASSY from the top cover without taking out the top cover from the equipment.

(1) You can remove the following parts from the top of the scanner frame ASSY without taking out the ASSY from the top cover.

- CIS film
- Shield film
- CIS shield film 2
- CIS unit (shown on the next page). Lightly pull up the arm, move the CIS unit to the left, and lift up the right edge of the CIS unit. While holding up the CIS unit, disconnect the CIS harness.
- CIS leaf springs (shown on the next page)

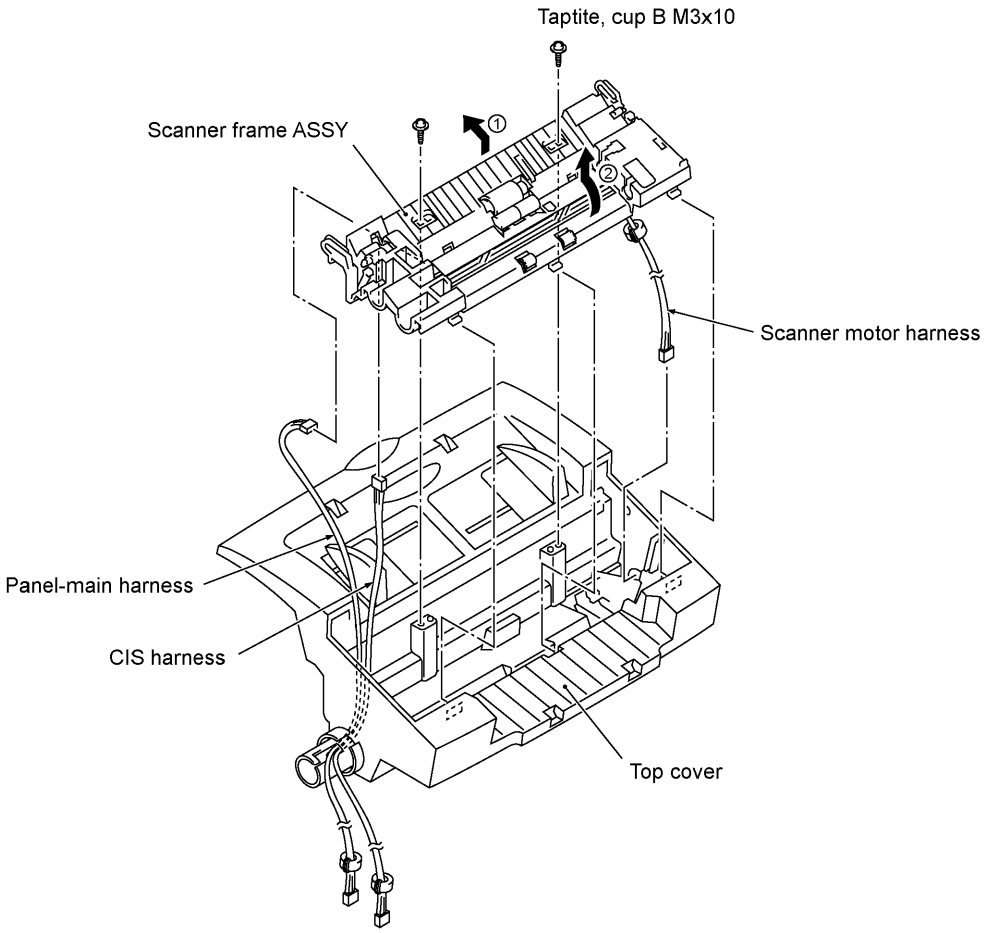
NOTE: Once removed, the CIS film, shield film, and CIS shield film 2 will become unusable and new ones will have to be put back in.





(2) Remove the two screws from the scanner frame ASSY.

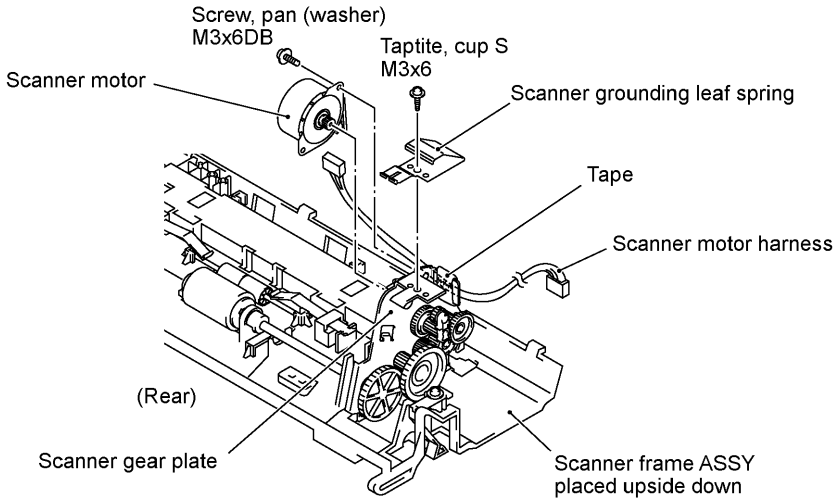
(3) Lightly lift up the rear edge of the scanner frame ASSY and hold up the ASSY (and disconnect the CIS harness if the CIS is mounted).



(4) Turn the scanner frame ASSY upside down.

(5) Remove the screw from the scanner motor, take off the motor, and disconnect the scanner motor harness.

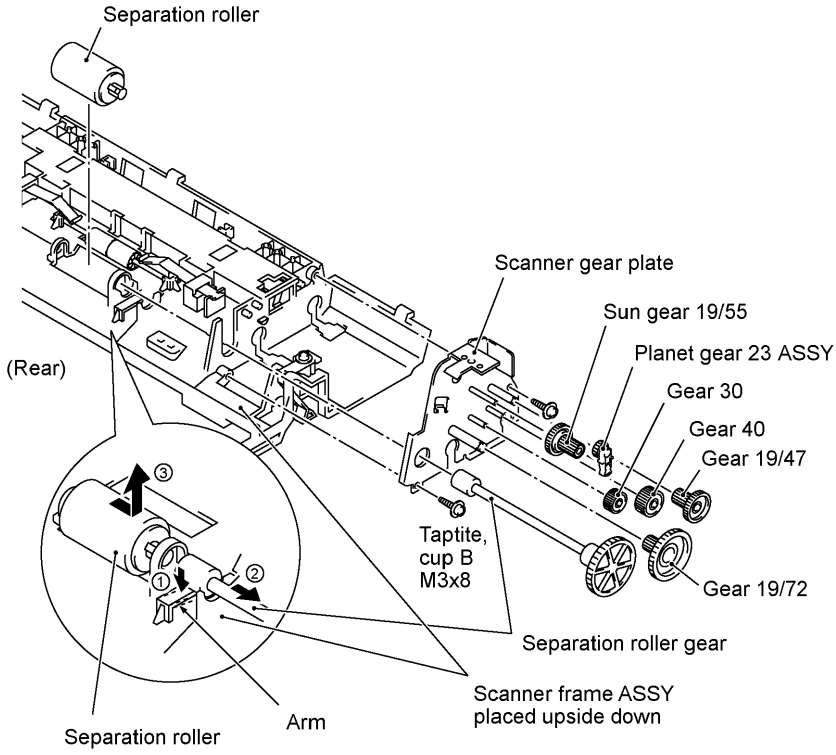
(6) Take off the scanner grounding leaf spring by removing the screw.



(7) Slightly push down the arm (in the direction of arrow •) and shift the separation roller gear to the right (arrow ❟) when viewed from the rear. Then shift the separation roller to the right (arrow ***f***) and take it up.

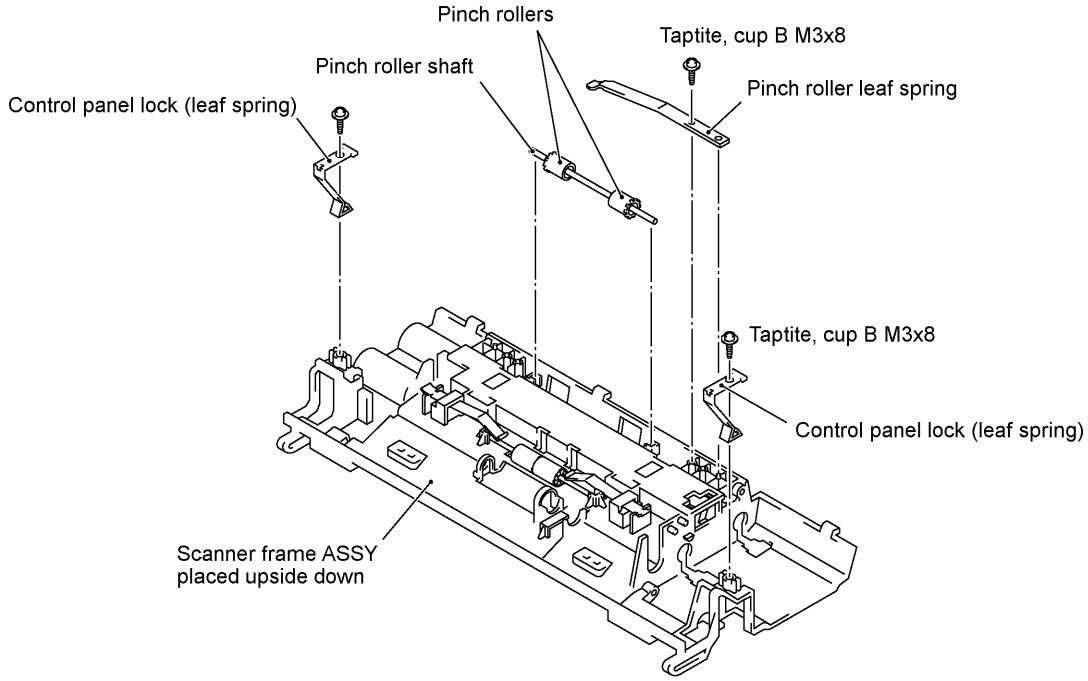
(8) Take off the scanner gear plate by removing the two screws.

You may remove the gears by unhooking their latches and the separation roller gear.

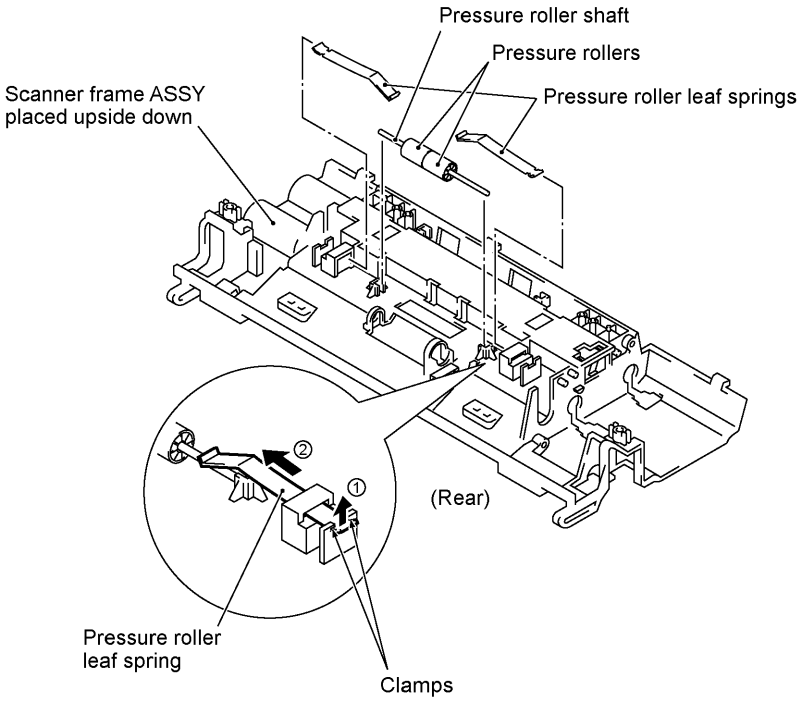


(9) Take off the pinch roller leaf spring by removing the screw. Then remove the pinch rollers and shaft.

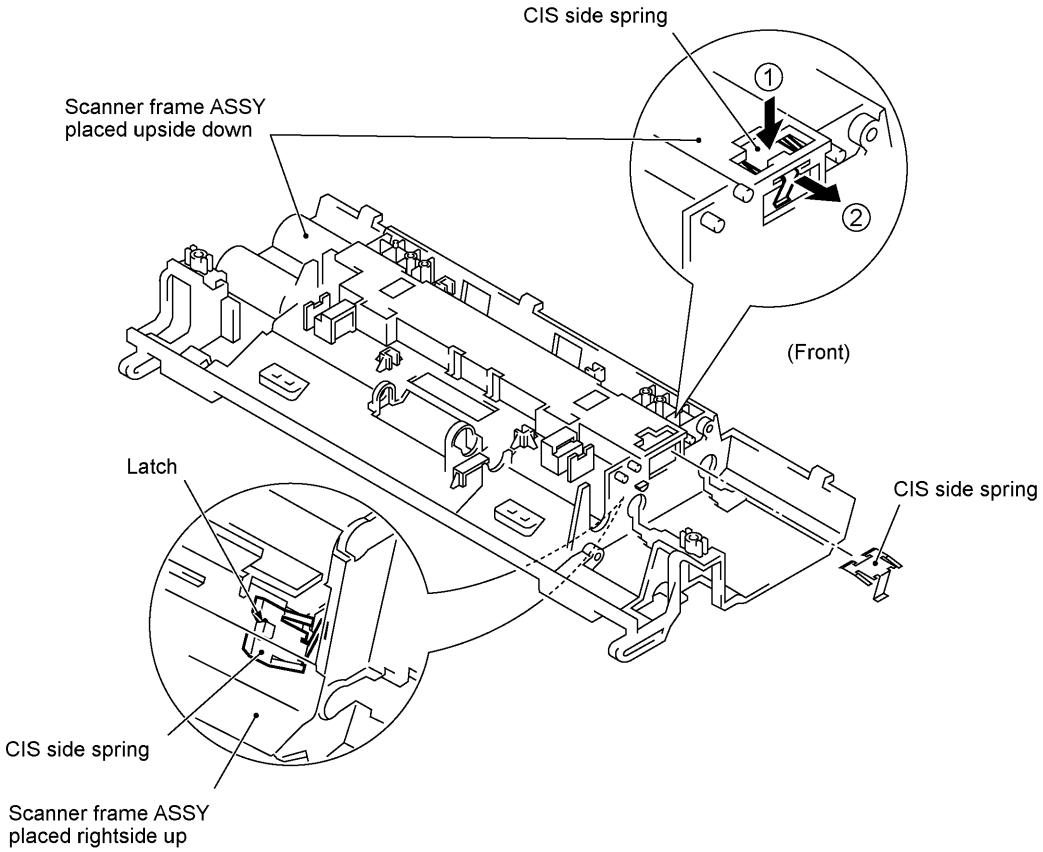
(10) Take off the control panel locks (leaf springs) by removing the screws.



(11) Remove the pressure roller leaf springs by pulling them in the direction of arrows • and ❯ in this order as shown below. Then remove the pressure rollers and shaft.



(12) Push down the CIS side spring to release it from the latch, then pull it out to the right (when viewed from the rear).



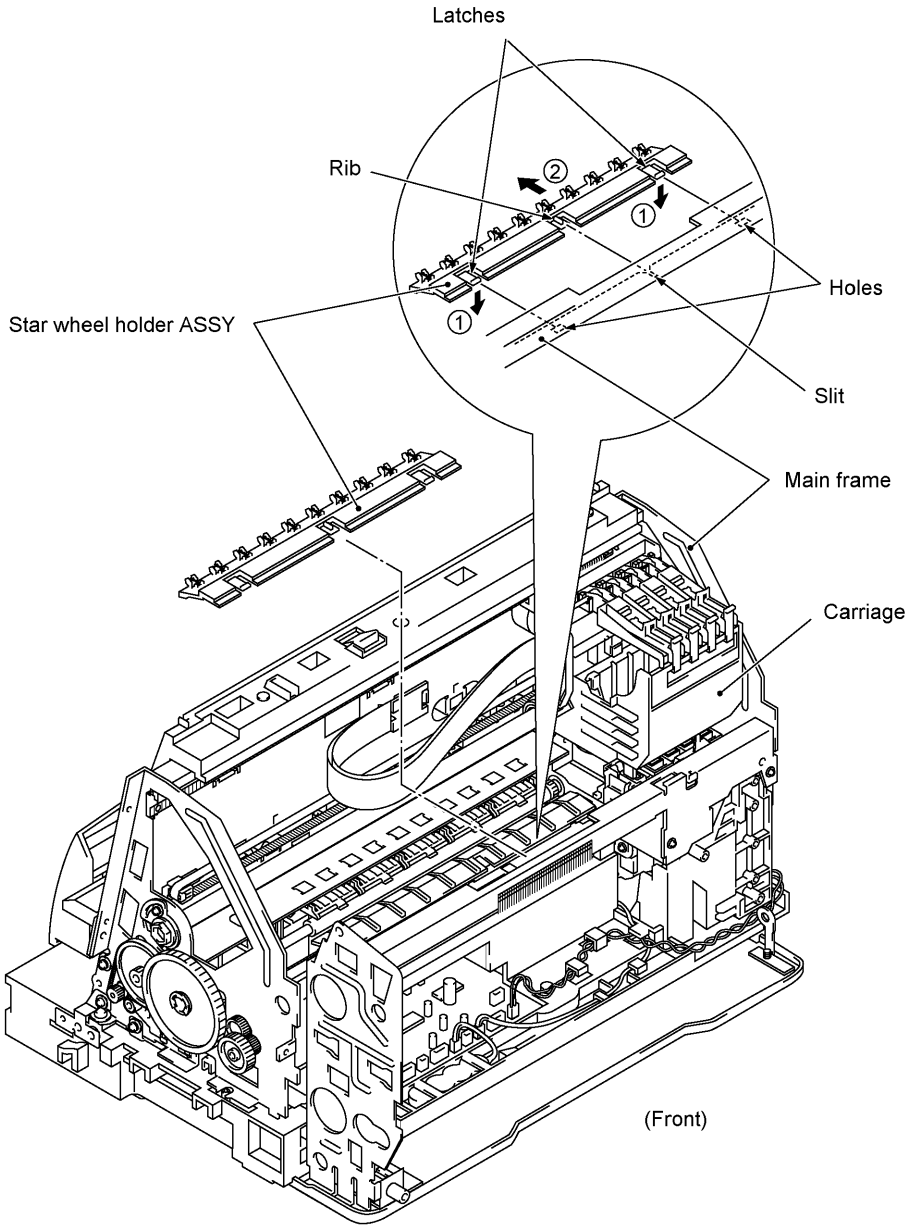
n Reassembling Notes

- When reinstalling the CIS unit, first connect the CIS harness, insert the left end under the arm of the scanner frame, put the CIS unit into the scanner frame, and move it to the right (see the illustration given on page IV-32).
- When attaching the CIS film, align the right, left and rear edges of the cutout with those provided in the scanner frame and fit its two tabs into the scanner frame, as illustrated on page IV-31.

1.13 Star Wheel Holder ASSY

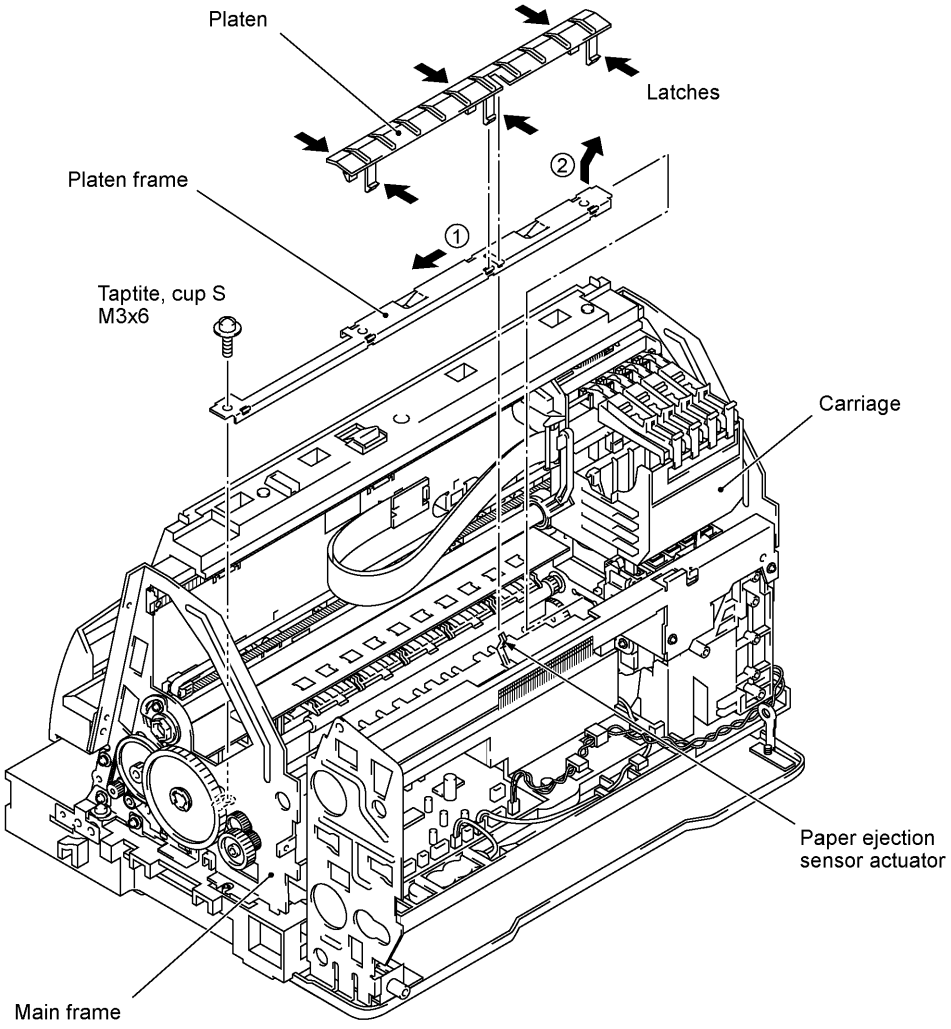
(1) Move the carriage to either end of its travel.

(2) Insert the tip of a flat screwdriver between each latch of the star wheel holder ASSY and the main frame from the front and lightly twist it to unhook the latch while pulling the star wheel holder ASSY to the rear.



1.14 Platen and Its Frame

(1) Make sure that the carriage is placed in the home position.
(2) Remove the screw from the platen frame.
(3) Slightly move the platen frame to the left and take it out.
(4) Unhook the six latches of the platen from the platen frame.



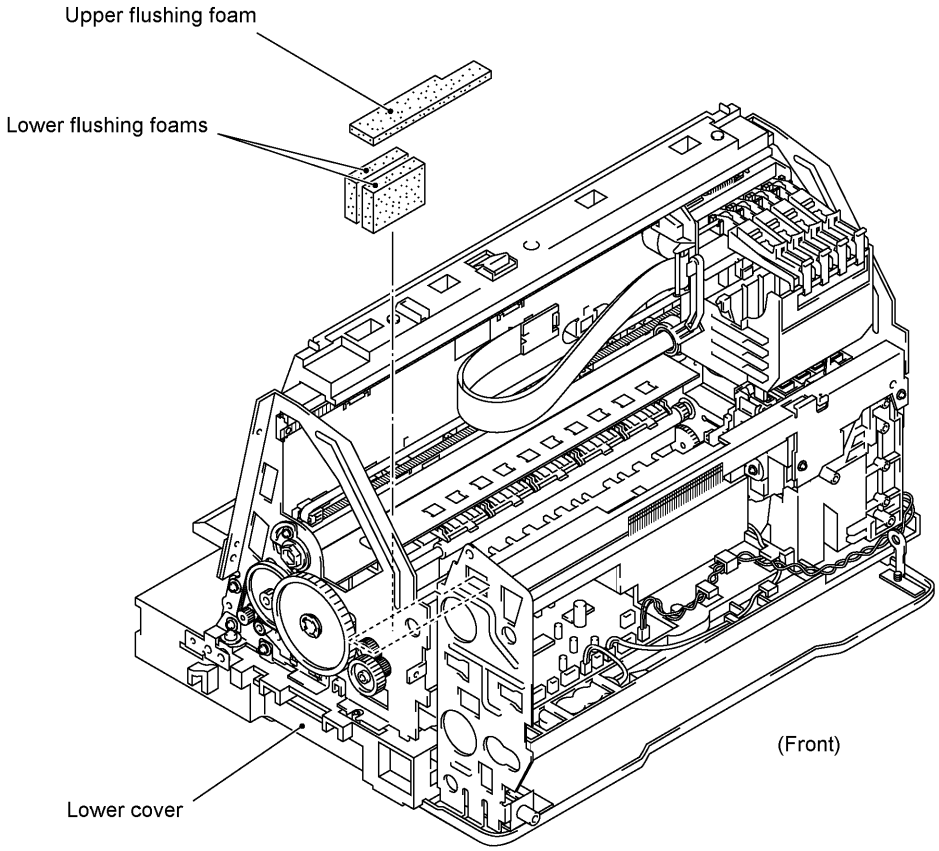
1.15 Flushing Foams

After the main PCB is replaced with any other one, you need to replace the flushing foams with new ones.

(1) Pull out the upper flushing foam and two lower flushing foams from the lower cover.

NOTE: Use vinyl gloves to prevent your hands from becoming dirty.

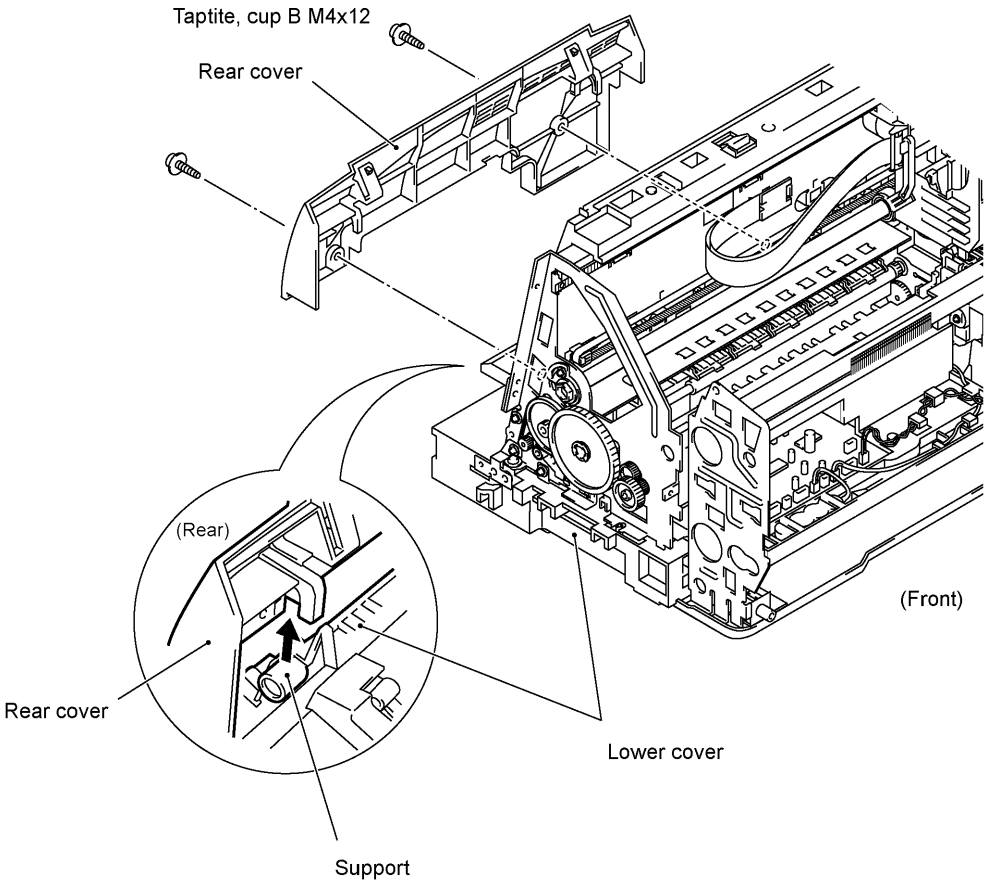
NOTE: For the removal of the flushing foams pack, refer to Subsection 1.33.



1.16 Rear Cover

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

(2) Lift up the rear cover.



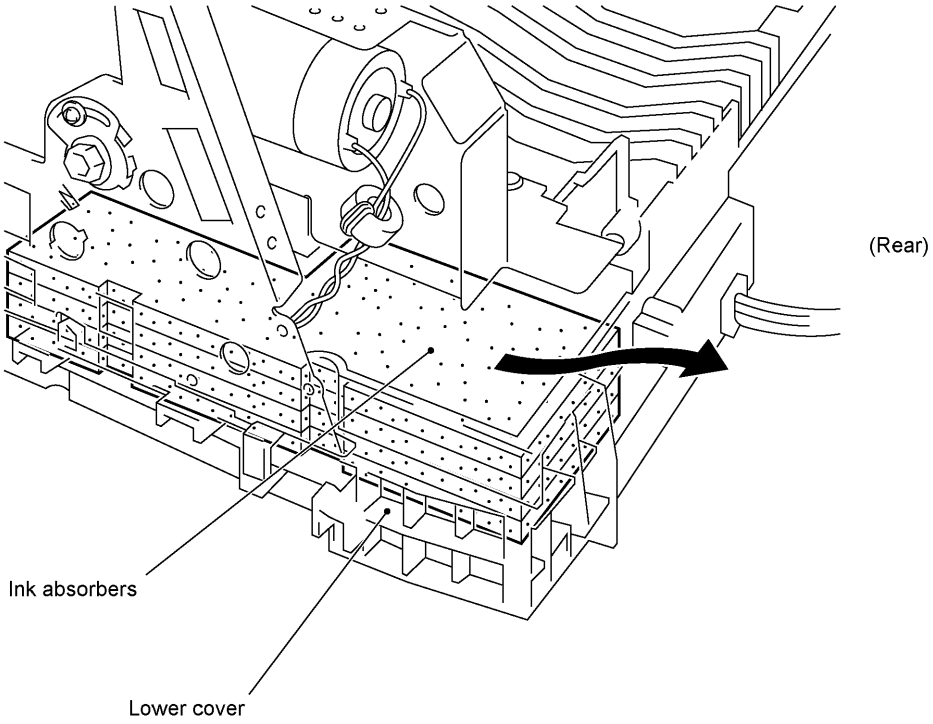
1.17 Ink Absorbers

After the main PCB is replaced with any other one, you need to replace the ink absorbers with new ones.

(1) Pull out the ink absorbers from the lower cover.

NOTE: Use vinyl gloves to prevent your hands from becoming dirty.

(2) If the lower cover or the surrounding parts are stained with ink, wipe them with a waste cloth.



NOTE: For the removal of the ink absorbers pack, refer to Subsection 1.33.

n Reassembling Notes

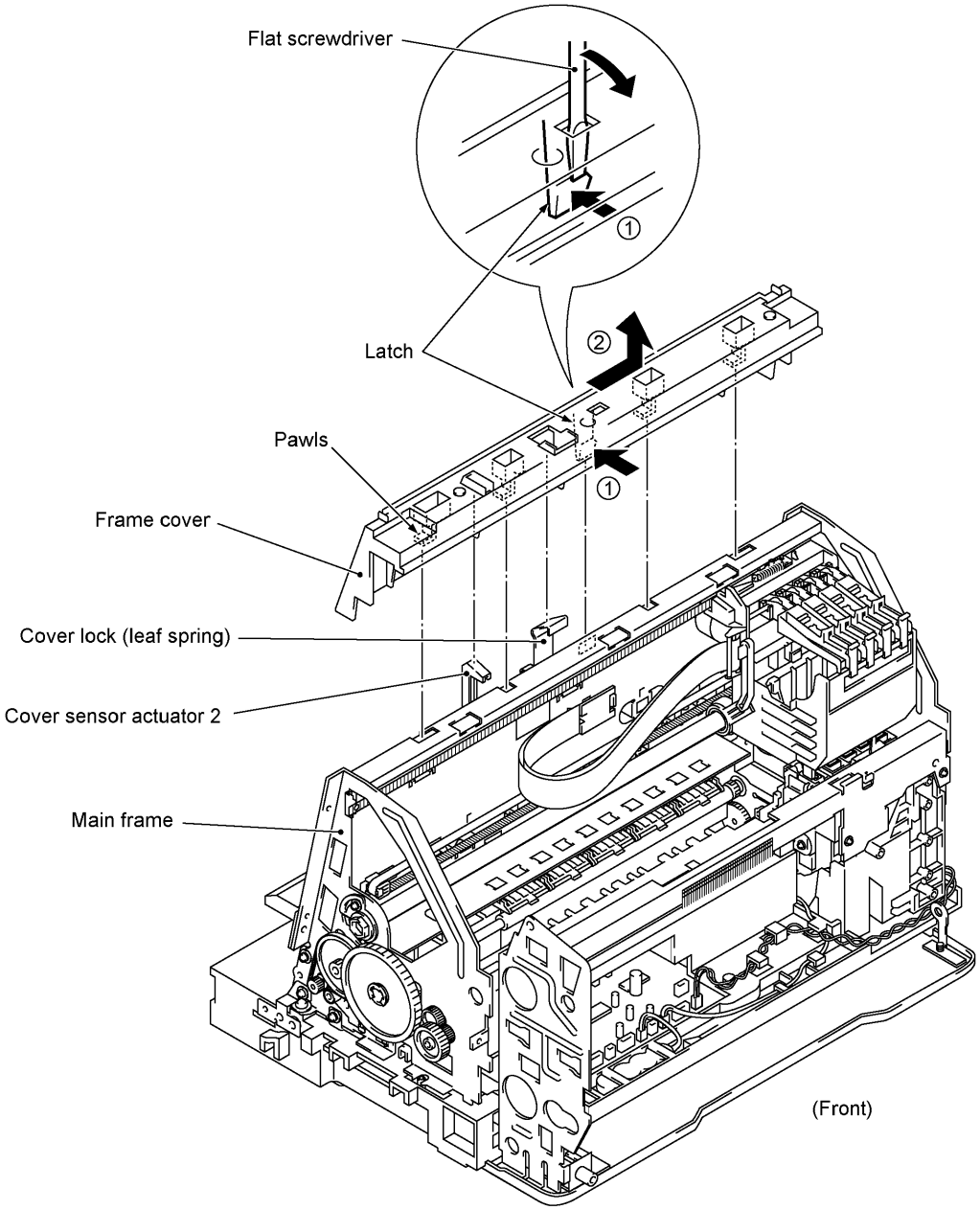
- When setting ink absorbers into the lower cover, use a screwdriver and the like.

1.18 Frame Cover, Purge Lever Cover, Cover Sensor Actuator 2, and Paper Pressure Holders

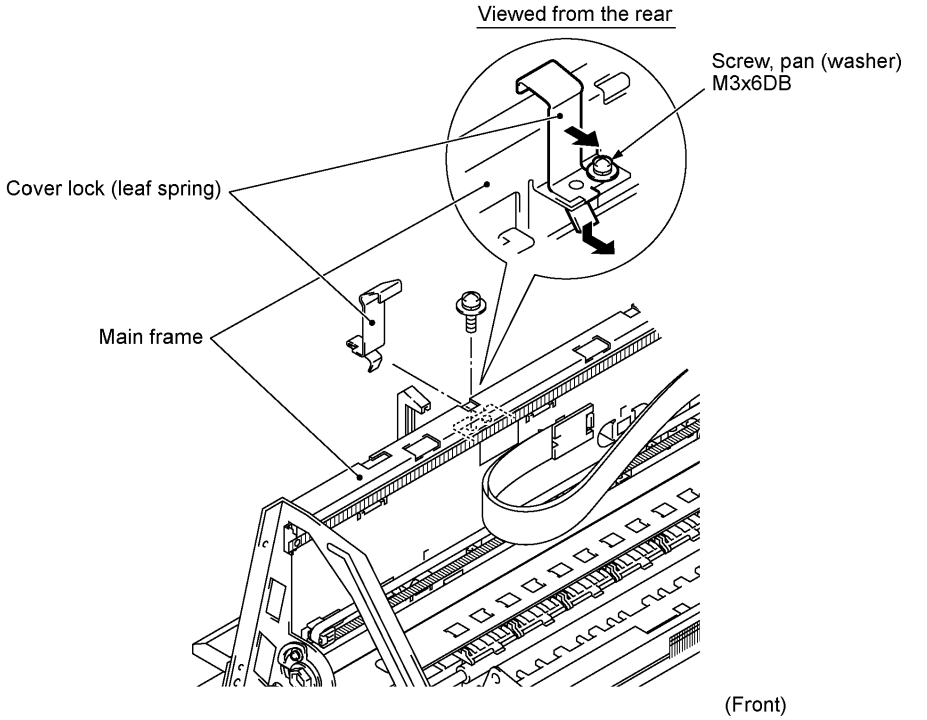
(1) Insert the tip of a flat screwdriver through a hole provided in the top of the frame cover and press the latch to the rear (in the direction of arrow •), then shift the frame cover to the right to release the four pawls. Lift up the frame cover (arrow ❟).

CAUTION: Take care not to scratch or damage the encoder strip when using a screwdriver.

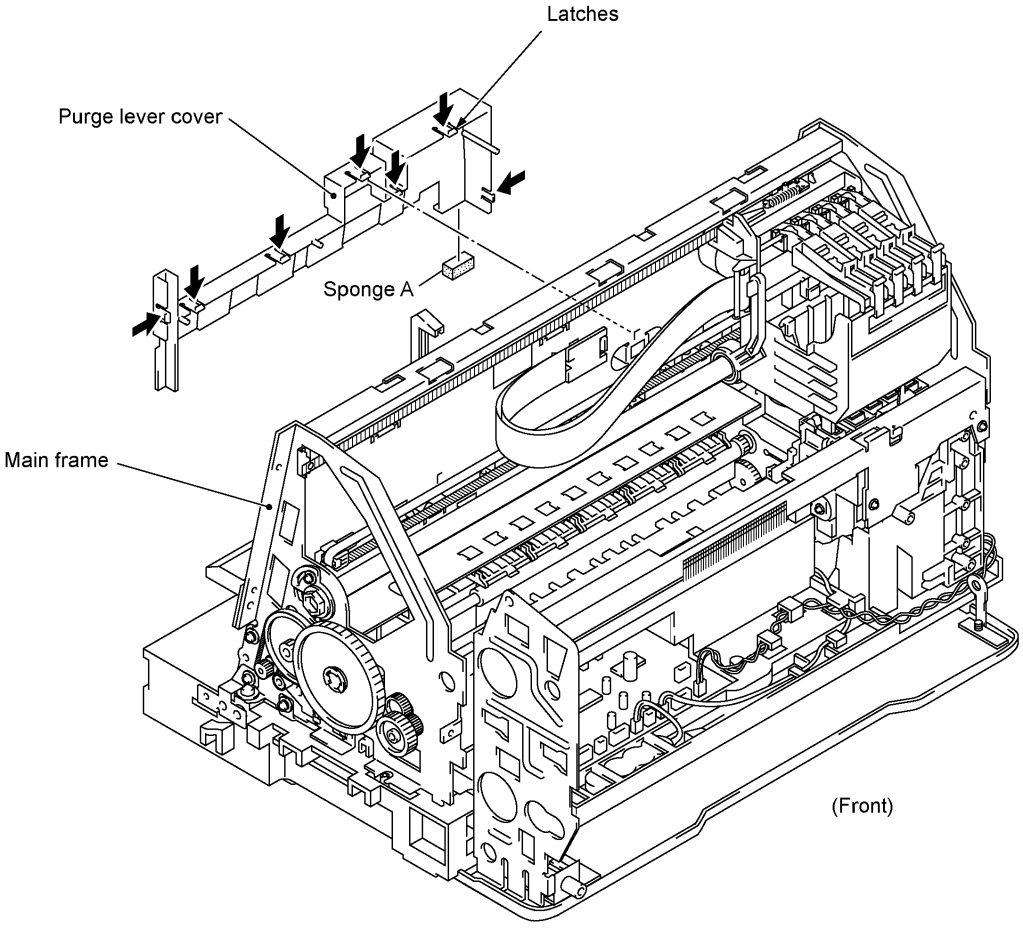
NOTE: You may remove the frame cover and other components given in this section without taking off the top cover.



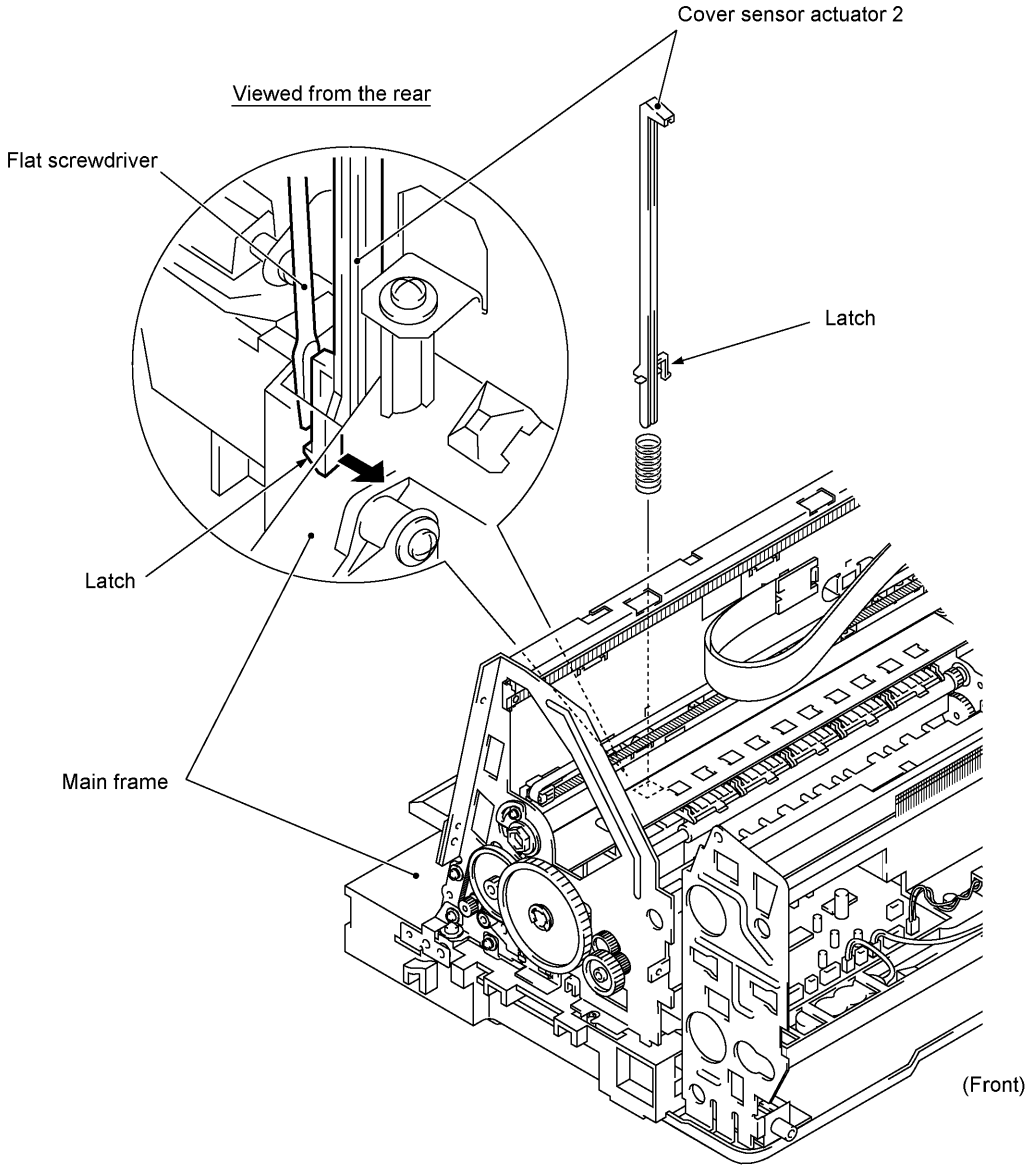
(2) Remove the screw that secures the cover lock (leaf spring) from the main frame, and then take it off.



(3) Remove the purge lever cover by unhooking the latches.

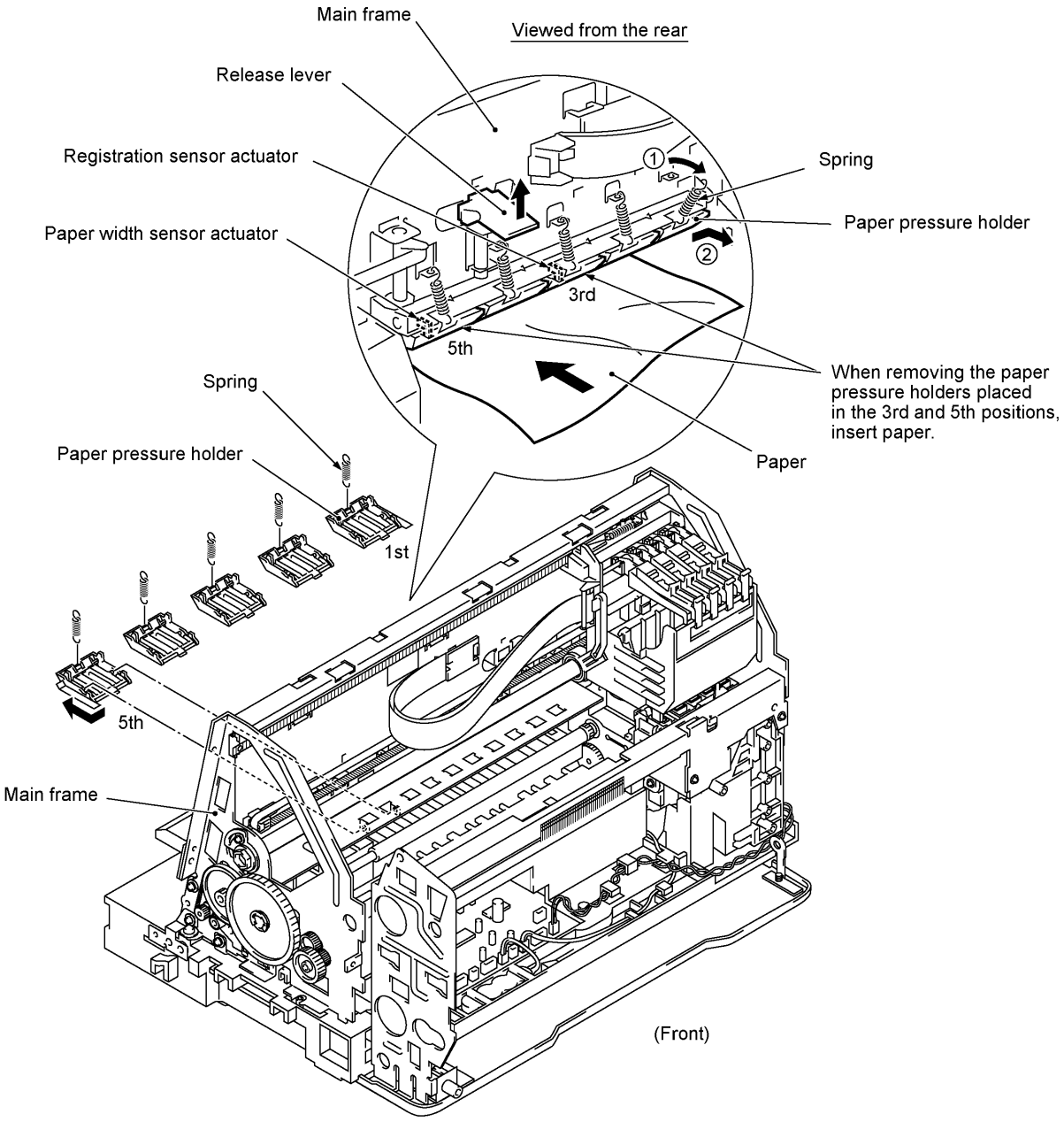


(4) Pull the top of the cover sensor actuator 2 to the left to unhook the latch from the lower cover, and then lift it up.



(5) Remove the paper pressure holders and springs according to the instructions below.

- Start the removal work from the right-hand side holder and work your way over to the left-hand side, when viewed from the rear.
- Unhook the top end of the spring from the main frame (in the direction of arrow •), shift the paper pressure holder to the right and pull it out to the rear (arrow ❟).
- When removing the paper pressure holders placed in the 3rd and 5th positions, be sure to insert paper as illustrated below in order to push down the registration sensor actuator and paper width sensor actuator, respectively.



n Reassembling Notes

- The paper pressure holders to be placed in the 1st and 5th positions are different in shape with each other and different from other three.
- After installing the paper pressure holders and their springs, pull up the release lever (blue) to check that it works normally.
- When setting the cover sensor actuator 2, fit the spring over the actuator and then put them into place.
- When reinstalling the frame cover, fit the cutouts over the cover lock and cover sensor actuator 2, press the frame cover against the main frame, and then shift it to the right so that its latch catches the main frame. (Refer to the illustration given on page IV-41.)

1.19 Paper Feed Gear L, PF Timing Belt, Idle Gear 720, and Tension Plate ASSY

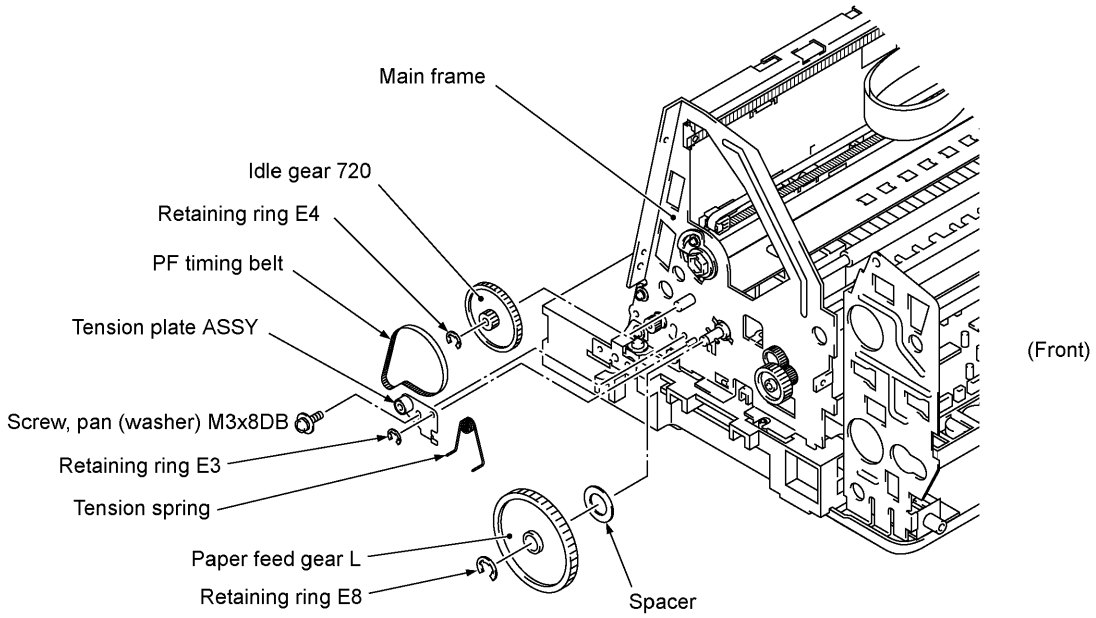
(1) Remove the retaining ring E8, paper feed gear L, and spacer from the left side of the main frame.

(2) Remove the tension spring to release the tension plate ASSY.

(3) Remove the PF timing belt from the idle gear 720 and paper feed motor gear.

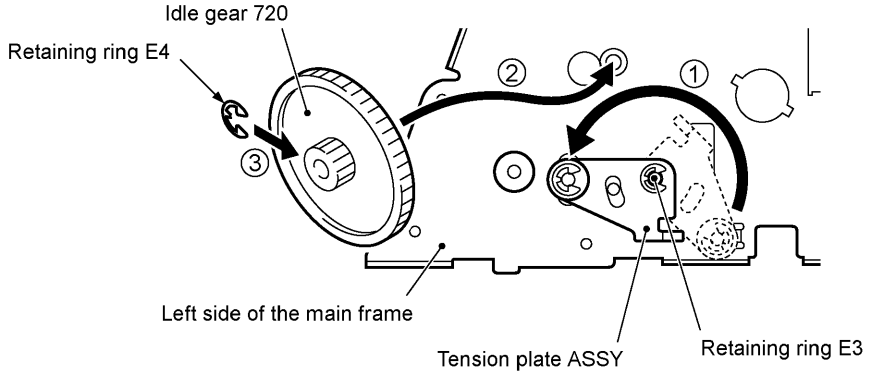
(4) Remove the retaining ring E4 and idle gear 720.

(5) Remove the retaining ring E3 and tension plate ASSY.



n Reassembling Notes

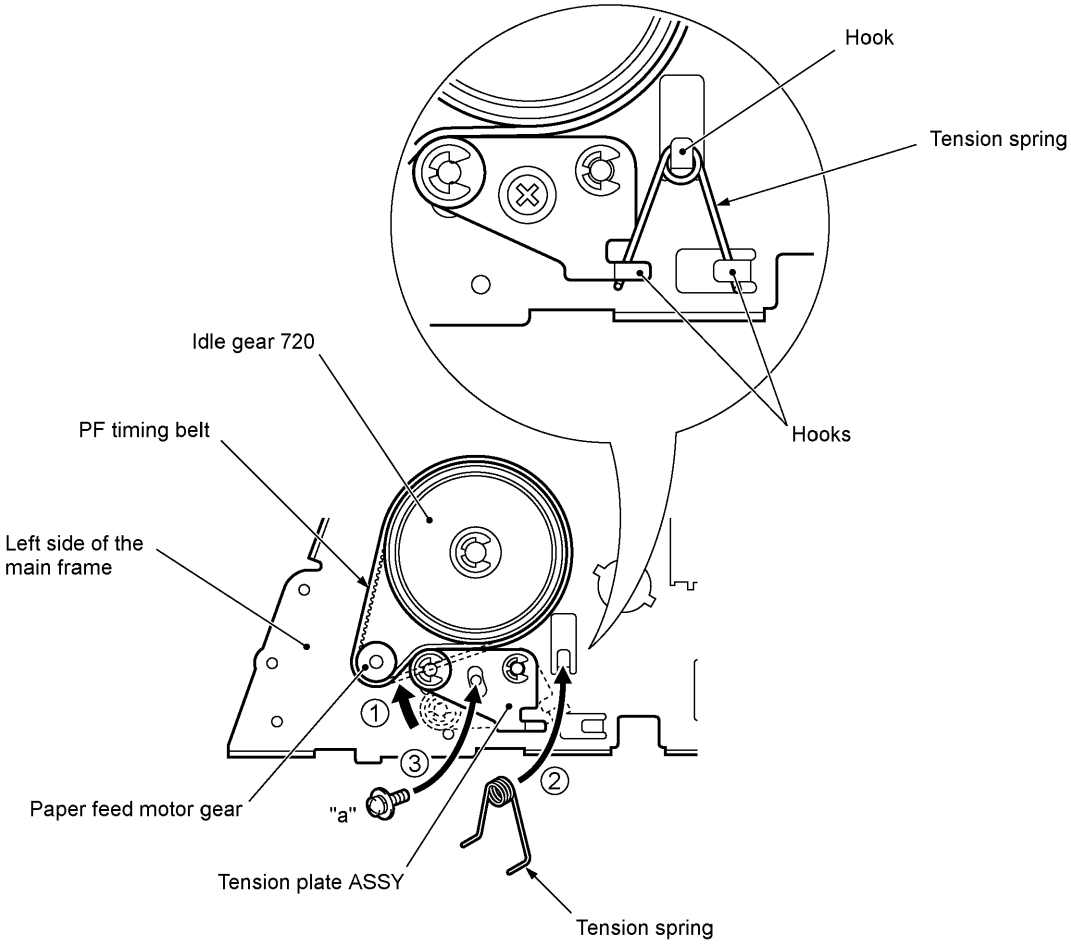
- When reinstalling the tension plate ASSY, idle gear 720, and PF timing belt, follow the steps below.
  1) Secure the tension plate ASSY to the left side of the main frame with retaining ring E3 and turn it counterclockwise (in the direction of arrow •).
  2) Secure the idle gear 720 with the retaining ring E4 (arrows , and ƒ).



3) Put the PF timing belt around the paper feed motor gear and the idle gear 720.

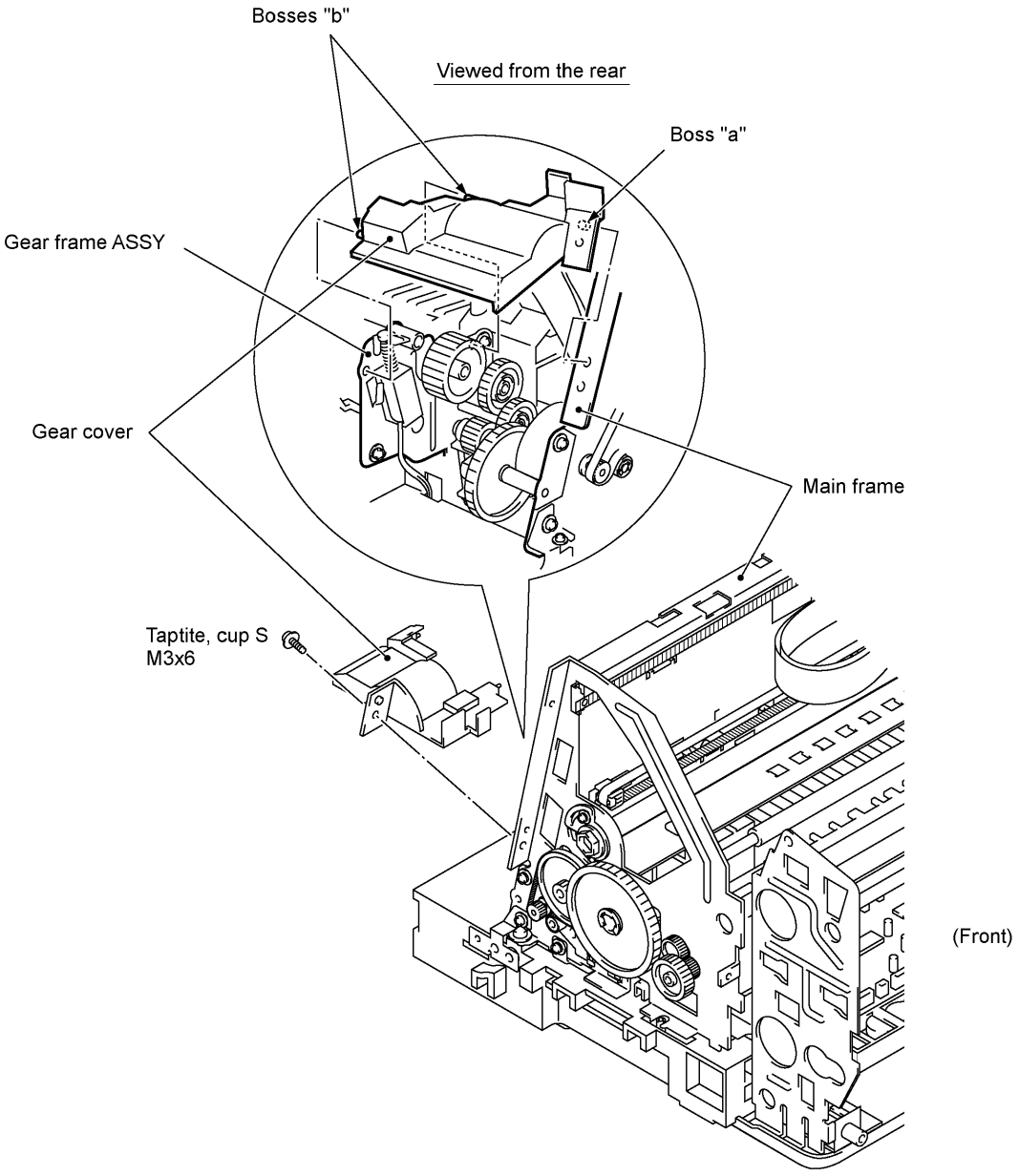
4) Turn the tension plate ASSY clockwise to apply tension to the PF timing belt (in the direction of arrow •) and set the tension spring onto the three hooks (arrow ,).

5) Secure the tension plate ASSY to the main frame with screw "a" (arrow *f*).



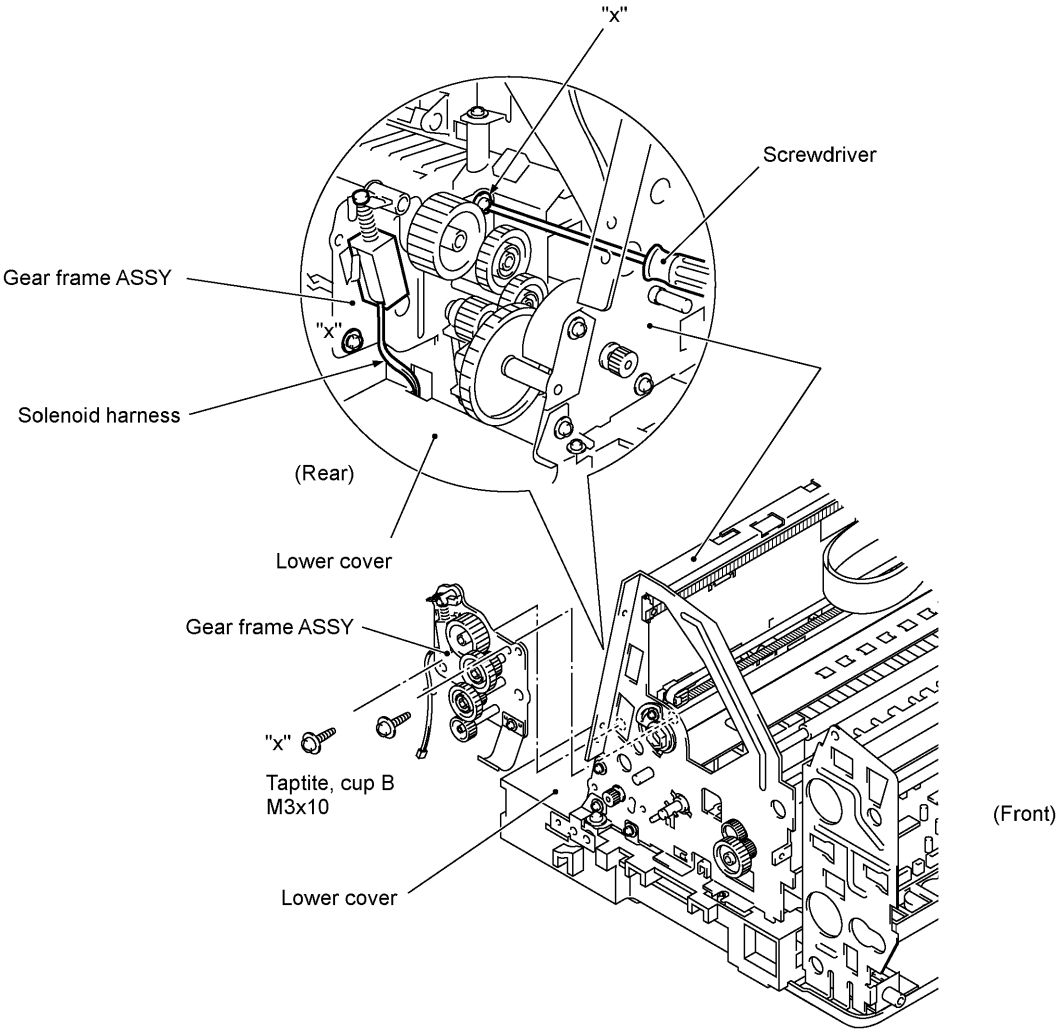
1.20 Gear Cover, Gear Frame ASSY (with Solenoid), and PF Arm ASSY

(1) Remove the screw from the gear cover, slightly pull the right rear corner of the gear cover to the rear to release boss "a" and take out the gear cover.

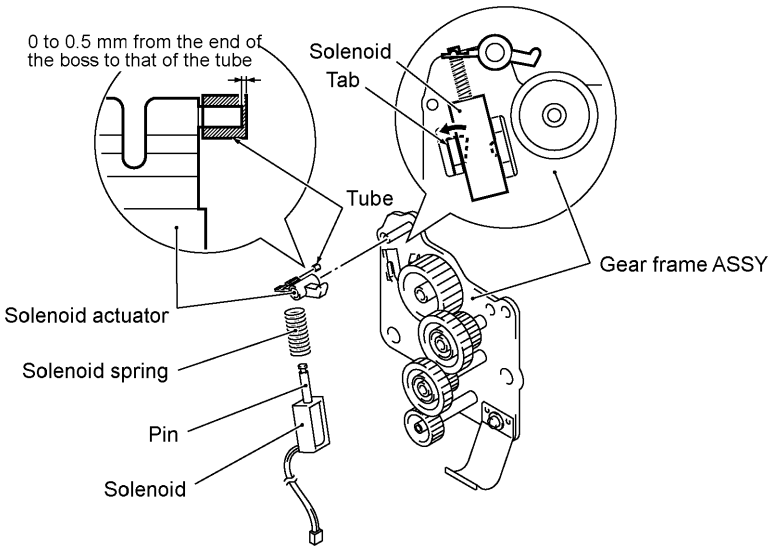


(2) Disconnect the solenoid harness from the main PCB. (To access the main PCB, remove the ROM cover if installed.) (Refer to the illustration given on page IV-53.)

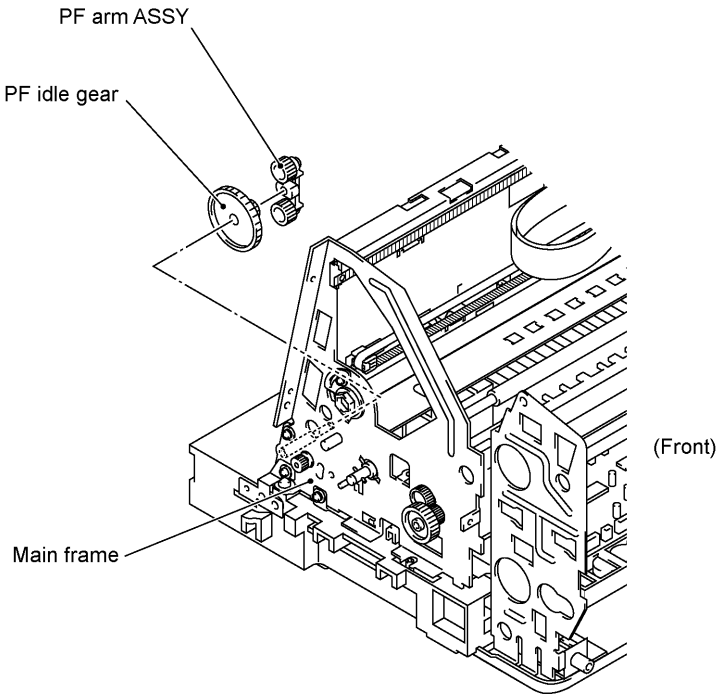
(3) Take out the gear frame ASSY by removing two screws "x."



(4) Pull the tab outwards and remove the solenoid from the gear frame ASSY. The solenoid actuator, spring, and pin also come off.



(5) Remove the PF arm ASSY by pulling its pawl outwards. Also remove the PF idle gear.



n Reassembling Notes

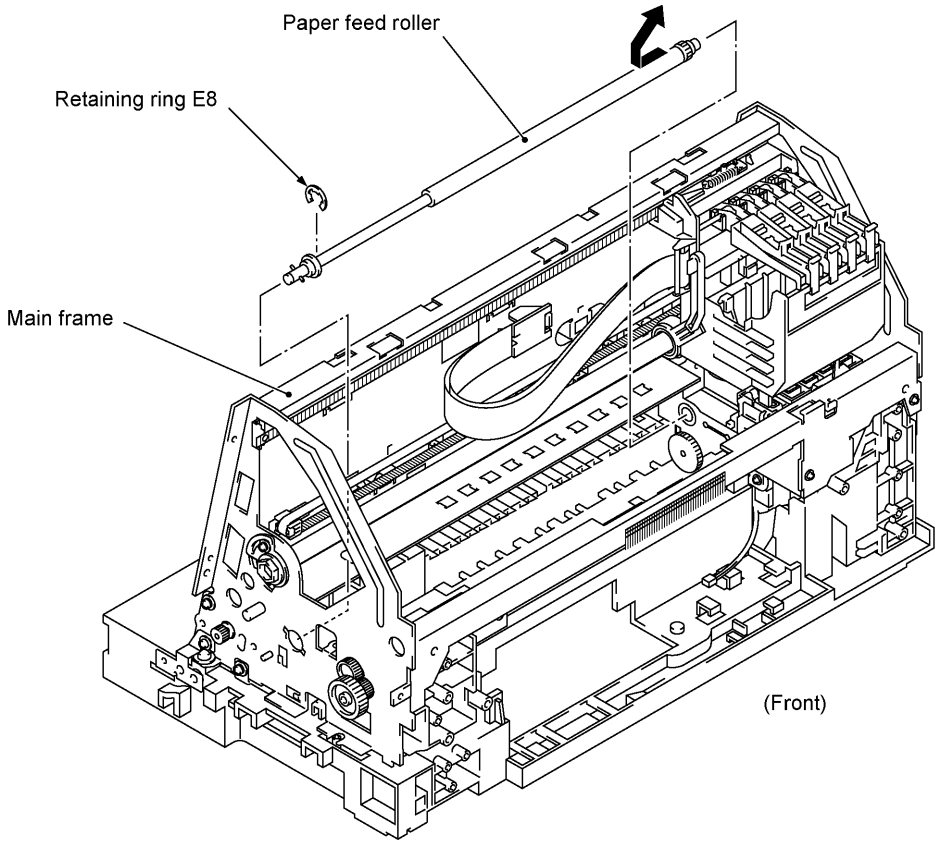
- When setting gears onto the shafts on the main frame, apply grease to those shafts. (Refer to Section 2.)
- When setting the tube onto the solenoid actuator, make the end of the tube flush with that of the boss of the solenoid actuator or allow a maximum of 0.5 mm protrusion of the tube from the boss, as illustrated on the previous page.

1.21 Paper Feed Roller

(1) Make sure that the carriage is placed in the home position.

(2) Remove the retaining ring E8 from the left end of the paper feed roller shaft inside the main frame.

(3) Pull the paper feed roller to the left to release its right end from the main frame and take it out.



1.22 Bottom Plate, Power Supply PCB, and Video PCB

(1) Remove the front cover if installed. (Refer to Section 1.8.)

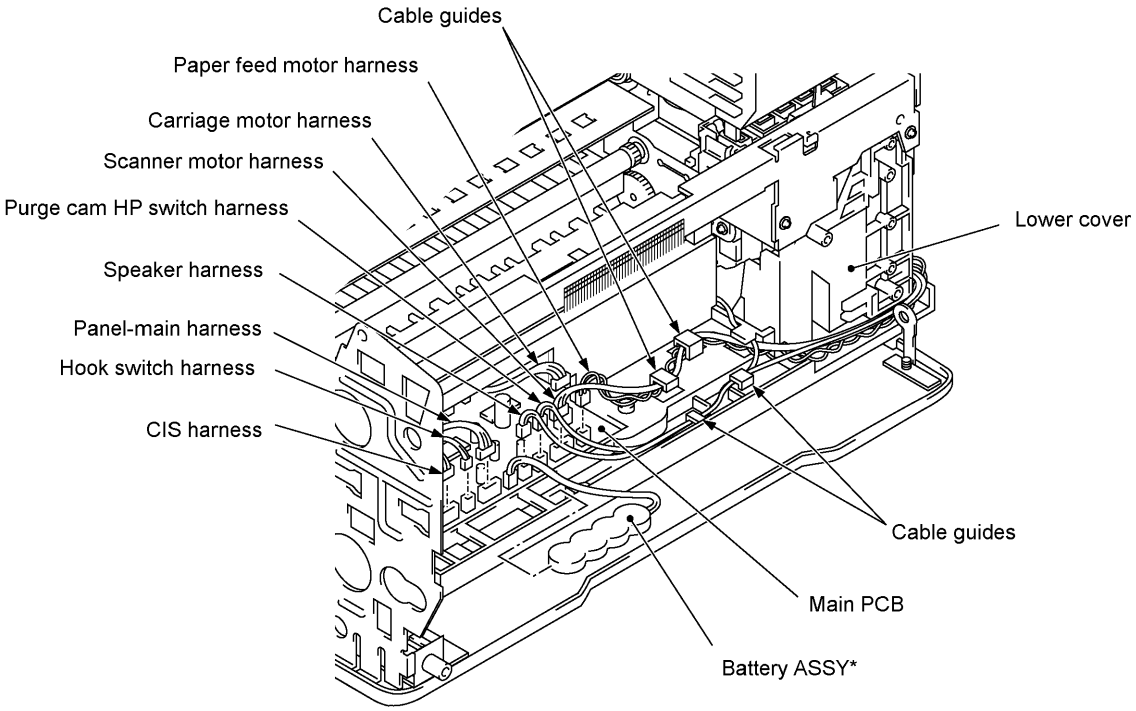
(2) For the MFC7160C/MFC-740, take the battery ASSY out of the supports at the front of the lower cover.

(3) Disconnect the following eight harnesses from the main PCB:

- CIS harness (9-pin)
- Hook switch harness (2-pin)
- Panel-main harness (6-pin)
- Speaker harness (2-pin)
- Purge cam HP switch harness (2-pin)
- Scanner motor harness (5-pin)
- Carriage motor harness (2-pin)
- Paper feed motor harness (4-pin)

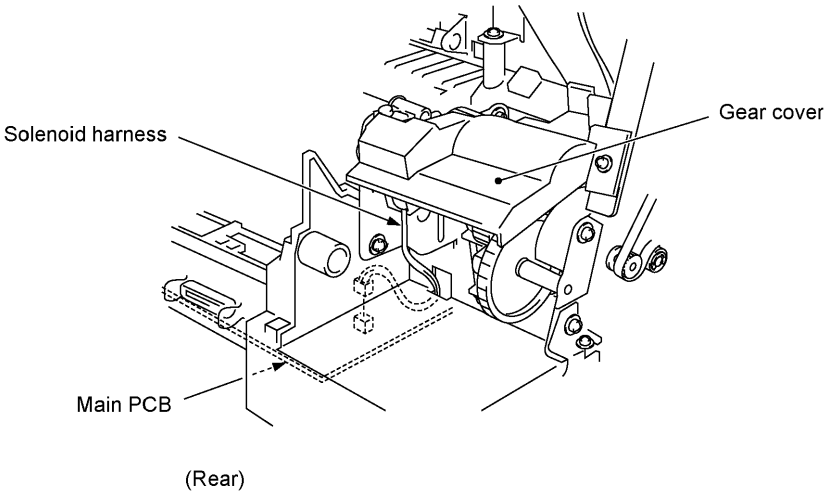
NOTE: The MFC7160C/MFC-740 has a Ni-MH battery ASSY. Only when you need to replace the main PCB, disconnect the battery harness. After installing a new main PCB, you may need to make settings (e.g., calendar clock and voice messages) to be stored in the RAM. If you need to replace the battery ASSY, do not disconnect the harness in this disassembly step. Doing so with the power cord unplugged will lose the settings stored in the RAM. Refer to Section 1.8.

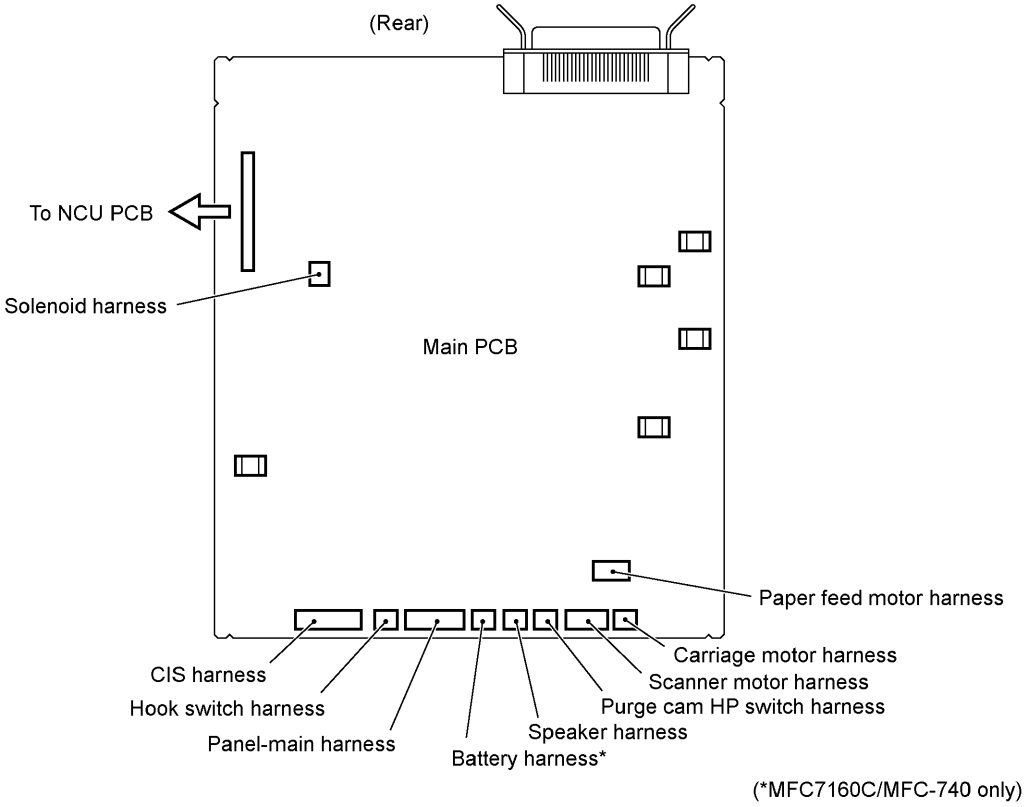
(4) Remove the ROM cover if installed. (Refer to Section 1.4.)



(*MFC7160C/MFC-740 only)

(5) Disconnect the solenoid harness.



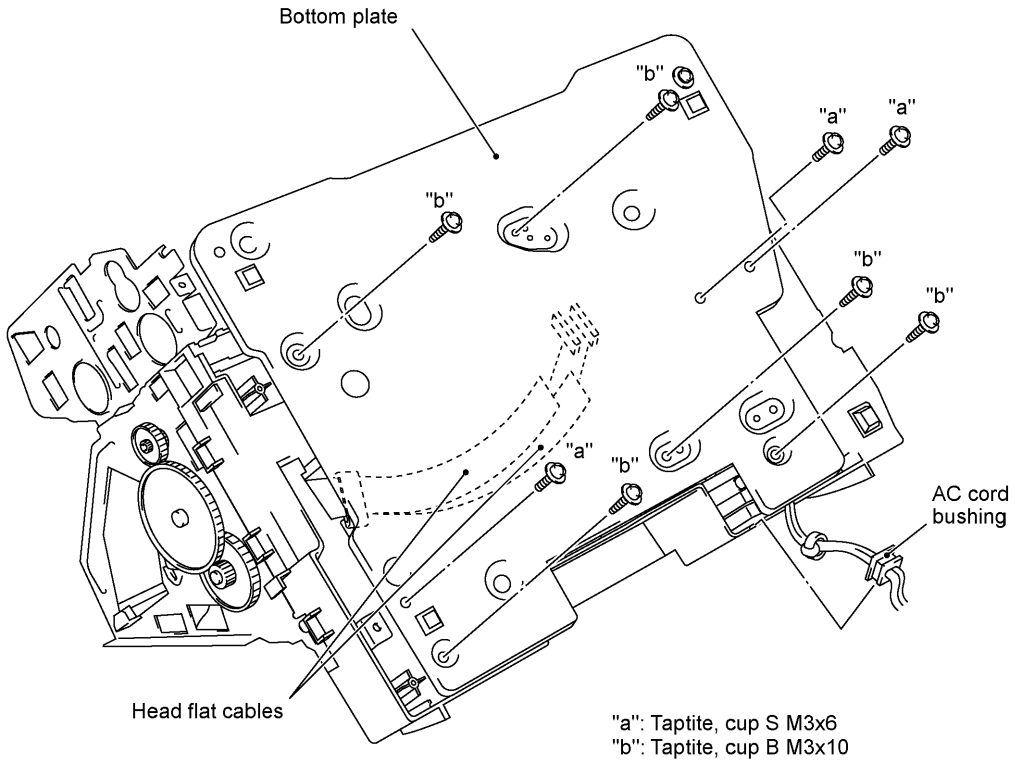


(6) Check that the frame cover is installed on the top of the main frame. If it has been removed, reinstall it. This prevents the cover sensor actuator 2 and cover lock (leaf spring) from bending or deforming. Then turn the facsimile equipment upside down as shown below.

(7) Remove the eight screws (three "a" and five "b" screws) from the bottom plate.

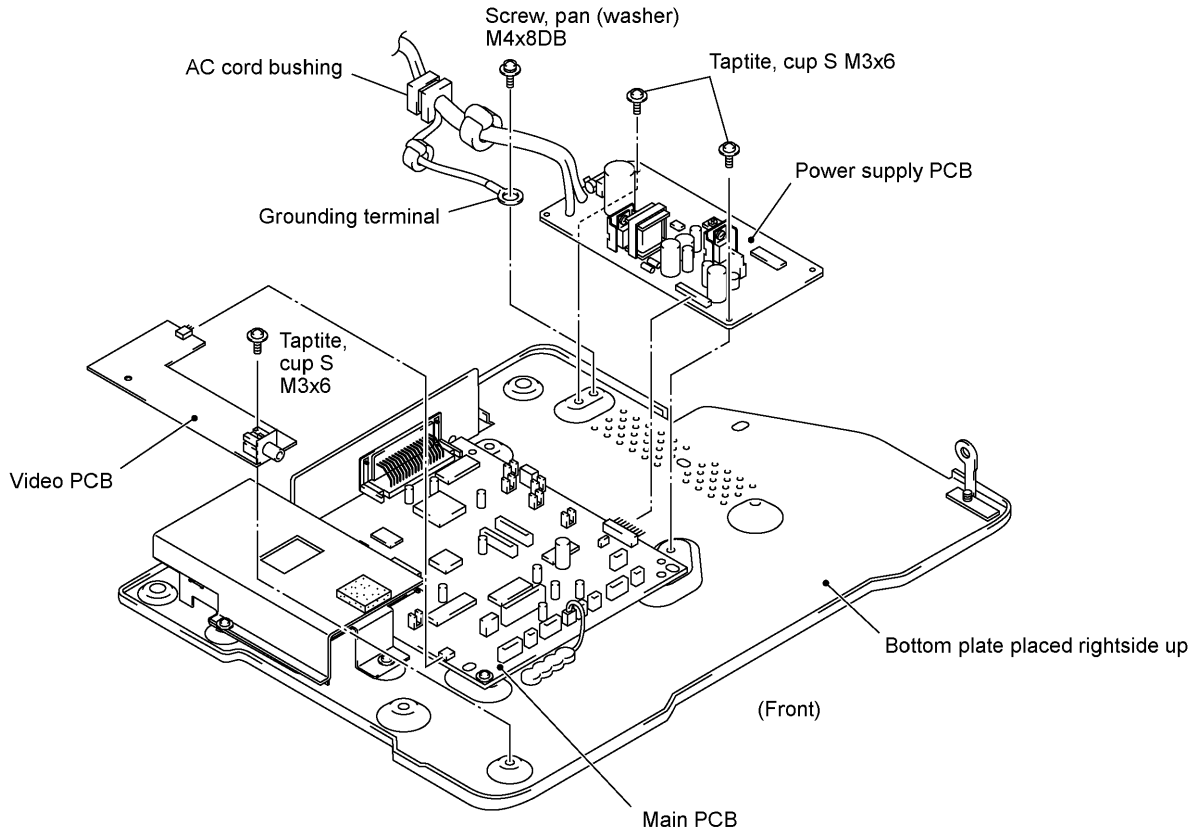
(8) Slightly lift up the bottom plate and disconnect the head flat cables from the main PCB.

(9) Take off the AC cord bushing from the lower cover.



(10) Remove the two screws from the power supply PCB and one screw from the grounding terminal. Then disconnect the power supply PCB from the main PCB.

(11) Remove the screw from the video PCB and disconnect the PCB from the main PCB.

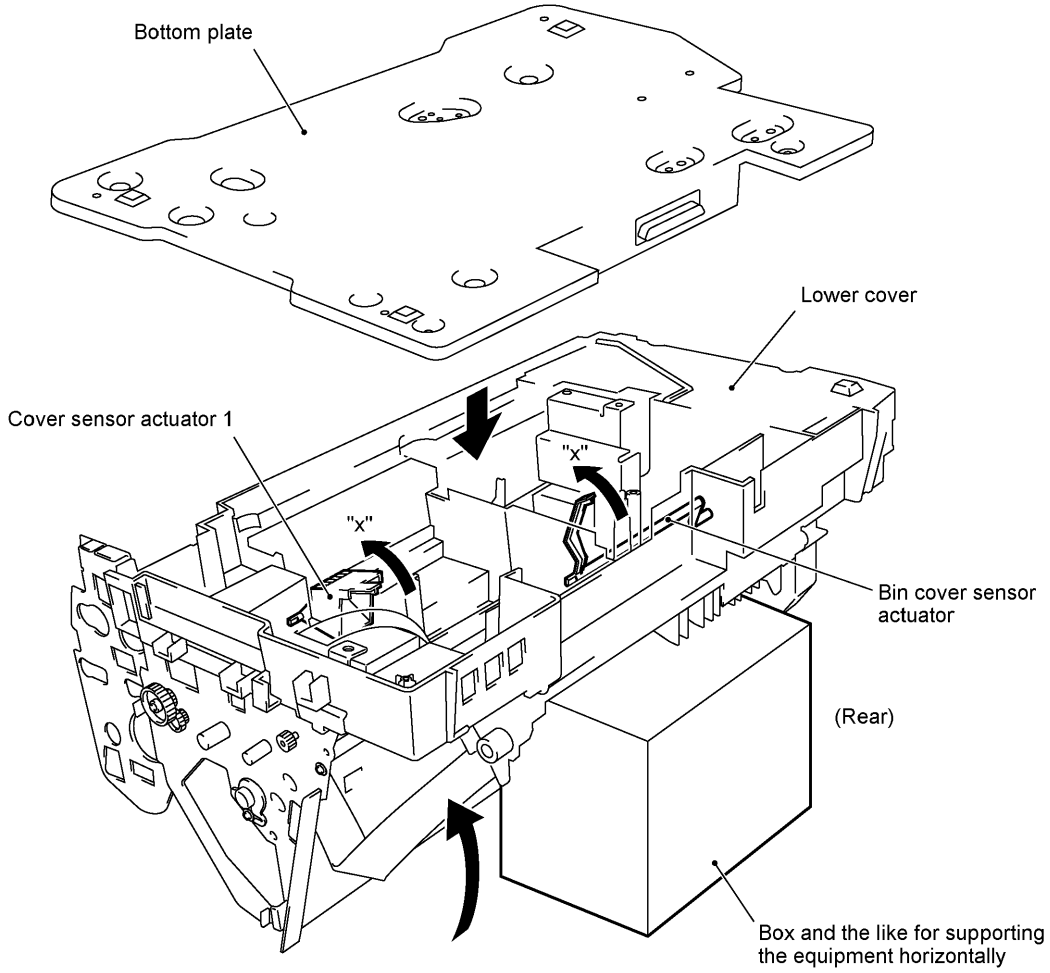


n Reassembling Notes

- When reinstalling the power supply PCB to the bottom plate, secure the grounding terminal to the bottom plate.

- Before reinstalling the bottom plate, turn the bin cover sensor actuator and cover sensor actuator 1 to the front of the equipment (in the direction of arrow "x" in the illustration given below).

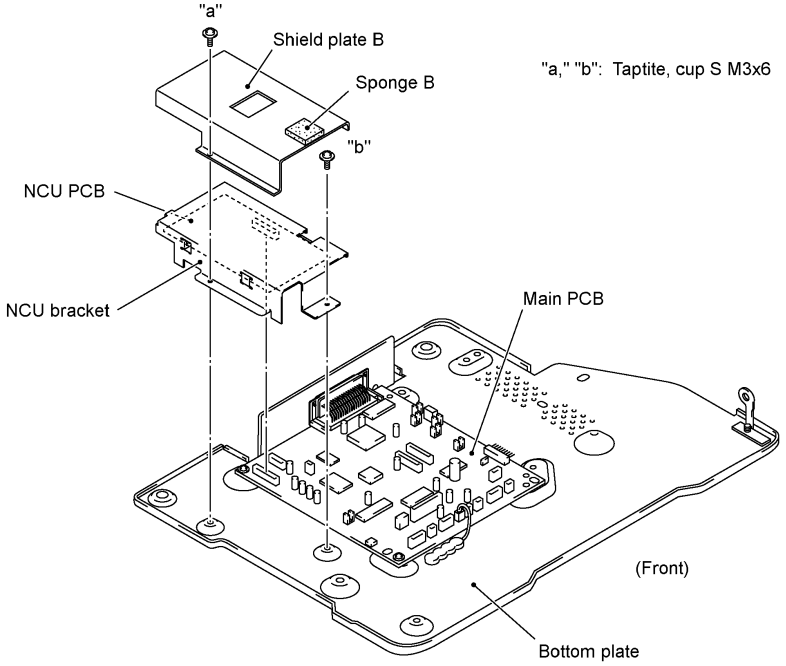
  If the cover sensor actuator 2 has been removed, the cover sensor actuator 1 tilts out of the sensor supports. To keep the actuator 1 in place, support the facsimile equipment with a box and the like as shown below so that the top face (when the equipment is placed upside down) becomes horizontal. Then set the actuator 1 in place and turn it to the front.
- Make sure that the paper width sensor actuator, paper ejection sensor actuator, and registration sensor actuator tilt towards the rear.
- When reinstalling the bottom plate, fit the AC cord bushing into the cutout of the lower cover and put the ferrite core into the lower cover.



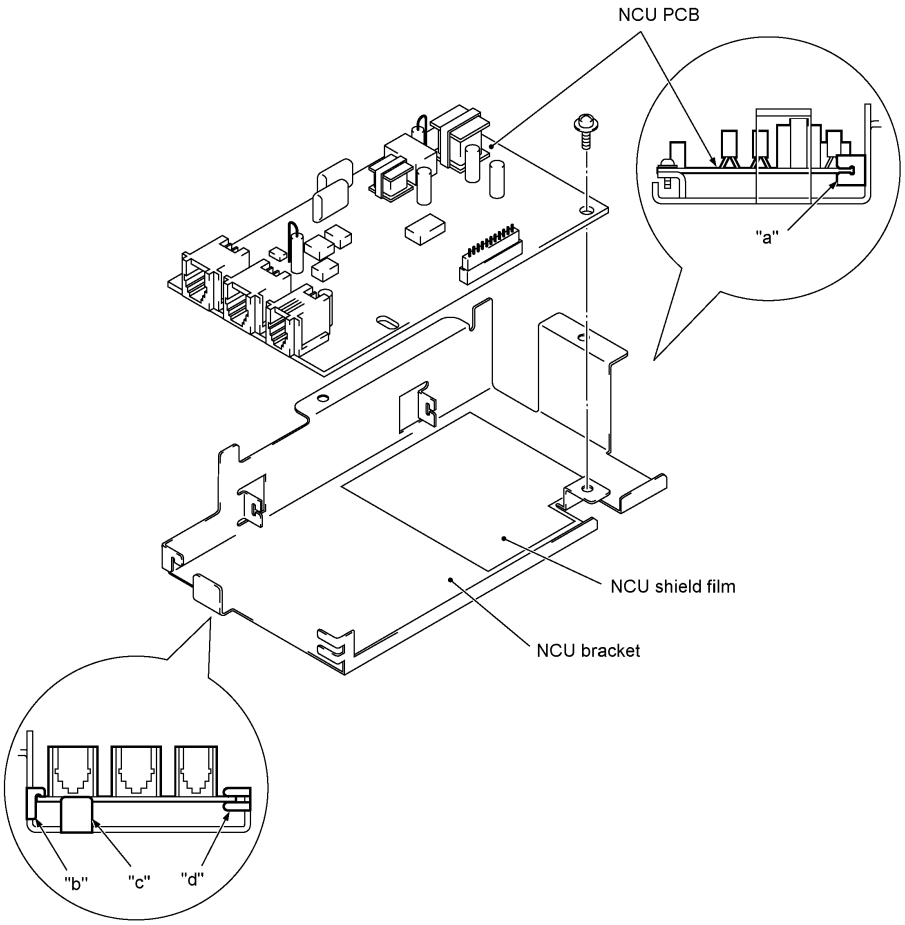
1.23 NCU PCB and Main PCB

(1) Take off the shield plate B by removing the screw "a."

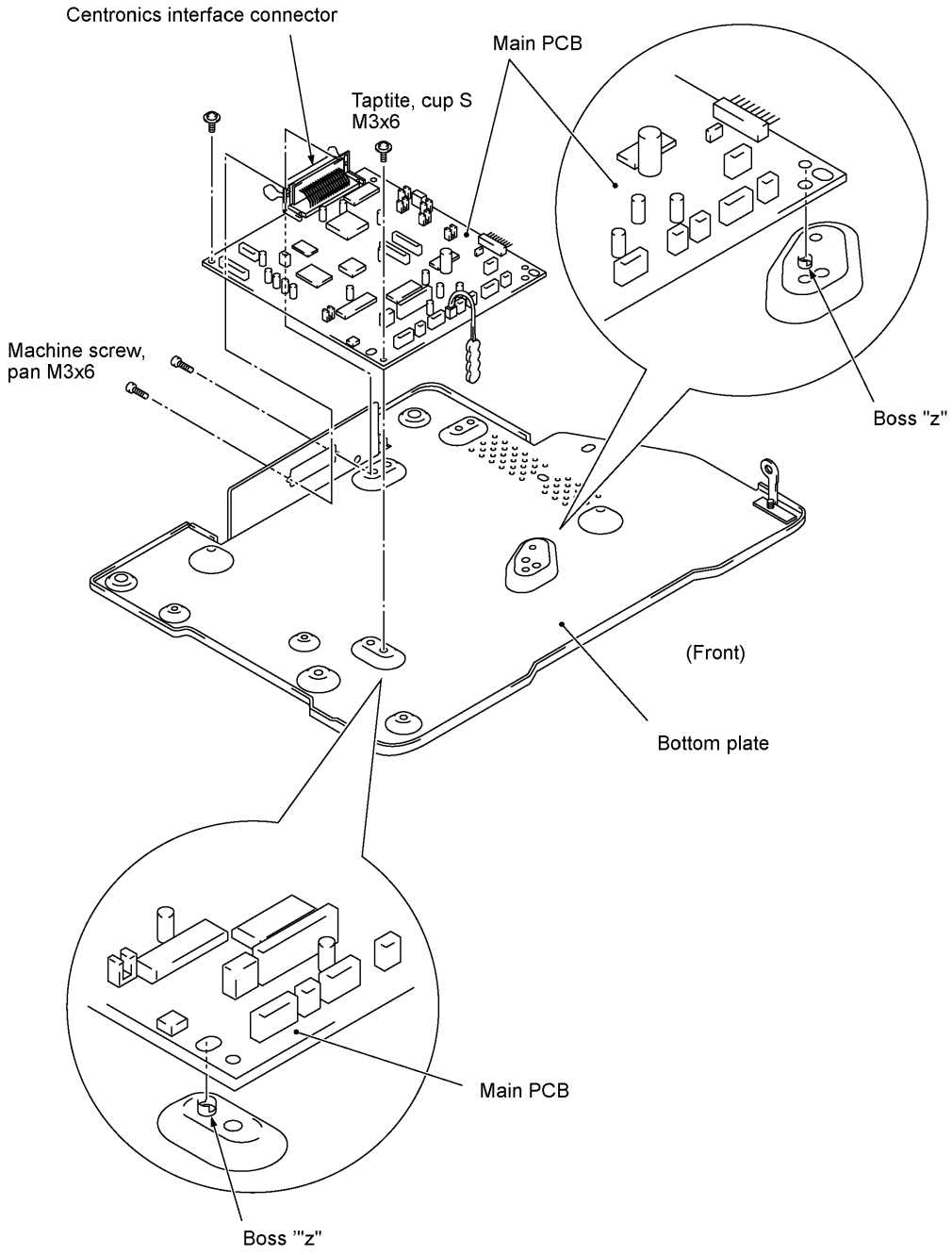
(2) Take off the NCU bracket (which holds the NCU PCB) by removing the screw "b."

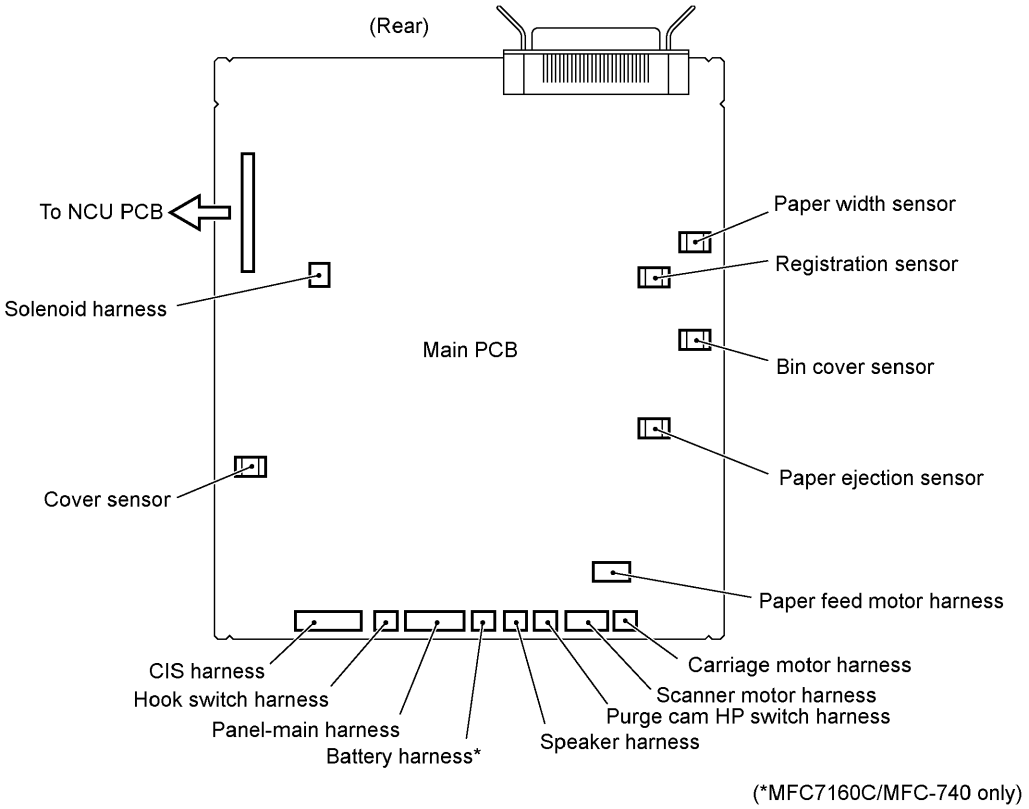


(3) Take off the NCU PCB from the NCU bracket by removing the screw.



(4) Remove the two screws from the main PCB and two screws from the Centronics interface connector, and then take off the main PCB.





n Reassembling Notes

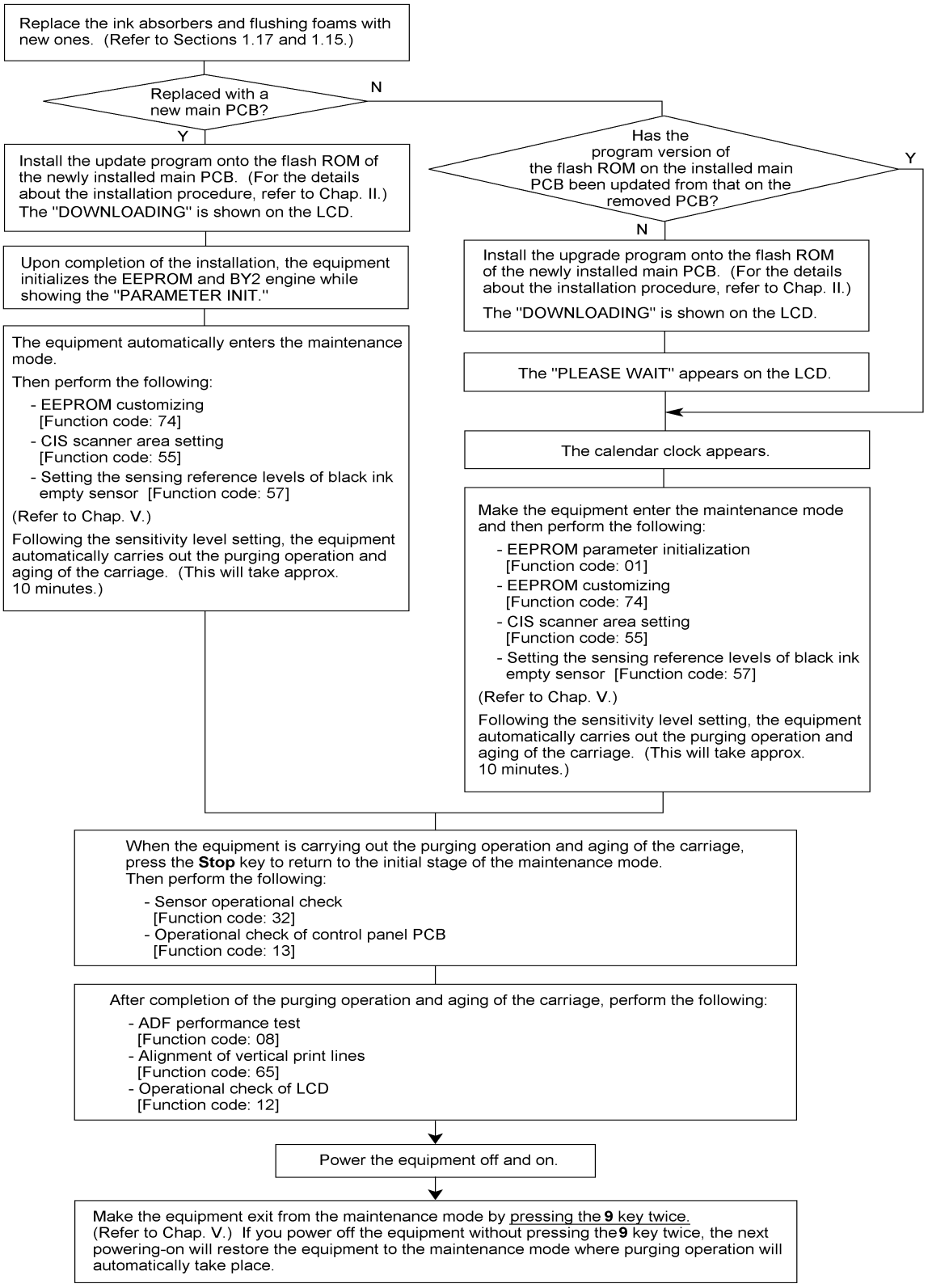
- When setting the main PCB on the bottom plate, first fit the two holes over bosses "z" provided on the bottom plate and then secure the PCB with the screws.
- When setting the NCU PCB to the NCU bracket, fit its edges onto "b" and "c" and into "a" and "d" as illustrated on page IV-57.
- When attaching the sponge B, align it with markings on the shield plate B.
- After you replace the main PCB, be sure to follow the flowchart given on the next page.

Setting up the main PCB after replacement

- **Important** -

NOTE: Before starting the following procedure, make sure that the print head unit is installed.

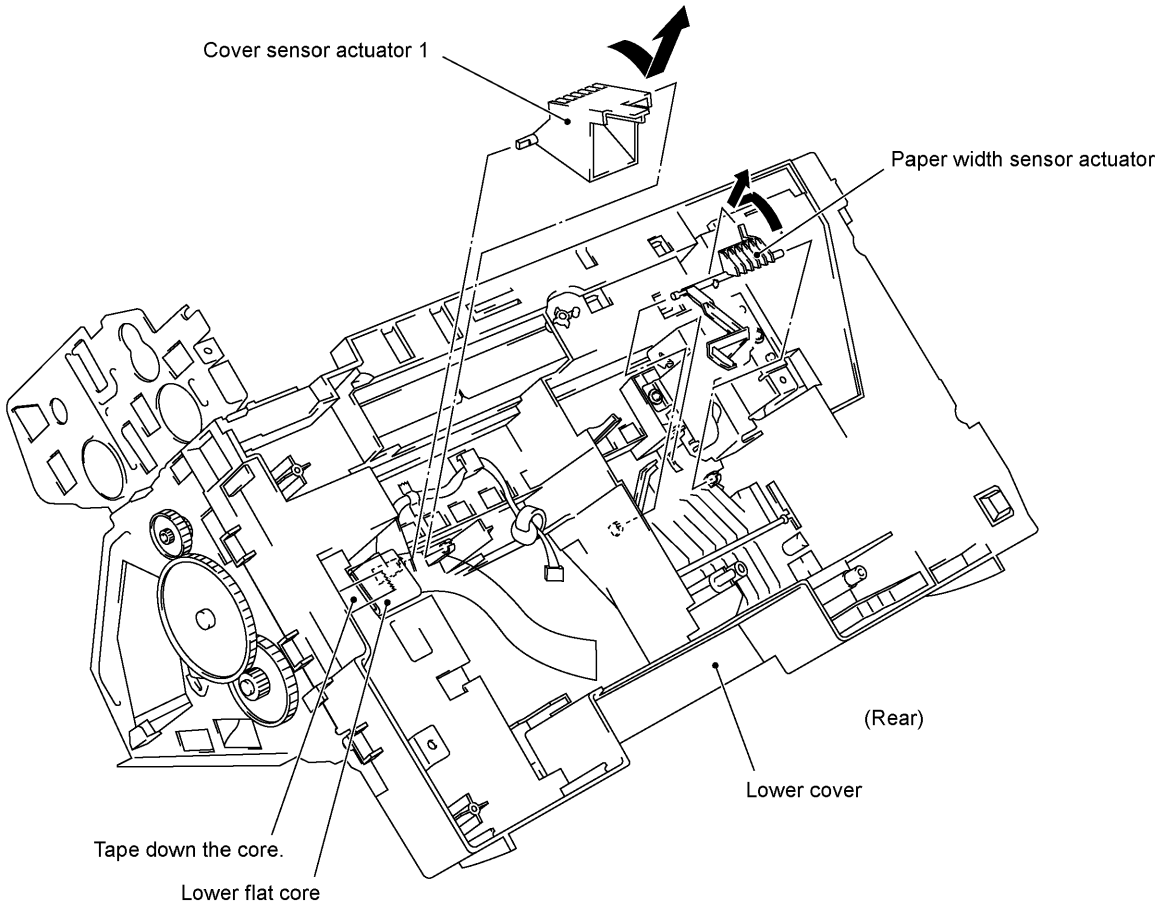
NOTE: When replacing the main PCB, it is recommended that you replace all ink cartridges in order to maintain accurate ink level information.

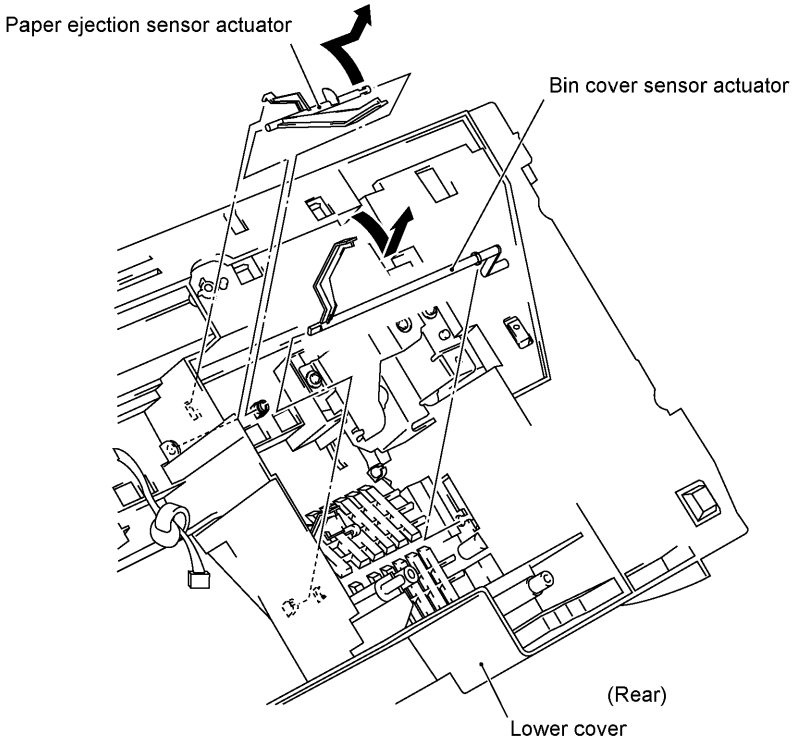


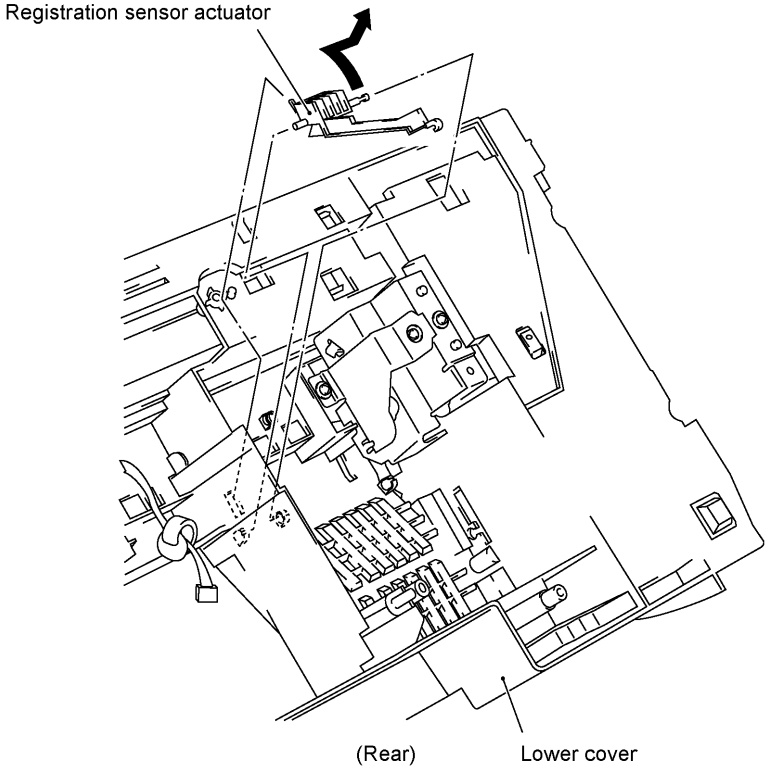
1.24 Sensor Actuators (Cover Sensor Actuator 1, Paper Width Sensor Actuator, Paper Ejection Sensor Actuator, Bin Cover Sensor Actuator, and Registration Sensor Actuator)

(1) Remove the following sensor actuators:

- Cover sensor actuator 1 (Pull it down and lift it up. If the cover sensor actuator 2 is installed and the top cover is closed, open the top cover so that the actuator 2 can be pushed down.)
- Paper width sensor actuator (Turn its end up and move it to the left and up.)
- Paper ejection sensor actuator (Turn its end up and move it to the right and up.)
- Bin cover sensor actuator (Turn its end up and move it up.)
- Registration sensor actuator (Turn its end up and move it to the right and up.)

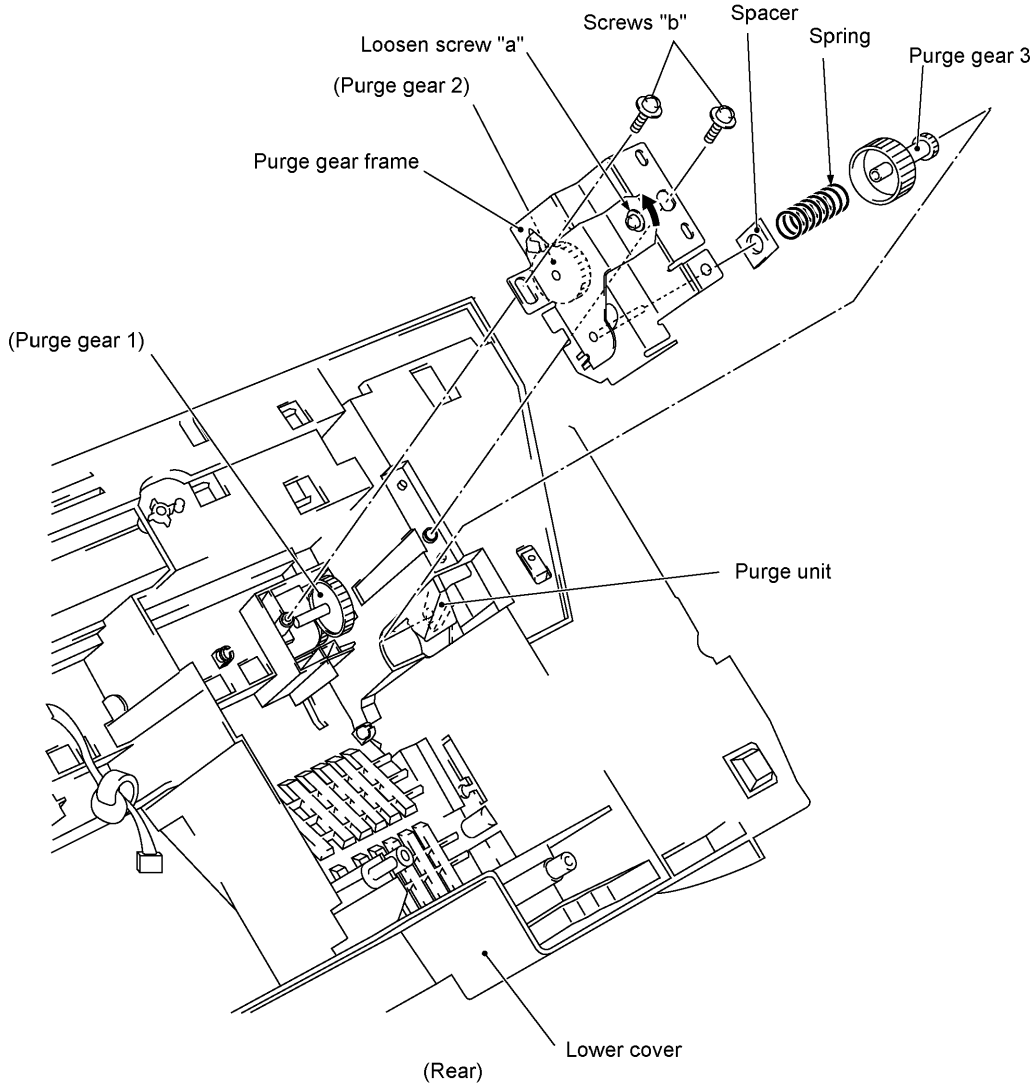



Paper ejection sensor actuator
Bin cover sensor actuator
(Rear)
Lower cover


Registration sensor actuator
(Rear)
Lower cover

1.25 Purge Gear Frame

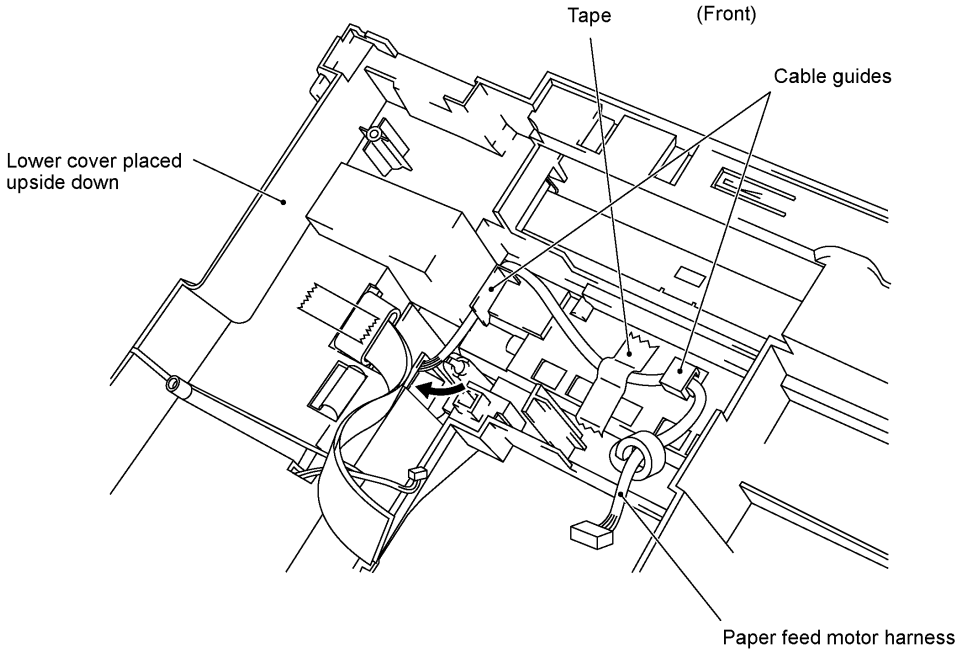
(1) Make sure that the carriage is placed in the home position.
(2) Loosen screw "a."
(3) Remove screws "b."
(4) Take off the purge gear frame together with the purge gear 3, spring, and spacer.



"a": Screw, pan (washer) M3x6DB
"b": Taptite, cup B M3x10

1.26 Paper Feed Motor

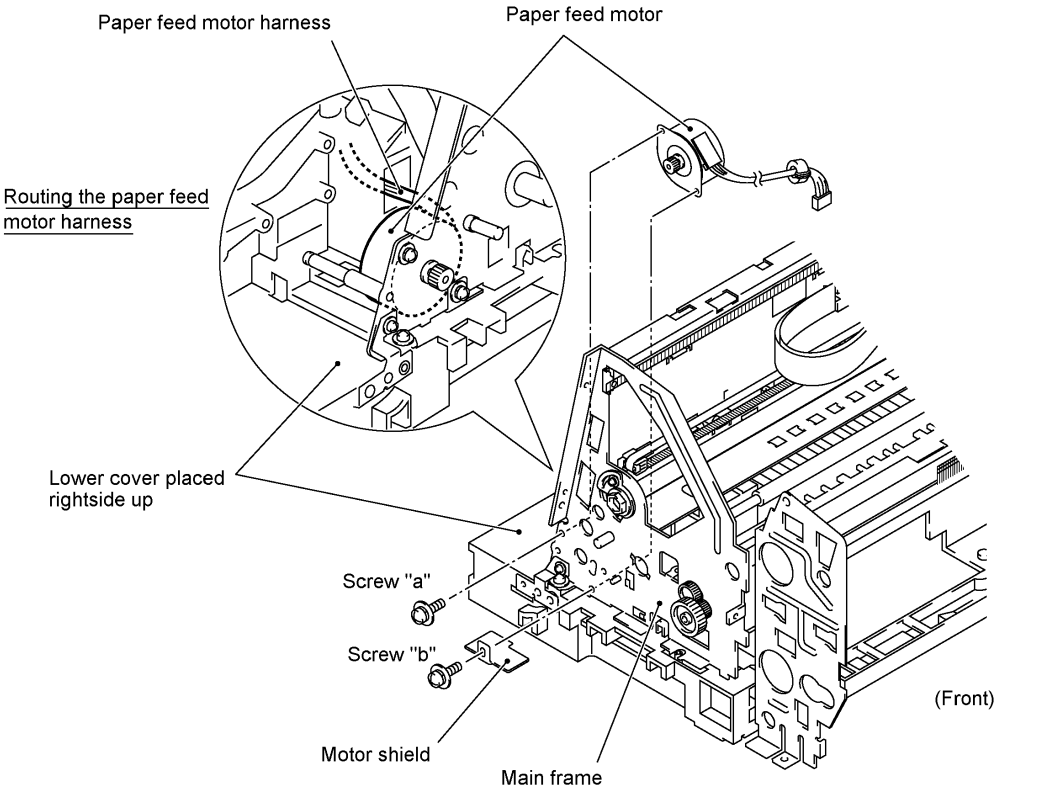
(1) Release the paper feed motor harness from the tape and cable guides.



(2) Place the lower cover rightside up.

(3) Remove screw "b" and pull out the motor shield.

(4) Remove screw "a" and pull out the paper feed motor harness to take out the paper feed motor.

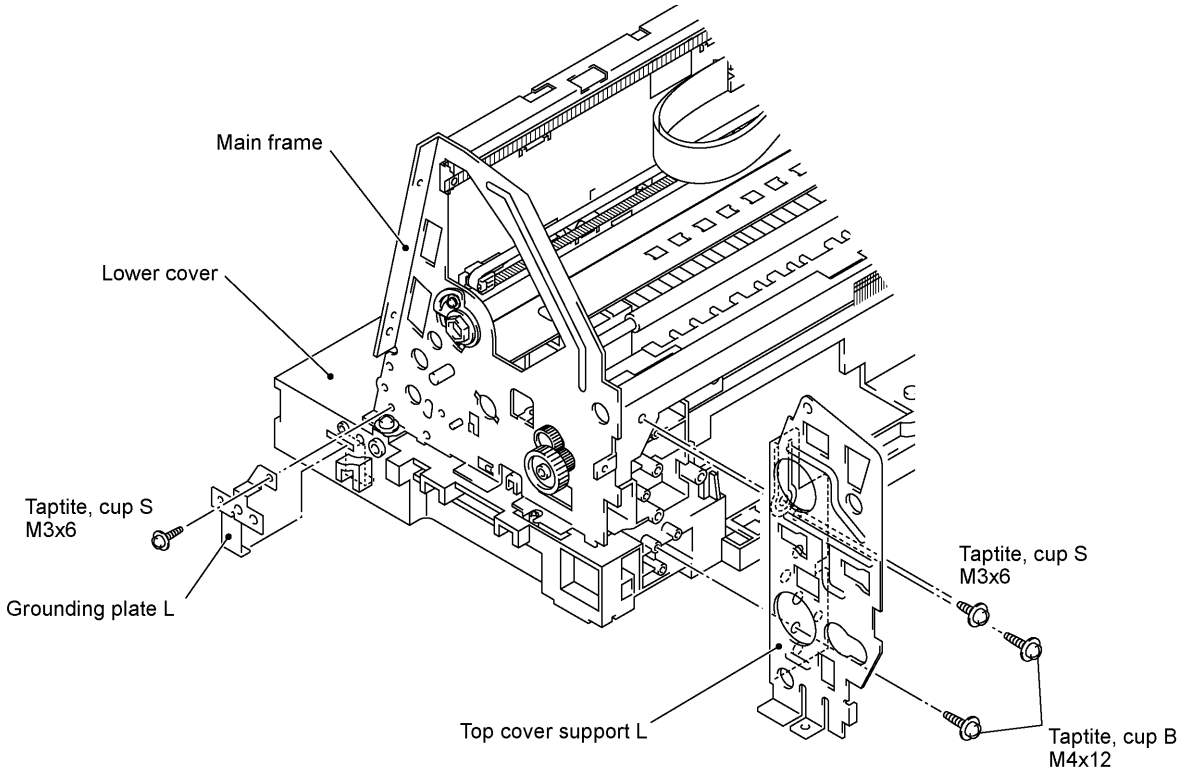


"a," "b": Screw, pan (washer) M3x8DB

1.27 Top Cover Support L and Grounding Plate L

(1) Take off the top cover support L by removing the three screws.

(2) Take off the grounding plate L by removing the screw.

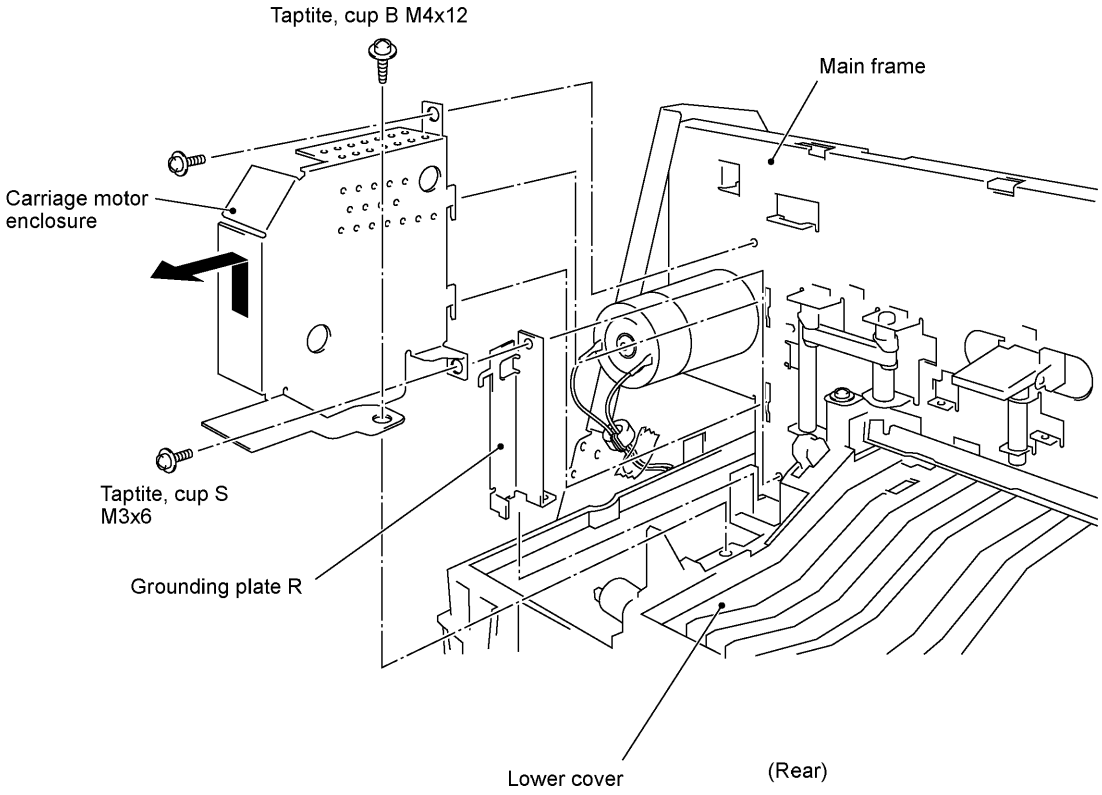


1.28 Carriage Motor Enclosure and Grounding Plate R

Only when you need to remove the carriage motor, remove the carriage motor enclosure and grounding plate R.

(1) Remove the three screws, slightly lift up the carriage motor enclosure, and take it off to the rear.

(2) Remove the grounding plate R (that is secured together with the carriage motor enclosure).



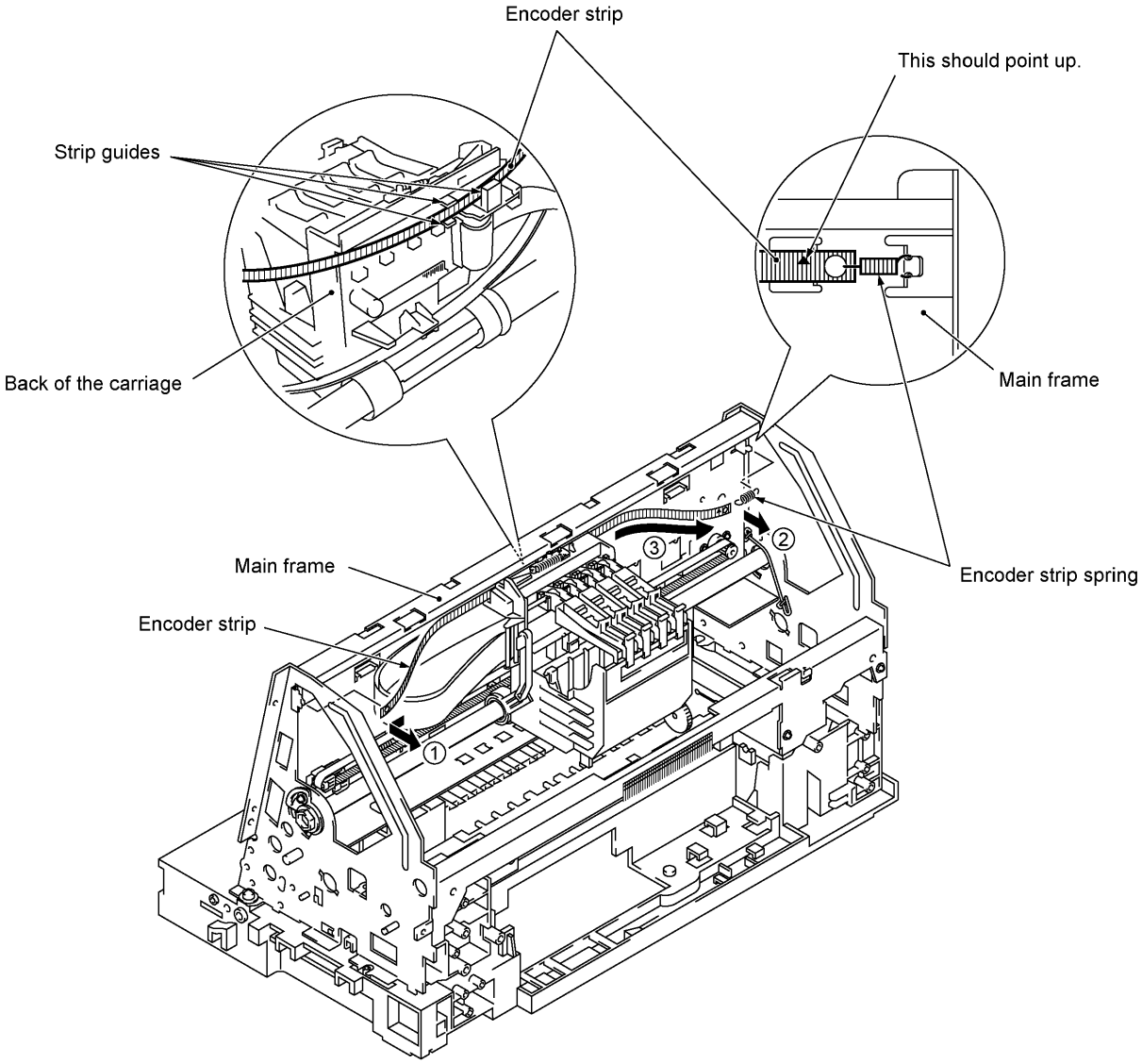
n Reassembling Notes

- Before installing the grounding plate R, move the carriage to the home position.

1.29 Encoder Strip

(1) Take off the encoder strip by removing its spring.

NOTE: Take care not to scratch or damage the encoder strip.



n Reassembling Notes

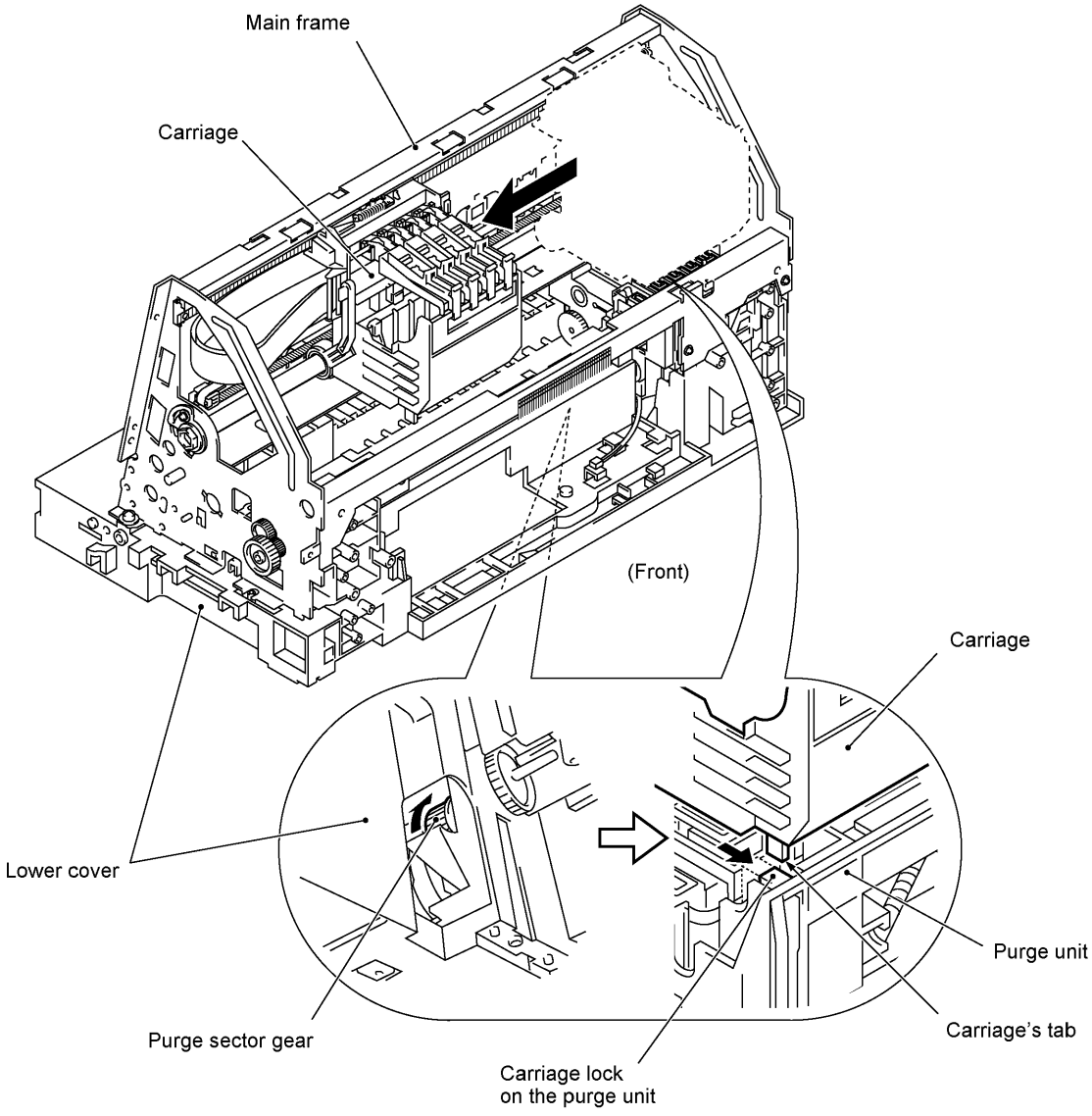
- Pass the encoder strip through the back of the carriage so that the strip will route as illustrated above and the ▲-marked end comes to the right. Then hook the ▲-marked end on the spring of the main frame so that the ▲ mark points up.

1.30 Purge Unit

> **Caution** Once removed, the components given in Subsections 1.30 through 1.34 require special adjustment jigs for reassembly. Refer to Section 3, “ADJUSTMENT” in this chapter.

(1) Move the carriage to the left and out of the home position.

NOTE: If the carriage is locked in the home position, you need to turn the purge sector gear counterclockwise (when viewed from the right) to retract the carriage lock. To access the purge sector gear, first take off the main frame from the lower cover (refer to Section 1.32) and insert your finger from the bottom of the main frame.

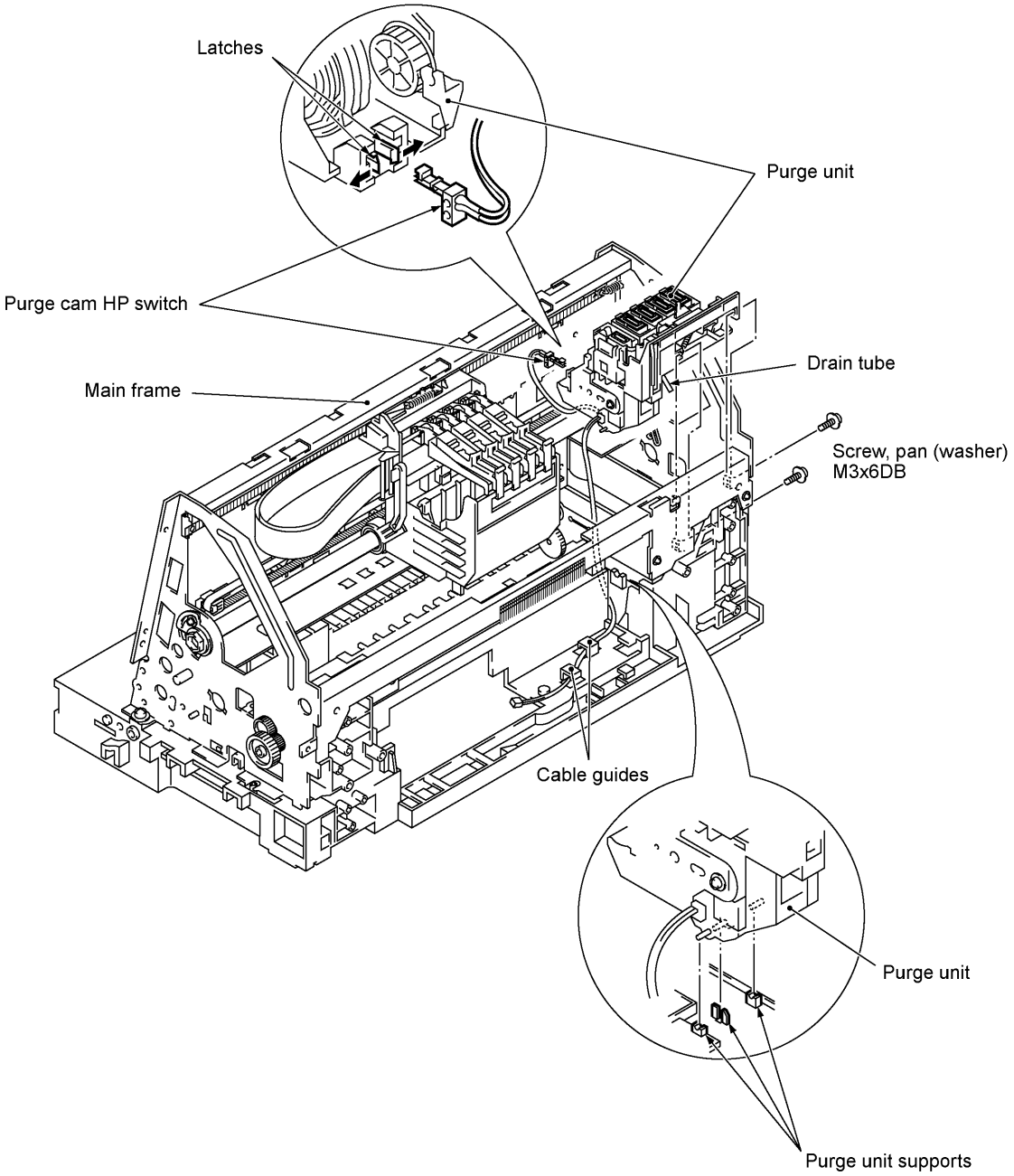


(2) Remove the two screws from the right side of the purge unit.

(3) Take out the purge cam HP switch harness from the cable guides provided on the lower cover.

(4) Lift the purge unit up and out of the lower cover and main frame.

(5) Take off the purge cam HP switch from the purge unit by pulling the unit's latches outwards.



n Reassembling Notes

- First route the purge cam HP switch harness through the lower cover and put the purge unit back into place.
- Make sure that the purge unit is fitted in the purge unit supports provided on the lower cover.
- After installing the purge unit, move the carriage to the right and left ends by hand to check that it travels smoothly.

1.31 Paper Ejection Roller

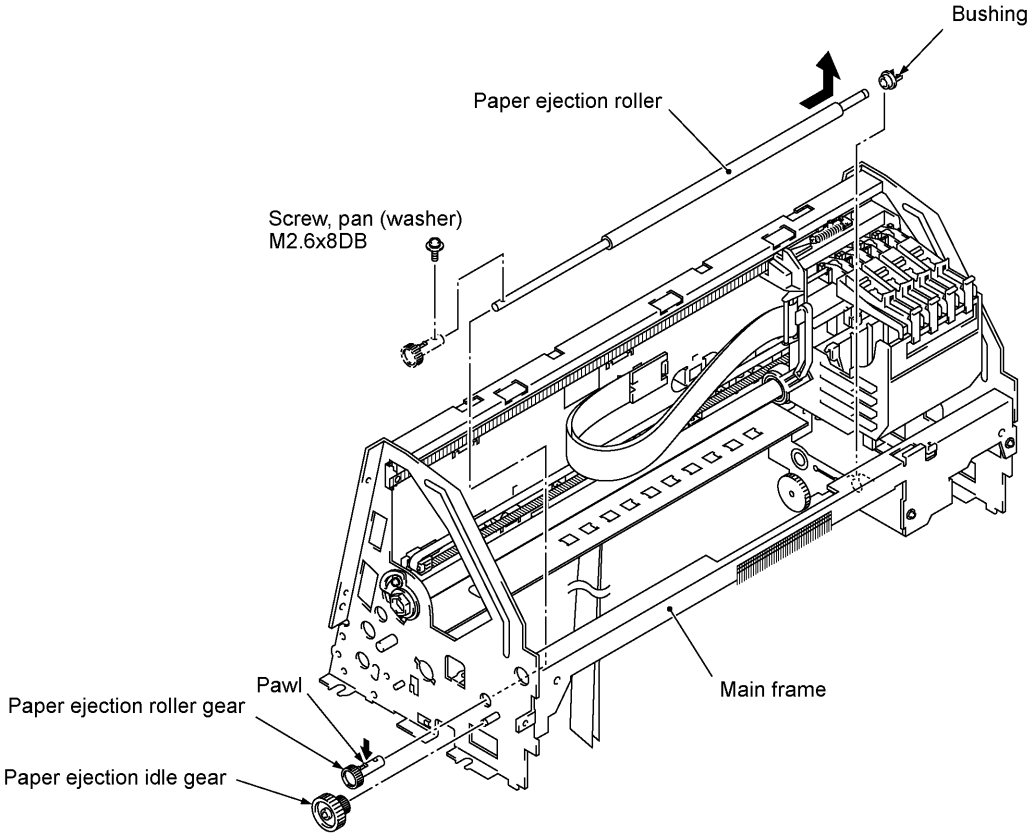
> **Caution** Once removed, the components given in Subsections 1.30 through 1.34 require special adjustment jigs for reassembly. Refer to Section 3, "ADJUSTMENT" in this chapter.

(1) At the left end of the paper ejection roller, remove the paper ejection idle gear by pulling its pawl outwards.

(2) Remove the screw from the paper ejection roller gear.

(3) Pull the paper ejection roller to the right and take it up. (If the star wheel holder ASSY is installed, pull out the paper ejection roller to the right through the cutout of the main frame.)

(4) Pull out the paper ejection roller gear to the left by pressing its pawl.

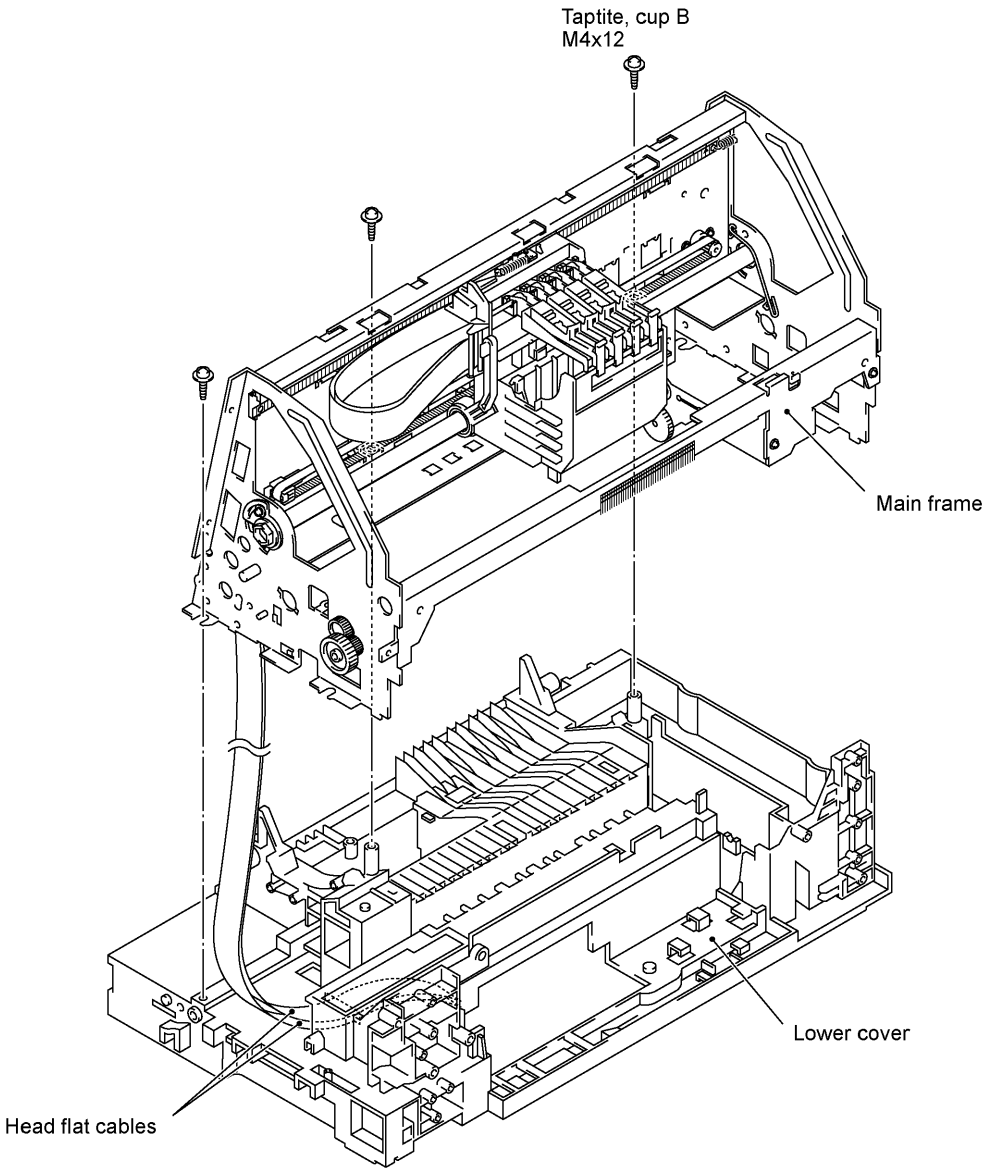


1.32 Main Frame

> **Caution** Once removed, the components given in Subsections 1.30 through 1.34 require special adjustment jigs for reassembly. Refer to Section 3, “ADJUSTMENT” in this chapter.

On the main frame are the carriage rail, carriage ASSY and carriage motor which can be removed without taking off the main frame from the lower cover. Refer to Section 1.34.

(1) Remove the three screws and lift up the main frame.

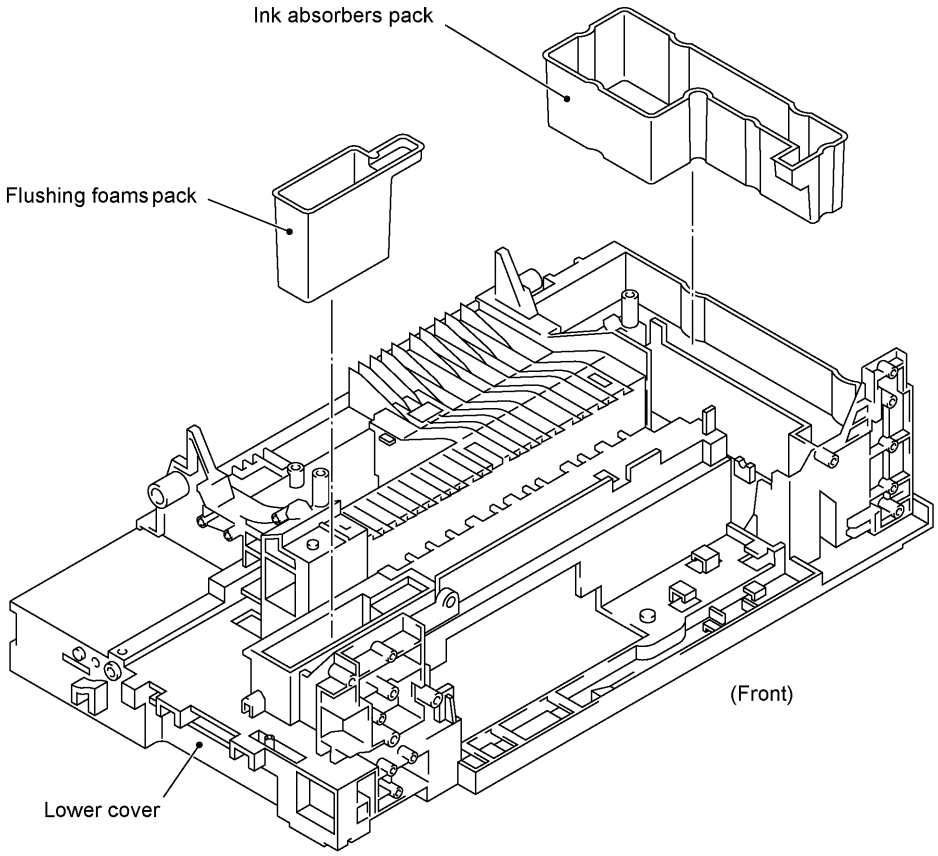


1.33 Flushing Foams Pack and Ink Absorbers Pack

> **Caution** Once removed, the components given in Subsections 1.30 through 1.34 require special adjustment jigs for reassembly. Refer to Section 3, "ADJUSTMENT" in this chapter.

(1) Lift up the flushing foams pack.

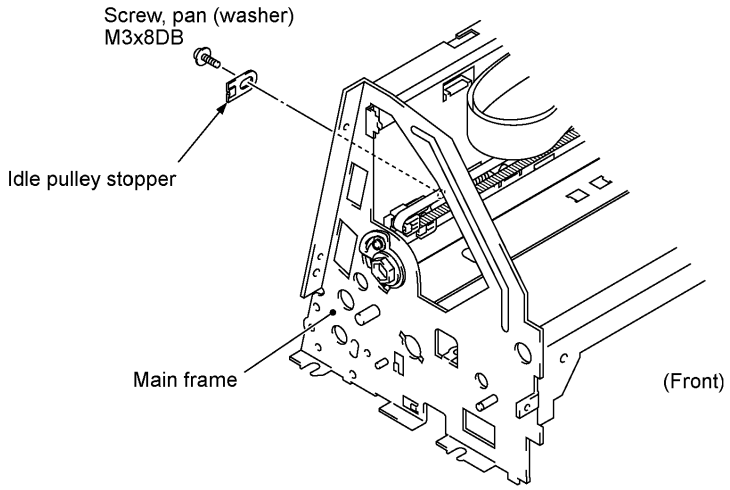
(2) Lift up the ink absorbers pack.



1.34 Carriage Rail, Carriage ASSY, and Carriage Motor

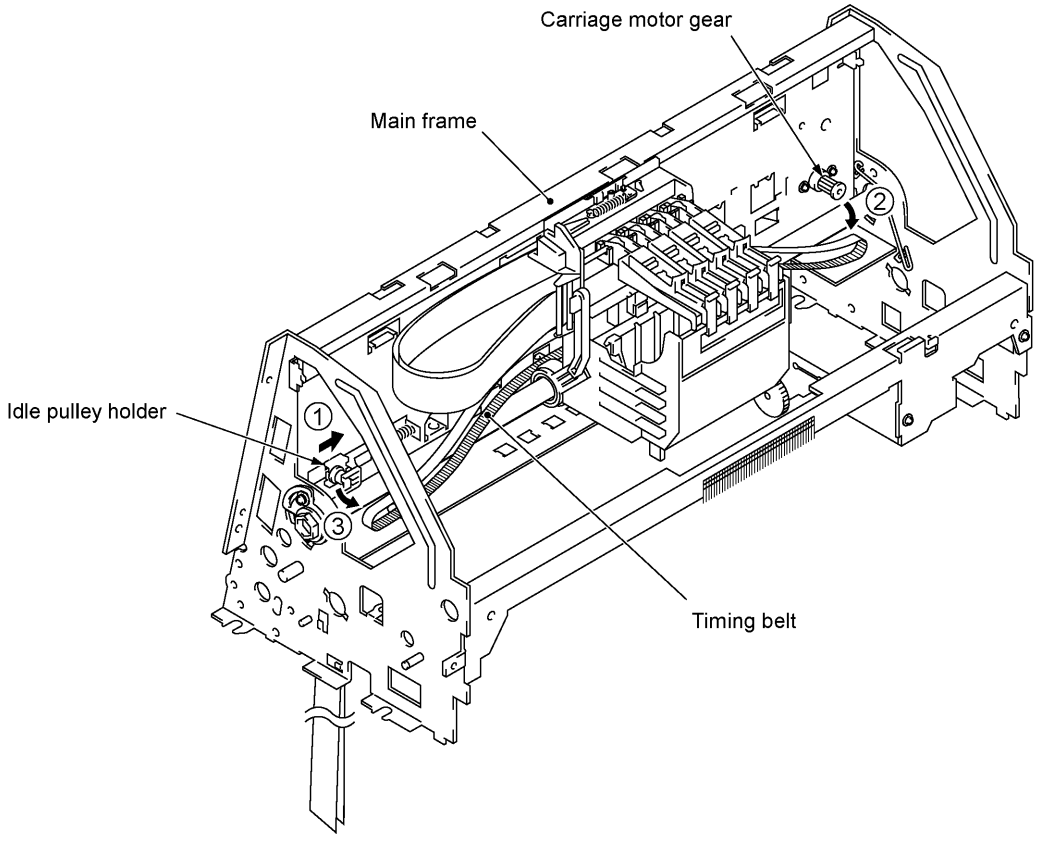
> **Caution** Once removed, the components given in Subsections 1.30 through 1.34 require special adjustment jigs for reassembly. Refer to Section 3, "ADJUSTMENT" in this chapter.

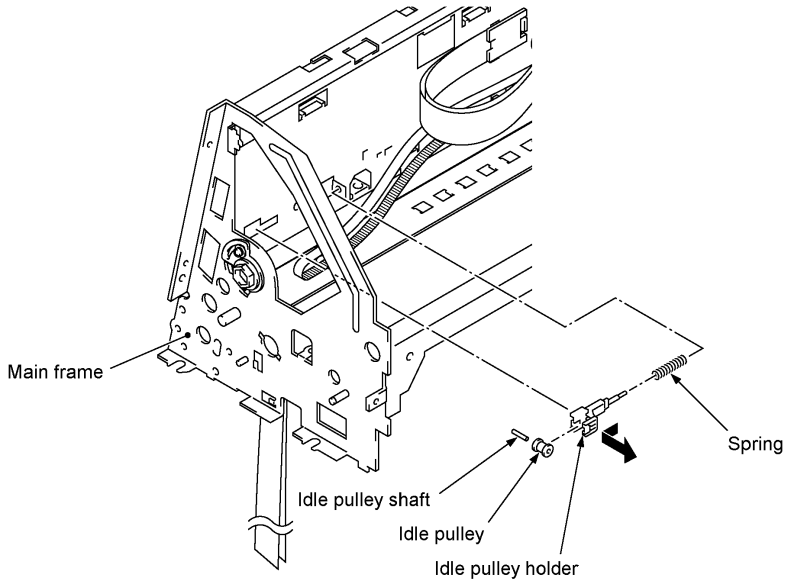
(1) Take off the idle pulley stopper by removing the screw.



(2) While pushing the idle pulley holder to the right (in the direction of arrow •), remove the timing belt from the carriage motor gear (arrow ❟). Then remove the timing belt from the idle pulley holder (arrow ƒ) and take off the idle pulley holder from the main frame.

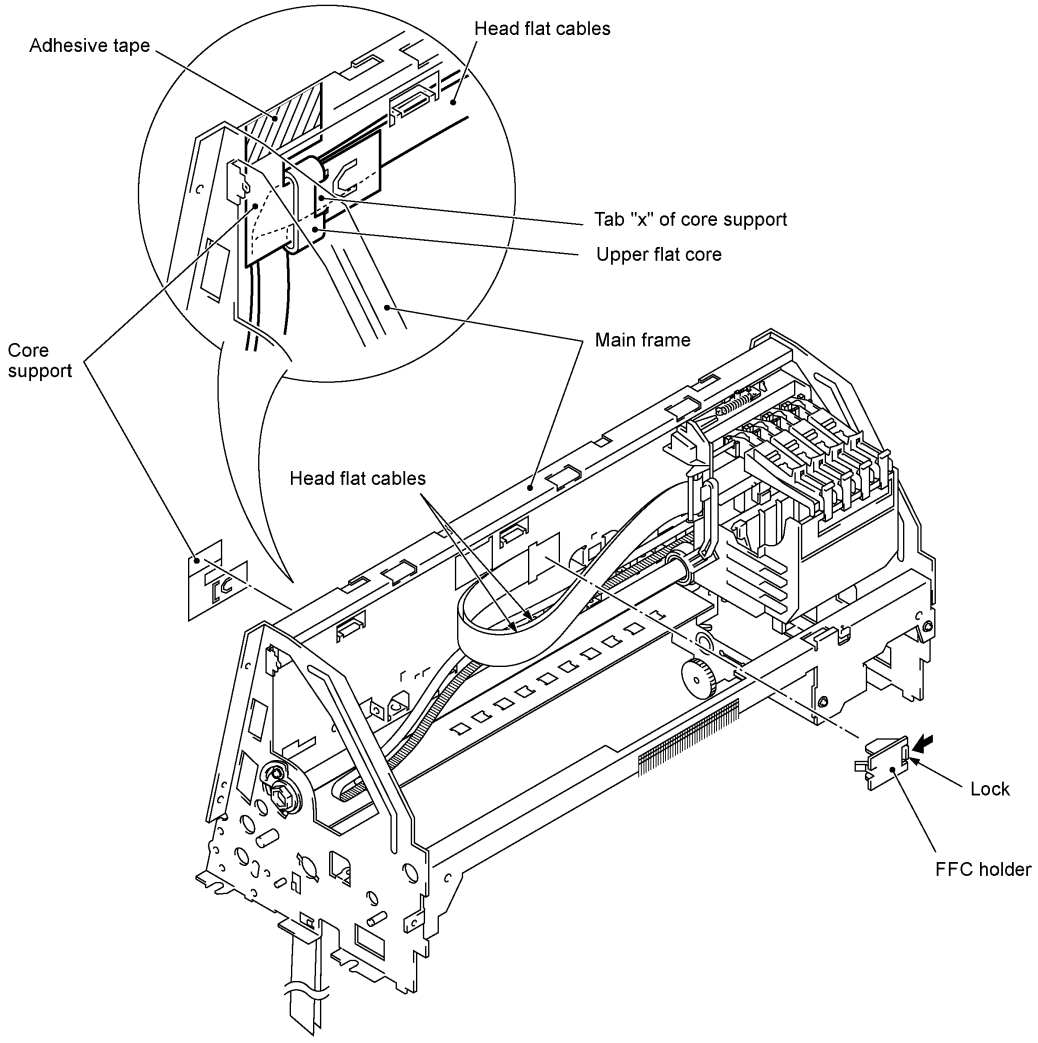
On the idle pulley holder are the idle pulley, idle pulley shaft, and spring as shown on the next page.





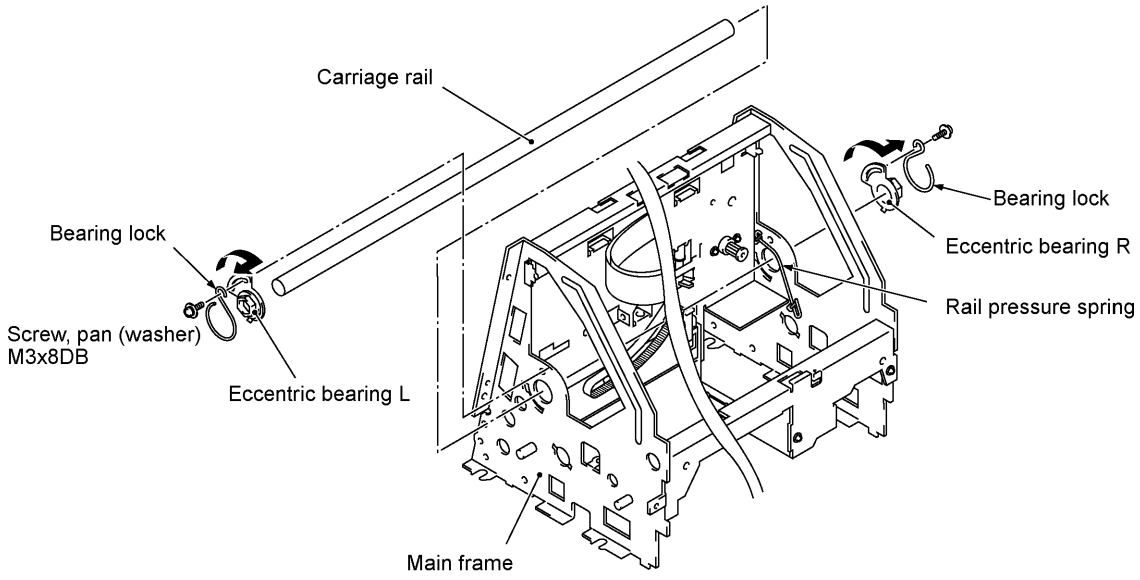
(3) Unhook the lock of the FFC holder and remove the holder by pushing it from the rear. This releases the head flat cables.

(4) Take off the upper flat core and the head flat cables from the core support. Then remove the core support.



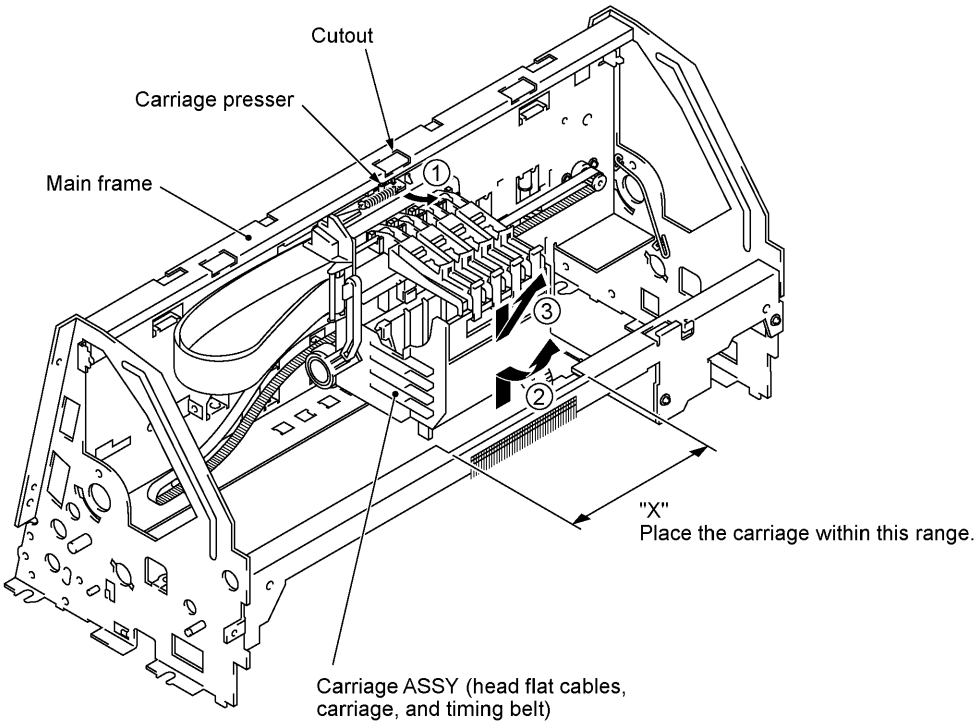
(5) Make sure that the ink cartridges and print head have been removed.

(6) Remove the screw from the eccentric bearing L and take off the bearing lock. Then turn the bearing clockwise (when viewed from the left) until its pawl becomes aligned with the cutout provided in the main frame, and then pull out the bearing L and carriage rail. In the same way, remove the eccentric bearing R.

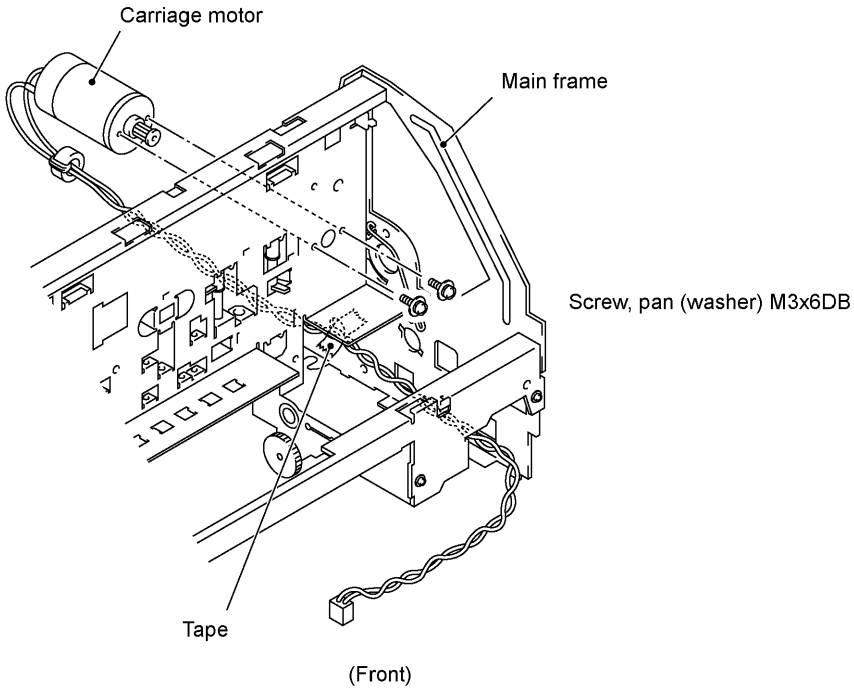


(7) Bring the carriage to the center of the travel ("X" range shown below).

(8) First pull the carriage presser to the front, lift up the carriage to take off the lower edge from the main frame, and take out the carriage ASSY (the head flat cables, carriage, and timing belt).



(9) Remove the two screws and tape, then take off the carriage motor.



n Reassembling Notes

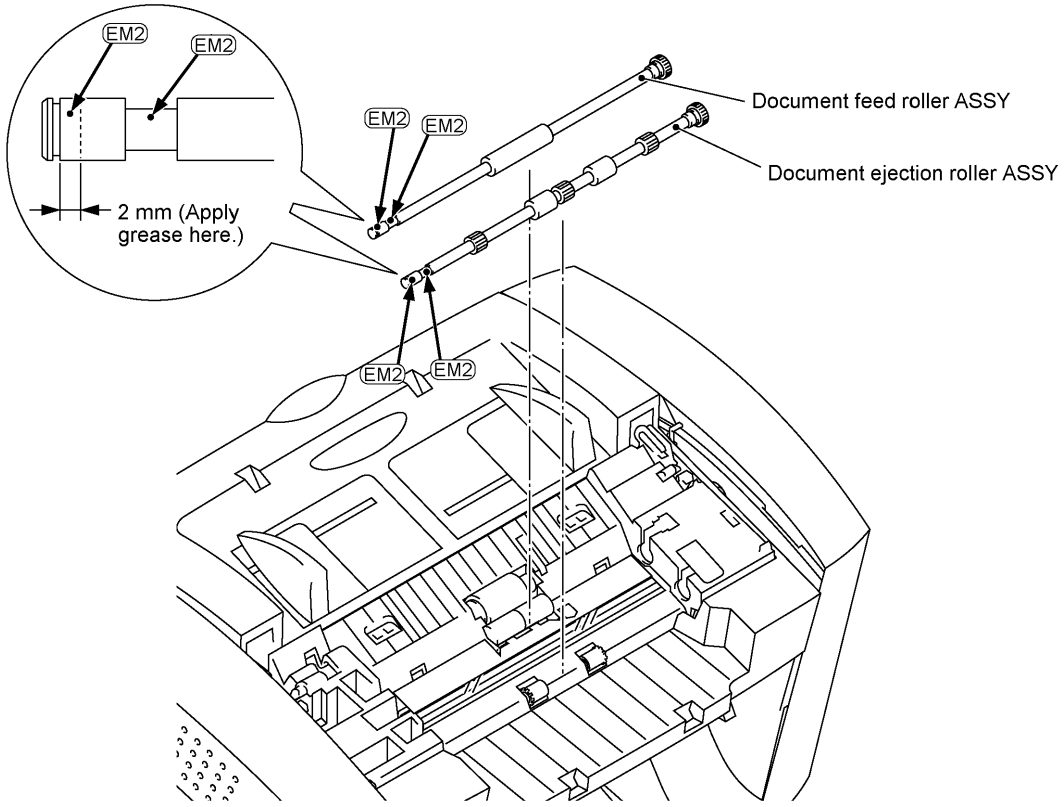
- When installing the carriage rail, loosen the screw on the eccentric bearing R to adjust its position.
- If you replace the carriage ASSY, be sure to set the sensing reference levels of the black ink empty sensor (function code: 57). (Refer to Chapter V, Subsection 3.10.)
- When routing the head flat cables, hook the upper flat core on the core support attached to the back of the main frame and make tab "x" of the core support catch the upper flat core as shown on page IV-74. Next, tape the lower flat core onto the bottom of the lower cover as shown on page IV-61.

2. LUBRICATION

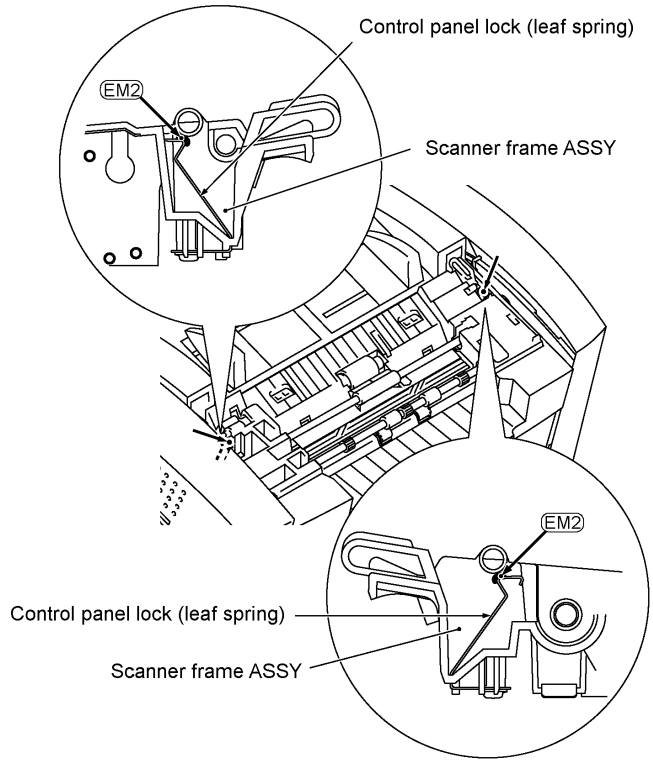
Apply the following lubricants to the lubrication points as illustrated below.

Lubricant type (Manufacturer)	Lubricant amount				
	Thin coat of grease with brush (1 mm^3)	Half of a rice-sized pinch of grease (3 mm^3)	Rice-sized pinch of grease (6 mm^3)	Bean-sized pinch of grease (12 mm^3)	Approx. 20 mm^3
Molykote EM-30LG or -30L (Dow Corning)	———	(EM0.5)	(EM1)	(EM2)	———
Silicone grease G501 (Shin-etsu Silicone)	(G0.2)	———	(G1)	———	———
Conductive grease FLOIL 946P (Kanto Kasei Ltd.)	(GE0.2)	———	———	———	(GE3)

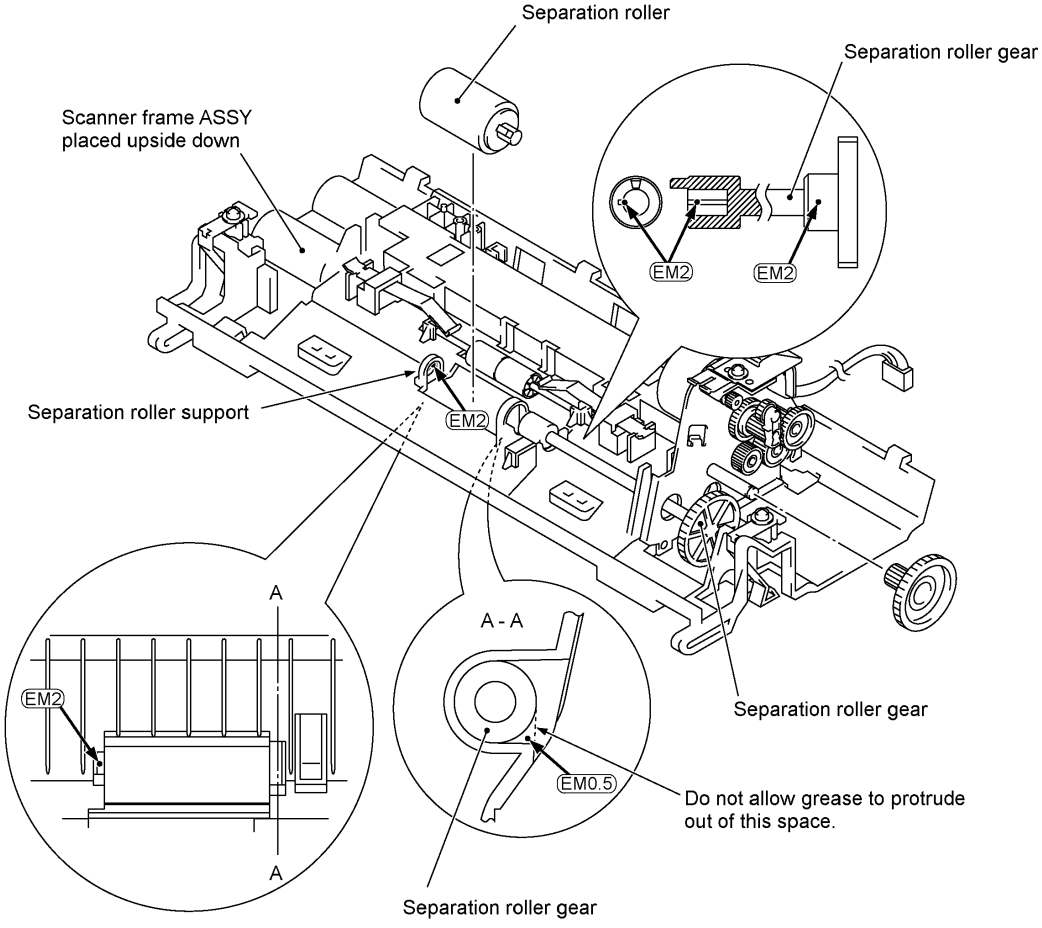
[1] Document feed roller ASSY and document ejection roller ASSY



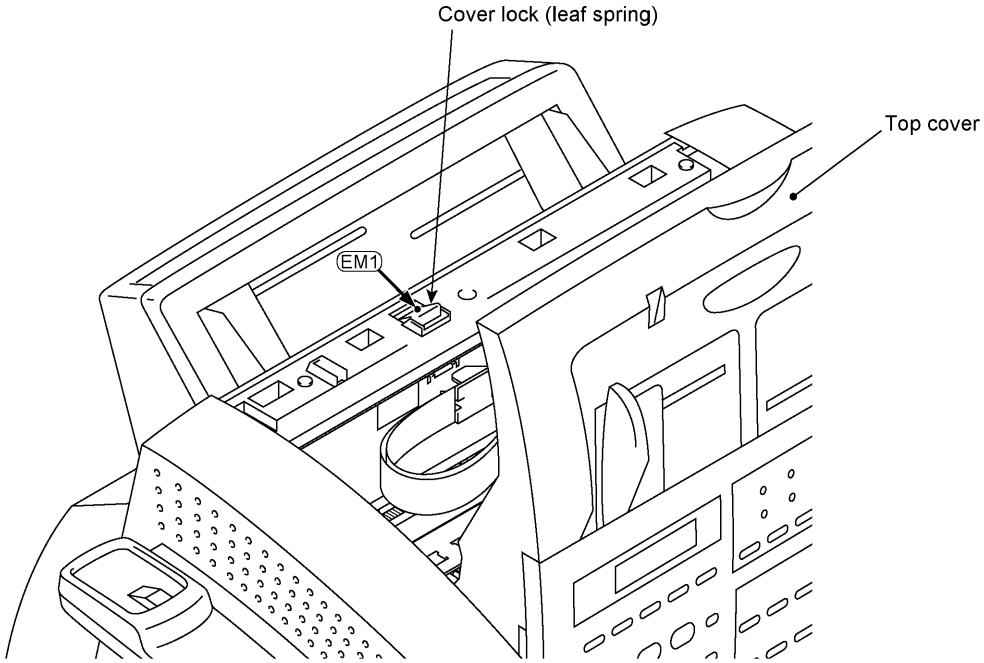
[2] Control panel locks



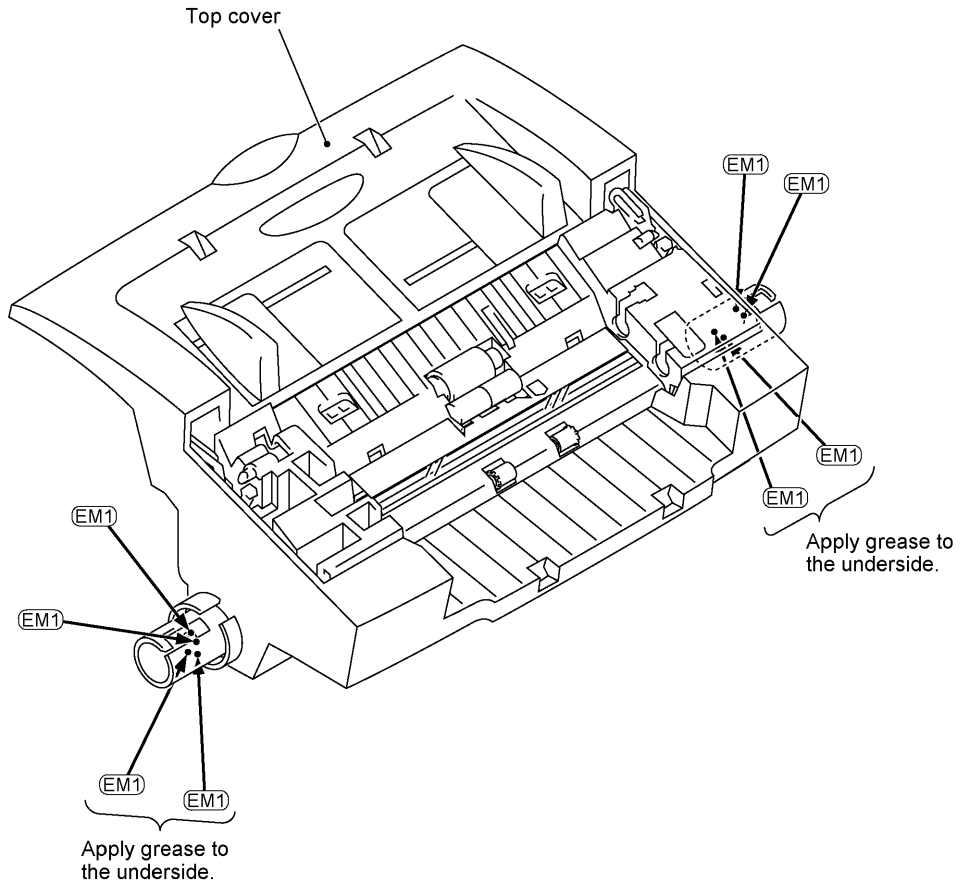
[3] Scanner frame ASSY and separation roller gear



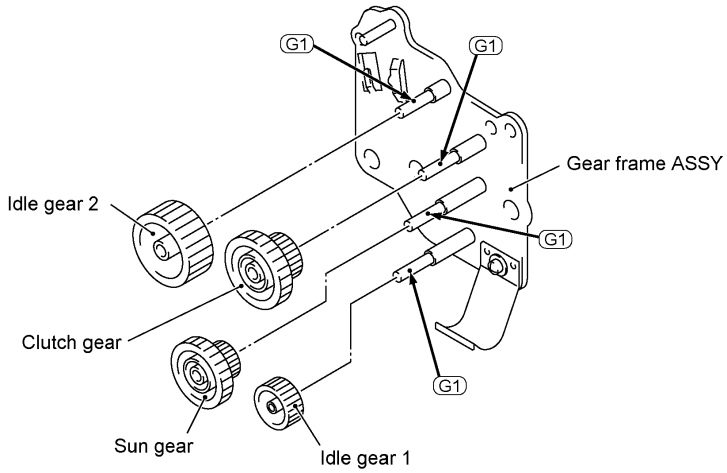
[4] Cover lock (leaf spring)



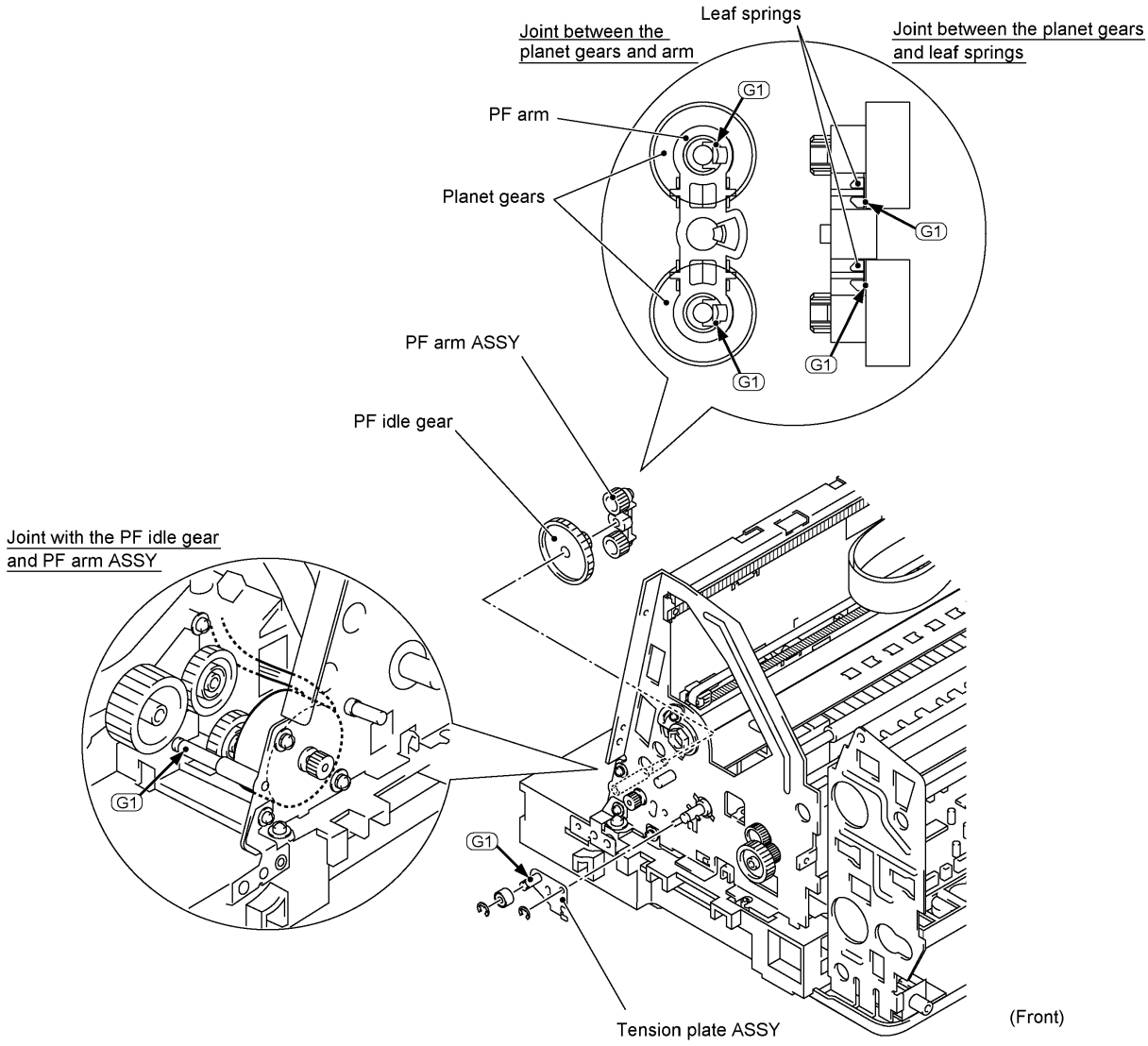
[5] Top cover



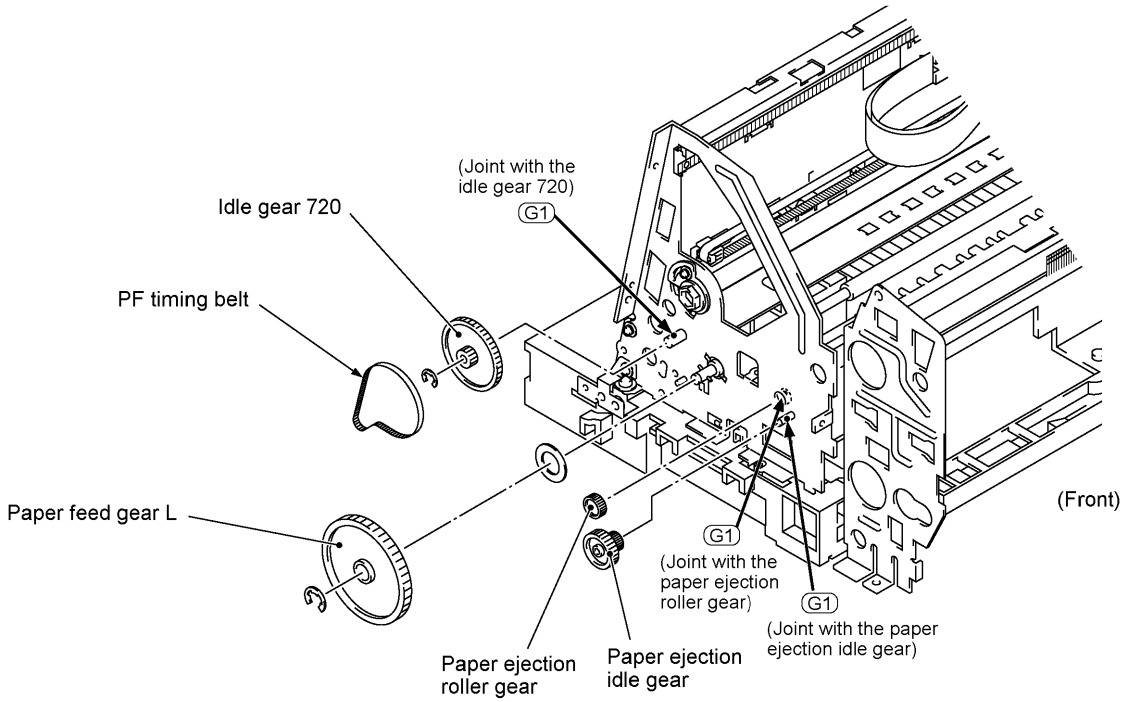
[6] Gear frame ASSY



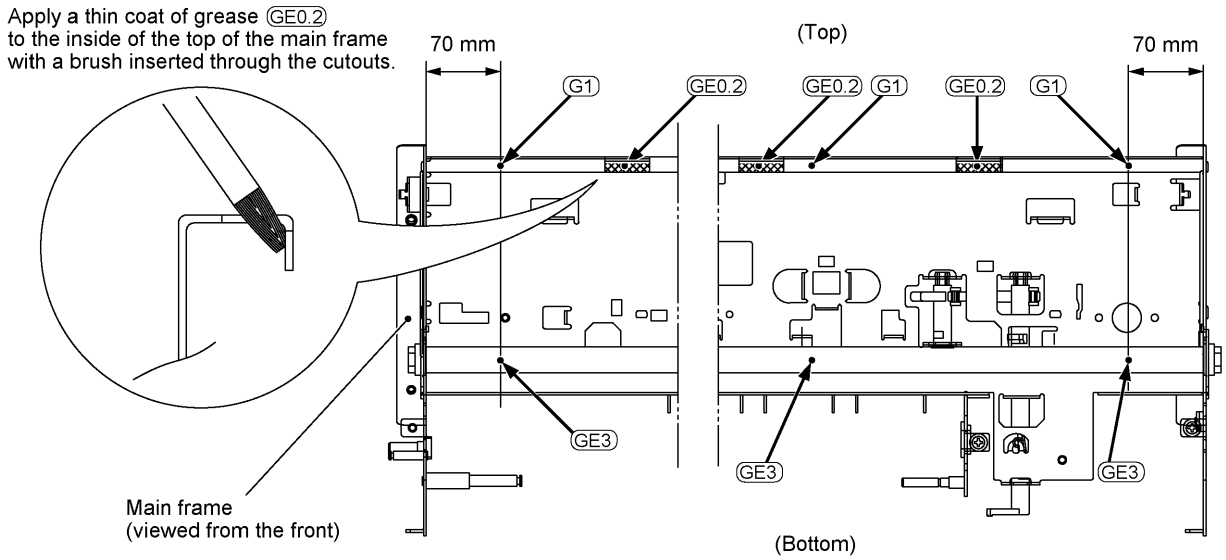
[7] PF arm ASSY and tension plate ASSY



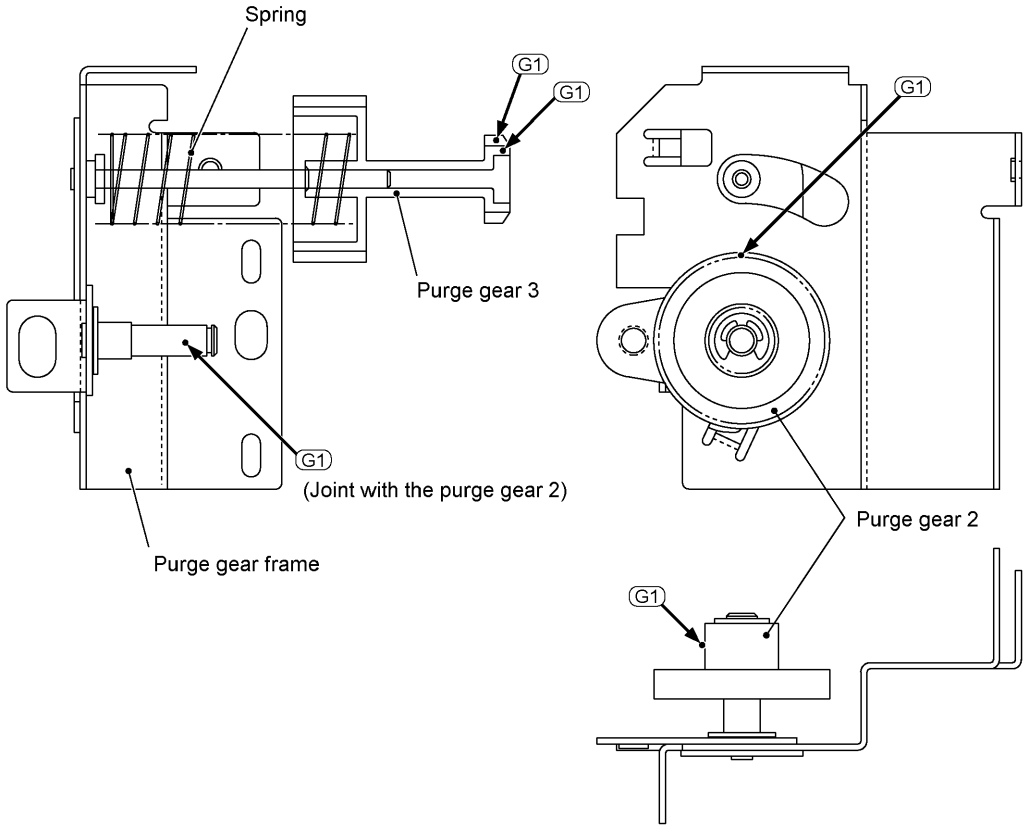
[8] Shafts on the left side of the main frame



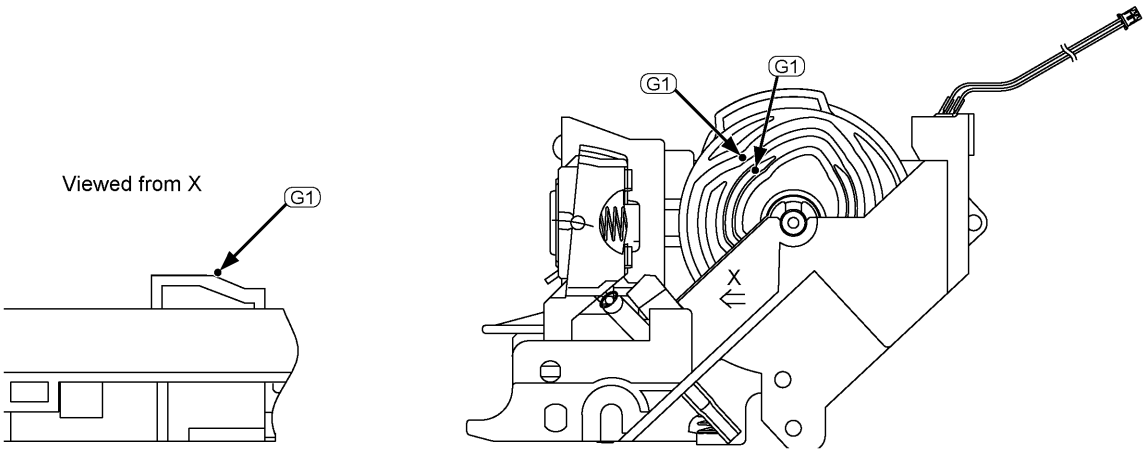
[9] Main frame



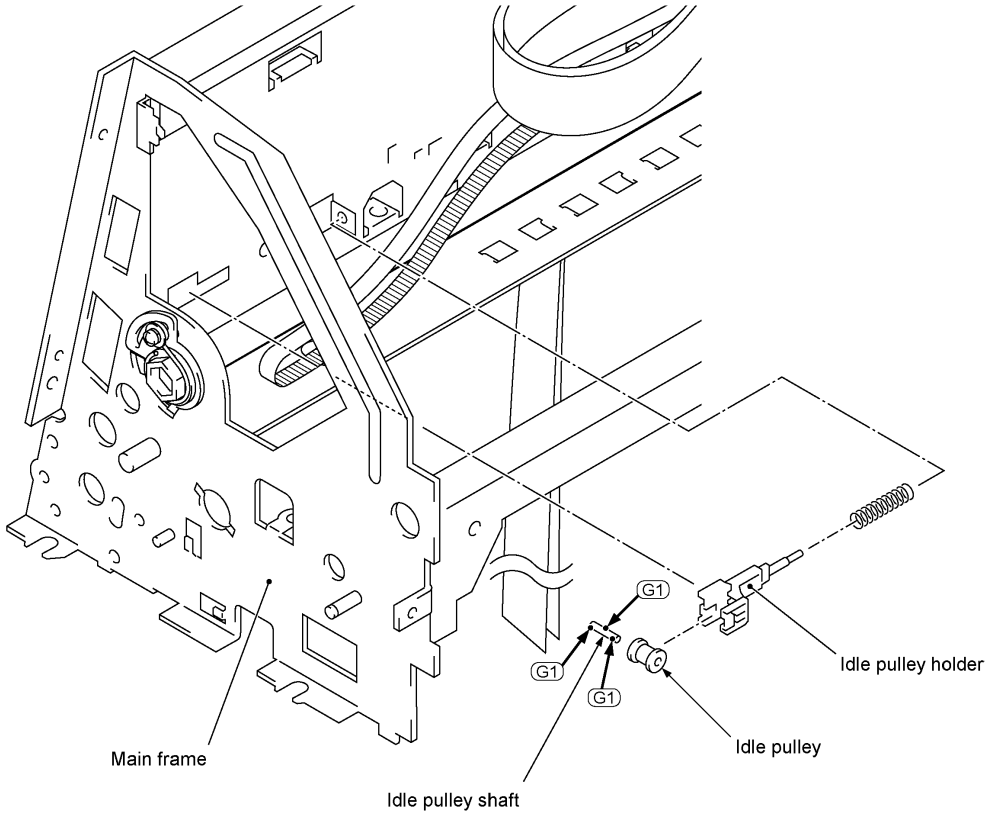
[10] Purge gear frame



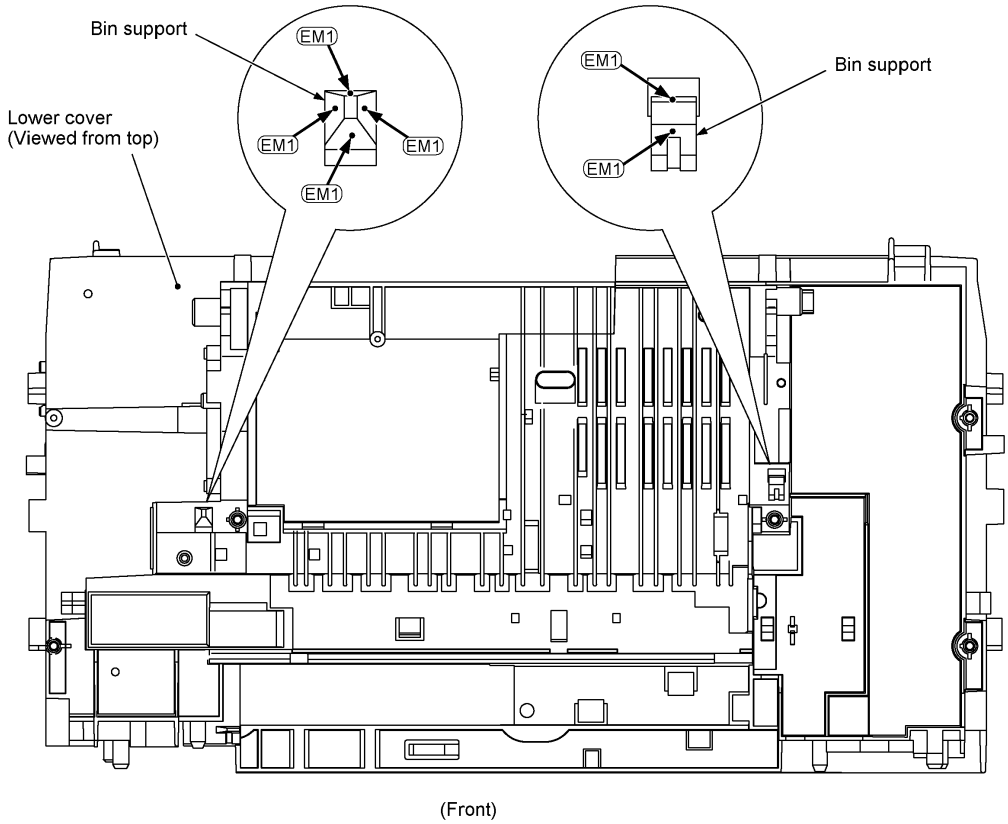
[11] Purge unit



[12] Idle pulley holder



[13] Lower cover



3. ADJUSTMENT

The adjustment jobs should be done on a flat, plain surface.

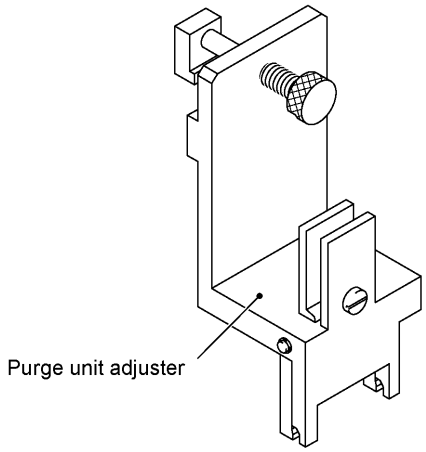
3.1 Purge Unit Front-to-rear Adjustment

If you have removed the purge unit, you need to adjust the position of the purge unit relative to the carriage rail by using the purge unit adjuster.

If you have removed also the carriage rail or carriage ASSY, first adjust the head-platen gap (see Section 3.2) and then proceed to this purge unit adjustment.

Purge unit adjuster

The purge unit adjuster is shown below.

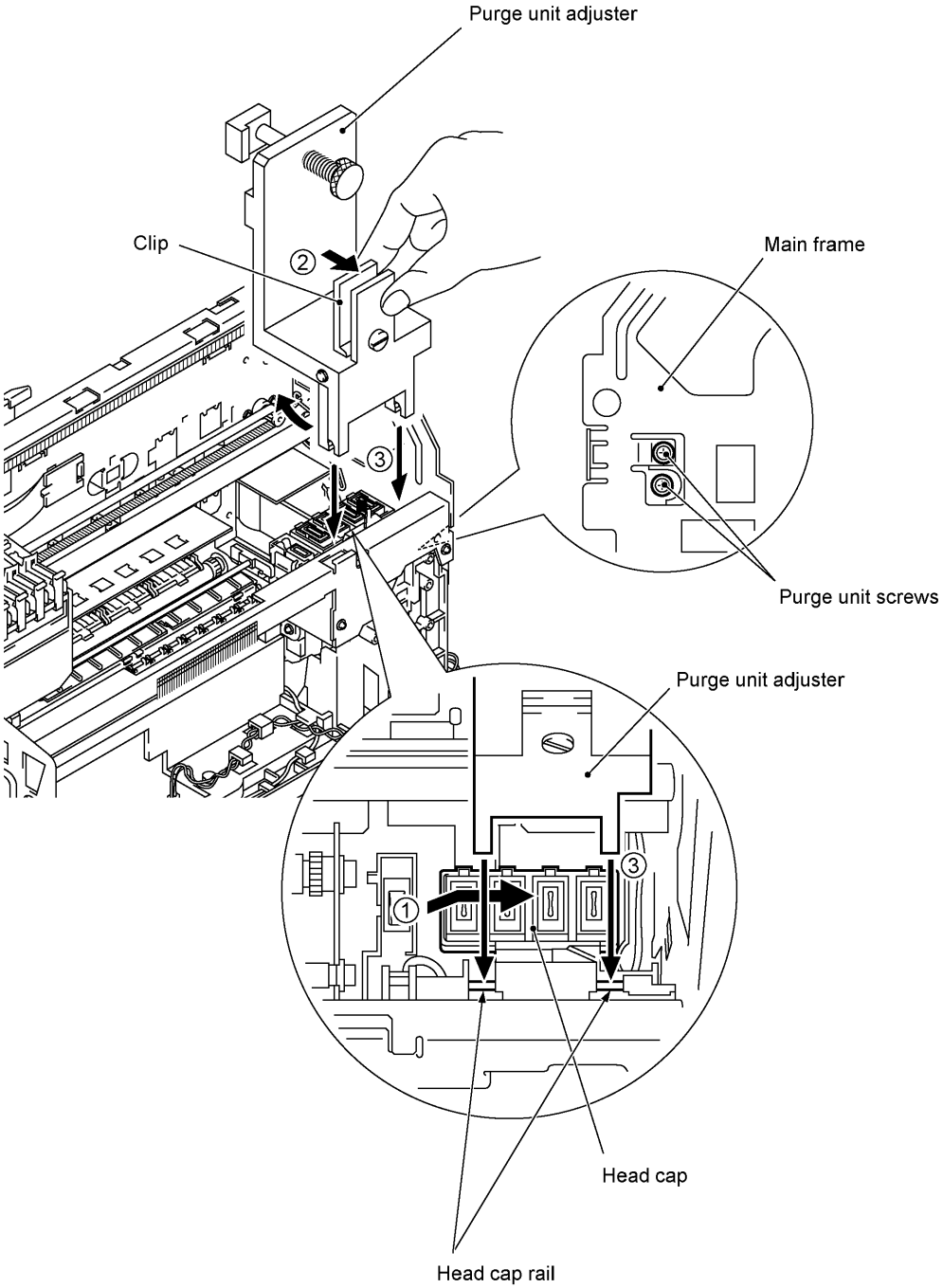


Adjustment procedure

(1) Move the carriage to the left end of the carriage rail.

(2) Put the removed purge unit back into place, and then temporarily tighten the two screws at the right side.

(3) Slightly move the head cap to the right with a flat screwdriver (in the direction of arrow •) so that the head cap rail can be seen as illustrated below, pinch the upper end of the clip (arrow ❟) to open its lower end, and make the clip catch the head cap rail (arrow ƒ).



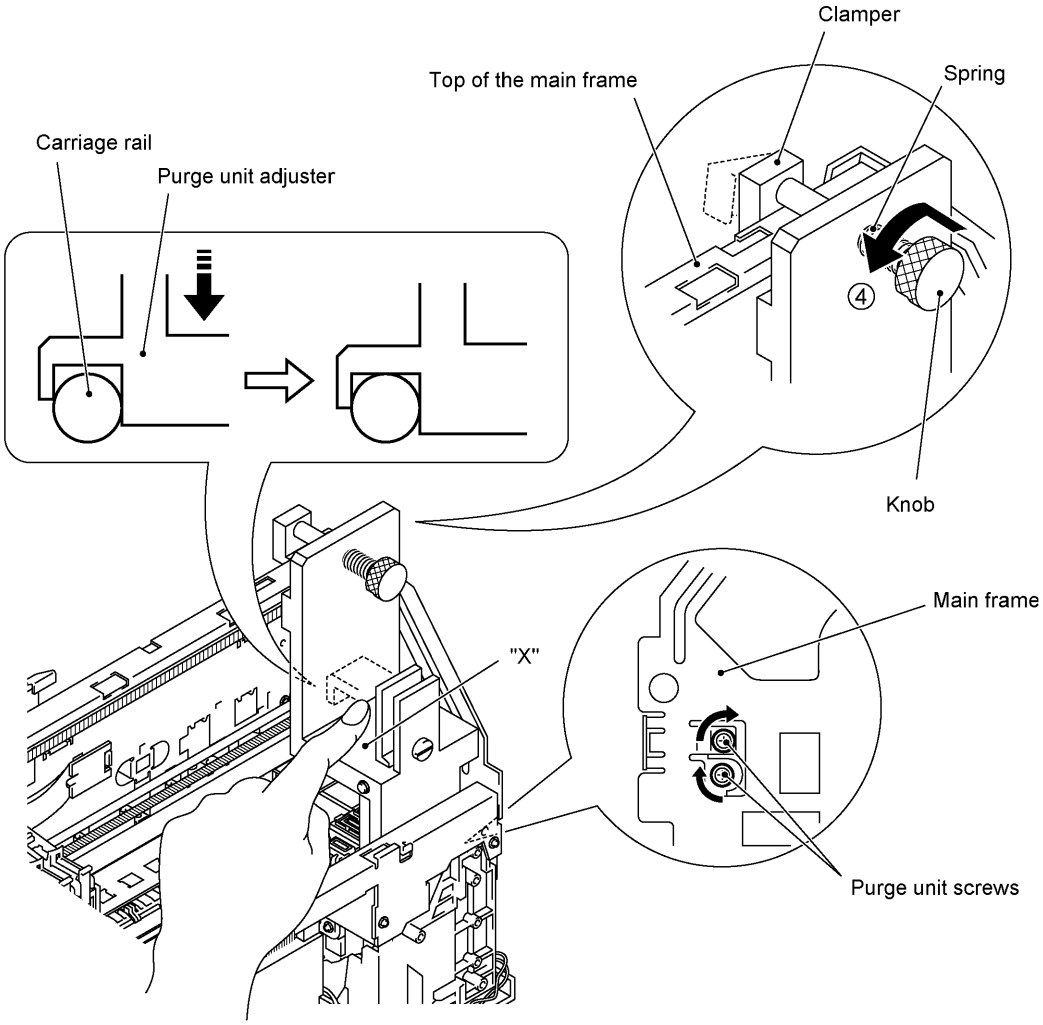
(4) Fit the purge unit adjuster over the carriage rail as shown below.

NOTE: Take care not to scratch or damage the carriage rail.

(5) While pressing the knob to the rear, turn it counterclockwise (in the direction of arrow „) in order to clamp the purge unit adjuster to the top of the main frame.

(6) While pushing down the purge unit adjuster at section "X," fully tighten the purge unit screws.

(7) Remove the purge unit adjuster.



3.2 Head-platen Gap Adjustment

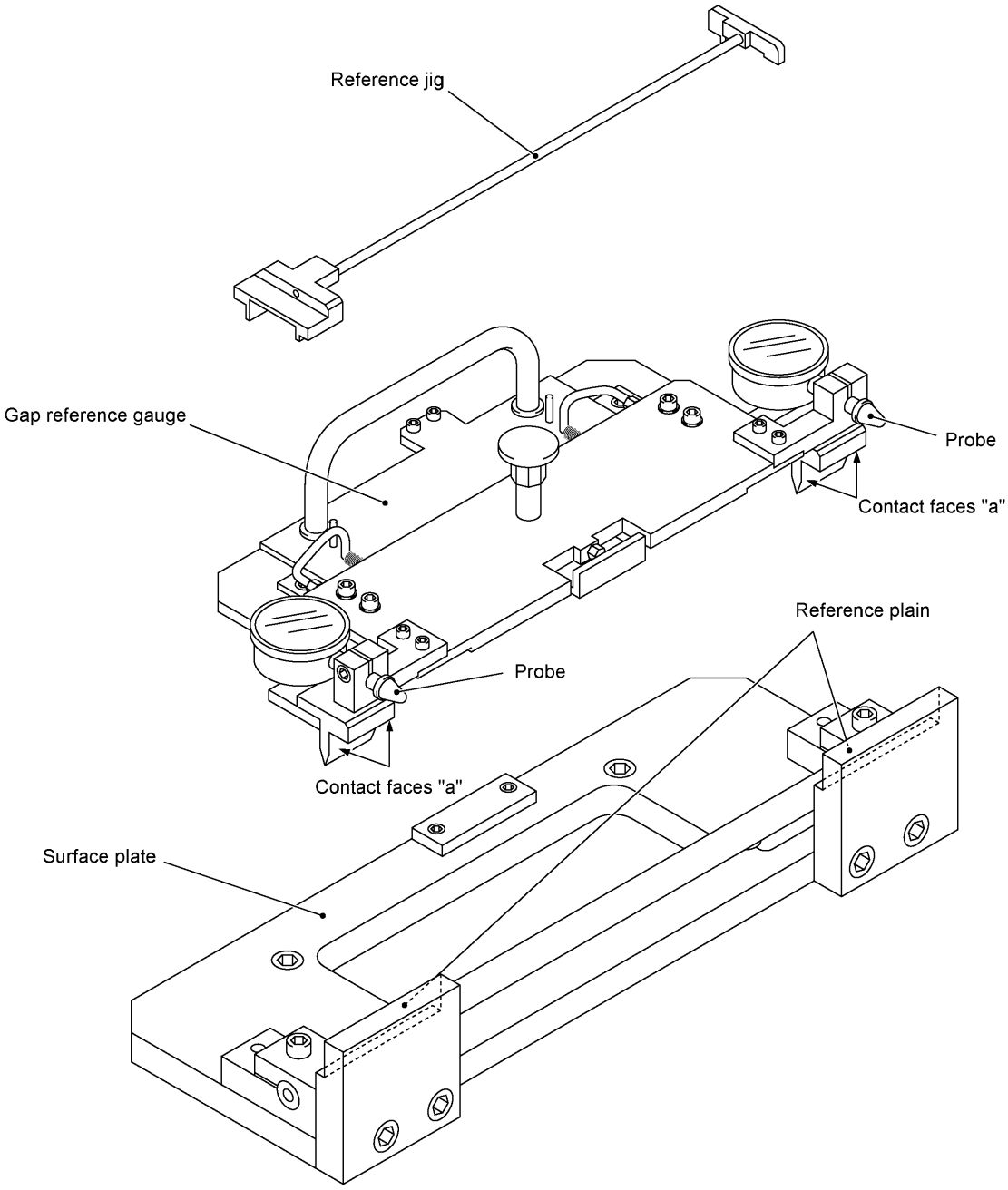
If you have removed the carriage rail or carriage ASSY, you need to adjust the gap between the print head and the platen by using the gap adjustment jig.

Gap adjustment jig

The gap adjustment jig consists of the reference jig, gap reference gauge and surface plate as illustrated below.

NOTE: Do not touch the reference plain or the ends of the probes.

NOTE: Take care not to stain or scratch contact faces "a" (that are to be fitted to the carriage rail) of the gap reference gauge.



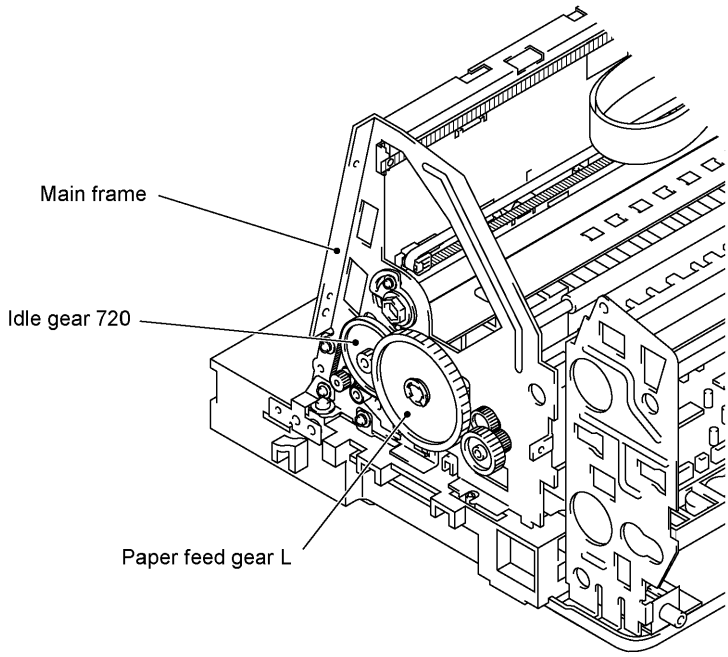
Adjustment procedure

(1) Place the facsimile equipment on a flat, firm surface.

(2) Secure the carriage rail and carriage ASSY to the main frame.

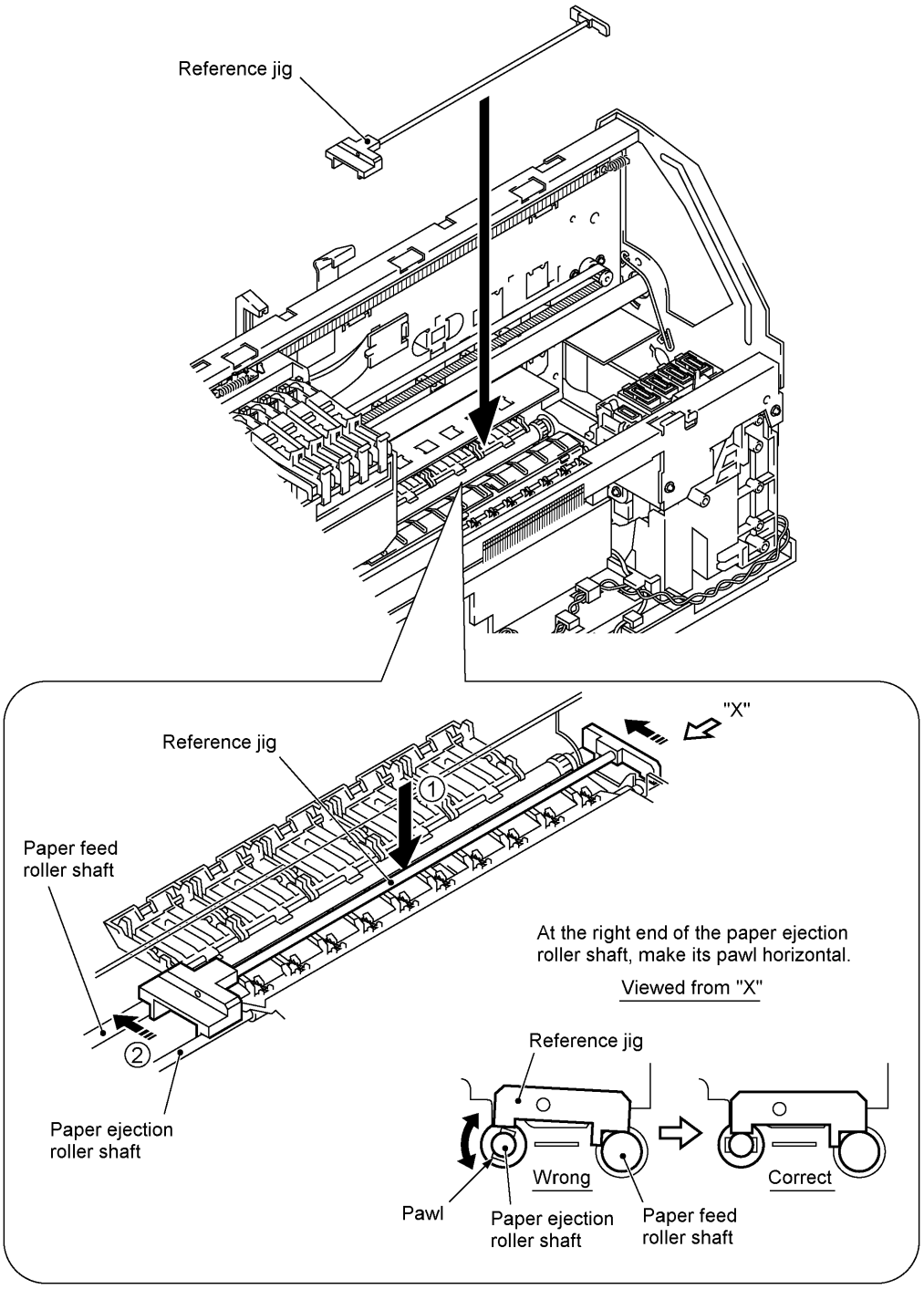
(3) Move the carriage to the left end of its travel.

NOTE: If the carriage is locked in the home position, rotate the idle gear 720 at the left side of the main frame to retract the carriage lock.



(4) At the right end of the paper ejection roller shaft, check that the pawl is in a horizontal position as illustrated on the next page. If not horizontal, turn the paper ejection roller to make the pawl horizontal.

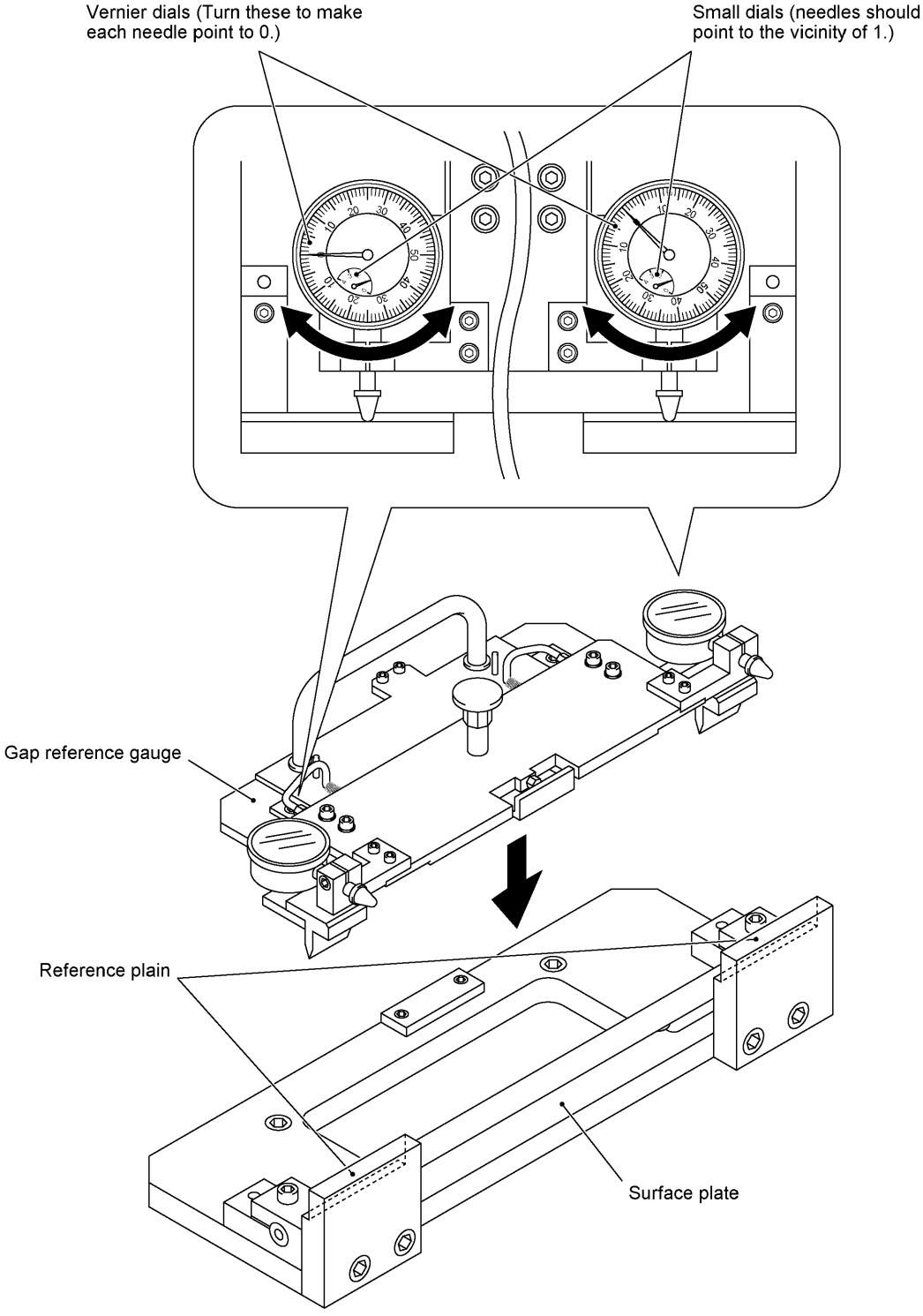
(5) Put the reference jig on the paper ejection roller shaft and paper feed roller shaft (in the direction of arrow •). Then push it to the rear (arrow ,).


Reference jig
"X"
Reference jig
①
Paper feed roller shaft
②
Paper ejection roller shaft
At the right end of the paper ejection roller shaft, make its pawl horizontal.
Viewed from "X"
Reference jig
Wrong
Correct
Pawl
Paper ejection roller shaft
Paper feed roller shaft

(6) Put the gap reference gauge on the surface plate.

Check the small dials to see that each needle points to the vicinity of 1. If either of the needles deviates significantly from 1, turn the corresponding vernier dial. One turn of the vernier dial rotates the needle of the small dial by one graduation.

Press the gap reference gauge against the reference plain of the surface plate and then turn the two vernier dials to make each needle point to zero (0).

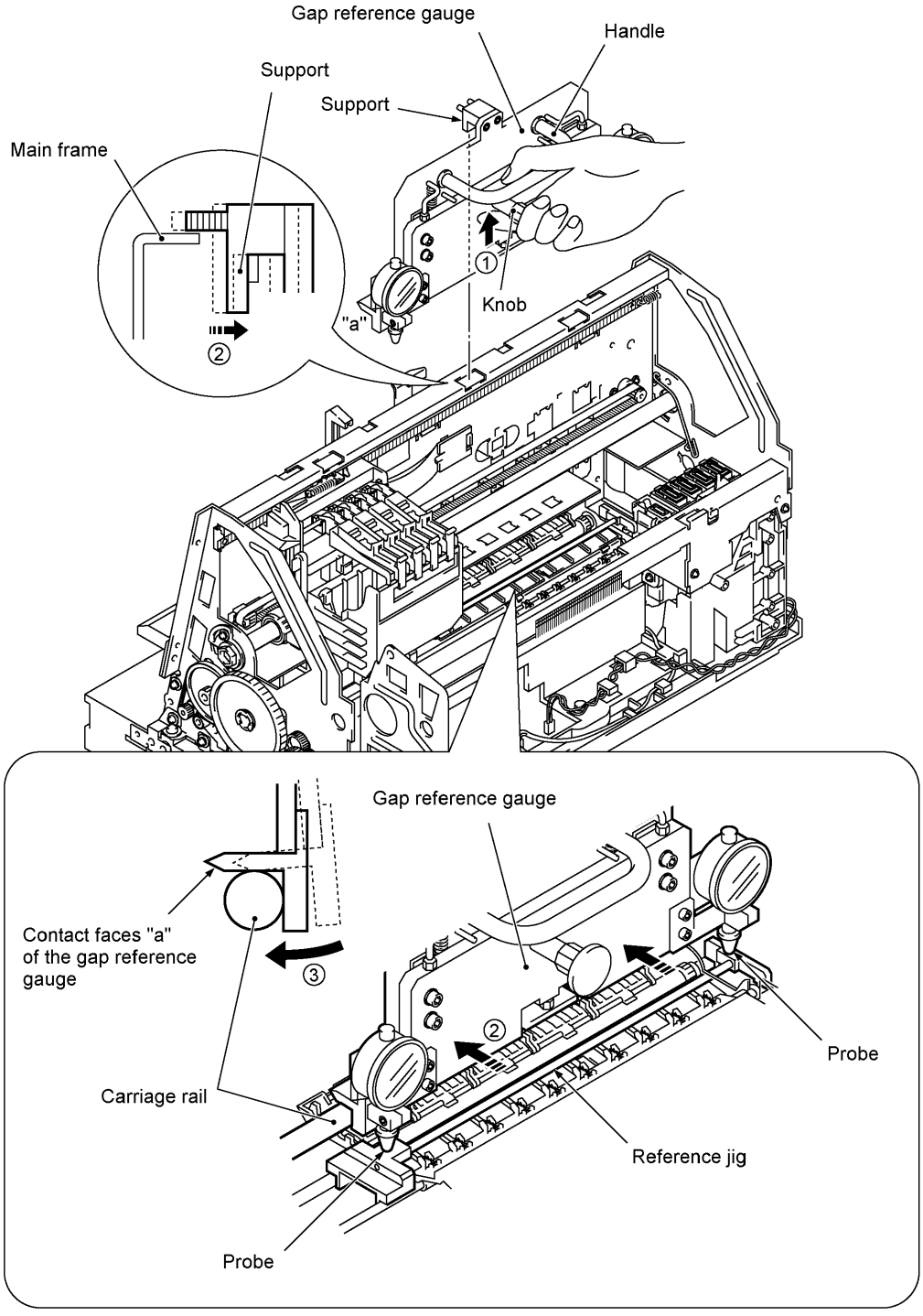


(7) Gently take off the gap reference gauge from the surface plate and hold the handle as shown below.

(8) While pulling up the knob (in the direction of arrow •) to prevent the probes from striking against facsimile components, first slightly tilt the gap reference gauge to the rear, hook its support in the cutout provided in the main frame, bring the probes into contact with the reference jig preset in step (5) and then tilt it towards you (arrow ❟).

If the head-platen gap is correct, those probes will be in contact with the reference jig so that the needles of the small dials will point to the vicinity of 1 and those of the vernier dials will point to zero.

If the needles point to any other values, proceed to the following steps to adjust the gap.

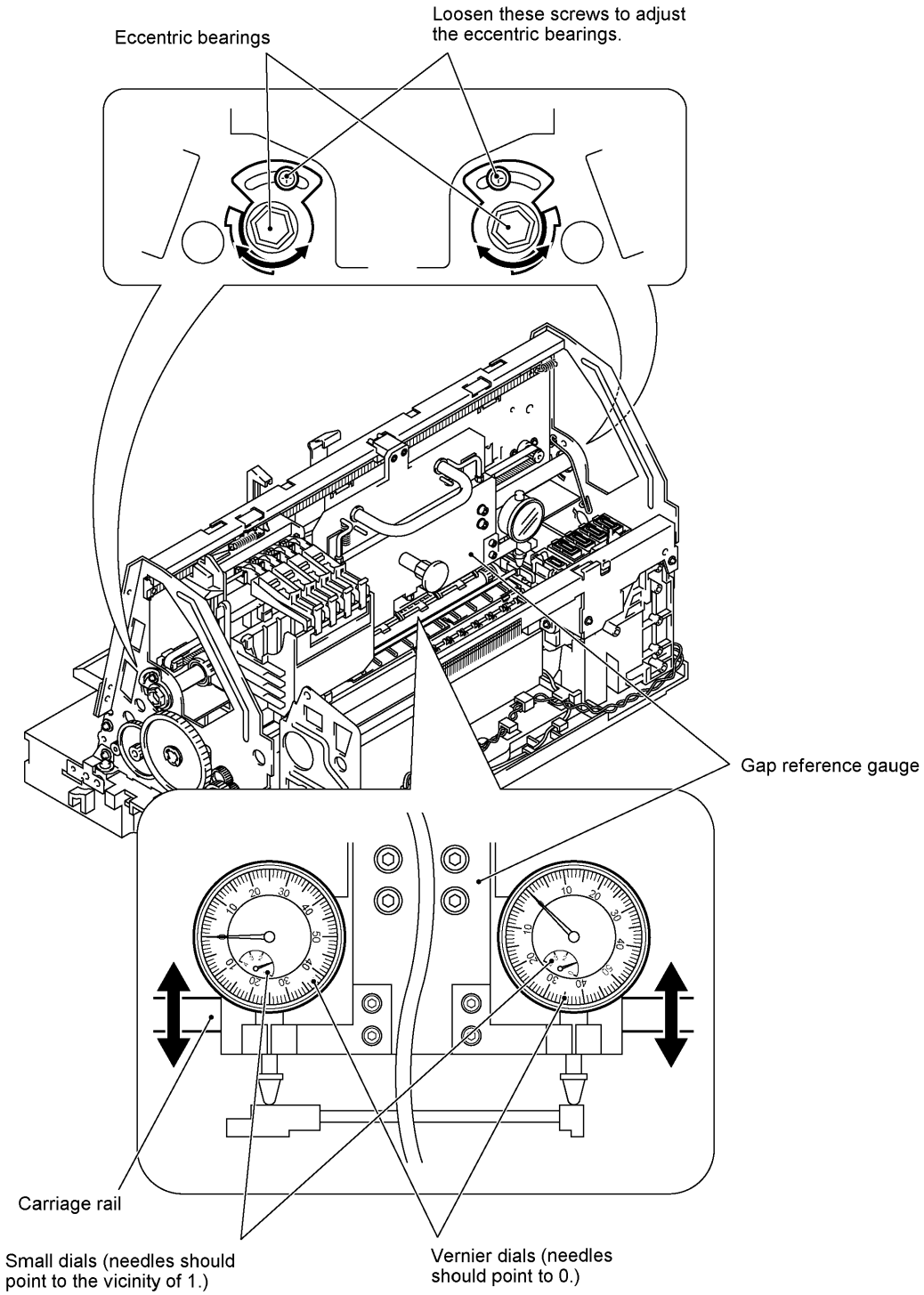


(9) Loosen the screws on the eccentric bearings (R) and (L), and then turn those bearings so that the needles of the small dials point to the vicinity of 1 and those of the vernier dials point to zero.

(10) Tighten the screws on the eccentric bearings.

After tightening these screws, the needles of the vernier dials may be deflected from zero. Deflection within ±0.03 is negligible.

(11) Remove the gap reference gauge and reference jig.



CHAPTER V.

MAINTENANCE MODE

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3.2 Printout of Scanning Compensation Data V-5
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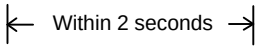
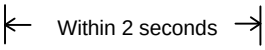
1. ENTRY INTO THE MAINTENANCE MODE

MFC7150C/MFC7160C: To make the facsimile equipment enter the maintenance mode, press the **Function**, *****, **2**, **8**, **6**, and **4** keys in this order.



MFC-740: To make the facsimile equipment enter the maintenance mode, press the **Menu**, *****, **2**, **8**, **6**, and **4** keys in this order.



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

To select one of the maintenance-mode functions listed in Section 2, enter the corresponding 2-digit function code with the numerical keys on the control panel. (The details of each maintenance-mode function are described in Section 3.)

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

2. LIST OF MAINTENANCE-MODE FUNCTIONS

Maintenance-mode Functions

Function Code	Function	Reference Subsection (Page)
01	EEPROM Parameter Initialization	3.1 (V-4)
02	————	————
03	————	————
04	————	————
05	Printout of Scanning Compensation Data	3.2 (V-5)
06	————	————
07	————	————
08	ADF* Performance Test	3.3 (V-7)
09	Test Pattern 1	3.4 (V-8)
10	Firmware Switch Setting	3.5 (V-9)
11	Printout of Firmware Switch Data	3.5 (V-50)
12	Operational Check of LCD	3.6 (V-51)
13	Operational Check of Control Panel PCB (Check of Keys and Buttons)	3.7 (V-51)
32	Sensor Operational Check	3.8 (V-53)
55	CIS Scanner Area Setting	3.9 (V-54)
57	Setting the Sensing Reference Levels of Black Ink Empty Sensor	3.10 (V-55)
65	Alignment of Vertical Print Lines	3.11 (V-57)
69	Initial Adjustment of PWM Value (Aging of the carriage)	3.12 (V-59)
74	EEPROM Customizing	3.13 (V-59)
82	Equipment Error Code Indication	3.14 (V-60)
87	Output of Transmission Log to the Telephone Line	3.15 (V-60)
91	EEPROM Parameter Initialization (except the telephone number storage area)	3.1 (V-4)
99	Exit from the Maintenance Mode	---- (V-1)

* ADF: Automatic document feeder

- **IMPORTANT** -

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

The user-accessible functions (codes 10, 11, 12, 82, 87 and 91) are shaded in the table given on the previous page. Function code 10 accesses the firmware switches WSW01 to WSW36, each of which has eight selectors. You should not allow end users to access all of those selectors, but you may allow them to access user-accessible selectors which are shaded in the firmware switch tables in Subsection 3.5.

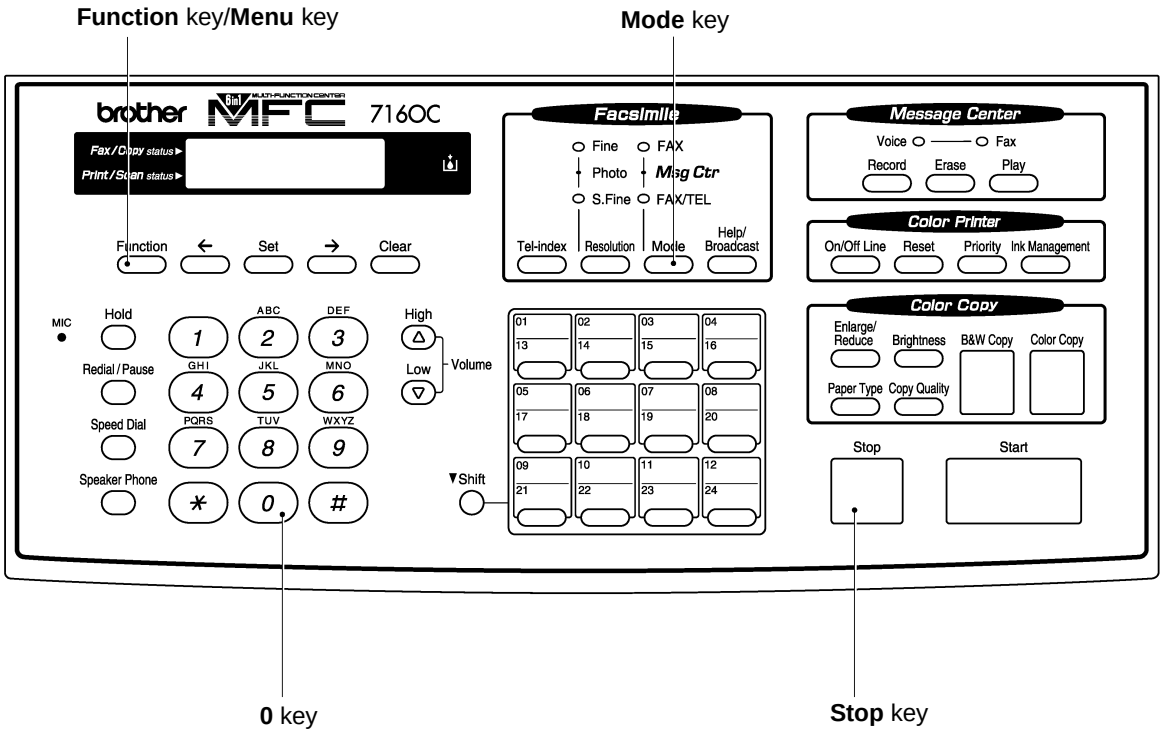
The service personnel should instruct end users to follow the procedure given below.

(1) MFC7150C/MFC7160C: Press the **Function** and **Mode** keys in this order.
MFC-740: Press the **Menu** and **Mode** keys in this order.
The LCD clears the current display.
NOTE: The **Mode** key is inoperable during standby for redialing and timer.

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

(3) Enter the desired function code (10, 11, 12, 82, 87, or 91) with the numerical keys.
For function code 10, access the desired firmware switch according to the operating procedure described in Subsection 3.5.

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



3. DETAILED DESCRIPTION OF MAINTENANCE-MODE FUNCTIONS

3.1 EEPROM Parameter Initialization

n Function

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

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

NOTE: If you replace the main PCB with one used for other facsimile equipment, carry out this procedure and then customize the EEPROM (maintenance-mode function code 74 in Section 3.13).

n Operating Procedure

(1) Press the **0** and **1** keys (or the **9** and **1** keys according to your need) in this order in the initial stage of the maintenance mode.

The "PARAMETER INIT" will appear on the LCD.

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

3.2 Printout of Scanning Compensation Data

n Function

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

n Operating Procedure

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

(1) Press the **0** and **5** keys in this order in the initial stage of the maintenance mode.

The "WHITE LEVEL 1" will appear on the LCD.

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

a) White level data for red image (310 bytes)
b) White level data for green image (310 bytes)
c) White level data for blue image (310 bytes)
d) Black level data (310 bytes)
e) LED light intensity value for red image (2 bytes)
f) LED light intensity value for green image (2 bytes)
g) LED light intensity value for blue image (2 bytes)
h) LED light intensity value for monochrome image (1 byte)
i) A/D reference value (1 byte)

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

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

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

```
7000 : D1 CC CA CC C5 C5 BE C5  C6 C1 C7 C6 C7 C9 CD CA
7010 : C9 C2 C0 C1 C1 C3 B6 B9  BD BC BE BE BE C4 C5 C8
7020 : C4 BA BA C2 BE B9 B0 B6  BE BB BB BB B9 BB BC B8
7030 : B1 B0 AE AC AB A8 AD AF  B3 B1 B2 B2 B2 B5 B3 B0
7040 : B8 B6 B3 B2 AF B3 B3 CB  CB CF CE CB CF D2 D3 D1
7050 : CC C9 C7 C6 C5 C4 C5 D3  D2 D3 D3 D3 D5 DA DC D8
7060 : DA D4 D1 D1 D2 D0 D2 CB  D2 D0 BD 3B 35 35 35 33
7070 : 32 30 2E 2F 2A 2B 14 18  19 19 1A 18 18 1C 1B 1D
7080 : 19 1A 19 17 14 13 14 23  24 27 26 2A 2B 28 29 2A
7090 : 27 26 25 21 21 20 21 31  34 37 35 37 37 38 3B 3A
70A0 : 38 37 36 33 33 2F 29 26  2C 32 2E 32 2E 2F 30 30
70B0 : 2E 2D 29 2A 29 29 1E 1A  1B 1D 20 1F 1E 1F 22 1F
70C0 : 1E 1C 1C 1C 19 18 17 32  36 3B 3D 46 CC D7 D6 D6
70D0 : D1 CB C5 CA C8 C5 BB B6  B9 B4 B8 B7 B6 B6 B9 B5
70E0 : B3 B5 B2 B2 AC B1 B8 B9  BD BE C0 C5 C4 C5 C9 CA
70F0 : C7 C1 BE BD B9 B8 BA DB  DF DE DB E1 DD E0 E2 EA
7100 : E5 E3 DF E9 F4 F4 DC D5  DF DA D2 C6 C1 BD C2 BD
7110 : B8 B4 AF AF AF B1 AF C7  C9 C9 C9 CC CD CE CF CD
7120 : CB C0 C1 BF BE BE B3 A9  A8 B0 AF B1 B4 B7 C1 C6
7130 : BE B5 AC A2 9E 93

7000 : D4 CF D1 D0 CA C5 BC C3  C5 C4 C7 C6 C6 C9 CF CC
7010 : CC C5 C6 C5 C6 C6 B3 B8  BC BB BE BD C0 C6 C8 CC
7020 : C7 BD C1 C7 C2 BA AE B5  BC BB BD BB BC BC BC BB
7030 : B6 B5 B3 B3 AF AA AB AC  B0 B2 B3 B1 B1 B7 B3 BA
7040 : BD BC B7 B8 B4 B7 B5 CA  CB CF CF CA CF D3 D4 D4
7050 : D0 CC CE CA CA C7 C6 D3  D3 D3 D4 D4 D6 DB DE DB
7060 : DD D9 D8 D7 D8 D4 D5 CC  D1 CD BA 3A 34 34 36 34
7070 : 32 2F 2F 2F 2A 2B 13 18  18 18 1A 18 1A 1C 1B 1C
7080 : 1A 18 18 17 13 13 13 21  24 26 27 29 2B 28 28 28
7090 : 26 25 24 22 22 20 23 32  34 37 35 36 39 37 3C 3A
70A0 : 38 38 35 33 32 2F 28 27  2A 32 2E 31 2E 2F 30 30
70B0 : 2E 2D 2A 2A 29 2A 1C 19  1A 1D 1E 20 1E 1E 23 1E
70C0 : 1C 1C 1D 1B 1B 18 19 31  35 3A 3B 45 D7 E0 E1 E1
70D0 : DD D9 D4 D9 D7 D0 C5 BE  BF BC C1 C2 BF C1 C5 C0
70E0 : BD C3 BF BF BA BB BF BF  C2 C5 C9 CC CB CD D0 D3
70F0 : CF CA C7 C6 C0 BD BE DC  E0 DD DD DE DE E0 E3 EB
7100 : E8 E9 E5 EE F5 F6 DB D6  DE DE D3 CC C9 C6 CA C8
7110 : C7 C5 C2 C3 C3 C4 C2 DC  DA DD DE E1 E0 E1 E2 DF
7120 : DD D6 D3 CE CB C7 B7 AE  AF B2 B2 B4 B4 B7 C2 C6
7130 : BF B5 AA A2 9E 90

7000 : D1 CE D0 CF C9 C4 BC C3  C3 C3 C7 C5 C6 C7 CD CB
7010 : CC C6 C7 C5 C4 C7 B4 B6  BC BD BF BE BF C7 C9 CB
7020 : C7 BD C1 C6 C2 B9 AE B6  BC BB BD BA BB BC BC BC
7030 : B5 B4 B3 B2 AE AA AC AC  B0 B1 B1 AF B1 B6 B1 B8
7040 : BB BB B7 B7 B3 B5 B4 CA  CB CF CE CA CF D4 D4 D5
7050 : D0 CC CF CC CA C7 C6 D4  D1 D4 D4 D6 D8 DD E0 DC
7060 : DE DA D9 DA DC D8 D6 D0  D4 D1 BE 38 35 35 35 35
7070 : 33 30 2F 2E 29 2B 15 18  18 18 1A 19 19 1C 1B 1F
7080 : 1B 1B 18 19 13 13 14 21  25 27 27 2A 2B 27 29 2A
7090 : 27 26 25 24 22 22 22 32  34 38 35 36 38 37 3C 3B
70A0 : 39 39 36 33 33 2F 29 26  2C 33 2F 31 30 2F 30 2F
70B0 : 2E 2D 2B 2C 29 2A 1F 1A  1B 1D 1E 1E 1E 1F 22 1D
70C0 : 1D 1C 1D 1E 1B 18 19 30  37 3B 3D 45 DC E5 E4 E8
70D0 : E2 DC D8 DD DB D1 C6 C1  C6 C1 C3 C5 C2 C4 C9 C4
70E0 : C3 C8 C3 C4 BE BF C3 C1  C6 C9 CC CE CE D0 D2 D6
70F0 : D3 CF CB CA C5 C1 C3 E1  E3 E2 E1 E3 E3 E4 E6 EF
7100 : EC EB E8 F1 F3 F4 DA D5  DB D8 CF C7 C0 BF C2 BE
7110 : BD BB B9 B8 B7 B6 B6 D1  D0 D2 D5 D7 D7 D9 D9 D9
7120 : DA D2 D2 CE CC C7 BC B1  B0 B3 B4 B2 B1 B2 BC BA
7130 : B5 AB A5 9F 9D 8E

7000 : 2E 2A 2A 28 27 24 25 27  28 28 2A 29 29 2A 2F 2C
7010 : 2B 29 28 26 25 23 21 12  13 14 14 16 16 16 19 18
7020 : 16 14 13 13 11 0E 0C 09  0B 0C 0C 0D 0D 0D 12 10
7030 : 0D 0C 0A 09 07 06 09 0B  0C 0D 0E 0E 0E 0F 10 0F
7040 : 0E 0D 0B 0A 09 07 25 27  27 28 28 2A 2A 2A 2C 2C
7050 : 29 28 27 27 25 23 33 32  31 33 33 33 33 34 36 36
7060 : 34 32 32 2F 2E 2C 2E 28  28 2A 2B 2A 2A 2B 2F 2D
7070 : 2A 29 28 27 26 23 25 11  11 11 12 13 13 13 17 15
7080 : 13 13 11 0F 0D 0D 1E 1D  1F 1F 21 22 21 22 25 23
7090 : 21 1F 1F 1E 1E 1B 2F 2E  2E 2F 30 31 31 31 35 33
70A0 : 32 30 2E 2D 2B 29 2B 23  25 28 26 29 2A 28 2B 2B
70B0 : 27 27 26 25 22 21 23 16  16 17 18 19 1A 1A 1C 1B
70C0 : 1A 18 17 15 13 12 31 30  32 31 32 32 33 34 37 36
70D0 : 33 32 30 2F 2D 2C 2D 12  13 16 15 15 17 15 18 18
70E0 : 15 16 13 12 10 0D 14 12  14 14 15 16 14 16 1A 18
70F0 : 15 15 12 11 11 0F 40 41  41 41 42 43 43 43 46 44
7100 : 43 42 41 3F 3D 3B 3E 14  15 16 17 17 17 17 1B 1A
7110 : 17 16 14 14 11 0F 35 34  34 35 36 35 37 37 39 38
7120 : 36 35 33 32 31 30 30 20  20 22 21 22 23 20 25 23
7130 : 21 1F 1D 1C 1C 1A

7000 : 12 4F

7000 : 10 9B

7000 : 10 67

7000 : 5E

7000 : 22
```

Scanning Compensation Data List

3.3 ADF Performance Test

n Function

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

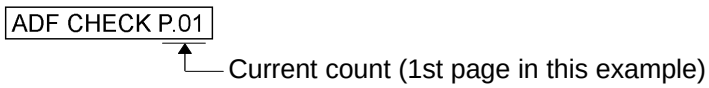
n Operating Procedure

(1) Set documents. (Allowable up to the ADF capacity.)

The "DOC. READY" will appear on the LCD.

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

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



(3) After showing the final count, the equipment beeps for one second. To return the equipment to the initial stage of the maintenance mode, press the **Stop** key.

3.4 Test Pattern 1

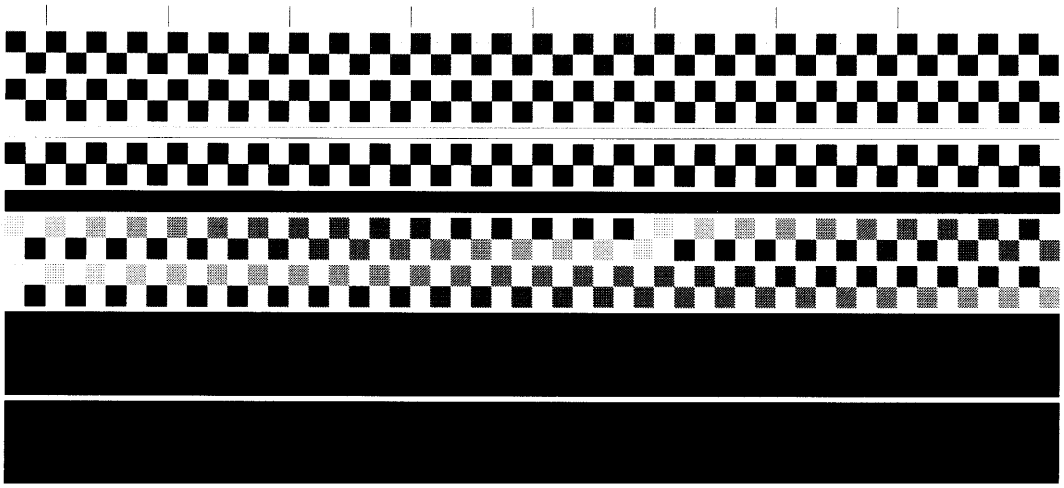
n Function

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

n Operating Procedure

Press the **0** and **9** keys in this order in the initial stage of the maintenance mode.

The figure below shows test pattern 1.



Test Pattern 1

3.5 Firmware Switch Setting and Printout

[A] Firmware switch setting

n Function

The facsimile equipment incorporates the following firmware switch functions (WSW01 through WSW36) which may be activated with the procedures using the control panel keys and buttons. The firmware switches have been set at the factory in conformity to the communications standards and codes of each country. Do not disturb them unless necessary. Some firmware switches may not be applicable in some versions. The firmware switch data list indicates "Not used." for those inapplicable switches.

Firmware Switches (WSW01 through WSW36)

WSW No.	Function	Reference Page
WSW01	Dial pulse setting	V-11
WSW02	Tone signal setting	V-12
WSW03	PABX mode setting	V-13
WSW04	TRANSFER facility setting	V-15
WSW05	1st dial tone and busy tone detection	V-16
WSW06	**Pause** key setting and 2nd dial tone detection	V-18
WSW07	Dial tone setting 1	V-20
WSW08	Dial tone setting 2	V-21
WSW09	Protocol definition 1	V-22
WSW10	Protocol definition 2	V-23
WSW11	Busy tone setting	V-24
WSW12	Signal detection condition setting	V-25
WSW13	Modem setting	V-26
WSW14	AUTO ANS facility setting	V-27
WSW15	REDIAL facility setting	V-28
WSW16	Function setting 1	V-29
WSW17	Function setting 2	V-30
WSW18	Function setting 3	V-31
WSW19	Transmission speed setting	V-32
WSW20	Overseas communications mode setting	V-33
WSW21	TAD setting 1	V-34
WSW22	ECM and copy resolution setting	V-35
WSW23	Communications setting	V-36
WSW24	TAD setting 2	V-37
WSW25	TAD setting 3	V-38
WSW26	Function setting 4	V-39
WSW27	Function setting 5	V-40
WSW28	Function setting 6	V-41
WSW29	Function setting 7	V-42
WSW30	Function setting 8	V-43
WSW31	Function setting 9	V-44
WSW32	Function setting 10	V-45
WSW33	Function setting 11	V-46
WSW34	Function setting 12	V-47
WSW35	Function setting 13	V-48
WSW36	Function setting 14	V-49

n Operating Procedure

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

The equipment displays the "WSW00" on the LCD and becomes ready to accept a firmware switch number.

(2) Enter the desired number from the firmware switch numbers (01 through 36).

The following appears on the LCD:

WSWXX = 0 0 0 0 0 0 0 0

(3) Use the ◀ and ▶ keys to move the cursor to the selector position to be modified.

(4) Enter the desired number using the **0** and **1** keys.

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

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

(7) Press the **Set** or **Stop** key to return the equipment to the initial stage of the maintenance mode.

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

n Note

The user-accessible selectors of the firmware switches are shaded in the tables given on the following pages.

n Detailed Description for the Firmware Switches

WSW01 (Dial pulse setting)

Selector No.	Function	Setting and Specifications
1 2	Dial pulse generation mode	No. 1 2 0 0 : N 0 1 : N+1 1 0 : 10-N 1 1 : N
3 4	Break time length in pulse dialing	No. 3 4 0 0 : 60 ms 0 1 : 67 ms 1 0 : 40 ms (for 16 PPS) 1 1 : 64 ms (at 106-ms intervals)
5 6	Inter-digit pause	No. 5 6 0 0 : 800 ms 0 1 : 850 ms 1 0 : 950 ms 1 1 : 600 ms
7	Switching between pulse (DP) and tone (PB) dialing, by the function switch	0: Yes 1: No
8	Default dialing mode, pulse (DP) or tone (PB) dialing	0: PB 1: DP

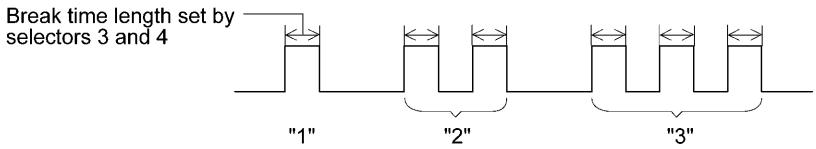
- **Selectors 1 and 2: Dial pulse generation mode**

  These selectors set the number of pulses to be generated in pulse dialing.

  N: Dialing "N" generates "N" pulses. (Dialing "0" generates 10 pulses.)
  N + 1: Dialing "N" generates "N + 1" pulses.
  10 - N: Dialing "N" generates "10 - N" pulses.

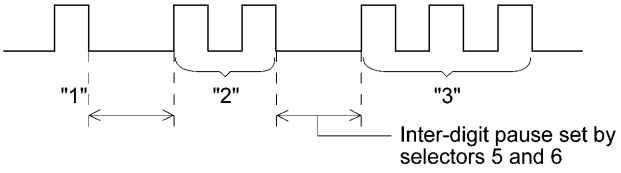
- **Selectors 3 and 4: Break time length in pulse dialing**

  These selectors set the break time length in pulse dialing.
  (Example: If "1," "2," and "3" are dialed when N is set by selectors 1 and 2.)



- **Selectors 5 and 6: Inter-digit pause**

  These selectors set the inter-digit pause in pulse dialing.
  (Example: If "1," "2," and "3" are dialed when N is set by selectors 1 and 2.)



- **Selector 7: Switching between pulse (DP) and tone (PB) dialing, by the function switch**

  This selector determines whether or not the dialing mode may be switched between the pulse (DP) and tone (PB) dialing by using the function switch.

- **Selector 8: Default dialing mode, pulse (DP) or tone (PB) dialing**

  This selector sets the default dialing mode (pulse dialing or tone dialing) which may be changed by the function switch. If the user switches it with the function switch when selector 7 is set to "0," the setting specified by this selector will also be switched automatically.

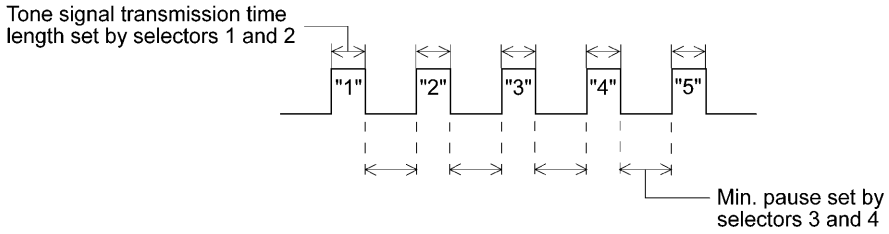
WSW02 (Tone signal setting)

Selector No.	Function	Setting and Specifications
1 2	Tone signal transmission time length	No. 1 2 0 0 : 70 ms 0 1 : 80 ms 1 0 : 90 ms 1 1 : 100 ms
3 4	Min. pause in tone dialing	No. 3 4 0 0 : 70 ms 0 1 : 80 ms 1 0 : 90 ms 1 1 : 140 ms
5 | 8	Attenuator for pseudo ring backtone to the line (selectable in the range of 0-15 dB)	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 level of beep generated as a ring backtone in the F/T mode or as a signal during remote control operation or at the start of ICM recording.

  Setting two or more selectors to “1” produces addition of attenuation assigned to each selector.

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	Min. detection time length of PABX* dial tone, required for starting dialing	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*	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	"R" key function	0: 1st dial tone detection add 1: No 1st dial tone detection

* PABX: Private automatic branch exchange

NOTE: Selectors 2 through 4 and 6 through 8 are not applicable where no PABX is installed.

- **Selectors 1 and 5: CNG detection when sharing a modular wall socket with a telephone**

  These selectors determine whether or not the equipment detects a CNG signal when a line is connected to a telephone sharing a modular wall socket with the equipment. Upon detection of CNG signals by the number of cycles specified by these selectors, the equipment interprets CNG as an effective signal and then starts FAX reception.

Selector No. 1	Selector No. 5	Cycle
0 (A)	0 (A)	0.5 cycle
0 (A)	1 (B)	1.0 cycle
1 (B)	0 (A)	1.5 cycles
1 (B)	1 (B)	2.0 cycles

- **Selectors 2 through 4: Min. detection time length of PABX dial tone, required for starting dialing**

  Upon detection of the PABX dial tone for the time length set by these selectors, the equipment starts dialing.

  These selectors are effective only when both selectors 6 and 7 are set to "1" (Detection).

- **Selectors 6 and 7: Dial tone detection in PABX**

  These selectors activate or deactivate the dial tone detection function which detects a dial tone when a line is connected to the PABX.

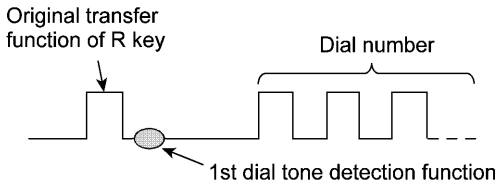
  Setting both of these selectors to "1" activates the dial tone detection function so that the equipment starts dialing upon detection of a dial tone when a line is connected.

  Other setting combinations deactivate the dial tone detection function so that the equipment starts dialing after the specified WAIT (3.5, 5.0, or 7.0 sec.) without detection of a dial tone when a line is connected.

- **Selector 8: "R" key function**

  This selector determines whether or not the 1st dial tone detection function (specified by selectors 1 through 3 of WSW05) is added to the R key.

  If this selector is set to "0," pressing the R key automatically activates the 1st dial tone detection function when the PABX and the automatic calling are selected by using the function switch. If you press the R key and a dial number in succession, the equipment will automatically carry out the 1st dial tone detection function following the original transfer function as shown below.



WSW04 (TRANSFER facility setting)

Selector No.	Function	Setting and Specifications
1	Earth function in transfer facility	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 x : 480 and 620 Hz (C)
4	Tone detection sensitivity in ICM recording	0: OFF 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 those models equipped with a built-in TAD.

- **Selector 1: Earth function in transfer facility**

  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 equipment detects both of the frequencies set by these selectors in ICM recording, it will disconnect the line. For example, if these selectors are set to "0, 0," the equipment will disconnect the line upon detection of 350 Hz and 440 Hz.

- **Selectors 4: 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**

  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 R 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	DTMF detection time	0 : 40 ms min. 1: 100 ms min.

NOTE: Selectors 5 through 7 are not applicable in those countries where no busy tone detection is supported, e.g., U.S.A.

- **Selectors 1 through 3: 1st dial tone detection**

  These selectors activate or deactivate the 1st dial tone detection function which detects the 1st dial tone issued from the PSTN when a line is connected to the PSTN.

  Setting all of these selectors to "1" activates the dial tone detection function so that the equipment starts dialing upon detection of a dial tone when a line is connected. (However, in those countries which support no dial tone detection function, e.g., in the U.S.A., setting these selectors to "1" makes the equipment start dialing after a WAIT of 3.5 seconds.) For the detecting conditions of the 1st dial tone, refer to WSW07 and WSW08.

  Other setting combinations deactivate the dial tone detection function so that the equipment starts dialing after the specified WAIT (3.5, 7.0, 10.5, 14.0, 17.5, 21.0, or 24.5 seconds) without detection of a dial tone when a line is connected to the PSTN.

- **Selector 4: Max. pause time allowable for remote ID code detection**

  This selector sets the maximum pause time allowable for detecting the second digit of a remote ID code after detection of the first digit in remote reception.

  If selector 4 is set to "0" (2 seconds), for instance, only a remote ID code whose second digit is detected within 2 seconds after detection of the first digit will become effective so as to activate the remote function.

- **Selectors 5 and 6: Busy tone detection in automatic sending mode**

  These selectors determine whether or not the equipment automatically disconnects a line upon detection of a busy tone in automatic sending mode.

  Setting selector 6 to "0" ignores a busy tone so that the equipment does not disconnect the line.

  Setting selectors 5 and 6 to "0" and "1," respectively, makes the equipment detect a busy tone only after dialing and disconnect the line.

  Setting both of selectors 5 and 6 to "1" makes the equipment detect a busy tone before and after dialing and then disconnect the line.

- **Selector 7: Busy tone detection in automatic receiving mode**

  This selector determines whether or not the equipment automatically disconnects a line upon detection of a busy tone in automatic receiving mode.

WSW06 (Pause key setting and 2nd dial tone detection)

Selector No.	Function	Setting and Specifications
1 | 3	**Pause** key setting and 2nd dial tone detection	No. 1 2 3 0 0 0 : No pause 0 0 1 : 3.5 sec. WAIT 0 1 0 : 7 sec. WAIT 0 1 1 : 10.5 sec. WAIT 1 0 0 : 14 sec. WAIT 1 1 0 : 2nd dial tone detection only in pulse dialing (DP) system 1 0 1 : 2nd dial tone detection both in DP and push-button (PB) dialing system 1 1 1 :
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 times	0: Once 1: Twice
8	2nd dial tone interrupt detecting time	0: 30 ms 1: 50 ms

NOTE: Selectors 4 through 8 are not applicable in those countries where no dial tone detection is supported, e.g., U.S.A.

- **Selectors 1 through 3: Pause key setting and 2nd dial tone detection**

Selectors 1	2	3	
0	0	0	No WAIT is inserted even if the **Pause** key is pressed.
0	0	1	If you press the **Pause** key during dialing, the facsimile equipment will insert WAIT as defined in the above table. If the **Pause** key is pressed repeatedly, the equipment inserts the specified WAIT multiplied by the number of depressions. It applies also in hook-up dialing.
0	1	0	
0	1	1	
1	0	0	
1	0	1	When these selectors are set to "1, 0, 1": If you press the **Pause** key during dialing, the equipment will wait for the 2nd dial tone to be sent via the communications line. When these selectors are set to "1, 1, 0" or "1, 1, 1": If you press the **Pause** key during dialing, the equipment will first wait for the 2nd dial tone to be sent via the communications line. After that, the equipment will insert a WAIT of 3.5 seconds. If no 2nd dial tone is received within the specified time length (set by WSW08), the equipment will disconnect the line if in automatic dialing, or it will start transmitting the dial signal if given after depression of the **Pause** key in hook-up dialing. (In those countries where no dial tone detection function is supported, setting these selectors to "1, 0, 1," "1, 1, 0," or "1, 1, 1" inserts a WAIT of 3.5 seconds.)
1	1	0	
1	1	1	

- **Selectors 4 through 6: Detection of international tone**

  Upon detection of the 2nd dial tone for the time length specified by these selectors, the equipment starts dialing.

  This setting is effective only when the 2nd dial tone detection function is activated by selectors 1 through 3 (Setting 101, 110, or 111).

  This function does not apply in those countries where no dial tone detection function is supported.

- **Selector 7: No. of 2nd dial tone detection times**

  This selector sets the number of dial tone detection times required for starting dialing.

- **Selector 8: 2nd dial tone interrupt detecting time**

  This selector sets the allowable time length of an interrupt which should not be interpreted as an interrupt in the 2nd tone dialing.

WSW07 (Dial tone setting 1)

Selector No.	Function	Setting and Specifications
1 2	Frequency band range	No. 1 2 0 0 : Narrows by 10 Hz 0 1 : Initial value 1 X : Widens by 10 Hz
3	Line current detection	0: No 1: Yes
4 | 6	2nd dial tone detection level (Z = 600 Ω)	No. 4 5 6 0 0 0 : -21 dBm 0 0 1 : -24 dBm 0 1 0 : -27 dBm 0 1 1 : -30 dBm 1 0 0 : -33 dBm 1 0 1 : -36 dBm 1 1 0 : -39 dBm 1 1 1 : -42 dBm
7	1st dial tone interrupt detecting time	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: Frequency band range**

  These selectors set the frequency band for the 1st dial tone and the 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**

  This selector determines whether or not the equipment should detect a line current before starting dialing.

- **Selectors 4 through 6: 2nd dial tone detection level**

  These selectors set the detection level of the 2nd dial tone.

- **Selector 7: 1st dial tone interrupt detecting time**

  This selector sets the allowable time length of an interrupt which should not be interpreted as an interrupt in the 1st dial tone dialing.

WSW08 (Dial tone setting 2)

Selector No.	Function	Setting and Specifications
1 | 3	1st dial tone detection time length	No. 1 2 3 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
4 5	Time-out length for 1st and 2nd dial tone detection	No. 4 5 0 0 : 10 sec. 0 1 : 20 sec. 1 0 : 15 sec. 1 1 : 30 sec.
6 | 8	Detection level of 1st dial tone and busy tone before dialing	No. 6 7 8 0 0 0 : -21 dBm 0 0 1 : -24 dBm 0 1 0 : -27 dBm 0 1 1 : -30 dBm 1 0 0 : -33 dBm 1 0 1 : -36 dBm 1 1 0 : -39 dBm 1 1 1 : -42 dBm

NOTE: The WSW08 is not applicable in those countries where no dial tone detection is supported, e.g., U.S.A.

- **Selectors 1 through 3: 1st dial tone detection time length**

  Upon detection of the 1st dial tone for the time length set by these selectors, the equipment starts dialing.

  This setting is effective only when selectors 1 through 3 of WSW05 are set to "1,1,1."

- **Selectors 4 and 5: Time-out length for 1st and 2nd dial tone detection**

  These selectors set the time-out length for the 1st and 2nd dial tone detection so that the equipment waits dial tone input for the specified time length and disconnects itself from the line when no dial tone is inputted.

WSW09 (Protocol definition 1)

Selector No.	Function	Setting and Specifications
1	Frame length selection	0: 256 octets 1: 64 octets
2	Use of non-standard commands	0: Allowed 1: Prohibited
3 4	No. of retries	No. 3 4 0 0 : 4 times 0 1 : 3 times 1 0 : 2 times 1 1 : 1 time
5	T5 timer	0: 300 sec. 1: 60 sec.
6	T1 timer	0: 35 sec. 1: 40 sec.
7 8	Elapsed time for time-out control for no response from the called station in automatic sending mode	No. 7 8 0 0 : 60 sec. 0 1 : 140 sec. (in the French versions) 70 sec. (in other versions) 1 0 : 90 sec. 1 1 : 35 sec.

NOTE: Selectors 1 through 6 are not applicable in those models which do not support ECM.

- **Selector 1: Frame length selection**

  Usually a single frame consists of 256 octets (1 octet = 8 bits). For communications lines with higher bit error rate, however, set selector 1 to "1" so that the facsimile equipment can divide a message into 64-octet frames.

  Remarks: The error correction mode (ECM) is a facsimile transmission manner in which the equipment divides a message into frames for transmission so that if any data error occurs on the transmission line, the equipment retransmits only those frames containing the error data.

- **Selector 2: Use of non-standard commands**

  If this selector is set to "0," the equipment may use non-standard commands (the machine's native-mode commands, e.g., NSF, NSC, and NSS) for communications. If it is set to "1," the equipment will use standard commands only.

- **Selectors 3 and 4: No. of retries**

  These selectors set the number of retries in each specified modem transmission speed.

- **Selector 5: T5 timer**

  This selector sets the time length for the T5 timer.

- **Selector 6: T1 timer**

  This selector sets the time length for the T1 timer.

- **Selectors 7 and 8: Elapsed time for time-out control**

  If the equipment receives no response (no G3 command) from the called terminal in automatic sending during the time set by these selectors, it disconnects the line.

WSW10 (Protocol definition 2)

Selector No.	Function		Setting and Specifications
1	Switching of DPS, following the CML ON/OFF		0: No 1: Yes
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 1: Switching of DPS, following the CML ON/OFF**

  Setting this selector to "1" automatically switches DPS following the CML ON/OFF operation.

- **Selector 2: Time length from transmission of the last dial digit to CML ON**

  This selector sets the time length from when the equipment transmits the last dial digit until the CML relay comes on.

- **Selector 3: Time length from CML ON to CNG transmission**

  This selector sets the time length until the equipment transmits a CNG after it turns on the CML relay.

- **Selector 4: Time length from CML ON to CED transmission**

  This selector sets the time length until the equipment transmits a CED after it turns on the CML relay. This setting does not apply to switching between facsimile and telephone.

- **Selectors 5 and 6: No. of training retries**

  These selectors set the number of training retries to be repeated before automatic fallback.

- **Selectors 7 and 8: Encoding system (Compression)**

  This selector determines whether or not use of the MR/MMR coding system will be allowed.

WSW11 (Busy tone setting)

Selector No.	Function	Setting and Specifications
1 2	Frequency band range	No. 1 2 0 0 : Narrows by 10 Hz 0 1 : Initial value 1 x : Widens by 10 Hz
3	Not used.	
4	ON/OFF time length ranges (More than one setting allowed)	1: 400-600/400-600 ms
5		1: 175-440/175-440 ms
6		1: 700-800/700-800 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: Frequency band range**

  These selectors set the frequency band for busy tone to be detected.

- **Selectors 4 through 8: ON/OFF time length ranges**

  These selectors set the ON and OFF time length ranges for busy tone to be detected. If more than one selector is set to "1," the ranges become wider. For example, if selectors 4 and 5 are set to "1," the ON and OFF time length ranges are from 175 to 600 ms.

WSW12 (Signal detection condition setting)

Selector No.	Function	Setting and Specifications
1 2	Min. OFF time length of calling signal (Ci)	No. 1 2 0 0 : 300 ms (in the U.S.A. and Canadian versions) 1500 ms (in other versions) 0 1 : 500 ms 1 0 : 700 ms 1 1 : 900 ms
3 4	Max. OFF time length of calling signal (Ci)	No. 3 4 0 0 : 6 sec. 0 1 : 7 sec. 1 0 : 9 sec. 1 1 : 11 sec.
5 6	Detecting time setting	No. 5 6 0 0 : 800 ms (1000 ms*) 0 1 : 200 ms 1 0 : 250 ms 1 1 : 150 ms
7	Delay	0: Yes 1: No
8	Not used.	

*1000 ms in Chinese versions.

- **Selectors 1 through 4: Min. and max. OFF time length of calling signal (Ci)**

  If the equipment detects the OFF state of calling signal (Ci) for a time length which is 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: Detecting time setting**

  These selectors set the time length required to make the equipment acknowledge itself to be called. That is, if the equipment continuously detects calling signals with the frequency set by selectors 1 through 4 of WSW14 during the time length set by these selectors 5 and 6, it acknowledges the call.

- **Selector 7: Delay**

  Setting this selector to "0" allows the equipment to insert a 900 ms WAIT after acknowledgment of the call until the equipment turns on the CML relay to start receiving operation.

WSW13 (Modem setting)

Selector No.	Function	Setting and Specifications
1 2	Cable equalizer	No. 1 2 0 0 : 0 km 0 1 : 0 km 1 0 : 7.2 km 1 1 : 7.2 km
3 4	Reception level	No. 3 4 0 0 : -43 dBm 0 1 : -47 dBm 1 0 : -49 dBm 1 1 : -51 dBm
5 | 8	Modem attenuator	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

The modem should be adjusted according to the user's line conditions.

- **Selectors 1 and 2: Cable equalizer**

  These selectors are used to improve the pass-band characteristics of analogue signals on a line. (Attenuation in the high-band frequency is greater than in the low-band frequency.)

  Set these selectors according to the distance from the telephone switchboard to the facsimile equipment.

- **Selectors 3 and 4: Reception level**

  These selectors set the optimum receive signal level.

- **Selectors 5 through 8: Modem attenuator**

  These selectors are used to adjust the transmitting level 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.

  This setting will be limited if selector 8 of WSW23 is set to "0."

WSW14 (AUTO ANS facility setting)

Selector No.	Function	Setting and Specifications
1 2	Frequency band selection (Lower limit)	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)	No. 3 4 0 0 : 30 Hz 0 1 : 55 Hz 1 X : 70 Hz
5 | 8	No. of rings in AUTO ANS mode	No. 5 6 7 8 0 0 0 0 : Fixed to once 0 0 0 1 : Fixed to 2 times 0 0 1 0 : Fixed to 3 times 0 0 1 1 : Fixed to 4 times 0 1 0 0 : 1 to 2 times 0 1 0 1 : 1 to 3 times 0 1 1 0 : 1 to 4 times 0 1 1 1 : 1 to 5 times 1 0 0 0 : 2 to 3 times 1 0 0 1 : 2 to 4 times 1 0 1 0 : 2 to 5 times 1 0 1 1 : 2 to 6 times 1 1 0 0 : 1 to 10 times 1 1 0 1 : 2 to 10 times 1 1 1 0 : 3 to 5 times 1 1 1 1 : 4 to 10 times

- **Selectors 1 through 4: Frequency band selection**

  These selectors are used to select the frequency band of calling signals for activating the AUTO ANS facility.

  In the French versions, if the user sets the PBX to OFF from the control panel, the setting made by selectors 1 and 2 will take no effect and the frequency's lower limit will be fixed to 32 Hz. (Even if the setting made by these selectors does not apply, it will be printed on the configuration list.)

- **Selectors 5 through 8: No. of rings in AUTO ANS mode**

  These selectors set the number of rings to initiate the AUTO ANS facility.

WSW15 (REDIAL facility setting)

Selector No.	Function	Setting and Specifications
1 2	Selection of 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 8	Not used.	

- **Selectors 1 through 6: Selection of redial interval and No. of redialings**

  The equipment redials by the number of times set by selectors 3 through 6 at intervals set by selectors 1 and 2.

WSW16 (Function setting 1)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	CCITT superfine recommendation	0: OFF 1: ON
3 | 6	Not used.	
7	Max. document length limitation	0: 400 cm 1: 90 cm
8	**Stop** key pressed during reception	0: Not functional 1: Functional

- **Selector 2: CCITT superfine recommendation**

  If this selector is set to "1," the equipment communicates in 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	Power failure report output	0: ON 1: OFF
4	Calendar clock/prompt alternate display	0: No 1: Yes
5	Calendar clock type	0: U.S.A. type 1: European type
6	Not used.	
7	Non-ring reception	0: OFF 1: ON
8	Not used.	

NOTE: Selector 4 is not applicable to those models having a 2-row LCD.

- **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 3: Power failure report output**

  This selector determines whether or not the equipment outputs a power failure report when the power comes back on.

- **Selector 4: Calendar clock/prompt alternate display**

  If this selector is set to "1," the calendar clock and the prompt "INSERT DOCUMENT" appear alternately on the LCD while the equipment is on standby; if it is set to "0," only the calendar clock appears.

- **Selector 5: Calendar clock type**

  If this selector is set to "0" (USA), the MM/DD/YY hh:mm format applies; if it is set to "1" (Europe), the DD/MM/YY hh:mm format applies: DD is the day, MM is the month, YY is the last two digits of the year, hh is the hour, and mm is the minute.

- **Selector 7: Non-ring reception**

  Setting this selector to "1" makes the equipment receive calls without ringer sound if the ring delay is set to 0.

WSW18 (Function setting 3)

Selector No.	Function	Setting and Specifications
1	Not used.	
2 3	Detection enabled time for CNG and no tone	No. 2 3 0 0 : 40 sec. 0 1 : 0 sec. (No detection) 1 0 : 5 sec. 1 1 : 80 sec.
4 5	Not used.	
6	Registration of station ID	0: Permitted 1: Prohibited
7 8	Tone sound monitoring	No. 7 8 0 X : No monitoring 1 0 : Up to phase B at the calling station only 1 1 : All transmission phases both at the calling and called stations

- **Selectors 2 and 3: Detection enabled time for CNG and no tone**

  After the line is connected via the external telephone or by picking up the handset of the facsimile equipment, the equipment can detect a CNG signal or no tone for the time length specified by these selectors. The setting specified by these selectors becomes effective only when selector 8 of WSW20 is set to "1."

- **Selector 6: Registration of station ID**

  Setting this selector to "0" permits the registration of station ID for Austrian and Czech versions.

- **Selectors 7 and 8: Tone sound monitoring**

  These selectors set monitoring specifications of the tone sound inputted from the line.

WSW19 (Transmission speed setting)

Selector No.	Function	Setting and Specifications
1 | 3	First transmission speed choice for fallback	No. 1 2 3 / No. 4 5 6 0 0 0 : 2,400 bps 0 0 1 : 4,800 bps 0 1 0 : 7,200 bps 0 1 1 : 9,600 bps 1 0 0 : 12,000 bps * 1 0 1 : 14,400 bps * 1 1 0 : 14,400 bps * 1 1 1 : 14,400 bps *
4 | 6	Last transmission speed choice for fallback	
7	Not used.	
8	V. 17 mode	0: Permitted 1: Prohibited

* In those models with a maximum of 9600 bps capability, selection of 12,000 bps or 14,400 bps will still only produce a set speed automatically reduced to 9600 bps.

NOTE: Selector 8 is applicable only to those models that support 14,400 bps.

- **Selectors 1 through 6: First and last choices of transmission speed for fallback**

  These selectors are used to set the MODEM speed range. With the first transmission speed choice specified by selectors 1 through 3, the equipment attempts to synchronize the data transmission via the MODEM. If the synchronization fails, the equipment automatically steps down to the next lowest speed and attempts to synchronize the data transmission again. The equipment repeats this sequence while stepping down the transmission speed to the last choice specified by selectors 4 through 6.

  If the MODEM always falls back to a low transmission speed (e.g., 4,800 bps), set the first transmission speed choice to the lower one (e.g., modify it from 12,000 bps to 7,200 bps) in order to deactivate the high-speed MODEM function and reduce the training time for shorter transmission time.

  Generally, to save the transmission time, set the last transmission speed choice to a higher one.

WSW20 (Overseas communications mode setting)

Selector No.	Function	Setting and Specifications
1	EP* tone prefix	0: OFF 1: ON
2	Overseas communications mode (Reception)	0: 2100 Hz 1: 1100 Hz
3	Overseas communications mode (Transmission)	0: OFF 1: Ignores DIS once.
4 5	Min. time length from reception of CFR to start of transmission of video signals	No. 4 5 0 0 : 100 ms 0 1 : 200 ms 1 0 : 300 ms 1 1 : 400 ms
6 7	Chattering elimination for CNG detection	No. 6 7 0 0 : A (During CNG ON and OFF) 0 1 : B (During CNG OFF only) 1 X : C (No elimination)
8	CNG detection on/off	0: OFF 1: ON

* EP: Echo protection

- **Selector 1: EP tone prefix**

  Setting this selector to "1" makes the equipment transmit a 1700 Hz echo protection (EP) tone immediately preceding training in V.29 modulation system to prevent omission of training signals.

  Prefixing an EP tone is effective when the equipment fails to transmit at the V.29 modem speed and always has to fall back to 4800 bps transmission.

- **Selectors 2 and 3: Overseas communications mode**

  These selectors should be used if the facsimile equipment malfunctions in overseas communications. According to the communications error state, select the signal specifications.

  Setting selector 2 to "1" allows the equipment to use 1100 Hz CED signal instead of 2100 Hz in receiving operation. This prevents malfunctions resulting from echoes, since the 1100 Hz signal does not disable the echo suppressor (ES) while the 2100 Hz signal does.

  Setting selector 3 to "1" allows the equipment to ignore a DIS signal sent from the called station once in sending operation. This operation suppresses echoes since the first DIS signal immediately follows a 2100 Hz CED (which disables the ES) so that it is likely to be affected by echoes in the disabled ES state. However, such a disabled ES state will be removed soon so that the second and the following DIS signals are not susceptible to data distortion due to echoes. Note that some models when called may cause error by receiving a self-outputted DIS.

- **Selectors 8: CNG detection on/off**

  If this selector is set to "1," the equipment detects a CNG signal according to the condition preset by selectors 2 and 3 of WSW18 after a line is connected. If it is set to "0," the equipment detects a CNG signal as long as the line is connected.

WSW21 (TAD setting 1)

Selector No.	Function	Setting and Specifications
1 | 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	Two-way recording	No. 6 7 0 0 : For U.S.A. (A) 0 1 : Except for U.S.A. (B) 1 0 : Without beep (C) 1 1 : OFF (D)
8	Erasure of message stored in the memory after the message transfer	0: Yes 1: No

NOTE: Selectors 1 through 8 are applicable to those models equipped with a built-in TAD.

- **Selectors 1 through 5: Max. waiting time for voice signal**

  In the TAD mode, the equipment 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: Two-way recording**

  These selectors select the specifications of the two-way recording feature.

- **Selector 8: Erasure of message stored in the memory after the message transfer**

  Setting this selector to "0" will erase the message recorded in the memory after the document retrieval feature transfers the message.

WSW22 (ECM and copy resolution setting)

Selector No.	Function	Setting and Specifications	
1	ECM* in sending	0: ON	1: OFF
2	ECM* in receiving	0: ON	1: OFF
3	Not used.		
4	Copy resolution	0: Fine	1: Superfine
5	Acceptable TCF bit error rate (%) (Only at 4800 bps)	0: 0%	1: 8%
6		0: 0%	1: 4%
7		0: 0%	1: 2%
8		0: 0%	1: 1%

* ECM: Error correction mode

NOTE: Selectors 5 through 8 are applicable to the Chinese, Taiwanese and Asian versions only.

- **Selector 4: Copy resolution**

  This selector determines whether resolution for multi-copy should be Fine or Superfine.

- **Selectors 5 through 8: Acceptable TCF bit error rate (%)**

  Setting two or more selectors to "1" produces addition of percent assigned to each selector. If you set selectors 7 and 8 to "1," the acceptable TCF bit error rate will be 3%.

WSW23 (Communications setting)

Selector No.	Function	Setting and Specifications
1	Starting point of training check (TCF)	0: From the head of a series of zeros 1: From any arbitrary point
2 3	Allowable training error rate	No. 2 3 0 0 : 0% 0 1 : 0.5% 1 0 : 1% 1 1 : 2%
4 5	Decoding error rate for transmission of RTN	No. 4 5 0 0 : 16% 0 1 : 14% 1 0 : 10% 1 1 : 8%
6	Issue of RTN at the occurrence of a pagination error	0: Yes 1: No
7	Not used.	
8	Limitation of attenuation level	0: Yes 1: No

NOTE: Selector 8 is not applicable to the French versions.

- **Selector 1: Starting point of training check (TCF)**

  At the training phase of receiving operation, the called station detects for 1.0 second a training check (TCF) command, a series of zeros which is sent from the calling station for 1.5 seconds to verify training and give the first indication of the acceptability of the line.

  This selector sets the starting point from which the called station should start counting those zeros. If this selector is set to "0," the called station starts counting zeros 100 ms after the head of a series of zeros is detected.

  If it is set to "1," the called station starts counting zeros upon detection of 10-ms successive zeros 50 ms after the head of a series of zeros is detected. In this case, if the detection of 10-ms successive zeros is too late, the data counting period will become less than 1.0 second, making the called station judge the line condition unacceptable.

- **Selectors 2 and 3: Allowable training error rate**

  The called station checks a series of zeros gathered in training (as described in Selector 1) according to the allowable training error rate set by these selectors. If the called station judges the line condition to be accepted, it responds with CFR; if not, it responds with FTT.

- **Selectors 4 and 5: Decoding error rate for transmission of RTN**

  The facsimile equipment checks the actual decoding errors and then transmits an RTN according to the decoding error rate (Number of lines containing an error per page ÷ Total number of lines per page) set by these selectors.

- **Selector 6: Issue of RTN at the occurrence of a pagination error**

  If this selector is set to "0," the facsimile equipment transmits an RTN when a pagination error occurs due to recording lag relative to receiving.

- **Selector 8: Limitation of attenuation level**

  Setting this selector to "0" limits the transmitting level of the modem to 10 dB.

  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

NOTE: Selectors 1 and 2 are applicable to those models equipped with a built-in TAD.

- **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 those versions which have an OGM facility, the settings made by these selectors also apply to the length of time from CML-ON up to the start of OGM transmission.

- **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 will not be limited by selector 8 of WSW23.

WSW25 (TAD setting 3)

Selector No.	Function	Setting and Specifications
1 | 4	Not used.	
5 | 7	Pause between paging number and PIN	No. 5 6 7 0 0 0 : 2 sec. 0 0 1 : 4 sec. 0 1 0 : 6 sec. 0 1 1 : 8 sec. 1 0 0 : 10 sec. 1 0 1 : 12 sec. 1 1 0 : 14 sec. 1 1 1 : 16 sec.
8	Automatic shift to facsimile message receive mode in ICM recording mode	0: Yes 1: No

NOTE: Selectors 5 through 7 are applicable only to the U.S.A. versions.

NOTE: Selector 8 is applicable to those models equipped with a built-in TAD.

- **Selectors 5 through 7: Pause between paging number and PIN**

  These selectors set the pause time between a telephone number being paged and PIN (private identification number) for the paging feature.

- **Selector 8: Automatic shift to facsimile message receive mode in ICM recording mode**

  If this selector is set to "0," the equipment automatically shifts to the facsimile message receive mode after recording an ICM. If it is set to "1," the equipment automatically disconnects the line after the waiting time has passed.

WSW26 (Function setting 4)

Selector No.	Function	Setting and Specifications
1	Application of DC wetting pulse	0: OFF 1: ON
2	Overvoltage limiter at the applying time of a wetting pulse	0: ON 1: OFF
3	Not used.	
4 5	No. of CNG cycles to be detected (when the line is connected via the external telephone except in the external TAD mode)	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 or via the facsimile equipment in 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	FAX reception after the time-out of pseudo ring backtones in F/T mode	0: Yes 1: No

NOTE: Selectors 1, 2, 6 and 7 are not applicable to the U.S.A. versions.

NOTE: Selectors 6 and 7 are applicable to those models equipped with a built-in TAD.

- **Selectors 1 and 2: Application of DC wetting pulse and overvoltage limiter**

  These selectors take effect only when the UK version of the facsimile equipment is set up for the British Telecom's caller ID service or its equivalent.

  Selector 2 takes effect only when selector 1 is set to "1."

- **Selectors 4 and 5: No. of CNG cycles to be detected**

  The equipment interprets a CNG as an effective signal if it detects a CNG signal by the number of cycles specified by these selectors when the line is connected via the external telephone except in the external TAD mode.

- **Selectors 6 and 7: No. of CNG cycles to be detected**

  The equipment interprets a CNG as an effective signal if it detects a CNG signal by the number of cycles specified by these selectors when the line is connected via the external telephone in the external TAD mode or via the facsimile equipment in F/T mode.

- **Selector 8: FAX reception after the time-out of pseudo ring backtones in F/T mode**

  If this selector is set to "0," the equipment starts receiving FAX messages when it receives a CNG signal within 10-second no-tone period provided after the time-out of pseudo ring backtones. If no CNG is received within the period, the equipment disconnects the line.

  If it is set to "1," the equipment disconnects the line after issuing pseudo ring backtones.

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 at the start time of OGM ON mode	0: No 1: Yes
4	Detection of distinctive ringing pattern	0: Yes 1: No
5	Automatic erasure of voice alarm	0: Yes 1: No
6 | 8	Not used.	

NOTE: Selector 3 is applicable to those models equipped with a built-in TAD

NOTE: Selector 4 is applicable only to the U.S.A. versions

- **Selector 2: Ringer OFF setting**

  This selector determines whether or not the ringer can be set to OFF.

- **Selector 3: Automatic playback of OGM at the start time of OGM ON mode**

  This selector determines whether or not the equipment automatically plays back an OGM the moment it switches to the OGM ON mode in the MC mode.

- **Selector 4: Detection of distinctive ringing pattern**

  If this selector is set to "1," the equipment detects only the number of rings; if it is set to "0," the equipment detects the number of rings and the ringing time length to compare the detected ringing pattern with the registered distinctive one.

- **Selector 5: Automatic erasure of voice alarm**

  This selector determines whether or not the voice alarm should be erased from the memory after it is issued.

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	Current available resolution in receiving	0: Sends the current resolution statement 1: Switches the resolution to the lower level
8	Not used.	

- **Selectors 1 through 6: Transmission level of DTMF high-/low-band frequency signal**

  These selectors are intended for the manufacturer who tests the equipment for the Standard. Never access them.

- **Selector 7: Current available resolution in receiving**

  If this selector is set to "0," the equipment will send the resolution statement to the calling station, telling the maximum capacity of the equipment independent of the current memory space available.

  If this selector is set to "1," the equipment automatically switches the resolution to the lower level (superfine → fine → standard) if the memory space is insufficient to receive data at the designated resolution.

WSW29 (Function setting 7)

Selector No.	Function	Setting and Specifications
1 | 6	Not used.	
7	Automatic dialing by caller IDs stored in the memory	0: Yes 1: No
8	Not used.	

NOTE: Selector 7 is applicable to those versions supporting the caller ID service. Note that it is not applicable to the U.S.A. versions.

- **Selector 7: Automatic dialing by caller IDs stored in the memory**

  This selector determines whether or not the automatic dialing function by caller IDs stored in the memory (see the Note below) can be accessed.

  If it is set to "0," caller IDs stored in the memory can be shown on the LCD by the user function 6-9 and then pressing the **Start** key when the desired caller ID is displayed dials the caller automatically.

  (Note: The equipment can store a maximum of the latest 30 incoming caller IDs together with the reception date and time in the memory.)

WSW30 (Function setting 8)

Selector No.	Function	Setting and Specifications
1 | 3	Detection level of dial tone or busy tone for the built-in TAD operation	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 those models equipped with a built-in TAD.

- **Selectors 1 through 3: Detection level of dial tone or busy tone for built-in TAD operation**

  If dial tone or busy tone inputted during ICM recording is below the level specified by these selectors, the TAD stops recording and disconnects the line.

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	Backing up received data	0: Yes 1: No
4	Black ink empty sensor	0: Yes 1: No
5	Minimum short-OFF duration in distinctive ringing	0: 130 ms 1: 90 ms
6 | 8	Not used.	

NOTE: Selector 5 is applicable only to the U.S.A. versions.

- **Selector 2: Default reduction rate for failure of automatic reduction during recording**

  This selector sets the default reduction rate to be applied if the automatic reduction function fails to record one-page data sent from the calling station in a single page of the current recording paper.

  If it is set to "0," the equipment records one-page data at full size (100%) without reduction; if it is set to "1," the equipment records it at 70% size.

- **Selector 3: Backing up received data**

  This selector determines whether the equipment backs up received data into the DRAM (just as in the backup operation to be performed if a paper-empty error, ink-empty error or cover-open error occurs). Only the data received at the latest five transmission sequences may be backed up. To print out the backed-up data, press the **Help** key while holding down the **Shift** key, or carry out purging operation.

- **Selector 5 Minimum short-OFF duration in distinctive ringing**

  The ringer pattern consists of short and long rings, e.g., short-short-long rings. This selector sets the minimum OFF duration following a short ring in order to avoid missing ringer tones in distinctive ringing.

  If this selector is set to "1," when the short-OFF duration is a minimum of 90 ms long, then the equipment will interpret the short-OFF as OFF.

WSW32 (Function setting 10)

Selector No.	Function	Setting and Specifications
1 | 4	Not used.	
5 6	Default resolution	No. 5 6 0 0 : Standard 0 1 : Fine 1 0 : Super fine 1 1 : Photo
7 8	Default contrast	No. 7 8 0 X : Automatic 1 0 : Super light 1 1 : Super dark

- **Selectors 5 and 6: Default resolution**

  These selectors set the default resolution which applies when the equipment is powered up or completes a transaction.

- **Selectors 7 and 8: Default contrast**

  These selectors set the default contrast which applies when the equipment is powered up or completes a transaction.

WSW33 (Function setting 11)

Selector No.	Function	Setting and Specifications
1 | 3	Detection threshold level for voice signals inputted via the telephone line in the built-in TAD operation	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	Not used.	

NOTE: Selectors 1 through 3, 7 and 8 are applicable to those models equipped with a built-in TAD.

NOTE: Selector 6 is not applicable to the U.S.A. versions.

- **Selectors 1 through 3: Detection threshold level for voice signals inputted via the telephone line in the built-in TAD operation**

  If the equipment detects voice signals exceeding the threshold level set by these selectors, it will interpret them as effective voice.

- **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 facsimile equipment to the connected PC, you may need to keep the FAX receiving speed within the transmission speed limit to the PC. In an initial negotiation sequence for transmission, the equipment responds to the calling station with the allowable FAX receiving speed specified by these selectors.

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	Not used.	
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 3 are applicable to those models equipped with a built-in TAD.

- **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 equipment 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 6 and 7: Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation**

  If the equipment receives this specified number of DTMF tone signals during external TAD operation, it will not detect CNG afterwards.

  If these selectors are set to "1, 1," the CNG detection will not be inhibited.

WSW35 (Function setting 13)

Selector No.	Function	Setting and Specifications
1 | 4	Detection time length of the disconnection tone in ICM recording	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 those models equipped with a built-in TAD.

- **Selectors 1 through 4: Detection time length of the disconnection tone in ICM recording**

  If the equipment detects disconnection tone for the time length set by these selectors, it will disconnect the line.

WSW36 (Function setting 14)

Selector No.	Function	Setting and Specifications
1	ECP mode*	0: ON 1: OFF
2	Recovery from Inactive PC Interface	0: Disabled 1: Enabled
3	PC Power-off Recognition Time	0: Normal 1: Long
4 5	Not used.	
6 | 8	Lower limit of frequency to be ignored after detection of calling signals (Ci)	No. 6 7 8 0 0 0 : 0 (Not ignored) 0 0 1 : 4 (448 Hz) 0 1 0 : 8 (244 Hz) 0 1 1 : 12 (162 Hz) 1 0 0 : 16 (122 Hz) 1 0 1 : 20 (97 Hz) 1 1 0 : 24 (81 Hz) 1 1 1 : 28 (69 Hz)

*ECP (Enhanced Capabilities Port)

- **Selector 1: ECP mode**

  The ECP mode enhances the normal bidirectional communications between the facsimile equipment and the connected PC for higher transmission speed.

- **Selector 2: Recovery from Inactive PC Interface**

  If the facsimile equipment recognizes via the STB signal line that the connected PC is powered off, it will turn the PC interface outputs Low to protect the PC from hazards that could be caused by weak electric current accidentally flown from the equipment.

  This selector determines whether the equipment should recover from the inactive PC interface to normal interfacing state upon receipt of data from the PC.

- **Selector 3: PC Power-off Recognition Time**

  This selector sets the time length from when the equipment detects the PC powered off until it recognizes the detected state as power-off.

  If selector 2 is set to "0," it is recommended that selector 3 be set to "1"; otherwise, the equipment may mistakenly detect PC powered off.

- **Selectors 6 through 8: Lower limit of frequency to be ignored after detection of calling signals (Ci)**

  At the start of reception, if the equipment detects the frequency of calling signals (Ci) specified by selectors 1 through 4 of WSW14, it will start the ringer sounding. When doing so, the equipment may fail to detect the calling signals normally due to noises superimposed at the time of reception. To prevent it, use selectors 6 through 8 of WSW36.

  If the equipment detects higher frequencies than the lower limit specified by these selectors, it will regard them as noise and interpret that detecting state as being normal, allowing the ringer to keep sounding (until the equipment starts automatic reception of FAX data if in the FAX mode or enters the TAD mode if set in the TEL mode, according to the preset number of ringers).

[B] Printout of firmware switch data

n Function

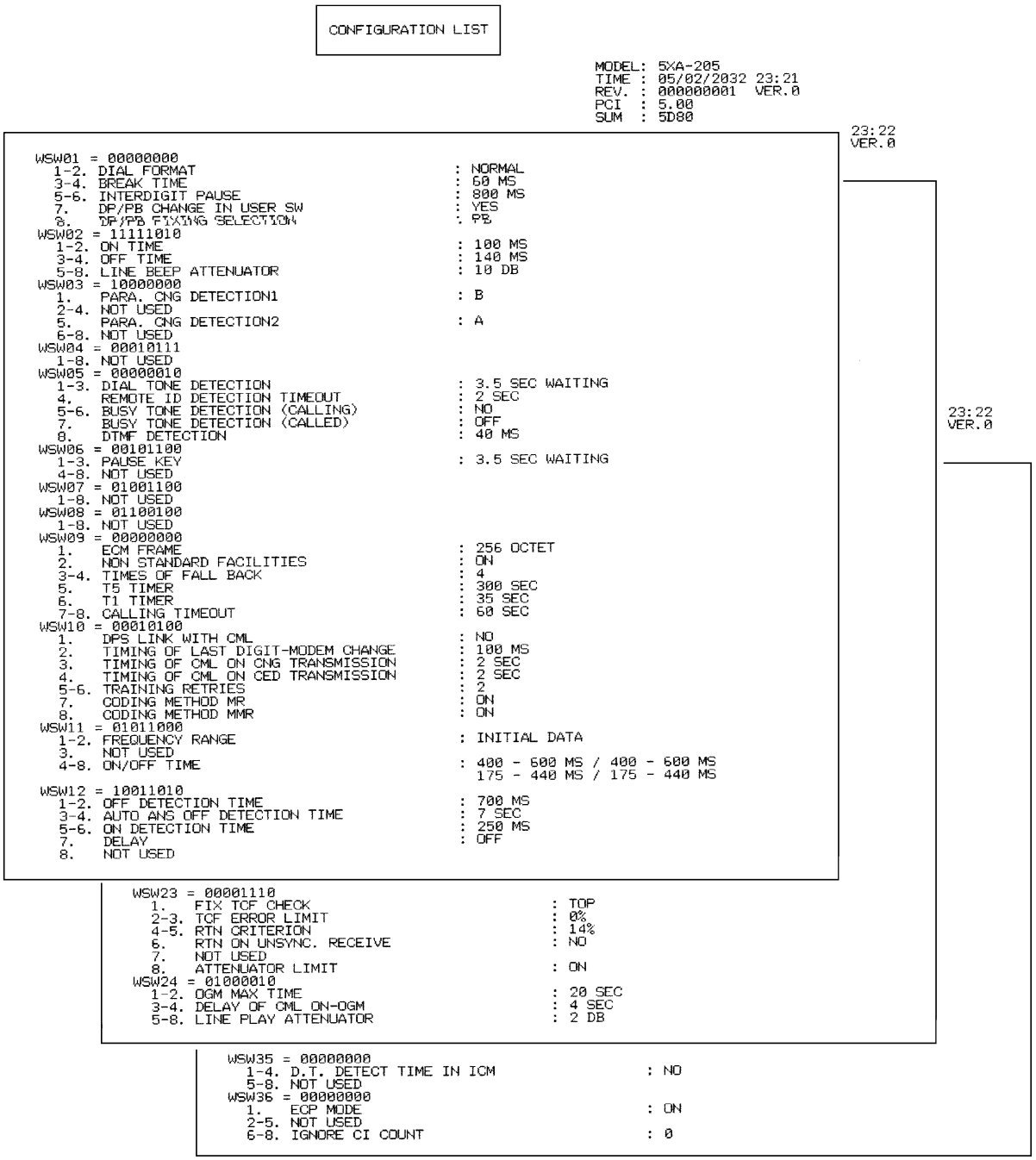
The equipment prints out the setting items and contents specified by the firmware switches.

n Operating Procedure

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

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

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



Configuration List

3.6 Operational Check of LCD

n Function

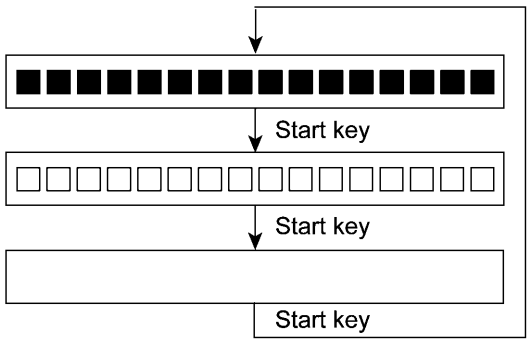
This function allows you to check whether the LCD on the control panel works normally.

n Operating Procedure

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

The LCD shows

(2) Press the **Start** key. Each time you press the **Start** key, the LCD cycles through the displays shown at right.



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

3.7 Operational Check of Control Panel PCB

n Function

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

n Operating Procedure

(1) Press the **1** and **3** keys in this order in the initial stage of the maintenance mode.

The "00 " will appear on the LCD.

(2) Press the keys and buttons in the order designated in the illustration shown below.

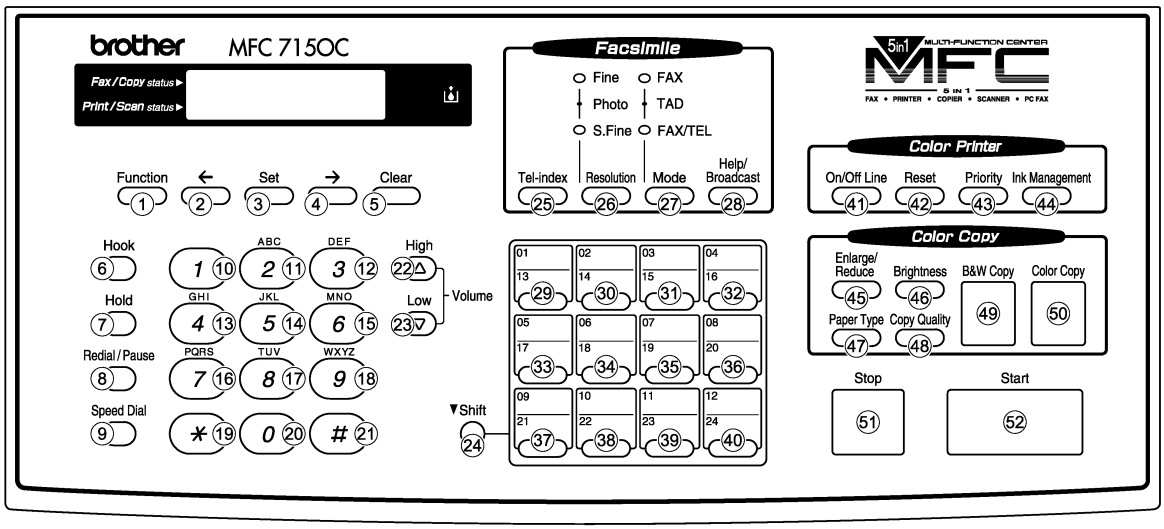
The LCD shows the corresponding number in decimal notation each time a key or button is pressed. Check that the displayed number is correct by referring to the illustration below.

If a key or button is pressed out of order, the equipment beeps and displays the "INVALID OPERATE" on the LCD. To return to the status ready to accept key & button entry for operational check, press the **Stop** key.

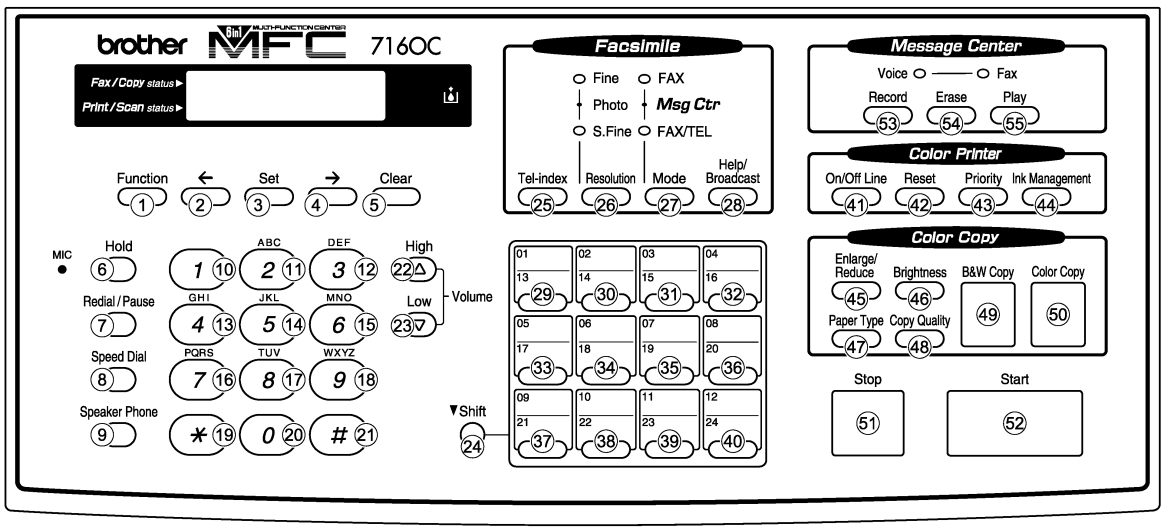
(3) After the last number key or button is pressed, the equipment beeps and returns to the initial stage of the maintenance mode.

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

MFC7150C



MFC7160C/MFC-740



Key & Button Entry Order

3.8 Sensor Operational Check

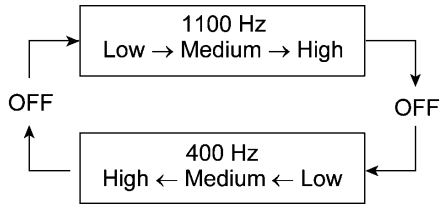
n Function

This function allows you to check that the following 13 sensors operate correctly.

- Document front sensor
- Document rear sensor
- Bin cover sensor
- Cover sensor
- Registration sensor
- Hook switch
- Paper width sensor
- Paper ejection sensor
- Head property EEPROM
- Black ink cartridge detector
- Yellow ink cartridge sensor
- Cyan ink cartridge sensor
- Magenta ink cartridge sensor

n Operating Procedure

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



If the sensors are ON as listed below, the LCD will show "FRRET1##CVRGWDHK" and "JM ##HDIKIYICIM," which can be switched by pressing the **Start** key. (## means that the area is not used.)

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

LCD	Sensors	Sensor signal ON
FR	Document front sensor	No document detected.
RE	Document rear sensor	No document detected.
T1	Bin cover sensor	Bin's front cover closed.
CV	Cover sensor	Top cover closed.
RG	Registration sensor	No recording paper detected.
WD	Paper width sensor	No recording paper (A4 or wider) detected.
HK	Hook switch	On-hook state.
JM	Paper ejection sensor	No document detected.
HD	Head property EEPROM	Head (rank) detected.
IK	Black ink cartridge sensor	Ink cartridge loaded.
IY	Yellow ink cartridge sensor	Ink cartridge loaded.
IC	Cyan ink cartridge sensor	Ink cartridge loaded.
IM	Magenta ink cartridge sensor	Ink cartridge loaded.

(2) Change the detecting conditions and check that the displayed letters disappear. For example, insert a document through the document front sensor and check that the "FR" disappears.

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

3.9 CIS Scanner Area Setting

n Function

The equipment sets the CIS scanner area and stores it into the EEPROM.

n Operating Procedure

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

The "SCANNER AREA SET," "BLACK LEVEL INIT," and "WHITE LEVEL INIT" will appear on the LCD in this order.

The equipment checks and sets the area to be scanned.

If no error is noted, the equipment returns to the initial stage of the maintenance mode.

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

3.10 Setting the Sensing Reference Levels of Black Ink Empty Sensor

n Function

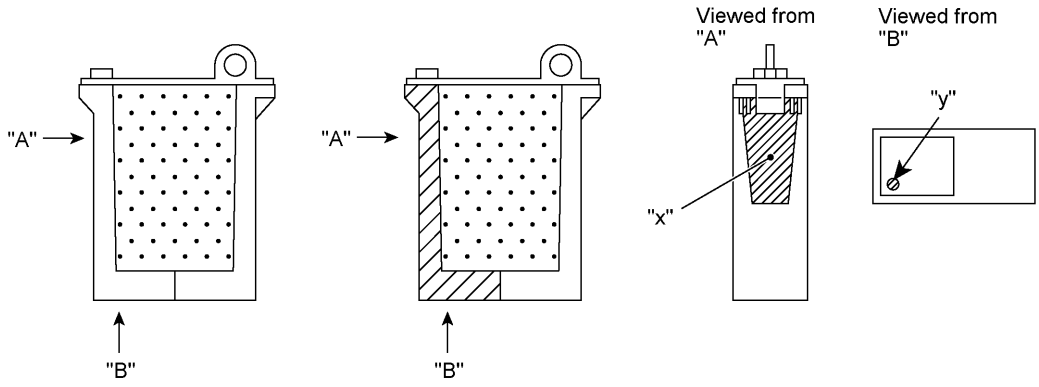
This function allows you to set the sensing reference levels of the black ink empty sensor which apply when the controller judges whether there is ink in the black ink cartridge. The setting procedure requires two types of reference cartridges--an empty cartridge and foam-empty cartridge.

NOTE: If you replace the main PCB or carriage ASSY, carry out this procedure.

n Operating Procedure

Handling notes for reference cartridges: Shown below are empty cartridge and foam-empty cartridge to be used for setting the sensing reference levels of the black ink empty sensor. Do not touch sections "x" or "y."

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



Empty cartridge Foam-empty cartridge

(1) Press the **5** and **7** keys in this order in the initial stage of the maintenance mode.
The LCD shows the "BKEMP TEST START" and "REMOVE ALL CART!" alternately.

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

(3) Remove all ink cartridges, one at a time.

(4) Close the top cover.

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

(6) Press the **5** and **7** keys in this order again.
The LCD shows the "BKEMP TEST START" and "SET EMPTY CART!" alternately.

(7) Open the top cover.
The carriage automatically moves left to the ink cartridge replacement position.

(8) Set the empty cartridge into the black ink cartridge position.

(9) Close the top cover.

The equipment shows the "-BKEMP CHECK-" and starts setting the sensing level for the empty cartridge.

If the equipment completes setting normally, the "SET F.EMP CART!!" appears. If it fails, the "BKEMP EMPTY:NG!" appears, so press the **Stop** key and go back to step (1).

(10) Open the top cover.

The carriage automatically moves left to the ink cartridge replacement position.

(11) Remove the empty cartridge and set the foam-empty cartridge into the black ink cartridge position instead.

(12) Close the top cover.

The equipment shows the "-BKEMP CHECK-" and starts setting the sensing level for the foam-empty cartridge.

If the equipment normally completes setting, it beeps and displays the "SET F.EMP CART!!." Two seconds later, the "SET ALL NEW CART" appears. If it fails, the "BKEMP F.EMP:NG!" appears, so press the **Stop** key and go back to step (1).

(13) Open the top cover and remove the foam-empty cartridge.

(14) Load all ink cartridges removed in step (3) back into place.

(15) Close the top cover.

The equipment automatically carries out purging for all colors of ink and then aging of the carriage (to obtain the initial value of the PWM). This will take approx. 10 minutes.

(16) Press the **Stop** key to return to the initial stage of the maintenance mode.

3.11 Alignment of Vertical Print Lines

n Function

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

n Operating Procedure

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

The equipment prints out a set of vertical alignment check patterns which consist of No. 1 to No. 9 lines for each of the 360 dpi, 720 dpi, and 1440 dpi.

If the vertical alignment is on, No. 5 line (each in the 360 dpi, 720 dpi, and 1440 dpi printouts) shows vertically aligned lines as shown on the next page.

The LCD shows the "360DPI ADJUST" and "ENTER NO. (1-9)" alternately.

(2) Check the printed vertical alignment check patterns for the 360 dpi and find which number line shows full alignment. If the line is other than No. 5, enter that line number by using the numerical keys. In the example given below, No. 5 line is not aligned and No. 9 line is fully aligned, so press the **9** key.

The LCD shows the "720DPI ADJUST" and "ENTER NO. (1-9)" alternately.

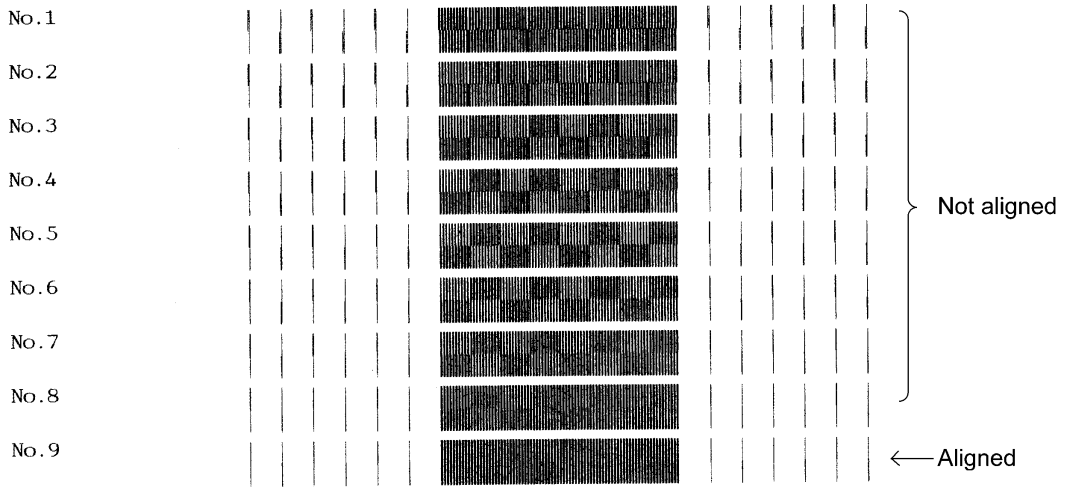
(3) For the 720 dpi, perform the same operation as in step (2).

The LCD shows the "1440DPI ADJUST" and "ENTER NO. (1-9)" alternately.

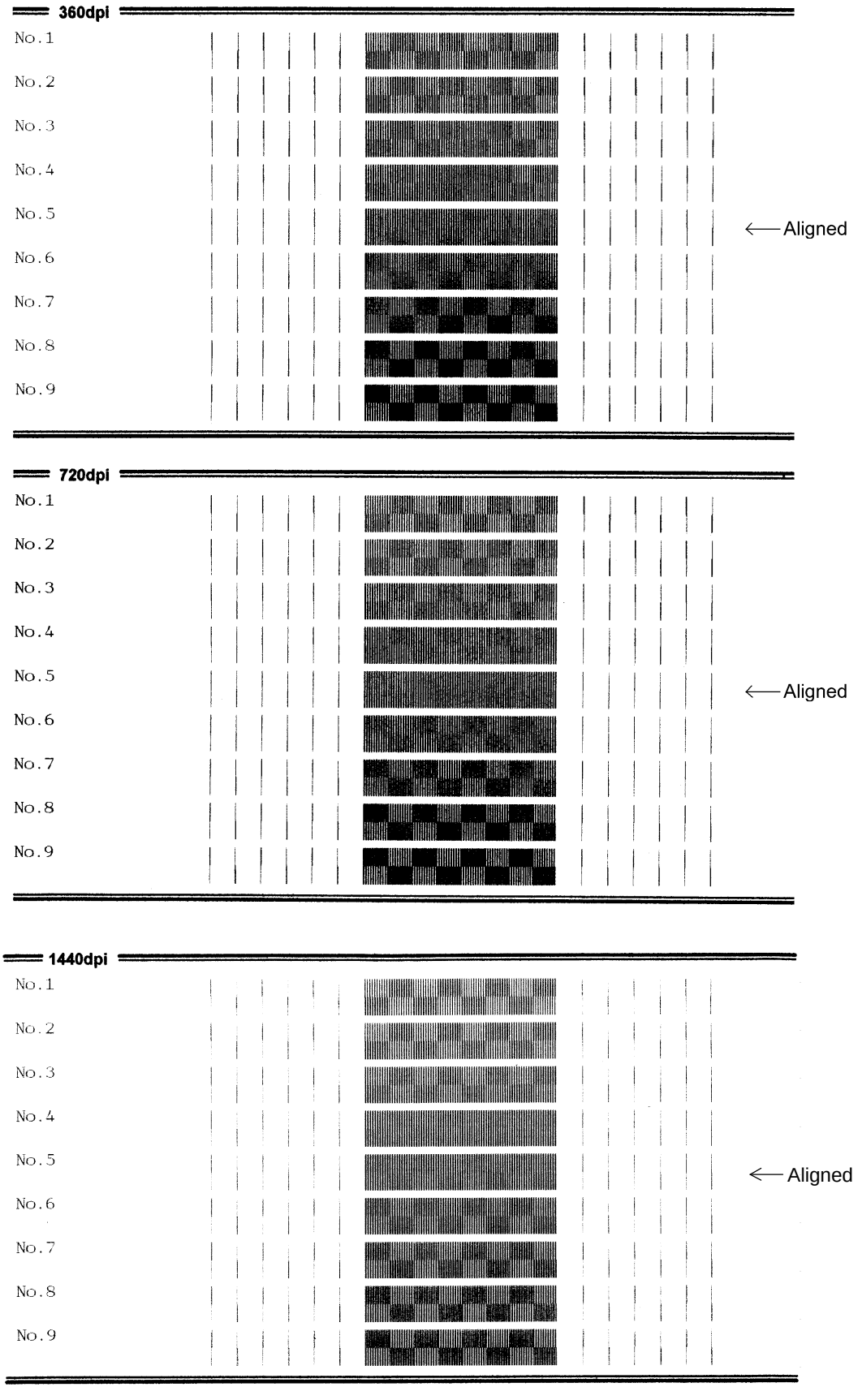
(4) For the 1440 dpi, perform the same operation as in step (2).

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

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



Vertical Alignment Check Pattern—Alignment OFF



Vertical Alignment Check Pattern—Alignment ON

3.12 Initial Adjustment of PWM Value (Aging of the Carriage)

n Function

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

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

NOTE: Opening the top cover or the front cover of the bin during the aging procedure will result in an error. If you perform this aging procedure with the top cover opened, the equipment will slowly age the carriage resulting in an error after completion of the aging.

n Operating Procedure

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

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

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

If any error occurs, the equipment beeps and shows "CR AGING :ERROR" on the LCD. To return to the initial stage of the maintenance mode, press the **Stop** key.

3.13 EEPROM Customizing

n Function

This function allows you to customize the EEPROM according to language, function settings, and firmware switch settings. The customizing codes list is given in Appendix 1.

NOTE: If you replace the main PCB, be sure to carry out this procedure.

n Operating Procedure

(1) Press the **7** and **4** keys in this order in the initial stage of the maintenance mode.

The current customizing code (e.g., 1101 in the case of MFC7160C U.S.A. versions) appears.

(2) Enter the desired customizing code (e.g., 0102 in the case of MFC7160C Canadian versions).

The newly entered code appears.

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

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

The equipment saves the setting and returns to the initial stage of the maintenance mode.

If you press the **Stop** key or no keys are pressed for one minute in the above procedure, the equipment stops the procedure and returns to the initial stage of the maintenance mode.

3.14 Equipment Error Code Indication

n Function

This function displays an error code of the last error on the LCD.

n Operating Procedure

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

The LCD shows the "MACHINE ERR X X."

NOTE: The "MACHINE ERR X X X X" may appear. The lower two X X shows the detail code for assembly line.

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

3.15 Output of Transmission Log to the Telephone Line

n Function

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

n Operating Procedure

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

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

1) MFC7150C/MFC7160C: Press the **Function**, **Mode**, and **0** keys in this order.

2) MFC-740: Press the **Menu**, **Mode**, and **0** keys in this order.

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

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

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

CHAPTER VI.

ERROR INDICATION AND TROUBLESHOOTING

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1. ERROR INDICATION

To help the user or the service personnel promptly locate the cause of a problem (if any), the facsimile equipment incorporates the self-diagnostic functions which display error messages for equipment errors and communications errors.

For the communications errors, the equipment also prints out the transmission verification report and the communications list.

1.1 Equipment Errors

If an equipment error occurs, the facsimile equipment emits an audible alarm (continuous beeping) for approximately 4 seconds and shows the error message on the LCD. For the error messages, see [1] below.

To display detailed error information, use the maintenance-mode function code 82 described in Chapter V, Section 3.14 (that is, make the equipment enter the maintenance mode and then press the **8** and **2** keys). Following the MACHINE ERR, one of the error codes listed in [2] will appear on the LCD.

[1] Error messages on the LCD

Messages on the LCD	Probable Cause
CHECK PAPER	The registration sensor detects no recording paper loaded in the bin.
PRINTER JAM	The paper ejection sensor detects that a paper jam has occurred.
CHECK PAPER SIZE	The paper width sensor stays ON, detecting no recording paper wider than A4-size loaded. Or the sensor stays OFF too long, detecting that the paper is abnormally long.
COVER OPEN	The cover sensor detects that the top cover is not closed.
CHECK CASSETTE	The bin cover sensor detects that the bin's front cover is not closed or the bin is not installed properly.
DOCUMENT JAM	n Document jam (1) The document length exceeds the limitation (400 or 90 cm) registered by firmware switch WSW16. (Refer to Chapter V, Section 3.5.) (Both the document front and rear sensors stay ON even after the document has been fed by the registered length.) (2) The document rear sensor detects no trailing edge of a document after the document has been fed by 400 cm. (The document rear sensor stays ON even after the document has been fed when the document front and rear sensors were OFF and ON, respectively.)

Messages on the LCD	Probable Cause
DOCUMENT JAM	n Document loading error (1) The document rear sensor detects no leading edge of a document within 10 seconds from the start of document loading operation. (The document rear sensor stays OFF even after the document has been fed when the document front sensor was ON.) (2) The loaded document is too short. (Since the document is shorter than the distance between the document front and rear sensors, the document front sensor is turned OFF before the document rear sensor is turned ON.)
CLEAN UP SCANNER	In the scanning compensation data list printed by the maintenance-mode function code 05 (refer to Chap. V, Section 3.2), less than fifty percent of the white level data is faulty. (This message may appear only in the maintenance mode)
SCANNER ERROR	In the scanning compensation data list printed by the maintenance-mode function code 05 (refer to Chap. V, Section 3.2), fifty percent or more of the white level data is faulty. (This message may appear only in the maintenance mode)
NEAR EMPTY CYAN NEAR EMPTY MGENT NEAR EMPTY YELLW NEAR EMPTY BLACK	The ink dot counter (for cyan, magenta, yellow, or black) in the EEPROM on the head PCB has counted up the specified number of dots, meaning near empty of ink. Even if any of these messages is displayed, color printing is still possible.
INK EMPTY CYAN INK EMPTY MAGENT INK EMPTY YELLOW INK EMPTY BLACK	The ink dot counter (for cyan, magenta, yellow, or black) in the EEPROM on the head PCB has counted up the specified number of dots, meaning that the ink has run out. Once any of these messages is displayed, color printing is no longer possible. (If black ink remains, printing of the received data record or monochrome copying is possible.) **NOTE:** For checking how much the black ink remains accurately, the controller compensates the ink dot count with the black ink empty sensor.
SET CARTRIDGES	Any one of the four ink cartridge sensors detects no ink cartridge loaded.
WARMING UP	The temperature inside the equipment has dropped to 5.5°C or below after two hours of powering-on state, or it has dropped to 3.5°C or below within two hours of powering-on state.
COOLING DOWN	The temperature inside the equipment has exceeded 48°C.
SET INK HEAD	The CPU on the main PCB has detected no print head mounted when attempting to read the property information obtained by the head property detector and stored in the EEPROM on the head PCB.

Messages on the LCD	Probable Cause
PLS OPEN COVER	To display the relating detailed error code, use maintenance-mode function code 82. (Refer to Chapter V, Section 3.14.) If this message appears, open and close the top cover. The message may disappear if opening/closing the top cover removes the error. If the error persists, the "MACHINE ERROR X X" will appear instead of this message.
PC BUSY OR FAIL	After connected with the host computer, the equipment has received no response from the computer. (A communications error has occurred.)

If only an alarm beep is heard without any message on the LCD when the equipment is powered up, the ROM or RAM will be defective.

[2] Error codes shown in the "MACHINE ERR X X " message

If the LCD shows the "PLS OPEN COVER" message, you can display the detailed error code following the MACHINE ERR, by using the maintenance-mode function code 82 described in Chapter V, Section 3.14.

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

NOTE: To check sensors, use the maintenance-mode function code 32 described in Chapter V, Section 3.8 (that is, press the **3** and **2** keys in the maintenance mode).

Error Code (Hex)	Error factor	Check:
23	Printer engine timeout.	• Main PCB
25	Ink cartridges had already been loaded when the power was first applied.	Reload ink cartridges, referring to the Owner's Manual.
31	The carriage cannot travel to the right or left.	• Carriage ASSY • Encoder strip (Any stains or scratches? Hooked correctly?) • Paper feed motor • Main PCB • Power supply PCB • Purge unit • CR base ASSY
32	After driven by the specified number of pulses, the carriage does not stop (since it cannot detect the left end of the travel).	
33	The carriage movement parameter exceeded the travel range during printing.	
34	When initialized, the carriage could not detect the right or left end of the travel range.	
35	The carriage cannot move in midway of travel.	
38	The carriage stop position is out of the travel range.	
39	Printing area error.	
3A	Sudden carriage stop during printing acceleration.	• Carriage ASSY • Encoder strip (Any stains or scratches? Hooked correctly?) • Paper feed motor • Main PCB • Power supply PCB • Purge unit • CR base ASSY
3D	The carriage has overridden the travel range.	
41	The head drive voltage has not been turned from Low to High within the specified time.	• Carriage ASSY • Main PCB • Print head unit • Power supply PCB
42	The head drive voltage has not been turned from High to Low within the specified time.	
43	The head drive voltage sticks to Low.	• Print head unit • Main PCB • Power supply PCB

Error Code (Hex)	Error factor	Check:
44	Head thermister broken.	• Print head unit • Carriage ASSY • Main PCB
45	Head thermister short-circuited.	
46	The number of performed purge sequences has reached the limit.	• Ink absorber • Main PCB
4B	Abnormal carriage travel speed detected when the power was applied.	• Encoder strip (Any stains or scratches? Hooked correctly?) • Purge unit • CR base ASSY • Carriage ASSY • Main PCB
4C	Head rated voltage data stored in the EEPROM on the head PCB is invalid. (This code may appear only in the maintenance mode.)	• Print head unit • Main PCB • Power supply PCB
50	The purge cam HP switch does not come ON even after the purge cam has been driven by the specified number of pulses.	• Purge unit • Purge gear frame • CR base ASSY • Paper feed motor • Main PCB
51	The purge cam HP switch does not go OFF even after the purge cam has been driven by the specified number of pulses.	
52	At the time of purge operation, the carriage has not stopped in the purge position.	
53	The purge cam HP switch has come ON when the carriage was in the wipe position.	
54	When reset, the purge cam HP switch does not come ON even after the purge cam has been driven by the specified number of pulses.	
55	When reset, the purge cam HP switch does not go OFF even after the purge cam has been driven by the specified number of pulses.	

Error Code (Hex)	Error factor	Check:
82	Recording paper feeding error.	• Bin • Registration sensor actuator • Paper width sensor actuator • Main PCB
83	Recording paper jam. (The registration sensor sticks to OFF, indicating that paper has jammed.)	• Registration sensor actuator • Main PCB
84	Recording paper jam. (The paper ejection sensor has detected a paper jam.)	• Paper ejection sensor actuator • Registration sensor actuator • Main PCB
88	Recording paper jam. (Even after the registration sensor has come ON, the paper ejection sensor does not detect paper.)	
A1	Top cover opened.	• Cover sensor actuators • Main PCB • Top cover
A2	Document too long to scan.	• Document front sensor actuator • Document rear sensor actuator • Control panel PCB • Document sensor PCB • Document feed roller • Scanner motor • Main PCB
A3	Document not detected by the document rear sensor.	
A4	50% or more faulty of white level data.	• CIS unit • Main PCB
A7	One-line feeding timeout.	
A8	One-line scanning timeout.	
AC	Less than 50% faulty of white level data.	• CIS unit • Main PCB
B8	A/D voltage regulation error.	• Carriage ASSY • Main PCB • Power supply PCB
B9	Light emission intensity error of the LED array.	• CIS unit • Main PCB

Error Code (Hex)	Error factor	Check:
D5	The MODEM has failed to complete the command transmission sequence.	
E4	Out of recording paper.	• Bin • Registration sensor actuator • Document feed roller • Main PCB
E6	Write error in EEPROM	• Main PCB
E8	Data scanning error during transmission.	• CIS unit • Main PCB
EA	Document removed at phase B	
F3	Voice message recording or playing-back not started.	• Main PCB
F6	PC interface error	• Interface cable • Main PCB

1.2 Communications Errors

If a communications error occurs, the facsimile equipment

① emits an audible alarm (intermittent beeping) for approximately 4 seconds,

② displays the corresponding error message, and

③ prints out the transmission verification report if the equipment is in sending operation.

n Definition of Error Codes on the Communications List

(1) Calling

Code 1	Code 2	Causes
10	08	Wrong number called.
11	01	No dial tone detected before start of dialing.
11	02	Busy tone detected before dialing.
11	03	2nd dial tone not detected.
11	05	No loop current detected.*
11	06	Busy tone detected after dialing or called.
11	07	No response from the remote station in sending.
11	10	No tone detected after dialing.
17	07	No response from the calling station in receiving.

*Available in Germany and Austria only.

(2) Command reception

Code 1	Code 2	Causes
20	01	Unable to detect a flag field.
20	02	Carrier was OFF for 200 ms or longer.
20	03	Abort detected ("1" in succession for 7 bits or more).
20	04	Overrun detected.
20	05	A frame for 3 seconds or more received.
20	06	CRC error in answerback.
20	07	Undefined command received.
20	08	Invalid command received.
20	09	Command ignored once for document setting or for dumping-out at turn-around transmission.
20	0A	T5 time-out error
20	0B	CRP received.
20	0C	EOR and NULL received.

(3) Compatibility [checking the NSF and DIS]

Code 1	Code 2	Causes
32	01	Remote terminal only with V.29 capability in 2400 or 4800 bps transmission.
32	02	Remote terminal not ready for polling.
32	10	Remote terminal not equipped with password function or its password switch OFF.
32	11	Remote terminal not equipped with or not ready for confidential mail box function.
32	12	Remote terminal not equipped with or not ready for relay broadcasting function.
32	13	No confidential mail in the remote terminal.
32	14	The available memory space of the remote terminal is less than that required for reception of the confidential or relay broadcasting instruction.

(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	11	Unregistered group code entered for relay broadcasting function, or the specified number of broadcasting subscribers exceeding the limit.
40	12	Retrieval attempted when not ready for retrieval.
40	13	Polled by any other manufacturers' terminal while waiting for secure polling.
40	17	Invalid resolution selected.

(5) Command reception [checking the NSF and DIS after transmission of NSS and DCS]

Code 1	Code 2	Causes
50	01	Vertical resolution capability changed after compensation of background color.

(6) ID checking

Code 1	Code 2	Causes
63	01	Password plus "lower 4 digits of telephone number" not coincident.
63	02	Password not coincident.
63	03	Polling ID not coincident.
63	04	Entered confidential mail box ID uncoincident with the mail box ID.
63	05	Relay broadcasting ID not coincident.
63	06	Entered retrieval ID uncoincident with that of the mail box ID.

(7) DCN reception

Code 1	Code 2	Causes
74		DCN received.

(8) TCF transmission/reception

Code 1	Code 2	Causes
80	01	Fallback impossible.

(9) Signal isolation

Code 1	Code 2	Causes
90	01	Unable to detect video signals and commands within 6 seconds after CFR is transmitted.
90	02	Received PPS containing invalid page count or block count.

(10) Video signal reception

Code 1	Code 2	Causes
A0	03	Error correction sequence not terminated even at the final transmission speed for fallback.
A0	11	Receive buffer empty. (5-second time-out)
A0	12	Receive buffer full during operation except receiving into memory.
A0	13	Decoding error continued on 500 lines.
A0	14	Decoding error continued for 10 seconds.
A0	15	Time-out: 5 seconds or more for one-line transmission.
A0	16	RTC not found and carrier OFF signal detected for 6 seconds.
A0	17	RTC found but no command detected for 60 seconds.
A0	18	Receive buffer full during receiving into memory.
A8	01	RTN, PIN, or ERR received at the calling terminal.*
A9	01	RTN, PIN, or ERR received at the called terminal.*

* Available in Germany and Austria only

(11) General communications-related

Code 1	Code 2	Causes
B0	02	Unable to receive the next-page data.
B0	03	Unable to receive polling even during turn-around transmission due to call reservation.
B0	04	PC interface error.

(12) Maintenance mode

Code 1	Code 2	Causes
E0	01	Failed to detect 1300 Hz signal in burn-in operation.
E0	02	Failed to detect PB signals in burn-in operation.

(13) Equipment error

Code 1	Code 2	Causes
FF	X X	Equipment error (For X X, refer to Section 1.1 [2].)

2. TROUBLESHOOTING

2.1 Introduction

This section gives the service personnel some of the troubleshooting procedures to be followed if an error or malfunction occurs with the facsimile equipment. It is impossible to anticipate all of the possible problems which may occur in future and determine the troubleshooting procedures, so this section covers some sample problems. However, those samples will help service personnel pinpoint and repair other defective elements if he/she analyzes and examines them well.

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.

2.3 Checking prior to Troubleshooting

Prior to proceeding to the troubleshooting procedures given in Subsection 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 located on the bottom of the machine is used. The supply voltage stays within the rating ±10%.

(2) Each voltage level on AC input lines and DC lines is correct.

(3) All cables and harnesses are firmly connected.

(4) None of the fuses are blown.

Recording paper

Check that:

(1) A recommended type of recording paper is used.

(2) The recording paper is not dampened.

Ink cartridges

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

Print head

(1) Check that the print head is installed on the carriage correctly. (Check the dimple contact between the print head PCB and the carriage PCB.)

(2) Repeat the head purging operation several times.

2.4 Troubleshooting Procedures

[1] Control panel related

Trouble	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 • FPC key • Main PCB

[2] Telephone related

Trouble	Check:
(1) No phone call can be made.	• FPC key • Hook switch PCB • Control panel PCB • NCU PCB • Main PCB
(2) Speed dialing or one-touch 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) Speaker silent during on-hook dialing.	• Ordinary dialing function (Pick up the handset and press the numerical keys.) If it works normally, proceed to the following checks; if not, refer to item (1) above. • Speaker
(4) Dial does not switch between tone and pulse.	• Main PCB

Trouble	Check:
(5) Telephone does not ring.	• Speaker • NCU PCB • Main PCB

[3] Communications related

Trouble	Check:
(1) No tone is transmitted.	• Main PCB • NCU PCB

[4] Paper/document feeding related

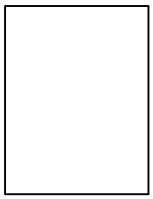
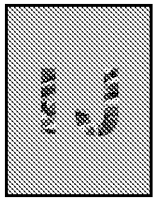
Trouble	Check:
(1) Neither "COPY: PRESS COPY" nor "FAX: NO. & START" message appears although documents are set.	• Sensors by using the maintenance-mode function code 32. (Refer to Chapter V, Section 3.8.) • Document front sensor actuator and document rear sensor actuator • Main PCB
(2) Document not fed.	• ADF and its related sections • Scanner motor and its harness • Document feed rollers and their related gears • Main PCB
(3) Document double feeding	• ADF parts
(4) Document jam	• Scanner motor
(5) Recording paper not fed.	• Bin related gears • Main PCB
(6) Recording paper jam	• Paper feeding mechanism • Gear drive unit

[5] Print-image related

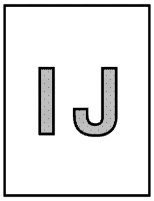
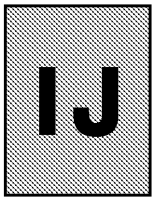
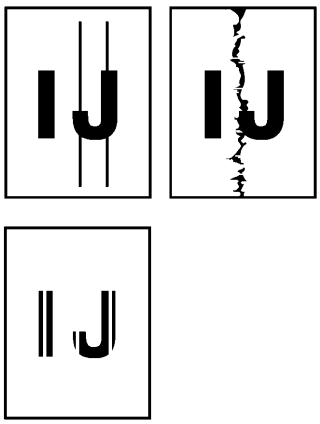
If the received or sent image has any problem, first make a copy with the facsimile equipment.

If the copied image is normal, the problem may be due to the remote terminal; if it is abnormal, proceed to the following checks:

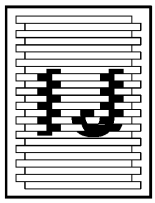
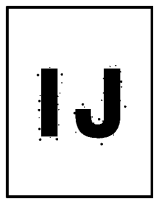
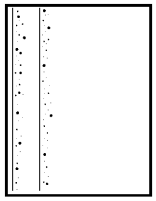
Jobs enclosed by parentheses (♦) require the special adjustment jig set.

Trouble	Action to be taken
(1) Completely blank 	<u>At the scanner</u> Check the following components: - CIS harness - 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 dimple contact between the print head PCB and the carriage PCB. Clean it if contaminated. (♦ If the problem persists, replace the carriage ASSY.) • Check the connection of the head flat cables on the main PCB. (♦ If either of those cables is broken or damaged, replace the carriage ASSY.) • Replace the main PCB.
(3) All black 	<u>At the scanner</u> Check the following components: - CIS harness - CIS unit - Main PCB <u>At the printer</u> Check the following components: - Print head unit - Main PCB - Carriage ASSY (♦ Replace the carriage ASSY.)

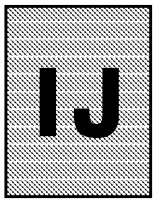
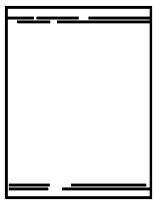
Jobs enclosed by parentheses (♦) require the special adjustment jig set.

Trouble	Action to be taken
(4) Light 	<u>At the scanner</u> Check the following components: - CIS unit - Main PCB <u>At the printer</u> Check the following components: - Ink cartridges - Print head unit - Main PCB - Power supply PCB
(5) Dark 	<u>At the scanner</u> Check the following components: - CIS unit - Main PCB <u>At the printer</u> • For each of the four ink-jet units, perform the head purging operation several times to remove dust or air bubbles from its nozzles. If the problem persists, replace the print head unit. • Check the paper feed-related rollers. (♦ Replacement of the paper feed roller or paper ejection roller requires the special adjustment jig set.) • Replace the main PCB and power supply PCB.
(6) Black or blurred vertical stripes 	<u>At the scanner</u> Check the following components: - CIS unit <u>At the printer</u> • Check whether paper is in abnormal contact with any other components during ejecting. • Check the encoder strip for stains or scratches. (♦ If the encoder strip is not hooked properly, correct it.) • (♦ Replace the CR base ASSY.)

Jobs enclosed by parentheses (♦) require the special adjustment jig set.

Trouble	Action to be taken
(7) Print edges not aligned 	<u>At the printer</u> • Check the alignment of vertical print lines by using the maintenance-mode function code 65. (Refer to Chapter V, Section 3.11). • Check the print head unit. • Check the encoder strip for stains or scratches. (♦ If the encoder strip is not hooked properly, correct it.)
(8) Ink splash  	<u>At the printer</u> • For each of the four ink-jet units, perform the head purging operation several times to remove dust or air bubbles from its nozzles. • Check the ink cartridges. Any of them has run out of ink or the ink viscosity has been increased, so replace it. • Replace the print head unit. • Replace the main PCB • Replace the power supply PCB. • (♦ Adjust the head-platen gap by turning the eccentric bearings on the carriage rail.)
(9) Random missing dots 	<u>At the printer</u> • For each of the four ink-jet units, perform the head purging operation several times to remove dust or air bubbles from its nozzles. • Check the ink cartridges. If any cartridges have run out of ink, replace them. • Check the dimple contact between the print head PCB and the carriage PCB. Clean it if contaminated. • Replace the print head unit. (♦ If the problem persists, replace the carriage ASSY.) • Check the connection of the head flat cables on the main PCB. (♦ If either of those cables is broken or damaged, replace the carriage ASSY.) • Replace the main PCB • (♦ Adjust the position of the purge unit.) • (♦ Clean the purge cap of the purge unit with the head cleaner. If the wiper or the pump of the purge unit is defective, replace the purge unit.)

Jobs enclosed by parentheses (♦) require the special adjustment jig set.

Trouble	Action to be taken
(10) White horizontal streaks 	• For each of the four ink-jet units, perform the head purging operation several times to remove dust or air bubbles from its nozzles. • Replace the print head unit. • Check the paper feed-related rollers. (♦ Replacement of the paper feed roller or paper ejection roller requires the special adjustment jig set.)
(11) Stained leading edge of recording paper 	<u>At the printer</u> • Clean the nozzle ends of the ink-jet units. • (♦ Adjust the head-platen gap by turning the eccentric bearings on the carriage rail.)

[6] PC-driven or video capture-driven printing

Trouble	Check:
(1) PC-driven printing is impossible.	• Interface with the host computer • PC interface cable • Main PCB • Centronics interface
(2) Video capture-driven printing is impossible	• Video PCB • Main PCB • Centronics interface
(3) Video printing is impossible.	• Video PCB • Main PCB

July ’98
5XA203
Printed in Japan

MFC7150C/MFC7160C

Appendix 1. EEPROM Customizing Codes

EEPROM Customizing Codes

This function allows you to customize the EEPROM according to language, function settings, and firmware switch settings.

n Operating Procedure

(1) MFC7150C/MFC7160C: Press the **Function**, *****, **2**, **8**, **6**, and **4** keys in this order to make the facsimile equipment enter the maintenance mode.

Within 2 seconds

MFC-740: Press the **Menu**, *****, **2**, **8**, **6**, and **4** keys in this order to make the facsimile equipment enter the maintenance mode.

Within 2 seconds

The equipment beeps for approx. one second and displays " ▮▮ MAINTENANCE ▮▮▮ " on the LCD.

(2) Press the **7** and **4** keys in this order in the initial stage of the maintenance mode.

The current customizing code (e.g., 1101 in the case of MFC7160C U.S.A. versions) appears.

(3) Enter the desired customizing code (e.g., 0102 in the case of MFC7160C Canadian versions).

The newly entered code appears.

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

(4) Press the **Start** key.

The equipment saves the setting and returns to the initial stage of the maintenance mode.

If you press the **Stop** key or no keys are pressed for one minute in the above procedure, the equipment stops the procedure and returns to the initial stage of the maintenance mode.

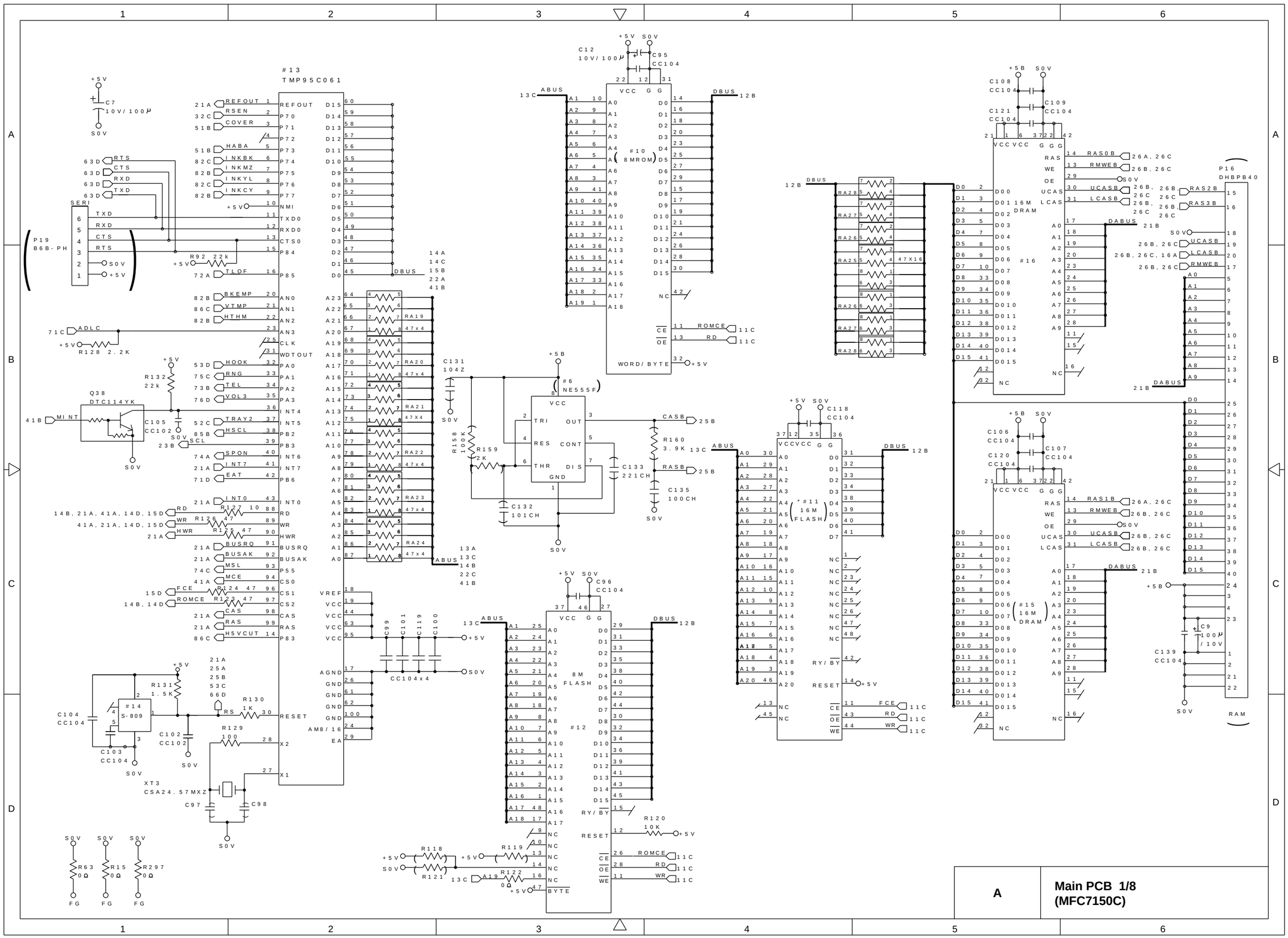
n EEPROM Customizing Codes List

Versions	Model	
	MFC7150C	MFC7160C
U.S.A.	1001	1101
CANADA	0002	0102

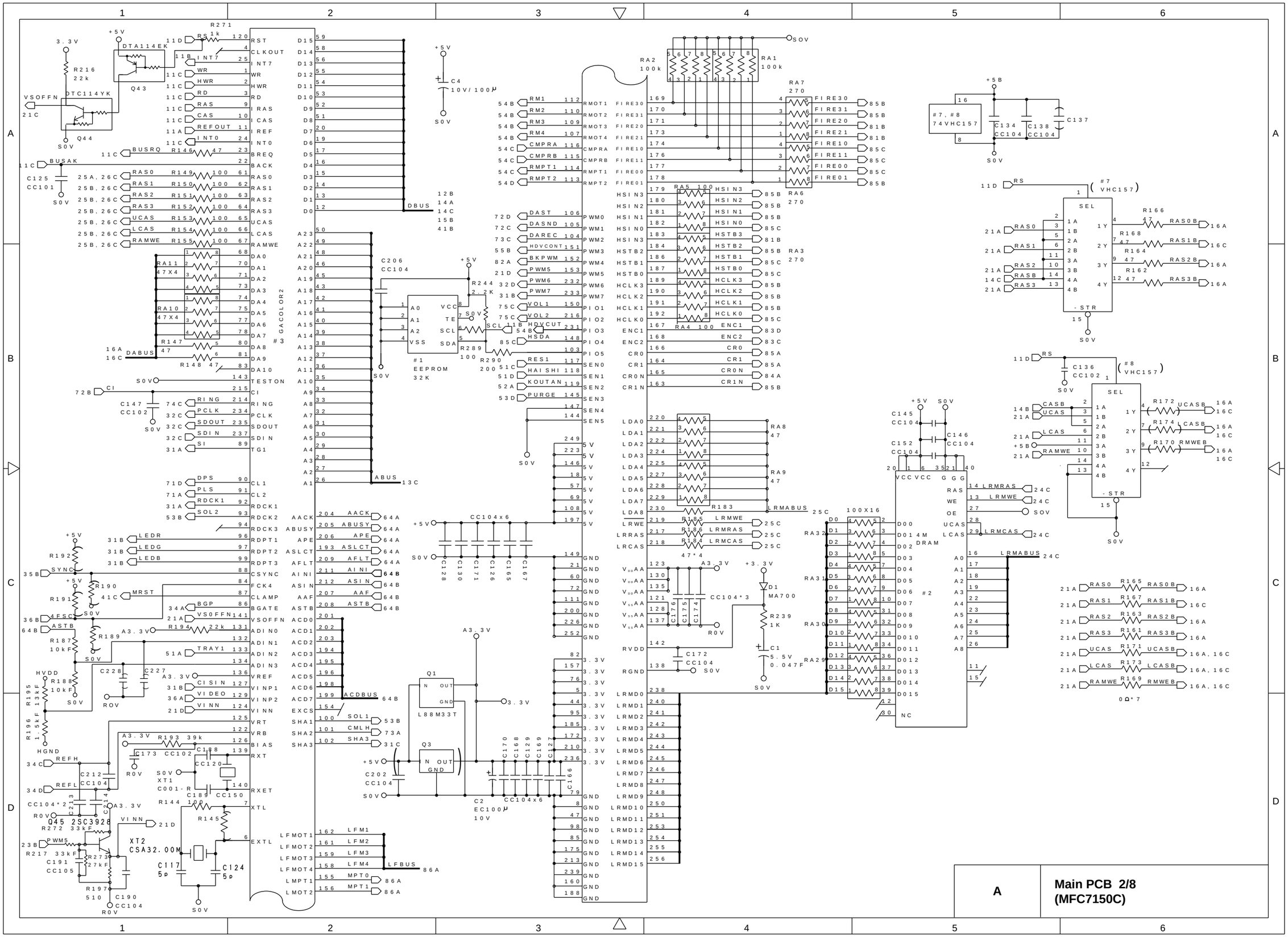
MFC7150C/MFC7160C

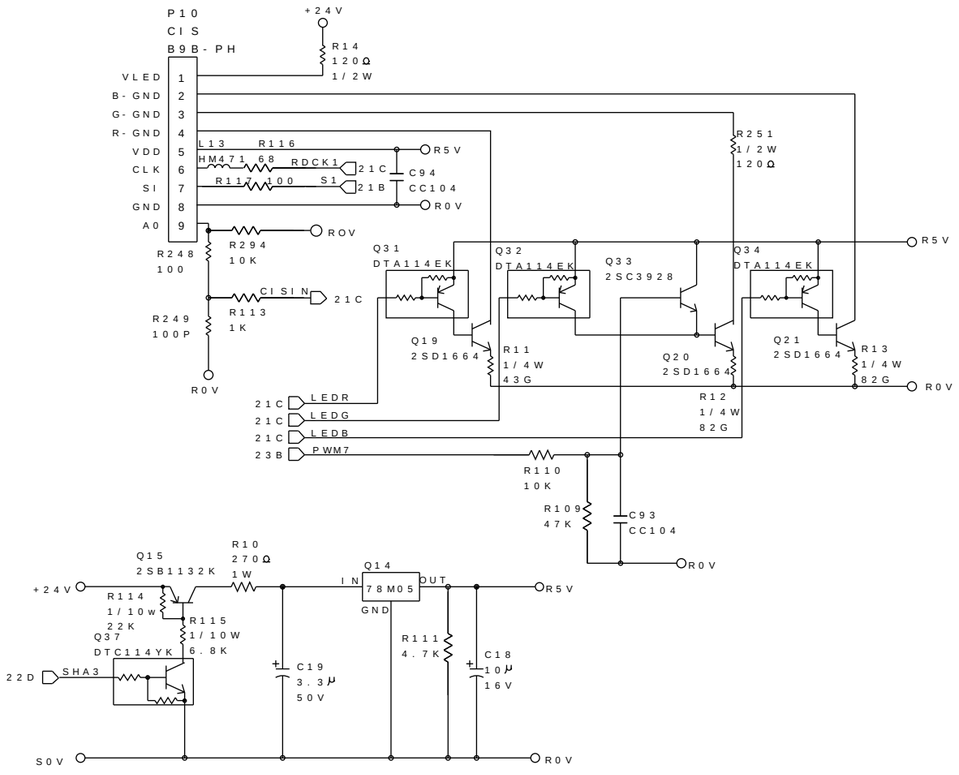
Appendix 2. Circuit Diagrams

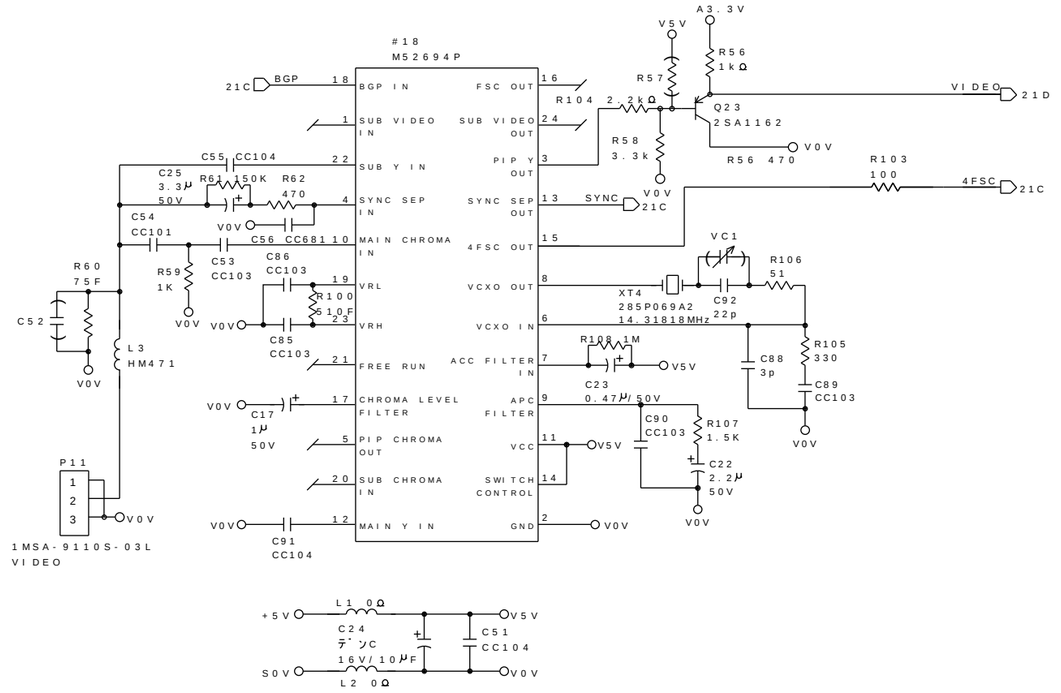
A. Main PCB
B. Network Control Unit (NCU) PCB
C. Control Panel PCB
D. Power Supply PCB

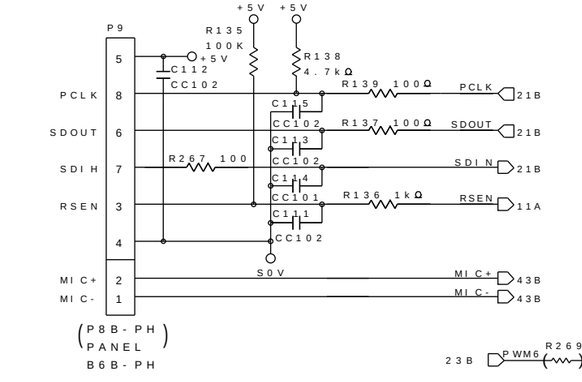


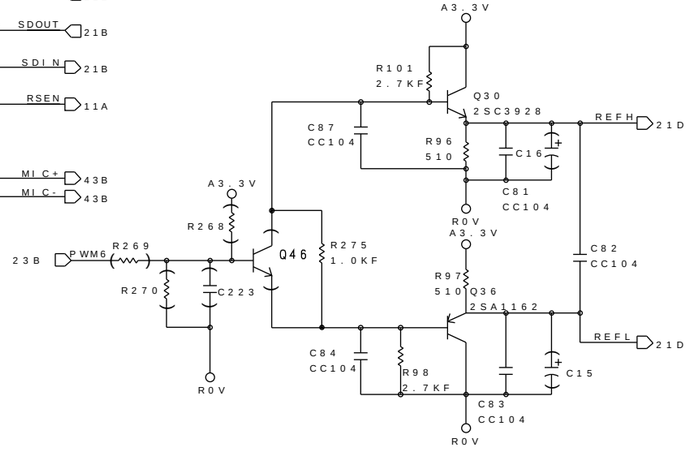
A	**Main PCB 1/8 (MFC7150C)**


Main PCB 2/8
(MFC7150C)
A
GACOLOR2
#3
#1
EEPROM
32K
#2
DRAM
#7
#8
74VHC157
L88M33T
MA700
Q45 2SC3928
XT2
CSA32.00M
DTA114EK
DTC114YK
Q43
Q44
R271
1k
R216
22k
C4
10V/100μ
C125
CC101
C206
CC104
R244
2.2K
R289
100
R290
200
51C
C147
CC102
C228
C227
R188
10kF
R195
13kF
R196
1.5kF
R193
39k
C173
C198
C212
C213
C214
R272
33kF
R217
33kF
R273
27kF
C191
CC105
R197
510
C190
R144
100
R145
C117
5p
C124
5p
R192
R190
41C
R191
R189
R187
10kF
R194
22k
C202
CC104
C2
EC100μ
10V
R183
R184
R185
R186
47*4
R239
1K
C1
5.5V
0.047F
C172
CC104
C145
CC104
C146
CC104
C152
CC104
C136
CC102
C134
CC104
C138
CC104
C137
R166
R168
R164
R162
R172
R174
R170
R165
R167
R163
R161
R171
R173
R169
0Ω*7
RA1
100k
RA2
100k
RA3
270
RA4
100
RA5
100
RA6
270
RA7
270
RA8
47
RA9
47
RA10
47X4
RA11
47X4
100X16
R147
47
R148
47
R149
100
R150
100
R153
100
R152
100
R155
100
R154
100
R146
47
CC104x6
CC104*3
CC104*2
R0V
S0V
+5V
+3.3V
A3.3V
3.3V
5V
+5B
VCC
GND
NC

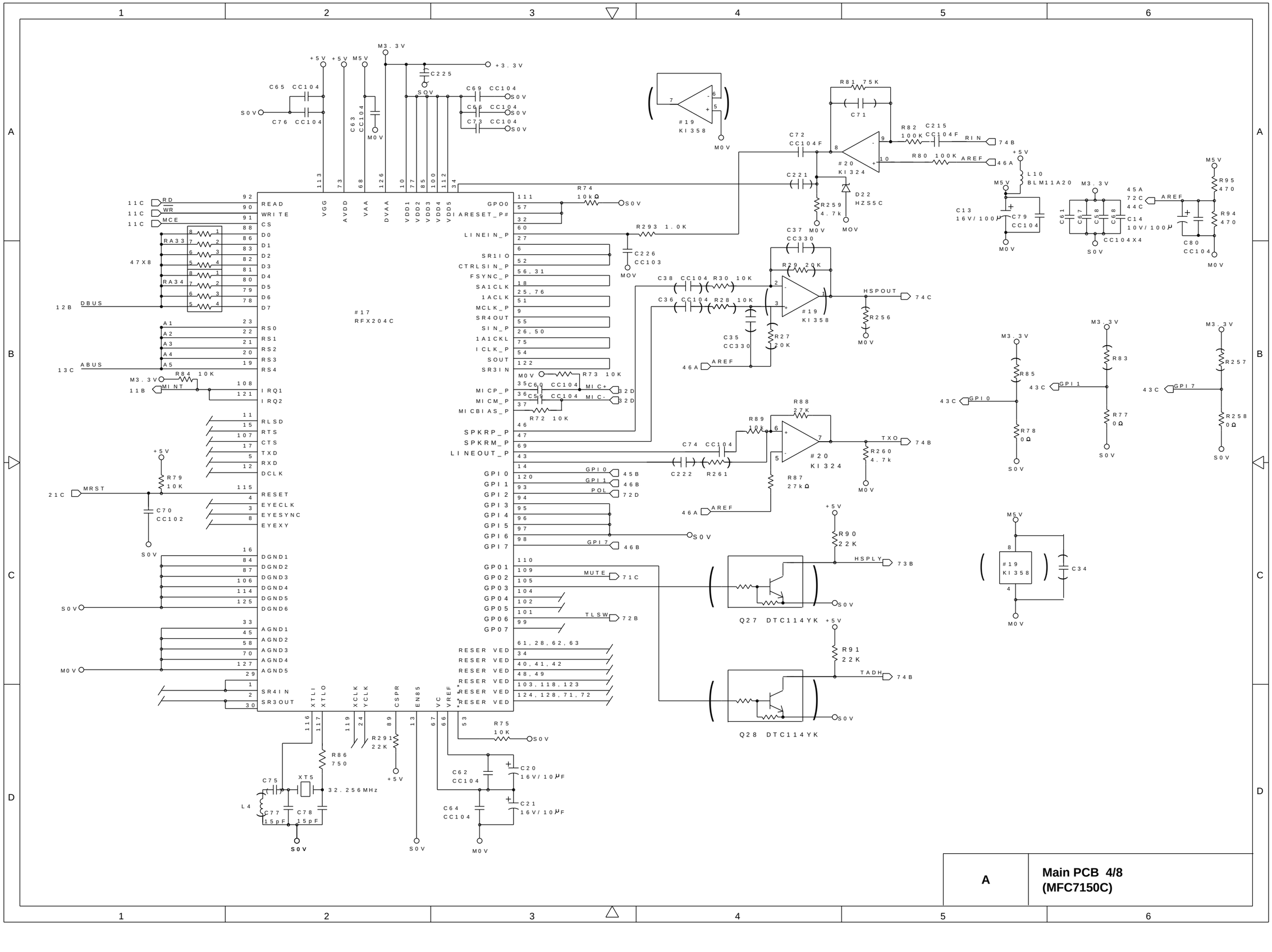




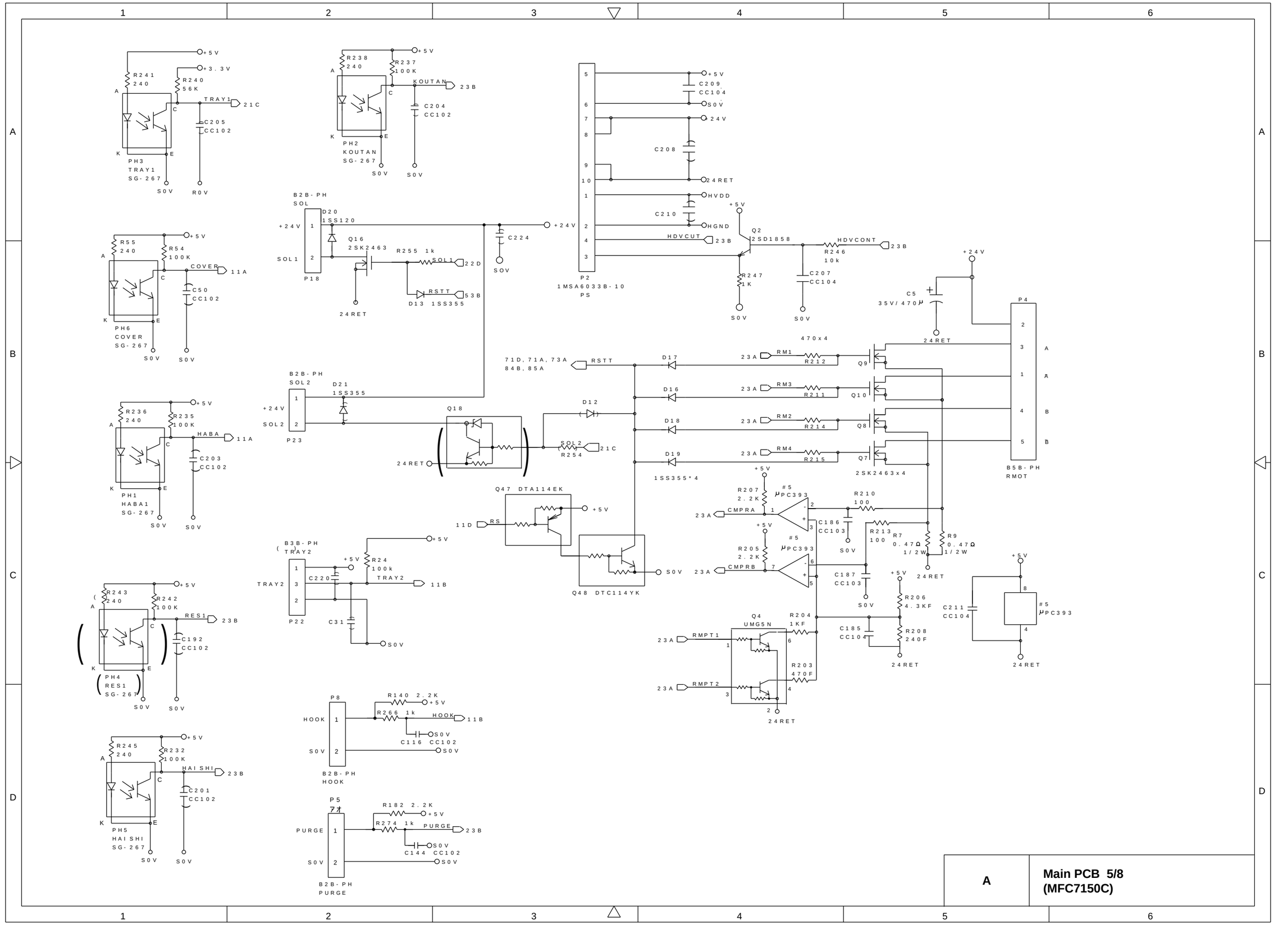




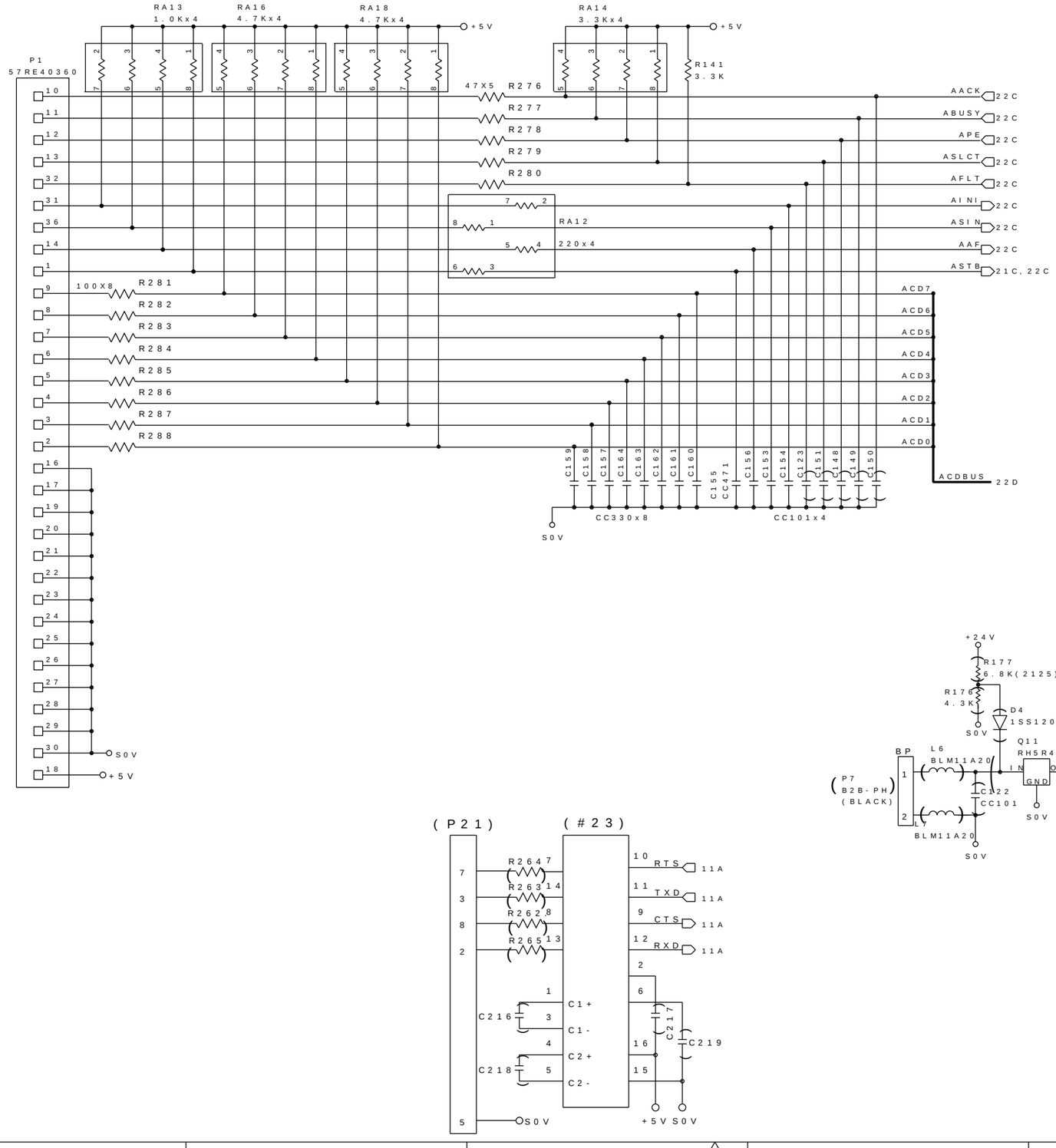
A	**Main PCB 3/8 (MFC7150C)**



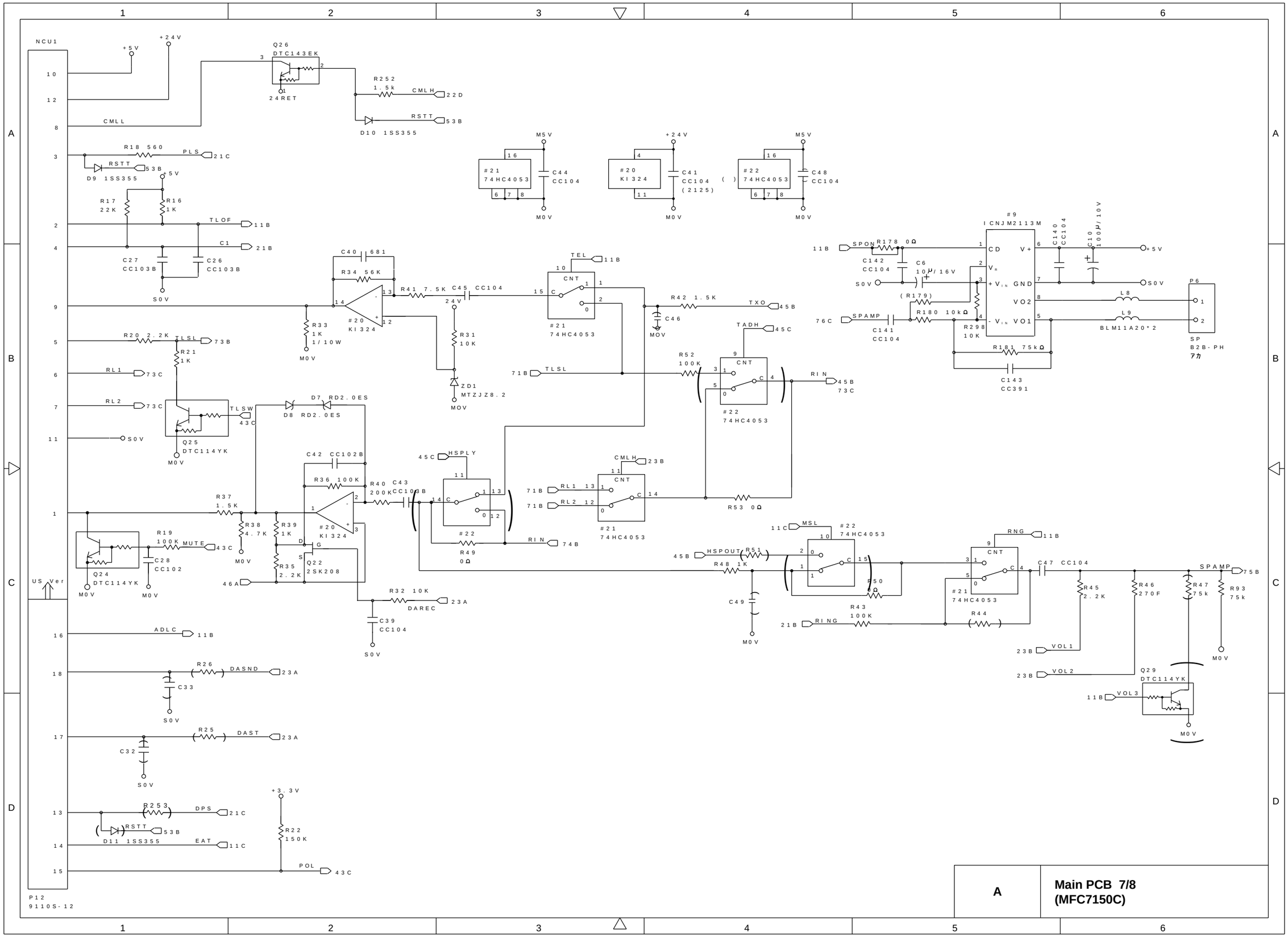
A	**Main PCB 4/8 (MFC7150C)**

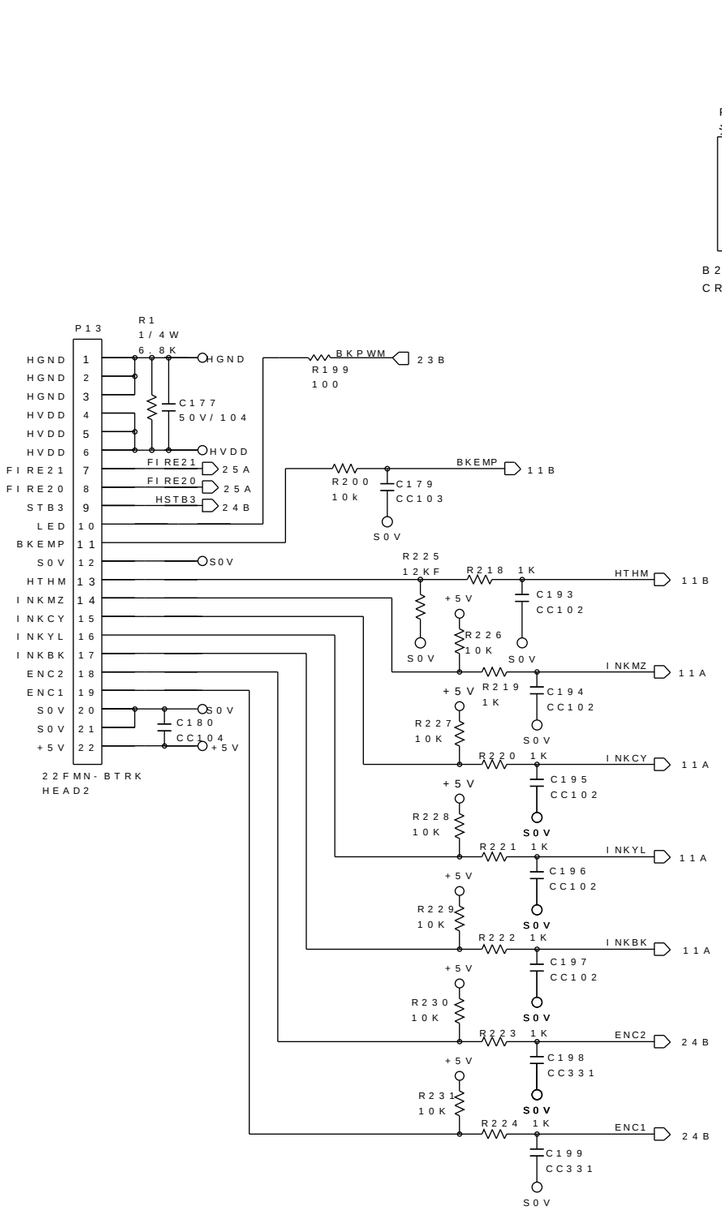


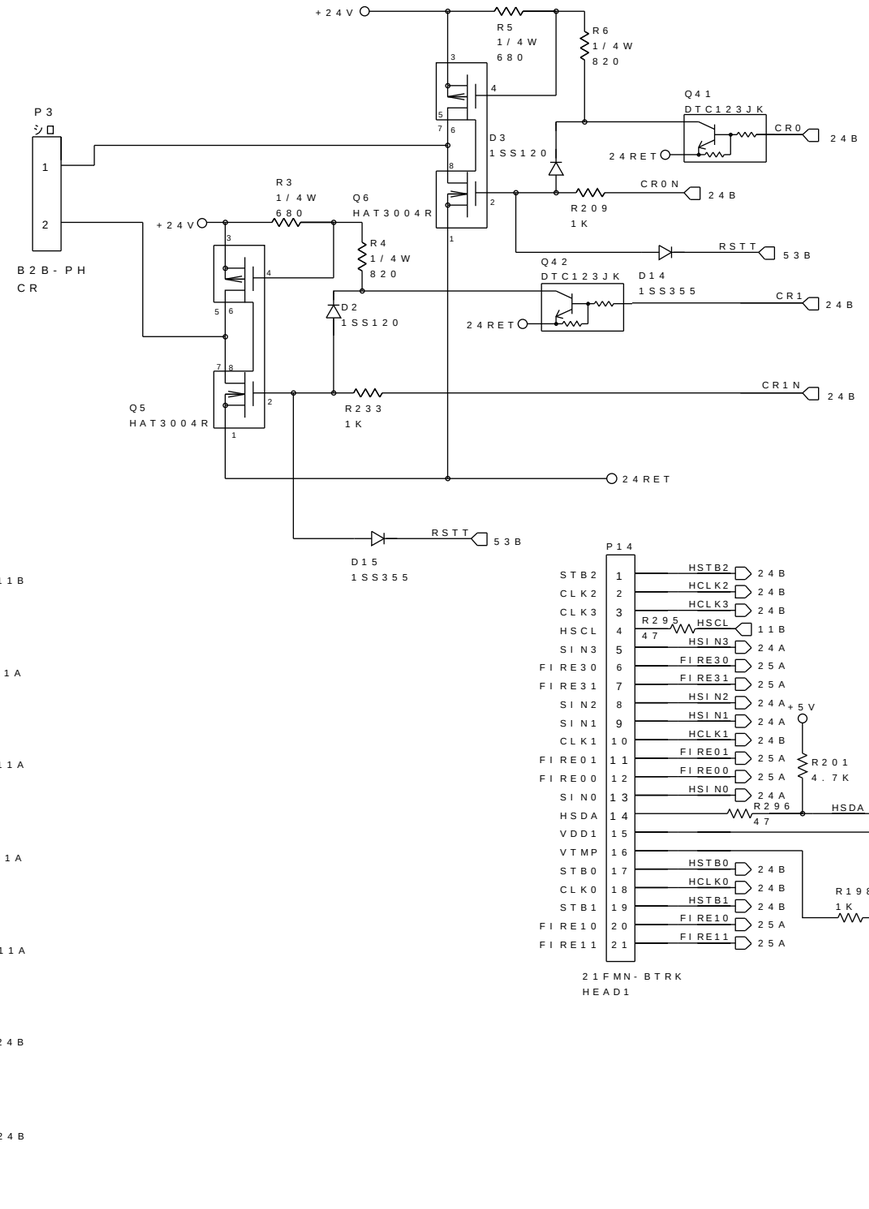
A	**Main PCB 5/8 (MFC7150C)**

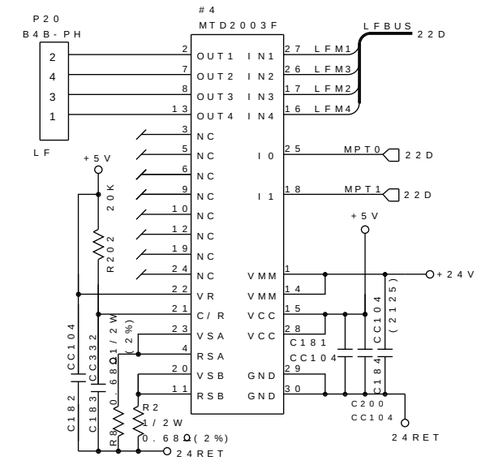


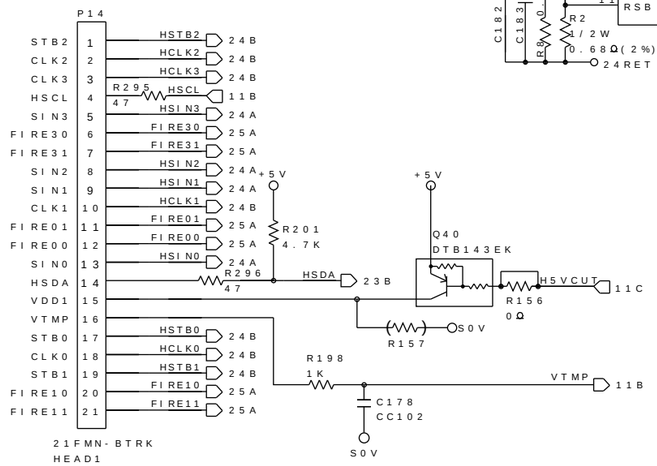
A	**Main PCB 6/8 (MFC7150C)**


NCU1
+5V
+24V
Q26
DTC143EK
24RET
R252
1.5k
CMLH
22D
RSTT
53B
D10 1SS355
CMLL
R18 560
PLS
21C
D9 1SS355
R17
22K
R16
1K
TLOF
11B
C1
21B
C27
CC103B
C26
CC103B
S0V
M5V
#21
74HC4053
C44
CC104
M0V
+24V
#20
KI324
C41
CC104
(2125)
M5V
#22
74HC4053
C48
CC104
#9
ICNJM2113M
SPON
R178 0Ω
11B
C142
CC104
C6
10μ/16V
S0V
(R179)
R180 10kΩ
SPAMP
76C
C141
CC104
R298
10K
R181 75kΩ
C143
CC391
CD
V+
VR
+VIN
GND
VO2
-VIN
VO1
C140
CC104
C10
100μ/10V
+5V
S0V
L8
L9
BLM11A20*2
P6
SP
B2B-PH
7カ
C40 681
R34 56K
R33
1K
1/10W
M0V
#20
KI324
R41 7.5K
C45 CC104
24V
R31
10K
ZD1
MTZJZ8.2
MOV
TEL
11B
CNT
#21
74HC4053
R42 1.5K
TXO
45B
C46
MOV
TADH
45C
R52
100K
71B
TLSL
CNT
#22
74HC4053
RIN
45B
73C
R20 2.2K
TLSL
73B
R21
1K
RL1
73C
RL2
73C
TLSW
43C
Q25
DTC114YK
M0V
S0V
D7 RD2.0ES
D8 RD2.0ES
C42 CC102B
R36 100K
R40 C43
200K CC103B
R37
1.5K
R38
4.7K
R39
1K
#20
KI324
45C
HSPLY
11
13
12
14
#22
R49
0Ω
RIN
74B
71B
RL1 13
71B
RL2 12
CMLH
23B
CNT
#21
74HC4053
R53 0Ω
R19
100K
MUTE
43C
C28
CC102
Q24
DTC114YK
M0V
M0V
US Ver
46A
Q22
2SK208
R32 10K
DAREC
23A
C39
CC104
S0V
45B
HSPOUT
R51
R48 1K
C49
M0V
11C
MSL
#22
74HC4053
R50
0Ω
R43
100K
21B
RING
RNG
11B
CNT
#21
74HC4053
R44
C47 CC104
R45
2.2K
R46
270F
R47
75k
R93
75k
SPAMP
75B
M0V
23B
VOL1
23B
VOL2
Q29
DTC114YK
11B
VOL3
M0V
ADLC
11B
R26
DASND
23A
C33
S0V
R25
DAST
23A
C32
S0V
+3.3V
R253
DPS
21C
RSTT
53B
D11 1SS355
EAT
11C
R22
150K
POL
43C
P12
9110S-12
A
Main PCB 7/8
(MFC7150C)

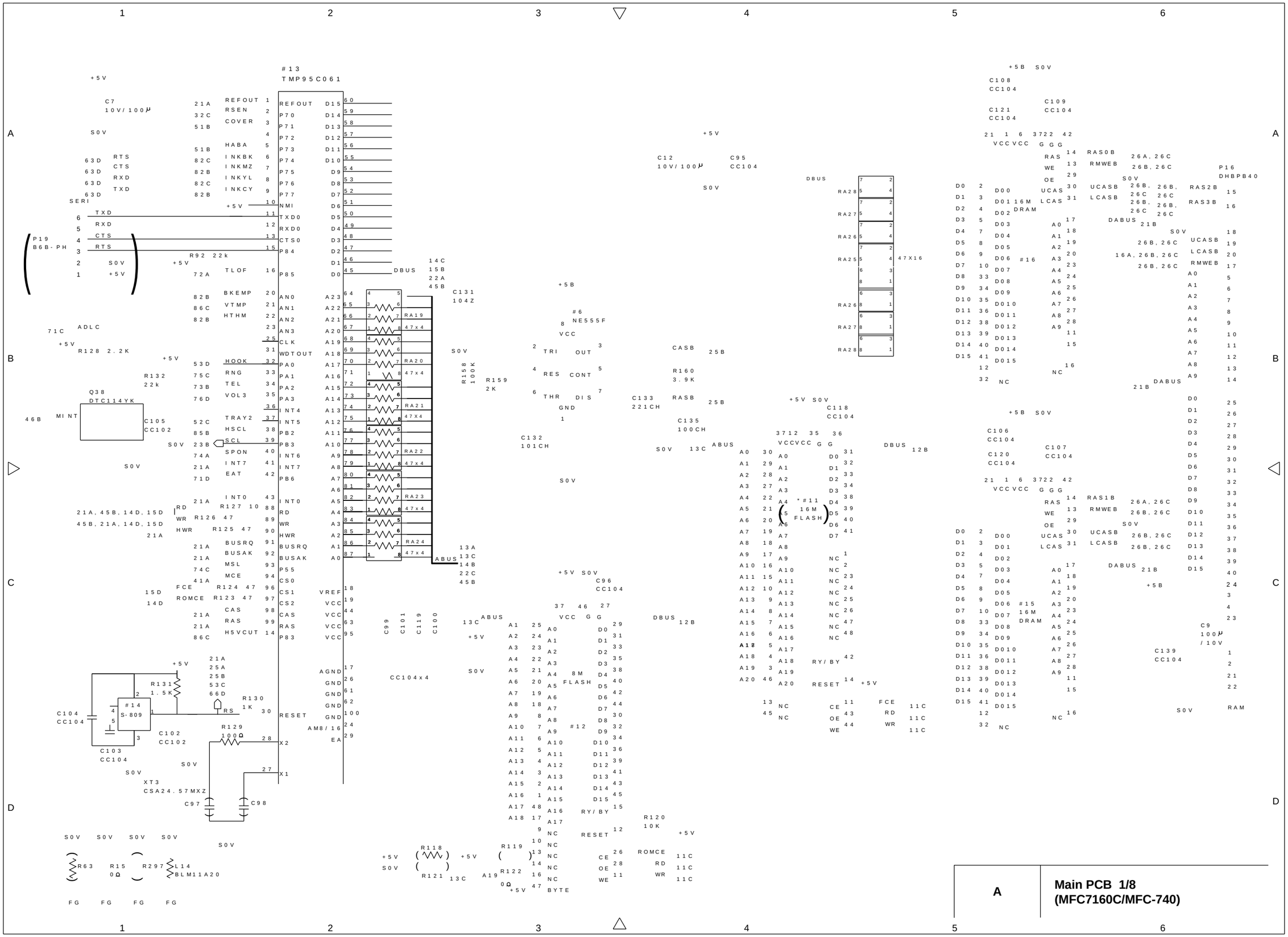




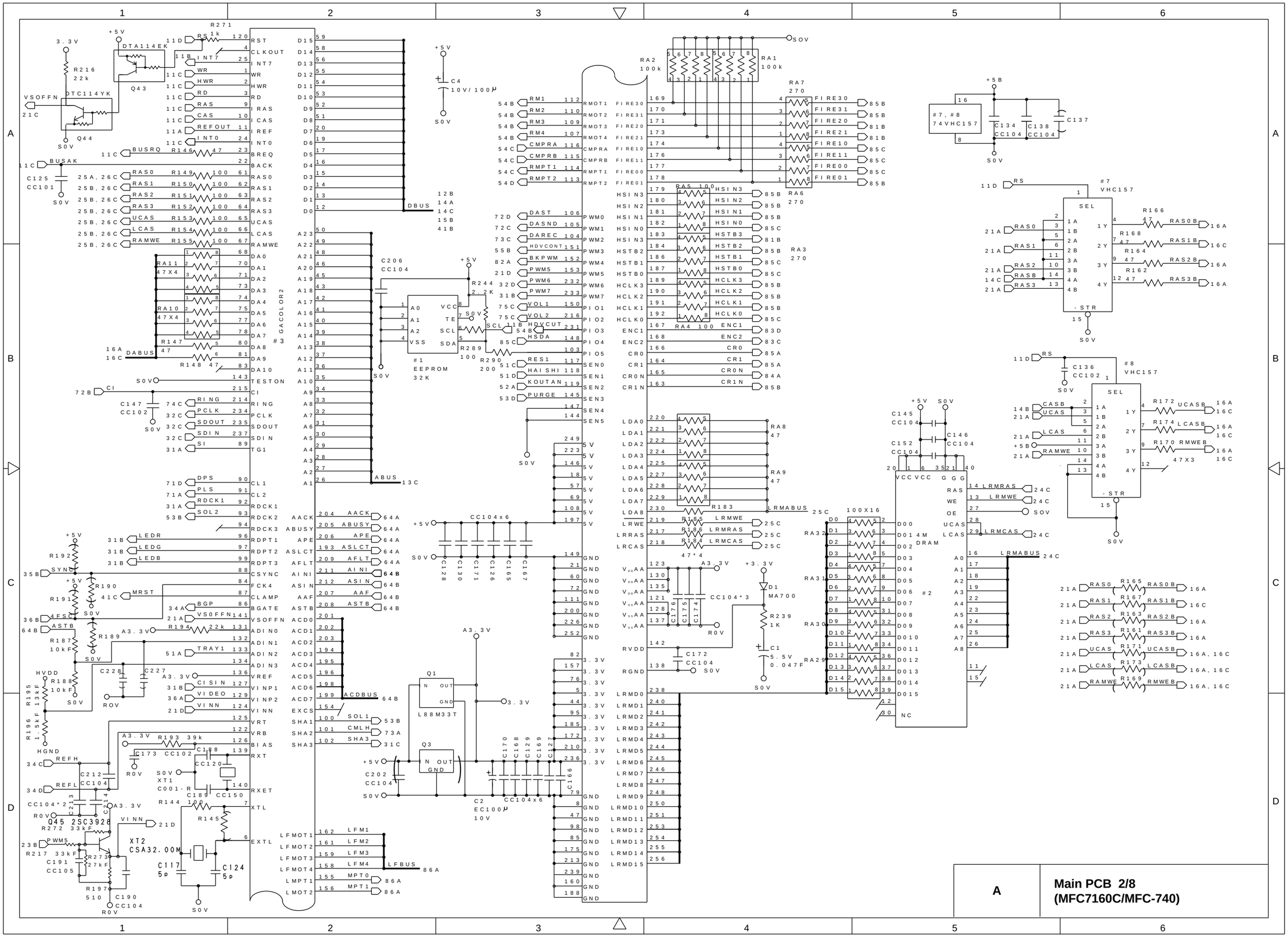


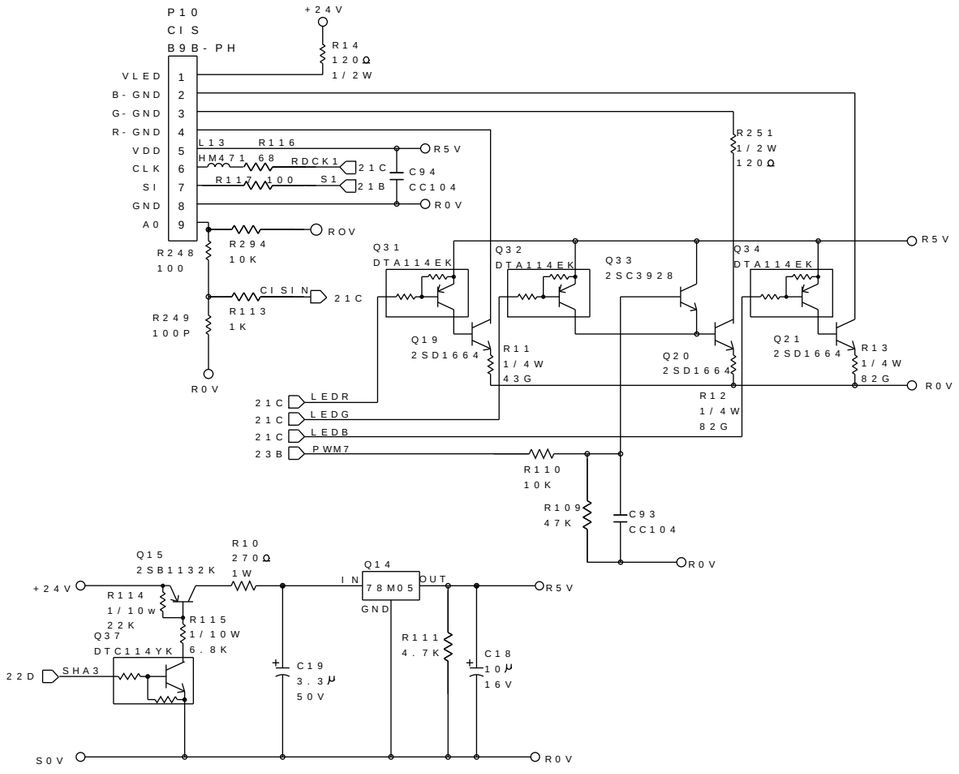


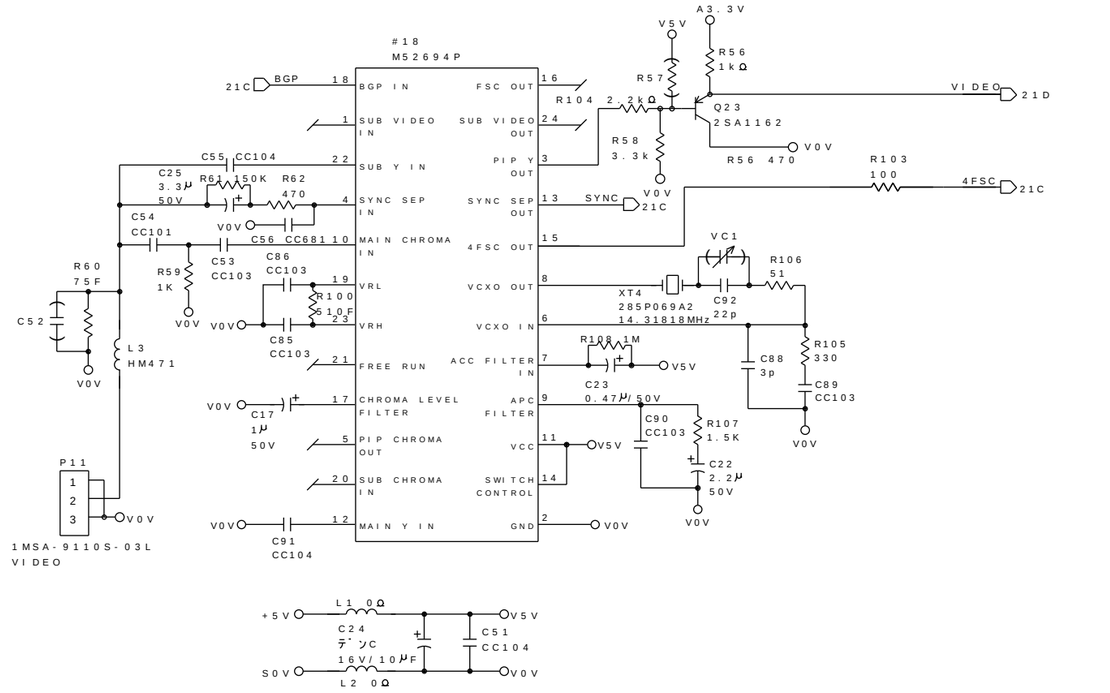
A	**Main PCB 8/8 (MFC7150C)**

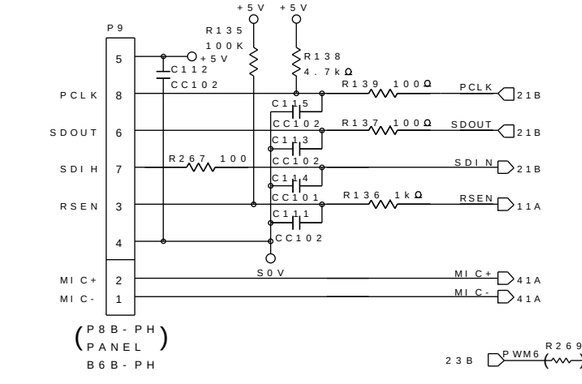


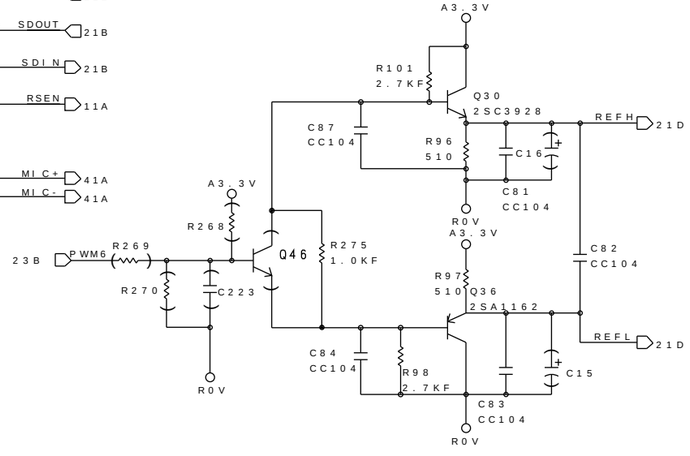
A	**Main PCB 1/8** **(MFC7160C/MFC-740)**


A3.3V
+5V
S0V
R0V
HGND
HVDD
DTA114EK
Q43
DTC114YK
Q44
Q45 2SC3928
Q1
Q3
L88M33T
D1
MA700
XT1
C001-R
XT2
CSA32.00M
C117
5p
C124
5p
R216
22k
R271
1k
R146
47
R147
47
R148
47
R149
100
R150
100
R153
100
R152
100
R153
100
R154
100
R155
100
RA11
47X4
RA10
47X4
R192
R191
R190
41C
R189
R194
22k
R187
10kF
R188
10kF
R195
13kF
R196
1.5kF
R193
39k
R272
33kF
R217
33kF
R273
27kF
R197
510
R144
100
R145
R244
2.2K
R289
100
R290
200
R183
R184
R185
R186
47*4
RA1
100k
RA2
100k
RA3
270
RA4
100
RA5
100
RA6
270
RA7
270
RA8
47
RA9
47
100X16
DRAM
#2
#3
#1
EEPROM
32K
GACOLOR2
C4
10V/100μ
C206
CC104
C202
CC104
C2
EC100μ
10V
C125
CC101
C147
CC102
C173
CC102
C198
C212
CC104
C213
C214
C191
CC105
C190
CC104
C228
C227
C176
C175
C174
C172
CC104
C170
C168
C129
C127
C166
CC104x6
CC104*3
C145
CC104
C152
CC104
C146
CC104
C134
CC104
C138
CC104
C137
C136
CC102
#7, #8
74VHC157
#7
VHC157
#8
VHC157
SEL
- STR
RS
CI
SYNC
MRST
ASTB
TRAY1
CISIN
VIDEO
VINN
VSOFFN
BUSAK
BUSRQ
DABUS
ACDBUS
ABUS
DBUS
AACK
SOL1
CMLH
SHA3
LFBUS
LRMABUS
LRMRAS
LRMWE
LRMCAS
LRMCASB
RAS0
RAS1
RAS2
RASB
RAS3
RAS0B
RAS1B
RAS2B
RAS3B
UCAS
LCAS
RAMWE
UCASB
LCASB
RMWEB
R162
R163
R164
R165
R166
R167
R168
R169
R171
R172
R173
R174
R170
47X3
RMOT1
RMOT2
RMOT3
RMOT4
CMPRA
CMPRB
RMPT1
RMPT2
PWM0
PWM1
PWM2
PWM3
PWM4
PWM5
PWM6
PWM7
PIO1
PIO2
PIO3
PIO4
PIO5
SEN0
SEN1
SEN2
SEN3
SEN4
SEN5
FIRE30
FIRE31
FIRE20
FIRE21
FIRE10
FIRE11
FIRE00
FIRE01
HSIN3
HSIN2
HSIN1
HSIN0
HSTB3
HSTB2
HSTB1
HSTB0
HCLK3
HCLK2
HCLK1
HCLK0
ENC1
ENC2
CR0
CR1
CR0N
CR1N
LDA0
LDA1
LDA2
LDA3
LDA4
LDA5
LDA6
LDA7
LDA8
LRWE
LRRAS
LRCAS
LRMD0
LRMD1
LRMD2
LRMD3
LRMD4
LRMD5
LRMD6
LRMD7
LRMD8
LRMD9
LRMD10
LRMD11
LRMD12
LRMD13
LRMD14
LRMD15
LFMOT1
LFMOT2
LFMOT3
LFMOT4
LMPT1
LMOT2
LFM1
LFM2
LFM3
LFM4
MPT0
MPT1
RES1
HAI SHI
KOUTAN
PURGE
HDVCUT
DASTB
DASND
DAREC
HDVCONT
BKPWM
PWM5
PWM6
PWM7
VOL1
VOL2
SCL
SDA
TESTON
RING
PCLK
SDOUT
SDIN
SI
TG1
CL1
CL2
RDCK1
RDCK2
RDCK3
RDPT1
RDPT2
RDPT3
CSYNC
FCK4
CLAMP
BGATE
ACD0
ACD1
ACD2
ACD3
ACD4
ACD5
ACD6
ACD7
EXCS
SHA1
SHA2
SHA3
ADIN0
ADIN1
ADIN2
ADIN3
VREF
VINP1
VINP2
VINN
VRT
VRB
BIAS
RXT
RXET
XTL
EXTL
DPS
PLS
RDCK1
SOL2
LEDR
LEDG
LEDB
BGP
VSOFFN
TRAY1
CISIN
VIDEO
VINN
BREQ
BACK
RAS0
RAS1
RAS2
RAS3
UCAS
LCAS
RAMWE
DA0
DA1
DA2
DA3
DA4
DA5
DA6
DA7
DA8
DA9
DA10
RST
CLKOUT
INT7
WR
HWR
RD
RAS
CAS
REFOUT
INT0
IRAS
ICAS
IREF
D0
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
A15
A16
A17
A18
A19
A20
A21
A22
A23
GND
3.3V
5V
A
B
C
D
1
2
3
4
5
6
Main PCB 2/8
(MFC7160C/MFC-740)

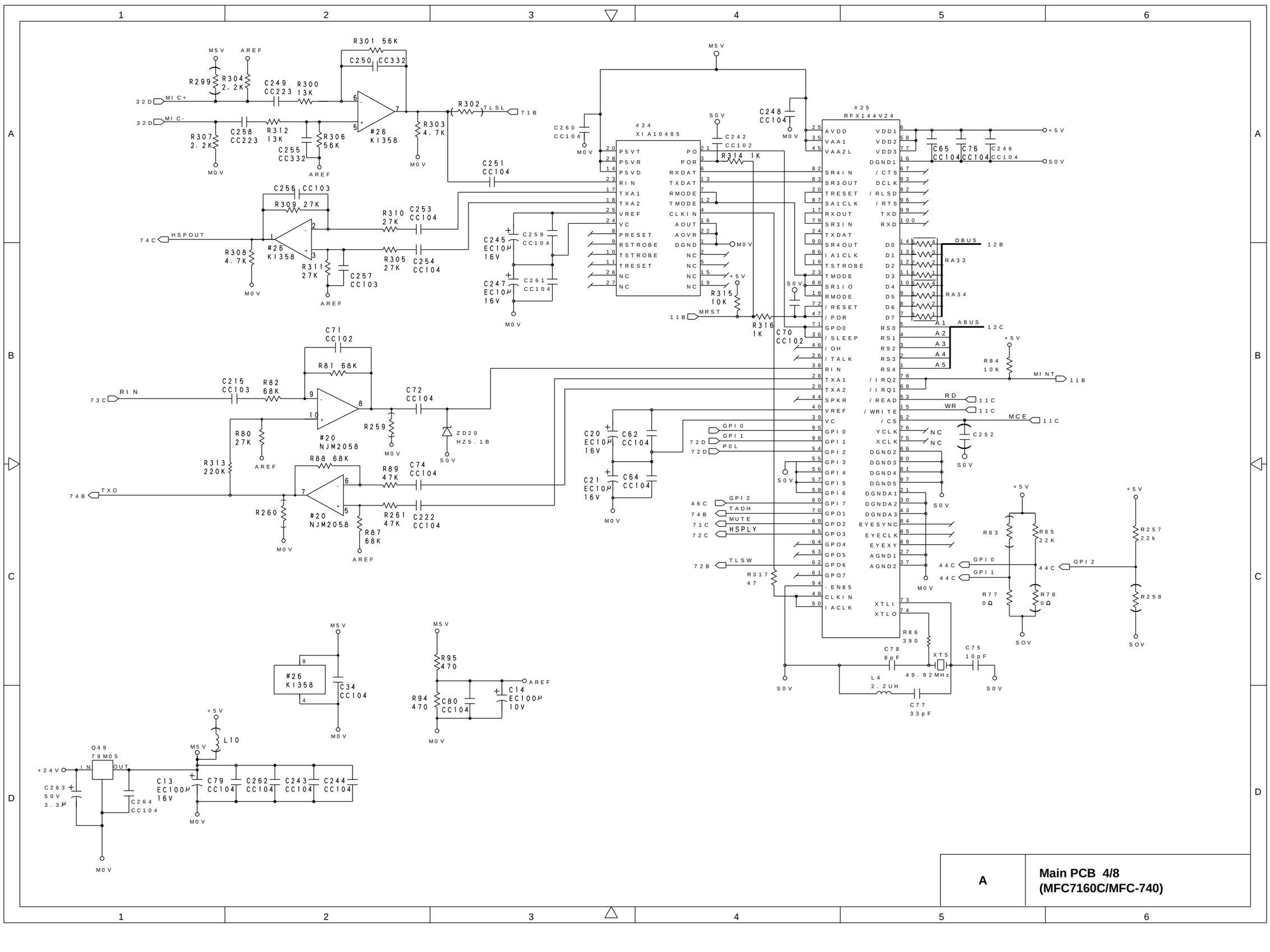








A	**Main PCB 3/8 (MFC7160C/MFC-740)**

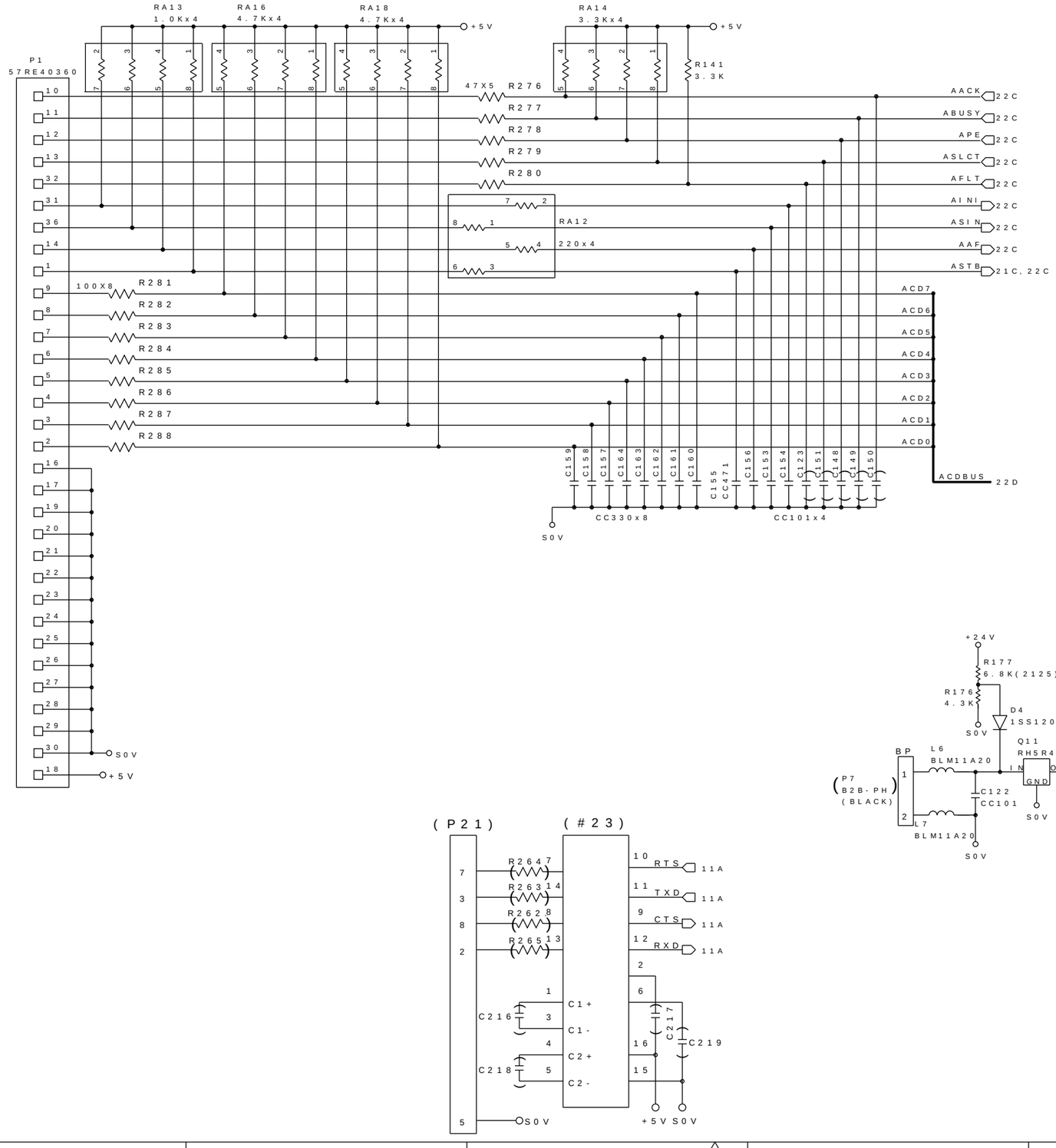


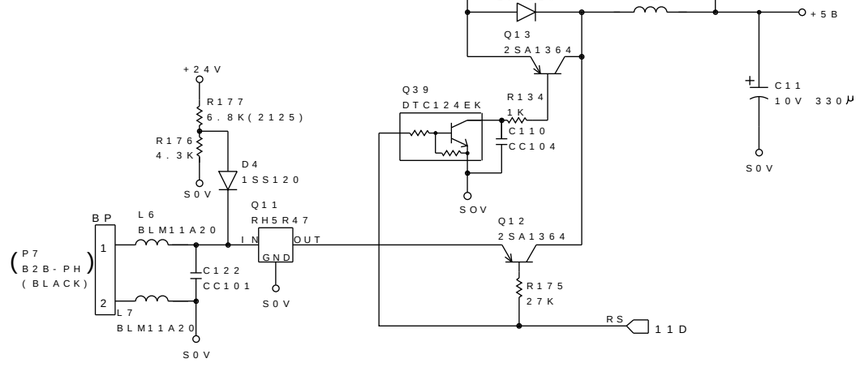
A

Main PCB 4/8
(MFC7160C/MFC-740)

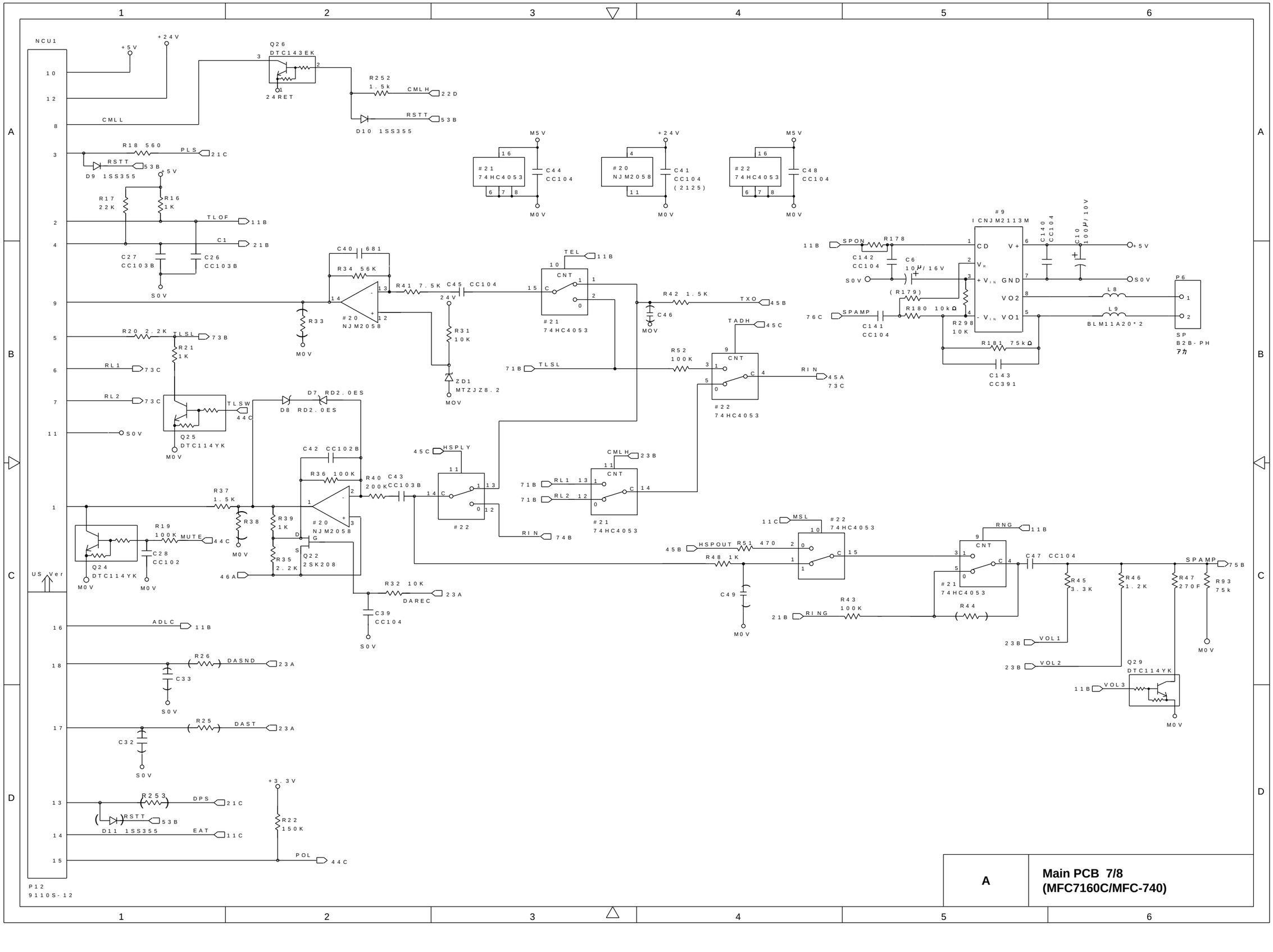
+3.3V
R240
56K
A
TRAY1
C
C205
CC102
K
E
PH3
TRAY1
SG-267
S0V
R0V
+5V
R55
240
R54
100K
A
COVER
C
C50
CC10
K
E
PH6
COVER
SG-267
S0V
S0V
+5V
A
HABA
C
K
E
PH1
HABA1
SG-267
S0V
S0V
+5V
A
RES1
C
K
E
PH4
RES1
SG-267
S0V
S0V
+5V
A
HAISHI
C
K
E
PH5
HAISHI
SG-267
S0V
S0V
+5V
A
KOUTAN
C
K
E
PH2
KOUTAN
SG-267
S0V
S0V
B2B-PH
SOL
+24V
1
SOL1
2
Q16
2SK2463
24RET
+24V
SOL2
24RET
HOOK
1
S0V
2
B2B-PH
HOOK
P5
PURGE
1
S0V
2
B2B-PH
PURGE
+5V
HOOK
11B
S0V
S0V
+5V
PURGE
23B
S0V
S0V
+5V
+24V
P2
1MSA6033B-10
PS
SOL2
21C
+5V
S0V
+24V
C208
24RET
HVDD
+5V
C210
HGND
HDVCUT
Q2
2SD1858
HDVCONT
+24V
C5
35V/470μ
S0V
470x4
24RET
23A
RM1
R212
Q9
23A
RM3
R211
Q10
23A
RM2
R214
Q8
23A
RM4
R215
Q7
+5V
2SK2463x4
R207
2.2K
#5
μPC393
2
R210
100
CMPRA
1
23A
+5V
3
C186
CC103
R213
100
R7
0.47Ω
1/2W
R9
0.47Ω
1/2W
#5
R205
2.2K
μPC393
S0V
6
CMPRB
7
23A
C187
CC103
+5V
24RET
5
S0V
R206
4.3KF
Q4
UMG5N
R204
1KF
C185
CC104
R208
240F
RMPT1
23A
1
6
R203
470F
RMPT2
23A
3
4
2
24RET
P4
2
3
A
1
A
4
B
5
B
B5B-PH
RMOT

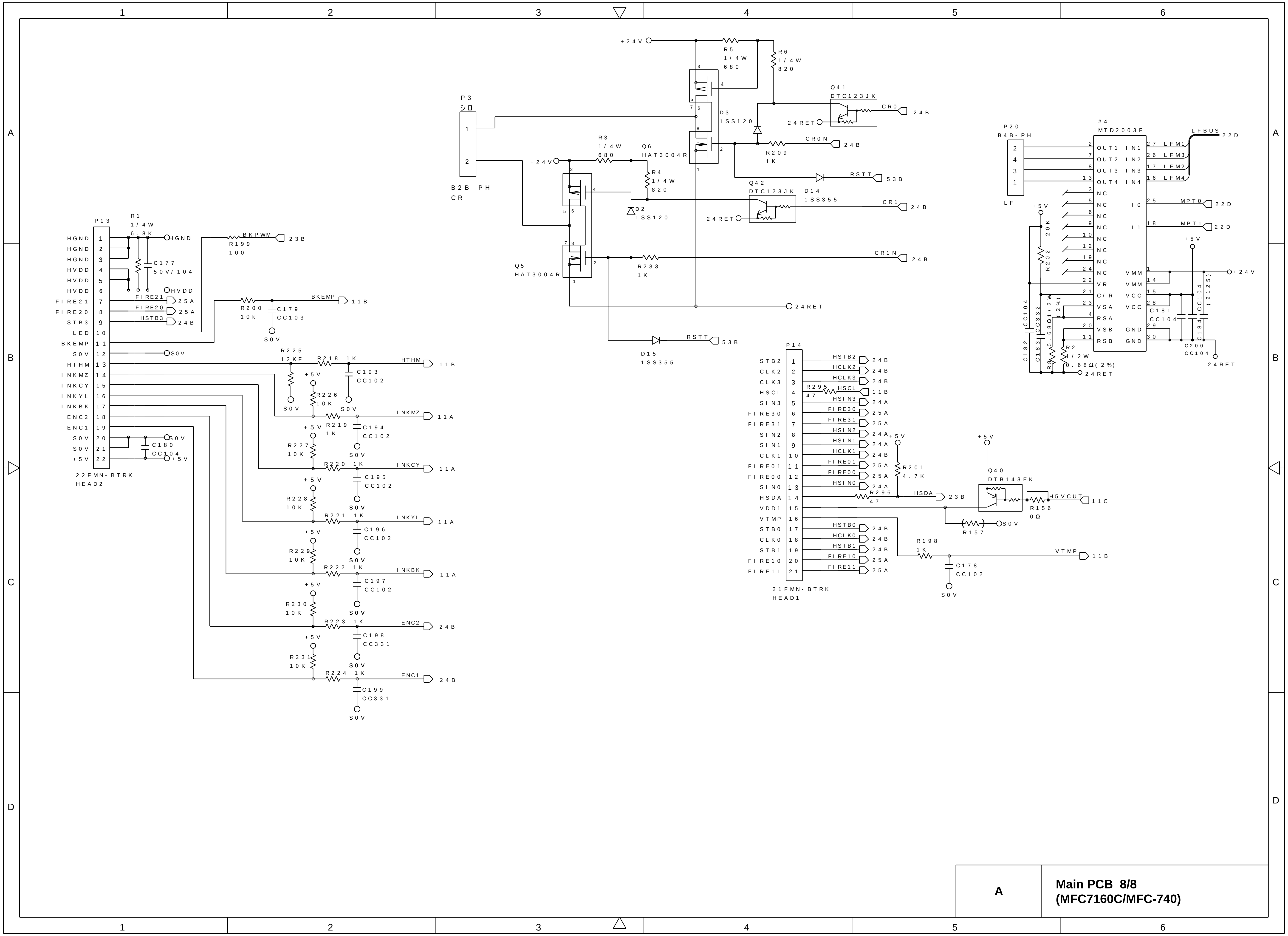
A	**Main PCB 5/8 (MFC7160C/MFC-740)**





A	**Main PCB 6/8** **(MFC7160C/MFC-740)**


NCU1
+5V
+24V
Q26
DTC143EK
24RET
R252
1.5k
CMLH
22D
RSTT
53B
D10 1SS355
CMLL
R18 560
PLS
21C
D9 1SS355
R17
22K
R16
1K
TLOF
11B
C1
21B
C27
CC103B
C26
CC103B
S0V
M5V
#21
74HC4053
C44
CC104
M0V
#20
NJM2058
C41
CC104
(2125)
#22
74HC4053
C48
CC104
C40 681
R34 56K
R33
R41 7.5K
C45 CC104
#20
NJM2058
TEL
11B
CNT
#21
74HC4053
R42 1.5K
TXO
45B
C46
TADH
45C
R52
100K
CNT
#22
74HC4053
RIN
45A
73C
71B TLSL
R20 2.2K
TLSL
73B
R21
1K
RL1
73C
RL2
73C
Q25
DTC114YK
TLSW
44C
D7 RD2.0ES
D8 RD2.0ES
ZD1
MTZJZ8.2
R31
10K
24V
C42 CC102B
R36 100K
R40 C43
200K CC103B
R37
1.5K
R38
R39
1K
R35
2.2K
#20
NJM2058
#22
45C HSPLY
CMLH
23B
CNT
#21
74HC4053
71B RL1 13
71B RL2 12
R19
100K
MUTE
44C
C28
CC102
Q24
DTC114YK
US Ver
46A
Q22
2SK208
R32 10K
DAREC
23A
C39
CC104
RIN
74B
MSL
11C
#22
74HC4053
45B HSPOUT R51 470
R48 1K
C49
R43
100K
21B RING
RNG
11B
CNT
#21
74HC4053
C47 CC104
R44
R45
3.3K
R46
1.2K
R47
270F
R93
75k
SPAMP
75B
VOL1
23B
VOL2
23B
Q29
DTC114YK
VOL3
11B
ADLC
11B
R26
DASND
23A
C33
R25
DAST
23A
C32
+3.3V
R253
DPS
21C
RSTT
53B
D11 1SS355
EAT
11C
R22
150K
POL
44C
P12
9110S-12
#9
ICNJM2113M
SPON
R178
11B
C142
CC104
C6
10μ/16V
S0V
(R179)
R180 10kΩ
SPAMP
76C
C141
CC104
R298
10K
R181 75kΩ
C143
CC391
C140
CC104
C10
100μ/10V
+5V
S0V
L8
L9
BLM11A20*2
P6
SP
B2B-PH
7カ
A
Main PCB 7/8
(MFC7160C/MFC-740)



A

Main PCB 8/8
(MFC7160C/MFC-740)

1. 指示ナキ抵抗ノ消費電力ハ1／4Wトスル。

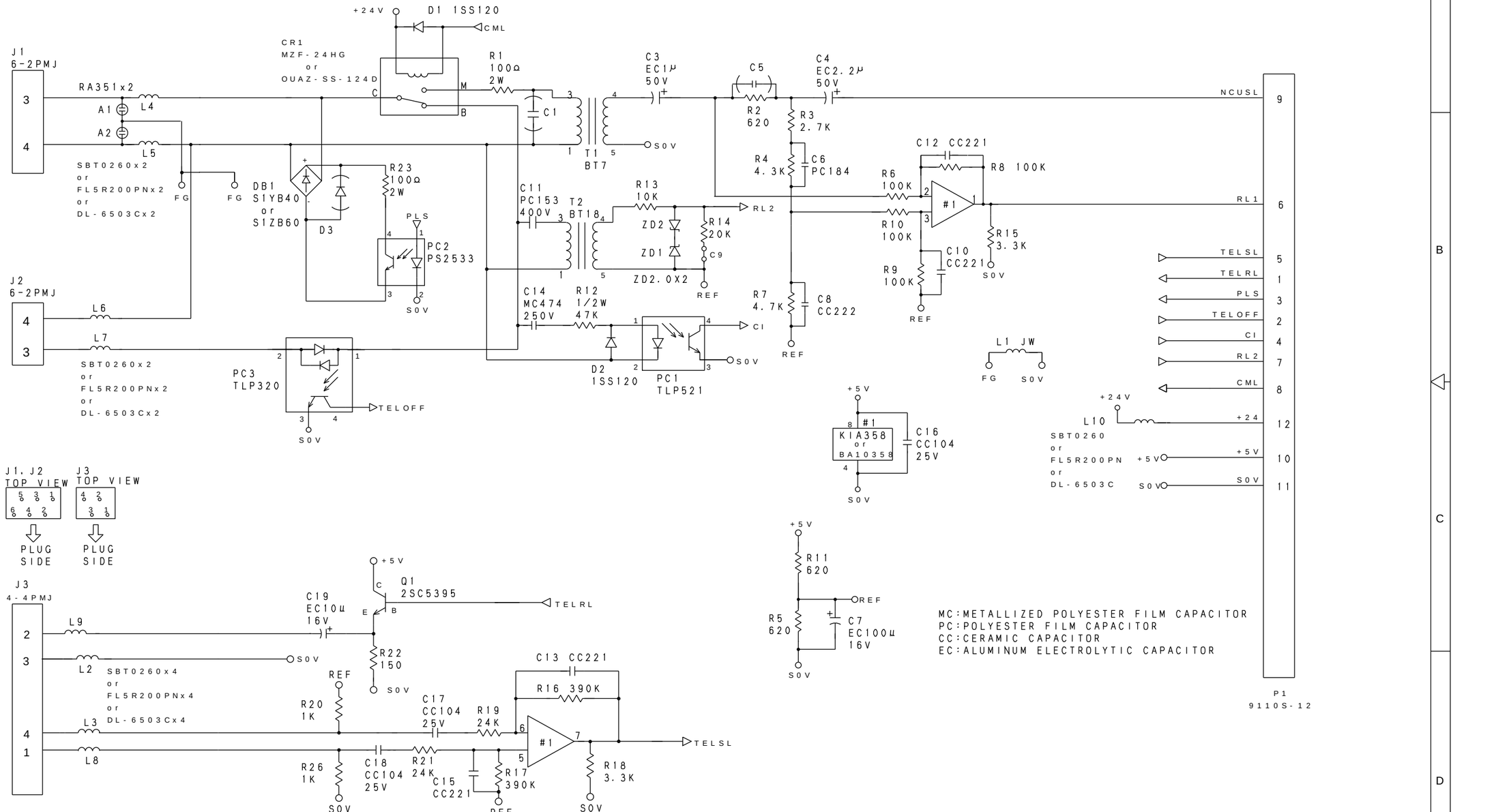
1. UNLESS OTHERWISE SPECIFIED, POWER CONSUMPTION OF RESISTORS IS 1/4W.

2. 指示ナキコンデ゛ンサモノ耐圧ハ25V又ハ50Vトスル。

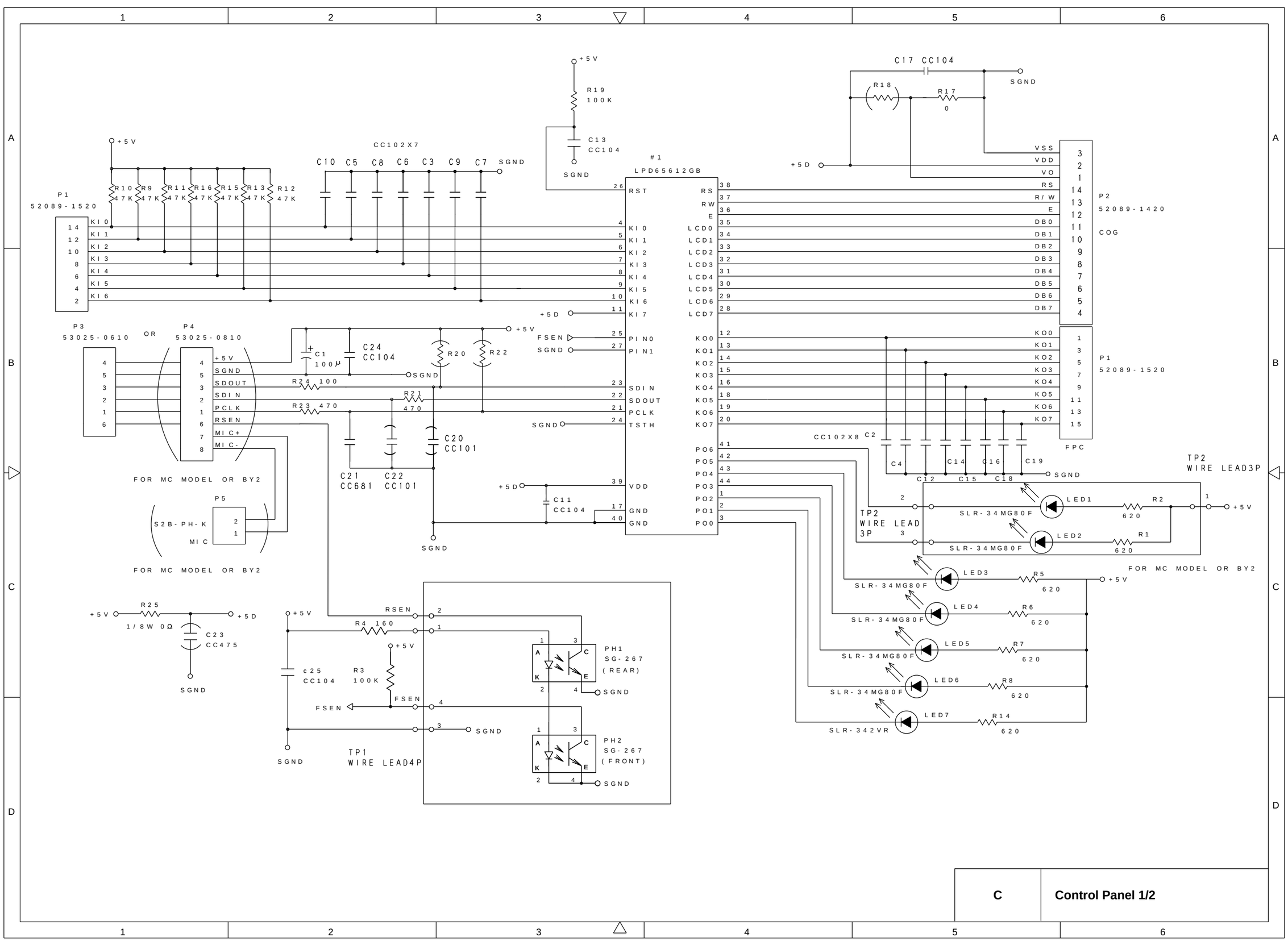
2. UNLESS OTHERWISE SPECIFIED, THE VOLTAGE RESISTANCE OF CAPACITORS IS 25V OR 50V.

3. ( ) 内ノ部品ハ未実装トスル。

3. COMPONENTS IN PARENTHESIS NOT TO BE MOUNTED.



B	**NCU (U.S.A.)**



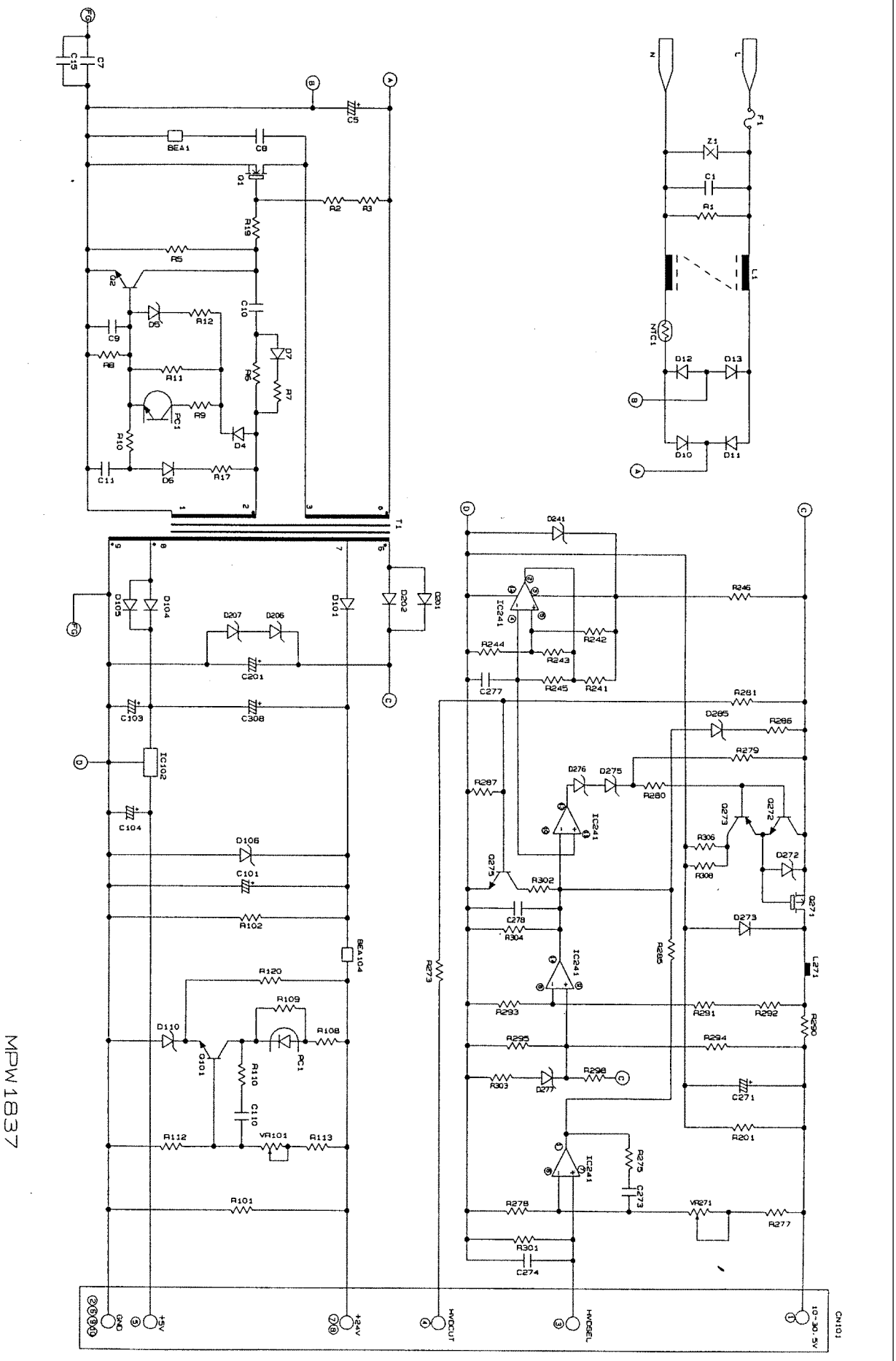
C	Control Panel 1/2

YL2/BY2 PANEL KEY MATRIX REFERENCE TABLE 1

KEY NO.	KEY NAME		KEY CODE	KEY NO.	KEY NAME		KEY CODE
	YL2	BY2			YL2	BY2	
1	Function	Function	01	37	1TOUCH-09/21	1TOUCH-09/21	1B
2	←	←	07	38	1TOUCH-10/22	1TOUCH-10/22	1A
3	SET	SET	0F	39	1TOUCH-11/23	1TOUCH-11/23	22
4	→	→	17	40	1TOUCH-12/24	1TOUCH-12/24	32
5	Clear	Clear	1F	41	Record	Record	39
6	Hook	Hook	05	42	Erase	Erase	3B
7	10KEY-1	10K	0D	43	Play	Play	3A
8	10KEY-2		09	44	On/Off Line	On/Off Line	3D
9	10KEY-3		11	45	FF/Cont	Reset	3C
10	Volume High		19	46	Test/Reset	Ink Management	2B
11	Hold		04	47	Enlarge	Enlarge/Reduce	29
12	10KEY-4		0C	48	Reduce	Brightness	2F
13	10KEY-5		15	49		Mono Copy	2C
14	10KEY-6		14	50	Copy	Color Copy	2E
15	Volume Low		1C	51	Sort	Paper Type	35
16	Redial/Pause		06	52	Photo	Copy Quality	2D
17	10KEY-7		0B	53	Stop	Stop	36
18	10KEY-8		0E	54	Start	Start	2A
19	10KEY-9		16	55	Print Priority	Priority	3E
20	Speed Dial		03				
21	10KEY-*		02				
22	10KEY-0		0A				
23	10KEY-#		13				
24	Shift		12				
25	Tel-index		27				
26	Resolution		21				
27	Mode		31				
28	Help/Broadcast		37				
29	1TOUCH-01/13		1D				
30	1TOUCH-02/14		24				
31	1TOUCH-03/15		25				
32	1TOUCH-04/16		34				
33	1TOUCH-05/17		1E				
34	1TOUCH-06/18		26				
35	1TOUCH-07/19		23				
36	1TOUCH-08/20		33				

YL2/BY2 PANEL KEY MATRIX REFERENCE TABLE 2

	KO0 P1-1P	KO1 P1-3P	KO2 P1-5P	KO3 P1-7P	KO4 P1-9P	KO5 P1-11P	KO6 P1-13P	KO7 P1-15P
KI0 P1-14P	1	8	9	10	26	47	27	41
KI1 P1-12P	21	22	24	38	39	54	40	43
KI2 P1-10P	20	17	23	37	35	46	36	42
KI3 P1-8P	11	12	14	15	30	49	32	45
KI4 P1-6P	6	7	13	29	31	52	51	44
KI5 P1-4P	16	18	19	33	34	50	53	55
KI6 P1-2P	2	3	4	5	25	48	28	



D	**Power supply 100-120V**