



**MULTI-FUNCTION CENTER
SERVICE MANUAL**

**MODEL: MFC9600/MFC9850/MFC9870
DCP1200/MFC9750**

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PREFACE

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

To perform appropriate maintenance so that the machine 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 AND LUBRICATION
CHAPTER V.	MAINTENANCE MODE
CHAPTER VI.	ERROR INDICATION AND TROUBLESHOOTING
Appendix 1.	EEPROM Customizing Codes
Appendix 2.	Circuit Diagrams

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

SAFETY INFORMATION

Laser Safety (110-120V Model only)

This printer is certified as a Class 1 laser product under the US Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. This means that the printer does not produce hazardous laser radiation.

Since radiation emitted inside the printer is completely confined within the protective housings and external covers, the laser beam cannot escape from the machine during any phase of user operation.

CDRH Regulations (110-120V Model only)

The Center for Device and Radiological Health (CDRH) of the US Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States. The label shown below indicates compliance with the CDRH regulations and must be attached to laser products marketed in the United States.

The label for Chinese products

MANUFACTURED:	JULY	1999	C
BROTHER CORP. (ASIA) LTD.			
BROTHER BUJI NAN LING FACTORY			
Gold Garden Industry, Nan Ling Village, Buji,			
Rong Gang, Shenzhen, China.			
This product complies with FDA radiation			
performance standards, 21 CFR Subchapter J.			

CHAPTER I.

GENERAL DESCRIPTION

CHAPTER I. GENERAL DESCRIPTION

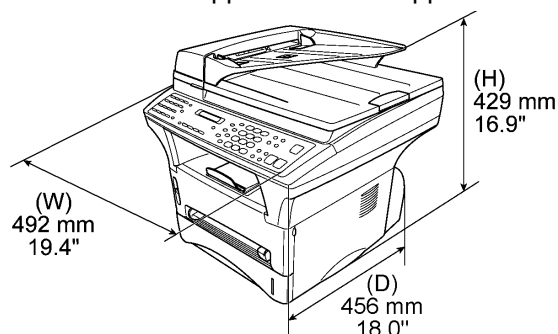
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1. MACHINE OUTLINE

1.1 External Appearance and Weight

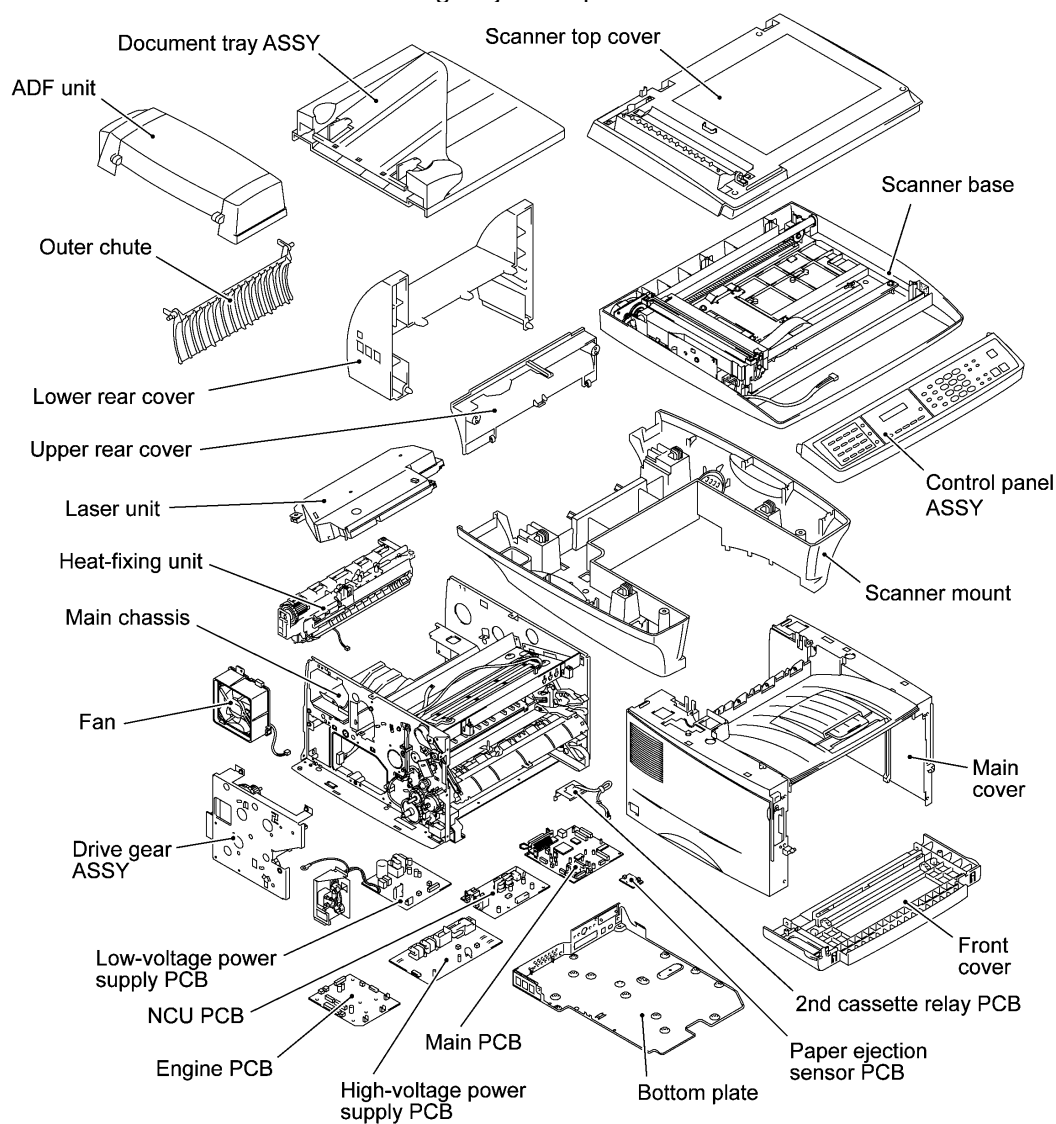
The figure below shows the machine appearance and approximate dimensions.



Weight:	Machine proper	15.2 kg
	Machine (incl. drum unit & toner cartridge)	17.0 kg
	In package	21.2 kg

1.2 Components

The machine consists of the following major components:



2. SPECIFICATIONS

(1/6)

Machine Type	Multi-Function Center w/ Fax	Multi-Function Center w/o Fax
Model	MFC9600	DCP1200
GENERAL		
Print Engine	Laser (ZL)	Laser (ZL)
Modem Speed (bps)	14,400 (Fax)	—
Transmission Speed (sec.)	5	—
ITU-T Group	G3	—
Coding System	MH/MR/MMR/JBIG	—
Input/Output Width	FB: 8.5" x 11" ADF: 5.8" to 8.5"/2.75" to 8.5"	FB: 8.5" x 11" ADF: 5.8" to 8.5"/2.75" to 8.5"
ADF (pages)	Up to 50	Up to 50
LCD	16 chars x 2 lines	16 chars x 2 lines
On-Screen Programming	Yes	Yes
Backup Clock	Yes (1 hour)	Yes (1 hour)
Memory Capacity	8 MB	8 MB
Backup Memory	No	No
Optional Memory	Yes (8 & 16 MB)	Yes (8 & 16 MB)
Dimensions w/ Carton (WxDxH)	23.5 x 22.3 x 22.8 inches 598 x 567 x 580 mm	23.5 x 22.3 x 22.8 inches 598 x 567 x 580 mm
Dimensions w/o Carton (WxDxH)	19.4x18x16.9 inches 492x456x429 mm	19.4x18x16.9 inches 492x456x429 mm
Weight w/o Carton	17 kg	17 kg
Weight w/ Carton	21.2 kg	21.2 kg
Color	Gray 1495	Gray 1495
Standby Mode	Yes	Yes
PC-Fax Protocol Compliance	Class 2	—
Simultaneous Operation	Yes (Print/Fax, Print/Copy, Print/Scan)	Yes (Print/Copy, Print/Scan)
Energy Star Compliance	Yes	Yes
Operating Environment Temperature Humidity	5°C to 35°C 60% ±25%	5°C to 35°C 60% ±25%
Power Source	120 VAC, 50/60 Hz	120 VAC, 50/60 Hz
Power Consumption (Sleep/Standby/Peak)	Less than 14W/60W/850W	Less than 14W/60W/850W
On/Off Switch	No	Yes
TELEPHONE		No
Automatic Redial	Yes	
Handset	No	
One-Touch Dial	32 (16x2)	
Speed Dial	100	
Max. Number of Digits for One-Touch & Speed Dial	20 digits	
Registerable Number Of Characters	15 chars	
Telephone Index	Yes (Normal)	
Speaker Phone	No (Only On-HOOK/Monitor Available)	

Machine Type	Multi-Function Center w/ Fax	Multi-Function Center w/ Fax
Model	MFC9870	MFC9850
GENERAL		
Print Engine	Laser (ZL)	Laser (ZL)
Modem Speed (bps)	14,400 (Fax)	14,400 (Fax)
Transmission Speed (sec.)	5	5
ITU-T Group	G3	G3
Coding System	MH/MR/MMR/JBIG	MH/MR/MMR/JBIG
Input/Output Width	FB: 8.5" x 11" ADF: 5.8" to 8.5"/2.75" to 8.5"	FB: 8.5" x 11" ADF: 5.8" to 8.5"/2.75" to 8.5"
ADF (pages)	Up to 50	Up to 50
LCD	16 chars x 2 lines	16 chars x 2 lines
On-Screen Programming	Yes	Yes
Backup Clock	Yes (9 hours)	Yes (9 hours)
Memory Capacity	4 MB (RAM) + 4 MB (flash ROM)	4 MB (RAM) + 2 MB (flash ROM)
Backup Memory	2 MB (flash ROM)	2 MB (flash ROM)
Optional Memory	Yes (RAM: 8 & 16 MB, ROM: 4 & 2 MB)	Yes (RAM: 8 & 16 MB)
Dimensions w/ Carton (WxDxH)	23.5 x 22.3 x 22.8 inches 598 x 567 x 580 mm	23.5 x 22.3 x 22.8 inches 598 x 567 x 580 mm
Dimensions w/o Carton (WxDxH)	19.4x18x16.9 inches 492x456x429 mm	19.4x18x16.9 inches 492x456x429 mm
Weight w/o Carton	17 kg	17 kg
Weight w/ Carton	21.2 kg	21.2 kg
Color	Gray 1495	Gray 1495
Standby Mode	Yes	Yes
PC-Fax Protocol Compliance	Class 2	—
Simultaneous Operation	Yes (Print/Fax, Print/Copy, Print/Scan)	Yes (Print/Fax, Print/Copy, Print/Scan)
Energy Star Compliance	Yes	Yes
Operating Environment Temperature Humidity	5°C to 35°C 60% ±25%	5°C to 35°C 60% ±25%
Power Source	220 VAC, 50/60 Hz	220 VAC, 50/60 Hz
Power Consumption (Sleep/Standby/Peak)	Less than 14W/60W/800W	Less than 14W/60W/800W
On/Off Switch	No	No
TELEPHONE		
Automatic Redial	Yes	Yes
Handset	No	No
One-Touch Dial	32 (16x2)	32 (16x2)
Speed Dial	100	100
Max. Number of Digits for One-Touch & Speed Dial	20 digits	20 digits
Registerable Number Of Characters	15 chars	15 chars
Telephone Index	Yes (Normal)	Yes (Normal)
Speaker Phone	No	No

Machine Type	Multi-Function Center w/o Fax
Model	MFC9750
GENERAL	
Print Engine	Laser (ZL)
Modem Speed (bps)	—
Transmission Speed (sec.)	—
ITU-T Group	—
Coding System	—
Input/Output Width	FB: 8.5" x 11" ADF: 5.8" to 8.5"/2.75" to 8.5"
ADF (pages)	Up to 50
LCD	16 chars x 2 lines
On-Screen Programming	Yes
Backup Clock	No
Memory Capacity	4 MB (RAM)
Backup Memory	No
Optional Memory	Yes (RAM: 8 & 16 MB)
Dimensions w/ Carton (WxDxH)	23.5 x 22.3 x 22.8 inches 598 x 567 x 580 mm
Dimensions w/o Carton (WxDxH)	19.4x18x16.9 inches 492x456x429 mm
Weight w/o Carton	17 kg
Weight w/ Carton	21.2 kg
Color	Gray 1495
Standby Mode	Yes
PC-Fax Protocol Compliance	—
Simultaneous Operation	Yes (Print/Copy, Print/Scan)
Energy Star Compliance	Yes
Operating Environment Temperature Humidity	5°C to 35°C 60% ±25%
Power Source	220 VAC, 50/60 Hz
Power Consumption (Sleep/Standby/Peak)	Less than 14W/60W/800W
TELEPHONE	No
Automatic Redial	
Handset	
One-Touch Dial	
Speed Dial	
Max. Number of Digits for One-Touch & Speed Dial	
Registerable Number Of Characters	
Telephone Index	
Speaker Phone	

Machine Type	Multi-Function Center w/ Fax	Multi-Function Center w/o Fax
Model	MFC9600	DCP1200
Chain Dialing	Yes	
Caller ID	Yes	
Call Waiting Caller ID	No	
Distinctive Ringing	Yes	
Hold/Mute Key	No	
Power Failure Dialing	No	
Speaker Volume	Yes (3 steps + OFF)	
Ringer Volume	Yes (3 steps + OFF)	
Handset Volume	No	
PBX Feature	No	
Transfer Method	Flash	
FAX		No
Internet FAX	Yes (Network/PC) LAN, NetCentric	Yes (Network/PC), NetCentric
Data Modem	No	
Easy Receive/Fax Detect	Yes	
Fax/Tel Switch	No	
Super Fine	Yes (TX & RX)	
300 dpi Transmission	No	
Gray Scale	64	
Contrast	Yes (Auto/S.Light/S.Dark)	
Smoothing	Yes	
Call Reservation Over Auto TX	No	
Password Check	No	
Enhanced Remote Activation	Yes	
Multi-Resolution Transmission	Yes	
Multi-Transmission	No	
Next-Fax Reservation	Yes (Dual Access)	
Delayed Timer	Yes (50 timers/50 jobs)	
Polling	Yes (Std/Seq)	
Quick-Scan Key	(Memory TX w/o key)	
Scan Speed (A4:Standard)	Approx. 2 sec./page (A4:standard)	
Memory Transmission	700 pages	
Broadcasting	Yes (182 locations)	
Batch Transmission	Yes	
Auto Reduction	Yes	
Out-of-Paper Reception (Brother #1 Chart)	Up to 310 pages	
Dual Access	Yes	
ECM (Error Correction Mode)	Yes	
ITU SUB Addressing	No	

Machine Type	Multi-Function Center w/ Fax	Multi-Function Center w/ Fax
Model	MFC9870	MFC9850
Chain Dialing	Yes	Yes
Caller ID	No	No
Call Waiting Caller ID	No	No
Distinctive Ringing	Yes (U.K. DEN)	Yes (U.K. DEN)
Hold/Mute Key	No	No
Power Failure Dialing	No	No
Speaker Volume	Yes (3 steps + OFF)	Yes (3 steps + OFF)
Ringer Volume	Yes (3 steps + OFF)	Yes (3 steps + OFF)
Handset Volume	No	No
PBX Feature	Yes	Yes
Transfer Method	Flash	Flash
FAX		
Internet FAX	Yes (Network), available w/ option	No
Data Modem	No	No
Easy Receive/Fax Detect	Yes	Yes
Fax/Tel Switch	No	No
Super Fine	Yes (TX & RX)	Yes (TX & RX)
300 dpi Transmission	No	No
Gray Scale	64	64
Contrast	Yes (Auto/S.Light/S.Dark)	Yes (Auto/S.Light/S.Dark)
Smoothing	Yes	Yes
Call Reservation Over Auto TX	No	No
Password Check	No	No
Enhanced Remote Activation	Yes	Yes
Multi-Resolution Transmission	Yes	Yes
Multi-Transmission	No	No
Next-Fax Reservation	Yes (Dual Access)	Yes (Dual Access)
Delayed Timer	Yes (50 timers/50 jobs)	Yes (50 timers/50 jobs)
Polling	Yes (Std/Seq/Sec/Del)	Yes (Std/Seq/Sec/Del)
Quick-Scan Key	(Memory TX w/o key)	(Memory TX w/o key)
Scan Speed (A4:Standard)	Approx. 2 sec./page (A4:standard)	Approx. 2 sec./page (A4:standard)
Memory Transmission	250 pages	250 pages
Broadcasting	Yes (182 locations)	Yes (182 locations)
Batch Transmission	Yes	Yes
Auto Reduction	Yes	Yes
Out-of-Paper Reception (ITU-T Chart)	Up to 150 pages	Up to 150 pages
Dual Access	Yes	Yes
ECM (Error Correction Mode)	Yes	Yes
ITU SUB Addressing	Yes (Wordcraft S/W)	No

Machine Type	Multi- Function Center w/o Fax
Model	MFC9750
Chain Dialing	
Caller ID	
Call Waiting Caller ID	
Distinctive Ringing	
Hold/Mute Key	
Power Failure Dialing	
Speaker Volume	
Ringer Volume	
Handset Volume	
PBX Feature	
Transfer Method	
FAX	No
Internet FAX	
Data Modem	
Easy Receive/Fax Detect	
Fax/Tel Switch	
Super Fine	
300 dpi Transmission	
Gray Scale	
Contrast	
Smoothing	
Call Reservation Over Auto TX	
Password Check	
Enhanced Remote Activation	
Multi-Resolution Transmission	
Multi-Transmission	
Next-Fax Reservation	
Delayed Timer	
Polling	
Quick-Scan Key	
Scan Speed (A4:Standard)	
Memory Transmission	
Broadcasting	
Batch Transmission	
Auto Reduction	
Out-of-Paper Reception (Brother #1 Chart)	
Out-of-Paper Reception (ITU-T Chart)	
Dual Access	
ECM (Error Correction Mode)	
ITU SUB Addressing	

Machine Type	Multi- Function Center w/ Fax	Multi- Function Center w/o Fax
Model	MFC9600	DCP1200
Group Dial	Yes (6)	
Error Re-Transmission	No	
Station ID	1 (20 digits/20 chars)	
Off-Hook Alarm	No	
Remote Maintenance	Yes	
Call Reservation Over Manual TX	No	
RX Mode Indication	LCD	
Resolution Indication	LED	
Memory Security	No	
Color FAX	No	
Manual Broadcasting	Yes	
LCD Language	English	
OPEN LCR	No	
E-MAIL FAX	Via Net work/PC	
LIST/REPORT		No
Activity Report/Journal Report	Yes (up to 50)	
Transmission Verification Report	Yes	
Coverpage	Yes (Super)	
Help List	Yes	
Callback Message	No	
Caller ID List	Yes	
ALL Dial List	Yes	
Tel Index List	Yes	
INTERFACE		
External TAD Interface	Yes	No
Missing Link/PC Interface	No	No
Host Interface (Serial)	No	No
Host Interface (IEEE1284)	Yes	Yes
Host Interface (USB)	Yes	Yes
LAN Interface	Yes (10-Base T: LAN Board)	Yes
PRINTER		
Color/Mono	Mono	Mono
Engine Type	Laser (ZL)	Laser (ZL)
Resolution (dpi)	600 x 600	600 x 600
Speed (ppm)	12	12
Paper Capacity (sheets)	250	250
Additional Paper Capacity (sheets)	250 (User Option)	250 (User Option)
Output Paper Capacity (sheets)	150	150
Standard Print Language	Windows GDI (600 x 600)	Windows GDI (600 x 600)

Machine Type	Multi- Function Center w/ Fax	Multi- Function Center w/ Fax
Model	MFC9870	MFC9850
Group Dial	Yes (6)	Yes (6)
Error Re-Transmission	No	No
Station ID	1 (20 digits/20 chars)	1 (20 digits/20 chars)
Off-Hook Alarm	Yes	Yes
Remote Maintenance	Yes	Yes
Call Reservation Over Manual TX	No	No
RX Mode Indication	LCD	LCD
Resolution Indication	LED	LED
Memory Security	Yes	Yes
Color FAX	No	No
Manual Broadcasting	Yes	Yes
LCD Language	English	English
OPEN LCR	No	No
E-MAIL FAX	Yes (Via Network)	No
LIST/REPORT		
Activity Report/Journal Report	Yes (up to 50)	Yes (up to 50)
Transmission Verification Report	Yes	Yes
Coverpage	Yes (Super)	Yes (Super)
Help List	Yes	Yes
Callback Message	No	No
Caller ID List	No	No
ALL Dial List	Yes	Yes
Tel Index List	Yes	Yes
INTERFACE		
External TAD Interface	Yes	Yes
Missing Link/PC Interface	No	No
Host Interface (Serial)	No	No
Host Interface (IEEE1284)	Yes	Yes
Host Interface (USB)	Yes	Yes
LAN Interface	Yes (10-Base T: LAN Board), available w/ option	No
PRINTER	Yes	Yes
Color/Mono	Mono	Mono
Engine Type	Laser (ZL)	Laser (ZL)
Resolution (dpi)	600 x 600	600 x 600
Speed (ppm)	12	12
Paper Capacity (sheets)	250	250
Additional Paper Capacity (sheets)	250 (User option)	250 (User option)
Output Paper Capacity (sheets)	150	150
Standard Print Language	Windows GDI (600 x 600)	Windows GDI (600 x 600)

Machine Type	Multi- Function Center w/o Fax
Model	MFC9750
Group Dial	
Error Re-Transmission	
Station ID	
Off-Hook Alarm	
Remote Maintenance	
Call Reservation Over Manual TX	
RX Mode Indication	
Resolution Indication	
Memory Security	
Color FAX	
Manual Broadcasting	
LCD Language	
OPEN LCR	
E-MAIL FAX	
LIST/REPORT	No
Activity Report/Journal Report	
Transmission Verification Report	
Coverpage	
Help List	
Callback Message	
Caller ID List	
ALL Dial List	
Tel Index List	
INTERFACE	
External TAD Interface	No
Missing Link/PC Interface	No
Host Interface (Serial)	No
Host Interface (IEEE1284)	Yes
Host Interface (USB)	Yes
LAN Interface	No
PRINTER	Yes
Color/Mono	Mono
Engine Type	Laser (ZL)
Resolution (dpi)	600 x 600
Speed (ppm)	12
Paper Capacity (sheets)	250
Additional Paper Capacity (sheets)	250 (User option)
Output Paper Capacity (sheets)	150
Standard Print Language	Windows GDI (600 x 600)

Machine Type	Multi- Function Center w/ Fax	Multi- Function Center w/o Fax
Model	MFC9600	DCP1200
Emulation	PCL4	PCL4
Resident Fonts	24 bitmap (PCL4 Comp.)	24 bitmap (PCL4 Comp.)
Fonts Disk Based	Yes (35 TrueType)	Yes (35 TrueType)
Paper Handling Size	LTR, LGL, A4, B5, A5, A6, EXE	LTR, LGL, A4, B5, A5, A6, EXE
Manual Feed Slot	Custom Size (2.75" x 5" to 8.5" x 14")	Custom Size (2.75" x 5" to 8.5" x 14")
Other Paper Type	OHP, Envelopes, Labels, Organizer	OHP, Envelopes, Labels, Organizer
Sheet Weight (Paper Cassette) (Manual Slot)	64-105 g/m ² (17 to 28 lb) 64-157 g/m ² (17 to 43 lb)	64-105 g/m ² (17 to 28 lb) 64-157 g/m ² (17 to 43 lb)
Printer Driver	Win3.1x, 95/98, and NT4.0 Driver	Win3.1x, 95/98, and NT4.0 Driver
Utility Software	Yes (Remote Printer Console for PCL4)	Yes (Remote Printer Console for PCL4)
Bundled Cable	Yes (Parallel)	Yes (Parallel)
Network	Optional LAN Board (Brother) Printer/Internet FAX	Optional LAN Board (Brother) Printer only
COPY		
Color/Mono	Mono	Mono
Speed (ppm)	Up to 12	Up to 12
Multi Copy (Stack)	Up to 99	Up to 99
Multi Copy (Sort)	Yes	Yes
Reduction/Enlargement (%)	25 to 400% in 1% increments	25 to 400% in 1% increments
Resolution (dpi)	300 x 600	300 x 600
SCANNER		
Color/Mono	Color/Mono	Color/Mono
Resolution (dpi)	1,200 x 1,200 (Int.)/300 x 600 (Opt.)	1,200 x 1,200 (Int.)/300 x 600 (Opt.)
Speed (sec)	2	2
Gray Scale	256	256
TWAIN Compliant	Yes	Yes
PCI Scanner (Parallel/Serial)	Parallel	Parallel
E-MAIL Scan Key	Yes	Yes
Scan Key	Yes	Yes
MESSAGE CENTER/MESSAGE MANAGER		No
ICM Recording Time	N/A	
Page Memory	N/A	
OGM	N/A	
TAD Type	N/A	
Memo/Recording Conversation	N/A	
Fax Forwarding	Yes	
Fax Retrieval	Yes	
Paging	Yes	
Remote Access	Yes	
Toll Saver	N/A	

Machine Type	Multi- Function Center w/ Fax	Multi- Function Center w/ Fax
Model	MFC9870	MFC9850
Emulation	PCL4	No
Resident Fonts	24 bitmap (PCL4 Comp.)	No
Fonts Disk Based	Yes (35 TrueType)	Yes (35 TrueType)
Paper Handling Size	LTR, A4, B5, A5, B6, A6, EXE	LTR, A4, B5, A5, B6, A6, EXE
Manual Feed Slot	Custom Size (2.75" x 5" to 8.5" x 14")	Custom Size (2.75" x 5" to 8.5" x 14")
Other Paper Type	OHP, Envelopes, Labels, Organizer	OHP, Envelopes, Labels, Organizer
Sheet Weight (Paper Cassette) (Manual Slot)	64-105 g/m ² (17 to 28 lb) 64-157 g/m ² (17 to 43 lb)	64-105 g/m ² (17 to 28 lb) 64-157 g/m ² (17 to 43 lb)
Printer Driver	Win3.1x, 95/98, and NT4.0 Driver	Win3.1x, 95/98, and NT4.0 Driver
Utility Software	Yes (Remote Printer Console for PCL4)	No
Bundled Cable	Yes (Parallel)	Yes (Parallel)
Network	Option (Brother)	No
COPY		
Color/Mono	Mono	Mono
Speed (ppm)	Up to 12	Up to 12
Multi Copy (Stack)	Up to 99	Up to 99
Multi Copy (Sort)	Yes	Yes
Reduction/Enlargement (%)	25 to 400% in 1% increments	25 to 400% in 1% increments
Resolution (dpi)	300 x 600	300 x 600
SCANNER	Yes	No
Color/Mono	Color/Mono	N/A
Resolution (dpi)	1,200 x 1,200 (Int.)/300 x 600 (Opt.)	N/A
Speed (sec)	2	N/A
Gray Scale	256	N/A
TWAIN Compliant	Yes	N/A
PCI Scanner (Parallel/Serial)	Parallel	N/A
E-MAIL Scan Key	No	N/A
Scan Key	No	N/A
MESSAGE CENTER/MESSAGE MANAGER		
ICM Recording Time	N/A	N/A
Page Memory	N/A	N/A
OGM	N/A	N/A
TAD Type	N/A	N/A
Memo/Recording Conversation	N/A	N/A
Fax Forwarding	Yes	Yes
Fax Retrieval	Yes	Yes
Paging	No	No
Remote Access	Yes	Yes
Toll Saver	N/A	N/A

Machine Type	Multi- Function Center w/o Fax
Model	MFC9750
Emulation	PCL4
Resident Fonts	24 bitmap (PCL4 Comp.)
Fonts Disk Based	Yes (35 TrueType)
Paper Handling Size	LTR, A4, B5, A5, B6, A6, EXE
Manual Feed Slot	Custom Size (2.75" x 5" to 8.5" x 14")
Other Paper Type	OHP, Envelopes, Labels, Organizer
Sheet Weight (Paper Cassette) (Manual Slot)	64-105 g/m ² (17 to 28 lb) 64-157 g/m ² (17 to 43 lb)
Printer Driver	Win3.1x, 95/98, and NT4.0 Driver
Utility Software	Yes (Remote Printer Console for PCL4)
Bundled Cable	No
Network	
COPY	
Color/Mono	Mono
Speed (ppm)	Up to 12
Multi Copy (Stack)	Up to 99
Multi Copy (Sort)	Yes
Reduction/Enlargement (%)	25 to 400% in 1% increments
Resolution (dpi)	300 x 600
SCANNER	Yes (Option)
Color/Mono	Color/Mono
Resolution (dpi)	1,200 x 1,200 (Int.)/300 x 600 (Opt.)
Speed (sec)	2
Gray Scale	256
TWAIN Compliant	Yes
PCI Scanner (Parallel/Serial)	Parallel
E-MAIL Scan Key	No
Scan Key	No
MESSAGE CENTER/MESSAGE MANAGER	No
ICM Recording Time	
Page Memory	
OGM	
TAD Type	
Memo/Recording Conversation	
Fax Forwarding	
Fax Retrieval	
Paging	
Remote Access	
Toll Saver	

Machine Type	Multi- Function Center w/ Fax	Multi- Function Center w/o Fax
Model	MFC9600	DCP1200
MESSAGE CENTER Pro/MESSAGE MANAGER Pro		No
Fax/Voice Mail Box	N/A	
Fax/Voice on Demand	N/A	
MESSAGE CENTER (PC MC)		No
Fax Forwarding	N/A	
Paging	N/A	
ICM Recording Time	N/A	
OGM MC;MC Pro;Paging	N/A	
Fax/Voice Mail Box	N/A	
Fax/Voice on Demand	N/A	
VIDEO CAPTURE		No
Video Capture	Yes (Color)	
Video Print	Yes (Mono)	
Video Format	NTSC	
BUNDLED SOFTWARE (For Windows)		
Printer Driver	Brother	Brother
TWAIN	Brother	Brother
Viewer	Scan Soft	Scan Soft
PC Fax	SMSI	No
Others	Auto E-mail printing Netcentric (PC internet Fax)	Auto E-mail printing
Formats (Import)	TIFF/BMP/PCX/DCX/BTF/BTX/MAX/PDF	TIFF/BMP/PCX/DCX/BTF/BTX/MAX/PDF
Formats (Export)	TIFF/BMP/MAX/PDF	TIFF/BMP/MAX/PDF
OCR	Yes (Xerox TextBridge)	Yes (Xerox TextBridge)
Pop Up Menu	Yes (ScanSoft)	Yes (ScanSoft)
PCI Remote Setup (Remote Diagnostics)	Yes	Yes
Remote Setup for Time	Yes	No
Remote Setup for Tel No.	Yes	No
BUNDLED SOFTWARE (For iMAC)		
Printer Driver	Brother	Brother
TWAIN	Yes	Yes
Viewer	No	No
PC Fax	No	No
Others	No	No

Machine Type	Multi- Function Center w/ Fax	Multi- Function Center w/ Fax
Model	MFC9870	MFC9850
MESSAGE CENTER Pro/MESSAGE MANAGER Pro	No	No
Fax/Voice Mail Box	N/A	N/A
Fax/Voice on Demand	N/A	N/A
MESSAGE CENTER (PC MC)	No	No
Fax Forwarding	N/A	N/A
Paging	N/A	N/A
ICM Recording Time	N/A	N/A
OGM MC;MC Pro;Paging	N/A	N/A
Fax/Voice Mail Box	N/A	N/A
Fax/Voice on Demand	N/A	N/A
VIDEO CAPTURE		
Video Capture	No	No
Video Print	No	No
Video Format	No	No
BUNDLED SOFTWARE (For Windows)		
Printer Driver	Brother	Brother
TWAIN	Brother	No
Viewer	Wordcraft	No
PC Fax	Wordcraft	No
Others		
Formats (Import)	TIFF/BMP/PCX/DCX/BTF/BTX/MAX/PDF	No
Formats (Export)	TIFF/BMP/MAX/PDF	No
OCR	Yes (Wordcraft)	No
Pop Up Menu	Yes	No
PCI Remote Setup (Remote Diagnostics)	Yes	No
Remote Setup for Time	Yes	No
Remote Setup for Tel No.	Yes	No
BUNDLED SOFTWARE (For iMAC)		
Printer Driver	N/A	N/A
TWAIN	N/A	N/A
Viewer	N/A	N/A
PC Fax	N/A	N/A
Others	N/A	N/A

Machine Type	Multi- Function Center w/o Fax
Model	MFC9750
MESSAGE CENTER Pro/MESSAGE MANAGER Pro	No
Fax/Voice Mail Box	
Fax/Voice on Demand	
MESSAGE CENTER (PC MC)	No
Fax Forwarding	
Paging	
ICM Recording Time	
OGM MC;MC Pro;Paging	
Fax/Voice Mail Box	
Fax/Voice on Demand	
VIDEO CAPTURE	No
Video Capture	
Video Print	
Video Format	
BUNDLED SOFTWARE (For Windows)	
Printer Driver	Brother
TWAIN	No
Viewer	No
PC Fax	No
Others	
Formats (Import)	TIFF/BMP/PCX/DCX/BTF/BTX/MAX/PDF
Formats (Export)	TIFF/BMP/MAX/PDF
OCR	Yes (Wordcraft) (Option)
Pop Up Menu	No
PCI Remote Setup (Remote Diagnostics)	No
Remote Setup for Time	No
Remote Setup for Tel No.	No
BUNDLED SOFTWARE (For iMAC)	
Printer Driver	N/A
TWAIN	N/A
Viewer	N/A
PC Fax	N/A
Others	N/A

Machine Type	Multi- Function Center w/ Fax	Multi- Function Center w/o Fax
Model	MFC9600	DCP1200
Formats (Import)	Depends on viewer	Depends on viewer
Formats (Export)	Depends on viewer	Depends on viewer
OCR	No	No
Pop Up Menu	No	No
PCI Remote Setup	No	No
Remote Setup for Date/Time	No	No
Remote Setup for Tel No. Registration	No	No

Machine Type	Multi- Function Center w/ Fax	Multi- Function Center w/o Fax
Model	MFC9870	MFC9850
Formats (Import)	N/A	N/A
Formats (Export)	N/A	N/A
OCR	N/A	N/A
Pop Up Menu	N/A	N/A
PCI Remote Setup	N/A	N/A
Remote Setup for Date/Time	N/A	N/A
Remote Setup for Tel No. Registration	N/A	N/A

(6/6)

Machine Type	Multi- Function Center w/ Fax
Model	MFC9750
Formats (Import)	N/A
Formats (Export)	N/A
OCR	N/A
Pop Up Menu	N/A
PCI Remote Setup	N/A
Remote Setup for Date/Time	N/A
Remote Setup for Tel No. Registration	N/A

CHAPTER II.

INSTALLATION

CHAPTER II. INSTALLATION

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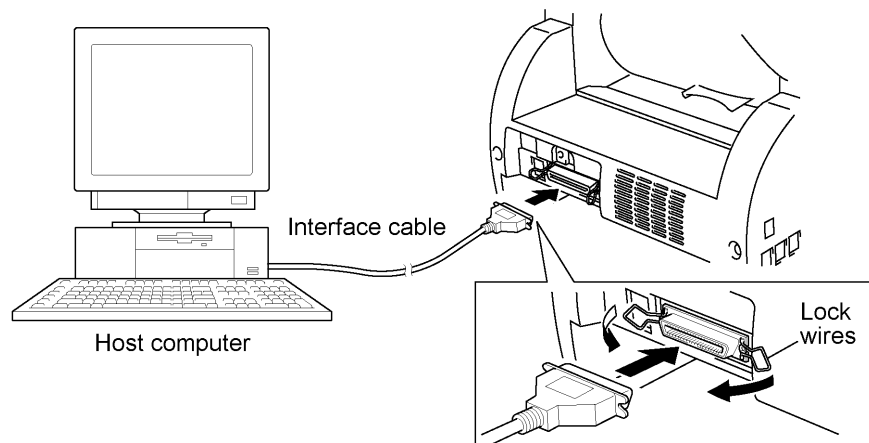
1. INSTALLING THE UPDATE DATA TO THE MACHINE

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 PC/AT-compatible computer (which is capable of running MS-DOS or its compatible OS).

Connecting the machine to your computer

- (1) Make sure that the machine'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 machine 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 machine's power cord into a wall socket.



Installing the update data onto the flash ROM of the machine

- (1) Copy the update data and transfer utility onto the desired directory of the hard disk.
e.g., C:\UPDATE
- (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. In the above example, type C:\ from the command line and press the **ENTER** key.
Then type CD UPDATE and press the **ENTER** key.
- (4) Check that your computer is connected with the machine correctly.
- (5) To start the transfer utility transmitting the update data to the flash ROM of the machine, type the following:

`ICEN filename /b`

Then press the **ENTER** key.

During downloading, the machine beeps *intermittently*.

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

NOTE: If the machine cannot return to the standby state after completion of downloading, turn the power off and on.

CHAPTER III.

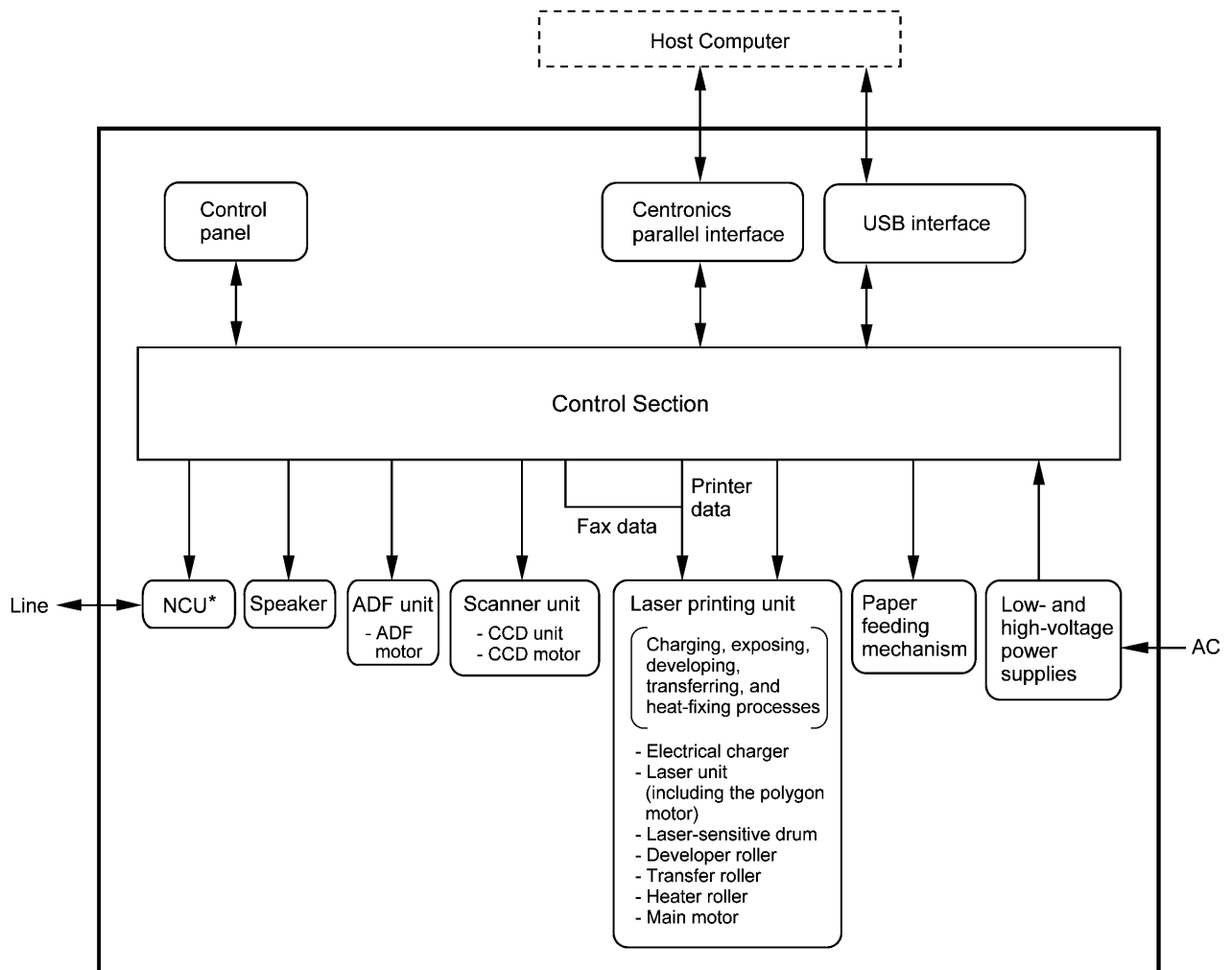
THEORY OF OPERATION

CHAPTER III. THEORY OF OPERATION

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1. OVERVIEW

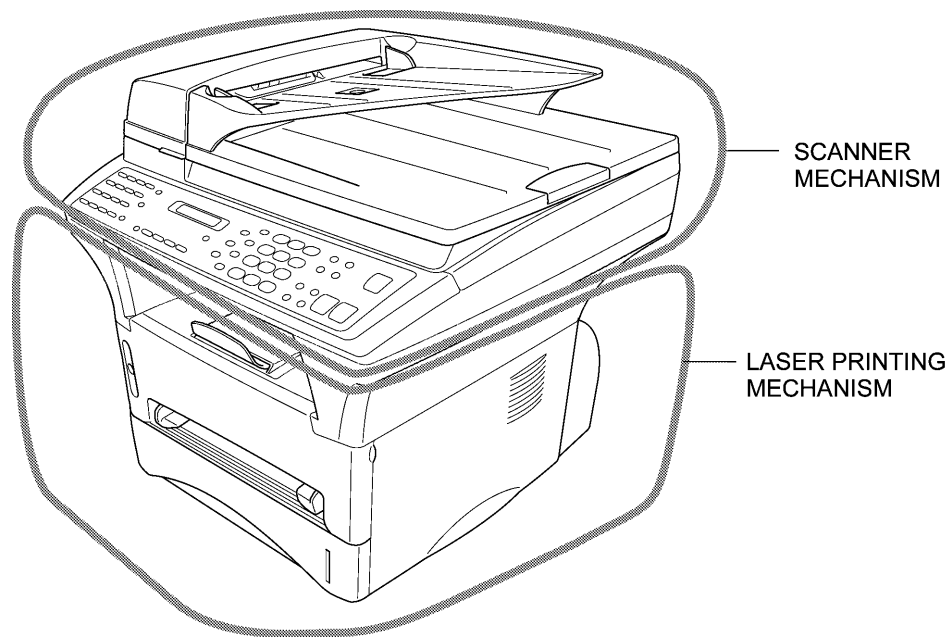


* Provided on models supporting facsimile function.

2. MECHANISMS

The machine is classified into the following mechanisms:

- **SCANNER MECHANISM**
 - ADF mechanism
 - Document scanning mechanism
- **LASER PRINTING MECHANISM**
 - Paper pick-up and registration mechanism
 - Print process mechanism (consisting of charging, exposing, developing, and transferring processes) with paper feeding mechanism
 - Heat-fixing mechanism with paper feeding mechanism
 - Paper ejecting mechanism
- **SENSORS AND ACTUATORS**

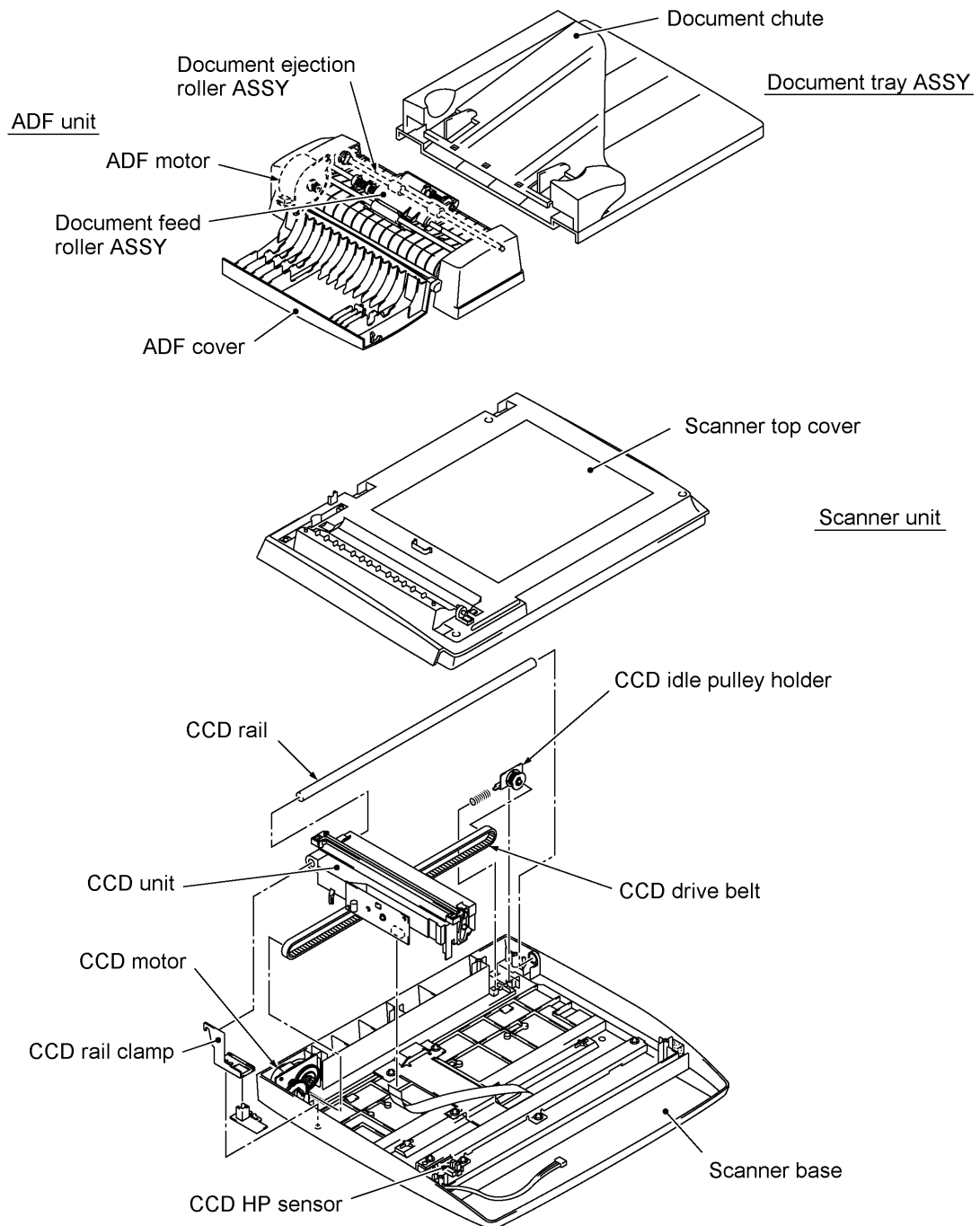


2.1 Scanner Mechanism

This mechanism consists of the following:

- document tray ASSY which consists of a document chute and document tray,
- automatic document feeder (ADF) unit which consists of a document feed roller ASSY, document ejection roller ASSY, ADF motor, and document front and rear sensors, and
- scanner unit which consists of a scanner top cover, CCD unit, CCD drive mechanism, CCD HP sensor, and scanner base.

For details about the sensors, refer to Section 2.3.



This scanner mechanism supports a dual scanning system.

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

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

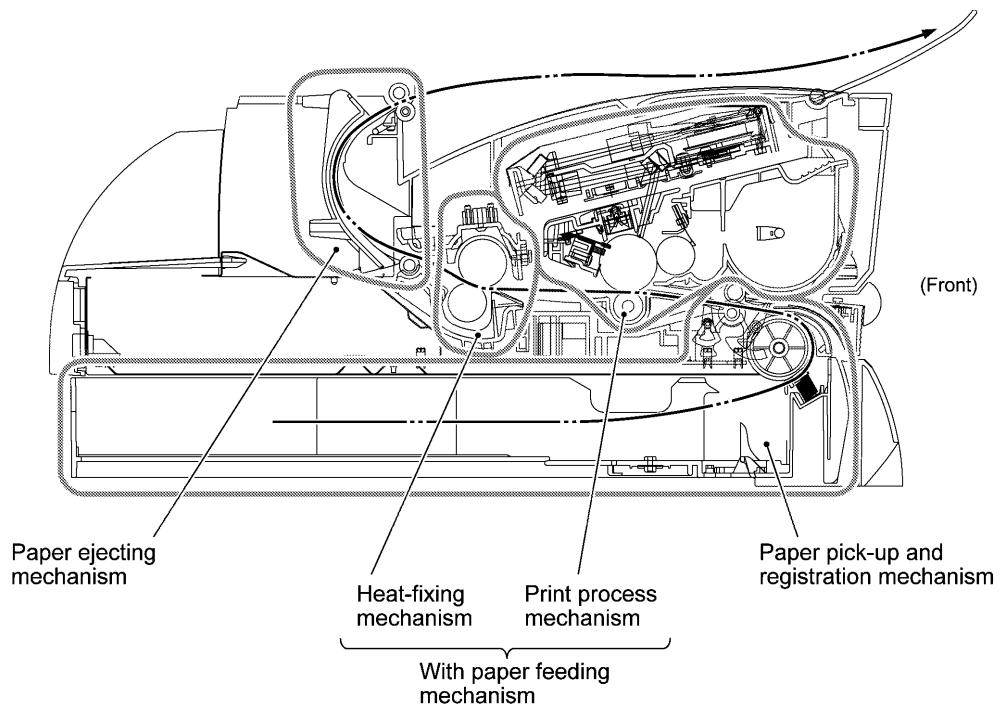
- (2) If you open the scanner unit, put a sheet of document (or put a bound book opened) on the glass of the scanner top cover, close the scanner unit, and start the scanning operation, then the CCD drive mechanism will be driven. That is, the CCD motor rotates and its rotation will be transmitted via the gear train to the CCD drive belt.

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

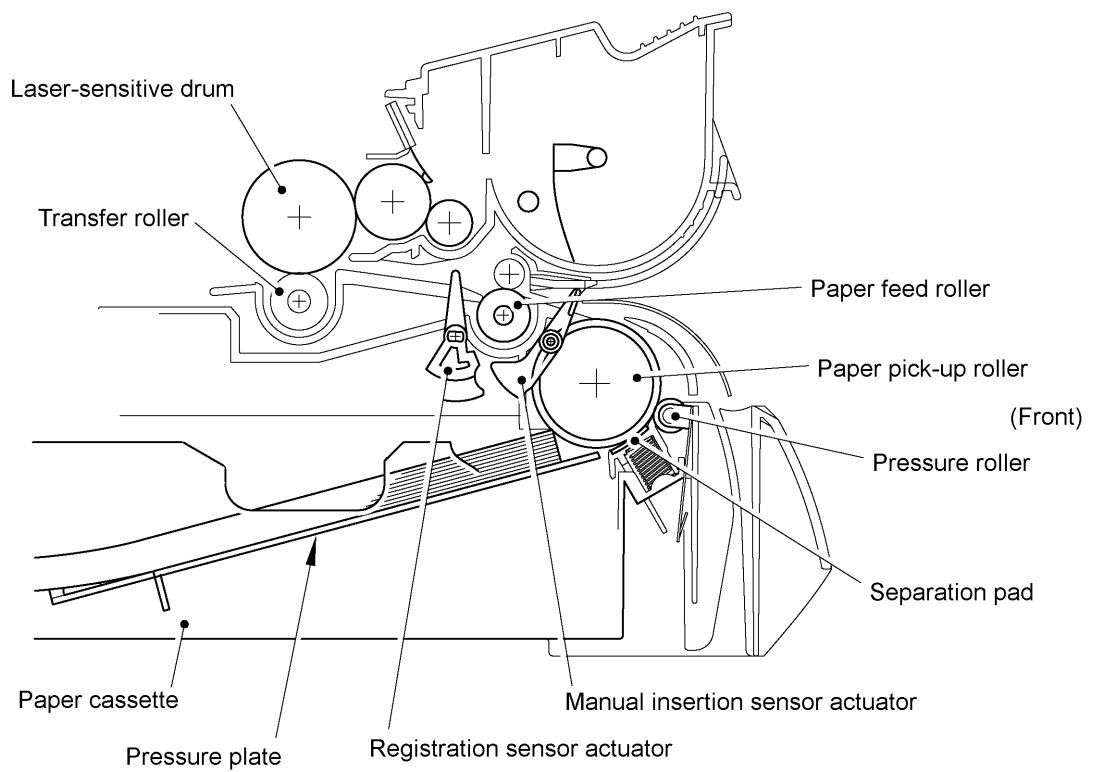
In this scanning system, the CCD unit moves horizontally beneath a document being kept in stationary position.

The CCD unit contains a charge coupled device (CCD) image sensor. The cold-cathode fluorescent lamp illuminates a document and the reflected light of the scanned image data is transmitted via the mirrors into the lens which reduces the scanned data so as to form the image on the CCD.

2.2 Laser Printing Mechanism



2.2.1 Paper pick-up and registration mechanism



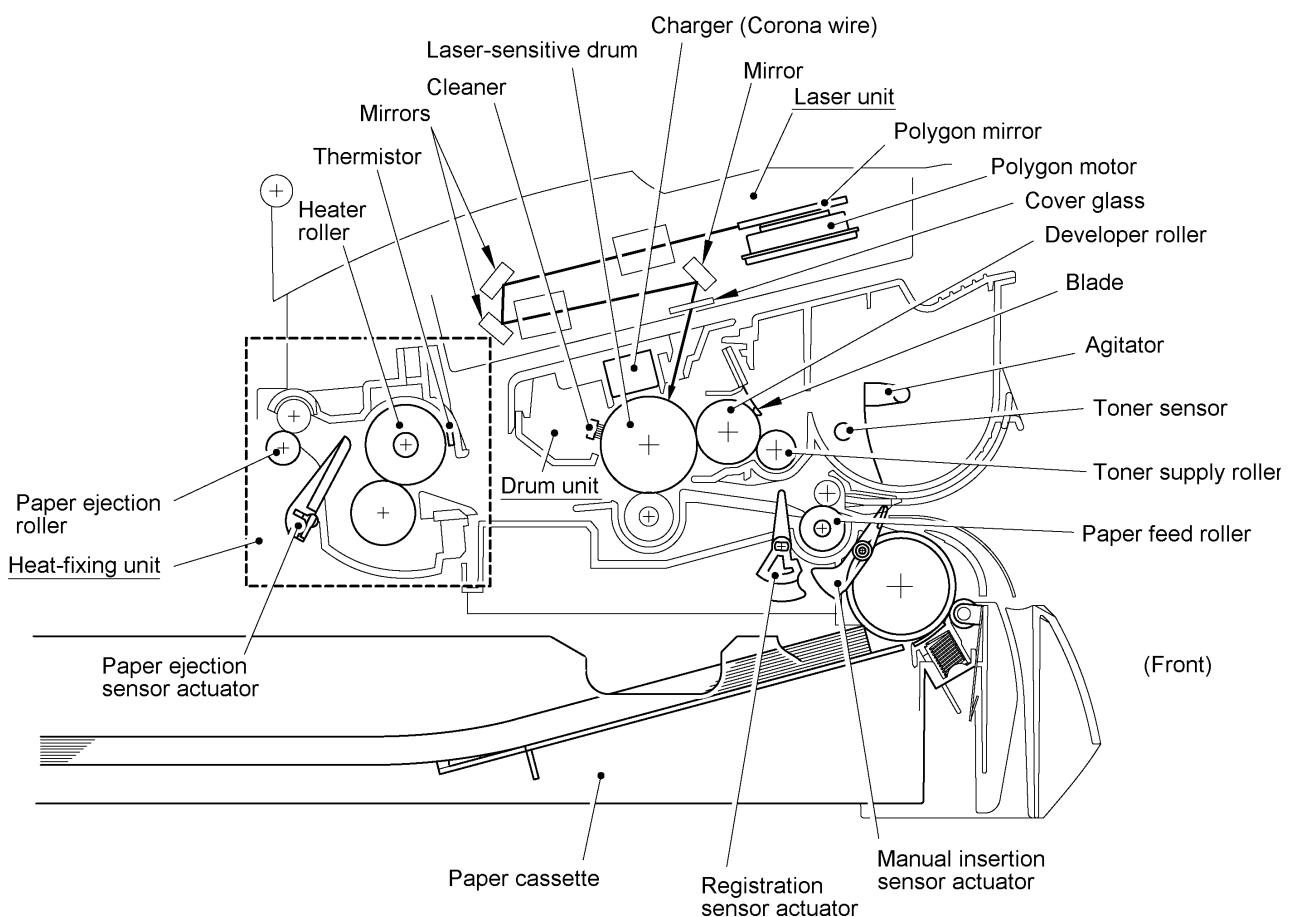
At the 1st stage, the controller drives the main motor without energizing the solenoid so that the paper feed roller simply idles.

At the 2nd stage, the controller energizes the solenoid so that the paper feed roller no longer rotates and the paper pick-up roller starts rotating to pick up paper into the machine, a sheet at a time. After the leading edge of the pulled-in paper passes through the manual insertion sensor actuator, the paper is further fed for the specified time length. Accordingly, the leading edge will reach the paper feed roller where the paper skew will be eliminated.

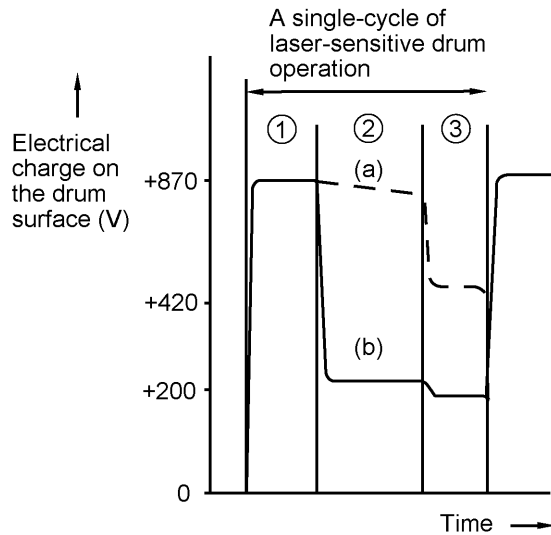
At the 3rd stage, the controller deenergizes the solenoid to rotate the paper feed roller for feeding paper to the transfer block in the drum unit.

When the leading and trailing edges of the paper pass through the registration sensor actuator, the sensor signals them to the controller. According to those signals, the controller may determine the first print position on the paper.

2.2.2 Print process mechanism

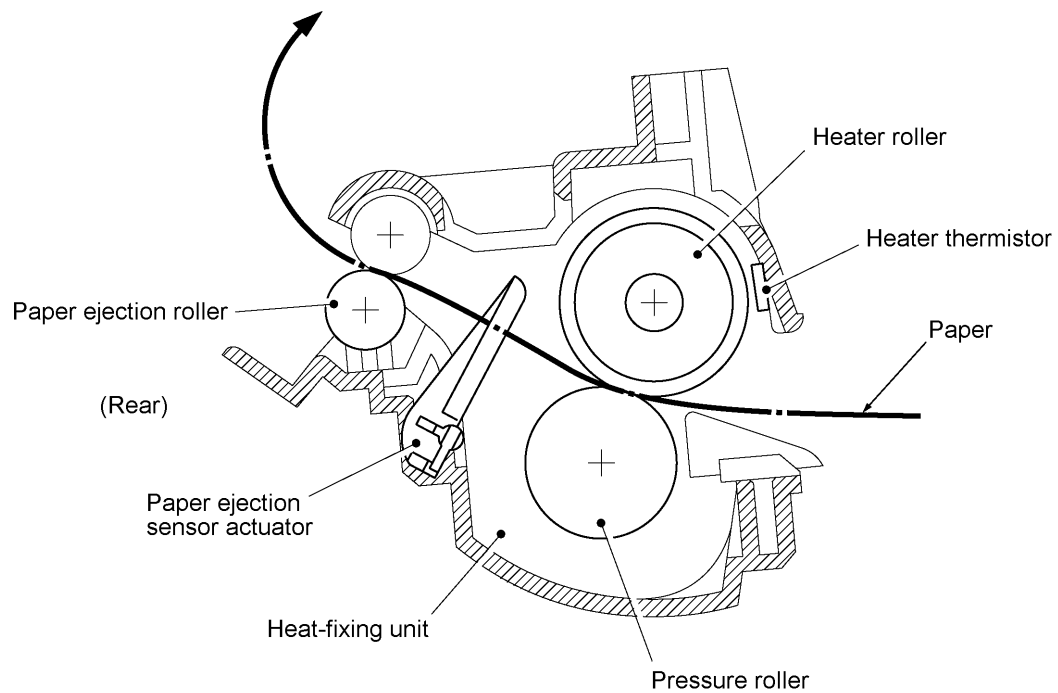


The print process unit works with laser beam, electrical charges, and toner. The graph below shows the transition of electrical charge on the surface of the laser-sensitive drum through the four processes: charging, exposing, developing, and transferring processes.



- ① Charges the drum surface positively.
- ② Exposes the drum surface to a laser beam to form a latent image and develops the latent image with toner.
 - (a) Unexposed area (Non-image area)
 - (b) Exposed area (Image area)
- ③ Transfers the toner-formed image from the drum to paper.

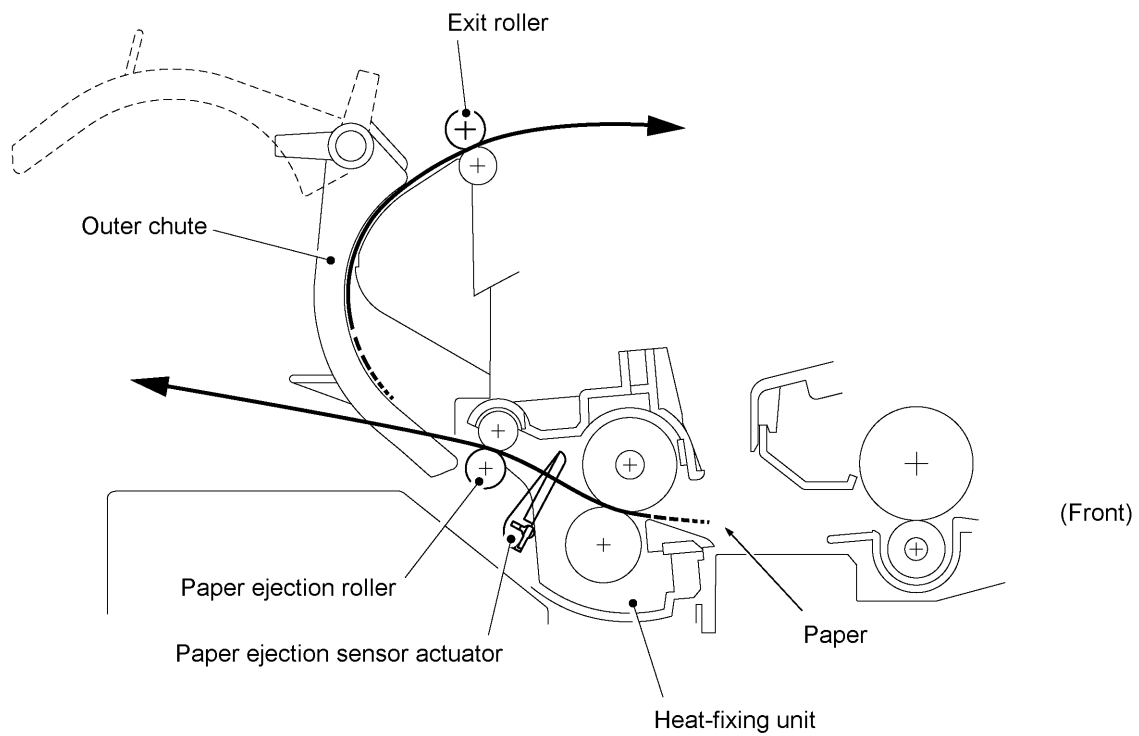
2.2.3 Heat-fixing mechanism



As the paper passes between the heater roller and the pressure roller in the heat-fixing unit, the heater roller fuses the toner on the paper.

The controller monitors the internal resistance of the heater thermistor to keep the surface temperature of the heater roller constant by turning the halogen heater lamp on and off.

2.2.4 Paper ejecting mechanism



After the paper passes through the heat-fixing process, it will be ejected from the heat-fixing unit by the paper ejection roller.

If the leading edge of the paper pushes up the actuator of the paper ejection sensor, the sensor signals the start of paper ejection. If the trailing edge has passed through the sensor actuator, the sensor signals the completion of paper ejection.

The paper will be turned over along the outer chute and ejected onto the main cover by the exit roller.

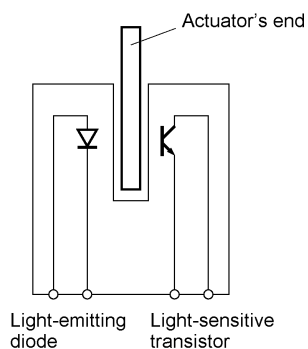
2.3 Sensors and Actuators

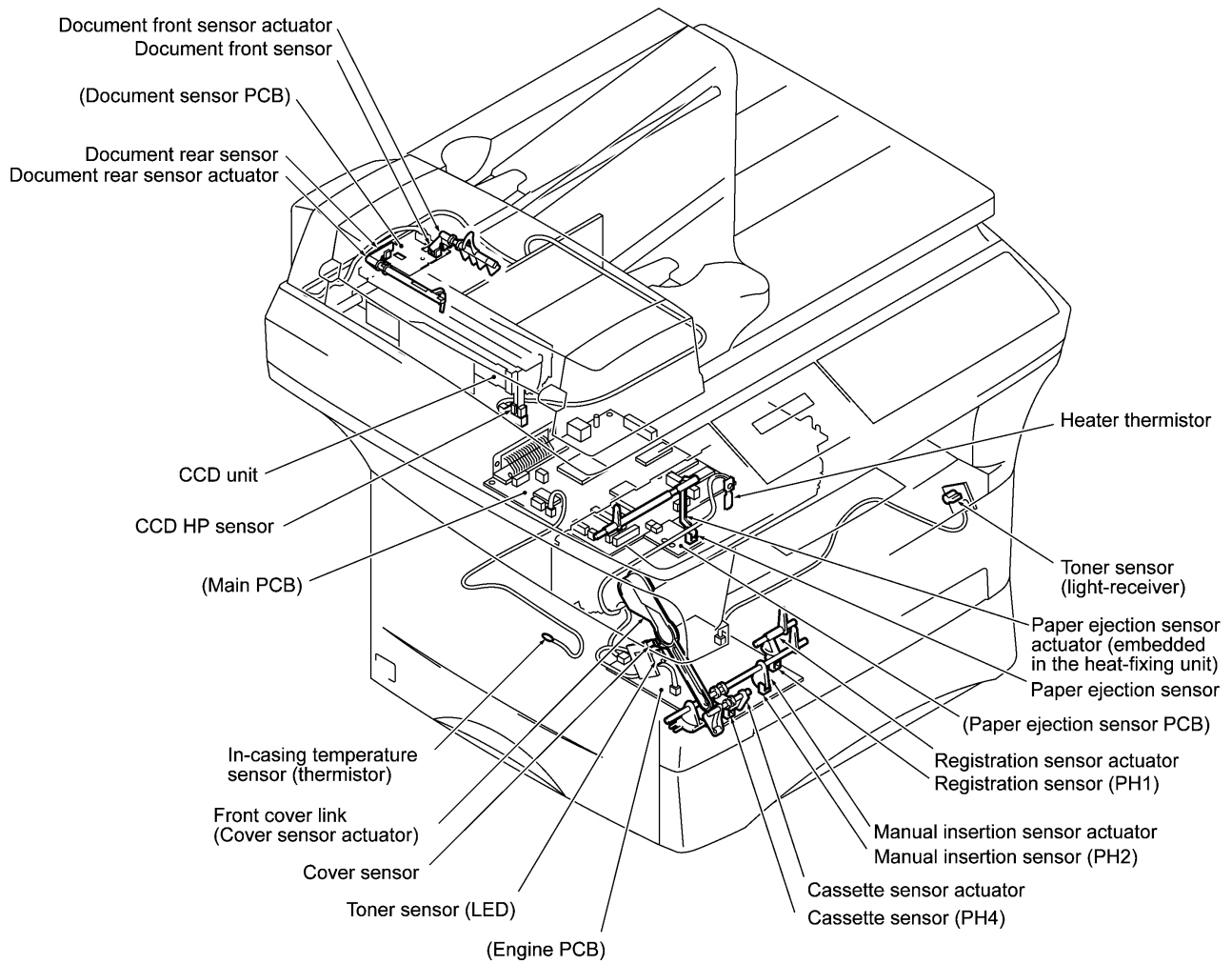
This machine has ten sensors: eight photosensors and two thermistors as described below.

Sensor name	Type	Located on
Document front sensor	Photosensor	Document sensor PCB
Document rear sensor	Photosensor	Document sensor PCB
Manual insertion sensor	Photosensor	Engine PCB
Registration sensor	Photosensor	Engine PCB
Cassette sensor	Photosensor	Engine PCB
Paper ejection sensor	Photosensor	Paper ejection sensor PCB
Toner sensor	Photosensor	Toner sensor (LED) PCB and toner sensor (light-receiver) PCB
Cover sensor	Photosensor	Toner sensor (LED) PCB
Heater thermistor	Thermistor	Heat-fixing unit
In-casing temperature sensor	Thermistor	Left-hand plate of the main chassis

- 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.
- Manual insertion sensor which detects whether paper is inserted manually through the paper slot or whether paper fed through the paper cassette has jammed.
- Registration sensor which detects the leading and trailing edges of recording paper, which allows the controller to determine the registration timing and check paper jam.
- Cassette sensor which detects whether the paper cassette is loaded.
- Paper ejection sensor which detects whether the recording paper goes out of the machine.
- Toner sensor which detects whether there is toner or a toner cartridge is loaded.
- Cover sensor which detects whether the front cover is closed.
- Heater thermistor which allows the controller to monitor the temperature of the heater roller of the fixing unit.
- In-casing temperature sensor which allows the controller to monitor the temperature inside the machine.

The above photosensors are a photo-interrupter 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.

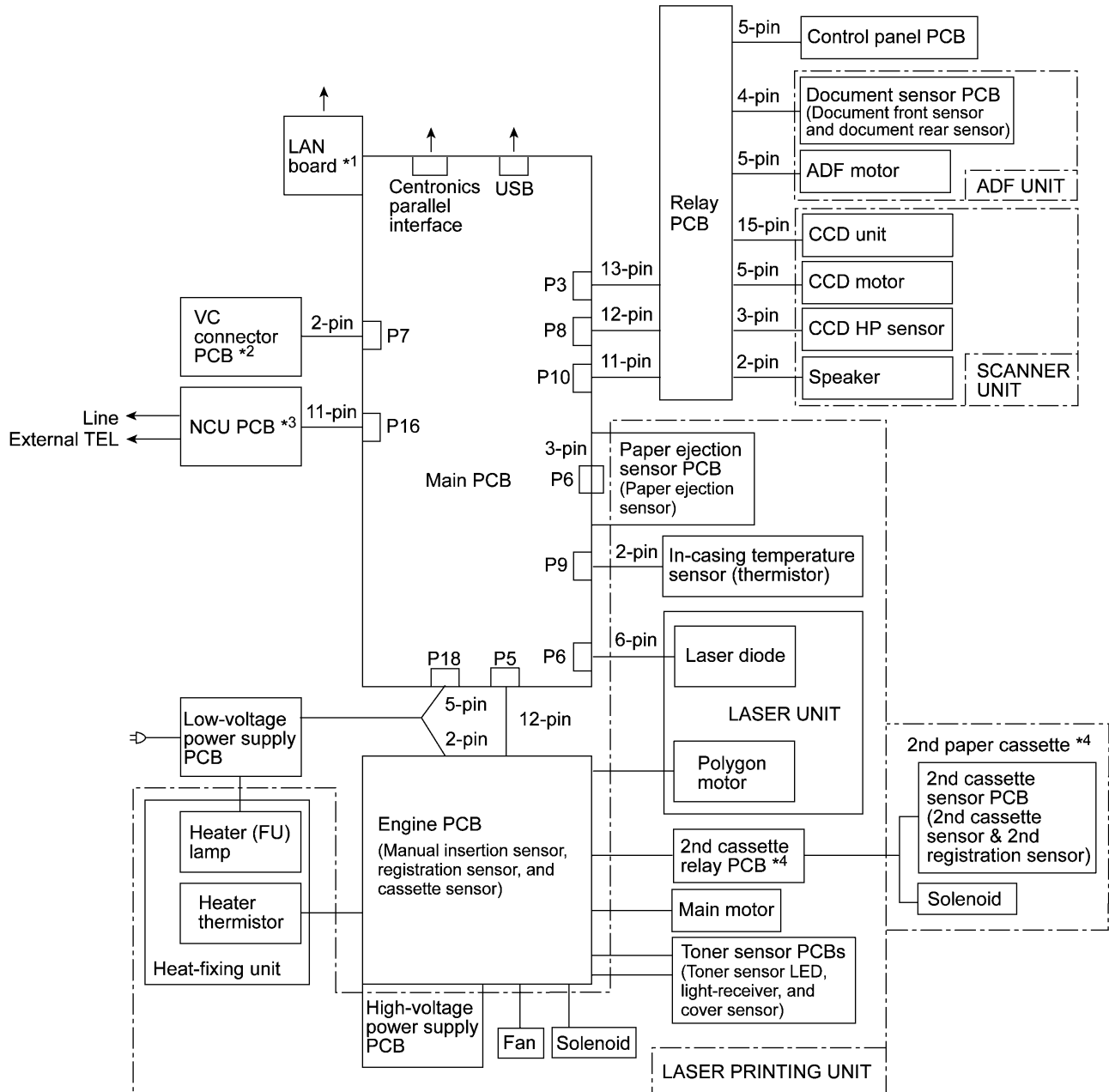




Location of Sensors and Actuators

3. CONTROL ELECTRONICS

The hardware configuration of the machine is shown below.



- *1 Provided on models supporting LAN interface.
- *2 Provided on models supporting video capture.
- *3 Provided on models supporting facsimile function.
- *4 Provided on models available with a 2nd paper cassette (as an option).

Configuration of Machine

CHAPTER IV.

DISASSEMBLY/REASSEMBLY AND LUBRICATION

CHAPTER IV. DISASSEMBLY/REASSEMBLY AND LUBRICATION

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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 accessing parts or units inside the machine. When having access to the power supply, be sure to unplug the power cord from the power outlet.
- (2) When servicing the optical system of the laser printing unit, be careful not to place screwdrivers or other reflective objects in the path of the laser beam. Be sure to take off any personal accessories such as wrist watches and rings before working on the printer. A reflected beam, though invisible, can permanently damage your eyes.
- (3) If the machine has been printing, allow the heat-fixing unit (inside this unit is a red-colored heater roller) sufficient time to cool down before starting maintenance jobs. It is HOT!
- (4) Be careful not to lose screws, washers, or other parts removed for parts replacement.
- (5) Do not remove gears from the document feed roller ASSY or document ejection roller ASSY if at all possible. Once removed, they will become unusable and new gears will have to be put back in.
- (6) When using soldering irons and other heat-generating tools, take care not to damage the resin parts such as wires, PCBs, and covers.
- (7) Before handling the PCBs, touch a metal portion of the machine to discharge static electricity; otherwise, the electronic parts may be damaged due to the electricity charged in your body.
- (8) When transporting PCBs, be sure to wrap them in conductive sheets such as aluminum foil.
- (9) Be sure to reinsert self-tapping screws correctly, if removed. Unless otherwise specified, tighten screws to the following torque values:

Taptite, bind B and cup B	M3:	0.7 N•m
	M4:	0.8 N•m
Taptite, cup S	M3:	0.8 N•m
Other screws	M3:	0.7 N•m
	M4:	0.8 N•m

- (10) When connecting or disconnecting cable connectors, hold the connector bodies not the cables. If the connector has a lock, always slide the connector lock to unlock it.
- (11) Before reassembly, apply the specified lubricant to the specified points. (Refer to Section 2 in this chapter.)
- (12) After repairs, check not only the repaired portion but also that the connectors and other related portions function properly before operation checks.

■ Preparation

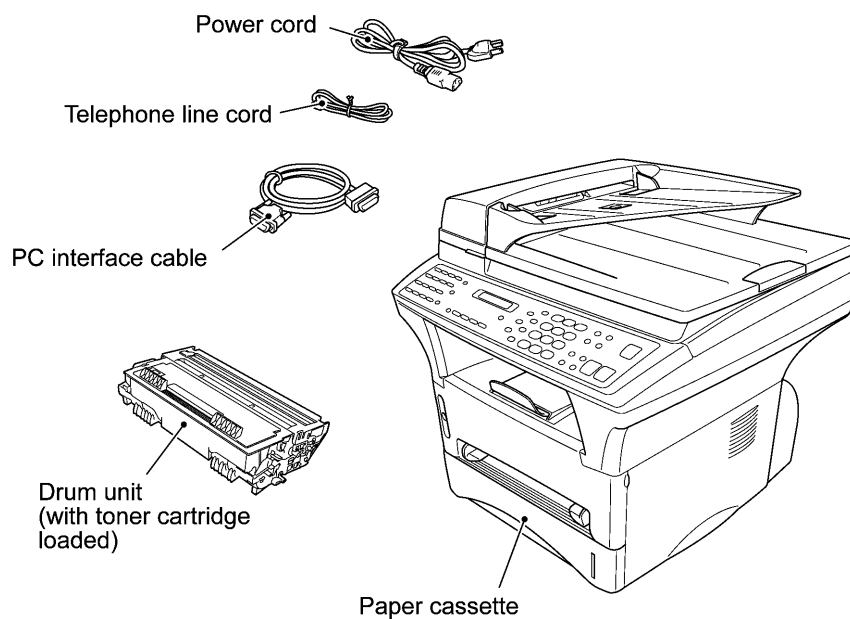
Prior to proceeding to the disassembly procedure,

(1) Unplug

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

(2) Remove

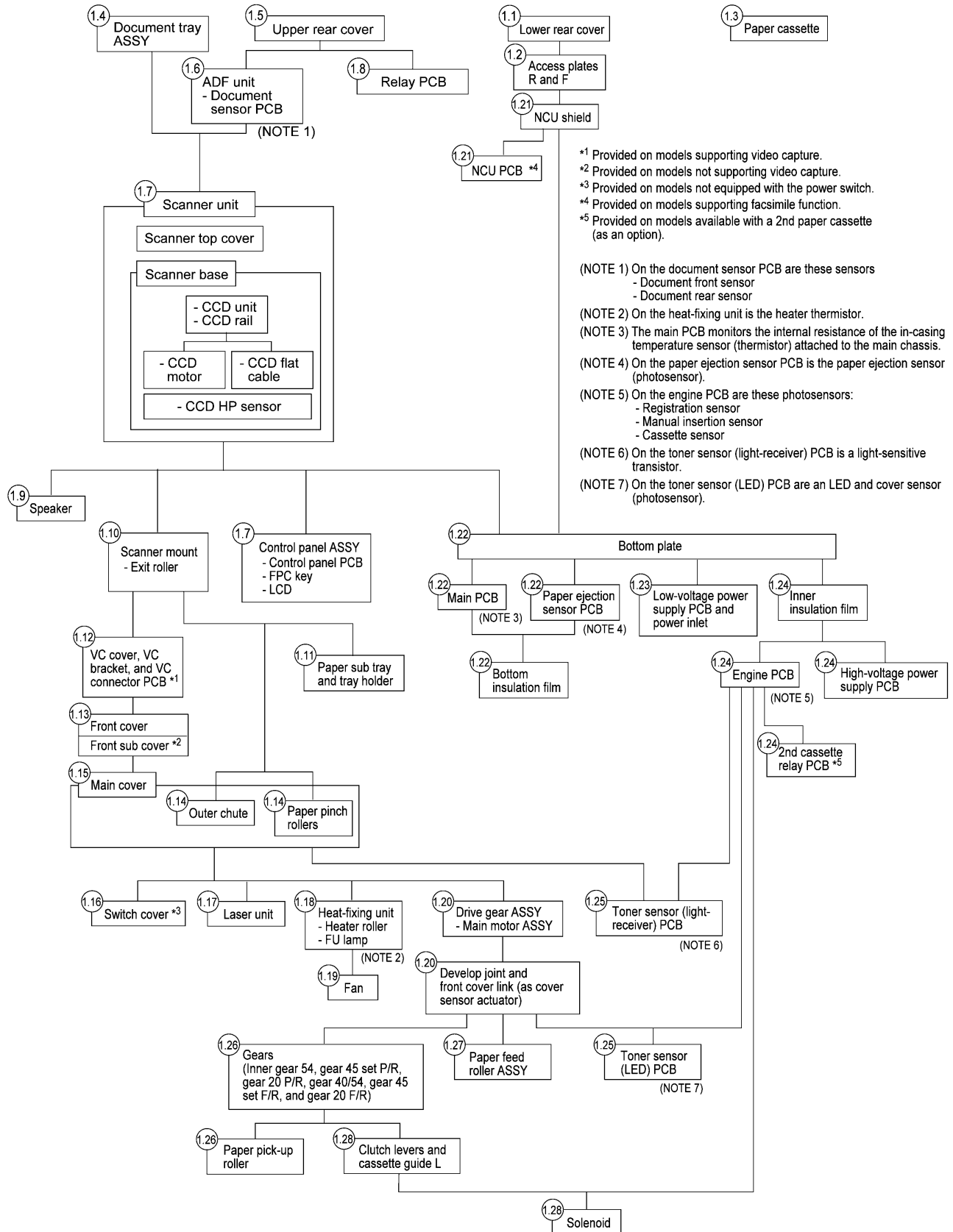
- the paper cassette and
- the drum unit (with toner cartridge loaded).



■ How to Access the Object Component

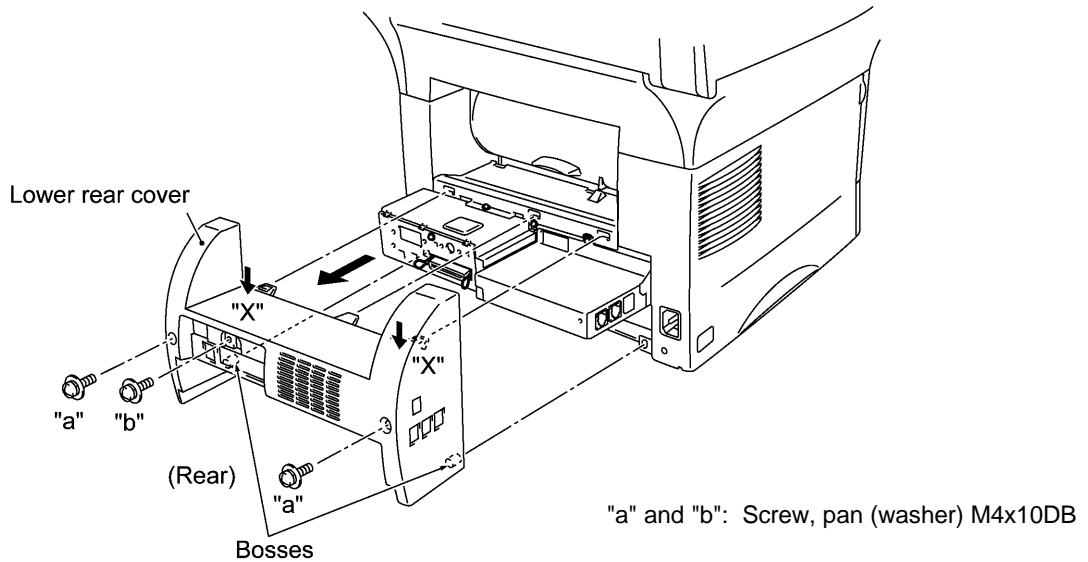
- On the next page is a disassembly order flow which helps you access the object components. To remove the heat-fixing unit, for example, first find it on the flow and learn its number (①.18 in this case). You need to remove parts numbered ①.4, ①.5, ①.6, ①.7, ①.10, ①.12, ①.13, and ①.15 so as to access the heat-fixing unit.
- Unless otherwise specified, the disassembled parts or components should be reassembled in the reverse order of removal.

■ Disassembly Order Flow



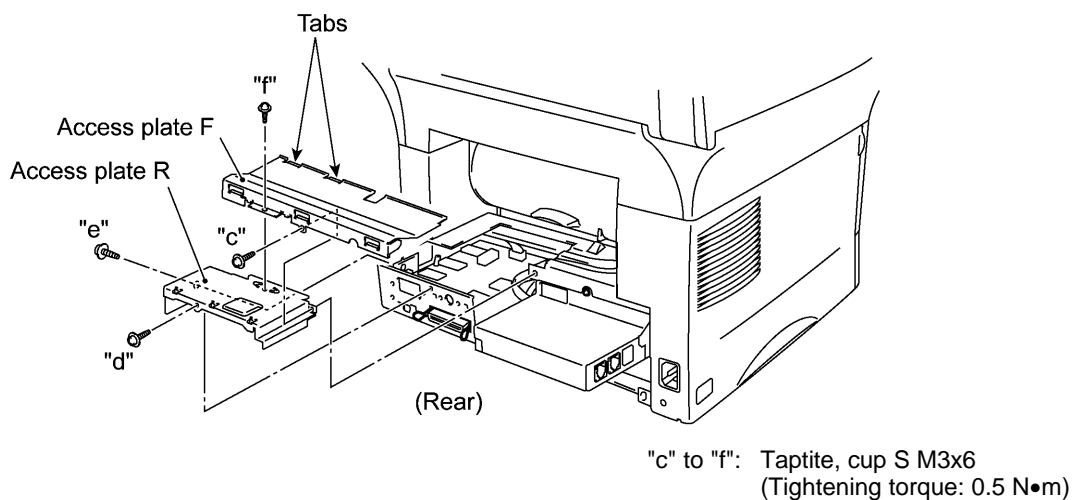
1.1 Lower Rear Cover

- (1) Remove the three screws (two "a" and one "b") from the lower rear cover. Screw "b" is provided on those models available with a 2nd paper cassette (as an option).
- (2) Lightly pressing sections "X," pull out the lower rear cover.



1.2 Access Plates R and F

- (1) Remove screw "c" that secures access plates R and F together to the main chassis.
- (2) Remove screws "d" and "e" from access plate R.
- (3) Take out access plates R and F together.
- (4) Remove screw "f" to separate those access plates.

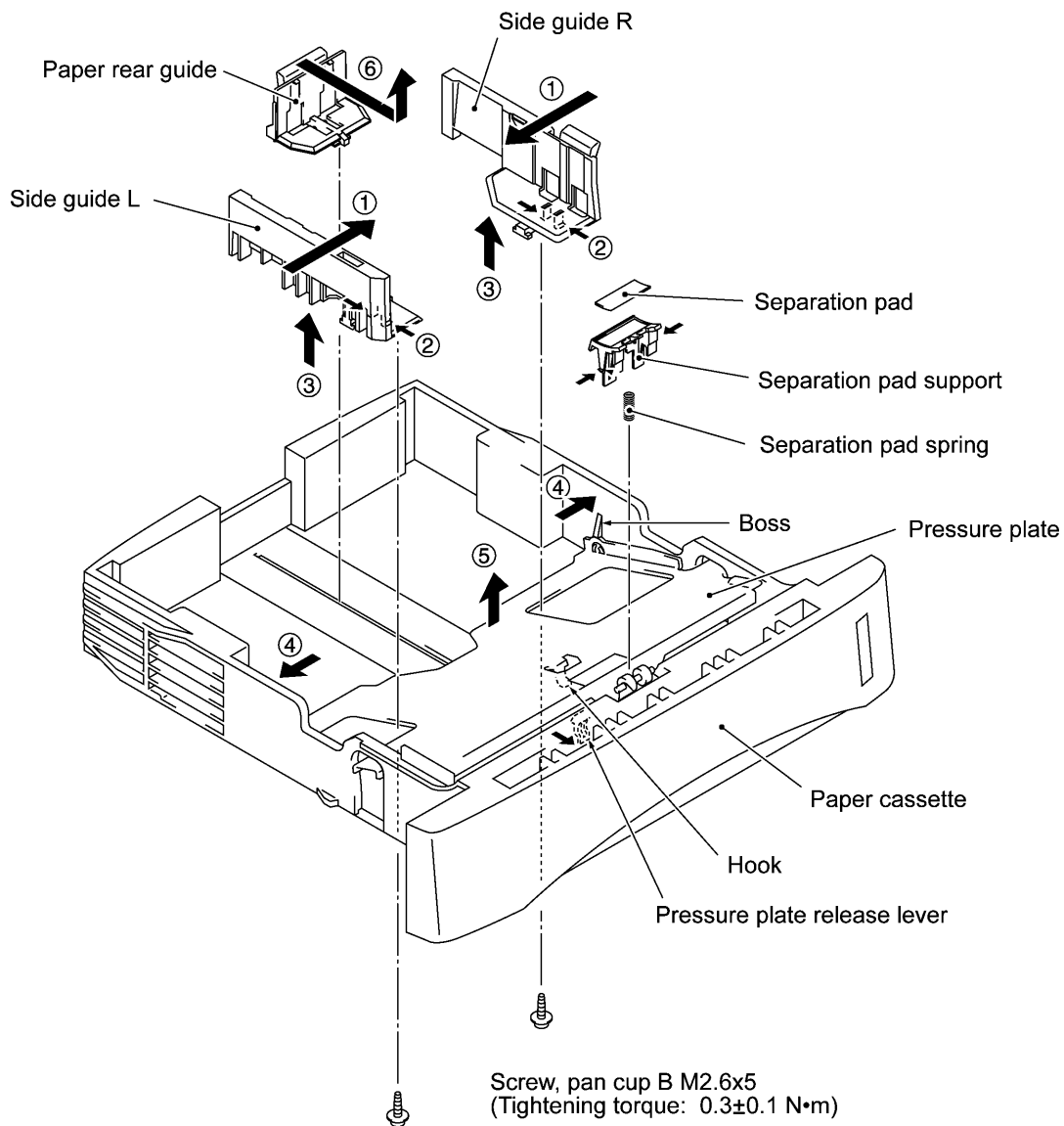


■ Reassembling Notes

- When reinstalling access plate F, fit the two tabs provided on the front end underneath the center edge of the main chassis.

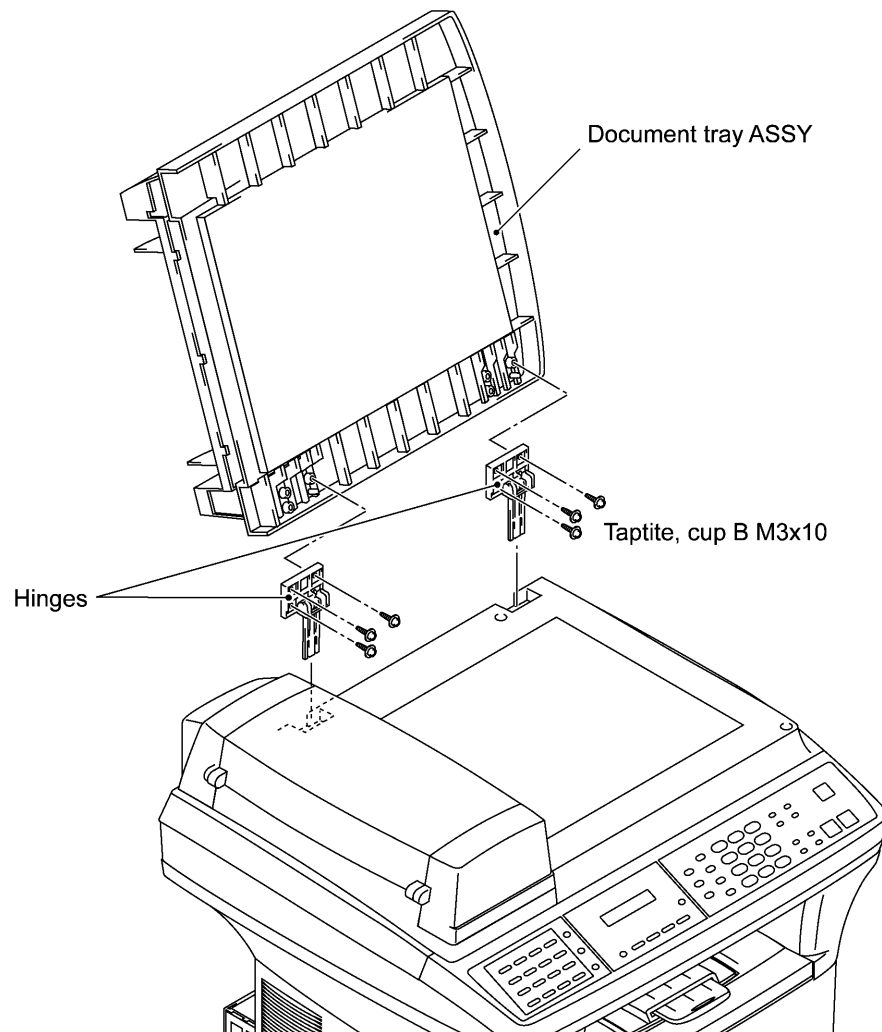
1.3 Paper Cassette

- (1) Pull the pressure plate release lever to the front to release the pressure plate.
- (2) Fully slide the side guide (R or L) inwards (in the direction of arrow ①) and remove the screw. Then release the latches (arrow ②) and pull up the side guide (arrow ③).
- (3) Release the pressure plate from the bosses (arrow ④) and remove it (arrow ⑤).
- (4) Fully slide the paper rear guide to the front and lift it up (arrow ⑥).

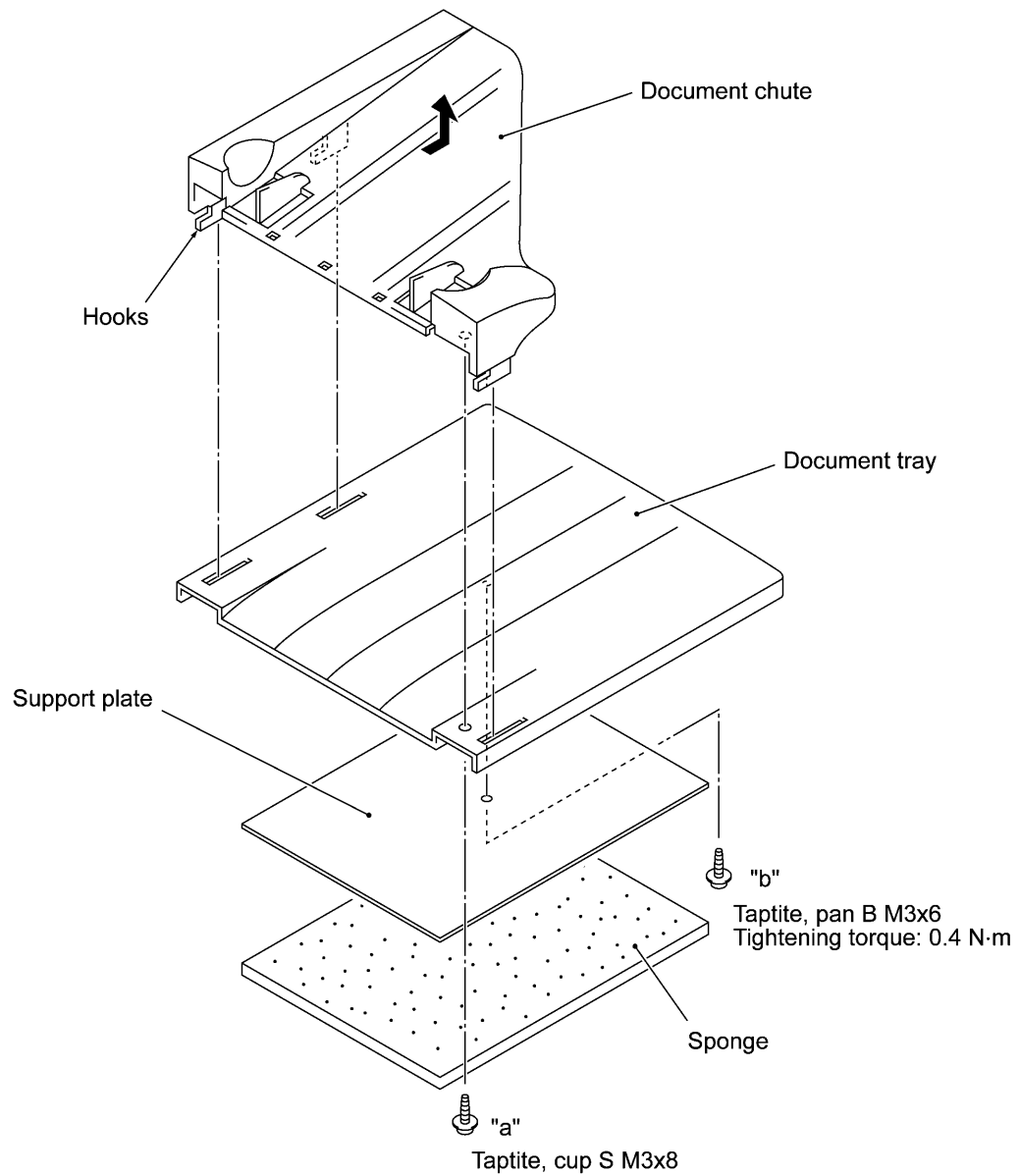


1.4 Document Tray ASSY

- (1) Fully open the document tray ASSY.
- (2) Lift up the document tray ASSY straight and pull the hinges up and out of the scanner unit.
- (3) Remove the three screws from each of the hinges.

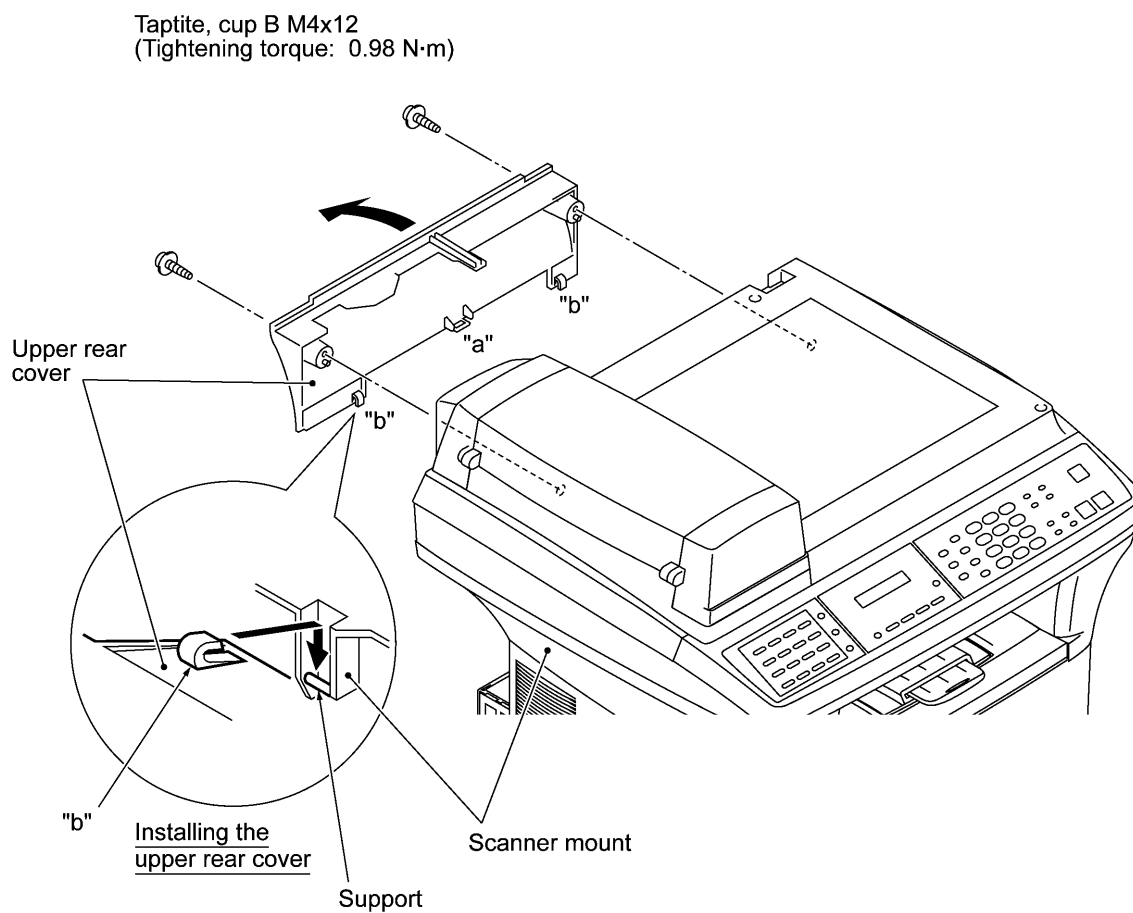


- (4) Remove screw "a," then lightly tap the left end of the document chute to release the three hooks from the document tray.
- (5) Remove the sponge.
- (6) Remove screw "b" to take off the support plate.



1.5 Upper Rear Cover

- (1) Remove the two screws from the upper rear cover.
- (2) Release section "a" from the latch provided on the scanner mount and pull the top of the upper rear cover to the rear and upwards.

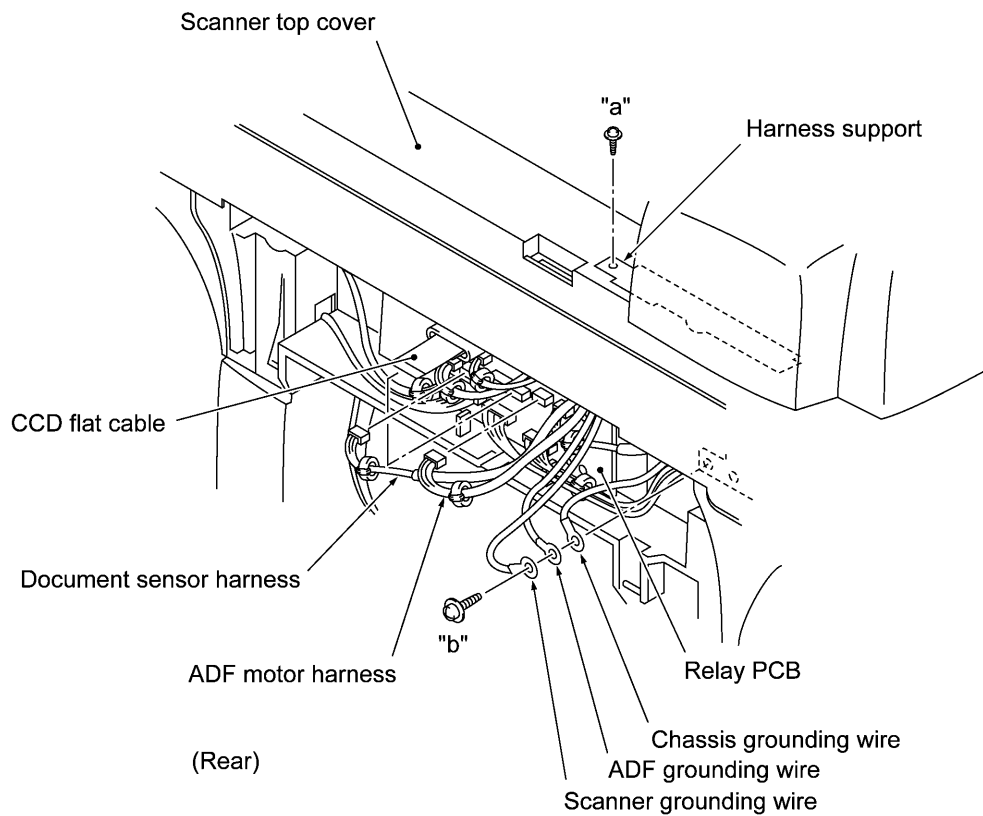


n Reassembling Notes

- When installing the upper rear cover, first hook sections "b" onto the supports of the scanner mount and push the upper rear cover into place.

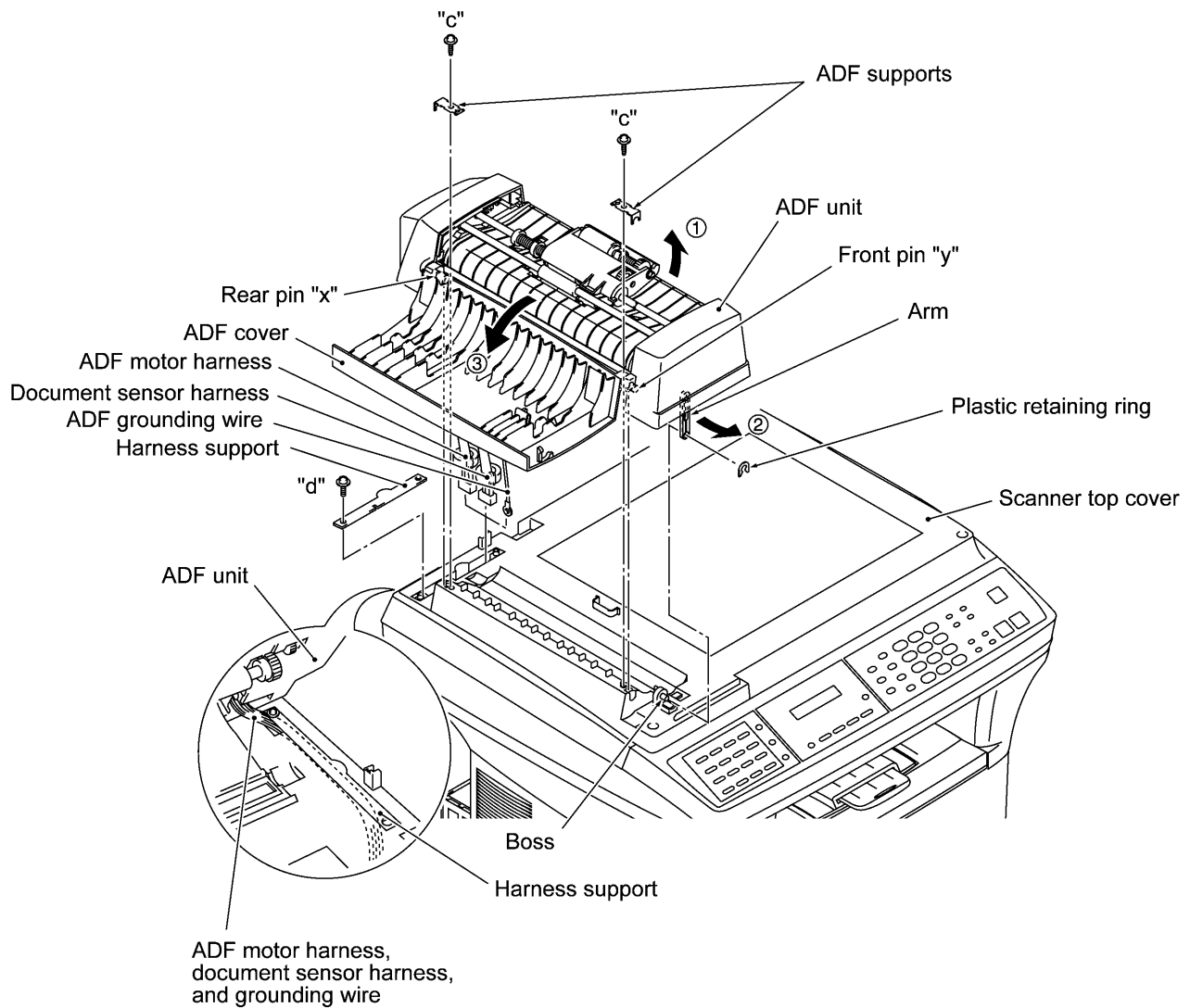
1.6 ADF Unit

- (1) Remove screw "a" from the harness support.
- (2) Remove screw "b" to release the grounding wires.
- (3) Disconnect the following from the relay PCB:
 - CCD flat cable (P4)
 - ADF motor harness (4-pin, P3)
 - Document sensor harness (4-pin, P8)



"a": Taptite, cup B M3x8
"b": Taptite, cup S M3x6

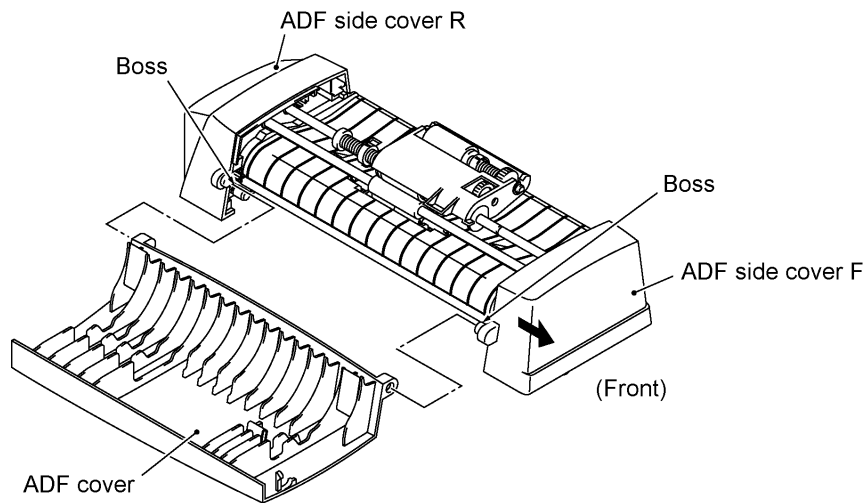
- (4) Turn the ADF unit in the direction of arrow ①, remove the plastic retaining ring, and release the arm (arrow ②) from the boss provided on the scanner top cover. Turn the ADF unit back into place.
- (5) Open the ADF cover (arrow ③) and remove two screws "c."
- (6) Lift up the ADF unit while pulling out the ADF motor harness, document sensor harness, and grounding wire. The ADF supports also come off.
- (7) Take off the harness support by removing screw "d."



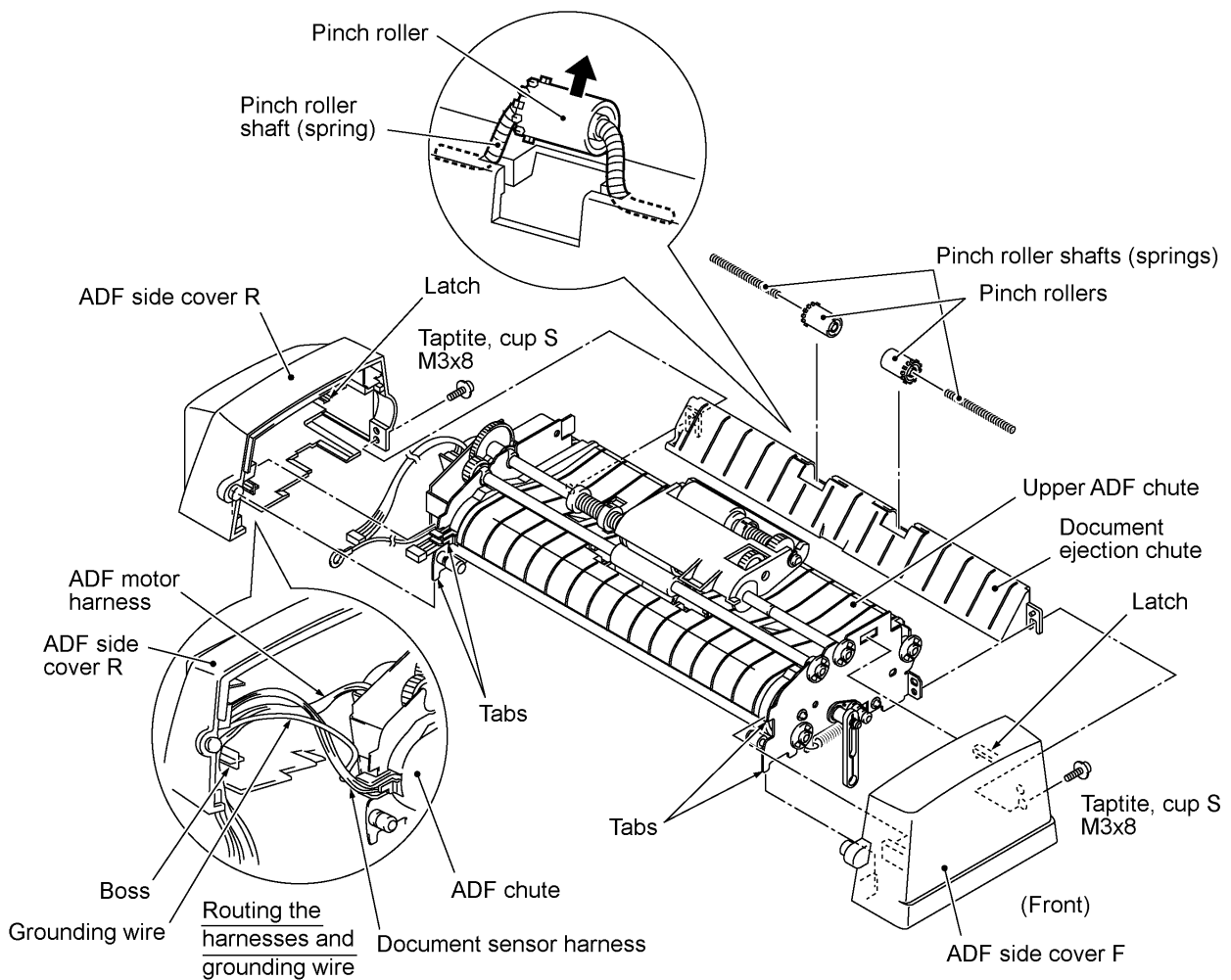
"c" and "d": Taptite, cup B M3x8

[Disassembling the ADF Unit]

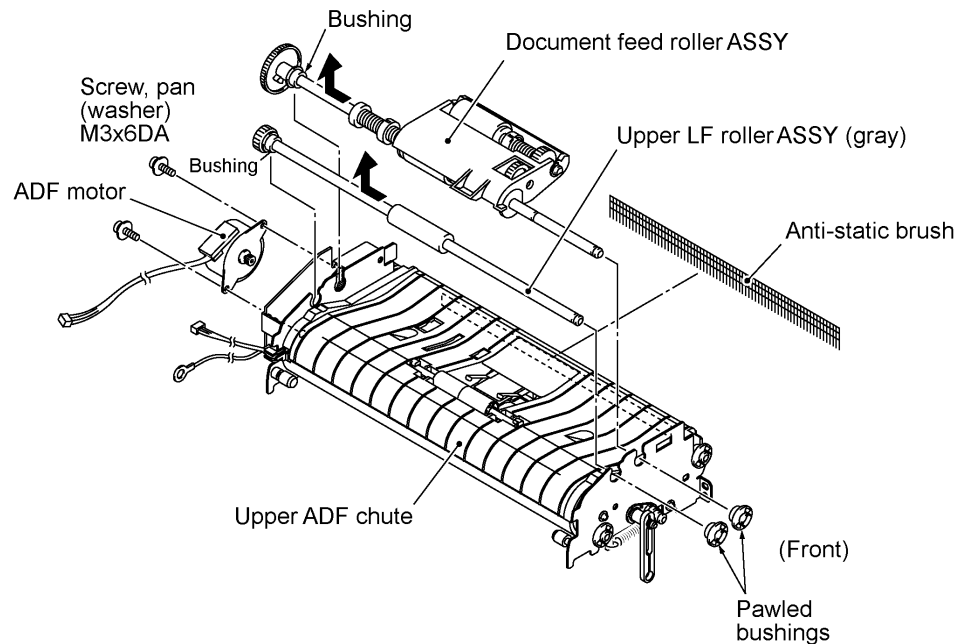
- 1) Open the ADF cover. Pull the ADF side cover outwards and release the ADF cover from the bosses provided on the ADF side covers.



- 2) At each of the ADF side covers F and R, remove the screw, pull the unscrewed corner outwards to release it from the document ejection chute, and unhook the latch.
- 3) Remove the document ejection chute (which has been secured with the screws removed in step 2) above).



- 4) At the front end of the document feed roller shaft, remove the pawled bushing by pulling its pawls outwards. At the rear end, pull the bushing outwards and lift up the document feed roller ASSY.
- 5) At the front end of the upper LF roller (gray) shaft, remove the pawled bushing by pulling its pawls outwards. At the rear end, pull the bushing outwards and lift up the upper LF roller ASSY.
- 6) Remove the two screws and take off the ADF motor.

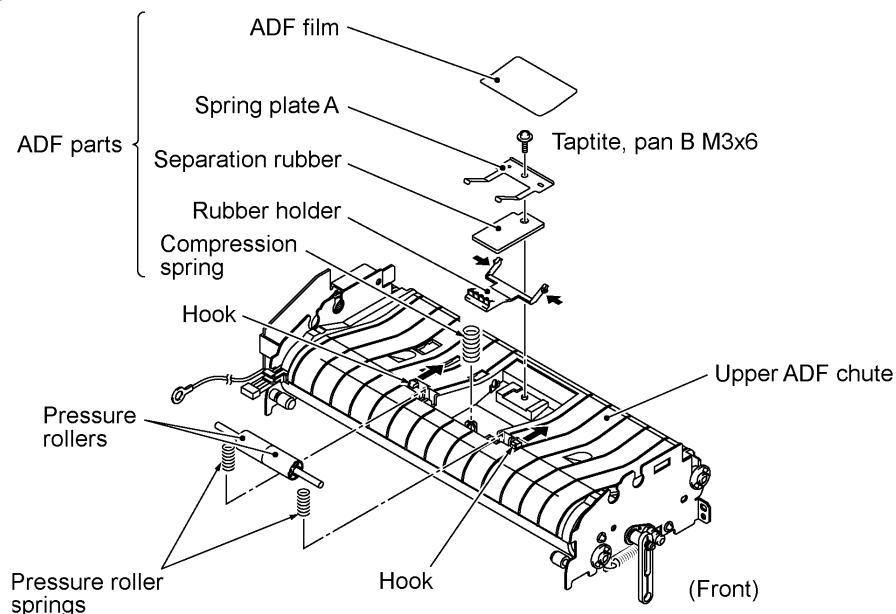


If you do not need to remove the ADF parts, skip to step 10).

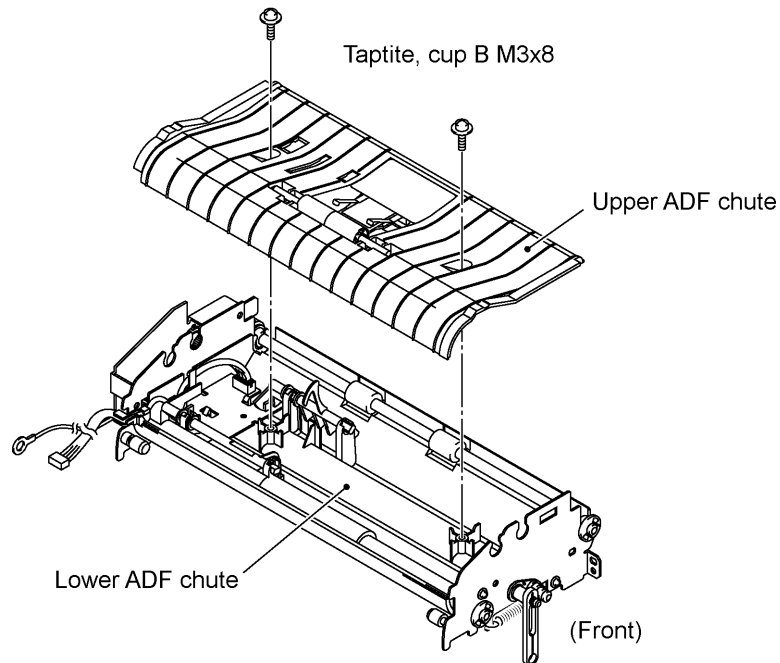
- 7) Peel off the ADF film.

NOTE: Once removed, the ADF film will become unusable and a new part will have to be put back in.

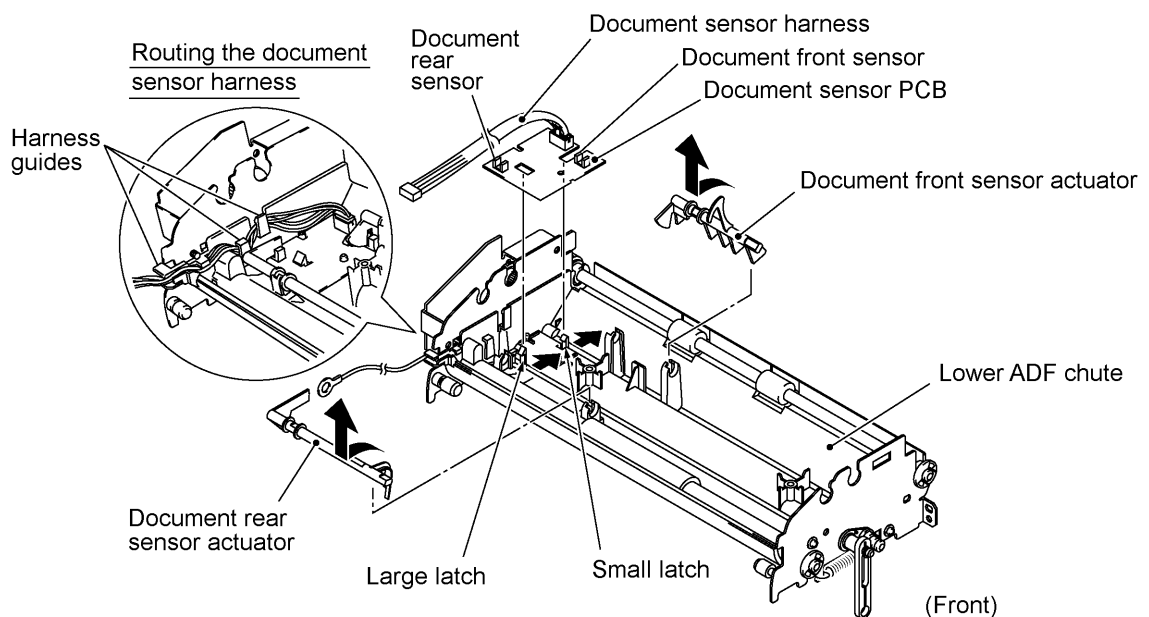
- 8) Remove the screw and take off the spring plate A, separation rubber, rubber holder, and compression spring.
- 9) Push the hooks provided on the upper ADF chute and remove the pressure rollers and their springs.



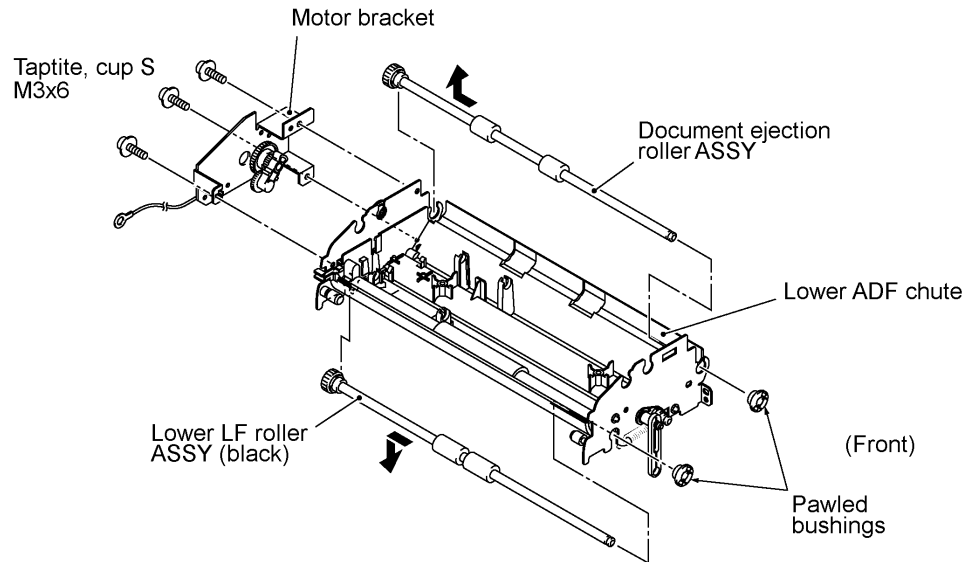
- 10) Remove the two screws and lift up the upper ADF chute.



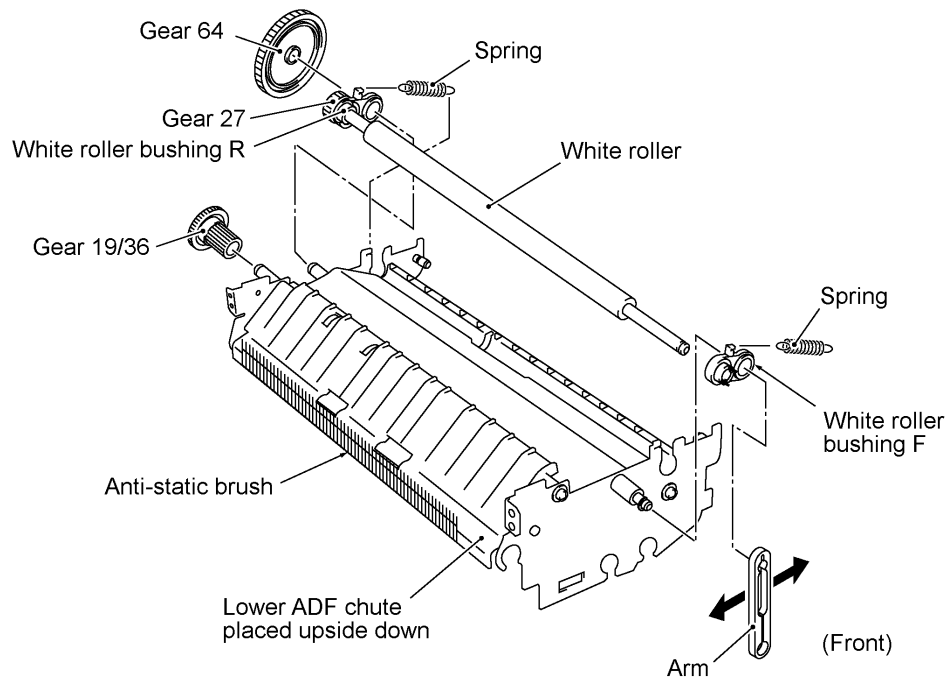
- 11) Turn the document front sensor actuator as shown below and lift it up.
- 12) Turn the document rear sensor actuator as shown below and lift it up.
- 13) Disconnect the document sensor harness from the document sensor PCB and take out its harness from the harness guides.
- 14) Unhook the two latches (large and small latches in this order) from the document sensor PCB and lift it up.



- 15) At the front end of the document ejection roller shaft, remove the pawled bushing by pulling its pawls outwards. At the rear end, pull the bushing outwards and lift up the document ejection roller ASSY.
- 16) Remove the three screws and take off the motor bracket.
- 17) At the front end of the lower LF roller (black) shaft, remove the pawled bushing by pulling its pawls outwards. At the rear end, pull the bushing outwards and remove the lower LF roller ASSY.

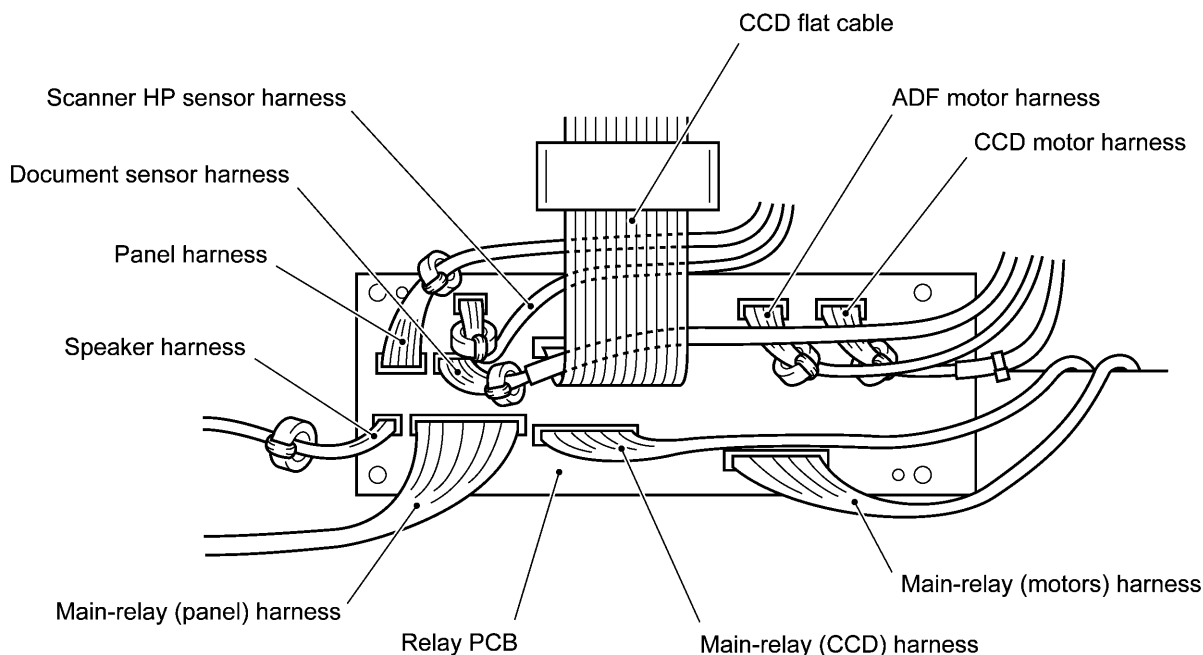


- 18) Turn the lower ADF chute upside down.
- 19) Pull the arm outwards and take it off.
- 20) At the rear side of the lower ADF chute, remove the gear 19/36 by pulling its pawl outwards.
- 21) Remove the gear 64 by pulling its pawl outwards.
- 22) Unhook the two springs.
- 23) Pull out the white roller bushing F by pulling its pawls outwards.
- 24) Remove the white roller together with the white roller bushing R and gear 27.



n Reassembling Notes

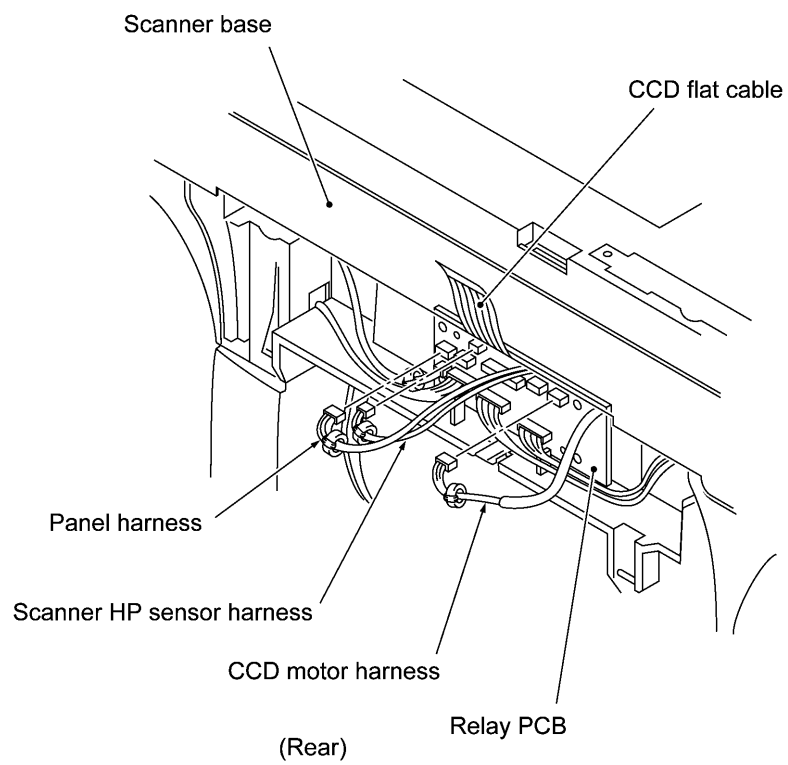
- Take care not to mistake the upper LF roller ASSY (gray) for the lower LF roller ASSY (black).
- When setting the document sensor PCB back into place, do not push it down straight, but first fit the PCB in the large latch and then fit it in the small latch (see the illustration given on page IV-13).
- Be sure to route the document sensor harness through the three harness guides so that it will not interfere with the document rear sensor actuator. (See the illustration given on page IV-13.)
- Reinstall the ADF motor with its connector side facing up. (See the illustration given on page IV-12.)
- Reinstall the ADF side covers so that the tabs of the ADF side plates become fitted inside the ribs provided on the ADF side covers. (See the illustration given on page IV-11.)
- When reinstalling the ADF side cover R, be sure to route the document sensor harness, ADF motor harness, and grounding wire between the boss and the ADF side cover R. (See the illustration given on page IV-11.)
- When reinstalling the ADF unit, first set the ADF support onto rear pin "x" of the ADF unit, set the ADF unit back into place, set the other ADF support onto front pin "y," then secure those ADF supports with two screws "c." (See the illustration given on page IV-10.)
- When connecting the ADF motor harness, document sensor harness, and grounding wires to the relay PCB, route them as shown below.



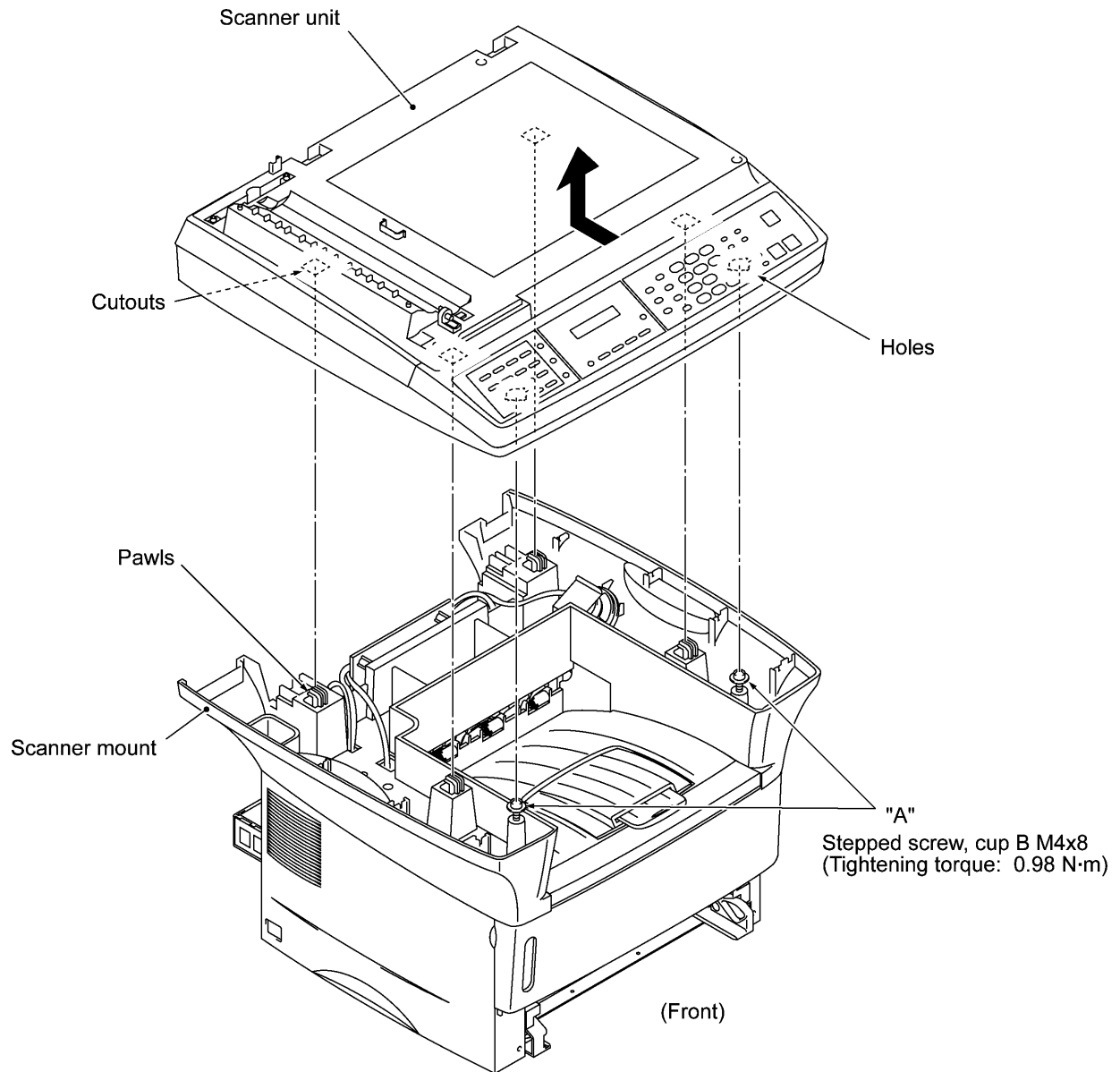
1.7 Scanner Unit and Control Panel ASSY

(1) Disconnect the following from the relay PCB:

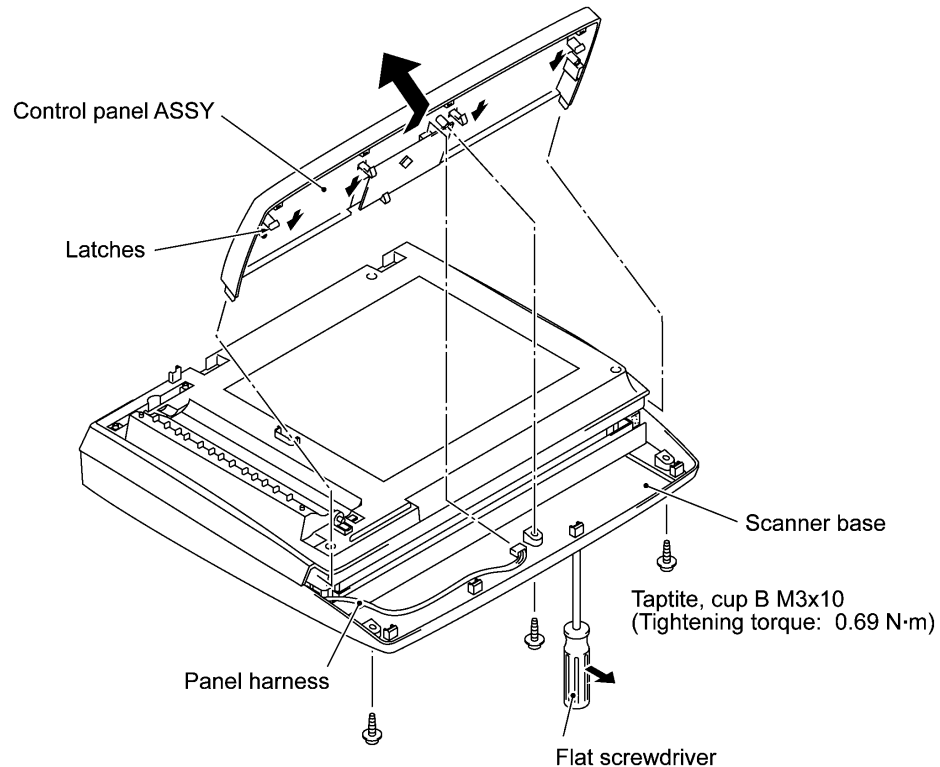
- CCD motor harness
- Panel harness
- Scanner HP sensor harness



- (2) Slide the scanner unit (with the control panel ASSY) to the rear by approx. 5 mm and then lift it up. (For the disassembly procedure of the scanner unit, refer to page IV-19.)

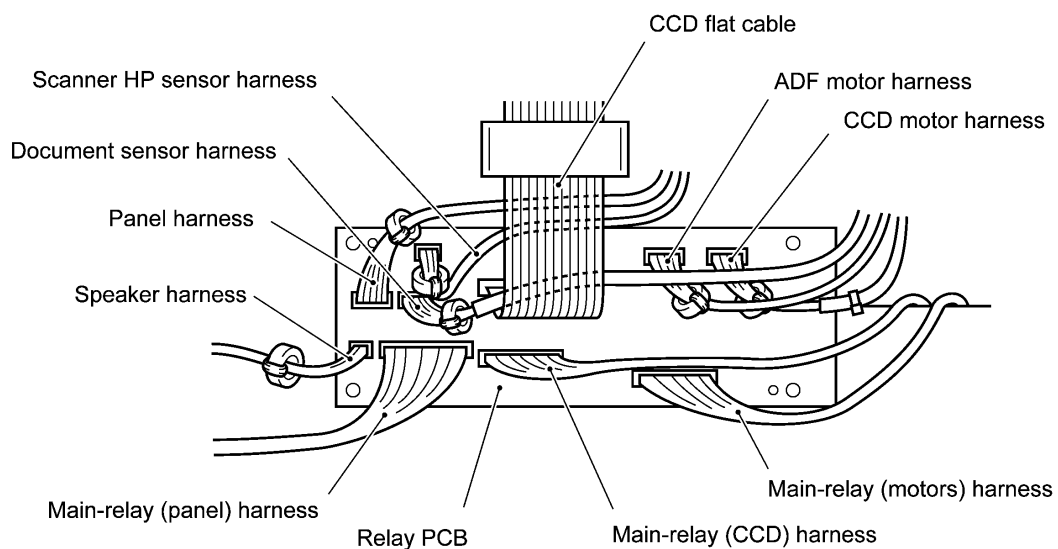


- (3) Remove the three screws from the underside of the scanner base.
- (4) Insert the tip of a flat screwdriver into each of the four holes provided in the scanner base and unhook the four latches while lifting up the control panel ASSY.
- (5) Disconnect the panel harness from the control panel PCB. (For the disassembly procedure of the control panel ASSY, refer to page IV-24.)

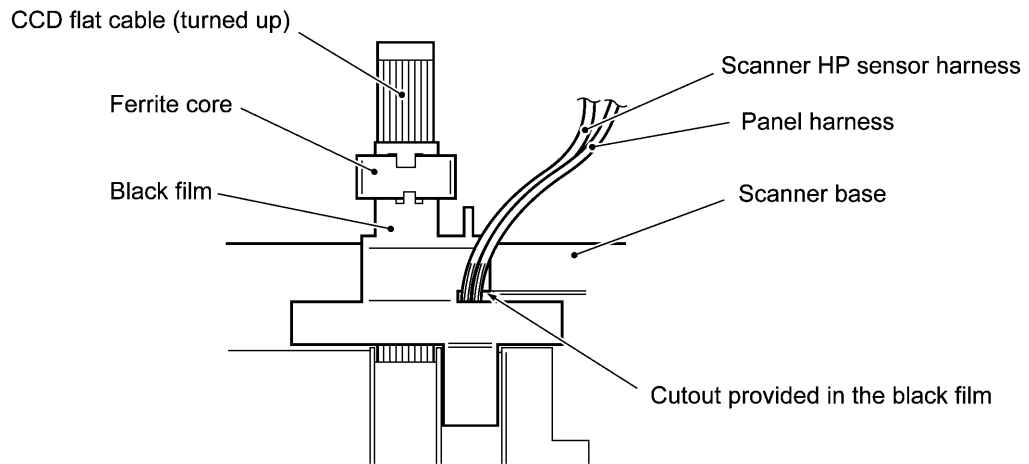


■ Reassembling Notes

- When reinstalling the scanner unit, fit the holes and cutouts provided in the scanner unit over screws "A" and pawls of the scanner mount, respectively, and then slide the scanner unit to the front. (Refer to page IV-17.)
- When connecting the CCD motor harness, panel harness, and scanner HP sensor harness to the relay PCB, route them as shown below.



- When connecting the CCD motor harness, panel harness, and scanner HP sensor harness to the relay PCB, route them as shown below.

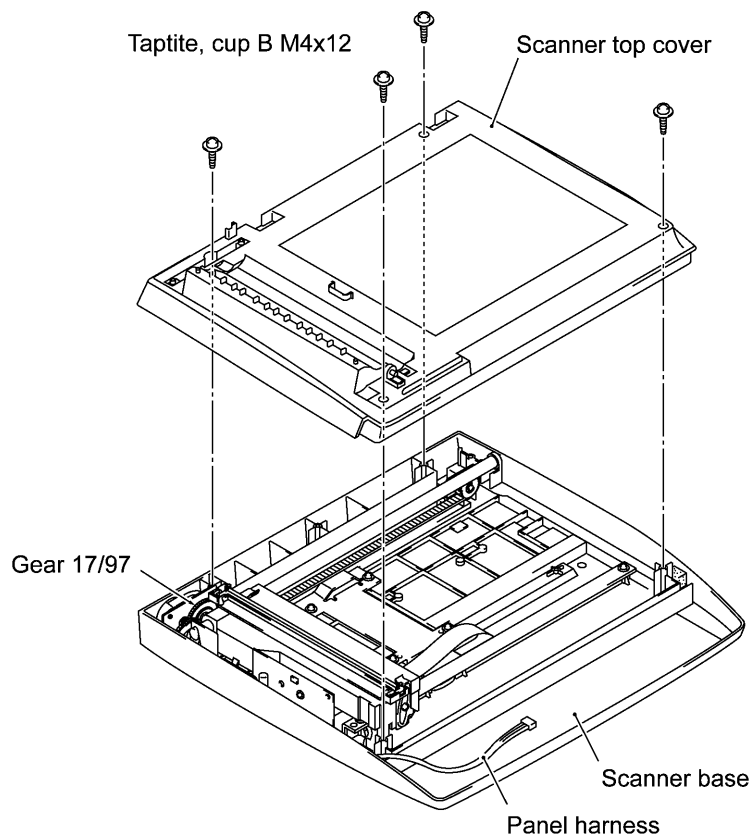


Viewed from the bottom

[**Disassembling the Scanner Unit**]

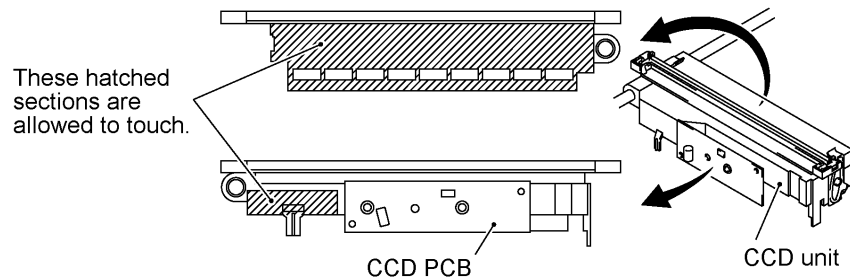
The disassembling job of the scanner unit should be done in a clean room to prevent dust or dirt from getting into the scanner unit.

- 1) Remove the four screws from the scanner top cover.
- 2) Separate the scanner top cover from the scanner base.

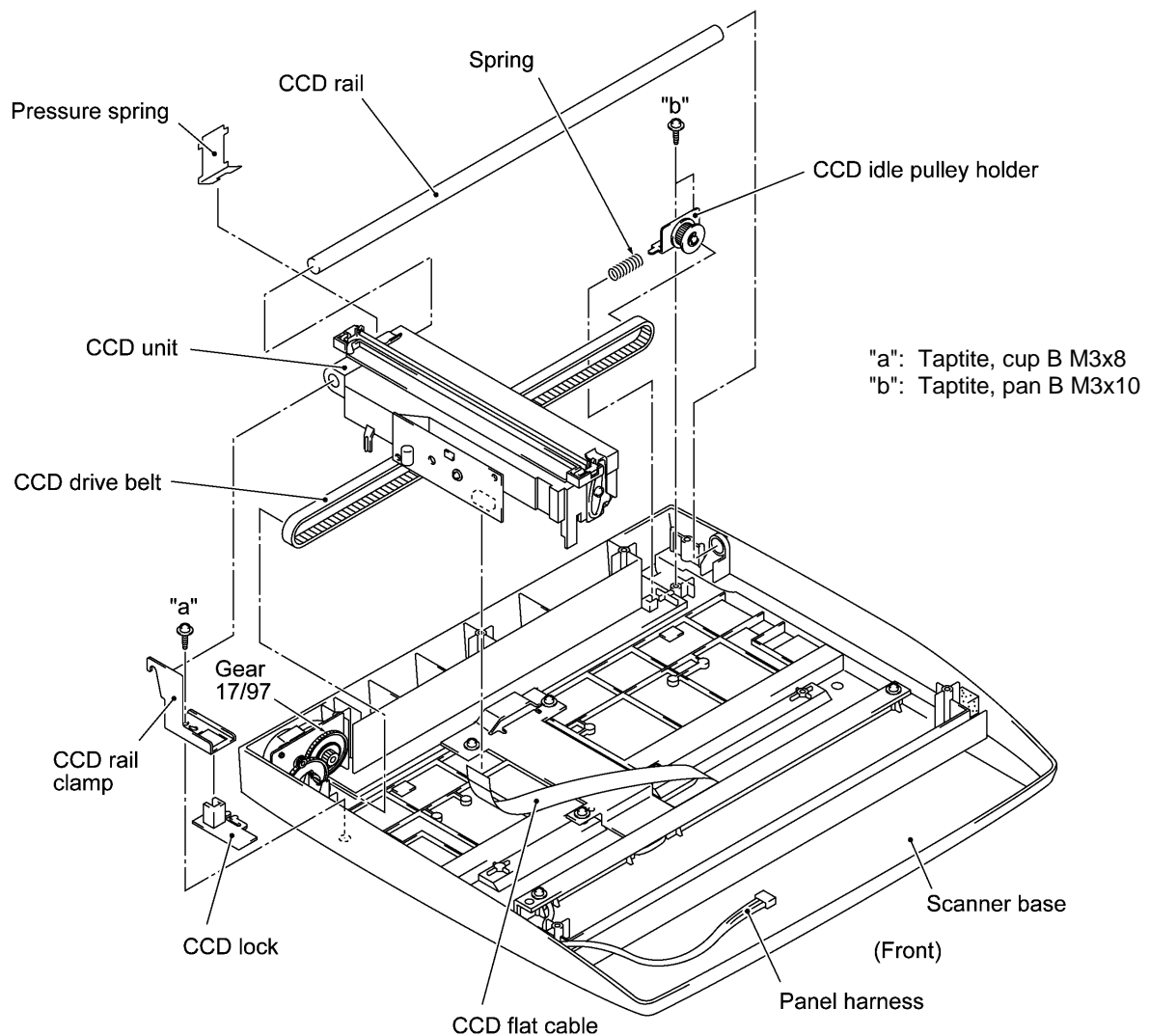


- 3) Turn the gear 17/97 to move the CCD unit to the right to make the following job easier.
- 4) Remove screw "a" and take out the CCD rail clamp. (See the illustration given on the next page.)
- 5) Remove two screws "b" from the CCD idle pulley holder, then remove the CCD drive belt from the idle pulley.
- 6) Lift up the CCD rail together with the CCD unit and CCD drive belt, and then disconnect the CCD flat cable.

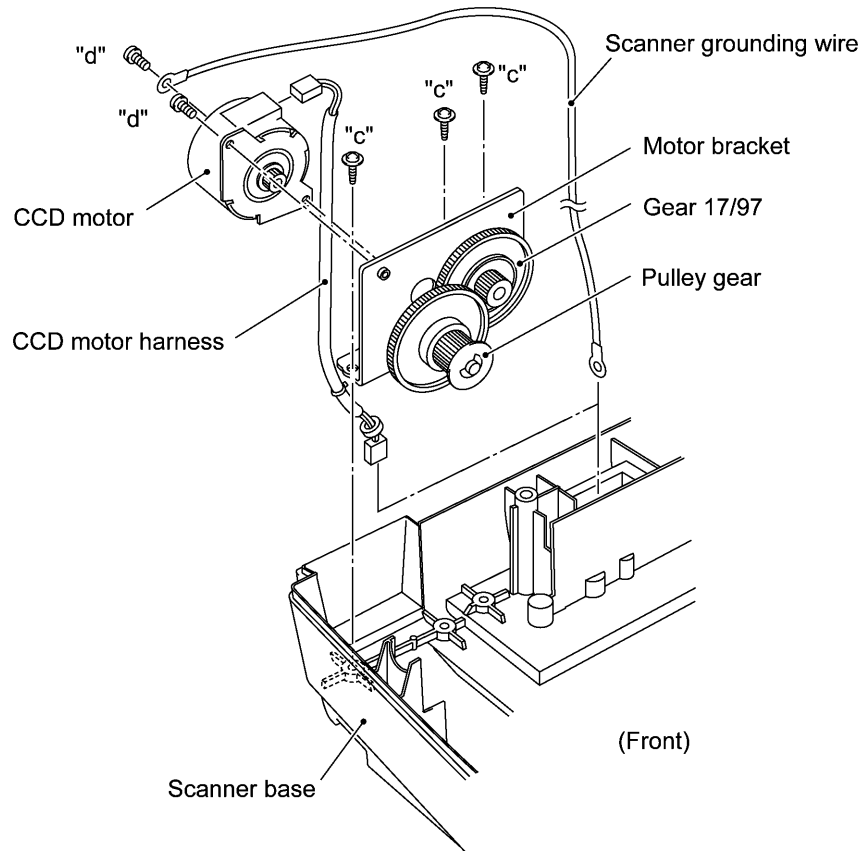
NOTE: When handling the CCD unit, do not touch the CCD PCB or glasses but hold the hatched sections as shown below.



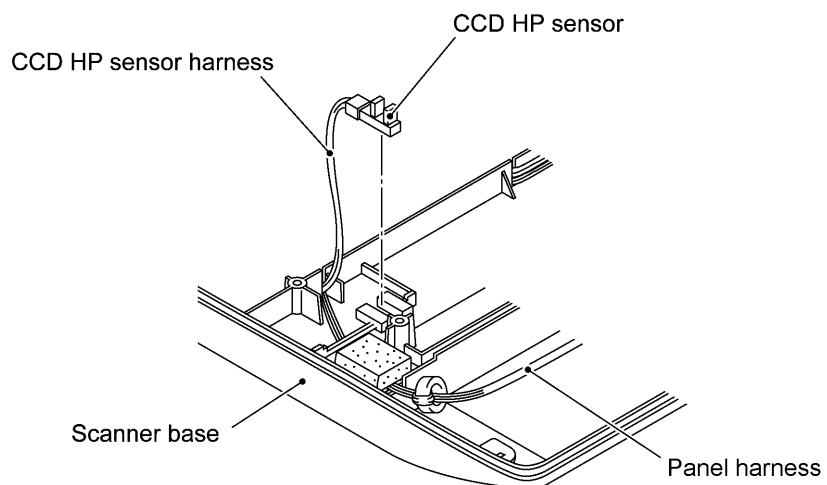
- 7) Pull out the CCD rail from the CCD unit.
- 8) Remove the CCD lock.



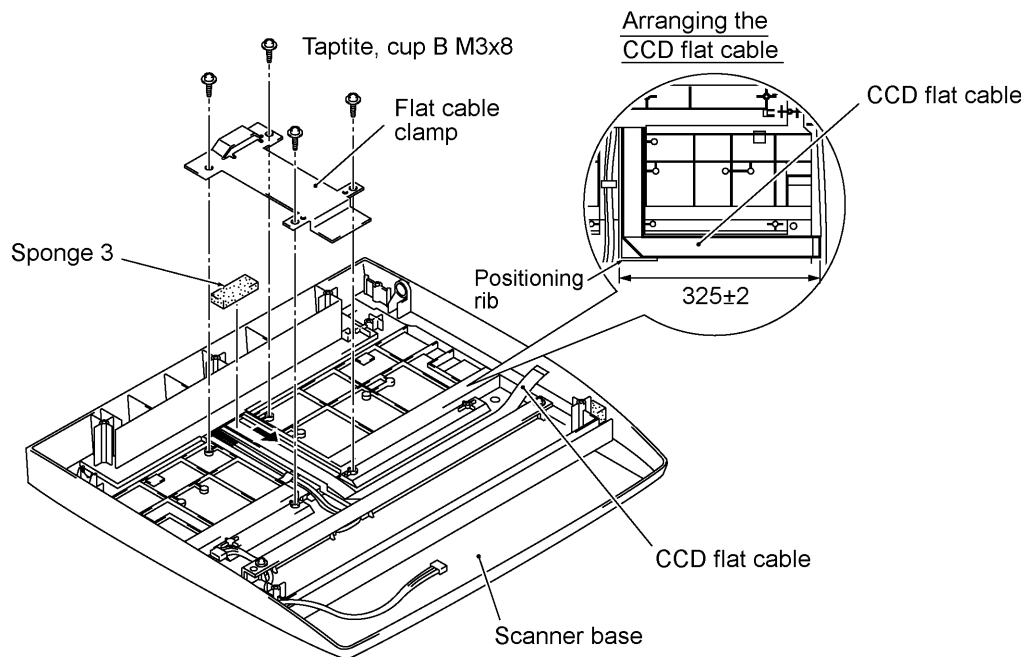
- 9) Pull up the CCD motor harness and disconnect it from the CCD motor.
- 10) Remove three screws "c" from the motor bracket.
- 11) Lift up the motor bracket.
- 12) Remove two screws "d" from the CCD motor. The scanner grounding wire also comes off.



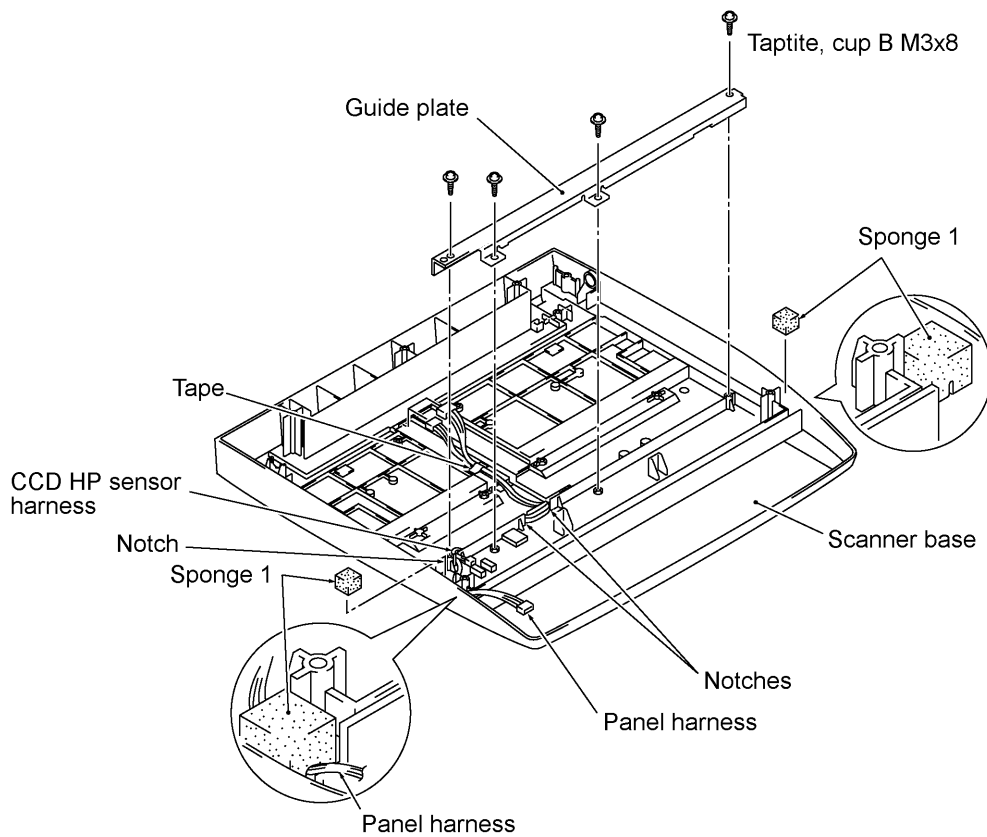
- 13) Disconnect the CCD HP sensor harness from the sensor.
- 14) Remove the CCD HP sensor.



- 15) Remove the four screws and take off the flat cable clamp. Remove sponge 3 attached with adhesive tape.
- 16) Remove the CCD flat cable (which is attached with adhesive tape).

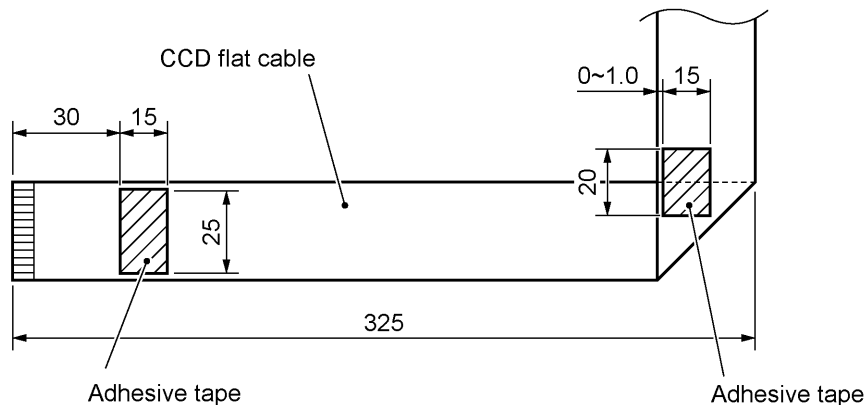


- 17) Remove the four screws and take off the guide plate.
 - 18) Remove tape and sponges 1, then take out the panel harness and CCD HP sensor harness.
- NOTE:** Once removed, the sponges 1 will become unusable and new ones will have to be put back in.

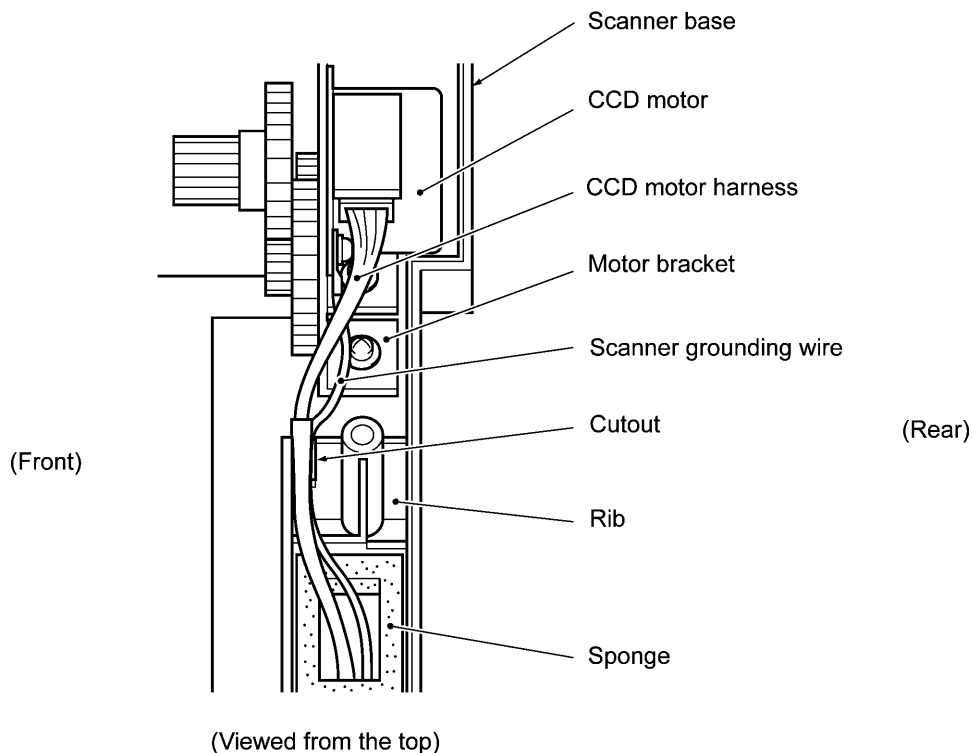


■ Reassembling Notes

- Route the panel harness and CCD HP sensor harness through the three notches, then tape them as illustrated on the previous page.
- When replacing the CCD flat cable with a new one, be sure to arrange the new cable as illustrated below, then route it along the positioning rib as shown on the previous page.



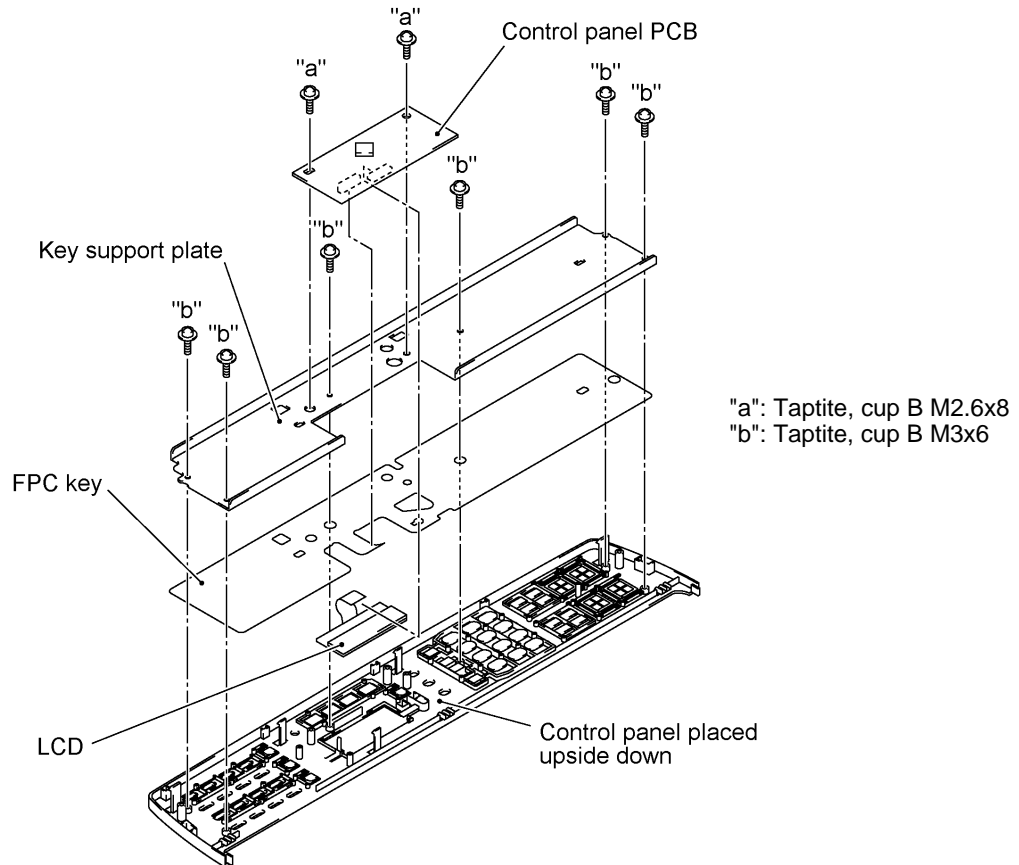
- Set the CCD motor back into place with its connector side facing up as shown on page IV-21. When securing the motor with screws "d," be sure to secure the scanner grounding wire also as shown on page IV-21.
- Route the CCD motor harness and scanner grounding wire as illustrated below.



- Set the CCD lock in the release (forward) position. If the CCD lock is placed in the lock position, the CCD home positioning will fail in the next powering-up sequence. If this happens, turn the CCD lock to the release position.

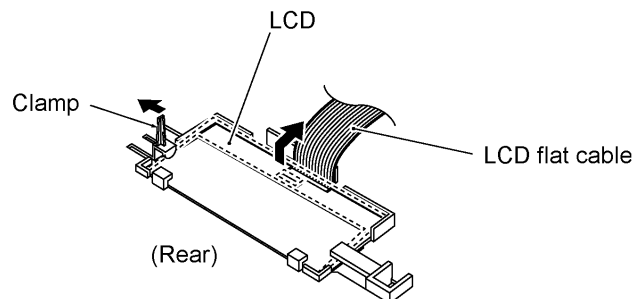
[Disassembling the Control Panel ASSY]

- 1) Turn the control panel ASSY upside down.
- 2) Remove two screws "a."
- 3) Slightly lift up the control panel PCB, then unlock the FPC key connector and disconnect the FPC key. Next, unlock the LCD cable connector and disconnect the LCD flat cable.
- 4) Remove six screws "b."
- 5) Remove the key support plate and FPC key.



- 6) As shown below, slightly pull the clamp outwards and 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.



■ 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.

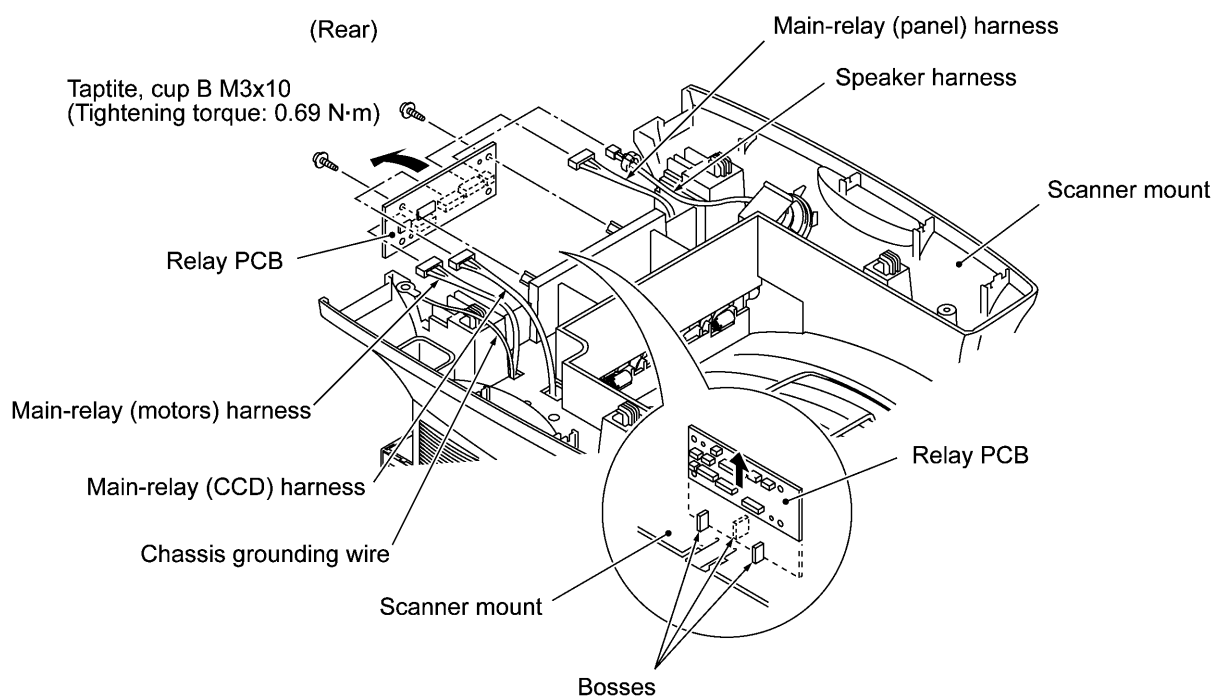
1.8 Relay PCB

(1) Disconnect the following harnesses from the relay PCB:

- Speaker harness
- Main-relay (panel) harness
- Main-relay (CCD) harness
- Main-relay (motors) harness

(2) Remove the two screws.

(3) Take out the relay PCB.

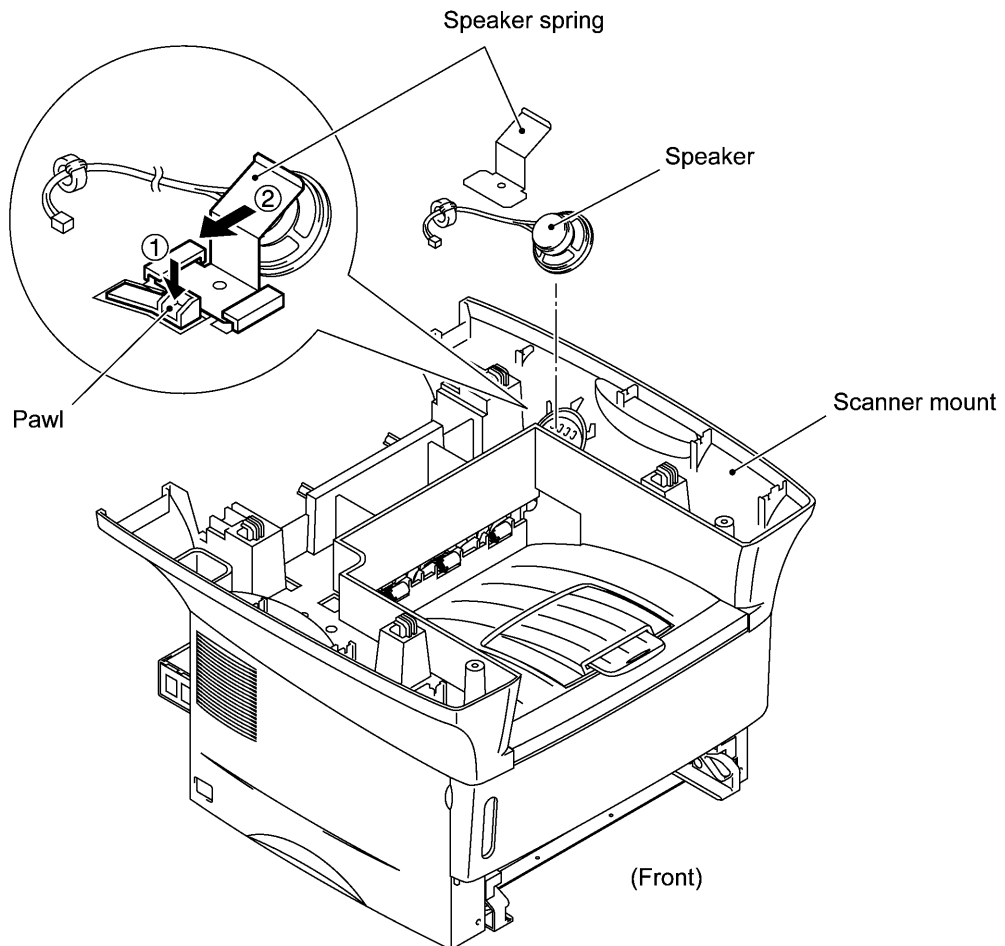


■ Reassembling Notes

- When setting the relay PCB back into place, be careful with the installation direction. The printed letters should not be upside down.

1.9 Speaker

- (1) Press the pawl in the direction of arrow ① and slide the speaker spring in the direction of arrow ②.
- (2) Lift up the speaker.

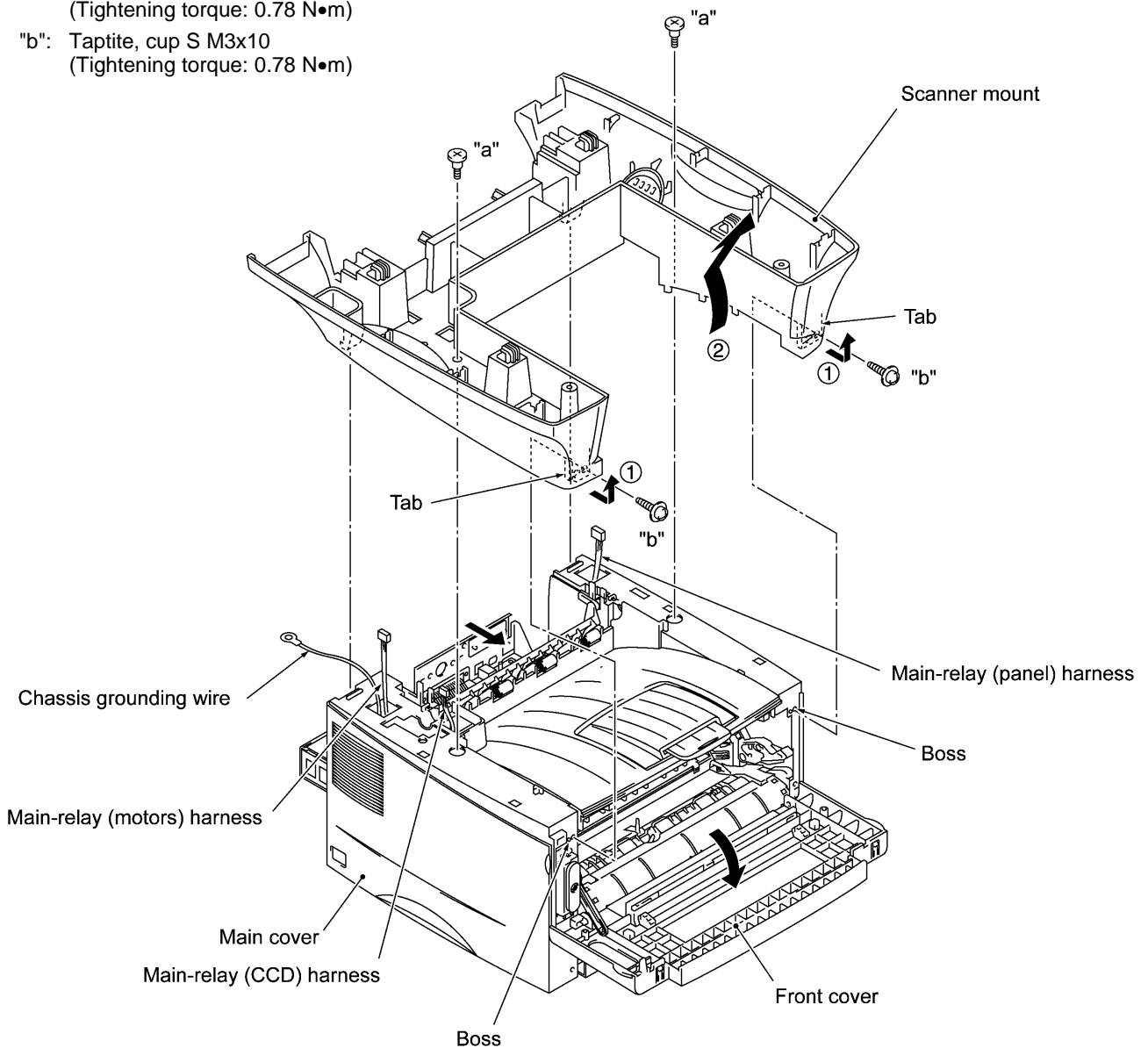


1.10 Scanner Mount

- (1) Remove two screws "a."
- (2) Open the front cover and remove two screws "b."
- (3) Pull the tabs of the scanner mount to the front and upwards (in the direction of arrows ①) to release them from the bosses provided on the main cover.
- (4) Lift up the scanner mount in the direction of arrow ②.

"a": Stepped screw
(Tightening torque: 0.78 N•m)

"b": Taptite, cup S M3x10
(Tightening torque: 0.78 N•m)

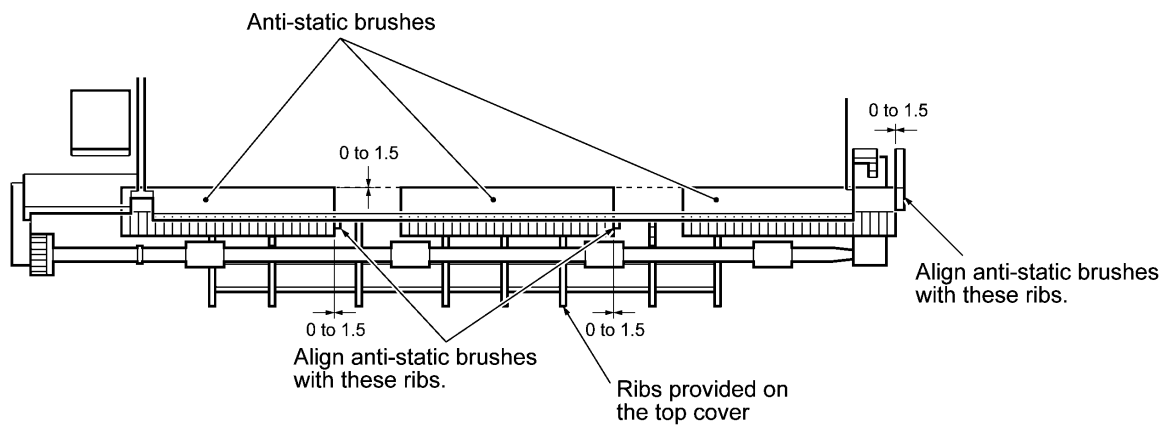
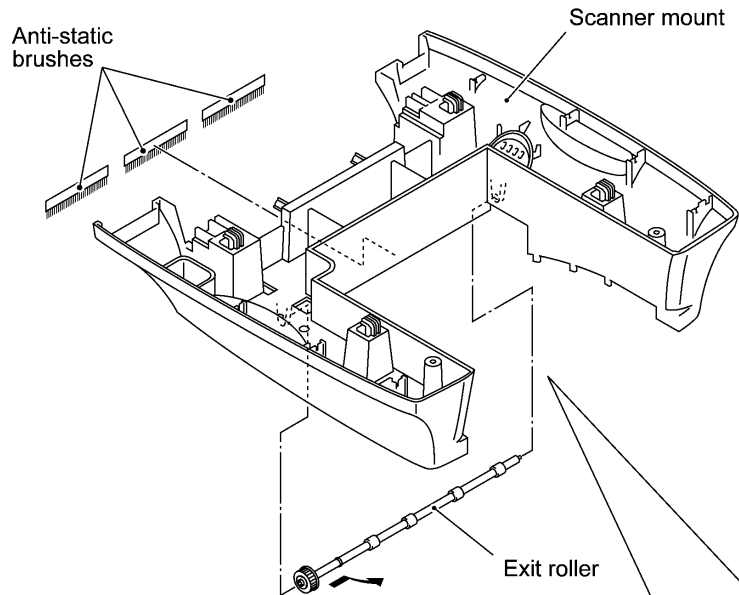


(5) Turn the scanner mount upside down.

(6) Peel off anti-static brushes.

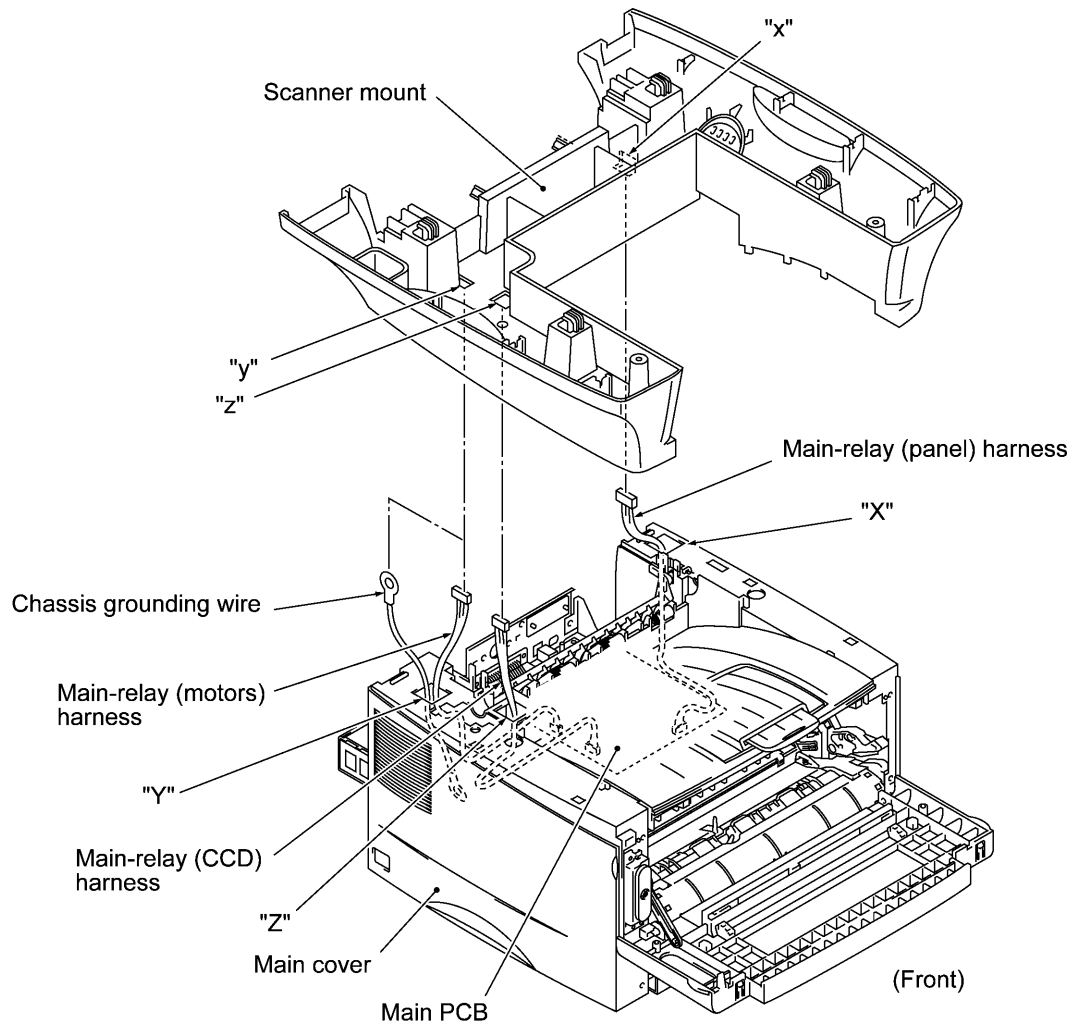
NOTE: Once removed, they will become unusable and new parts will have to be put back in.

(7) As shown below, warp the gear-equipped end of the exit roller and remove it.



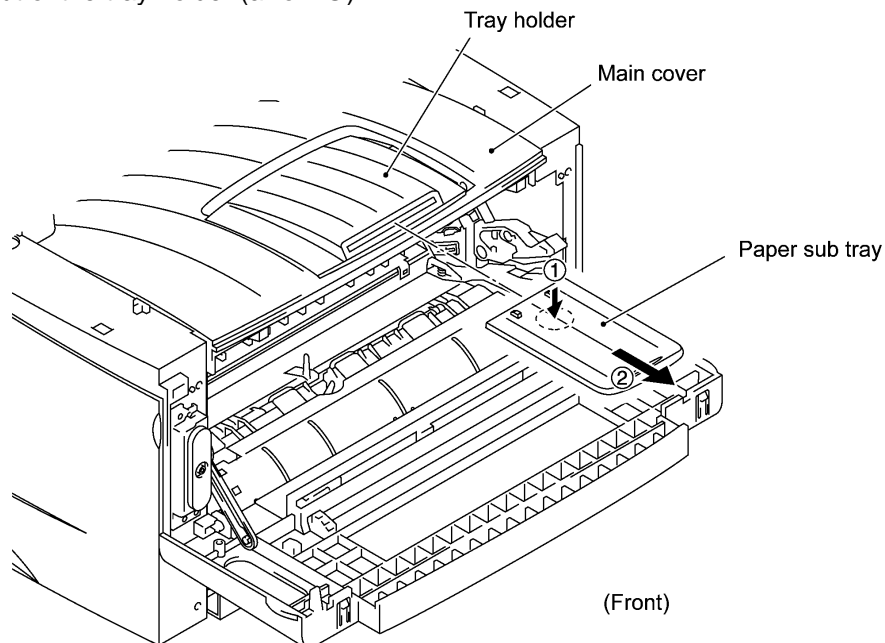
■ Reassembling Notes

- When setting the scanner mount back into place:
 - at the right-hand side, raise the main-relay (panel) harness coming through the main cover up and through cutout "x" provided in the scanner mount.
 - at the left-hand side, pull up the main-relay (motors) harness and chassis grounding wire and raise them up and through square cutout "y" provided in the scanner mount. Also pull up the main-relay (CCD) harness and raise it up and through round cutout "z."

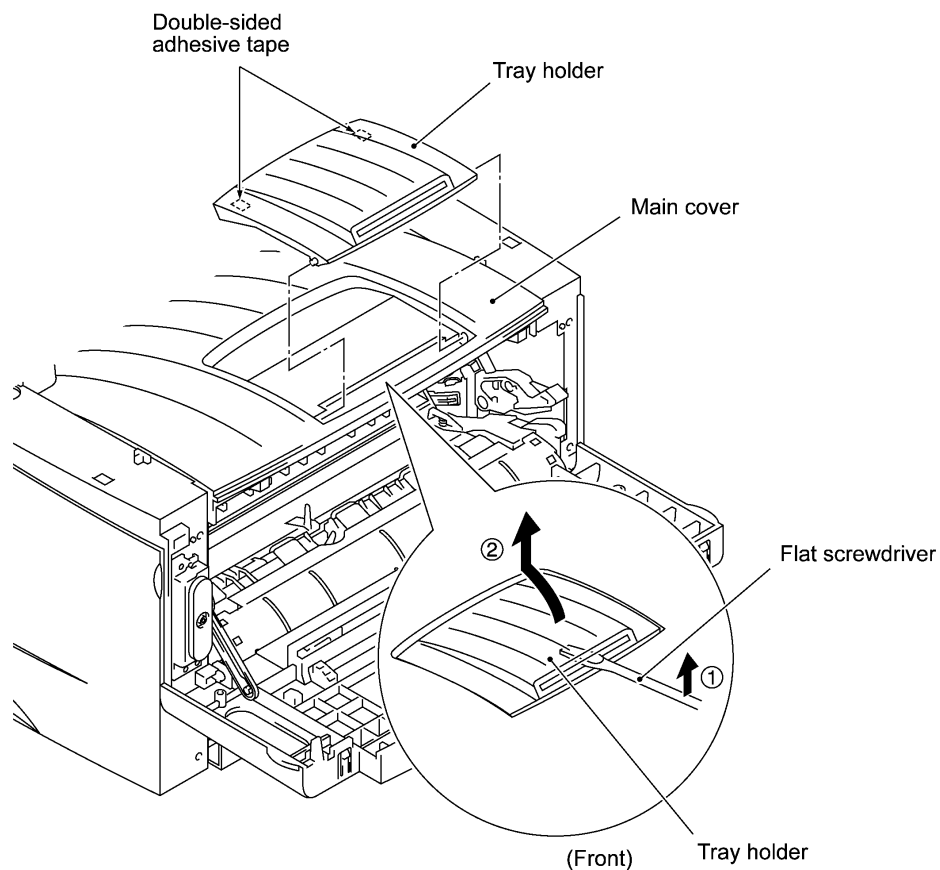


1.11 Paper Sub Tray and Tray Holder

- (1) Pull out the paper sub tray.
- (2) While pushing down the center of the paper sub tray to warp it (in the direction of arrow ①), pull it out of the tray holder (arrow ②).

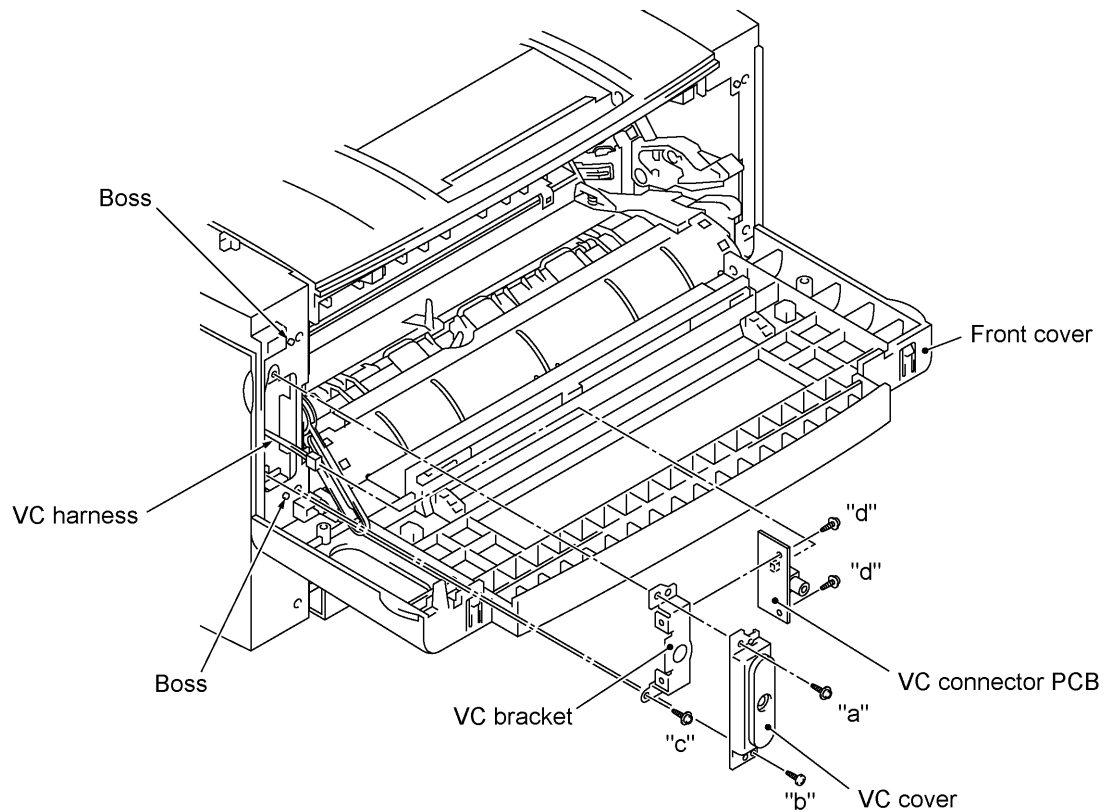


- (3) Insert the tip of a small flat screwdriver into the tray holder (in the direction of arrow ①) and pull up the tray holder (arrow ②).



1.12 VC Cover, VC Bracket, and VC Connector PCB (for models supporting video capture)

- (1) Remove two screws ("a" and "b"), then take off the VC cover.
- (2) Remove screw "c," take out the VC bracket together with the VC connector PCB, and disconnect the VC harness.
- (3) Remove two screws "d," then take off the VC connector PCB.



"a": Taptite, cup S M3x10
"b": Taptite, bind S M3x8
"c" and "d": Taptite, cup S M3x6

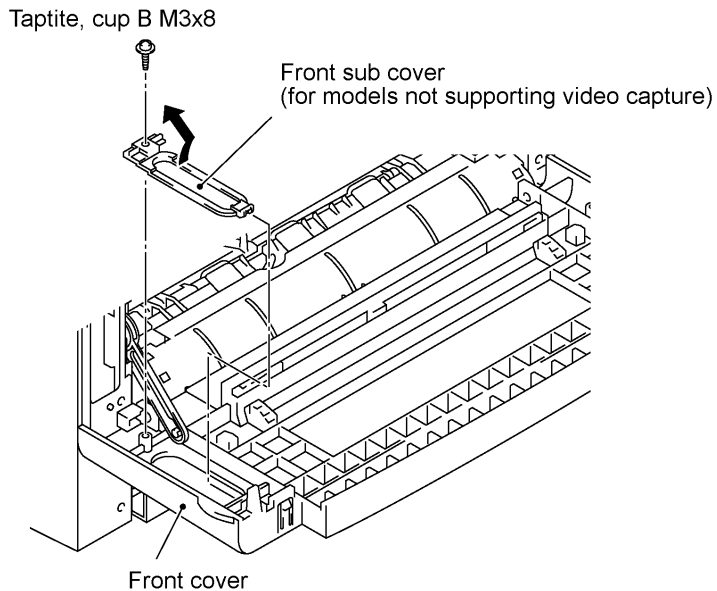
■ Reassembling Notes

- The routing of the VC harness is shown on page IV-34.

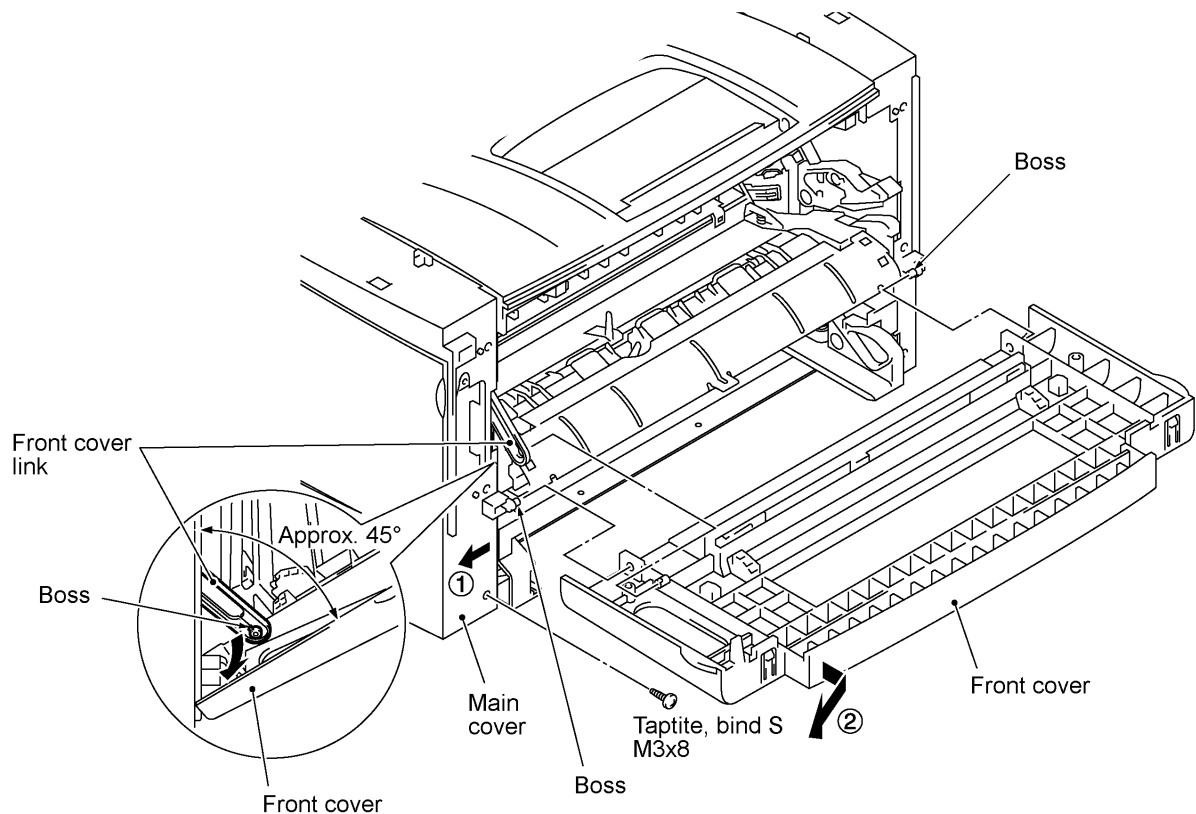
1.13 Front Cover

Front Sub Cover (for models not supporting video capture)

- (1) For models not supporting video capture:
Remove the screw and take off the front sub cover from the front cover.

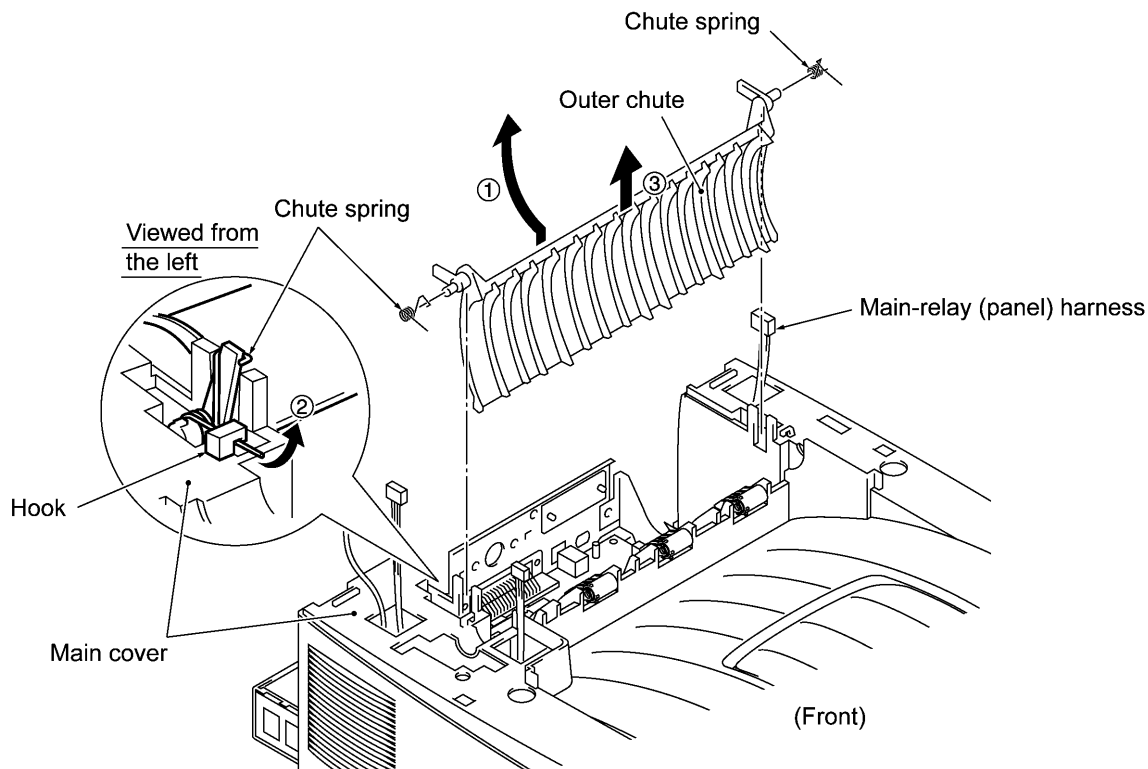


- (2) Remove the screw from the left bottom of the front side of the main cover.
- (3) Hold the front cover at an angle of 45° and pull the front cover link to the left to release it from the front cover.
- (4) Pull the bottom left front corner of the main cover to the left (in the direction of arrow) and release the front cover from the boss provided on the main cover (arrow).

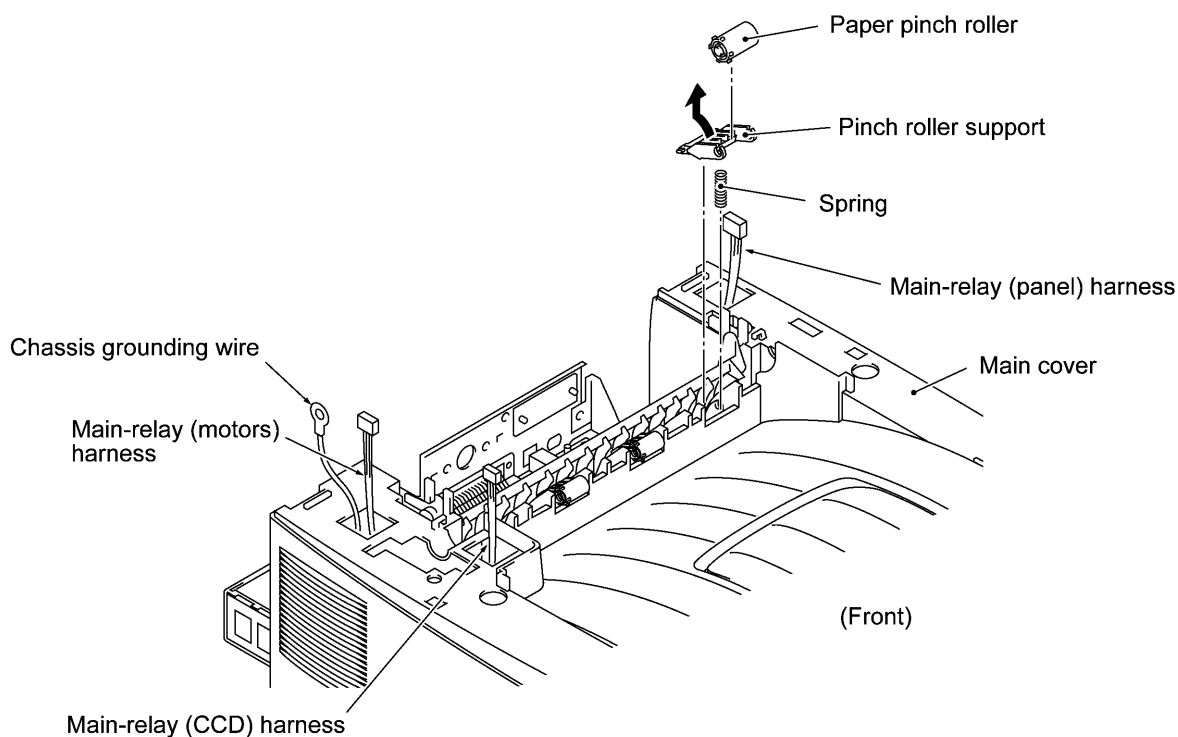


1.14 Outer Chute and Paper Pinch Rollers

- (1) Pull up the outer chute and open it (in the direction of arrow •).
- (2) Remove the chute springs from the hooks provided on the main cover (arrow ,), then lift up the outer chute (arrow *f*).

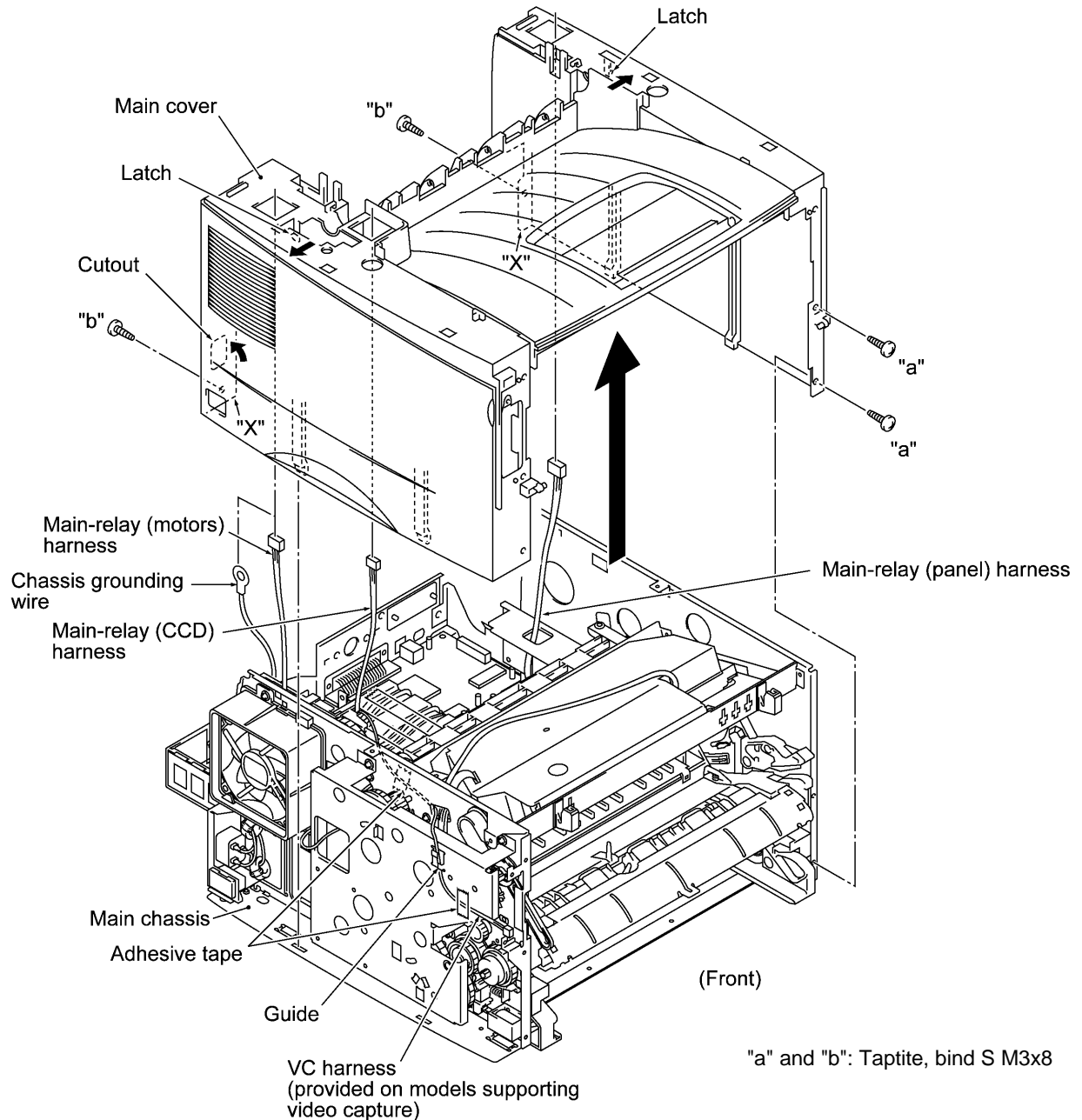


- (3) Remove the paper pinch rollers, their supports, and their springs.



1.15 Main Cover

- (1) Remove two screws "a" from the front side of the main cover.
- (2) Remove two screws "b" from the rear side of the main cover, and then pull corner edges "X" outwards to dislocate the main cover from the main chassis. Make sure that the cutout provided in the main cover is dislocated from the power inlet.
- (3) Unhook the two latches with the tip of a flat screwdriver, then lift up the main cover.

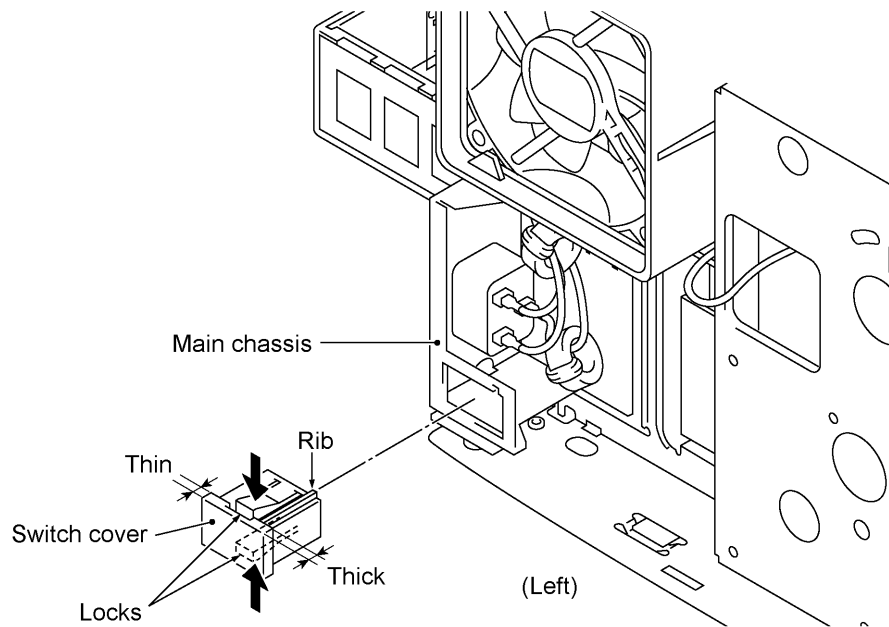


■ Reassembling Notes

- When reinstalling the main cover, route the main-relay (panel) harness, main-relay (CCD) harness, and main-relay (motors) harness through the respective cutouts provided in the main cover, as illustrated above.

1.16 Switch Cover (for models not equipped with a power switch)

- (1) Push the locks of the switch cover as shown below and remove it.

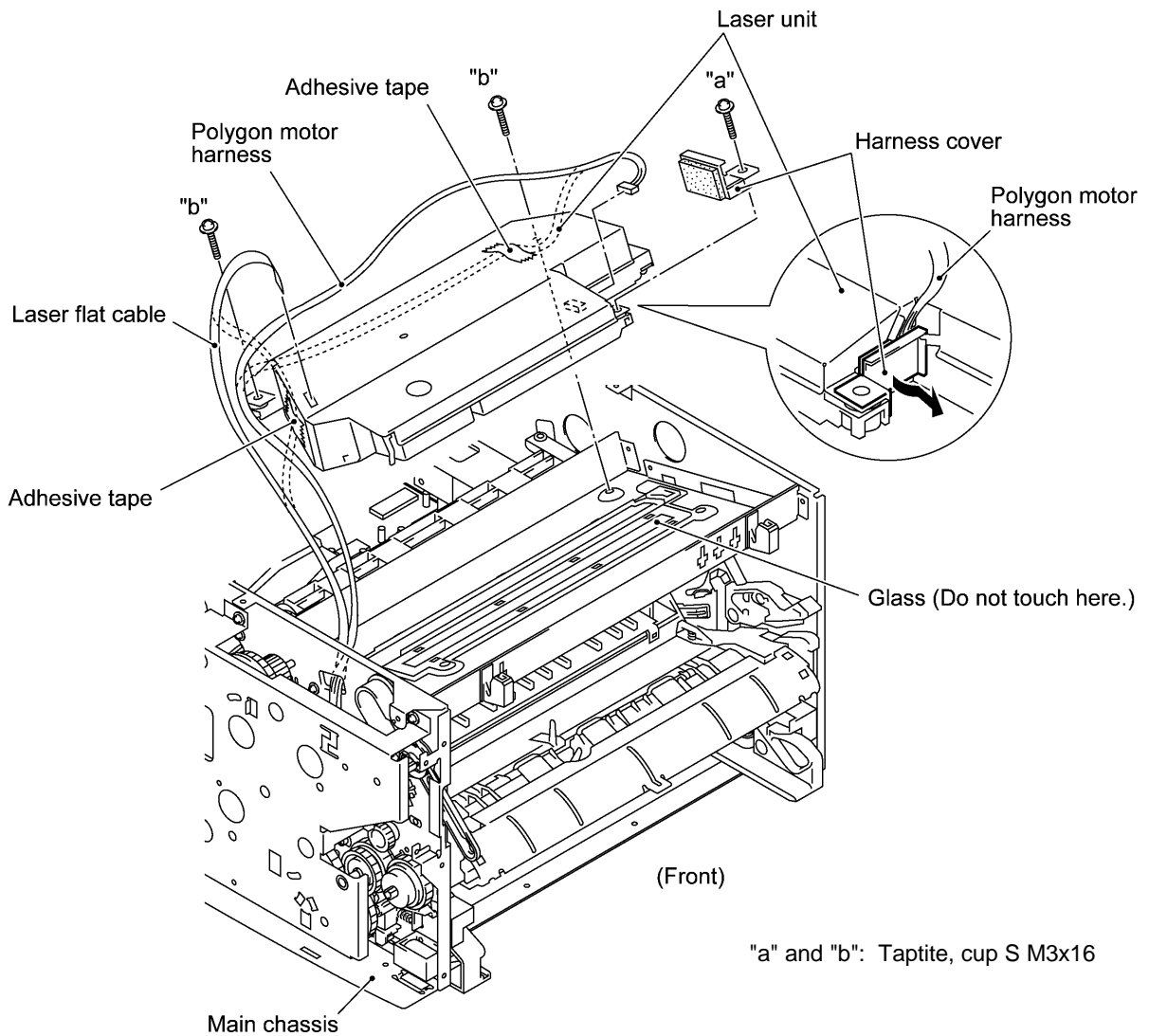


1.17 Laser Unit

- (1) Remove screw "a" and take off the harness cover.
- (2) Remove two screws "b."
- (3) Disconnect the polygon motor harness and laser flat cable from the laser unit.
- (4) Lift up the laser unit.

NOTE: When handling the laser unit, take care not to touch the inside of the unit, glass, or mirror.

NOTE: On the small PCB in the laser unit is a 2-pin connector which is for the adjustment in the factory. Do not disturb it.



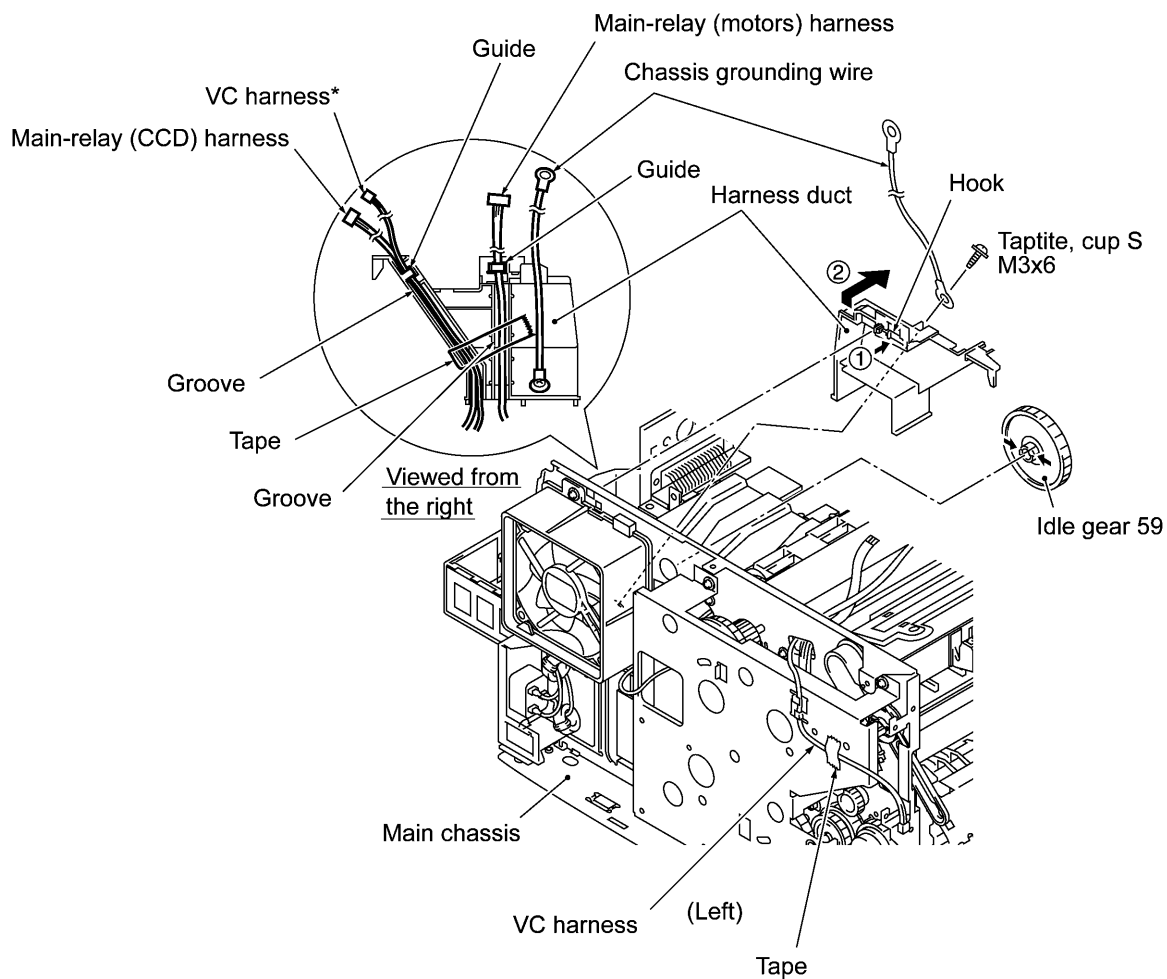
■ Reassembling Notes

- Before putting the laser unit back into place, check for any toner particles, paper dust or dirt, and clean them out.
- After routing the polygon motor harness and laser flat cable, tape them onto the laser unit as shown above.

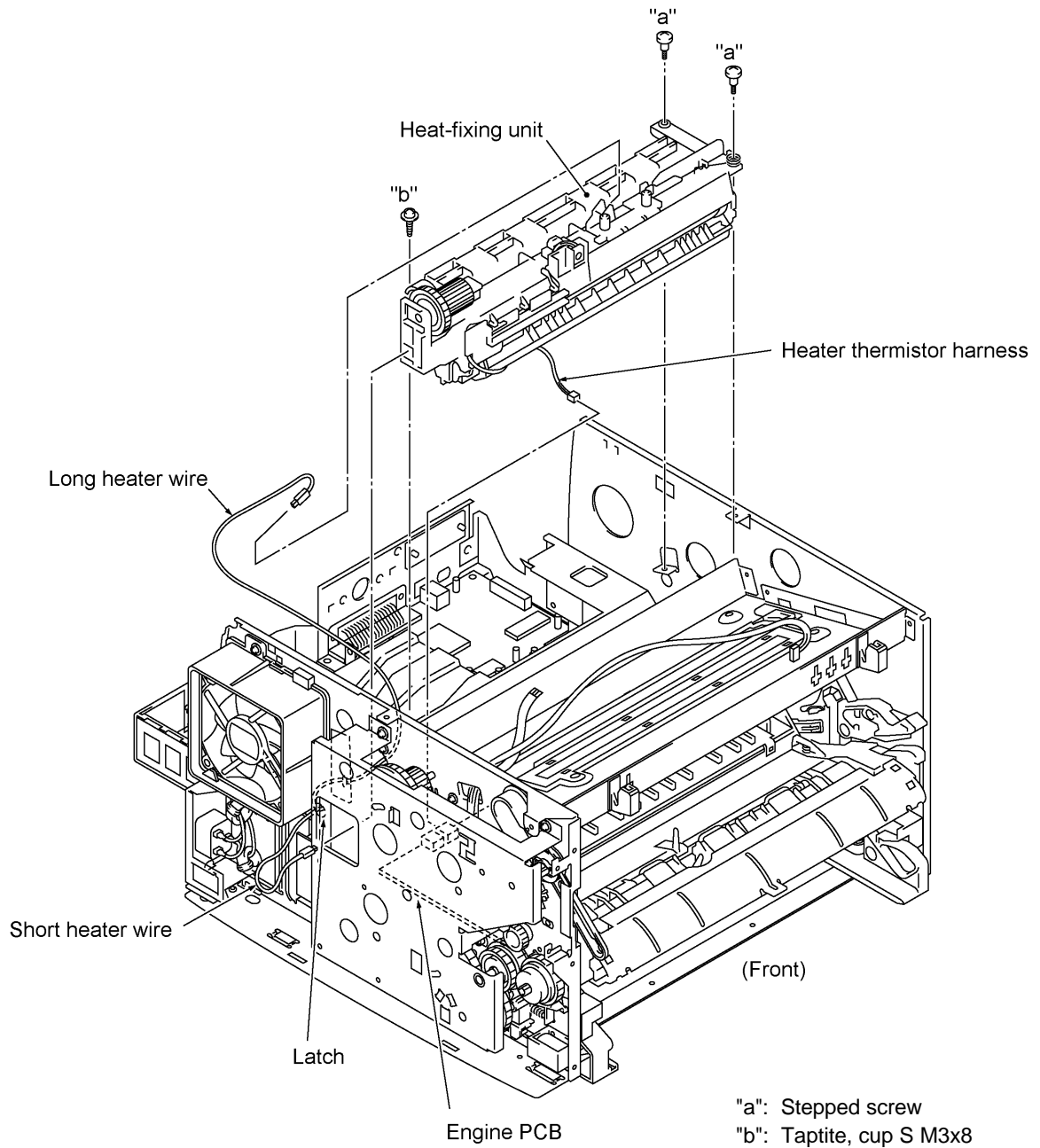
1.18 Heat-fixing Unit and FU Lamp

- (1) Remove the screw from the harness duct. The chassis grounding wire also comes off.
- (2) Peel off tape and take off the main-relay (motors) harness, main-relay (CCD) harness, and VC harness* from the harness duct.
- (3) Unhook the harness duct from the main chassis in the directions of arrows • and , .

*Provided on models supporting video capture

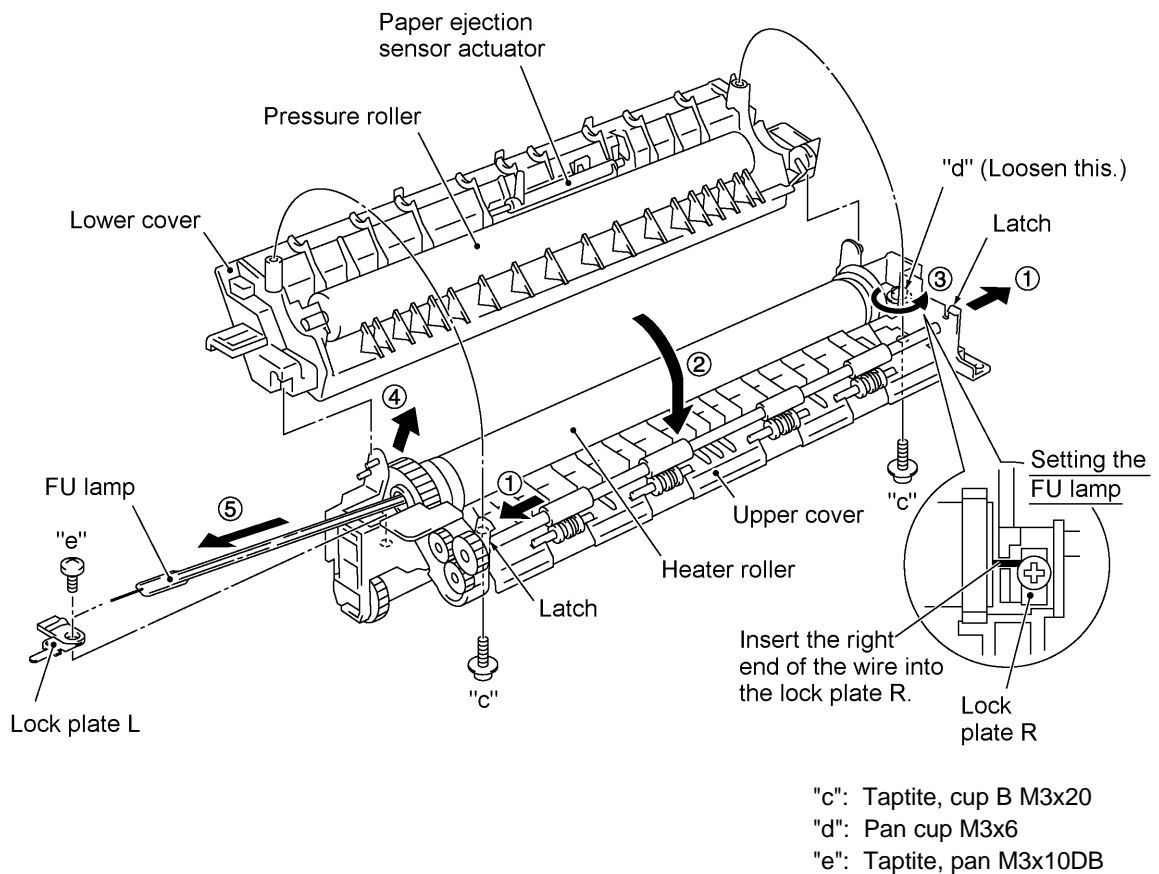


- (4) Remove three screws (two "a" and one "b").
- (5) Disconnect the long heater wire (of the heater harness) from the upper center of the heat-fixing unit.
- (6) Disconnect the short heater wire (of the heater harness) from the left end of the heat-fixing unit.
- (7) Lift up the heat-fixing unit and disconnect the heater thermistor harness from the engine PCB.



- (8) To take out the FU lamp from the heat-fixing unit, remove two screws "c."
- (9) Unhook the two latches outwards (in the direction of arrows •) with the tip of a flat screwdriver and open the upper cover (arrow ,). The upper and lower covers will become separated from each other.
- (10) Loosen screw "d" (arrow f).
- (11) Remove screw "e," slightly lift up the heater roller gear (arrow „), hold the lock plate L of the FU lamp between your fingers, and pull out the FU lamp from the heater roller (arrow ...).

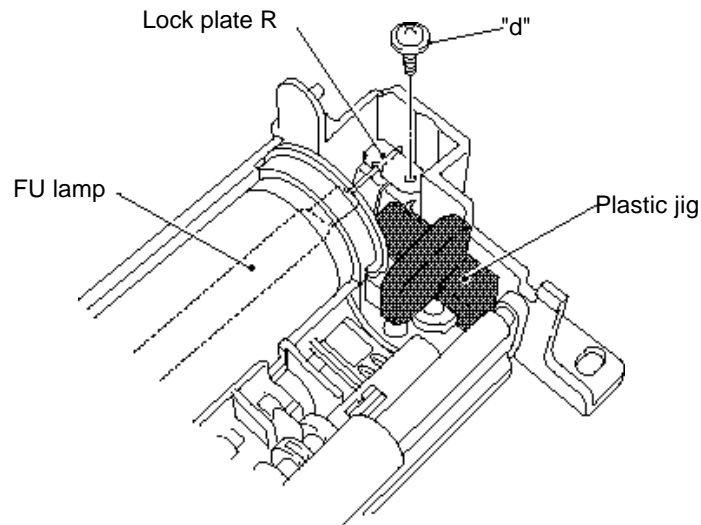
CAUTION: Do not touch the FU lamp. If you have touched it, clean it thoroughly with alcohol.



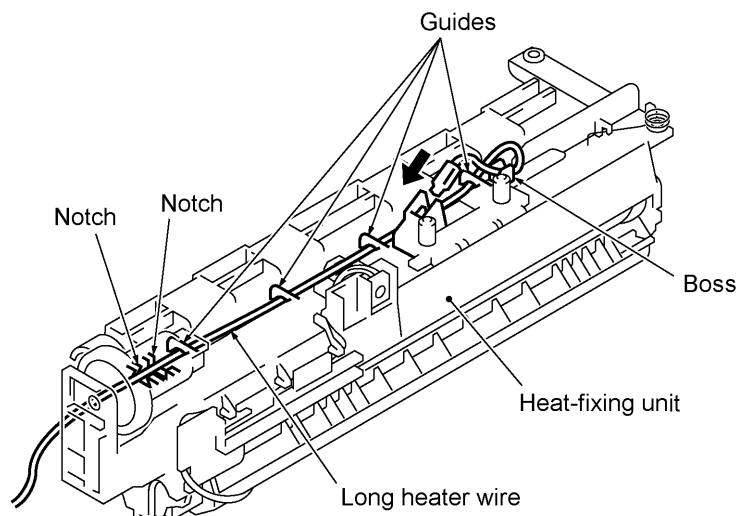
n Reassembling Notes

- When setting the FU lamp into the heat-fixing unit, be sure to insert the right end of the wire into the lock plate R as illustrated above.

- When securing the lock plate R with screw "d," be sure to use the plastic jig as shown below to avoid damaging the edge of the FU lamp with a screwdriver.



- A new heat-fixing unit will be provided with the heater thermistor harness being taped to the unit. Before installing the unit, remove the tape.
- When setting the heat-fixing unit back into place, make sure that the heater wires are routed through the latch of the fan duct (see the illustration given on page IV-41) and then route the long heater wire as shown below.



- If you remove and reinstall the heat-fixing unit because of any failure, make the machine enter the maintenance mode (see Note) after completion of reassembly and then make it exit from the mode (by pressing the **9** key twice). Otherwise, the heat-fixing unit may not become energized because of the following reason:

If the failure of the heat-fixing unit is caused by an opening of the thermistor circuit (that senses the temperature of the heat-fixing unit), the system misinterprets the hot heater as being cold. As a result, the temperature of the heat-fixing unit may become excessively high. To prevent the system from heating the hot heater further at the next powering-on, it is designed so that the heater will not be energized. To cancel this setting, you need to carry out the above maintenance-mode procedure.

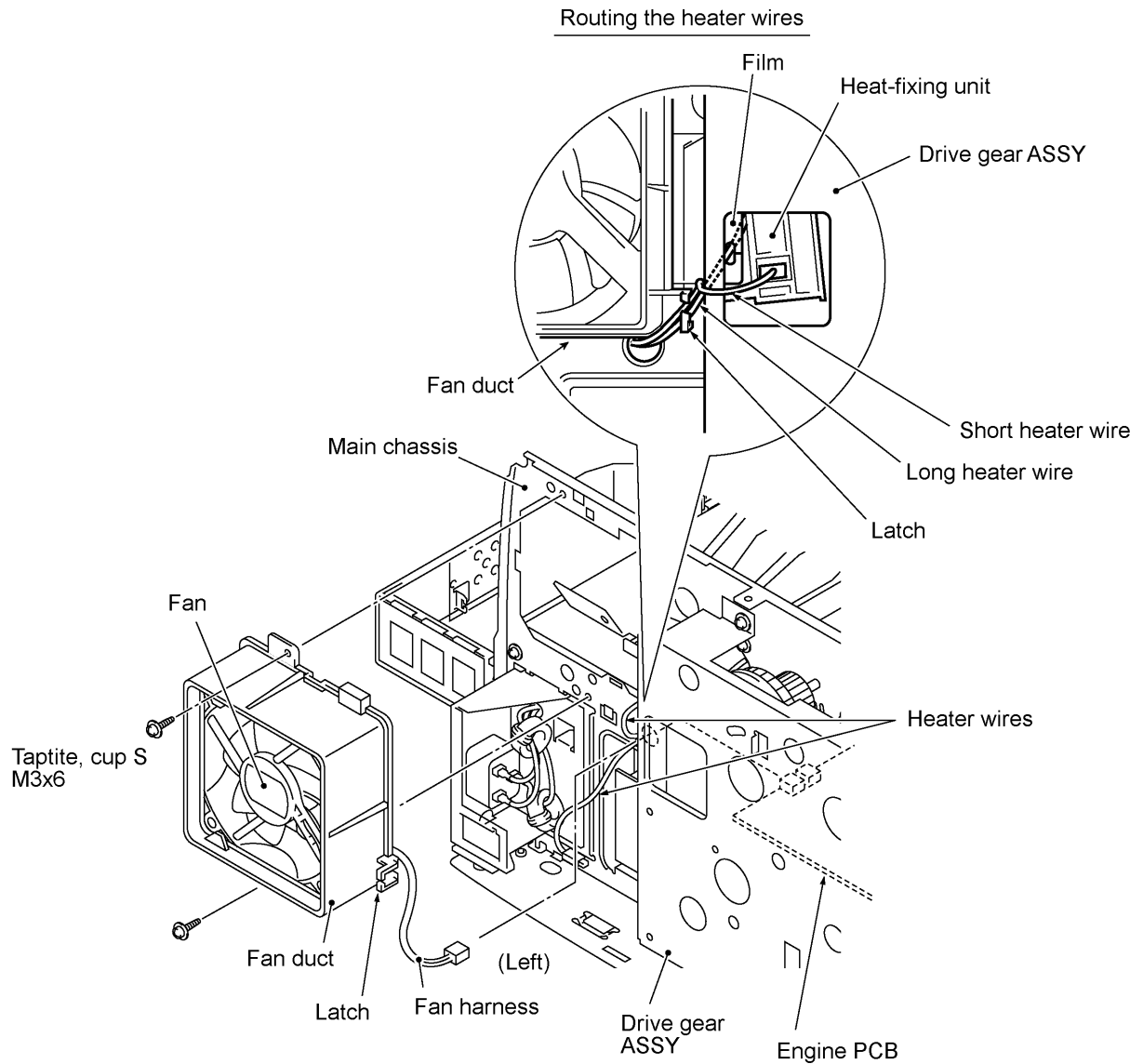
(Note) Entry into the maintenance mode

Machines w/ fax: Press the **Function/Menu**, *****, **2**, **8**, **6**, and **4** keys.

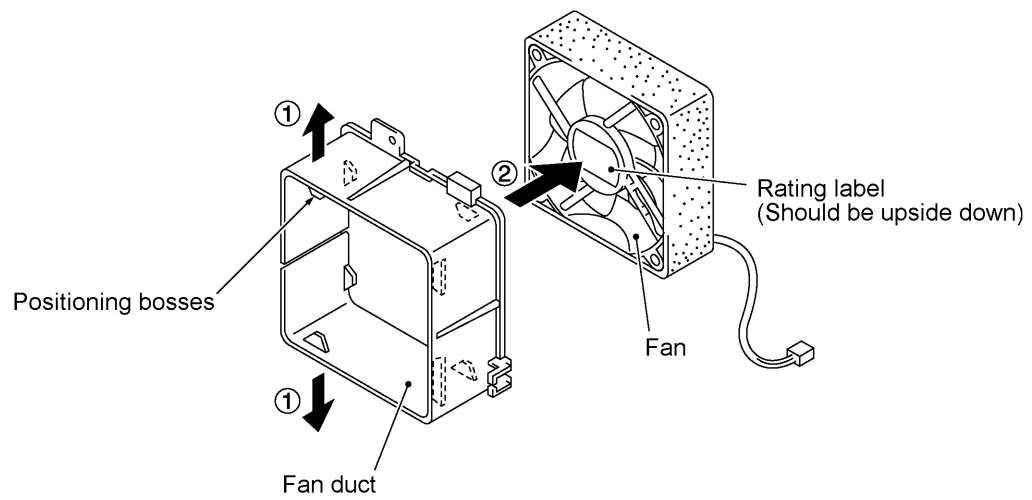
Machines w/o fax: Press the **Menu**, **0**, **2**, **8**, **6**, and **4** keys.

1.19 Fan

- (1) Disconnect the fan harness from the engine PCB.
- (2) Remove two screws, take out the heater wires from the latch of the fan duct, and take off the fan duct together with the fan.



(3) As shown below, pull the fan duct outwards and take out the fan.

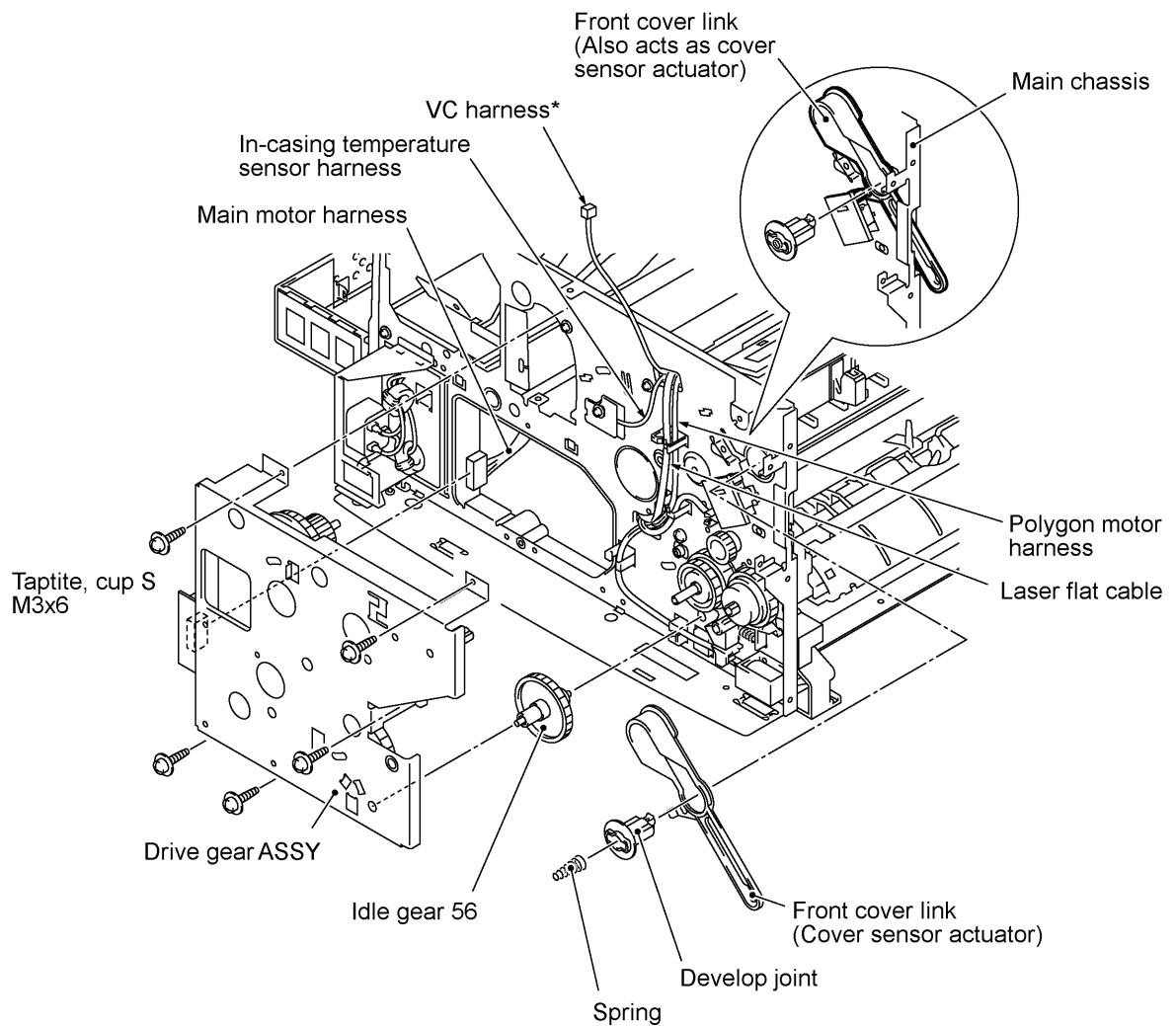


■ **Reassembling Notes**

- Put the fan back into place so that the rating label faces outwards and upside down.
- Route the heater wires through the latch of the fan duct as shown on the previous page.

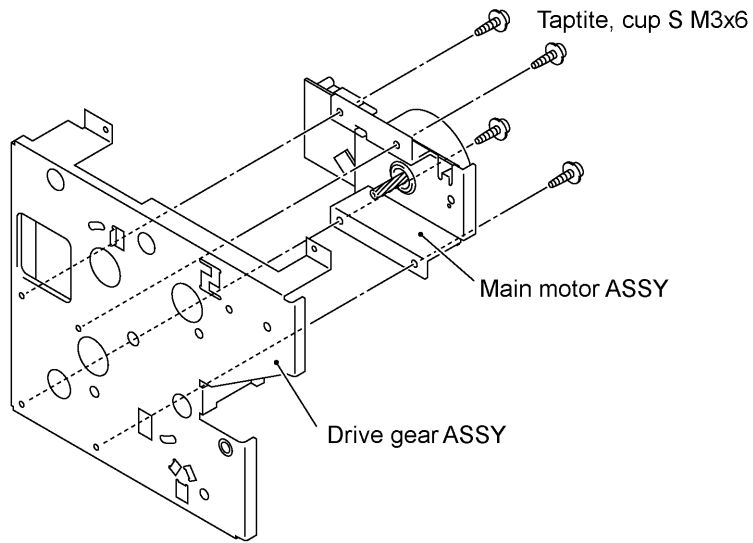
1.20 Drive Gear ASSY and Main Motor ASSY

- (1) Remove five screws from the drive gear ASSY.
- (2) Tilt the drive gear ASSY towards you while taking care not to drop the develop joint and spring, and then disconnect the main motor harness.
- (3) Remove the front cover link and idle gear 56 from the main chassis.



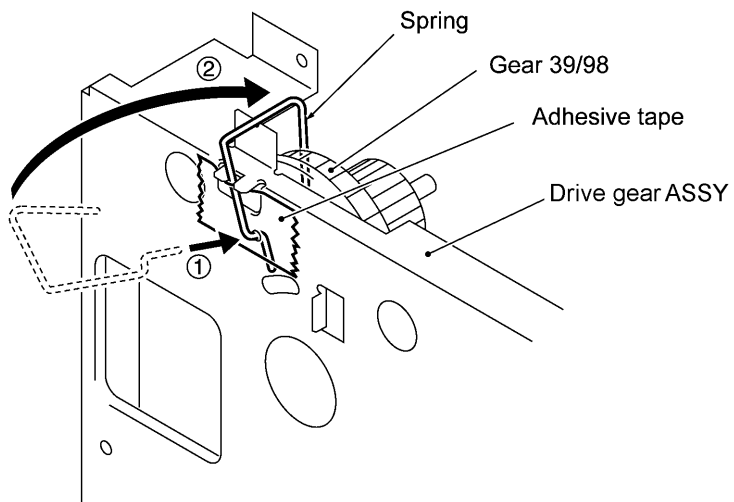
*Provided on models supporting video capture

- (4) Remove four screws and take off the main motor ASSY from the drive gear ASSY.



■ Reassembling Notes

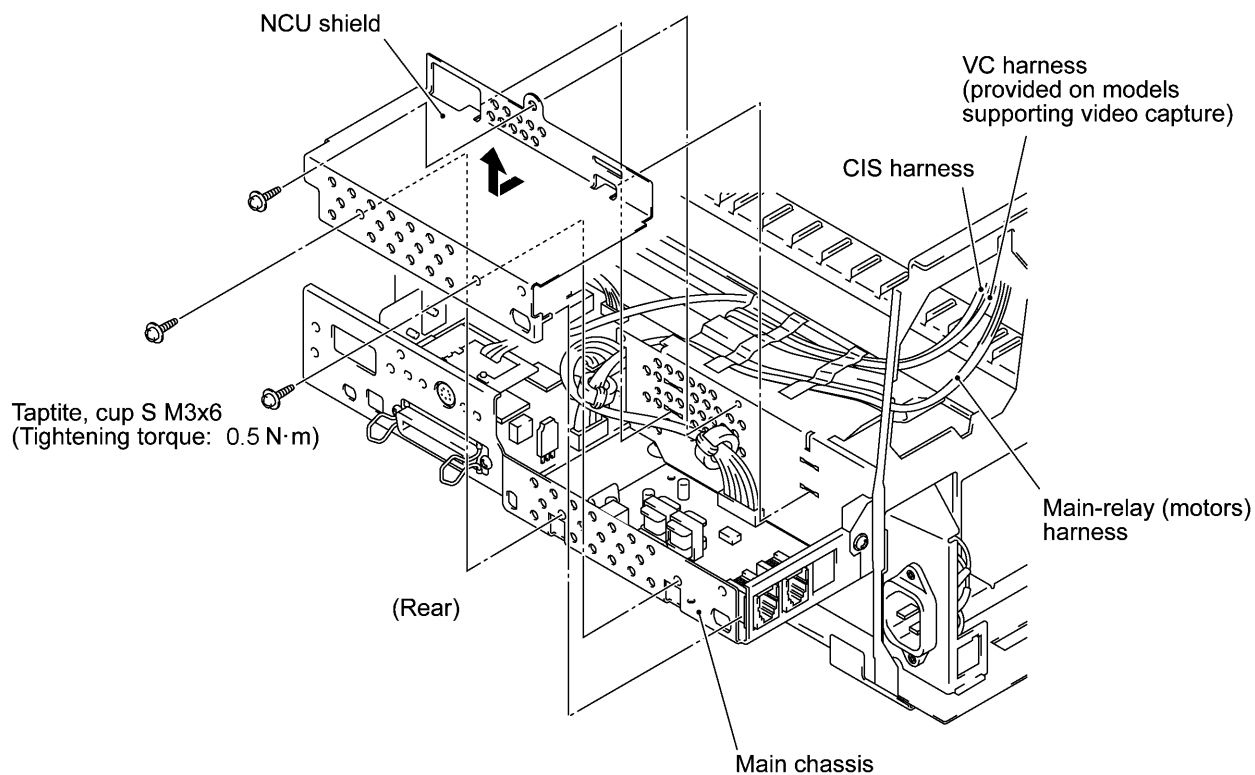
- If you have removed the gear 39/98 from the drive gear ASSY, hook the spring and tape it as shown below.



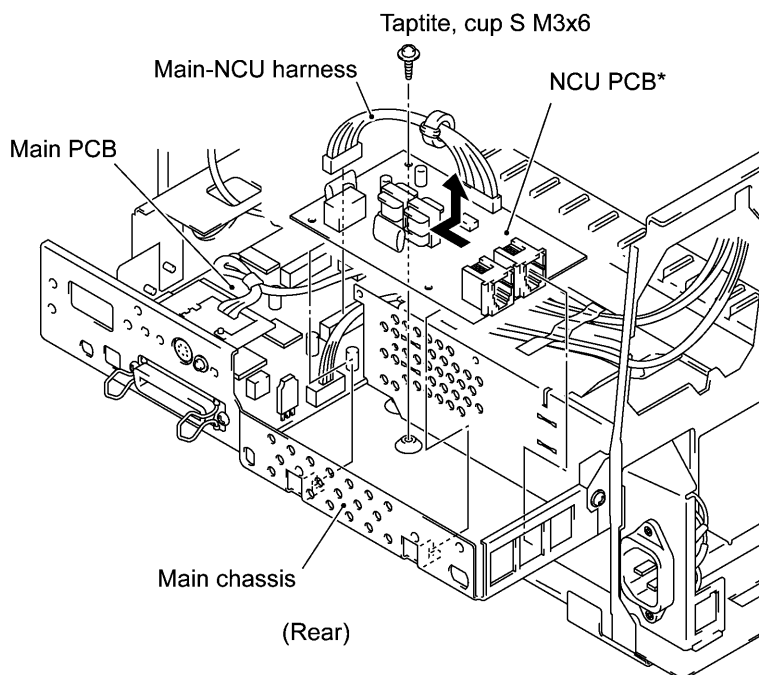
1.21 NCU Shield and NCU PCB*

(*Provided on models supporting facsimile function.)

- (1) Remove three screws from the NCU shield, then take off the NCU shield.



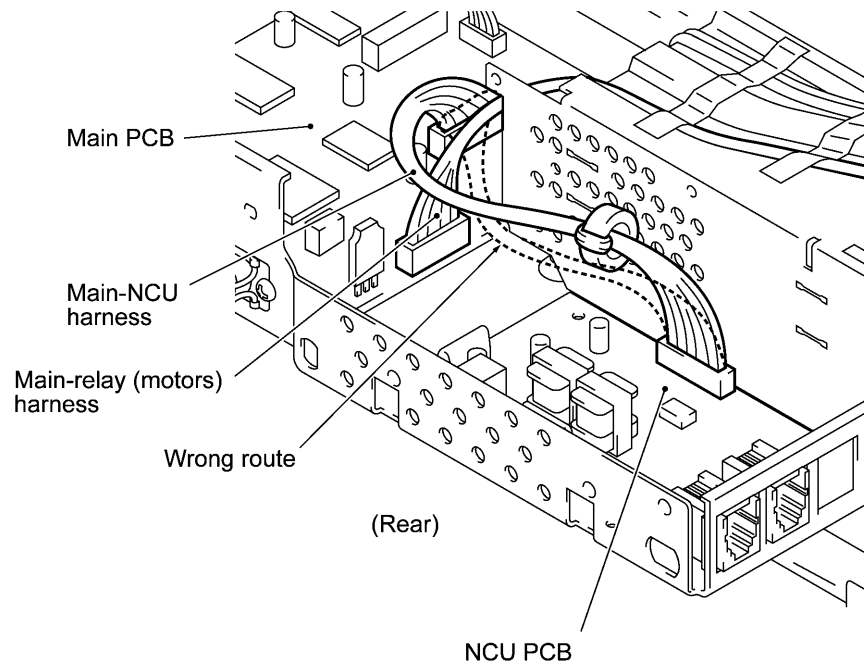
- (2) USA version: Disconnect the main-NCU harness from the main PCB.
European version: Disconnect the main-NCU harness and main-NCU harness 2 from the main PCB. See the illustration given on the next page.
- (3) Remove the screw from the NCU PCB and take out the PCB.



n Reassembling Notes

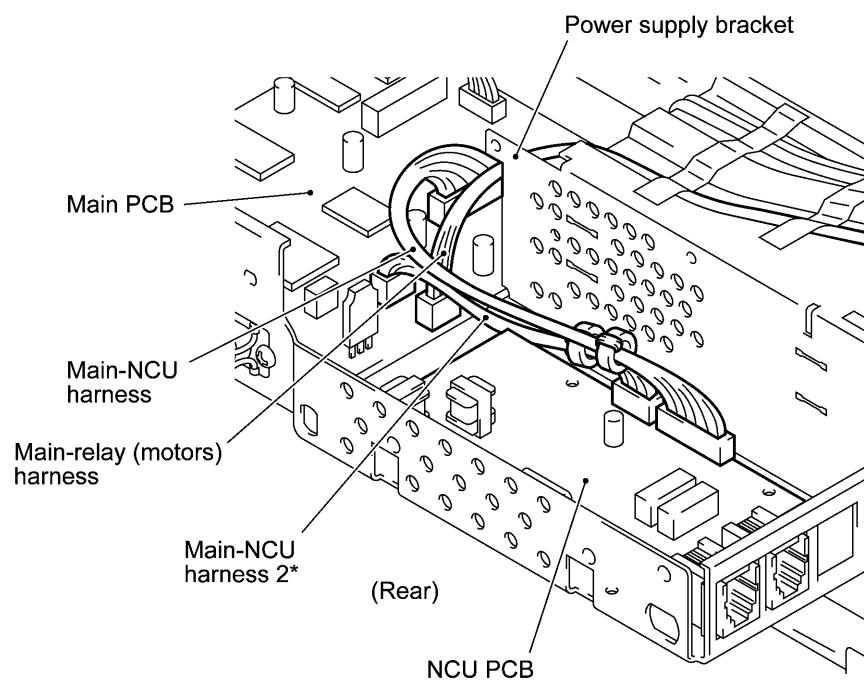
[USA version]

- Route the main-NCU harness above the main-relay (motors) harness as illustrated below.



[European version]

- As illustrated below, route the main-NCU harness and main-NCU harness 2 between the NCU PCB and the power supply bracket to prevent them from interfering with the primary circuitry on the NCU PCB. Then install the NCU shield.



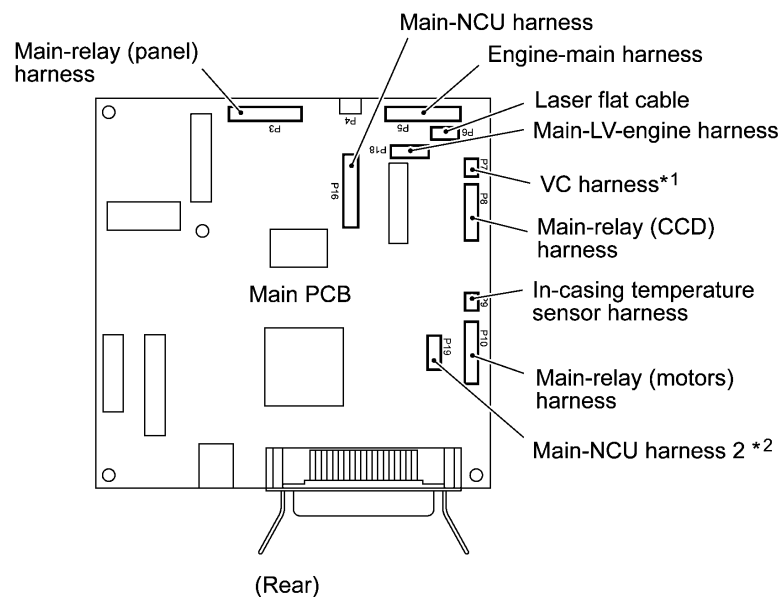
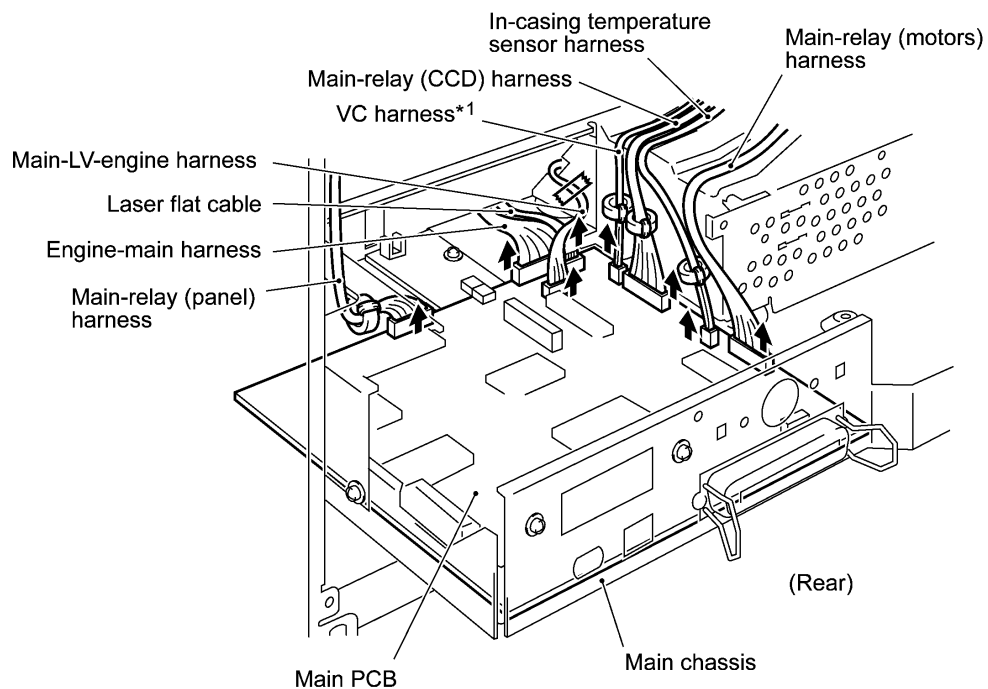
1.22 Bottom Plate, Main PCB, and Bottom Insulation Film

(1) Disconnect the following harnesses and flat cable from the main PCB:

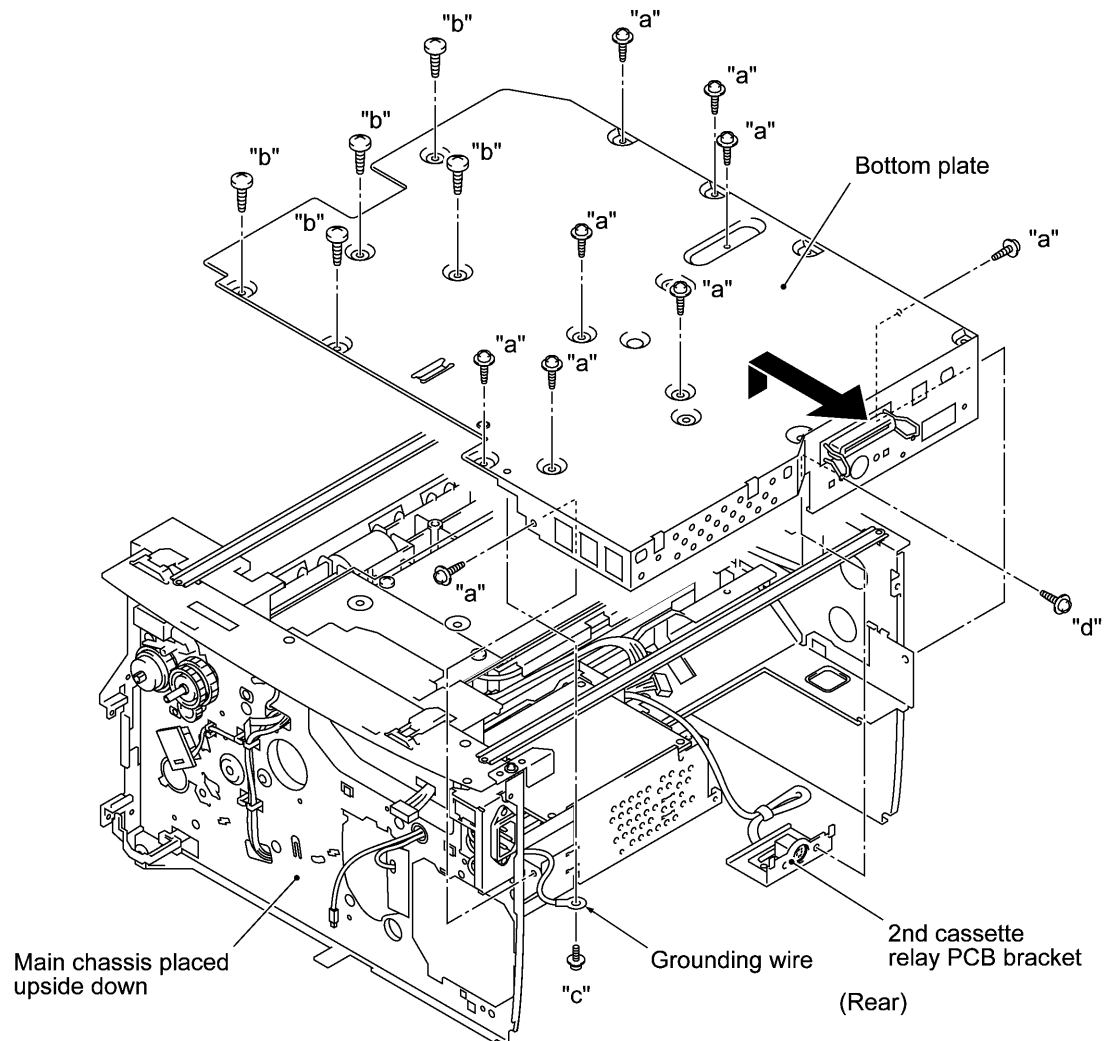
- Main-relay (panel) harness (13-pin, P3)
- Main-LV-engine harness (5-pin, P18)
- Laser flat cable (P6)
- Engine-main harness (12-pin, P5)
- VC harness*¹ (2-pin, P7)
- Main-relay (CCD) harness (12-pin, P8)
- In-casing temperature sensor harness (2-pin, P9)
- Main-relay (motors) harness (11-pin, P10)

*¹ Provided on models supporting video capture

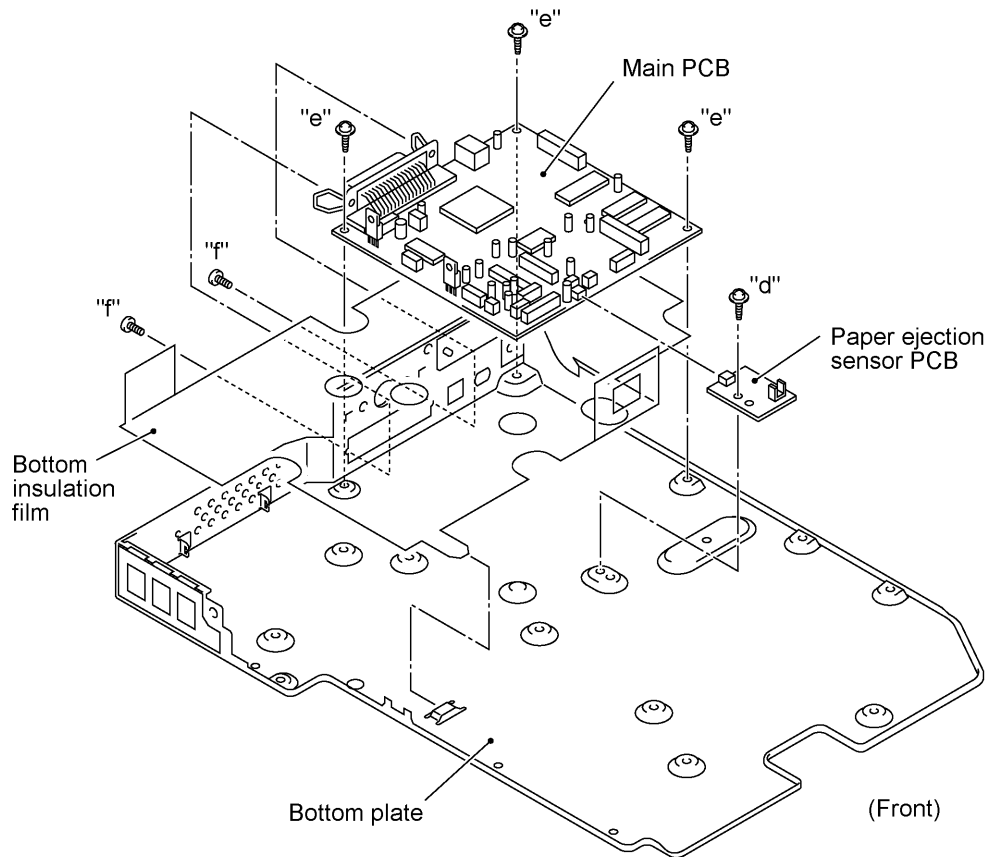
*² Provided on the European version



- (2) Turn the main chassis upside down.
- (3) Remove 14 screws (nine "a" and five "b").
- (4) Slightly lift up the bottom plate and pull it to the rear until you can remove screw "c."
- (5) Remove screw "c" to release the grounding wire.
- (6) For models available with a 2nd paper cassette: Removes screw "d" that secures the 2nd cassette relay PCB bracket to the bottom plate.
- (7) Pull the bottom plate to the rear and out of the main chassis.



- (8) Remove screw "d" and disconnect the paper ejection sensor PCB from the main PCB.
- (9) Remove five screws (three "e" and two "f"), then take off the main PCB from the bottom plate.
- (10) Remove the bottom insulation film.

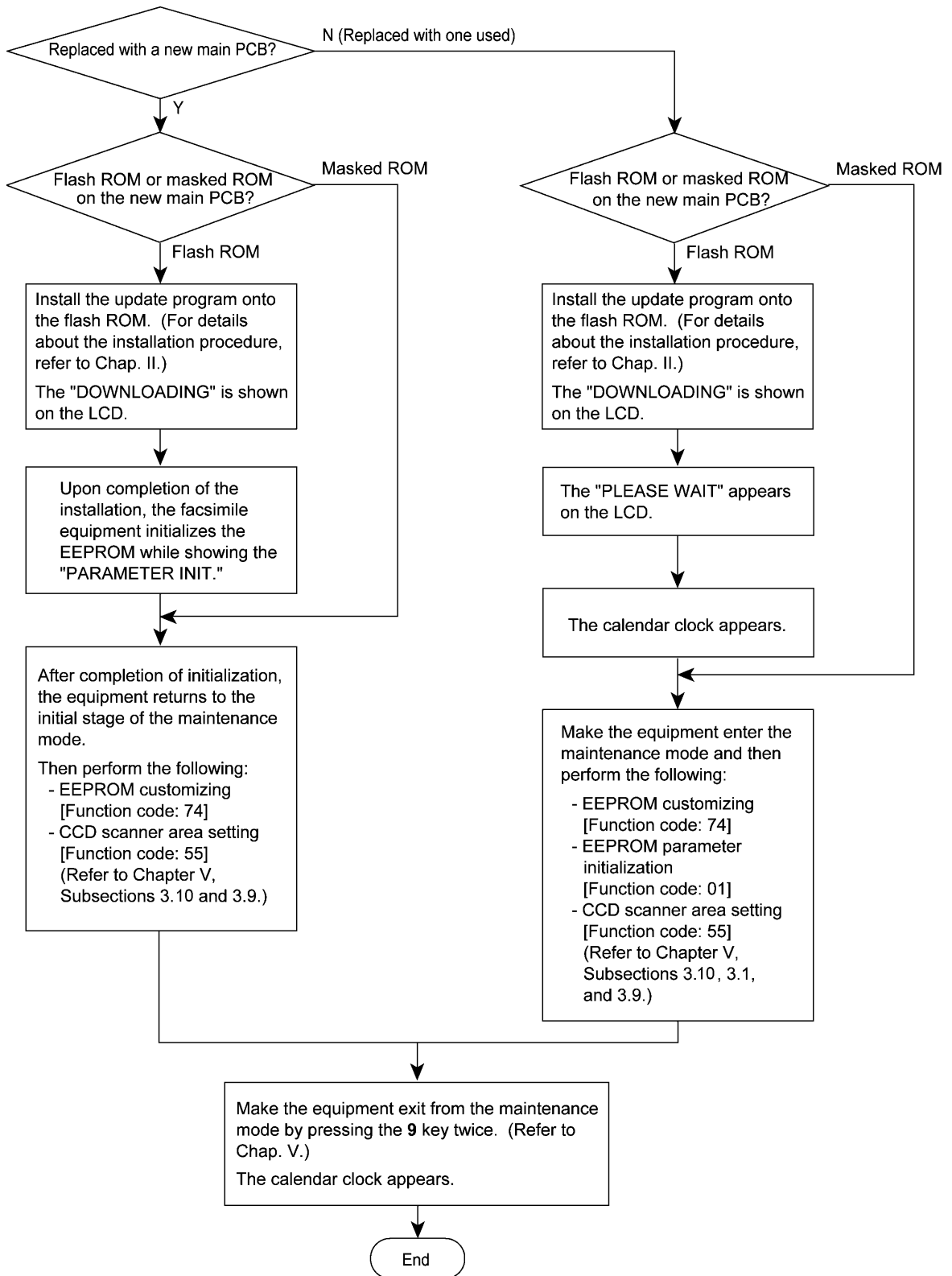


"d" and "e": Taptite, cup S M3x6
 "f": Machine screw, pan M3x6

■ Reassembling Notes

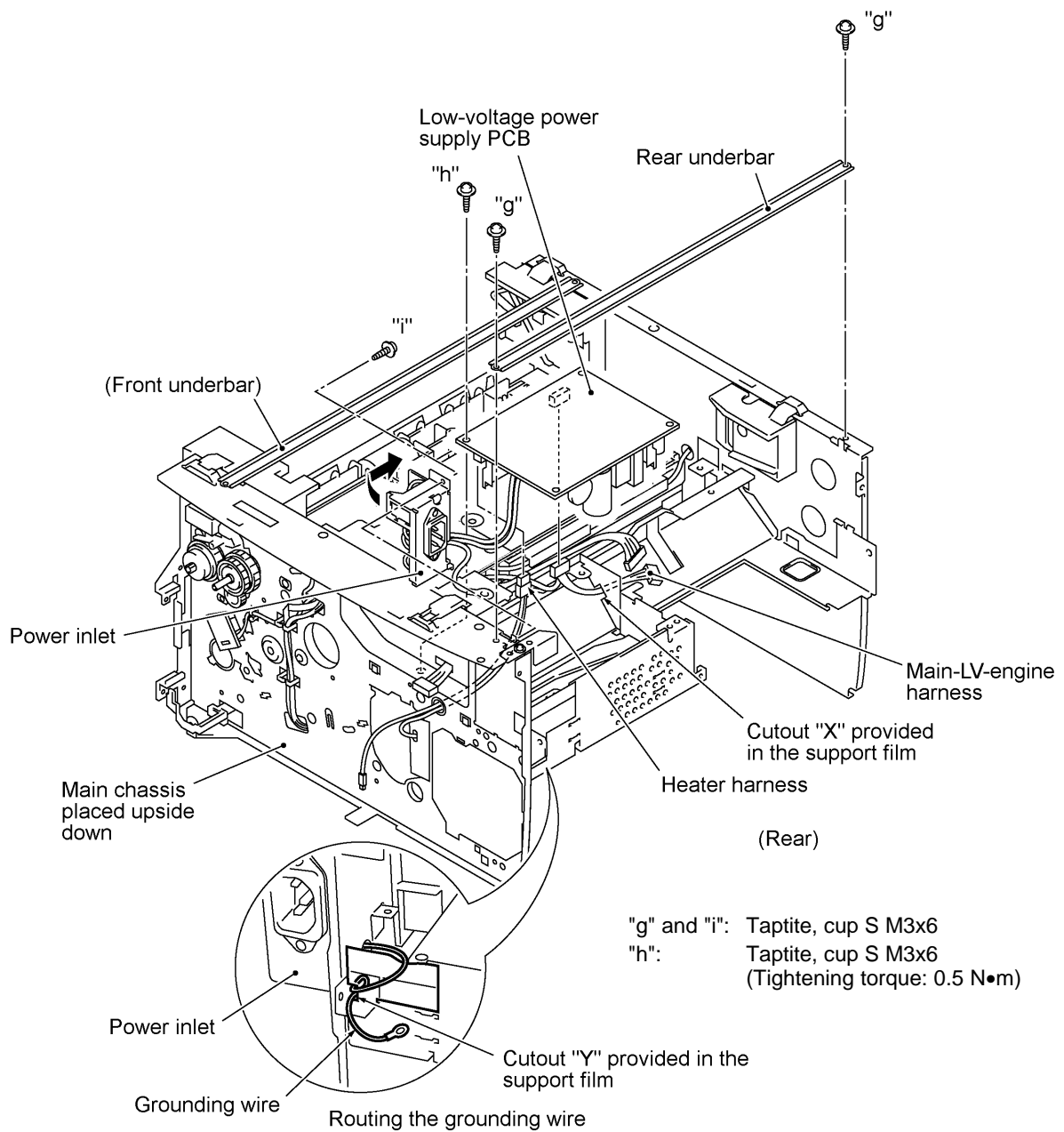
- When putting the bottom plate back into place, make sure that the grounding wire is looped and routed through the support film (as illustrated on page IV-51) and then secure the grounding wire to the bottom plate with screw "c" (shown on the previous page).
- After you replace the main PCB, be sure to follow the flowchart given on the next page.

Setting up the main PCB after replacement



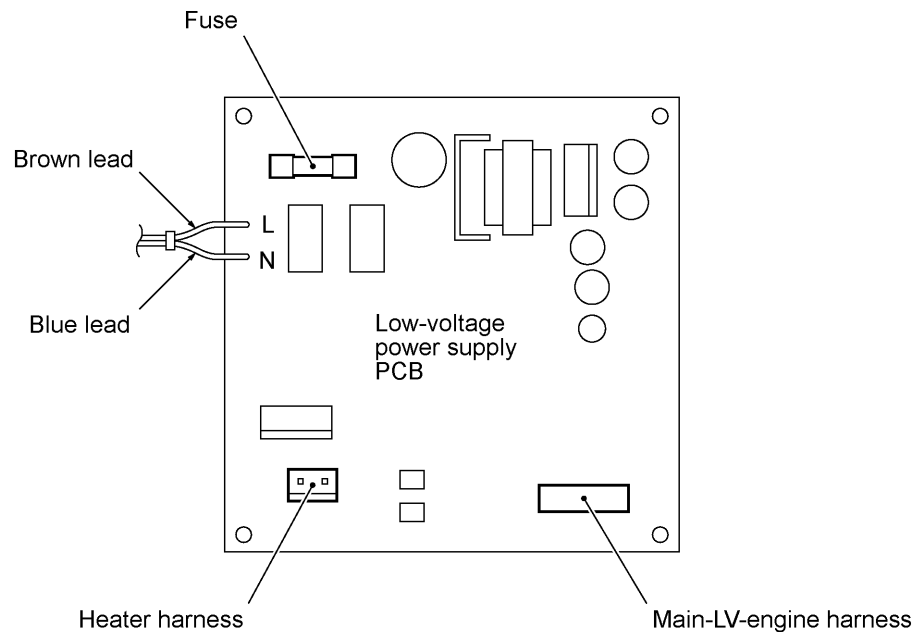
1.23 Low-voltage Power Supply PCB and Power Inlet

- (1) Remove two screws "g" and take off the rear underbar.
- (2) Remove screw "h."
- (3) Slightly lift up the low-voltage power supply PCB and disconnect the heater harness and main-LV-engine harness. The low-voltage power supply PCB is connected to the power inlet with soldered lead wires.
- (4) Remove screw "i."
- (5) While holding up the low-voltage power supply PCB, take out the power inlet from the main chassis to the inside in the direction of the arrow shown below.
- (6) To separate the power inlet from the low-voltage power supply PCB, unsolder the two lead wires from the PCB.



■ Reassembling Notes

- When connecting the power inlet to the low-voltage power supply PCB, insert the brown and blue lead wires into eyelets L and N in the PCB, respectively, and then solder those wires on the solder side of the PCB.

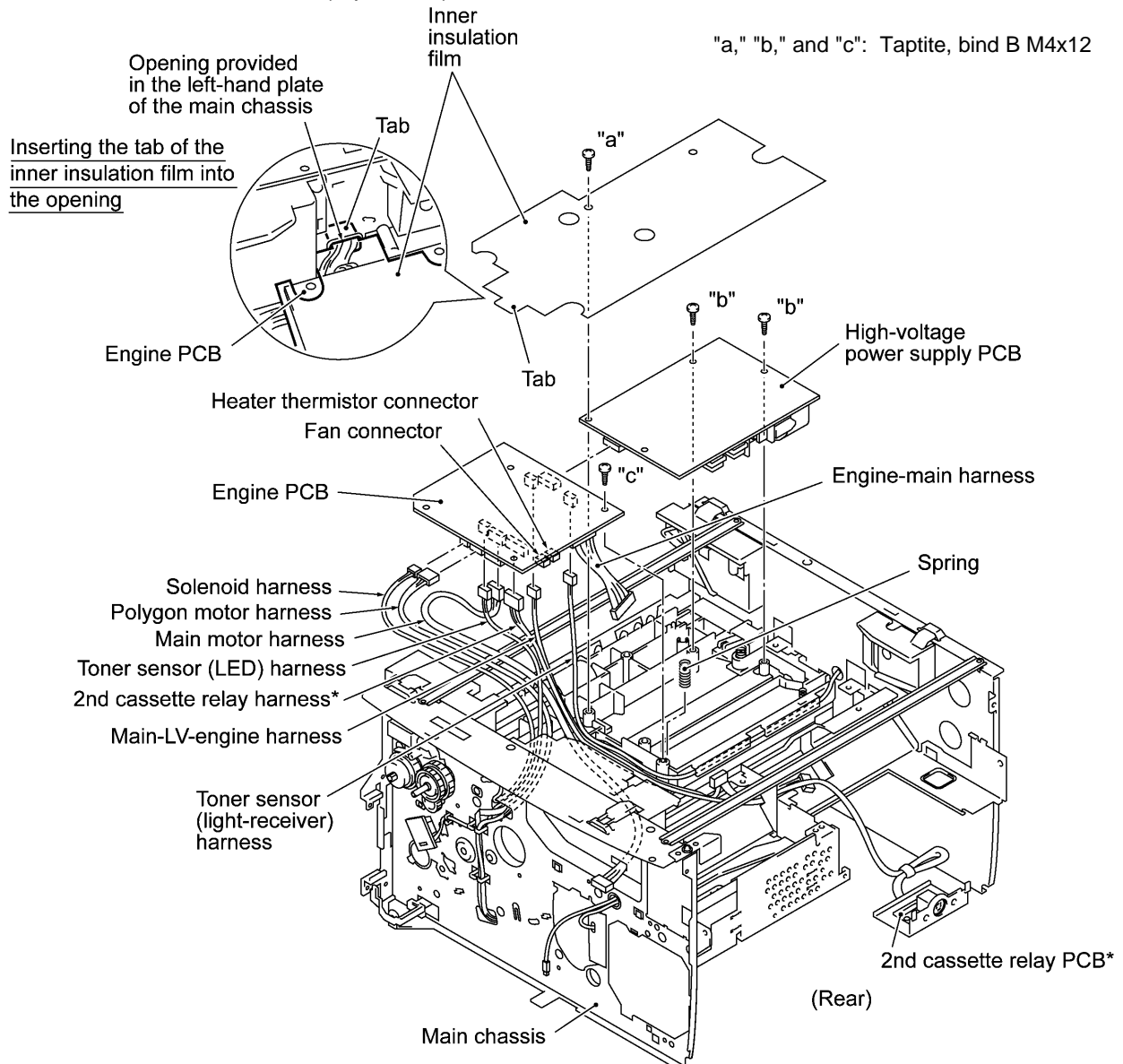


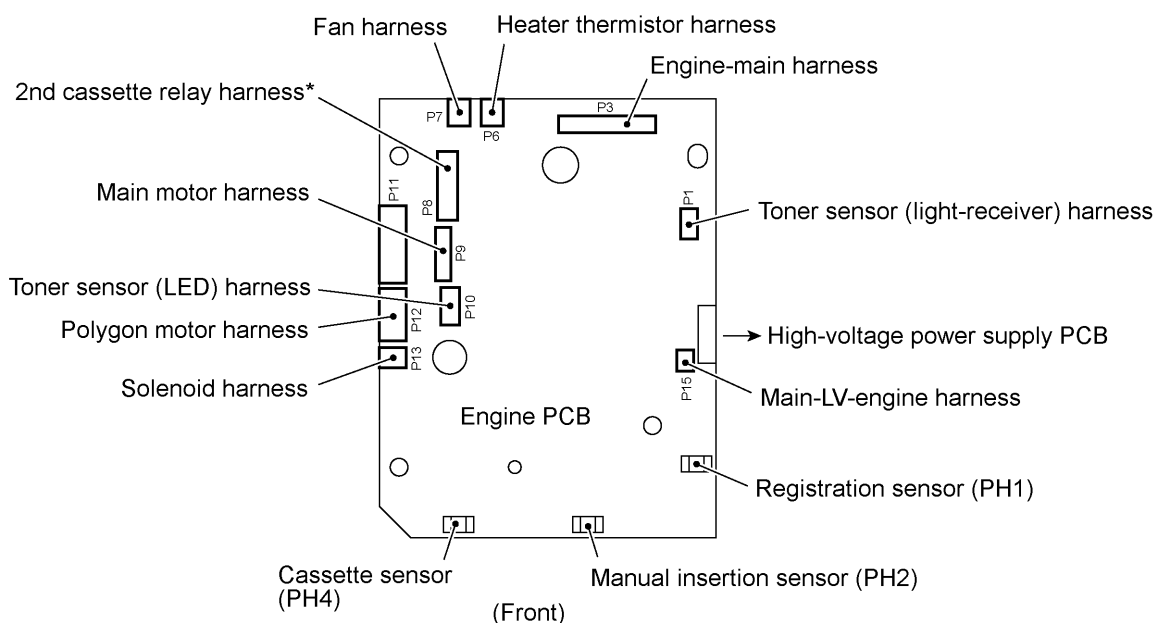
- After setting the power inlet back into place, fold the grounding wire into two and route the fold through cutout "Y" provided in the support film as shown on the previous page.
- When reinstalling the low-voltage power supply PCB, route the main-LV-engine harness through cutout "X" provided in the support film as shown on the previous page.

1.24 Inner Insulation Film, High-voltage Power Supply PCB, Engine PCB, and 2nd Cassette Relay PCB*

(*Provided on models available with a 2nd paper cassette)

- (1) Remove screw "a" and take off the inner insulation film.
- (2) Remove three screws (two "b" and one "c") from the high-voltage power supply PCB and engine PCB.
- (3) Slightly lift up the high-voltage power supply PCB and disconnect it from the engine PCB.
- (4) Pull the spring up and out.
- (5) Slightly hold up the engine PCB and disconnect the following harnesses:
 - Toner sensor (light-receiver) harness (3-pin, P1)
 - Main-LV-engine harness (2-pin, P15)
 - 2nd cassette relay harness* (8-pin, P8)
 - Heater thermistor harness (2-pin, P6), if the heat-fixing unit has not been removed
 - Fan harness (2-pin, P7), if the fan has not been removed
 - Toner sensor (LED) harness (4-pin, P10)
 - Main motor harness (6-pin, P9)
 - Polygon motor harness (5-pin, P12)
 - Solenoid harness (2-pin, P13)

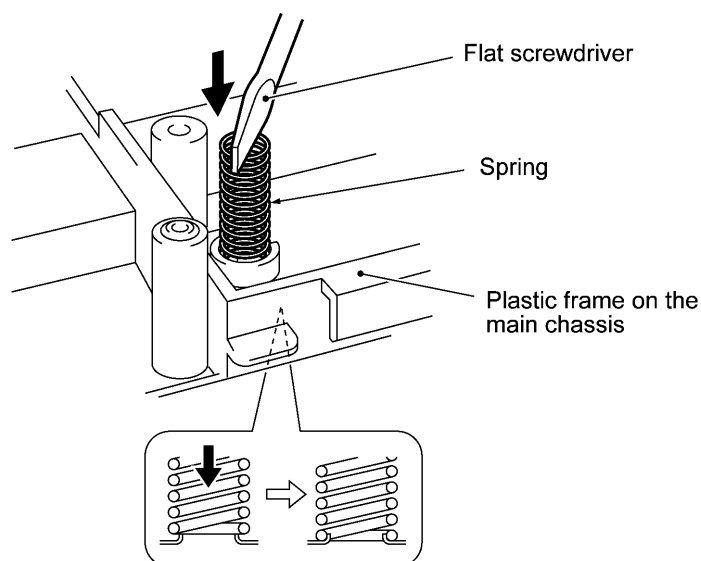




- (6) For models available with a 2nd paper cassette: Pull the 2nd cassette relay PCB bracket to take out its harness. Remove the screw and take off the 2nd cassette relay PCB from its bracket.

■ Reassembling Notes

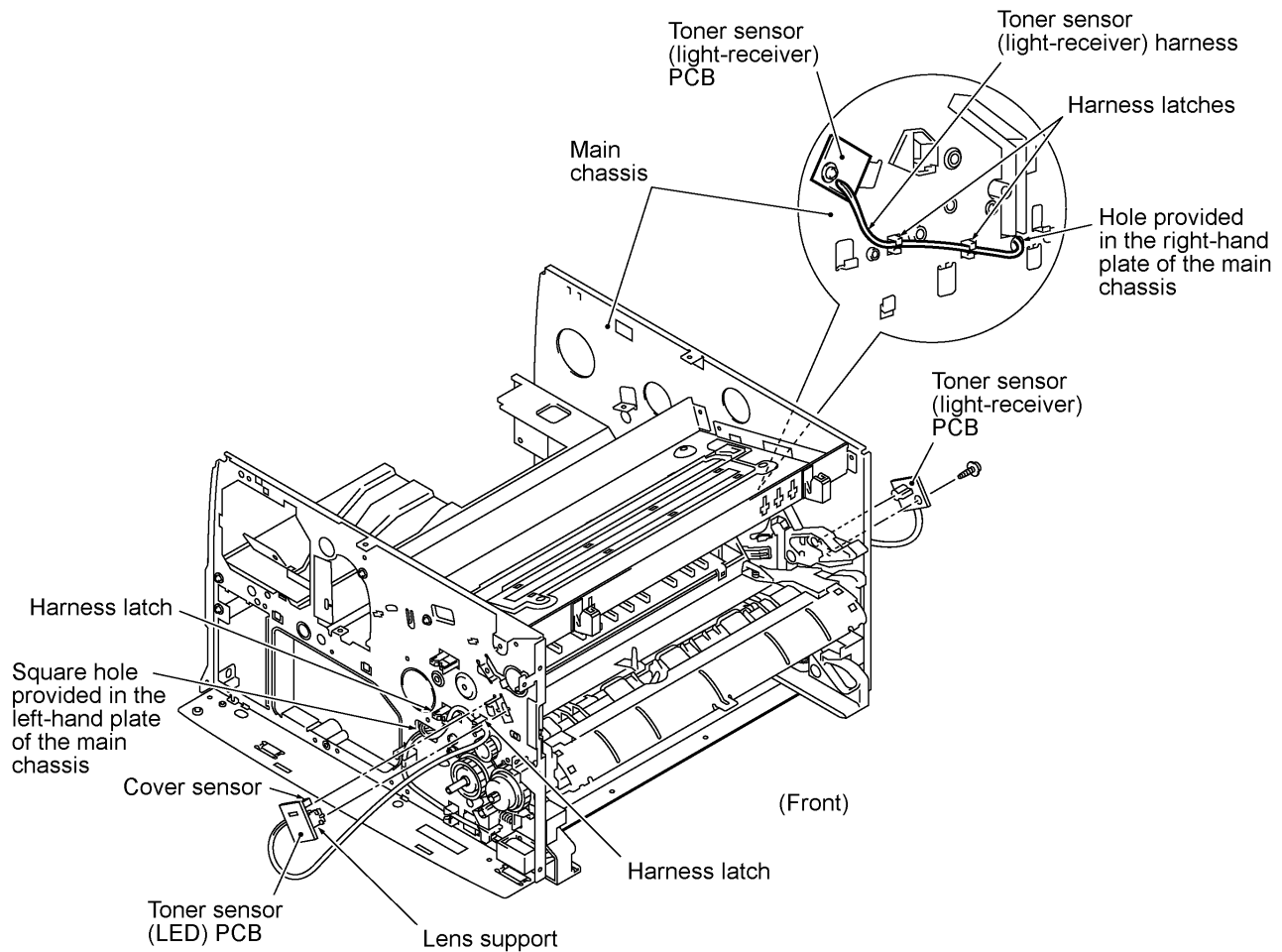
- Before reinstalling the high-voltage power supply PCB, push in the spring with a flat screwdriver until it snaps into place as shown below.



- Before reinstalling the high-voltage power supply PCB, check the high-voltage contacts for any toner particles, paper dust or dirt, and clean them out.

1.25 Toner Sensor (light-receiver) PCB and Toner Sensor (LED) PCB

- (1) At the right-hand plate of the main chassis, remove the screw from the toner sensor (light-receiver) PCB, release its harness from the two harness latches, and then pull it out.
- (2) At the left-hand plate of the main chassis, press the both sides of the lens support on the toner sensor (LED) PCB with your fingers to release them from the main chassis, release its harness from the two latches, and then pull it out.

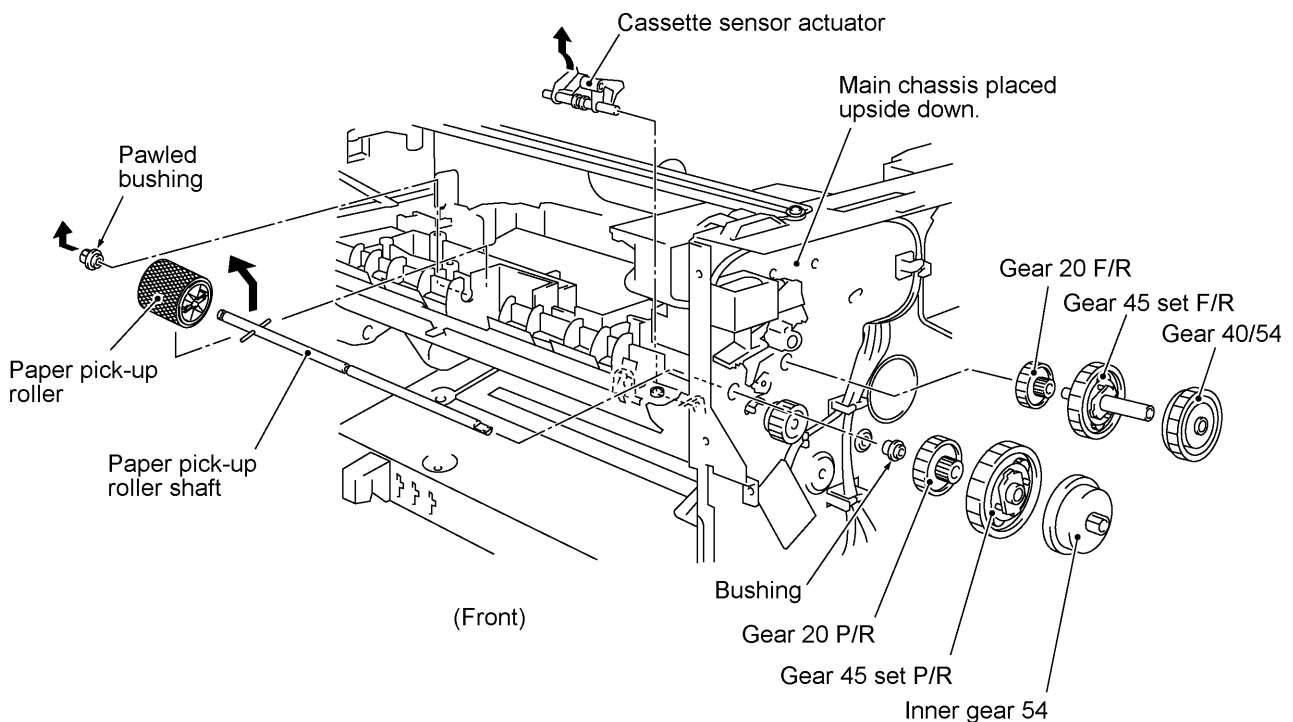


■ Reassembling Notes

- Route the toner sensor (LED) harness on the left-hand side of the main chassis as shown above. Also refer to the illustration given on page IV-53.
- Route the toner sensor (light-receiver) harness on the right-hand side of the main chassis as shown above and on the top of the plastic frame as shown on page IV-53.

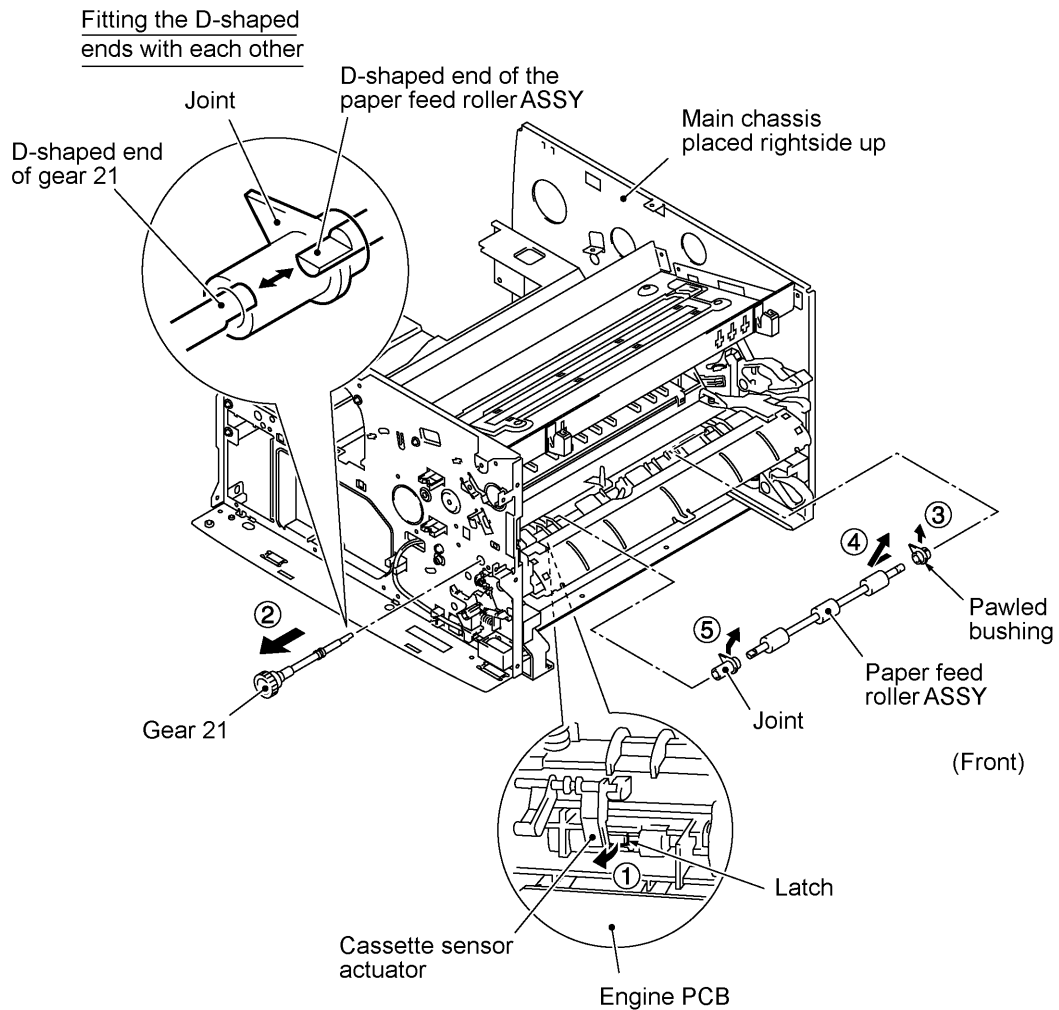
1.26 Gears and Paper Pick-up Roller

- (1) Place the main chassis upside down.
- (2) Remove the inner gear 54 (by pulling its pawl outwards), gear 45 set P/R, gear 20 P/R, and the bushing from the end of the paper pick-up roller shaft.
- (3) Remove the pawled bushing by pulling its pawl outwards, then remove the paper pick-up roller and its shaft.
- (4) Remove the gear 40/54, gear 45 set F/R, and gear 20 F/R.
- (5) If the engine PCB has been removed, take out the cassette sensor actuator. (This prevents the actuator from dropping during the following disassembly jobs.)



1.27 Paper Feed Roller ASSY

- (1) Unhook the latch (arrow) provided on the underside of the plastic frame by using a small flat screwdriver and pull out the gear 21 (arrow).
- (2) Place the main chassis rightside up.
- (3) At the right end of the paper feed roller shaft, pull up the pawl of the bushing (arrow) with the tip of a flat screwdriver and move the paper feed roller ASSY to the left (arrow). Then take out the bushing and paper feed roller ASSY.
- (4) Remove the joint (arrow).

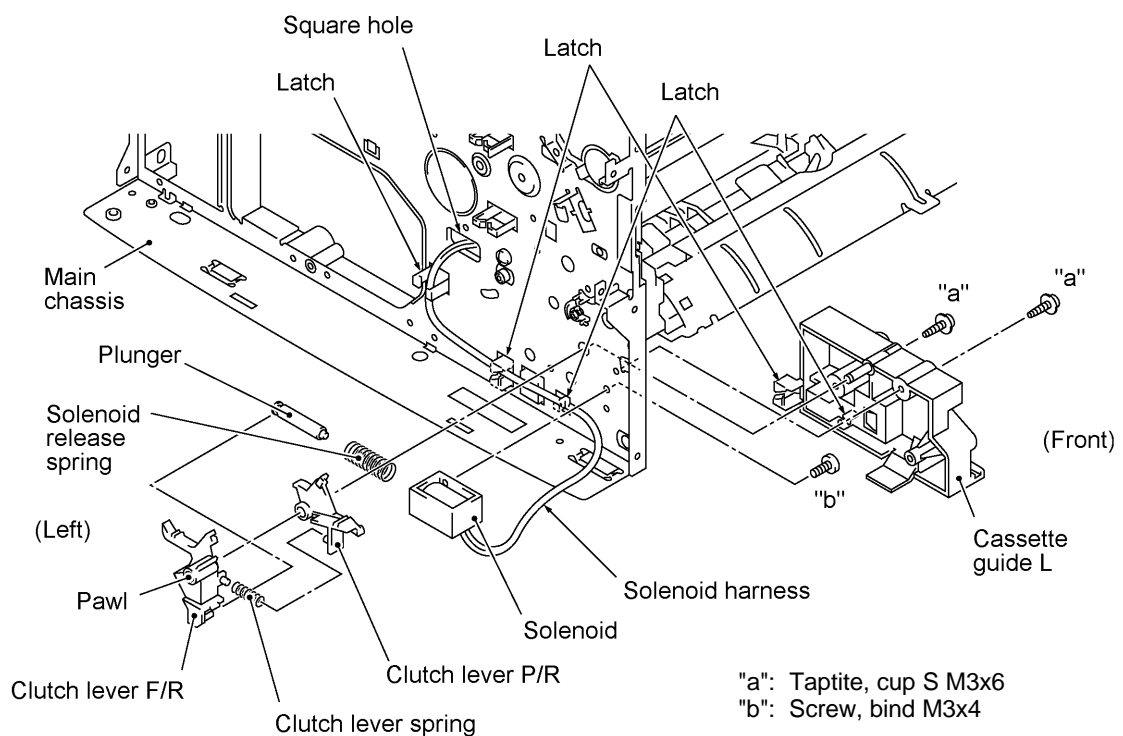


■ Reassembling Notes

- When setting the gear 21 back into place, insert it and turn it so that its D-shaped end becomes fitted with the D-shaped end of the paper feed roller ASSY.

1.28 Clutch Levers, Cassette Guide L, and Solenoid

- (1) Turn the main chassis upside down.
- (2) Remove the two screws and take off the front underbar (which is shown on page IV-51).
- (3) Place the main chassis rightside up.
- (4) Remove the clutch lever F/R by pulling its pawl outwards.
- (5) Remove the clutch lever spring and clutch lever P/R.
- (6) Remove the plunger and solenoid release spring.
- (7) Remove two screws "a" and take off the cassette guide L.
- (8) Remove screw "b" and take off the solenoid.

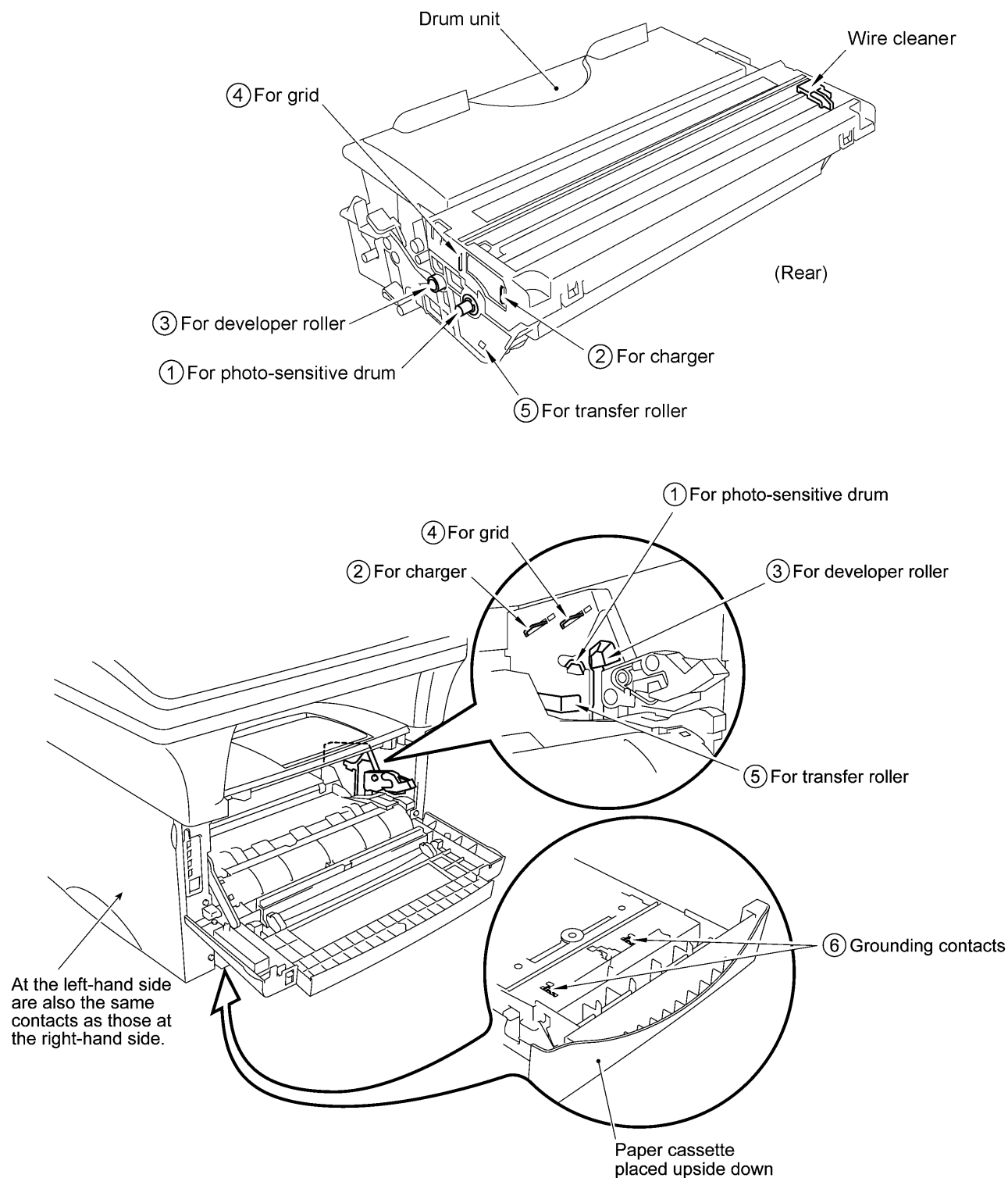


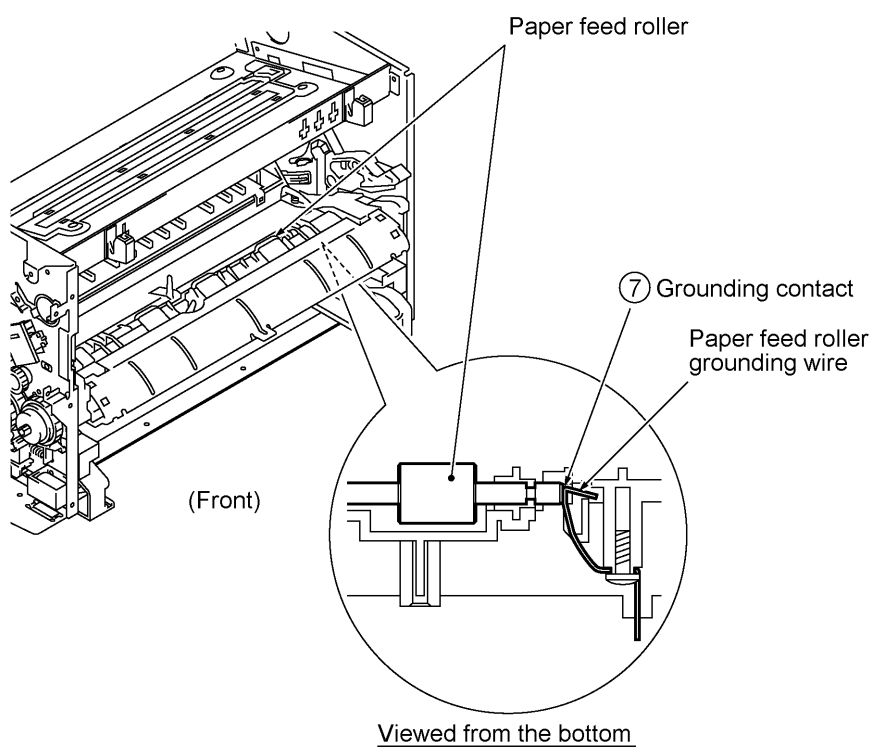
■ Reassembling Notes

- Route the solenoid harness through three latches and pass it through the square hole provided in the left-hand plate of the main chassis.

1.29 Cleaning of High-voltage Contacts and Grounding Contacts

If any toner particles, paper dust or dirt are on the contacts, clean them out. This will ensure that power flows correctly to enable printing.



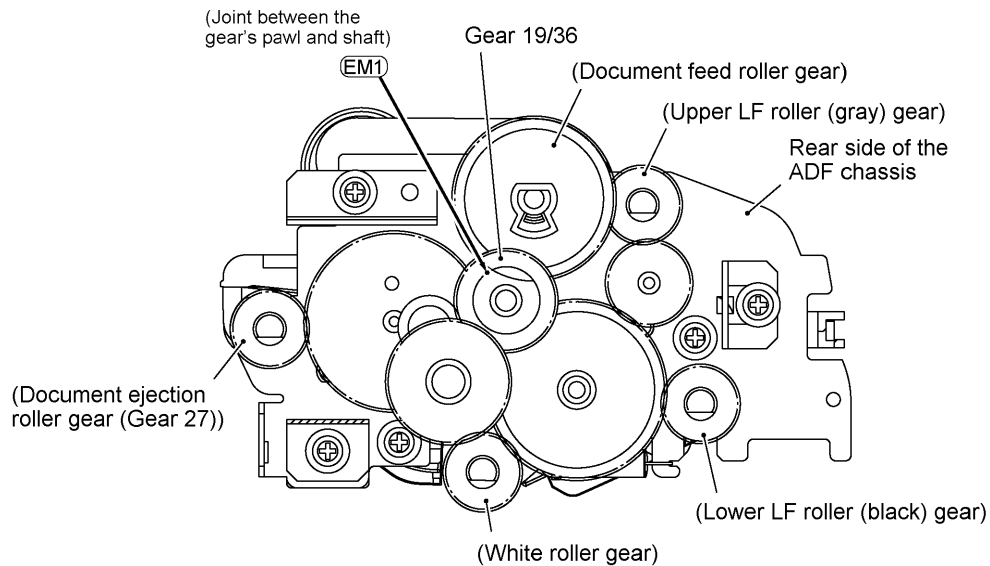


2. LUBRICATION

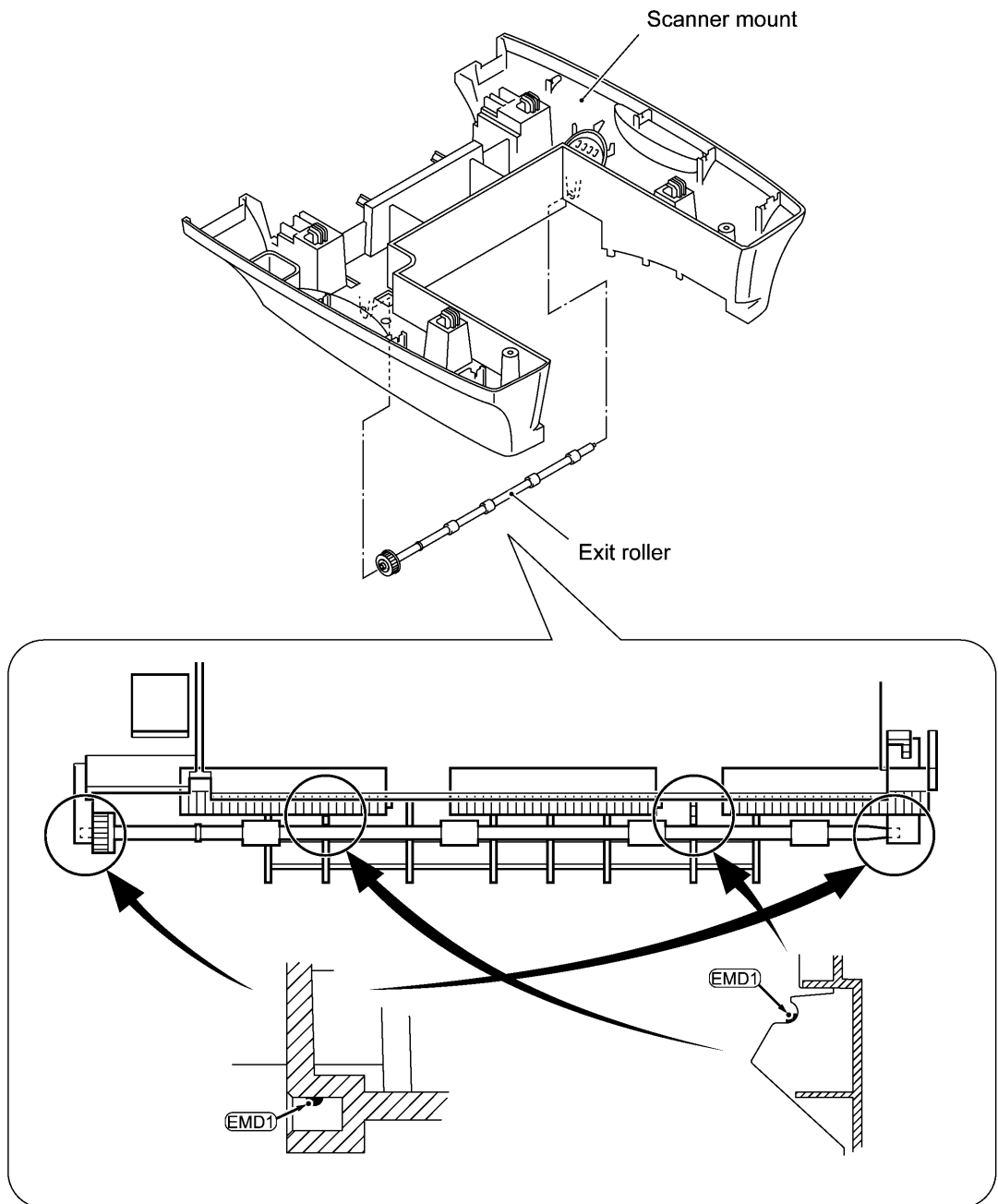
Apply the specified lubricants to the lubrication points as shown below.

Lubricant type (Manufacturer)	Lubricant amount			
	Half of a rice-sized pinch of grease (3 mm ³)	Rice-sized pinch of grease (6 mm ³)	Two rice-sized pinches of grease (12 mm ³)	Five rice-sized pinches of grease (30 mm ³)
Molykote grease EM-30L (Dow Corning)	_____	EM1	_____	_____
Molykote grease EMD-110 (Dow Corning.)	_____	EMD1	_____	_____
Molykote grease PG662 (Dow Corning)	_____	PG1	_____	_____

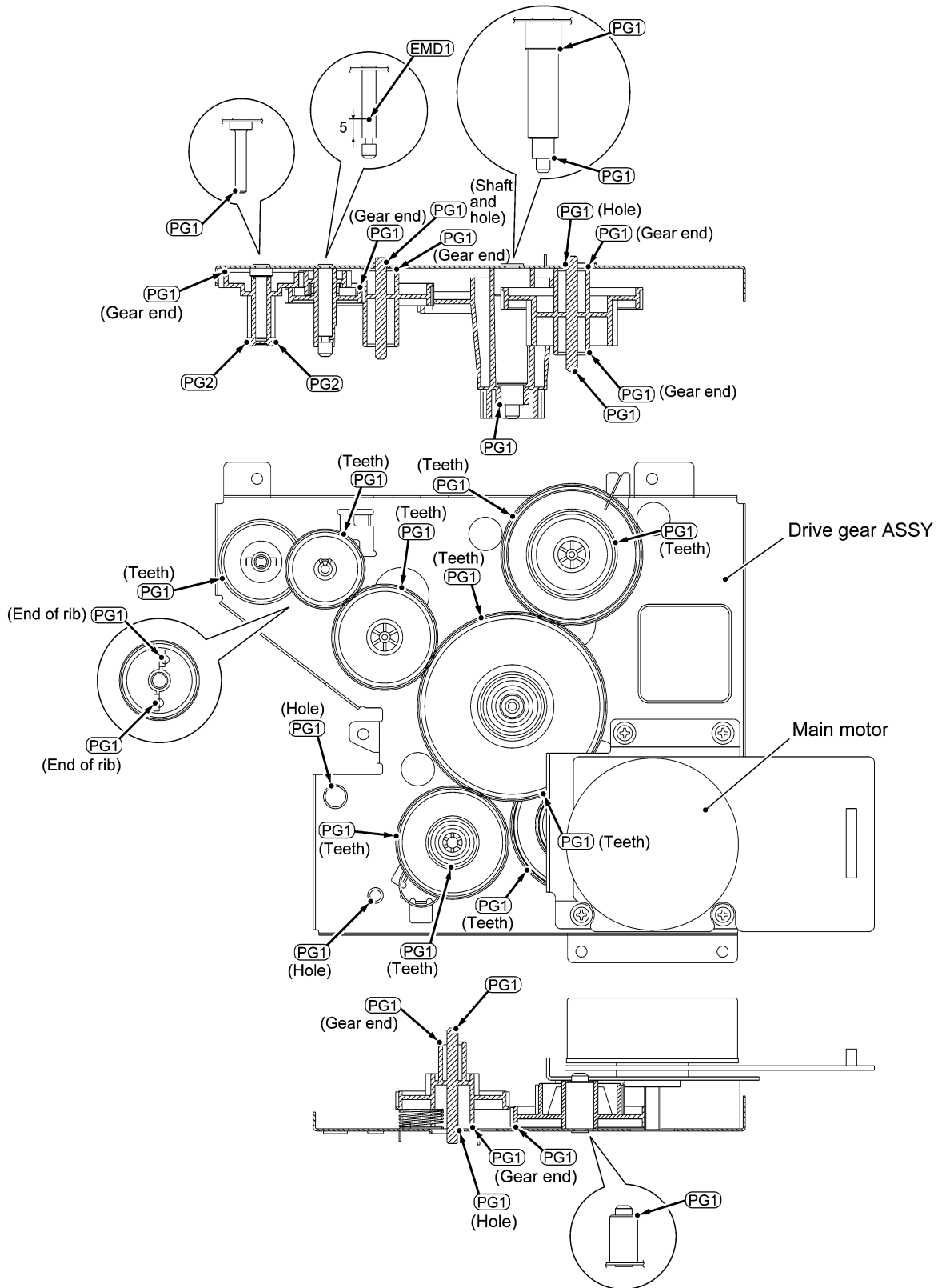
[1] ADF unit



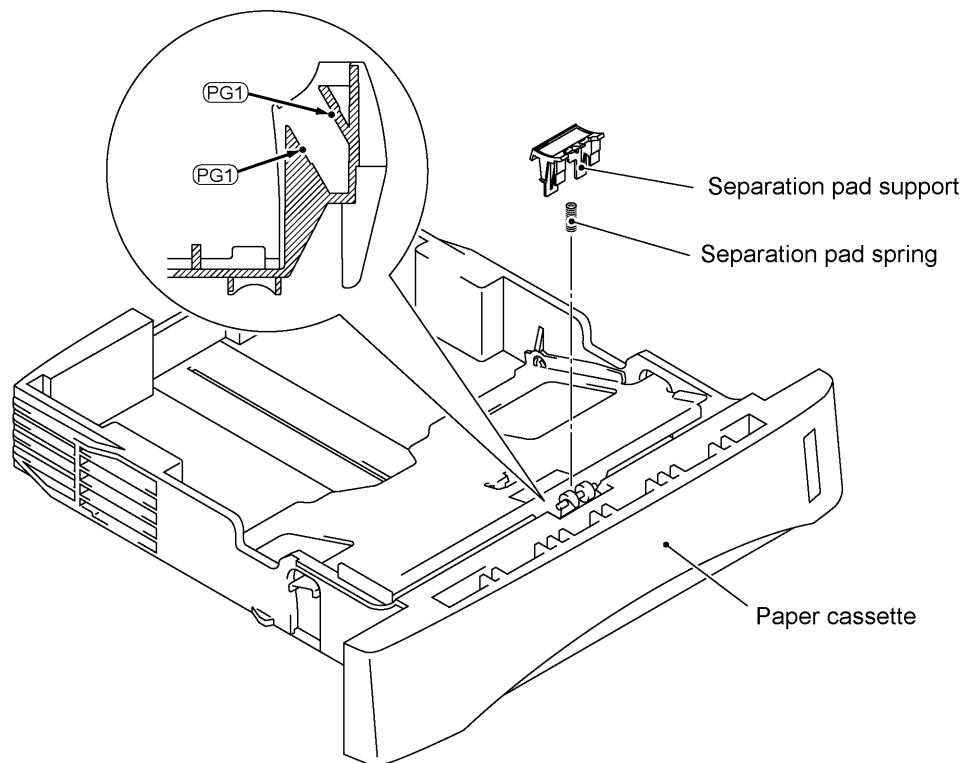
[2] Scanner mount



[3] Drive gear ASSY



[4] Paper cassette



CHAPTER V.

MAINTENANCE MODE

CHAPTER V. MAINTENANCE MODE

CONTENTS

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1. ENTRY INTO THE MAINTENANCE MODE

For machines w/ fax

American models: To make the machine enter the maintenance mode, press the **Function**, *, **2**, **8**, **6**, and **4** keys in this order.

|← Within 2 seconds →|

European models: To make the machine enter the maintenance mode, press the **Menu**, *, **2**, **8**, **6**, and **4** keys in this order.

|← Within 2 seconds →|

For machines w/o fax

To make the machine enter the maintenance mode, press the **Menu**, **0**, **2**, **8**, **6**, and **4** keys in this order.

|← Within 2 seconds →|

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

To select one of the maintenance-mode functions listed in Section 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 machine exit from the maintenance mode, restoring it to the standby state.
 - Pressing the **Stop** key after entering only one digit restores the machine to the initial stage of the maintenance mode.
 - If an invalid function code is entered, the machine resumes the initial stage of the maintenance mode.

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-53)
12	Operational Check of LCD	3.6 (V-54)
13	Operational Check of Control Panel PCB (Check of Keys and Buttons)	3.7 (V-54)
14	_____	_____
15	_____	_____
16	_____	_____
32	Sensor Operational Check	3.8 (V-56)
55	CCD Scanner Area Setting	3.9 (V-57)
74	EEPROM Customizing	3.10 (V-57)
79	Erasure of Received FAX Messages Temporarily Stored in the Flash Memory (Not applicable to the American version)	3.11 (V-58)
82	Machine Error Code Indication	3.12 (V-58)
87	Output of Transmission Log to the Telephone Line (Not applicable to machines w/o fax)	3.13 (V-59)
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 WSW43, 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) For machines w/ fax:

American models: Press the **Function** and **Resolution** keys in this order.

European models: Press the **Menu** and **Resolution** keys in this order.

For machines w/o fax:

Press the **Menu** and **Sort** keys in this order.

The LCD clears the current display.

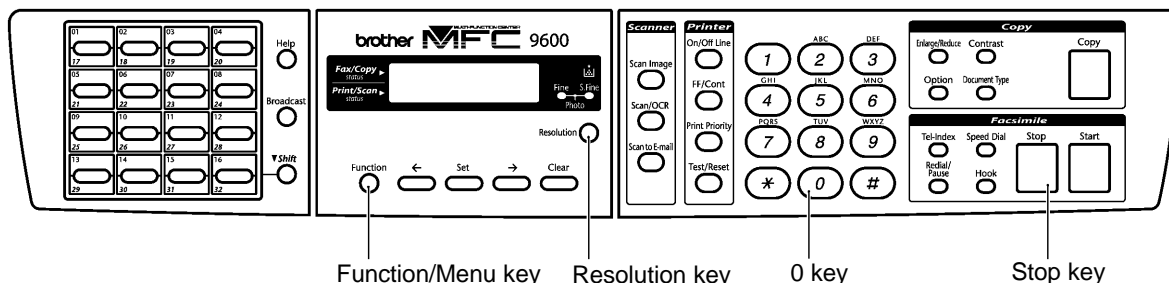
(2) Press the **0** key.

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

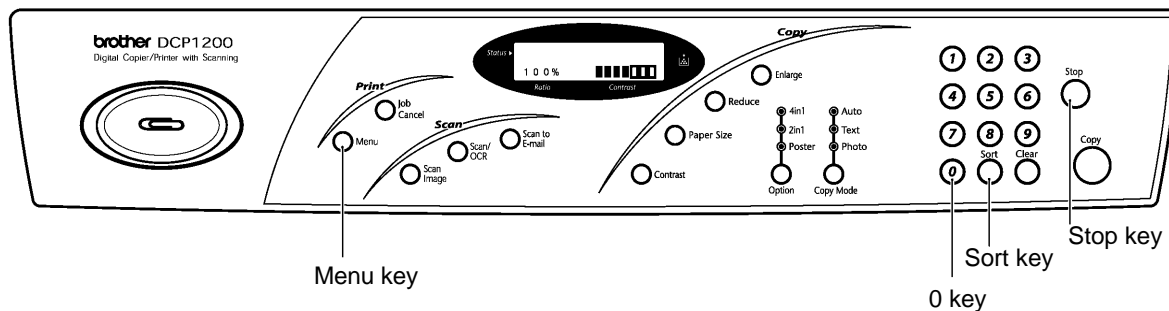
For function code 10, access the desired firmware switch according to the operating procedure described in Subsection 3.5.

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

MFC9600/MFC9850/MFC9870



DCP1200/MFC9750



3. DETAILED DESCRIPTION OF MAINTENANCE-MODE FUNCTIONS

3.1 EEPROM Parameter Initialization

n Function

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

Function code Data item	01	91
Maintenance-mode functions User switches Firmware switches Remote activation code Activity report	All of these will be initialized	These will be initialized
Station ID data Outside line number Telephone function registration One-touch dialing Speed dialing Group dialing		These will <u>not</u> be initialized
Received FAX messages temporarily stored in the flash memory (Not applicable to the American version) EEPROM customizing code (4-digit)	These will <u>not</u> be initialized. (Note that the first digit of the 4-digit customizing 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.)	

NOTE: If you replace the main PCB with one used for any other machine, carry out this procedure and then customize the EEPROM (maintenance-mode function code 74 in Subsection 3.10).

n Operating Procedure

- 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.
- Upon completion of parameter initialization, the machine returns to the initial stage of the maintenance mode.

3.2 Printout of Scanning Compensation Data

■ Function

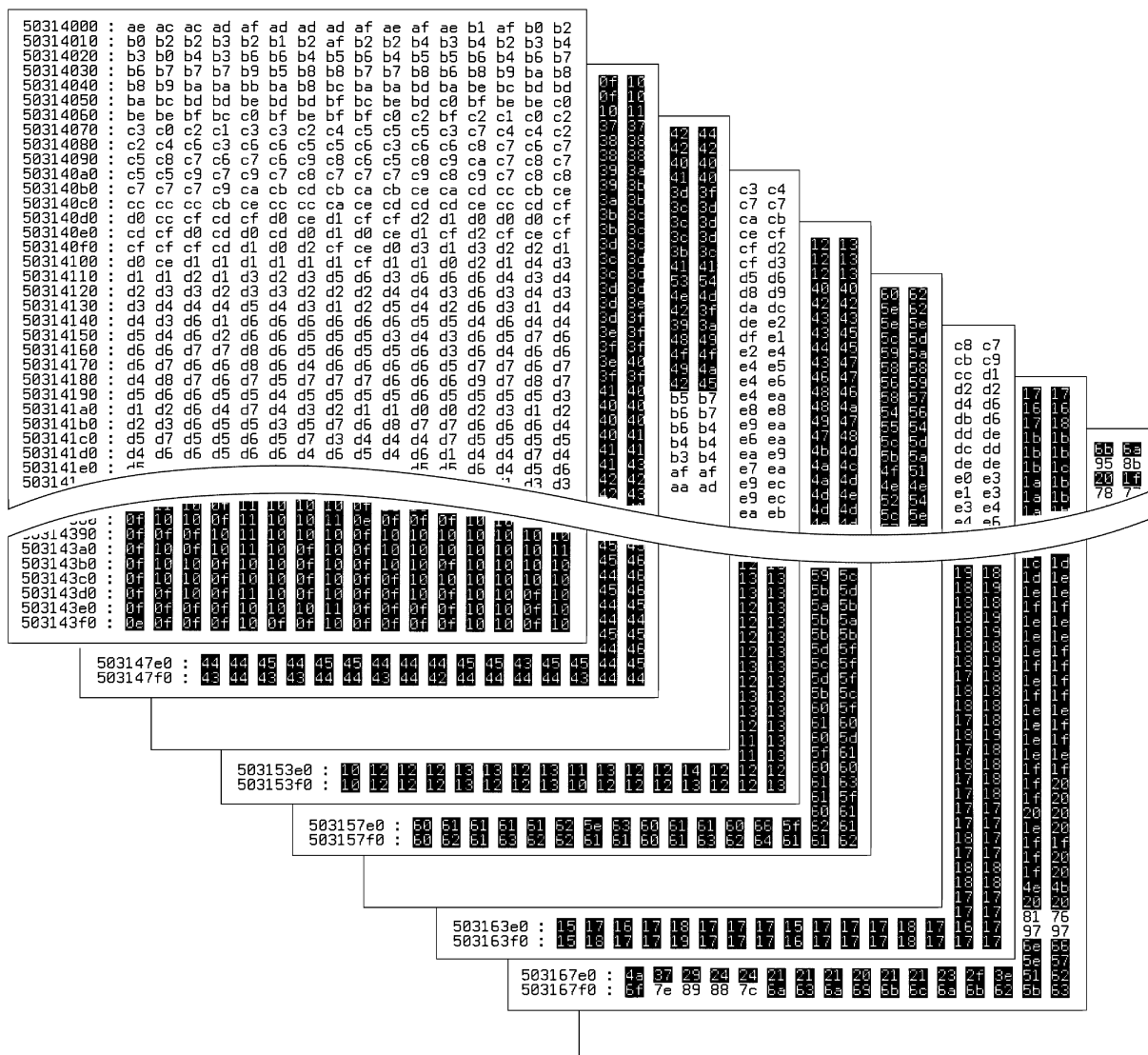
The machine prints out the white and black level data for scanning compensation.

■ Operating Procedure

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

- (1) 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 machine prints out the scanning compensation data list containing the following:
 - a) 2-value quantization white level data for green (2448 bytes)
 - b) 2-value quantization white level data for blue (2448 bytes)
 - c) 2-value quantization white level data for red (2448 bytes)
 - d) 2-value quantization black level data for green (16 bytes)
 - e) 2-value quantization black level data for blue (16 bytes)
 - f) 2-value quantization black level data for red (16 bytes)
 - g) A/D converter reference level for high value (3 bytes for green, blue, and red)
 - h) A/D converter reference level for low value (3 bytes for green, blue, and red)
 - i) Dark level offset data (3 bytes for green, blue, and red)
 - j) Gain control data (3 bytes for green, blue, and red)
- (3) Upon completion of recording of the compensation data list, the machine returns to the initial stage of the maintenance mode.

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



5030e000 :	08	08	09	09	09	09	08	09	08	09	08	09	09	08	09
50310000 :	09	0b	0b	0b	0c	0b	0a	0b	09	0b	0b	0a	0c	0b	0b
50312000 :	0d	0f	0f	10	11	0f	0f	0f	0d	0f	0f	0f	10	0f	0f
5033b340 :	81														
5033b341 :	81														
5033b342 :	81														
5033b345 :	62														
5033b346 :	62														
5033b347 :	62														
5033b34a :	ab														
5033b34b :	ad														
5033b34c :	b5														
5033b34f :	03														
5033b350 :	05														
5033b351 :	07														

Scanning Compensation Data List

3.3 ADF Performance Test

■ Function

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

■ Operating Procedure

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

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

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

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

ADF CHECK P.01

↑ Current count (1st page in this example)

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

3.4 Test Pattern 1

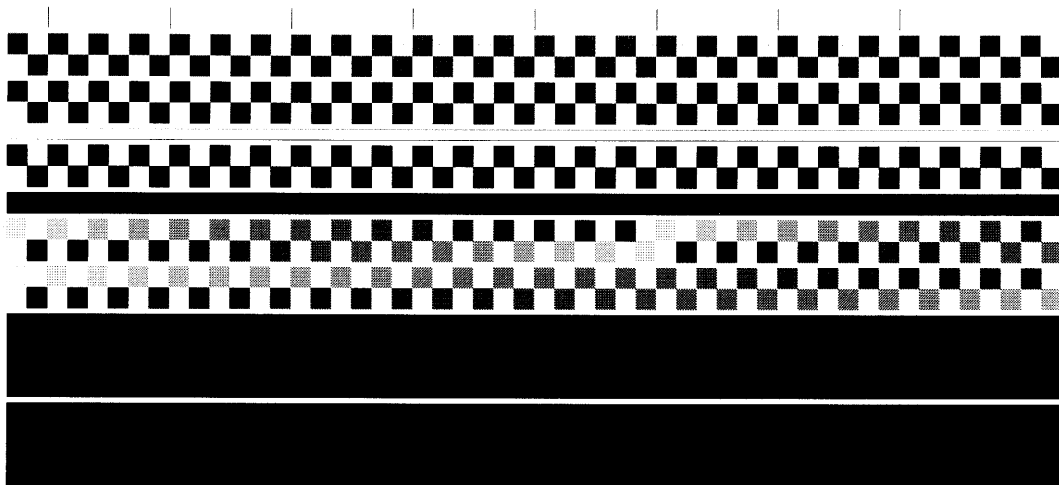
■ Function

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

■ Operating Procedure

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

The figure below shows test pattern 1.



Test Pattern 1

3.5 Firmware Switch Setting and Printout

[A] Firmware switch setting

n Function

The machine incorporates the following firmware switch functions (WSW01 through WSW43) 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.

NOTE: Machines w/o fax support some selectors of firmware switches. Those selector numbers are circled.

Firmware Switches (WSW01 through WSW43)

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 setting	V-34
WSW23	Communications setting	V-35
WSW24	TAD setting 2	V-36
WSW25	TAD setting 3	V-36
WSW26	Function setting 4	V-37
WSW27	Function setting 5	V-38
WSW28	Function setting 6	V-39
WSW29	Function setting 7	V-40
WSW30	Function setting 8	V-40
WSW31	Function setting 9	V-41
WSW32	Function setting 10	V-42
WSW33	Function setting 11	V-43
WSW34	Function setting 12	V-44

Firmware Switches (WSW01 through WSW43) *Continued*

WSW No.	Function	Reference Page
WSW35	Function setting 13	V-44
WSW36	Function setting 14	V-45
WSW37	Function setting 15	V-46
WSW38	Function setting 16	V-47
WSW39	Function setting 17	V-48
WSW40	Function setting 18	V-49
WSW41	Function setting 19	V-50
WSW42	Function setting 20	V-51
WSW43	Function setting 21	V-52

n Operating Procedure

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

- (2) Enter the desired number from the firmware switch numbers (01 through 43).

The following appears on the LCD:

Selector No. 1 Selector No. 8
 ↓ ↓
 WSWXX = 0 0 0 0 0 0 0

- (3) For machines w/ fax: Use the ◀ and ▶ keys to move the cursor to the selector position to be modified.

For machines w/o fax: Use the **Job Cancel** key to move the cursor to the selector position to be modified.

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

- (5) For machines w/ fax: Press the **Set** key.

For machines w/o fax: Press the **Menu** key.

This operation saves the newly entered selector values onto the EEPROM and readies the machine for accepting a firmware switch number.

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

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

NOTES: • To cancel this operation and return the machine to the initial stage of the maintenance mode during the above procedure, press the **Stop** key.

- If there is a pause of more than one minute after a single-digit number is entered for double-digit firmware switch numbers, the machine will automatically return to the initial stage of the maintenance mode.

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

I 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.

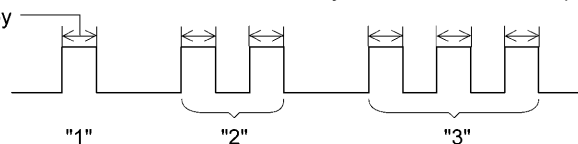
10 - N: Dialing "N" generates "10 - N" pulses.

I 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.)

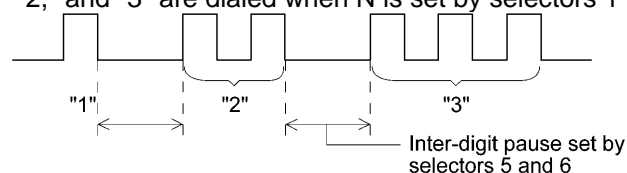
Break time length set by
selectors 3 and 4



I 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.

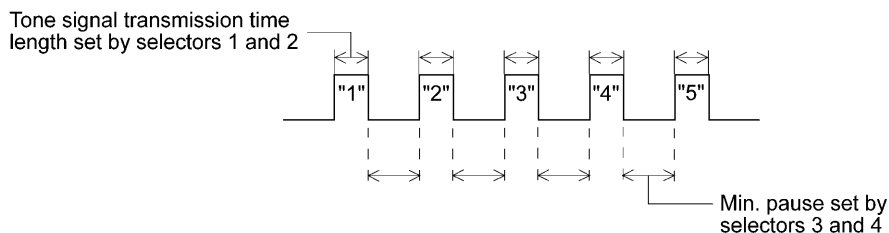
WSW02 (Tone signal setting)

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	Not used.	

* PABX: Private automatic branch exchange

NOTE: Selectors 2 through 4, 6 and 7 are not applicable where no PABX is installed.

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

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

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

I 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 machine starts dialing.

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

I **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 machine starts dialing upon detection of a dial tone when a line is connected.

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

WSW04 (TRANSFER facility setting)

Selector No.	Function	Setting and Specifications
1 4	Not used.	
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 5 through 8 are not applicable in those countries where no transfer facility is supported.

┆ **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 auto-matic 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 auto-matic receiving mode	0: Yes 1: No
8	Not used.	

NOTE: Selectors 5 through 7 are not applicable in those countries where no busy tone detection is supported.

I Selectors 1 through 3: 1st dial tone detection

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

Setting all of these selectors to "1" activates the dial tone detection function so that the machine starts dialing upon detection of a dial tone when a line is connected. For the detecting conditions of the 1st dial tone, refer to WSW07 and WSW08.

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

I 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.

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

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

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

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

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

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

This selector determines whether or not the machine 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 1 1 1 : } both in DP and push-button (PB) dialing system
4 6	Detection of 2nd dial 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

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

Selectors 1 2 3		
0	0	0
No WAIT is inserted even if the Pause key is pressed.		
0	0	1
0	1	0
0	1	1
1	0	0
If you press the Pause key during dialing, the machine will insert WAIT as defined in the above table. If the Pause key is pressed repeatedly, the machine inserts the specified WAIT multiplied by the number of depressions. It applies also in hook-up dialing.		
1	0	1
1	1	0
1	1	1
When these selectors are set to "1, 0, 1": If you press the Pause key during dialing, the machine 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 machine will first wait for the 2nd dial tone to be sent via the communications line. After that, the machine will insert a WAIT of 3.5 seconds. If no 2nd dial tone is received within the specified time length (set by WSW08), the machine 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.		

Ⅰ **Selectors 4 through 6: Detection of 2nd dial tone**

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

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

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

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

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

Ⅰ **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 through 7 are not applicable in those countries where no dial tone or line current detection is supported, e.g., U.S.A.

┆ **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 machine 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 machine starts dialing.

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

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

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

WSW09 (Protocol definition 1)

Selector No.	Function	Setting and Specifications
1	Frame length selection	0: 256 octets 1: 64 octets
2	Use of non-standard commands	0: Allowed 1: Prohibited
3 4	No. of retries	No. 3 4 0 0 : 4 times 0 1 : 3 times 1 0 : 2 times 1 1 : 1 time
5	T5 timer	0: 300 sec. 1: 60 sec.
6	T1 timer	0: 35 sec. 1: 40 sec.
7 8	Elapsed time for time-out control for no response from the called station in automatic sending mode	No. 7 8 0 0 : 60 sec. (55 sec. for US and Canada) 0 1 : 140 sec. 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 machine can divide a message into 64-octet frames.

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

Selector 2: Use of non-standard commands

If this selector is set to "0," the machine 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 machine will use standard commands only.

Selectors 3 and 4: No. of retries

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

Selector 5: T5 timer

This selector sets the time length for the T5 timer.

Selector 6: T1 timer

This selector sets the time length for the T1 timer.

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

If the machine 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	Not used.	
2	Time length from transmission of the last dial digit to CML ON	0: 100 ms 1: 50 ms
3	Time length from CML ON to CNG transmission	0: 2 sec. 1: 4 sec.
4	Time length from CML ON to CED transmission (except for facsimile-to-telephone switching)	0: 0.5 sec. 1: 2 sec.
5 6	No. of training retries	No. 5 6 0 0 : 1 time 0 1 : 2 times 1 0 : 3 times 1 1 : 4 times
7	Encoding system (Compression)	MR 0: Allowed 1: Not allowed
8		MMR 0: Allowed 1: Not allowed

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

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

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

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

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

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

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

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

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

This selector determines whether or not 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 : 1500 ms 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 0 1 : 200 ms 1 0 : 250 ms 1 1 : 150 ms
7 8	Not used.	

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

If the machine 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.

I Selectors 5 and 6: Detecting time setting

These selectors set the time length required to make the machine acknowledge itself to be called. That is, if the machine 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.

WSW13 (Modem setting)

Selector No.	Function	Setting and Specifications
1 2	Cable equalizer	No. 1 2 0 0 : 0 km 0 1 : 1.8 km 1 0 : 3.6 km 1 1 : 5.6 km
3 4	Reception level	No. 3 4 0 0 : -43 dBm 0 1 : -47 dBm 1 0 : -49 dBm 1 1 : -51 dBm
5 8	Modem attenuator	0: 0 dB 1: 8 dB 0: 0 dB 1: 4 dB 0: 0 dB 1: 2 dB 0: 0 dB 1: 1 dB

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

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

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

Set these selectors according to the distance from the telephone switchboard to the machine.

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

These selectors set the optimum receive signal level.

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

These selectors are used to adjust the transmitting level of the modem when the reception level at the remote station is improper due to line loss. This function applies to 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

I 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.)

I 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	Redialing for no response sent from the called terminal	0: Redialing 1: No redialing
8	Not used.	

NOTE: Selector 7 is not applicable in those countries where no busy tone detection is supported.

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

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

This setting is effective only when selector 7 is set to "0."

I **Selectors 7: Redialing for no response sent from the called terminal**

This selector determines whether or not the machine redials if no G3 command response comes from the called station after dialing within the time length set by selectors 7 and 8 of WSW09.

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 machine 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 4	Not used.	
⑤	Calendar clock type	0: U.S.A. type 1: European type
6	Not used.	
7	Non-ring reception	0: OFF 1: ON
8	Not used.	

┆ **Selectors 1 and 2: Off-hook alarm**

These selectors activate or deactivate the alarm function which sounds an alarm when the handset is off the hook after the communication is completed.

The off-hook alarm works also for an external telephone connected to the EXT modular socket.

┆ **Selector 5: Calendar clock type**

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

┆ **Selector 7: Non-ring reception**

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

WSW18 (Function setting 3)

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

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

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

I **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 : 1 1 0 : } 14,400 bps 1 1 1 :
4 6	Last transmission speed choice for fallback	
7	V. 34 mode	0: Permitted 1: Prohibited
8	V. 17 mode	0: Permitted 1: Prohibited

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

These selectors are used to set the modem speed range. With the first transmission speed choice specified by selectors 1 through 3, the machine attempts to establish the transmission link via the modem. If the establishment fails, the machine automatically steps down to the next highest speed and attempts to establish the transmission link again. The machine repeats this sequence while stepping down the transmission speed to the last choice specified by selectors 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.

I Selector 7: V. 34 mode

This selector determines whether or not the machine communicates with the remote station in the V. 34 mode when that station supports the V. 34 mode.

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 noise elimination at detection of CNG	No. 6 7 0 0 : Yes (When CNG goes either ON or OFF) 0 1 : Yes (Only when CNG goes OFF) 1 0 : No 1 1 : No
8	CNG detection on/off	0: OFF 1: ON

* EP: Echo protection

I **Selector 1: EP tone prefix**

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

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

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

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

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

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

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

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

WSW21 (TAD setting 1)

Selector No.	Function	Setting and Specifications
1 7	Not used.	
8	Erasure of message stored in the memory after the message transfer	0: Yes 1: No

I Selector 8: Erasure of message

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

WSW22 (ECM setting)

Selector No.	Function	Setting and Specifications
1	ECM* in sending	0: ON 1: OFF
2	ECM* in receiving	0: ON 1: OFF
3	Call Waiting Caller ID	0: ON 1: OFF
4	Not used.	
5 8	Acceptable TCF bit error rate (%) (Only at 4800 bps)	0: 0% 1: 8% 0: 0% 1: 4% 0: 0% 1: 2% 0: 0% 1: 1%

* ECM: Error correction mode

NOTE: Selector 3 is applicable to the American version only, but not applicable to those models equipped with high-speed modem.

NOTE: Selectors 5 through 8 are applicable to the Asian version only.

I Selector 3: Call Waiting Caller ID

Setting this selector to "0" allows the user to decide whether or not to interrupt the current call when a new call comes in. If Call Waiting Caller ID service is available in the area and the user subscribes to it, he/she can see information about his/her incoming call.

I 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 7	Not used.	
8	Limitation of attenuation level	0: Yes 1: No

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

I **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.

I **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.

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

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

I **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	Not used.	
3 4	Time length from CML ON to start of pseudo ring backtone transmission	No. 3 4 0 0 : 4 sec. 0 1 : 3 sec. 1 0 : 2 sec. 1 1 : 1 sec.
5 8	Not used.	

▮ Selectors 3 and 4: Time length from CML ON to start of pseudo ring backtone transmission

These selectors set the length of time from CML-ON up to the start of pseudo ring backtone transmission.

WSW25 (TAD setting 3)

Selector No.	Function	Setting and Specifications
1 4	Not used.	
5 7	Pause between paging number and PIN	No. 5 6 7 0 0 0 : 2 sec. 0 0 1 : 4 sec. 0 1 0 : 6 sec. 0 1 1 : 8 sec. 1 0 0 : 10 sec. 1 0 1 : 12 sec. 1 1 0 : 14 sec. 1 1 1 : 16 sec.
8	Not used.	

▮ 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.

WSW26 (Function setting 4)

Selector No.	Function	Setting and Specifications
1 2	Not used.	
3	Dialing during document reading into the temporary memory in in-memory message transmission	0: Disabled 1: Enabled
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)	No. 4 5 0 0 : 0.5 (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
8	Not used.	

NOTE: Selectors 6 and 7 take effect only in the V.34 mode.

I Selector 3: Dialing during document reading into the temporary memory in in-memory message transmission

If this selector is set to "0," the machine waits for document reading into the memory to complete and then starts dialing. This enables the machine to list the total number of pages in the header of the facsimile message.

I Selectors 4 and 5: No. of CNG cycles to be detected (when the line is connected via the external telephone except in the external TAD mode)

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

I Selectors 6 and 7: No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode)

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

WSW27 (Function setting 5)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	Ringer OFF setting	0: Yes 1: No
3	Not used.	
4	Detection of distinctive ringing pattern	0: No 1: Yes
5 7	Not used.	
⑧	Toner save mode	0: Yes 1: No

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

┆ **Selector 2: Ringer OFF setting**

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

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

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

WSW28 (Function setting 6)

Selector No.	Function	Setting and Specifications
1 3	Transmission level of DTMF high-band frequency signal	No. 1 2 3 0 0 0 : 0 dB 0 0 1 : +1 dB 0 1 0 : +2 dB 0 1 1 : +3 dB 1 0 0 : 0 dB 1 0 1 : -1 dB 1 1 0 : -2 dB 1 1 1 : -3 dB
4 6	Transmission level of DTMF low-band frequency signal	No. 4 5 6 0 0 0 : 0 dB 0 0 1 : +1 dB 0 1 0 : +2 dB 0 1 1 : +3 dB 1 0 0 : 0 dB 1 0 1 : -1 dB 1 1 0 : -2 dB 1 1 1 : -3 dB
7 8	Not used.	

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

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

WSW29 (Function setting 7)

Selector No.	Function	Setting and Specifications
1 6	Not used.	
7	Impedance switching control in pulse dialing	0: OFF 1: ON
8	Beep when the memory area for the activity report becomes full	0: No 1: Yes

NOTE: Selectors 7 and 8 are applicable to the European version only.

▮ **Selector 8: Beep when the memory area for the activity report becomes full**

If this selector is set to "1," the machine will beep when the memory area for the activity report becomes full (as well as displaying a message on the LCD, prompting the output of the activity report).

WSW30 (Function setting 8)

Selector No.	Function	Setting and Specifications
1 3	Not used.	
④	Duty cycle control of pulsed current for the heat-fixing unit	0: OFF 1: ON
⑤	Drum cleaning prompt settings	0: ON 1: OFF
6 8	Not used.	

NOTE: Selector 4 is applicable to the European version only.

▮ **Selector 4: Duty cycle control of pulsed current for the heat-fixing unit**

Setting this selector to "1" activates the duty cycle control that suppresses the rush current. The duty cycle is 10-ms ON and 20-ms OFF.

However, the duty cycle control may emit switching noise to the AC line. Depending upon the codes and regulations in the country, this selector should be set to "0."

▮ **Selector 5: Drum cleaning prompt settings**

Setting this selector to "1" (OFF) deactivates all of the drum cleaning prompt settings enabled by selectors 5 to 7 of WSW42.

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: 75% (Letter) 87% (A4) 95% (Legal)
3 4	Not used.	
5	Minimum short-OFF duration in distinctive ringing	0: 130 ms 1: 90 ms
6 7	Not used.	
⑧	"CHANGE DRUM SOON" message	0: Yes 1: No

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

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

If it is set to "0," the machine records one-page data at full size (100%) without reduction; if it is set to "1," the machine records it at the size* specified according to the current paper size.

(*American versions allow the user to select the desired paper size from the control panel. According to the paper size setting, the machine determines the reduction rate. Other versions can handle only A4-size paper, so the reduction rate is always 87%.)

I **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 machine will interpret the short-OFF as OFF.

I **Selector 8: "CHANGE DRUM SOON" message**

This selector determines whether or not the "CHANGE DRUM SOON" message should appear on the LCD when the service life of the laser-sensitive drum in the laser unit will expire soon.

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

I Selectors 5 and 6: Default resolution

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

I Selectors 7 and 8: Default contrast

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

WSW33 (Function setting 11)

Selector No.	Function	Setting and Specifications
1 5	Not used.	
6	Report output of polled transmission requests	0: Yes 1: No
7 8	Not used.	

NOTE: Selector 6 is not applicable to American versions.

WSW34 (Function setting 12)

Selector No.	Function	Setting and Specifications
1 3	Not used.	
4 5	No. of CNG cycles to be detected (when the line is connected via the machine or external telephone except in the external TAD mode)	No. 6 7 0 0 : 0.5 (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
6 7	Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation	No. 6 7 0 0 : 3 0 1 : 2 1 0 : 1 1 1 : OFF
8	CNG detection when the external telephone is connected with a line in TAD mode	0: Only when the equipment detects itself being called 1: Always

NOTE: Selectors 4 and 5 are not applicable to the American version.

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

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

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

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

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

┌ **Selector 8: CNG detection when the external telephone is connected with a line in TAD mode**

If this selector is set to "0," the equipment will detect a CNG signal only when it detects itself being called. If the external telephone is connected with a line before the equipment detects itself being called, the equipment will no longer detect a CNG signal.

If this selector is set to "1," the equipment will detect a CNG signal every time the external telephone is connected with a line, even without detecting itself being called.

WSW35 (Function setting 13)

Selector No.	Function	Setting and Specifications
1 8	Not used.	

WSW36 (Function setting 14)

Selector No.	Function	Setting and Specifications
①	ECP* mode	0: ON 1: OFF
②	Recovery from inactive PC interface	0: Disabled 1: Enabled
③	PC power-off recognition time	0: Normal 1: Long
4	Not used.	
5	Escape from phase C	0: Yes 1: No
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 machine and the connected PC for higher transmission speed.

Selector 2: Recovery from inactive PC interface

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

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

Selector 3: PC power-off recognition time

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

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

Selector 5: Escape from phase C

This selector determines whether or not the machine will escape from phase C when it detects an RTC (Return to Control) in non-ECM mode or an RCP (Return to Control Partial page) in ECM mode.

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

At the start of reception, if the machine 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 machine 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 machine 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 machine starts automatic reception of FAX data if in the FAX mode, according to the preset number of ringers).

WSW37 (Function setting 15)

Selector No.	Function	Setting and Specifications
1	Printout of the stored image data of an unsent document onto the error report	0: No 1: Yes
2	Erase of the stored image data of an unsent document at the time of the subsequent in-memory message transmission	0: No 1: Yes
3 8	Not used.	

┆ **Selector 1: Printout of the stored image data of an unsent document onto an error report**

This selector determines whether or not the 1st-page image data of a document will be printed out onto the error report if the document image data stored in the temporary memory cannot be transmitted normally.

┆ **Selector 2: Erasure of the stored image data of an unsent document at the time of the subsequent in-memory message transmission**

If in-memory message transmission fails repeatedly when selector 1 is set to "1," the temporary memory will be occupied with image data. Setting selector 2 to "1" will automatically erase the stored 1st-page image data of an unsent document at the time of the subsequent in-memory message transmission only when recording paper or toner runs out.

WSW38 (Function setting 16)

Selector No.	Function	Setting and Specifications
1 2	Setting of the equalizer	No. 1 2 0 X Automatic 1 0 : Fixed to 4 points 1 1 : Fixed to 16 points
3	Sending level of guard tone at phase 2	0: Normal - 7 db 1: Normal
4	Stepping down the transmission speed at fallback each	0: 2400 bps 1: 4800 bps
5 6	Automatic control of modem's EQM gain for proper transmission speed choice	No. 5 6 0 0 For higher transmission speed than the current setting 0 1 : No change from the current setting 1 0 : For lower transmission speed than the current setting 1 1 : For further lower transmission than the setting made by 1, 0
7	Redialing when a communications error occurs	0: ON 1: OFF
8	Not used.	

NOTE: WSW38 takes effect only in the V. 34 mode.

┆ **Selectors 1 and 2: Setting of the equalizer**

These selectors set the equalizer's training level to be applied if the machine fails to send training due to weak line connection. If these selectors are set to "0, X," the modem will automatically set the appropriate training level.

┆ **Selector 3: Sending level of guard tone at phase 2**

This selector sets the sending level of guard tone for 1800 Hz to be sent at Phase 2 in the V. 34 mode.

┆ **Selector 4: Stepping down the transmission speed at fallback each**

This selector determines how much the modem steps down the transmission speed at fallback when called by the remote station. If this selector is set to "1," the modem may step down the transmission speed from 33600 bps to 28800 bps by one-time fallback.

┆ **Selectors 5 and 6: Automatic control of modem's EQM gain for proper transmission speed choice**

These selectors determine how the modem controls the EQM (Eye Quality Monitor) gain for proper choice of the transmission speed, which applies if the modem selects higher transmission speed than the possible speed so that it always repeats falling back.

WSW39 (Function setting 17)

Selector No.	Function	Setting and Specifications
1 4	First transmission speed choice for fallback	No. 1 2 3 4 No. 5 6 7 8 0 0 0 0 : 2400 bps 0 0 0 1 : 4800 bps 0 0 1 0 : 7200 bps 0 0 1 1 : 9600 bps 0 1 0 0 : 12000 bps 0 1 0 1 : 14400 bps 0 1 1 0 : 16800 bps 0 1 1 1 : 19200 bps
5 8	Last transmission speed choice for fallback	1 0 0 0 : 21600 bps 1 0 0 1 : 24000 bps 1 0 1 0 : 26400 bps 1 0 1 1 : 28800 bps 1 1 0 0 : 31200 bps 1 1 0 1 : 33600 bps 1 1 1 0 : 33600 bps 1 1 1 1 : 33600 bps

NOTE: WSW39 takes effect only in the V. 34 mode.

I Selectors 1 through 8: First and last choices of transmission speed for fallback

These selectors are used to set the modem speed range. With the first transmission speed choice specified by selectors 1 through 4, the machine attempts to establish the transmission link via the modem. If the establishment fails, the machine automatically steps down to the next highest speed and attempts to establish the transmission link again. The machine repeats this sequence while stepping down the transmission speed to the last choice specified by selectors 5 through 8.

If the modem always falls back to a low transmission speed (e.g., 24,000 bps), set the first transmission speed choice to the lower one (e.g., modify it from 31,200 bps to 26,400 bps) in order to deactivate the high-speed modem function and reduce the training time for shorter transmission time.

WSW39 will be limited by selectors 3 through 8 of WSW40.

WSW40 (Function setting 18)

Selector No.	Function	Setting and Specifications			
1 2	Not used.				
3 8	Masking of symbol rate(s)	<div>Not masking Masking</div> <div> No. 3 0 1 3429 symbols/sec No. 4 0 1 3200 symbols/sec No. 5 0 1 3000 symbols/sec No. 6 0 1 2800 symbols/sec No. 7 - - Not used. No. 8 0 1 2400 symbols/sec </div>			

NOTE: WSW40 takes effect only in the V. 34 mode.

I Selectors 3 and 8: Masking of symbol rate(s)

These selectors allow you to limit the transmission speed range in the V. 34 mode by masking the desired symbol rate(s). Transmission speeds assigned to the symbol rates are listed below. The setting made by these selectors will limit the setting made by selectors 1 through 4 of WSW39.

If selector 3 is set to "1" to mask the 3429 symbols/second when the first transmission speed choice is 33600 bps (specified by selectors 1 through 4 of WSW39), for example, the allowable maximum transmission speed will be limited to 31200 bps. If selector 8 is set to "1" to mask the 2400 symbols/second when the first transmission speed choice is 33600 bps, then the allowable maximum transmission speed remains 33600 bps.

If selector 8 is set to "1" to mask the 2400 symbols/second when the first transmission speed choice is 21600 bps (specified by selectors 1 through 4 of WSW39), the allowable maximum transmission speed remains 21600 bps but the minimum transmission speed will be limited to 4800 bps.

Symbol rate	Transmission speed (bps)	Symbol rate	Transmission speed (bps)	Symbol rate	Transmission speed (bps)
2400	2400	3000	4800	3429	4800
	4800		7200		7200
	7200		9600		9600
	9600		12000		12000
	12000		14400		14400
	14400		16800		16800
	16800		19200		19200
	19200		21600		21600
	21600		24000		24000
			26400		28800
2800	4800	3200	4800		31200
	7200		7200		33600
	9600		9600		
	12000		12000		
	14400		14400		
	16800		16800		
	19200		19200		
	21600		21600		
	24000		24000		
	26400		26400		
			28800		
			31200		

WSW41 (Function setting 19)

Selector No.	Function	Setting and Specifications																																																
1 4	Not used.																																																	
5 8	Modem attenuator	<table><tr><td>No.</td><td>5</td><td>6</td><td>7</td><td>8</td><td></td></tr><tr><td></td><td>0</td><td>0</td><td>0</td><td>0</td><td>: -10 dBm</td></tr><tr><td></td><td>0</td><td>0</td><td>0</td><td>1</td><td>: -11 dBm</td></tr><tr><td></td><td>0</td><td>0</td><td>1</td><td>0</td><td>: -12 dBm</td></tr><tr><td></td><td>0</td><td>0</td><td>1</td><td>1</td><td>: -13 dBm</td></tr><tr><td></td><td>0</td><td>1</td><td>0</td><td>0</td><td>: -14 dBm</td></tr><tr><td></td><td></td><td></td><td> </td><td></td><td> </td></tr><tr><td></td><td>1</td><td>1</td><td>1</td><td>1</td><td>: -25 dBm</td></tr></table>	No.	5	6	7	8			0	0	0	0	: -10 dBm		0	0	0	1	: -11 dBm		0	0	1	0	: -12 dBm		0	0	1	1	: -13 dBm		0	1	0	0	: -14 dBm								1	1	1	1	: -25 dBm
No.	5	6	7	8																																														
	0	0	0	0	: -10 dBm																																													
	0	0	0	1	: -11 dBm																																													
	0	0	1	0	: -12 dBm																																													
	0	0	1	1	: -13 dBm																																													
	0	1	0	0	: -14 dBm																																													
	1	1	1	1	: -25 dBm																																													

NOTE: WSW41 takes effect only in the V. 34 mode.

I Selectors 5 through 8: Modem attenuator

These selectors are used to adjust the transmitting level of the modem when the reception level at the remote station is improper due to line loss. This function applies to super G3 protocol signals.

WSW42 (Function setting 20)

Selector No.	Function	Setting and Specifications		
1	Incoming mail server POP* ¹	0:	OFF	1: ON
2	Incoming mail server SMTP* ²	0:	OFF	1: ON
3	Internet-FAX forward function	0:	OFF	1: ON
4	JBIG* ³ coding system	0:	Disabled	1: Enabled
⑤	Alarm message when the corona wire abnormally emits ions	0:	Enabled	1: Disabled
⑥	Issue of a drum cleaning prompting sheet when the corona wire abnormally emits ions	0:	Enabled	1: Disabled
⑦	Issue of a drum cleaning prompting sheet when the specified number of pages has been printed	0:	Enabled	1: Disabled
8	Not used.			

*¹ POP: Post Office Protocol

*² SMTP: Simple Mail Transfer Protocol

*³ JBIG: Joint Bi-level Image Group

NOTE: Selectors 1 through 3 are applicable to those models equipped with LAN interface.

NOTE: Selectors 5 through 7 take effect only when selector 5 of WSW30 is set to "ON" (0).

I **Selector 3: Internet-FAX forward function**

If this selector is set to "ON," the machine may forward a FAX message received through Internet to other remote G3 facsimile equipment.

I **Selector 5: Alarm message when the corona wire abnormally emits ions**

This selector determines whether or not the alarm message "PLS CLEAN DRUM" will appear on the LCD when the corona wire abnormally emits ions.

I **Selector 6: Issue of drum cleaning prompting sheet when the corona wire abnormally emits ions**

This selector determines whether or not a drum cleaning prompting sheet will be printed out when the corona wire abnormally emits ions. The sheet prompts the user to clean the corona wire of the laser-sensitive drum.

I **Selector 7: Issue of a drum cleaning prompting sheet when the specified number of pages has been printed**

This selector determines whether or not a drum cleaning prompting sheet will be printed out when the specified number of pages has been printed (that is, when it is assumed that the corona wire becomes dirty). The sheet prompts the user to clean the corona wire of the laser-sensitive drum.

WSW43 (Function setting 21)

Selector No.	Function	Setting and Specifications
1	Addition of a header (station ID) to FAX images to be sent to PCs having e-mail addresses	0: Yes 1: No
2 3	Wait time for PCFax reception (Class 2) and FPTS command transmission	No. 2 3 0 0 : 50 ms 0 1 : 100 ms 1 0 : 150 ms 1 1 : 0 ms
4 5	Detection time of 2100 Hz CED or ANSam	No. 4 5 0 0 : 200 ms 0 1 : 300 ms 1 0 : 400 ms 1 1 : 500 ms
6 8	Not used.	

NOTE: Selector 1 is applicable to those models equipped with LAN interface.

[B] Printout of firmware switch data

n Function

The machine 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 machine prints out the configuration list as shown in the figure below.
- (3) Upon completion of printing, the machine returns to the initial stage of the maintenance mode.

CONFIGURATION LIST

MODEL : 8C5-405
TIME : 01/02/1999 20:55
REV. : U9910061104VER.0
PCI : 5.00
SUM : 322F

```
WSW01 = 00000000
1-2. DIAL FORMAT : NORMAL
3-4. BREAK TIME : 60 MS
5-6. INTERDIGIT PAUSE : 800 MS
7. DP/PB CHANGE IN USER SW : YES
8. DP/PB FIXING SELECTION : PB
WSW02 = 1111010
1-2. ON TIME : 100 MS
3-4. OFF TIME : 140 MS
5-8. LINE BEEP ATTENUATOR : 10 DB
WSW03 = 10000000
1. PARA. CNG DETECTION2 : B
2-4. NOT USED
5. PARA. CNG DETECTION1 : A
6-8. NOT USED
WSW04 = 00010111
1-6. NOT USED
7-8. FLASHING TIME : 500 MS
WSW05 = 00000110
1-3. DIAL TONE DETECTION : 3.5 SEC WAITING
4. REMOTE ID DETECTION TIMEOUT : 2 SEC
5-6. BUSY TONE DETECTION (CALLING) : AFTER DIALING
7. BUSY TONE DETECTION (CALLED) : OFF
8. NOT USED
WSW06 = 00101100
1-3. PAUSE KEY : 3.5 SEC WAITING
4-6. 2ND DT DETECTION TIME : 800 MS
7. 2ND DT DETECTION CYCLE : 1 CYCLE
8. 2ND DT INTERRUPT DETECTION TIME : 30 MS
WSW07 = 01001100
1-2. FREQUENCY RANGE : INITIAL DATA
3. NOT USED
4-6. 2ND DT DETECTION LEVEL : -30 DBM
7. 1ST DT INTERRUPT DETECTION TIME : 30 MS
8. NOT USED
WSW08 = 01100100
1-3. 1ST DT DETECTION TIME : 800 MS
4-5. 1ST/2ND DT TIME OUT : 10
6-8. 1ST DT DETECTION LEVEL : -33 DBM
WSW09 = 00000000
1. ECM FRAME : 256 OCTET
2. NON STANDARD FACILITIES : ON
3-4. TIMES OF FALL BACK : 4
5. T5 TIMER : 300 SEC
6. T1 TIMER : 35 SEC
7-8. CALLING TIMEOUT : 55 SEC
WSW10 = 00010100
1. NOT USED
2. TIMING OF LAST DIGIT-MODEM CHANGE : 100 MS
3. TIMING OF CML ON CNG TRANSMISSION : 2 SEC
4. TIMING OF CML ON CED TRANSMISSION : 2 SEC
5-6. TRAINING RETRIES : 2
7. CODING METHOD MR : ON
8. CODING METHOD MMR : ON
WSW11 = 01011000
1-2. FREQUENCY RANGE : INITIAL DATA
3. NOT USED
4-8. ON/OFF TIME : 175 - 600 / 175 - 600 MS
WSW12 = 10010111
1-2. OFF DETECTION TIME : 700 MS
3-4. AUTO ANS OFF DETECTION TIME : 7 SEC
5-6. ON DETECTION TIME : 250 MS
7-8. NOT USED
```

9 20:55
04VER.0

20:55
4VER.0

20:55
4VER.0

```
WSW24 = 01000010
1-2. NOT USED
3-4. DELAY OF CML ON-OGM : 4 SEC
5-8. NOT USED
```

```
2. DELETE AN IMAGE ON XMIT REPORT AT NEXT TX : OFF
3-8. NOT USED
WSW38 = 00010100
1-8. NOT USED
WSW39 = 11110000
1-8. NOT USED
```

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.

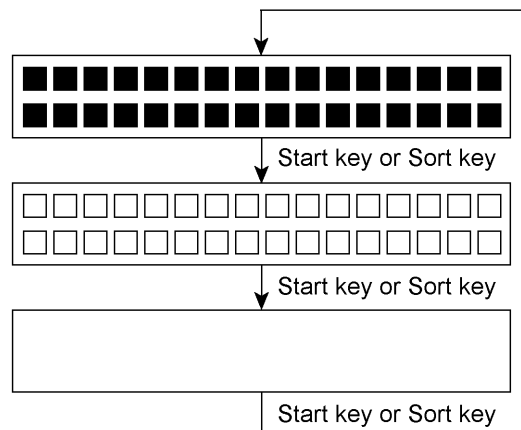
n Operating Procedure

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

The LCD shows

- (2) For machines w/ fax: Press the **Start** key. Each time you press the **Start** key, the LCD cycles through the displays shown at right.

For machines w/o fax: Press the **Sort** key. Each time you press the **Sort** key, the LCD cycles through the displays shown at right.



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

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.

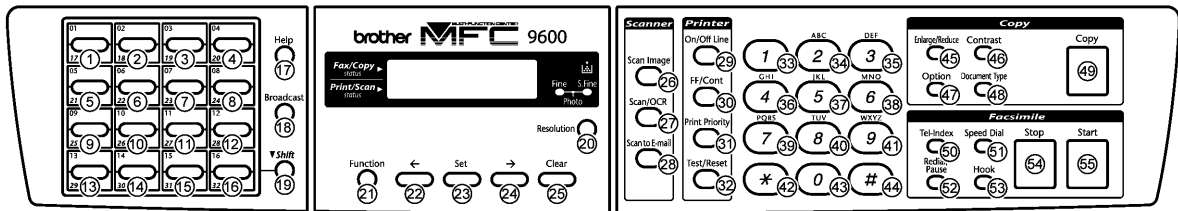
The LCD shows the corresponding number in decimal notation each time a key or button is pressed. Check that the displayed number is correct by referring to the illustration below.

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

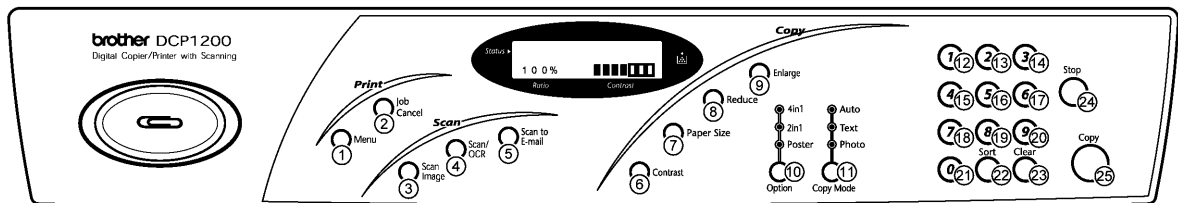
- (3) After the last number key or button is pressed, the machine beeps and returns to the initial stage of the maintenance mode.

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

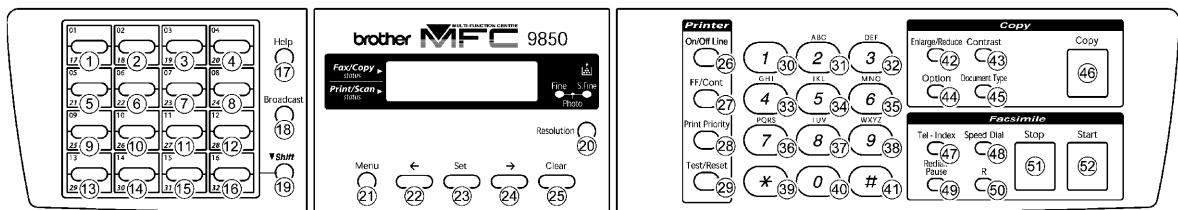
MFC9600



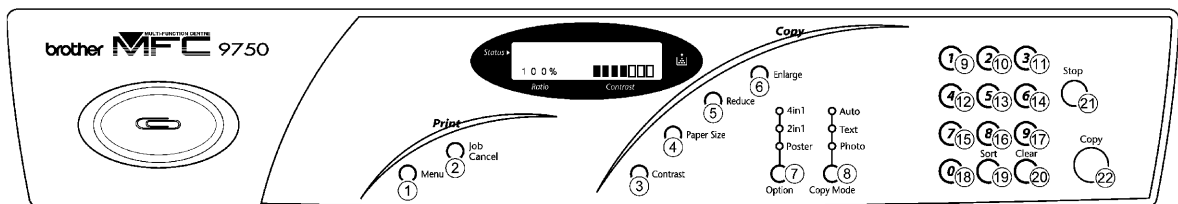
DCP1200



MFC9850/9870



MFC9750



Key & Button Entry Order

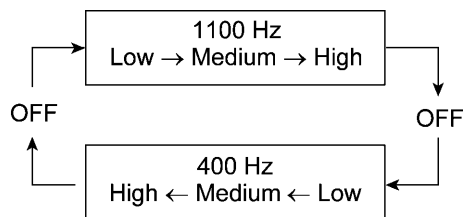
3.8 Sensor Operational Check

n Function

This function allows you to check whether the eight sensors--document front sensor, document rear sensor, cover sensor, registration sensor, toner sensor, paper ejection sensor, manual insertion sensor, and cassette sensor--operate correctly.

n Operating Procedure

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



NOTE: For models w/ fax: To stop beeping, press the **Function/Menu** key.
For models w/o fax: To stop beeping, press the **Menu** key.

If the sensing status are as listed below, the LCD will show the following:

"DFDRCVRSTNPOFHR2" and "MNCSC2" (which can be switched by pressing the **Start** key for machines w/ fax or the **Sort** key for machines w/o fax)

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

LCD	Sensors	Sensing status
DF	Document front sensor	No document detected.
DR	Document rear sensor	No document detected.
CV	Cover sensor	Front cover closed.
RS	Registration sensor	No paper detected.
TN	Toner sensor	No toner detected.
PO	Paper ejection sensor	No paper jam.
FH	CCD HP sensor	CCD placed in home position
R2	2nd registration sensor*	No paper detected.
MN	Manual insertion sensor	No paper detected.
CS	Cassette sensor	No paper cassette loaded.
C2	2nd cassette sensor*	No paper cassette loaded.

(*These error indications will always be displayed in models not equipped with a 2nd paper cassette.)

- (2) Change the detecting conditions (e.g., insert paper through the document sensors or the registration sensor(s), open the front cover, remove the toner cartridge, jam paper at the paper outlet, insert paper manually through the paper slot, and load the paper cassette(s)), and then check that the indication on the LCD changes according to the sensor states.
- (3) To stop this operation and return the machine to the initial stage of the maintenance mode, press the **Stop** key.

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

3.9 CCD Scanner Area Setting

n Function

The machine sets the CCD 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 machine checks and sets the area to be scanned.
If no error is noted, the machine returns to the initial stage of the maintenance mode.
If any error is noted, the "SCANNER ERROR" will appear on the LCD. To return the machine to the initial stage of the maintenance mode, press the **Stop** key.

3.10 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., 1001 in the case of MFC9600 USA version) appears.
- (2) Enter the desired customizing code (e.g., 0002 in the case of MFC9600 Canadian version).
The newly entered code appears.
NOTE: If a wrong 4-digit code is entered, the machine will malfunction.
- (3) For machines w/ fax: Press the **Start** key.
For machines w/o fax: Press the **Sort** key.
The machine 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 machine stops the procedure and returns to the initial stage of the maintenance mode.

3.11 Erasure of Received FAX Messages Temporarily Stored in the Flash Memory (Not applicable to the American version)

n Function

This function erases received FAX messages which are temporarily stored in the flash memory so that they will not be lost by powering off the equipment. This function also erases activity report data stored in the flash memory.

n Operating Procedure

- (1) Press the **7** and **9** keys in this order in the initial stage of the maintenance mode.
The machine shows the "BACKUP CLEAR" on the LCD and erases received FAX messages temporarily stored in the flash memory.
Upon completion of erasure, the machine will automatically return to the initial stage of the maintenance mode.

3.12 Machine 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 ERROR X X."
- (2) To stop this operation and return the equipment to the initial stage of the maintenance mode, press the **Stop** key.

3.13 Output of Transmission Log to the Telephone Line (Not applicable to machines w/o fax)

n Function

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

n Operating Procedure

- (1) If the user's machine has a transmission-related problem, call the user's machine at a remote location from your machine.
- (2) If the line is connected, have the user perform the following:
 - 1) American models: Press the **Function**, **Resolution**, and **0** keys in this order.
European models: Press the **Menu**, **Resolution**, and **0** keys in this order.
 - 2) Press the **8** and **7** keys.The above operation makes the user's machine send CNG to your machine for sending the transmission log.
- (3) If you hear the CNG sent from the user's machine, press the **Start** key of your machine.
Your machine will start to receive the transmission log from the user's machine.

3.14 Cancellation of the Memory Security Mode (Not applicable to the American versions and machines w/o fax)

n Function

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

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

n Operating Procedure

- (1) When the SECURE MODE is displayed on the LCD, hold down the **Menu** key and press the **#** key. Within two seconds, start to press the **2**, **7**, **9**, **0**, and **0** keys.
The memory security mode will be canceled and the machine returns to the calendar clock screen.

CHAPTER VI.

ERROR INDICATION AND TROUBLESHOOTING

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 machine incorporates the self-diagnostic functions which display error messages for machine errors and communications errors. (Note that machines w/o fax do not support error messages for communications errors.)

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

1.1 Machine Errors

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

To display detailed error information, use the maintenance-mode function code 82 described in Chapter V, Section 3.12 (that is, make the machine enter the maintenance mode and then press the **8** and **2** keys). Following the MACHINE ERROR, one of the error codes listed in [2] will appear on the LCD.

[1] Error messages on the LCD

Messages on the LCD	Probable Cause
CHANGE DRUM SOON	The service life of the drum unit will expire soon. This message appears for one minute. (You can turn this message indication on or off by the maintenance-mode function code 10, WSW31, selector 8. Refer to Chapter V, Section 3.5.)
CHECK CASSETTE CHECK CASSETTE#1 CHECK CASSETTE#2	The cassette sensor detects that no paper cassette is loaded. (For those models available with a 2nd paper cassette, the "CHECK CASSETTE#1" or "CHECK CASSETTE#2" will appear if the cassette sensor or the 2nd cassette sensor does not detect paper cassette, respectively. If both sensors detect no cassette, the "CHECK CASSETTE" will appear.)
CHECK PAPER CHECK PAPER#1 CHECK PAPER#2	Even after paper pick-up operation, the manual insertion sensor does not detect paper. (For those models available with a 2nd paper cassette, the "CHECK PAPER#1" or "CHECK PAPER#2" will appear if the manual insertion sensor or 2nd registration sensor does not detect paper, respectively. If both sensors detect no paper, the "CHECK PAPER" will appear.)
CHECK SCAN LOCK	The output of the CCD HP sensor does not change because: 1) The CCD lock is placed in the lock (backward) position, 2) The CCD HP sensor is defective, or 3) The CCD motor is defective.

Messages on the LCD	Probable Cause
CLEAN UP SCANNER	In the scanning compensation data list printed by the maintenance-mode function code 05 (refer to Chapter V, Section 3.2), less than fifty percent of the white level data is faulty. (This message may appear only in the maintenance mode.)
COOLING DOWN	The controller, which monitors the internal resistance of the incasing temperature sensor (thermistor) and heater thermistor, has detected that the temperature inside the machine or the heater temperature exceeded the specified level. If either temperature exceeds the preset level, recording is no longer possible.
COVER OPEN	The cover sensor detects that the front cover is not closed.
DOCUMENT JAM	<p>n Document jam</p> <p>(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 after the document has been fed by the registered length.)</p> <p>(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.)</p>
	<p>n Document loading error</p> <p>(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.)</p> <p>(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.)</p>
MACHINE ERROR XX	"XX" indicates an error code. Refer to [2] on pages VI-4 and VI-5.
PLS CLEAN DRUM	<p>In either of the following cases, this message appears, prompting the user to clean the corona wire of the laser-sensitive drum.</p> <ul style="list-style-type: none"> - When the specified number of pages has been printed after the replacement of the laser-sensitive drum. - When the corona wire abnormally emits ions. (This happens if the corona wire becomes dirty, superimposing noise components on toner sensor signals.)

Messages on the LCD	Probable Cause
PLS OPEN COVER	<p>To display the relating detailed error code, use maintenance-mode function code 82. (Refer to Chapter V, Section 3.12.)</p> <p>If this message appears, open and close the front cover. The message may disappear if opening/closing the front cover removes the error. If the error persists, the "MACHINE ERROR XX" will appear.</p>
PRINTER JAM	<p>(1) The paper ejection sensor stays OFF even after the registration sensor has gone OFF and the paper has been fed by the specified amount.</p> <p>(2) The paper ejection sensor stays ON even after it has come ON and the paper has been fed by the specified amount.</p>
SCANNER ERROR	<p>In the scanning compensation data list printed by the maintenance-mode function code 05 (refer to Chapter V, Section 3.2), fifty percent or more of the white level data is faulty.</p> <p>(This message may appear only in the maintenance mode.)</p>
TONER EMPTY	<p>The toner sensor has detected that there is no toner in the cartridge or that no toner cartridge is loaded. If this message appears, recording is no longer possible.</p>
TONER LOW	<p>The toner sensor has detected that there is not enough toner.</p>

If only an alarm beep is heard without any message on the LCD when the machine is powered up, the ROM or RAM will be defective.

[2] Error codes shown in the "MACHINE ERROR X X " message

Error Code <u>X</u> <u>X</u> (Hex.)	Error factor
(71	Polygon motor does not synchronize with the reference clock.)
(72	Cannot detect Beam Detect signal.)
(73	No toner cartridge loaded.)
(74	Toner empty.)
(75	In-casing temperature error.)
(76	Heater harness disconnected or broken.)
(77	Heater thermistor short circuit.)
(78	Heater thermistor harness disconnected or broken.)
(79	In-casing temperature sensor harness disconnected or broken.)
(7A	Main motor does not synchronize with the reference clock.)
(7B	ASIC error on the main PCB.)
(7C	Engine PCB error.)
(80	Paper size setting error.)
(82	Paper feeding error.)
(83	Paper jam. The registration sensor, 2nd registration sensor, and/or manual insertion sensor remains ON.)
(84	Paper jam. The paper ejection sensor remains ON.)
(85	No paper cassette loaded.)
(86	No 2nd paper cassette loaded.)
(88	Paper jam. Even after the registration sensor has gone OFF, the paper ejection sensor still stays OFF.)
(A1	Front cover opened.)
(A2	Document too long to scan.)
(A3	Document not detected by the document rear sensor.)
(A4	50% or more faulty of white level data.)
(A7	One-line feeding timeout error.)
(A8	One-line scanning timeout error.)
(A9	Abnormal scanning reference voltage.)
(AC	Less than 50% faulty of white level data.)

Error codes in parentheses do not appear in the "MACHINE ERROR X X", since those errors are displayed as messages described in "[1] Error messages on the LCD." In the maintenance mode (Function code 82), those error codes may be displayed.

Error Code X X (Hex.)	Error factor
(AE	The CCD HP sensor sticks to OFF, indicating that the CCD unit has not returned to the home position.)
(AF	The CCD HP sensor sticks to ON, indicating that the CCD unit has stayed in the home position.)
(B1	Dark level offset data error.)
(B2	Gain control data error.)
(B3	Scan area left edge detection error.)
(B4	Scan area right edge detection error.)
(B7	A/D converter reference voltage error (at High level).)
(B8	A/D converter reference voltage error (at Low level).)
(BA	Magnification error for substantial white level data.)
(BB	Substantial white level data error in black & white mode.)
(BC	Substantial white level data error in photo mode.)
(BD	Black level data error.)
(BE	Detection error of black mark.)
(BF	Detection error of ADF scanning position.)
(D5	The MODEM fails to complete the command transmission sequence.)
(E4	Out of recording paper.)
E6	Write error in EEPROM.
(E8	Data scanning error during transmission.)
(EA	Document removed in phase B.)
(F5	EOL not found in page memory transmission mode.)
(F6	PC interface error.)

Error codes in parentheses do not appear in the "MACHINE ERROR X X", since those errors are displayed as messages described in "[1] Error messages on the LCD." In the maintenance mode (Function code 82), those error codes may be displayed.

1.2 Communications Errors (Not applicable to machines w/o fax)

If a communications error occurs, the machine

- ① emits an audible alarm (intermittent beeping) for approximately 4 seconds,
- ② displays the corresponding error message, and
- ③ prints out the transmission verification report if the machine is in sending operation.

n Definition of Error Codes on the Communications List

(1) Calling

Code 1	Code 2	Causes
10	08	Wrong number called.
10	20	Retrieval file error.
10	21	Image data entry error.
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.
1A	01	Calling impossible due to memory full.

*Available in German versions only.

(2) Command reception

Code 1	Code 2	Causes
20	01	Unable to detect a flag field.
20	02	Carrier was OFF for 200 ms or longer.
20	03	Abort detected ("1" in succession for 7 bits or more).
20	04	Overrun detected.
20	05	A frame for 3 seconds or more received.
20	06	CRC error in answerback.
20	07	Undefined command received.
20	08	Invalid command received.
20	09	Command ignored once for document setting or for dumping-out at turn-around transmission.
20	0A	T5 timeout error
20	0B	CRP received.

Code 1	Code 2	Causes
20	0C	EOR and NULL received.
20	0D	Effective command not received.
20	10	Unable to reserve a command receiver memory.
20	11	Image data file error.

(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	Timeout: Five seconds or more for one-line transmission.
A0	16	RTC not found and carrier OFF signal detected for 6 seconds.
A0	17	RTC found but no command detected for 60 seconds.
A0	18	Receive buffer full during receiving into memory.
A0	19	Unable to obtain compressed image data to be sent in phase C.
A8	01	RTN, PIN, or ERR received at the calling terminal.*
A9	01	RTN, PIN, or ERR received at the called terminal.*

* Available in German versions only

(11) General communications-related

Code 1	Code 2	Causes
B0	02	Unable to receive the next-page data.
B0	03	Unable to receive polling even during turn-around transmission due to call reservation.
B0	04	PC interface error.
BF	01	Transmission canceled by pressing the Stop key (before completion of the G3 FAX negotiation).
BF	02	Transmission canceled by pressing the Stop key (after completion of the G3 FAX negotiation).
BF	03	Transmission canceled due to a scanning error.

(12) Transmission in V. 34 mode

Code 1	Code 2	Causes
C0	01	No common modulation mode or failed to poll.
C0	02	Unable to detect JM.
C0	03	Unable to detect CM.
C0	04	Unable to detect CJ.
C0	10	Cannot finish V. 34 negotiation or training.
C0	11	Modem error detected during V. 34 negotiation or training. (For modem error details, refer to the table below.)
C0	20	Modem error detected during sending of commands. (For modem error details, refer to the table below.)
C0	21	Modem error detected during receiving of commands. (For modem error details, refer to the table below.)
C0	22	Control channel connection time-out.
C0	30	Modem error detected during sending of video signals. (For modem error details, refer to the table below.)
C0	31	Modem error detected during receiving of video signals. (For modem error details, refer to the table below.)

Modem error details (Code 3)

Code 3	Causes
21	Timeout waiting for INFO0.
22	Checksum error in INFO0.
23	Timeout waiting for tone A or B.
24	Timeout waiting for first phase reverse.
25	Timeout waiting for probing cut-off tone.
26	Timeout waiting for second phase reverse.
27	Timeout waiting for end of probing.
28	Timeout waiting for third phase reverse.
29	Timeout waiting for INFO1.
2A	Checksum error in INFO1.
2B	Tone detected preceding INFO0.
2C	Unexpected INFO0 detected.
31	Timeout waiting for turning off the receive control channel.
91	Error occurred in the first CC train.
92	Timeout waiting for PPh.
93	Tone A/B detected in the CC retrain.
94	Timeout waiting for ALT.
95	ACH found.
96	FED turned off during reception of CC data.
97	Timeout waiting for turning off the CC.
A1	Retraining forced for problems not fixed in phase 2.
B0	Problem with S-sequence of HDX-resync.
B1	FED turned off in the S-sequence of HDX-resync.
B2	S-sequence finished before prediction in HDX-resync.
B3	Timeout waiting for S-Sbar in HDX-resync.
B4	Timeout waiting for S-Sbar in HDX-resync.
B5	Timeout waiting for S in HDX-resync.
B6	Timeout waiting for synchronization with PP.
C0	Problem with S-sequence in phase 3.
C1	FED turned off in the S-sequence in phase 3.

Code 3	Causes
C2	S-sequence finished before prediction in phase 3.
C3	Timeout waiting for S-Sbar in phase 3.
C4	Timeout waiting for S-Sbar in phase 3.
C5	Timeout waiting for S in phase 3.
C7	Training after TRN failure.
D0	Problem with S-sequence in phase 4.
D1	FED turned off in S-sequence in phase 4.
D2	S-sequence finished before prediction in phase 4.
D3	Timeout waiting for S-Sbar in phase 4.
D4	Timeout waiting for S-Sbar in phase 4.
D5	Timeout waiting for S in phase 4.
D6	Timeout waiting for MP.
D8	Timeout waiting for E.
DA	Timed out in re-negotiation of the transmitter rate.
DB	Timed out in the transmitter MPh.
E2	Retraining detected in phase 2.
E3	Retraining detected in phase 3.
E4	Retraining detected in phase 4.
FE	DTR turned off during retraining.
FF	Tx set-abort flag.
71	Did not write onto the first mapping frame.

(13) 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.
E0	03	Failed to detect commands from the RS-232C in burn-in operation.

(14) Machine error

Code 1	Code 2	Causes
FF	00	Burn-in operation canceled by pressing the Stop key.
FF	FF	Unrecoverable MODEM error.

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 machine. It is impossible to anticipate all of the possible problems which may occur in future and determine the troubleshooting procedures, so this section covers some sample problems. However, those samples will help service personnel pinpoint and repair other defective elements if he/she analyzes and examines them well.

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 32.5°C) with normal relative humidity (20 to 80%).
- (3) The machine is not subjected to rapid change of the ambient temperature. (Moving the machine from a cold place to warm place will cause condensation inside the machine. If it takes place, leave the machine in the warm place for approx. two hours before turning on the power.) Powering on the machine with dew condensation will result in damaged electronic devices.
- (4) 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 $\pm 10\%$.
- (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.

2.4 Troubleshooting Procedures

[1] Control panel related

Trouble	Check:
(1) LCD shows nothing.	<ul style="list-style-type: none"> Panel harness between the control panel PCB and relay PCB Main-relay (panel) harness between the relay PCB and main PCB Control panel PCB Low-voltage power supply PCB Main PCB LCD
(2) Control panel inoperative.	<ul style="list-style-type: none"> Panel harness between the control panel PCB and relay PCB Main-relay (panel) harness between the relay PCB and main PCB Control panel PCB FPC key Main PCB

[2] Telephone related

Trouble	Check:
(1) No phone call can be made.	<ul style="list-style-type: none"> FPC key Control panel PCB NCU PCB Main PCB
(2) Speed dialing or one-touch dialing will not work.	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Ordinary dialing function (other than the on-hook dialing with the hook key) If it works normally, proceed to the following checks; if not, refer to item (1) above.
(4) Dial does not switch between tone and pulse.	<ul style="list-style-type: none"> Main PCB
(5) Telephone does not ring.	<ul style="list-style-type: none"> Speaker NCU PCB Main PCB

[3] Communications related

Trouble	Check:
(1) No tone is transmitted.	<ul style="list-style-type: none"> Main PCB NCU PCB

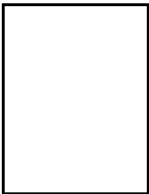

[4] Paper/document feeding related

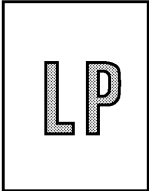
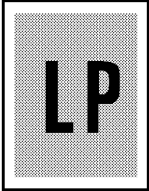
Trouble	Check:
(1) Neither "COPY: PRESS COPY" nor "FAX: NO. & START" message appears although documents are set.	<ul style="list-style-type: none"> Sensors by using the maintenance-mode function code 32. (Refer to Chapter V, Subsection 3.8.) Document front sensor actuator and document rear sensor actuator Main PCB
(2) Document not fed.	<ul style="list-style-type: none"> ADF and its related sections ADF motor and its harness Document feed roller and its related gears Main PCB
(3) Document double feeding	<ul style="list-style-type: none"> ADF parts
(4) Document jam	<ul style="list-style-type: none"> ADF motor
(5) Recording paper not fed.	<ul style="list-style-type: none"> Paper loaded in the paper cassette(s) Paper cassette(s) Drum unit Heat-fixing unit Drive gear ASSY Engine PCB Main PCB
(6) Recording paper double feeding	<ul style="list-style-type: none"> Separation pad on the paper cassette(s)

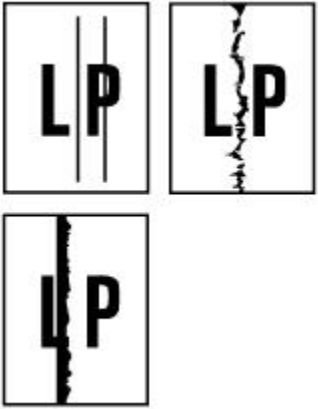
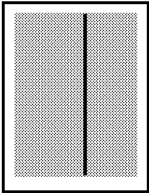

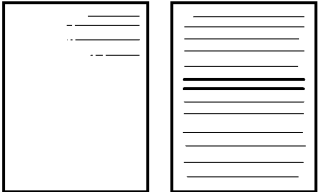
[5] Print-image related

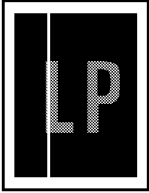
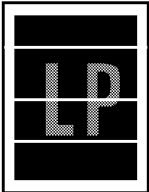
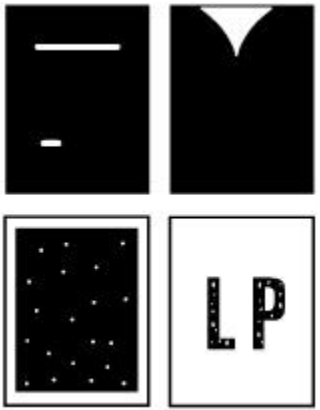
If the received or sent image has any problem, first make a copy with the machine.

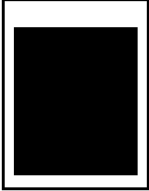
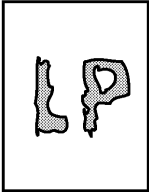
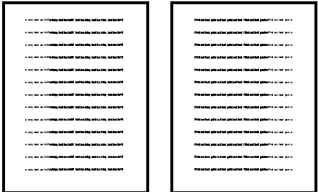
If the copied image is normal, the problem may be due to the remote terminal; if it is abnormal, proceed to the following checks:


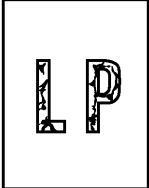
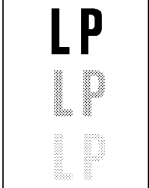
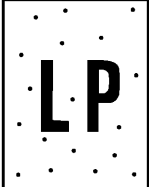
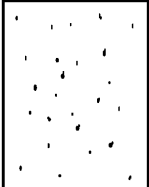
Trouble	Action to be taken
<p>(1) Completely blank</p> 	<p><u>At the scanner</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> - CCD flat cable - CCD unit - Main PCB <p><u>At the printer side</u></p> <ul style="list-style-type: none"> Clean the high-voltage contacts for the developer roller on the drum unit, main cover, and high-voltage power supply PCB. (Contacts f in the illustration given on page VI-27) Clean the grounding contacts on the drum unit, main cover, and high-voltage power supply PCB. (Contacts \bullet in the illustration given on page VI-27) Replace the toner cartridge. Replace the drum unit. Check the connection of the laser flat cable on the main PCB. Replace the main PCB. Replace the laser unit. Replace the high-voltage power supply PCB.
<p>(2) All black</p> 	<p><u>At the scanner</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> - CCD flat cable - CCD unit - Main PCB <p><u>At the printer side</u></p> <ul style="list-style-type: none"> Clean the high-voltage contacts for the grid and charger on the drum unit, main cover, and high-voltage power supply PCB. (Contacts ,, and , in the illustration given on page VI-27) Clean the charger (corona wires) itself. Check the connection of the laser flat cable on the main PCB. Replace the drum unit. Replace the high-voltage power supply PCB. Replace the main PCB.

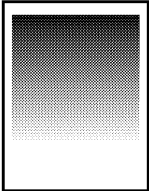
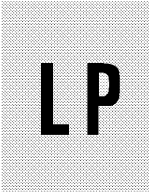

Trouble	Action to be taken
<p>(3) Light</p> 	<p><u>At the scanner</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> - CCD unit - Main PCB <p><u>At the printer side</u></p> <ul style="list-style-type: none"> Replace the toner cartridge with a new one and print 4 to 5 pages. If the problem persists, proceed to the next step. Remove the toner cartridge and start printing. If printing takes place, clean the toner sensors (LED and light-receiver), check the sensor harnesses, and then replace the toner sensor PCBs. Clean the high-voltage contacts for the transfer roller on the drum unit, main cover, and high-voltage power supply PCB. (Contacts ... in the illustration given on page VI-27) Clean the high-voltage contacts for the developer roller on the drum unit, main cover, and high-voltage power supply PCB. (Contacts f in the illustration given on page VI-27) Clean the grounding contacts on the drum unit and main cover. (Contacts • in the illustration given on page VI-27) Check the connection of the main PCB and high-voltage power supply PCB. Replace the drum unit. Replace the high-voltage power supply PCB. Replace the engine PCB. Replace the main PCB. Replace the laser unit.
<p>(4) Dark</p> 	<p><u>At the scanner</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> - CCD unit - Main PCB <p><u>At the printer side</u></p> <ul style="list-style-type: none"> Slide the wire cleaner to clean the corona wire inside the drum unit. Clean the high-voltage contacts for the grid and charger on the drum unit, main cover, and high-voltage power supply PCB. (Contacts „ and , in the illustration given on page VI-27) Replace the toner cartridge. Replace the drum unit. Replace the high-voltage power supply PCB. Replace the main PCB. Replace the engine PCB.

Trouble	Action to be taken
<p>(5) Black and blurred vertical stripes or band</p> 	<p><u>At the scanner</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> - CCD unit <p><u>At the printer side</u></p> <ul style="list-style-type: none"> ▮ Clean the paper path which may be contaminated with toner. ▮ Slide the wire cleaner to clean the corona wire inside the drum unit. ▮ Make sure that the wire cleaner is returned to its home position. ▮ Replace the toner cartridge. ▮ Replace the drum unit. ▮ Replace the heat-fixing unit.
<p>(6) Black vertical streaks on gray background</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> ▮ Clean the laser beam window (glass) on the laser unit. ▮ Replace the laser unit.
<p>(7) Black and blurred horizontal stripes</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> ▮ Slide the wire cleaner to clean the corona wire inside the drum unit. ▮ If the horizontal stripes appear at 39-mm intervals, replace the toner cartridge. ▮ If they appear at 94-mm intervals, replace the drum unit. ▮ If they appear at 79-mm intervals, replace the heat-fixing unit. ▮ Clean the grounding contacts. (Contacts • in the illustration given on page VI-27.) ▮ Replace the high-voltage power supply PCB.
<p>(8) Horizontal lines</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> ▮ Check the connection between the right end of the paper feed roller and the grounding wire. (Contact ‡ in the illustration given on page VI-28.)

Trouble	Action to be taken
<p>(9) White vertical streaks</p> 	<p><u>At the scanner</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> - CCD unit <p><u>At the printer side</u></p> <ul style="list-style-type: none"> Clean the laser beam window on the laser unit. Replace the toner cartridge. Replace the drum unit.
<p>(10) White horizontal stripes</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> Replace the drum unit.
<p>(11) Dropout, white spots, or hollow print</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> Check the connection of the main PCB and high-voltage power supply PCB. Replace the toner cartridge. Gently wipe off the surface of the photo-sensitive drum with a cotton swab. Replace the drum unit. Replace the high-voltage power supply PCB.

Trouble	Action to be taken
<p>(12) Faulty image registration (Leading edge of image starts too late on paper)</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> Instruct the user not to load paper exceeding the limit on the paper cassette(s). Instruct the user to use the recommended types of paper. Replace the paper cassette(s). Check the position of the registration sensor. Replace the drive gear ASSY.
<p>(13) Image distortion or improper image alignment</p> 	<p><u>In communications</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> - Error code displayed. (Refer to Section 1, "ERROR INDICATION" in this chapter.) - NCU PCB - Main PCB <p><u>At the scanner</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> - ADF unit - CCD motor and its harness - Main PCB <p><u>At the printer side</u></p> <ul style="list-style-type: none"> Check that the laser unit is secured with the screws without looseness. Check the connection of the polygon motor harness on the engine PCB. Check the connection of the laser flat cable on the main PCB. Replace the laser unit.
<p>(14) Blurred at either side</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> Check that the machine is placed on a flat surface. Shake the toner cartridge horizontally. If the problem persists, replace it. Clean the laser beam window (glass) on the laser unit. Replace the laser unit.

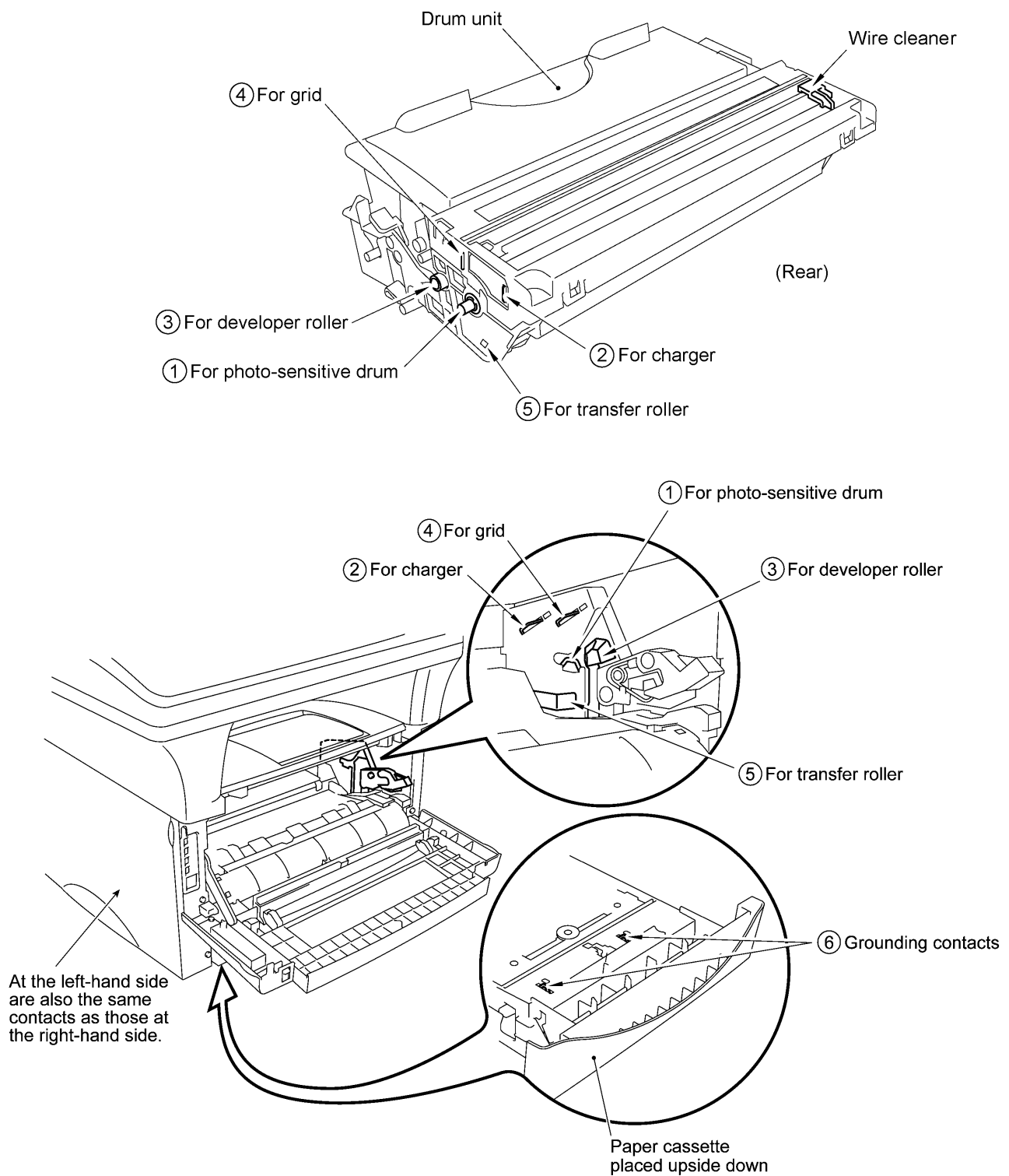
Trouble	Action to be taken
<p>(15) Dirt back of paper</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> Clean the pressure roller in the heat-fixing unit. Replace the heat-fixing unit. Replace the drum unit. Replace the high-voltage power supply PCB.
<p>(16) Poor fixing</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> Instruct the user to use paper of the recommended weight (less than 36 lb./m²). Clean the toner sensors (LED and light-receiver). Replace the toner cartridge. Replace the drum unit. Check the fitting of the heater thermistor. Replace the heat-fixing unit. Replace the low-voltage power supply PCB.
<p>(17) Ghost</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> Instruct the user to use paper of the recommended weight (less than 36 lb./m²). Replace the drum unit. Replace the high-voltage power supply PCB.
<p>(18) Black spots</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> Gently wipe off the surface of the photo-sensitive drum with a cotton swab. Replace the drum unit. Replace the heat-fixing unit. Replace the high-voltage power supply PCB.
<p>(19) Light rain</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> Replace the drum unit. Replace the high-voltage power supply PCB.

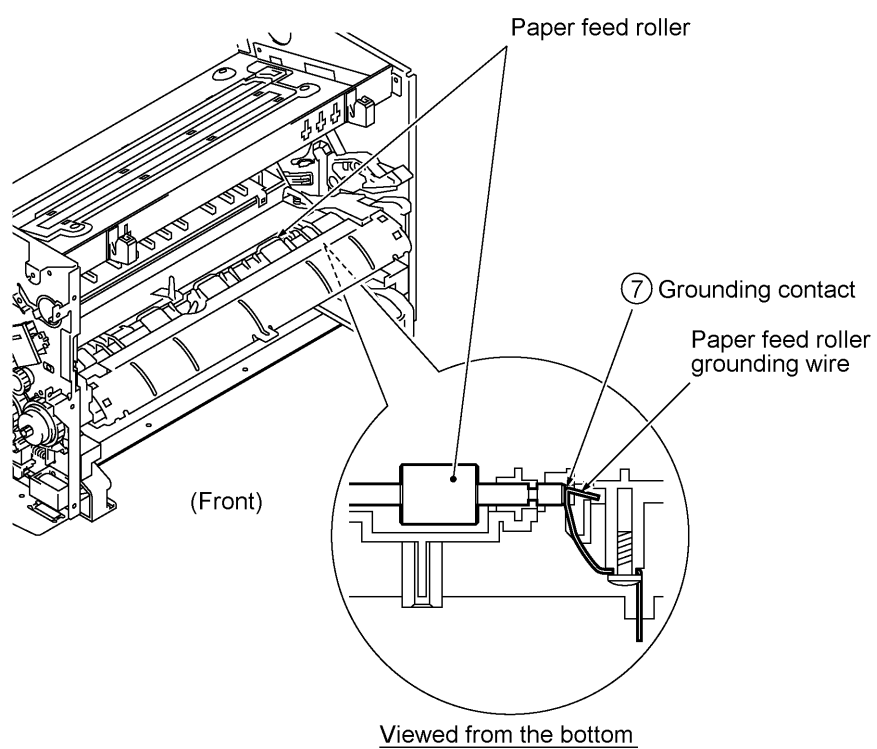
Trouble	Action to be taken
(20) Fading (black to white) 	<u>At the printer side</u> <ul style="list-style-type: none"> Replace the toner cartridge. Replace the high-voltage power supply PCB.
(21) Gray background 	<u>At the printer side</u> <ul style="list-style-type: none"> Instruct the user to use paper of the recommended weight (less than 36 lb./m²). Clean the toner sensors (LED and light-receiver). Check the toner sensor harnesses. Replace the toner cartridge. Replace the drum unit. Replace the high-voltage power supply PCB.
(22) Toner specks 	<u>At the printer side</u> <ul style="list-style-type: none"> Instruct the user to use paper of the recommended weight (less than 36 lb./m²). Replace the toner cartridge. Replace the drum unit.

[6] PC-driven or video capture-driven printing

Trouble	Check:
(1) PC-driven printing is impossible.	<ul style="list-style-type: none"> Interface with the host computer PC interface cable Main PCB Centronics interface
(2) Video capture-driven printing is impossible	<ul style="list-style-type: none"> VC connector PCB Main PCB Centronics interface
(3) Video printing is impossible.	<ul style="list-style-type: none"> VC connector PCB Main PCB

Location of High-voltage Contacts and Grounding Contacts





MFC9600/DCP1200
MFC9750/MFC9850/MFC9870

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) For machines w/ fax: American models: To make the equipment enter the maintenance mode, press the **Function**, *, **2**, **8**, **6**, and **4** keys in this order.

← Within 2 seconds →

European models: To make the equipment enter the maintenance mode, press the **Menu**, *, **2**, **8**, **6**, and **4** keys in this order.

← Within 2 seconds →

For machines w/o fax: To make the equipment enter the maintenance mode, press the **Menu**, **0**, **2**, **8**, **6**, and **4** keys in this order.

← Within 2 seconds →

The equipment beeps for approx. one second and displays “■■ MAINTENANCE ■■■” on the LCD.

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

The current customizing code (e.g., 1001 in the case of MFC9600 USA version) appears.

- (3) Enter the desired customizing code (e.g., 0002 in the case of MFC9600 Canadian version).

The newly entered code appears.

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

- (4) For machines w/ fax: Press the **Start** key.

For machines w/o fax: Press the **Sort** 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

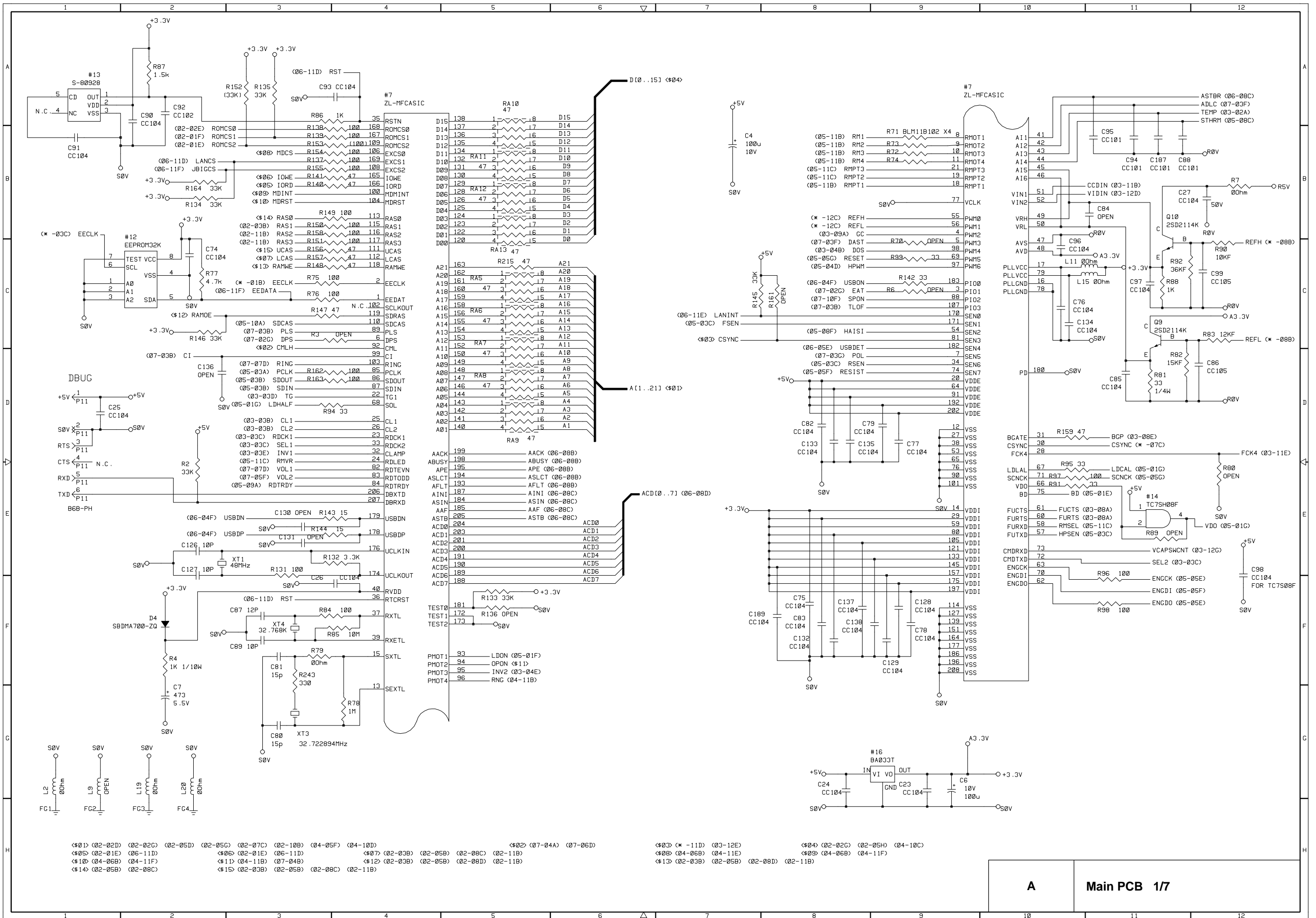
Versions	Model	
	MFC9600	DCP1200
U.S.A.	1001	1001
CANADA	0002	0002
Australia	0006	-
New Zealand	0027	-
ASIA	0040	-

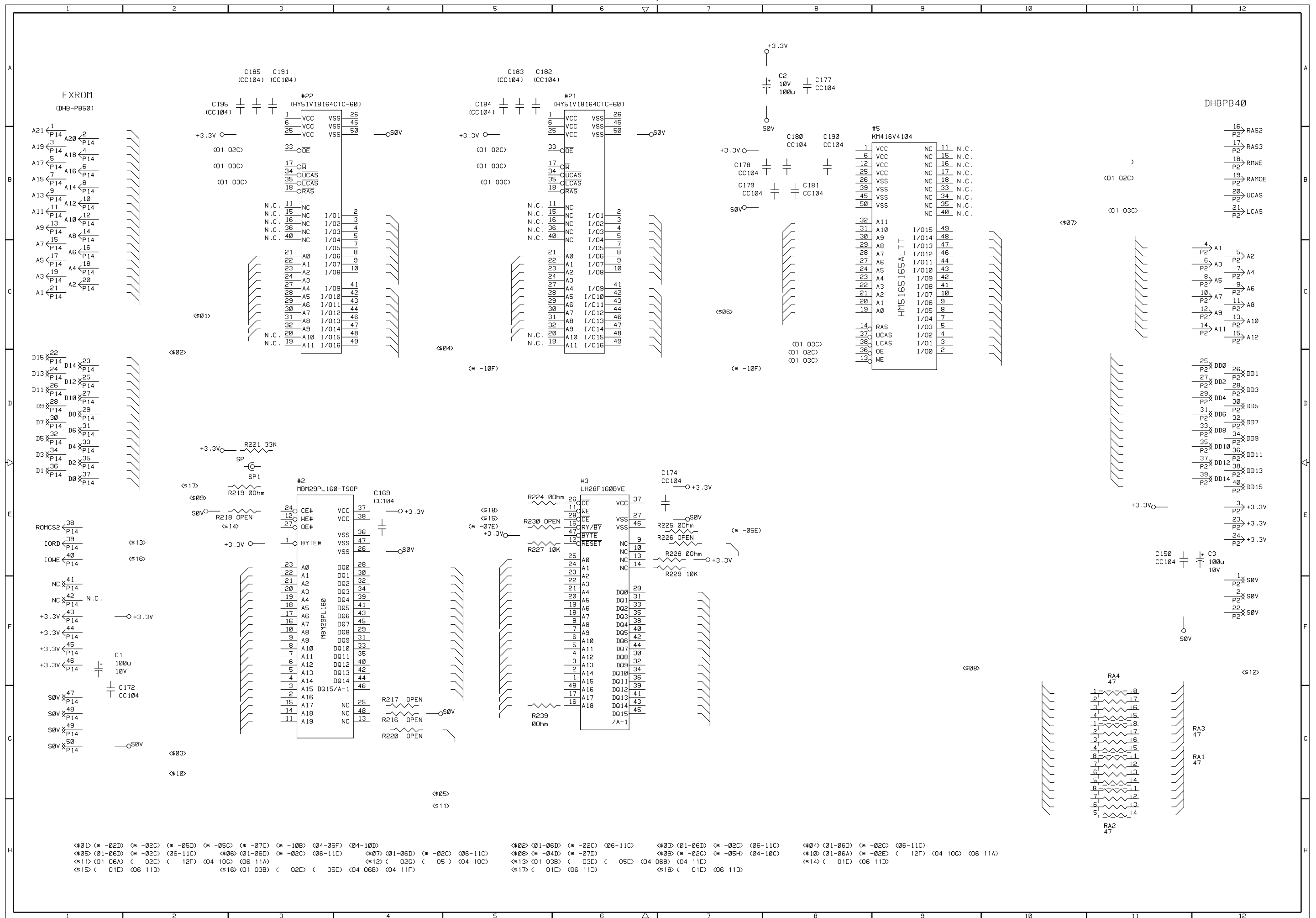
Versions	Model		
	MFC9750	MFC9850	MFC9870
Germany	0003	0003	0003
U.K.	0004	-	0004
France	0005	0005	0005
Norway	0007	-	0007
Belgium	0008	-	0008
Netherlands	0009	-	0009
Switzerland	0010	-	0010
Ireland	-	-	0004
Denmark	-	-	-
Austria	-	-	0003
Spain	0015	-	0015
Italy	0016	-	0016
Sweden	0026	-	0026

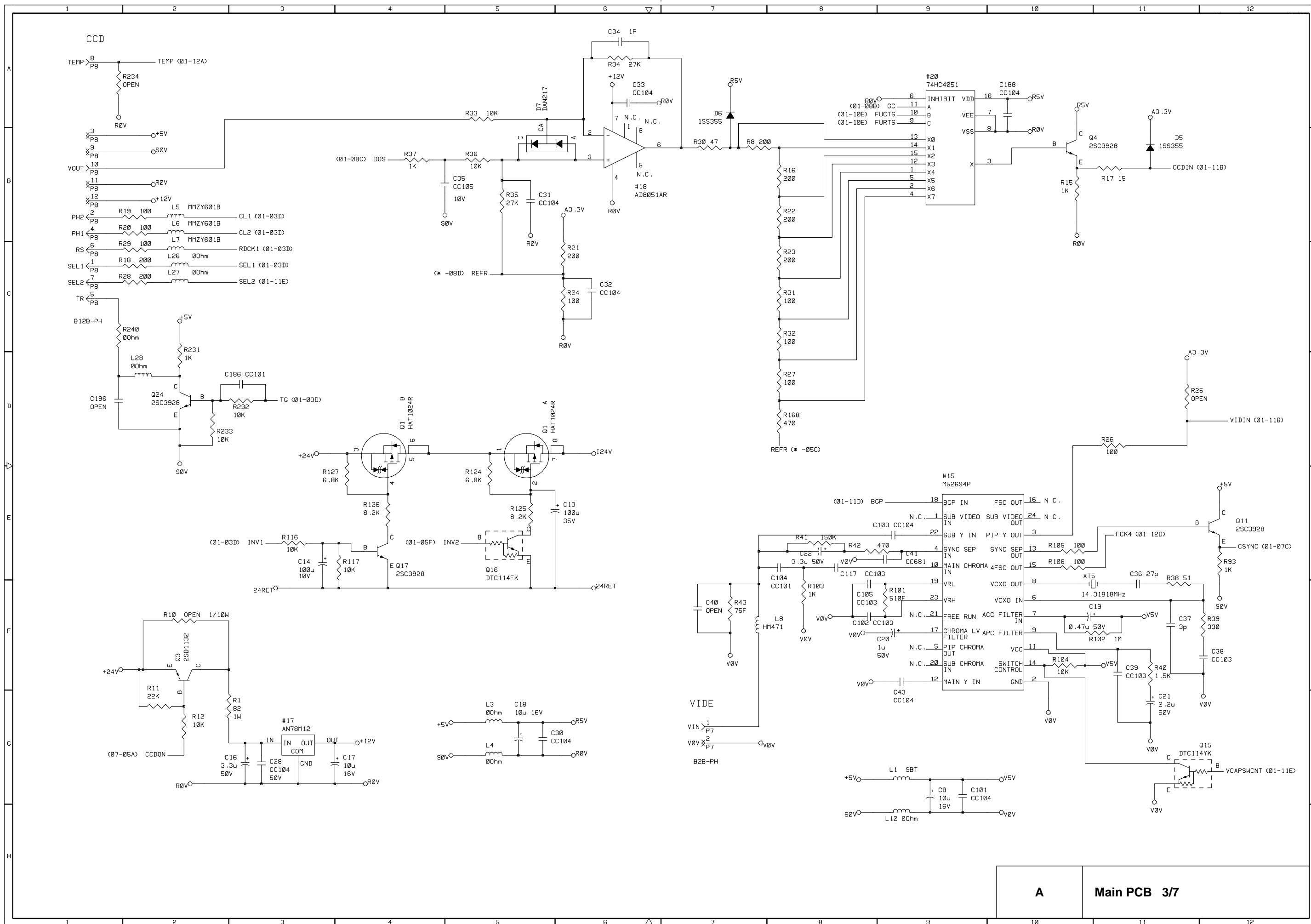
MFC9600/DCP1200 MFC9750/MFC9850/MFC9870

Appendix 2. Circuit Diagrams

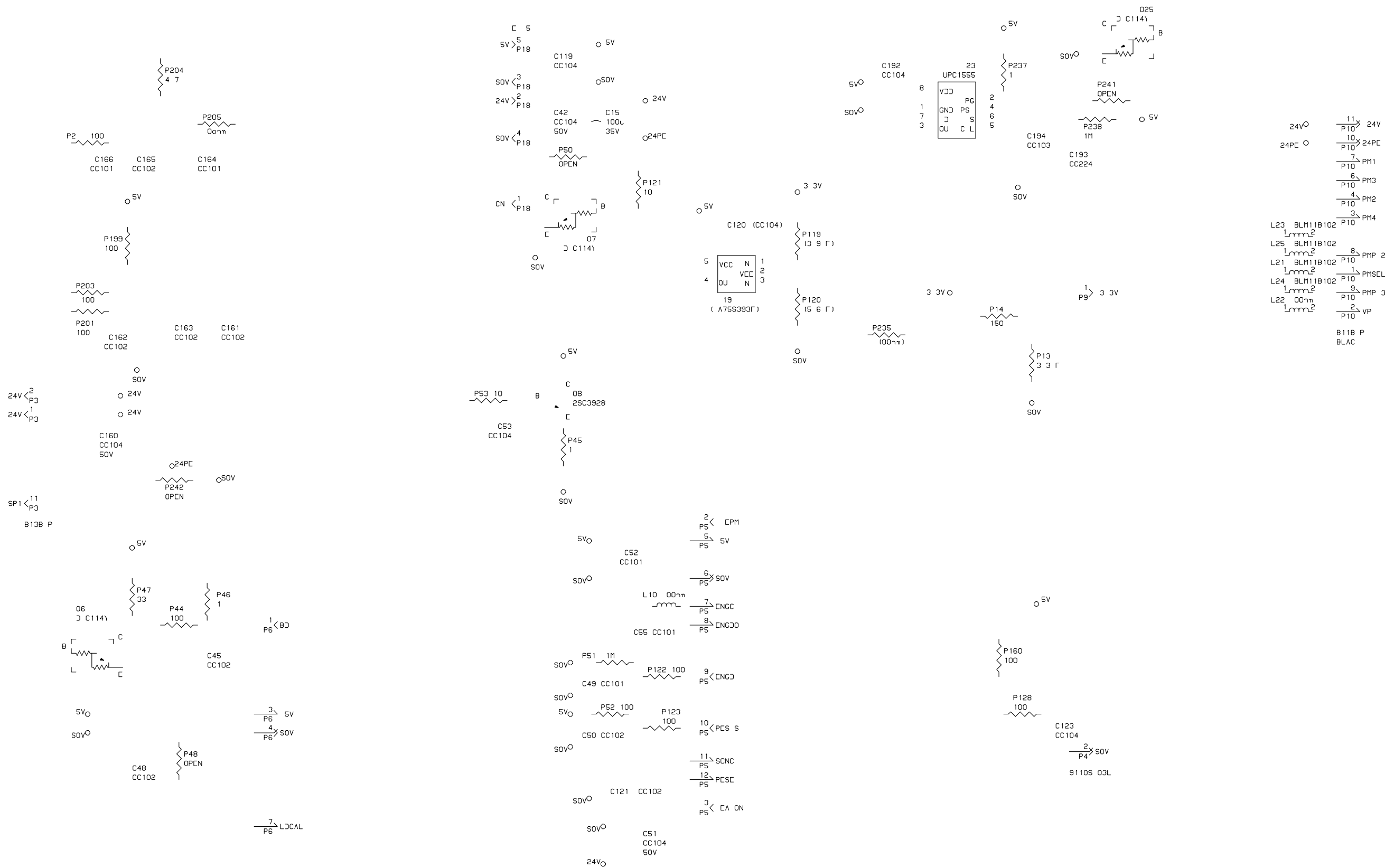
- A. Main PCB
- B. Engine PCB
- C. Network Control Unit (NCU) PCB
- D. Control Panel PCB
- E. Relay PCB
- F. Power Supply PCBs

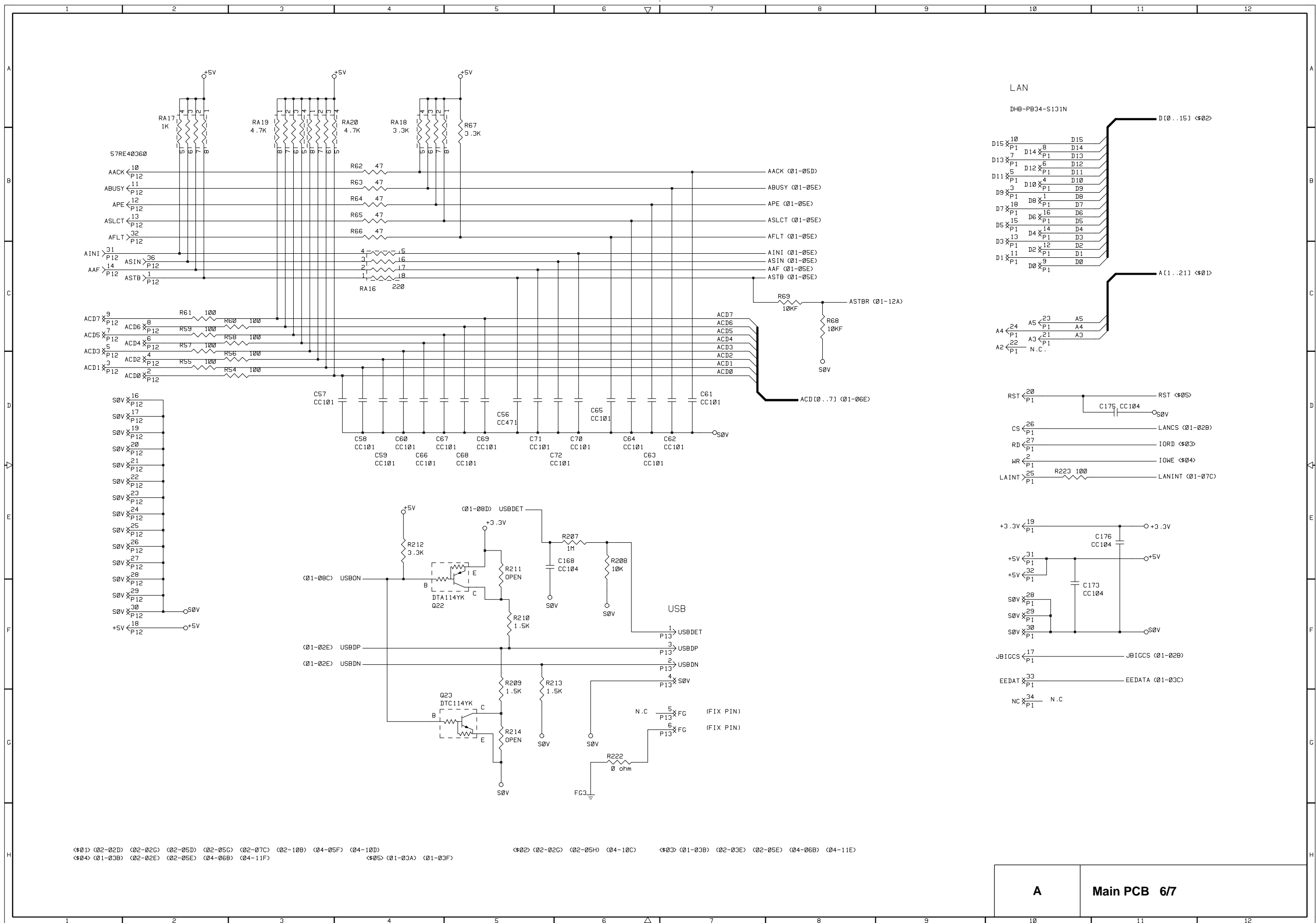


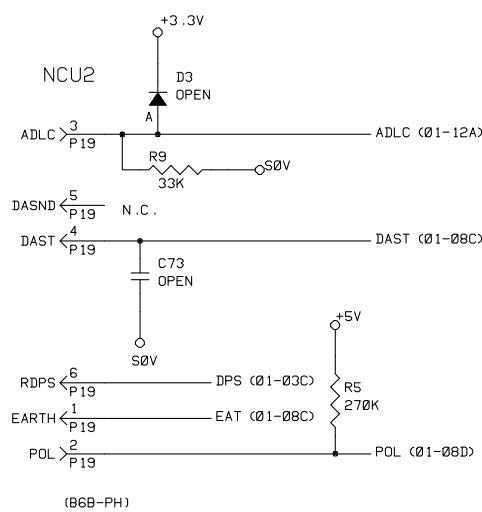
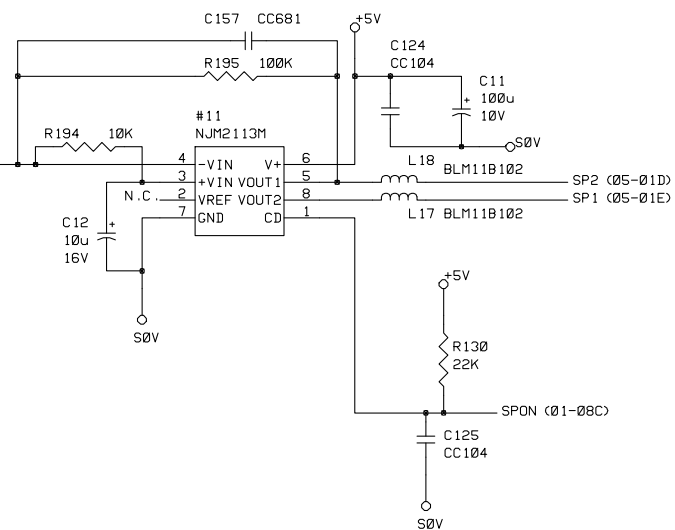
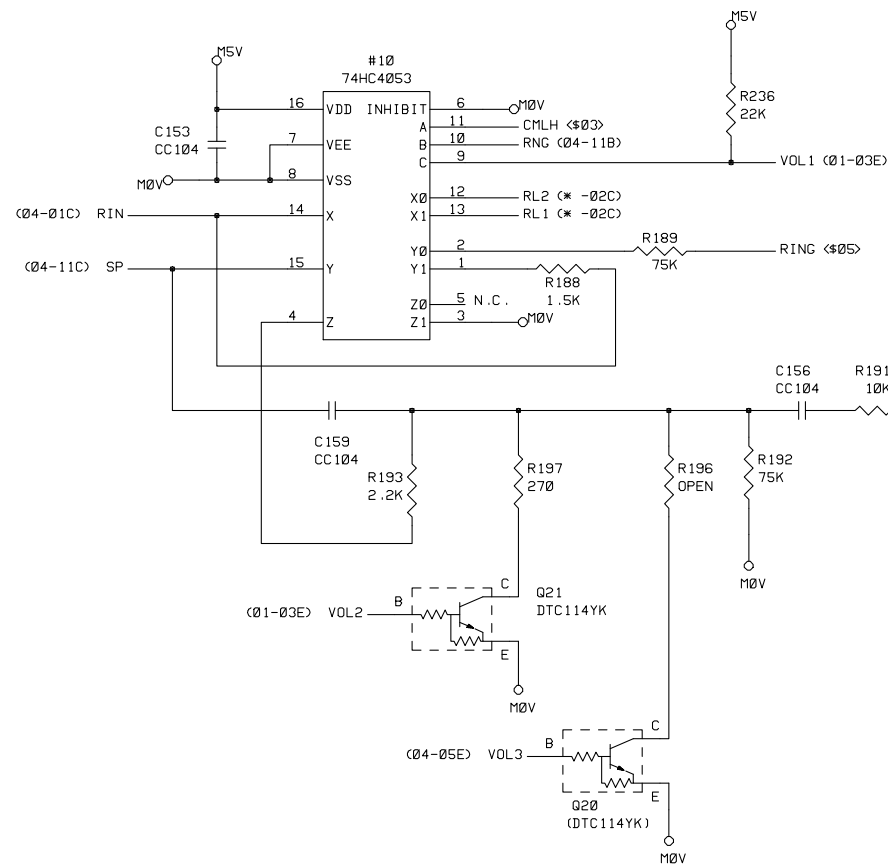
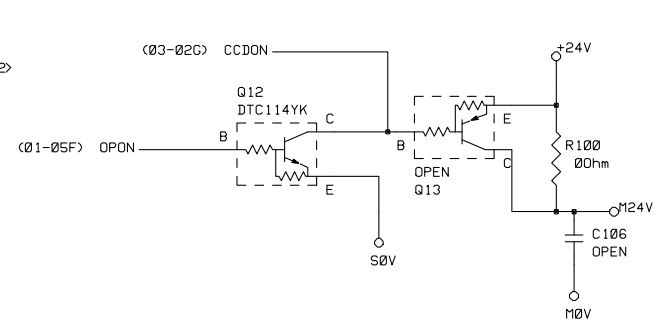
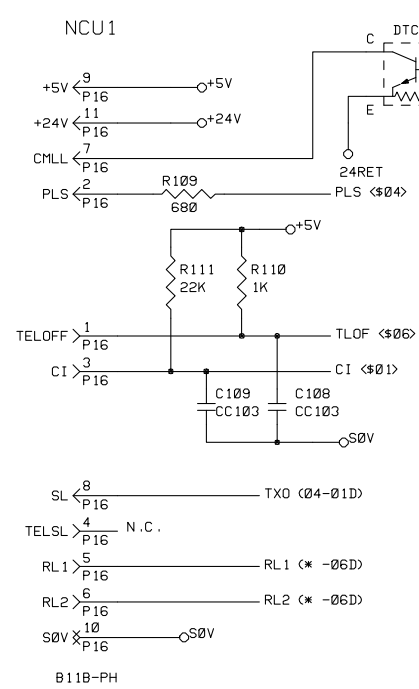




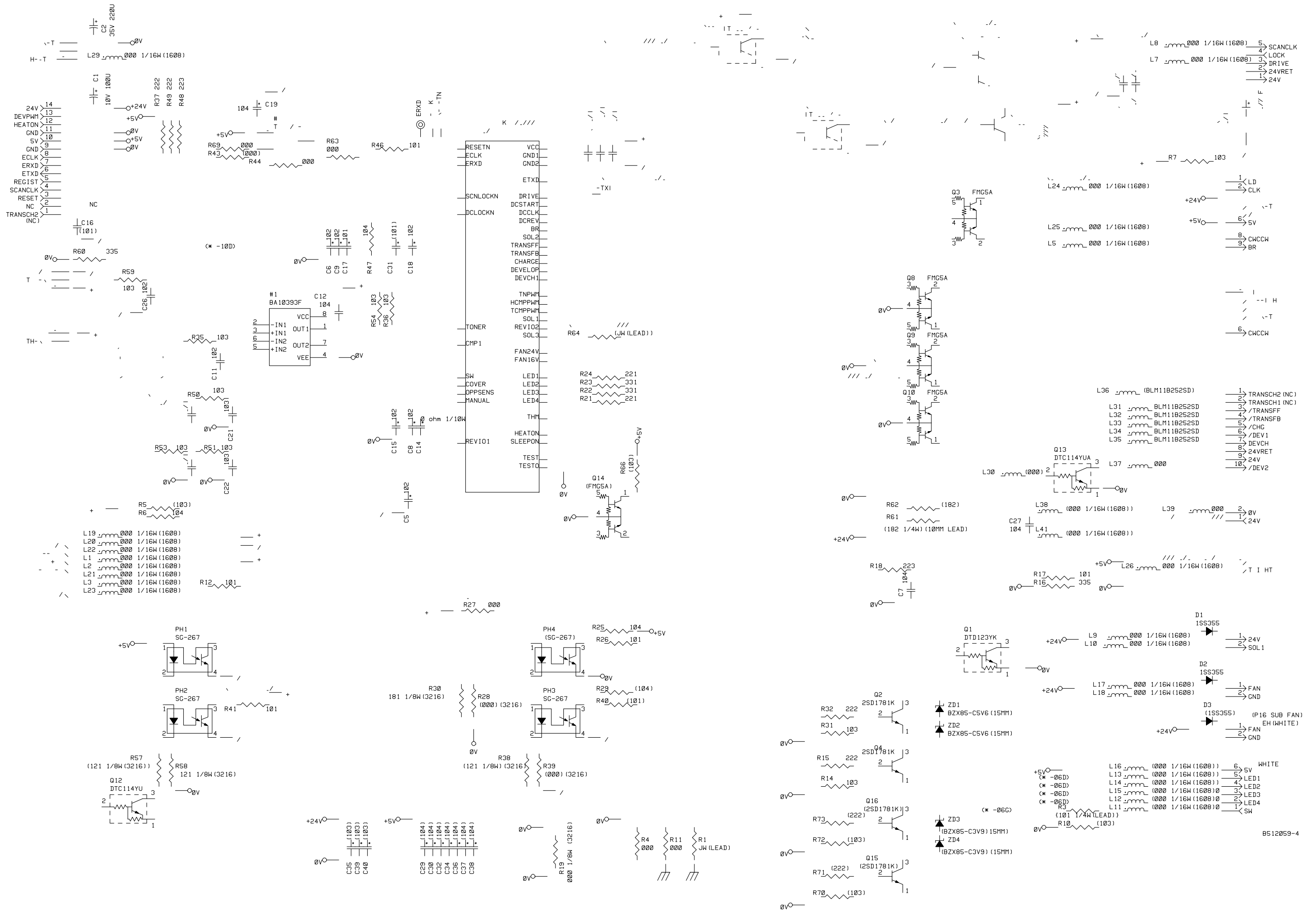




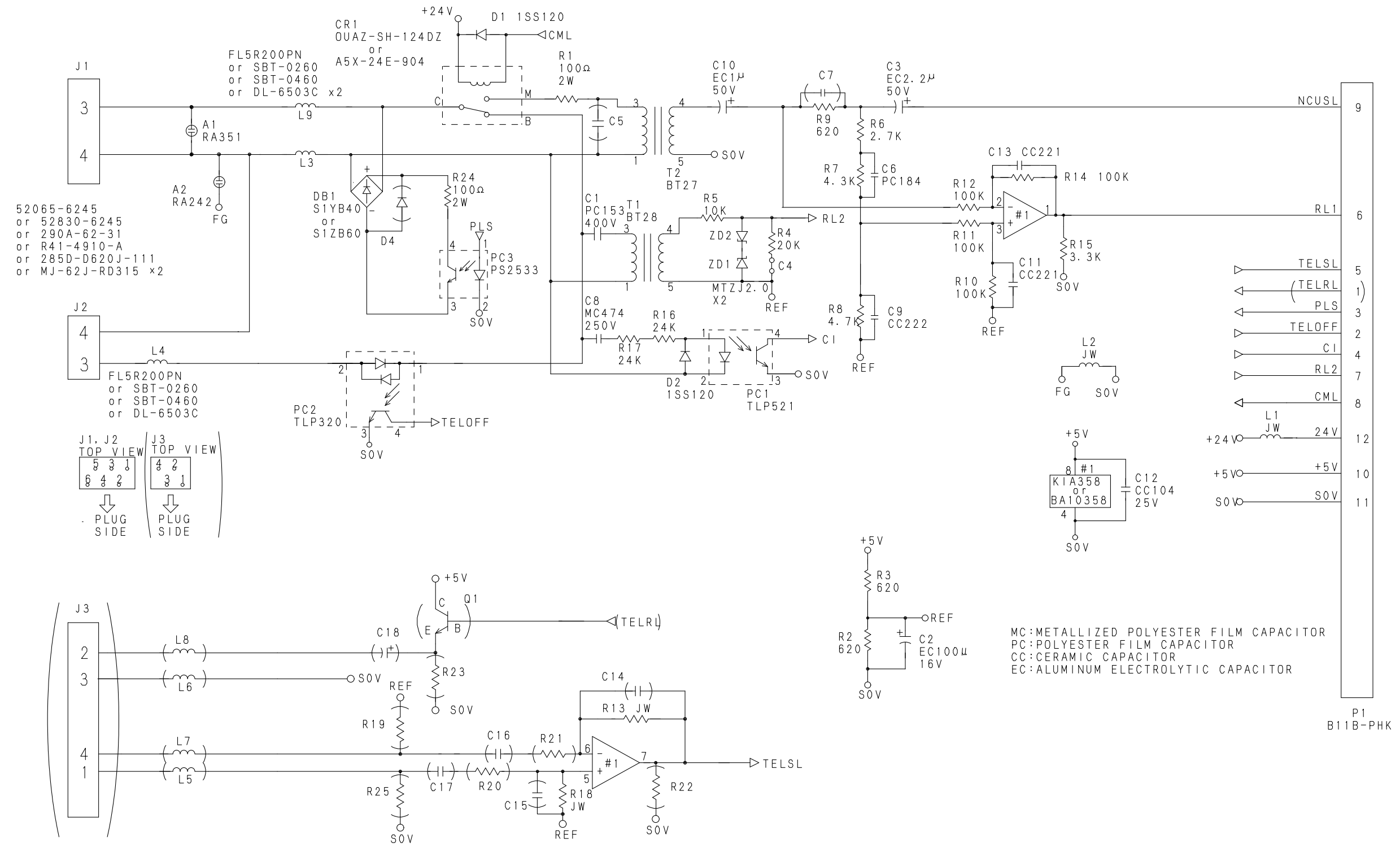


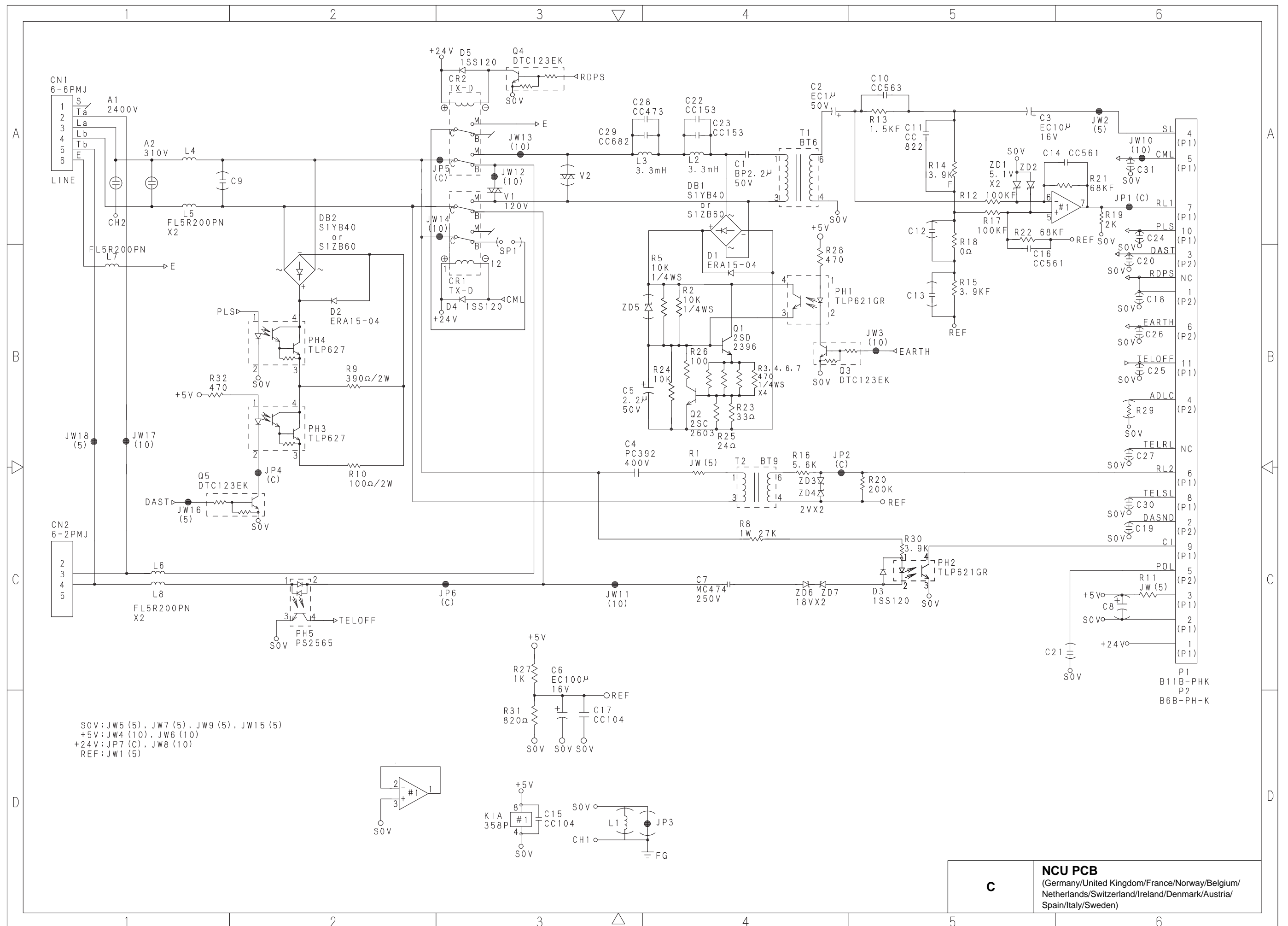


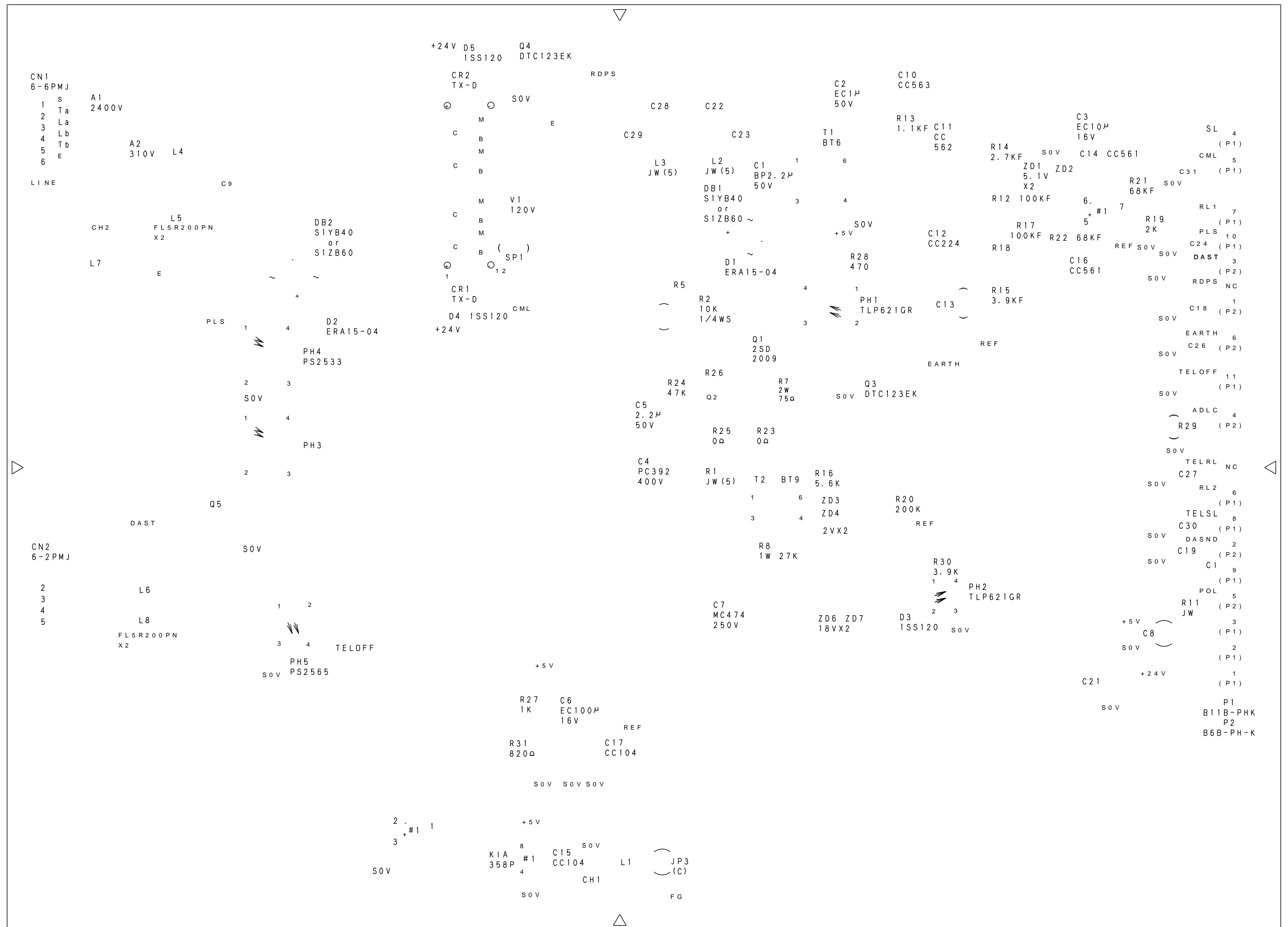
<01> (01-02D) (04-11B) <02> (01-03D) (04-11B) <03> (01-03D) (04-11B) <04> (01-03C) (04-11A) <05> (01-03D) (04-11C) <06> (01-08C) (04-11A)

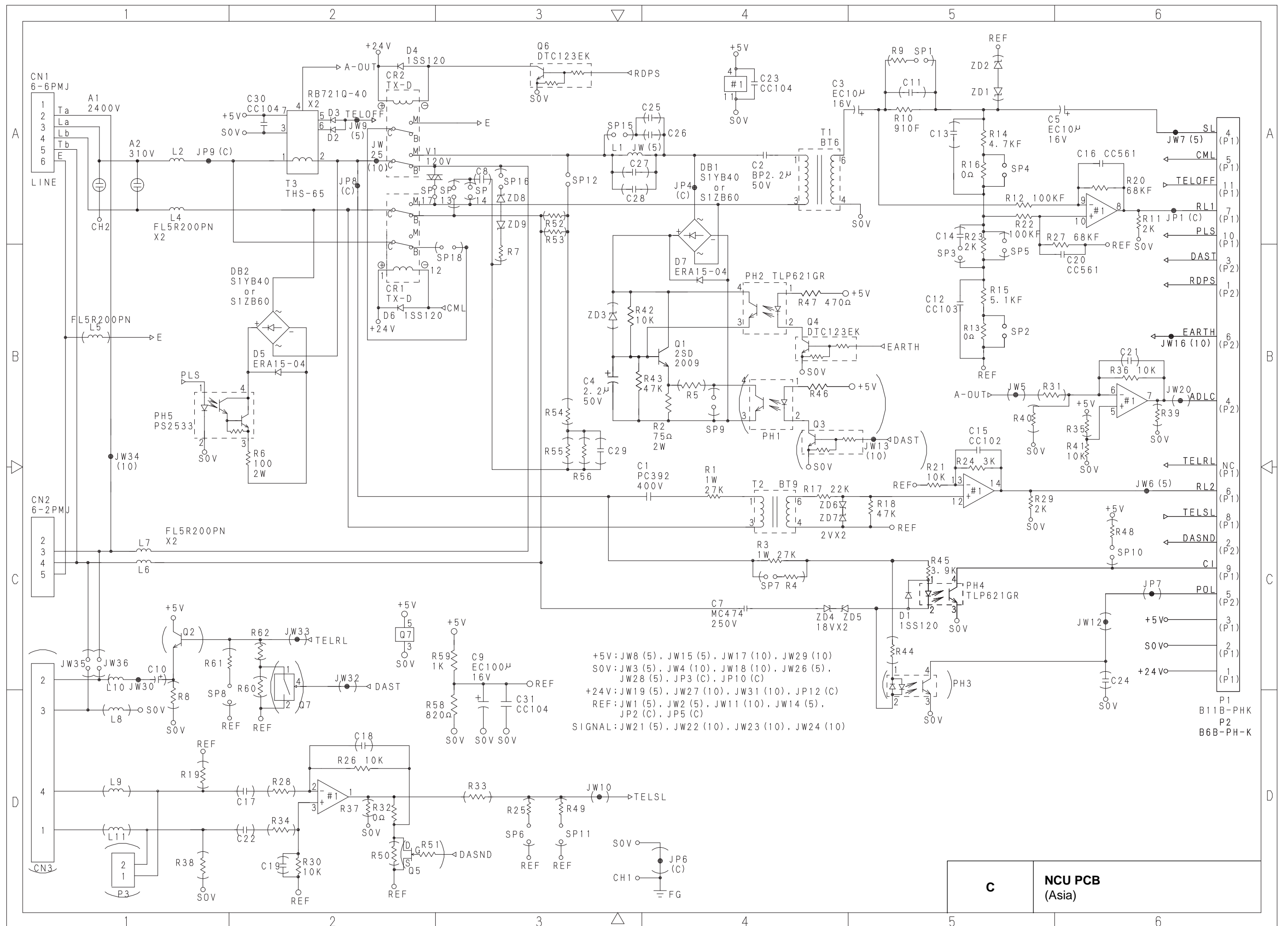


1. 指示ナキ抵抗ノ消費電力ハ1/4Wトスル。
1. UNLESS OTHERWISE SPECIFIED, POWER CONSUMPTION OF RESISTORS IS 1/4W.
2. 指示ナキコンデ`ンサノ耐压ハ25V又ハ50Vトスル。
2. UNLESS OTHERWISE SPECIFIED, THE VOLTAGE RESISTANCE OF CAPACITORS IS 25V OR 50V.
3. () 内ノ部品ハ未実装トスル。
3. COMPONENTS IN PARENTHESIS IS NOT TO BE MOUNTED.

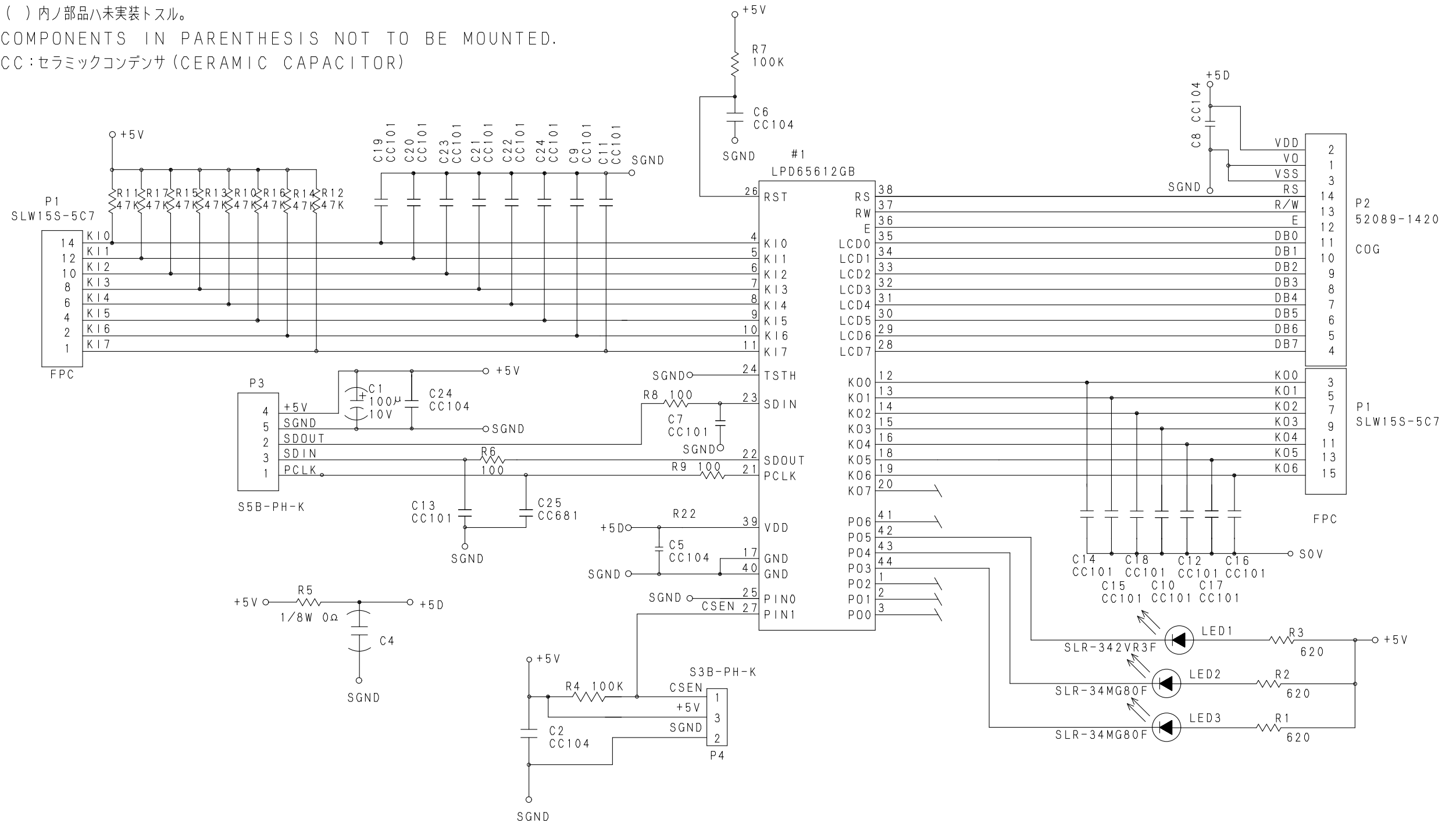








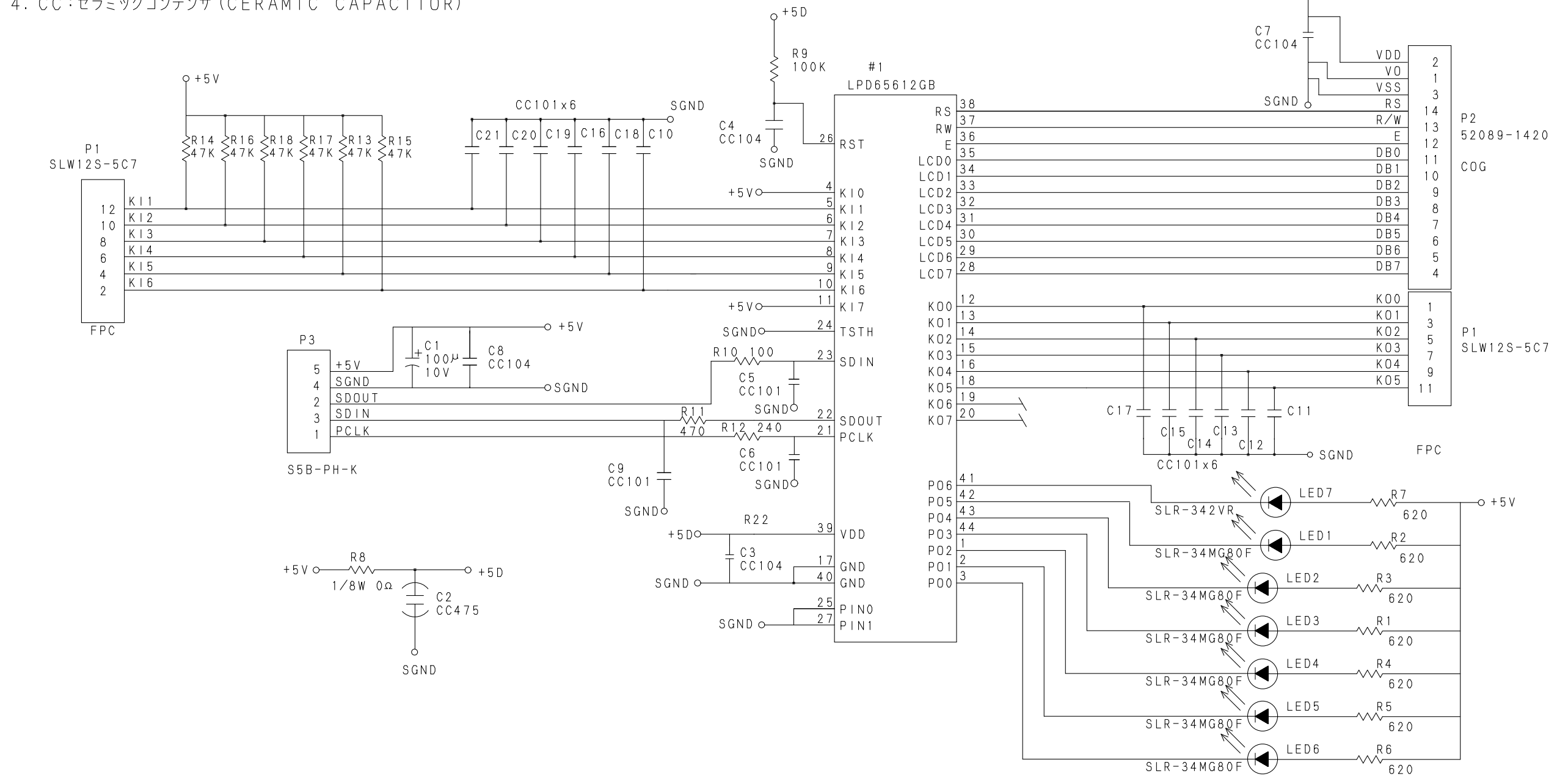
1. 指示ナキ抵抗ノ定格電力ハ1／10Wトスル。
1. UNLESS OTHERWISE SPECIFIED, STANDARD ELECTRIC POWER OF RESISTORS IS 1/10W.
2. 指示ナキコンデ"ンサノ耐圧ハ25V又ハ50Vトスル。
2. UNLESS OTHERWISE SPECIFIED, THE VOLTAGE RESISTANCE OF CAPACITORS IS 25V OR 50V.
3. () 内ノ部品ハ未実装トスル。
3. COMPONENTS IN PARENTHESIS NOT TO BE MOUNTED.
4. CC:セラミックコンデンサ (CERAMIC CAPACITOR)

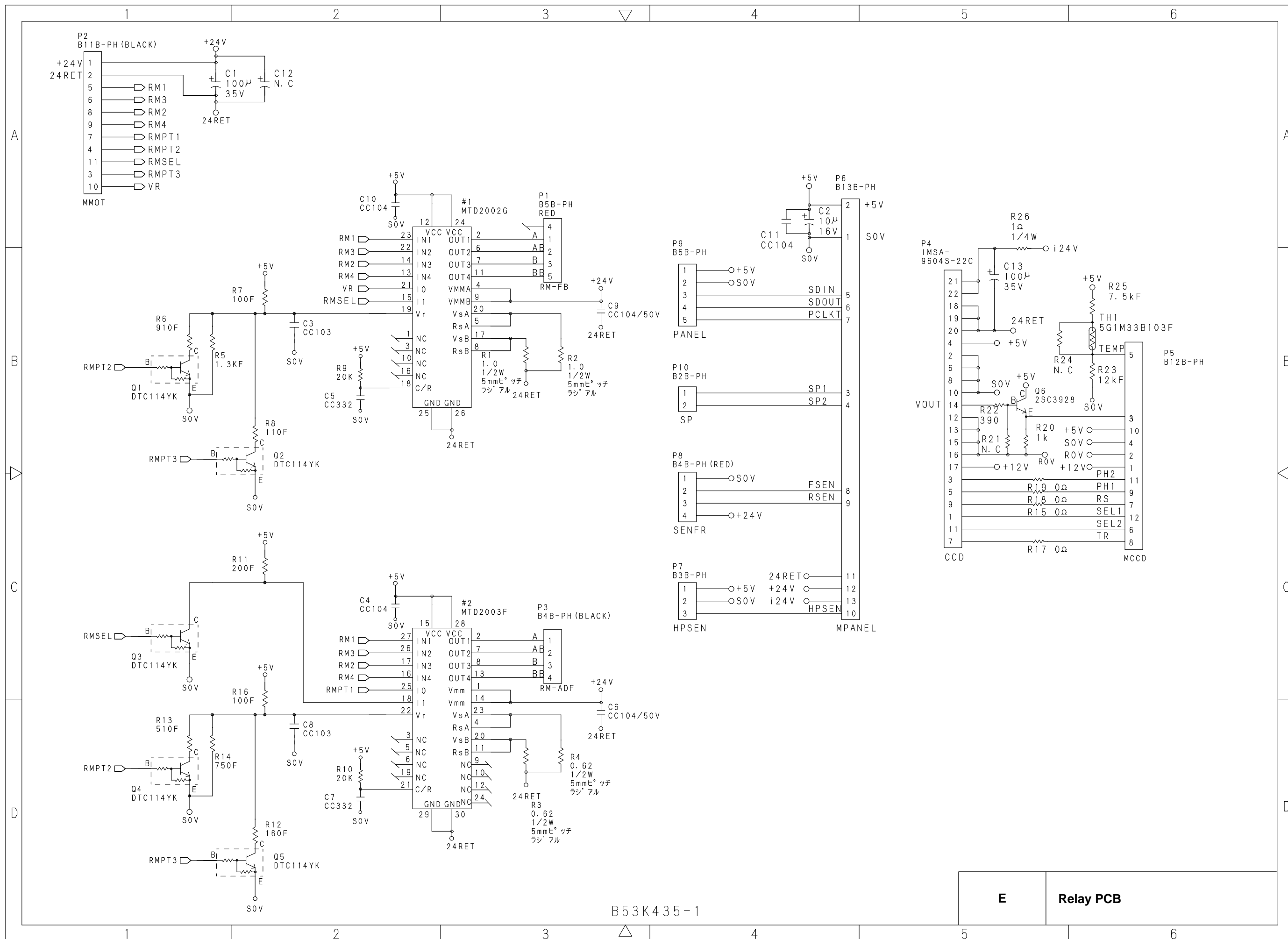


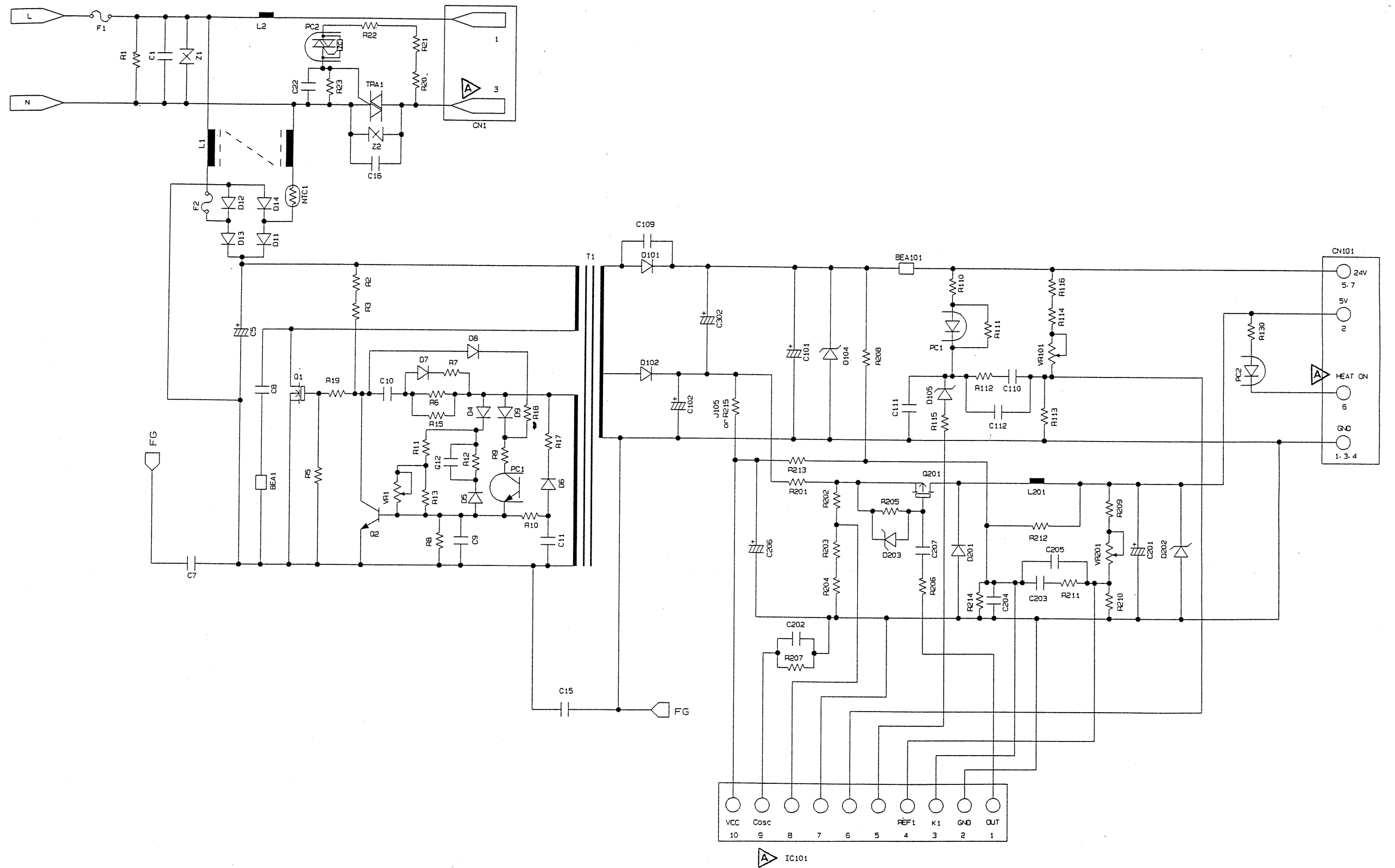
D

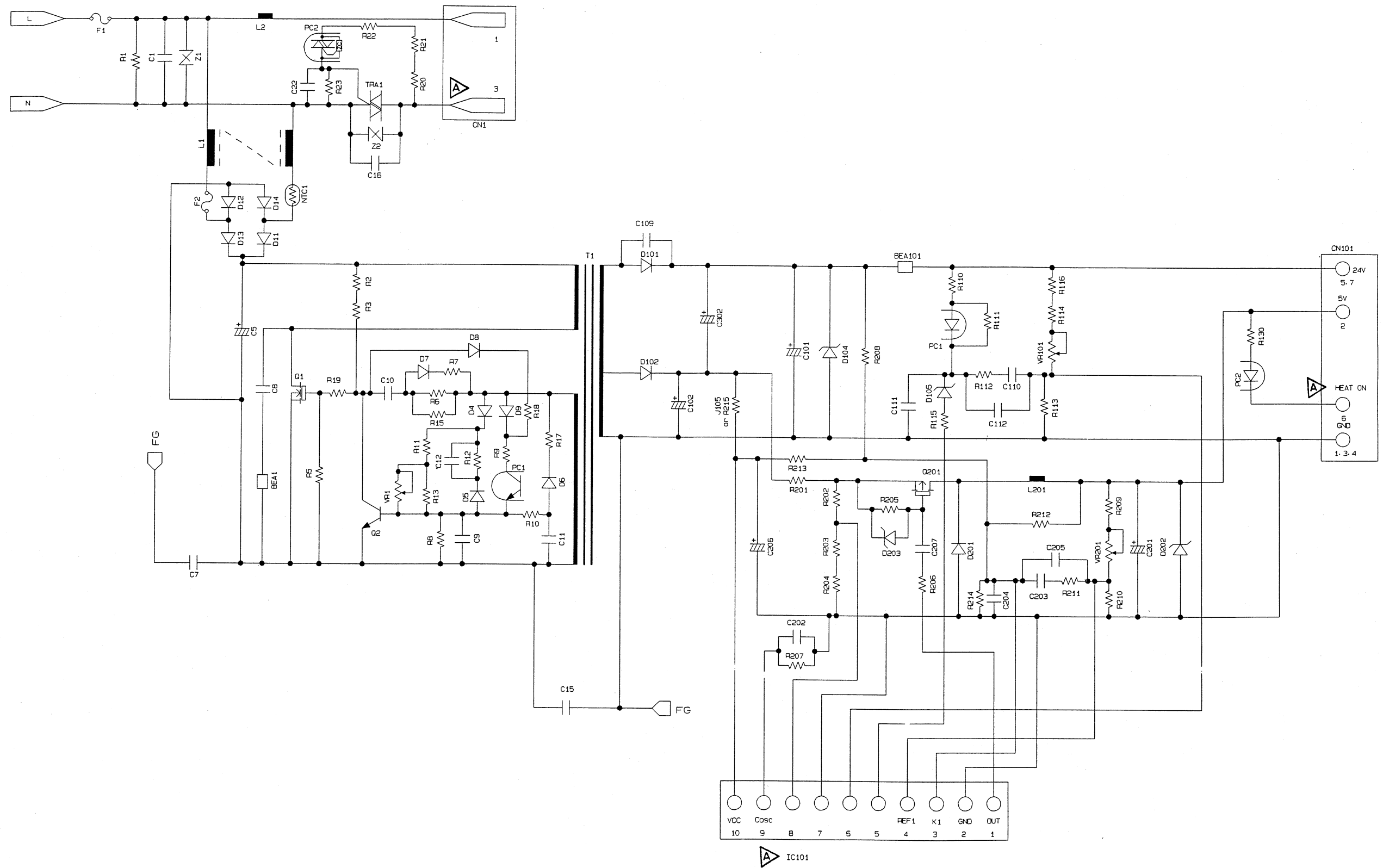
Control Panel PCB
(MFC9600/MFC9850/MFC9870)

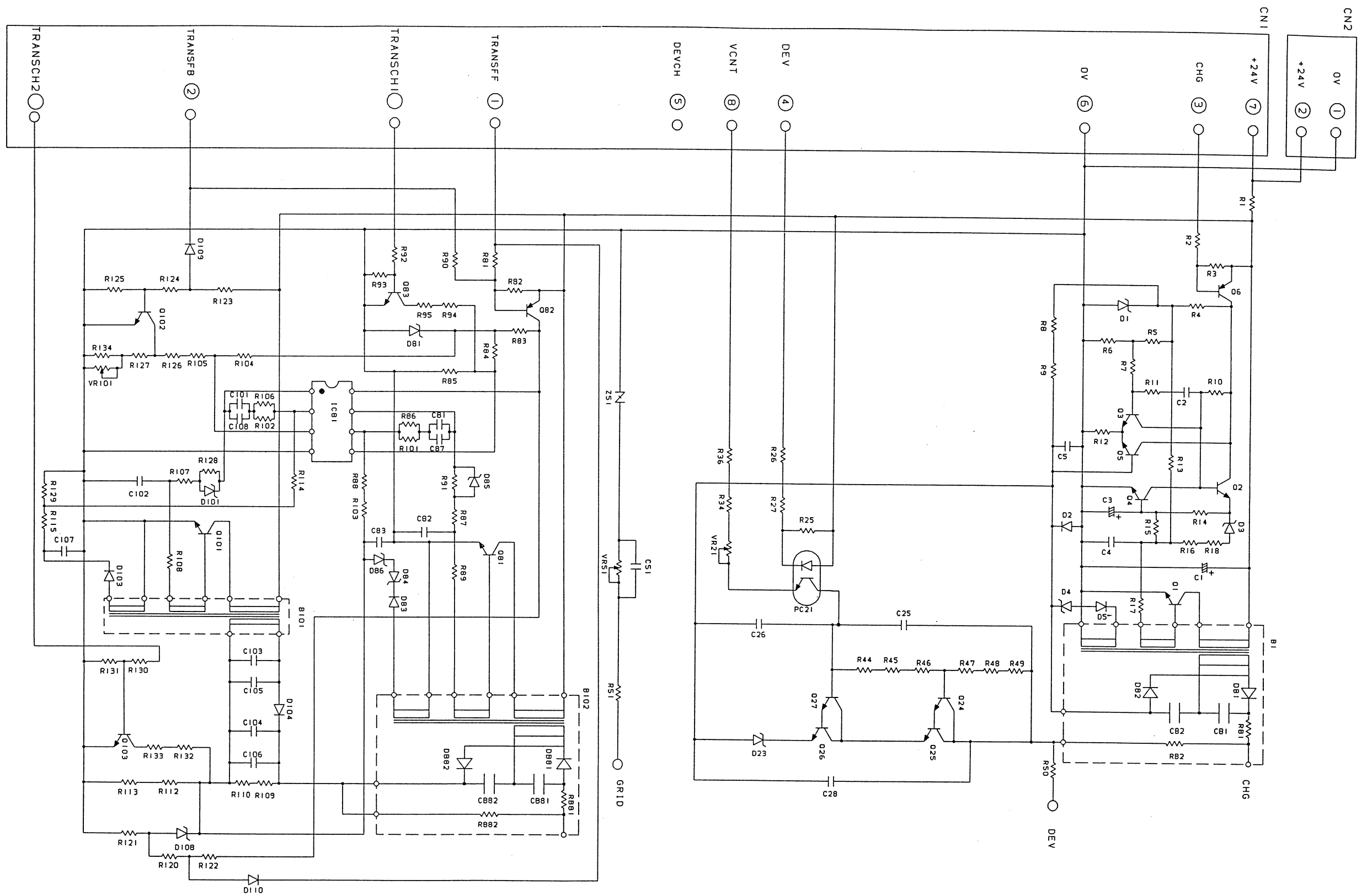
- 指示ナキ抵抗ノ定格電力ハ1／10Wトスル。
- 指示ナキコンデンサノ耐圧ハ25V又ハ50Vトスル。
- () 内ノ部品ハ未実装トスル。
- CC：セラミックコンデンサ (CERAMIC CAPACITOR)











F

Power Supply PCB
High-voltage power supply

brother®

Jan. '00
SM8C5401,
Printed in Japan