



**FACSIMILE EQUIPMENT  
SERVICE MANUAL**

**MODEL: FAX3550/3650/8000P/8200P  
MFC4450/4550/4550plus  
MFC6550MC/7550MC/7650MC  
MFC9000/9500**

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Specifications are subject to change without notice.

## PREFACE

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

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

This manual is made up of six chapters and appendices.

<b>CHAPTER I.</b>	<b>GENERAL DESCRIPTION</b>
<b>CHAPTER II.</b>	<b>INSTALLATION</b>
<b>CHAPTER III.</b>	<b>THEORY OF OPERATION</b>
<b>CHAPTER IV.</b>	<b>DISASSEMBLY/REASSEMBLY AND LUBRICATION</b>
<b>CHAPTER V.</b>	<b>MAINTENANCE MODE</b>
<b>CHAPTER VI.</b>	<b>ERROR INDICATION AND TROUBLESHOOTING</b>
<b>APPENDICES</b>	<b>Circuit Diagrams</b>

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

## 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 Japanese products

MANUFACTURED:            AUGUST            1998            K  
BROTHER INDUSTRIES, LTD.  
15-1 Naeshiro-cho Mizuho-ku Nagoya 467-8561, Japan.  
This product complies with FDA radiation  
performance standards, 21 CFR Subchapter J.

# CHAPTER I.

## GENERAL DESCRIPTION

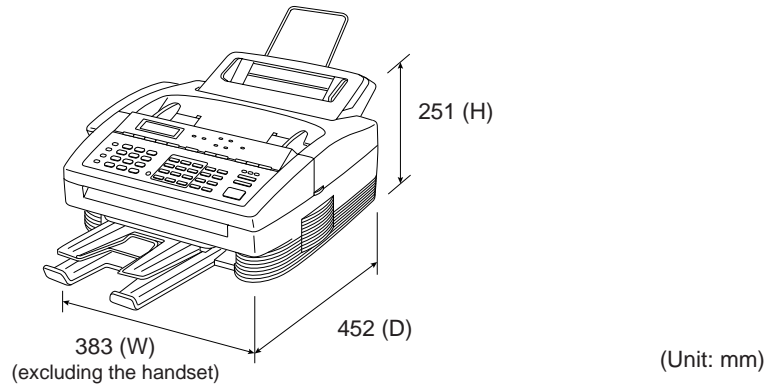
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# 1. EQUIPMENT OUTLINE

## 1.1 External Appearance and Weight

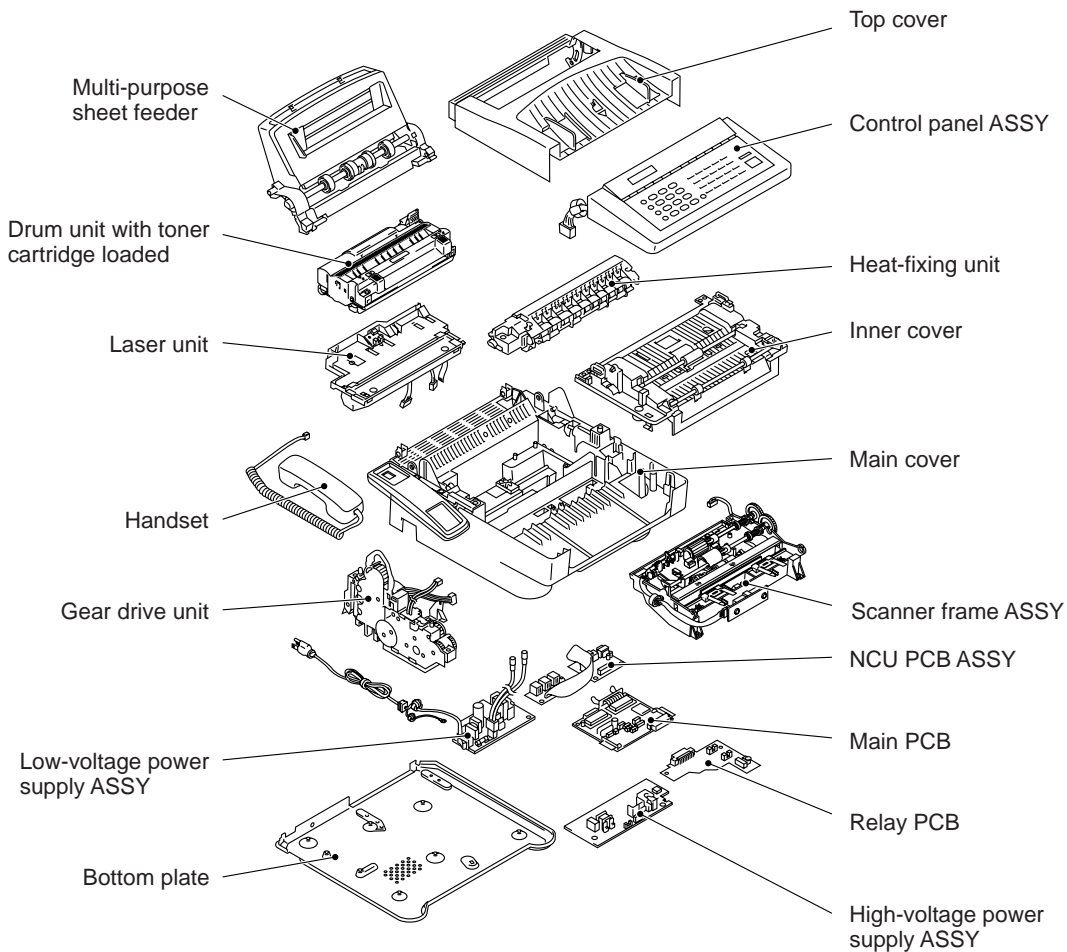
The figure below shows the equipment appearance and approximate dimensions.



Weight: Machine proper	Approx. 8.5 kg (excluding the drum unit and toner cartridge)
In package	Approx. 13.5 kg (FAX3550/3650/8000P/8200P)
	Approx. 14 kg (MFC4450/4550/4550plus/6550MC/7550MC/ 7650MC/9000/9500)

## 1.2 Components

The equipment consists of the following major components:



## 2. SPECIFICATIONS

(1/2)

MODEL	FAX3550	MFC4550	MFC6550MC	MFC7550MC
<b>COLOR</b>	1267	1138	1138	1138
<b>PRINTER</b>	Option			
Engine	—	HL-720	HL-730	HL-730
PPM	—	6	6	6
dpi	—	600 x 600	600 x 600	600 x 600
Paper Capacity	200	200	200	200
Standards	—	Windows GDI (600x600)	Windows GDI (600x600)	Windows GDI (600x600)
Emulation	—	No	PCL4 (300x300)	PCL4 (300x300)
Memory (Typical)	—	512 KB	512 KB	1 MB
Memory (Min.)	—	300 KB	400 KB	1 MB
Fonts Resident	—	No	24-bit map (PCL4 Comp)	24-bit map (PCL4 Comp)
Fonts Disk Based	—	No	Yes	Yes
Paper Handling	LTR, LGL, A4	LTR, LGL, EXE, A4, B5, A5	LTR, LGL, EXE, A4, B5, A5	LTR, LGL, EXE, A4, B5, A5
Multi-purpose Sheet Feeder	Custom Size (2.85x5-8x14) Envelope (BL/C5/COM 10/Mona)	Custom Size (2.85x5-8x14) Envelope (BL/C5/COM 10/Mona)	Custom Size (2.85x5-8x14) Envelope (BL/C5/COM 10/Mona)	Custom Size (2.85x5-8x14) Envelope (BL/C5/COM 10/Mona)
Printer Driver	—	Windows 3.1, 95 Driver with Auto Installer Program	Windows 3.1, 95 Driver with Auto Installer Program	Windows 3.1, 95 Driver with Auto Installer Program
Toner Life (5%/page)	2200 pages	2200 pages	2200 pages	2200 pages
Utility Software	—	—	RPC	RPC
<b>SCANNER</b>	Option			
Color/Mono	—	Mono	Mono	Mono
Gray Scale	—	64	256	256
dpi	—	400 x 400	600 x 600	600 x 600
Twain	—	Yes	Yes	Yes
ADF Capacity (pages)	(30)	30	30	30
Formats	—	TIFF/BMP (by M/L)	TIFF/BMP (by M/L)	TIFF/BMP (by M/L)
OCR	—	Option	Yes	Yes
<b>COPY</b>				
dpi	200 x 400	200 x 400	600 class	600 class
No. of Copies	1-99	1-99	1-99	1-99
Sorting	No	No	Yes	Yes
Reduction/Enlargement	50-200%	50-200%	50-200%	50-200%
<b>FAX</b>				
Modem	ROCKWELL V12	ROCKWELL V12	ROCKWELL V24	ROCKWELL V24
Modem Speed	14400 bps (FAX only)	14400 bps (FAX only)	14400 bps (FAX only)	14400 bps (FAX only)
CCITT Group	G3	G3	G3	G3
Coding Method	MH/MR/MMR	MH/MR/MMR	MH/MR/MMR	MH/MR/MMR
Transmission Speed	6 sec.	6 sec.	6 sec.	6 sec.
Input/Output Width	8.5"/8.5"	8.5"/8.5"	8.5"/8.5"	8.5"/8.5"
LCD Size	16 x 1	16 x 2	16 x 2	16 x 2
Super Fine	Yes (Send only)	Yes (Send only)	Yes (Send only)	Yes
Gray Scale	64	64	64	64
Smoothing	Yes	Yes	Yes	Yes
Handset	Yes	Yes	Yes	Yes
One-touch Dial	20 x 2	12 x 2	12 x 2	12 x 2
Speed Dial	100	36	36	100
Telephone Index	Yes	Yes	Yes	Yes
Contrast	Super L/Auto/Super D	Super L/Auto/Super D	Super L/Auto/Super D	Super L/Auto/Super D
Multi-resolution Transmission	Yes	Yes	Yes	Yes
FAX/TEL Switch	Yes	Yes	Yes	Yes
Distinctive Ringing	Yes	Yes	Yes	Yes
Caller ID	Yes	Yes	Yes	Yes
Next FAX-reservation	Yes	Yes	Yes	Yes
Help	Yes	Yes	Yes	Yes
TAD Interface	Yes	Yes	Yes	Yes



<b>MODEL</b>	FAX3650	MFC4450	MFC4550plus	MFC7650MC
<b>COLOR</b>	1267	1138	1138	1138
<b>PRINTER</b>	Option			
Engine	—	HL-720	HL-720	HL-730
PPM	—	6	6	6
dpi	200 x 200	600 x 600	600 x 600	600 x 600
Paper Capacity	200	200	200	200
Standards	Windows GDI (200x200)	Windows GDI (600x600)	Windows GDI (600x600)	Windows GDI (600x600)
Emulation	—	No	PCL4 (300x300)	PCL4 (300x300)
Memory (Typical)	—	512 KB	512 KB	1 MB
Memory (Min.)	—	300 KB	400 KB	600 KB
Fonts Resident	—	No	24-bit map (PCL4 Comp)	24-bit map (PCL4 Comp)
Fonts Disk Based	—	No	Yes	Yes
Paper Handling	LTR, LGL, A4	LTR, LGL, A4, B5, A5	LTR, LGL, A4, B5, A5	LTR, LGL, A4, B5, A5
Multi-purpose Sheet Feeder	—	Custom Size (2.85x5-8x14) Envelope (BL/C5/COM 10/Mona)	Custom Size (2.85x5-8x14) Envelope (BL/C5/COM 10/Mona)	Custom Size (2.85x5-8x14) Envelope (BL/C5/COM 10/Mona)
Printer Driver	—	Windows 3.1, 95 Driver with Auto Installer Program	Windows 3.1, 95 Driver with Auto Installer Program	Windows 3.1, 95 Driver with Auto Installer Program
Toner Life (5%/page)	2200 pages	2200 pages	2200 pages	2200 pages
Utility Software	—	—	RPC	RPC
<b>SCANNER</b>	Option			
Color/Mono	—	Mono	Mono	Mono
Gray Scale	—	64	64	256
dpi	—	400 x 400	400 x 400	600 x 600
Twain	—	Yes	Yes	Yes
ADF Capacity (pages)	—	30	30	30
Formats (Import)	—	TIFF/BMP/PCX/DCX/BTF/BTX/UNI	TIFF/BMP/PCX/DCX/BTF/BTX/MAX	TIFF/BMP/PCX/DCX/BTF/BTX/MAX
Formats (Export)	—	TIFF/BMP/UNI	TIFF/BMP/MAX	TIFF/BMP/MAX
OCR	—	Option	Yes	Yes
<b>COPY</b>				
dpi	200 x 400	200 x 400	200 x 400	600 class
No. of Copies	1-99	1-99	1-99	1-99
Sorting	Yes	No	No	Yes
Reduction/Enlargement	50-200%	50-200%	50-200%	50-200%
<b>FAX</b>				
Modem	ROCKWELL V12	Toshiba	ROCKWELL V12	ROCKWELL V24
Modem Speed	14400 bps (FAX only)	9600 bps (FAX only)	14400 bps (FAX only)	14400 bps (FAX only)
CCITT Group	G3	G3	G3	G3
Coding Method	MH/MR/MMR	MH/MR/MMR	MH/MR/MMR	MH/MR/MMR
Transmission Speed	6 sec.	9 sec.	6 sec.	6 sec.
Input/Output Width	8.5"/8.5"	8.5"/8.5"	8.5"/8.5"	8.5"/8.5"
LCD Size	16 x 1	16 x 2	16 x 2	16 x 2
Super Fine	Yes	Yes	Yes	Yes
Gray Scale	64	64	64	64
Smoothing	Yes	Yes	Yes	Yes
Handset	Yes	No	Yes	Yes
One-touch Dial	20 x 2	12 x 2	12 x 2	12 x 2
Speed Dial	100	36	36	100
Telephone Index	Yes	Yes	Yes	Yes
Contrast	Super L/Auto/Super D	Super L/Auto/Super D	Super L/Auto/Super D	Super L/Auto/Super D
Multi-resolution Transmission	Yes	Yes	Yes	Yes
FAX/TEL Switch	Yes	Yes (with External)	Yes	Yes
Distinctive Ringing	Yes	Yes (with External)	Yes	Yes
Caller ID	Yes	No	Yes	Yes
Next FAX-reservation	Yes	Yes	Yes	Yes
Help	Yes	Yes	Yes	Yes
TAD Interface	Yes	Yes	Yes	Yes

MODEL	FAX8000P	MFC9000	MFC9500	FAX8200P
<b>COLOR</b>	1138	1138	1138	1138
<b>PRINTER</b>	Option			Option
Engine	—	HL-730	HL-730	—
PPM	—	6	6	—
dpi	—	600 x 600 (GDI) / 300 x 300 (PCL4)	600 x 600 (GDI) / 300 x 300 (PCL4)	—
Paper Capacity	200	200	200	200
Standards	—	Windows GDI	Windows GDI	—
Emulation	—	PCL4	PCL4	—
Memory (Typical)	—	512 KB	512 KB	—
Memory (Min.)	—	400 KB	400 KB	—
Fonts Resident	—	24-bit map (PCL4 Comp)	24-bit map (PCL4 Comp)	—
Fonts Disk Based	—	Yes	Yes	—
Paper Handling	A4, B5, A5	A4, B5, A5	A4, B5, A5	A4
Multi-purpose Tray	Custom Size (73x127-126x350 mm) Envelope (DL/C5/COM 10/Mona)	Custom Size (73x127-216x350 mm) Envelope (DL/C5/COM 10/Mona)	Custom Size (73x127-216x350 mm) Envelope (DL/C5/COM 10/Mona)	—
Printer Driver	—	Windows 3.1, 95 Driver with Auto Installer Program Mac Driver (Option)	Windows 3.1, 95 Driver with Auto Installer Program Mac Driver (Option)	—
Toner Life (5%/page)	2200 pages	2200 pages	2200 pages	2200 pages
Utility Software	—	Remote Priter Console (RPC)	Remote Printer Console (RPC)	—
<b>SCANNER</b>	Option			Option
Color/Mono	—	Mono	Mono	—
Gray Scale	—	256	256	—
dpi	—	600 x 600	600 x 600	—
Twain	—	Yes	Yes	—
ADF Capacity (pages)	30	30	30	—
Formats	—	TIFF/BMP	TIFF/BMP	—
OCR	—	Option	Yes	—
<b>COPY</b>				
dpi	200 x 400	300 x 400	300 x 400	200 x 400
No. of Copies	1-99	1-99	1-99	1-99
Sorting	Available with optional memory	Yes	Yes	Yes
Reduction/Enlargement	50-200%	50-200%	50-200%	50-200%
<b>FAX</b>				
Modem	ROCKWELL V12	ROCKWELL V12	ROCKWELL V24	ROCKWELL V12
Modem Speed	14400 bps (FAX only)	14400 bps (FAX only)	14400 bps (FAX only)	14400 bps (FAX only)
CCITT Group	G3	G3	G3	G3
Coding Method	MH/MR/MMR	MH/MR/MMR	MH/MR/MMR	MH/MR/MMR
Transmission Speed	6 sec.	6 sec.	6 sec.	6 sec.
Input/Output Width	8.5"/8.5"	8.5"/8.5"	8.5"/8.5"	8.5"/8.5"
LCD Size	16 x 1	16 x 2 (STN)	16 x 2 (STN)	16 x 1
Super Fine (Send)	Yes	Yes	Yes	Yes
Super Fine (Receive)	Available with optional memory	Available with optional memory	Available with optional memory	Yes
Gray Scale	64	64	64	64
Smoothing	Yes	Yes	Yes	Yes
Handset	No	No	No	No
One-touch Dial	20 x 2	12 x 2	12 x 2	20 x 2
Speed Dial	100	100	100	100
Telephone Index	Yes	Yes	Yes	Yes
Contrast	Light/Auto/Dark	Light/Auto/Dark	Light/Auto/Dark	Light/Auto/Dark
Multi-resolution Transmission	Yes	Yes	Yes	Yes
FAX/TEL Switch	Yes	Yes	Yes	Yes
Distinctive Ringing	Yes	Yes	Yes	—
Caller ID	Yes (U.K., Sweden, Holland and France)	Yes (U.K., Sweden, Holland and France)	Yes (U.K., Sweden, Holland and France)	Yes (U.K., Sweden, Holland and France)
Next FAX-reservation	Yes	Yes	Yes	Yes
Help	Yes	Yes	Yes	Yes
TAD Interface	Yes	Yes	Yes	Yes

MODEL	FAX3550	MFC4550	MFC6550MC	MFC7550MC
<b>FAX</b>				
Coverpage	Yes, Super	Yes, Super	Yes, Super	Yes, Super
Polling Type	Std/Del/Seq	Std/Del/Seq	Std/Del/Seq	Std/Del/Seq
Receive password	Yes	Yes	Yes	Yes
Delayed Transmission	Yes, 3 timings	Yes, 3 timings	Yes, 3 timings	Yes, 3 timings
Call Reservation	Yes	Yes	Yes	Yes
Callback Message	Yes	Yes	Yes	Yes
Page Memory (TX)*	300 KB (30 pgs: MMR)	200 KB (20 pgs: MMR)	300 KB (30 pgs: MMR)	700 KB (70 pgs: MMR)
Out-of-paper Reception*	400 KB (40 pgs: MMR)	400 KB (40 pgs: MMR)	600 KB (60 pgs: MMR)	1.5 MB (150 pgs: MMR)
Super Quick Scan	Yes	Yes	Yes	Yes
Auto Reduction	Yes	Yes	Yes	Yes
ECM	Yes	Yes	Yes	Yes
Broadcasting	Yes	Yes	Yes	Yes
Multi Transmission	Yes	Yes	Yes	Yes
<b>MESSAGE CENTER</b>				
TAD Feature	No	No	Yes (Hardware & PC)	Yes (Hardware & PC)
ICM Recording Time	No	No	Hardware: 15 min.	Hardware: 30 min.
Paging	No	No	Yes (Hardware & PC)	Yes (Hardware & PC)
Toll Saver	No	No	Yes (Hardware & PC)	Yes (Hardware & PC)
OGM	No	No	Yes (Hardware & PC)	Yes (Hardware & PC)
Mail Box	No	No	Yes (PC only)	Yes (PC only)
Fax-on-demand	No	No	Yes (PC only)	Yes (PC only)
Voice-on-demand	No	No	Yes (PC only)	Yes (PC only)
FAX Forwarding	Yes	Yes	Yes	Yes
FAX Retrieval	Yes	Yes	Yes	Yes
<b>MACHINE MEMORY</b>				
	0.75 MB	0.75 MB	1 MB	2 MB
<b>OPTIONAL MEMORY (FAX &amp; PRINTER FLEX)</b>				
	1 or 2 MB	1 or 2 MB	1 or 2 MB	1 or 2 MB
<b>PC FAX (Send/Receive)</b>				
Standard	Option	Yes (by M/L)	Yes (by M/L)	Yes (by M/L)
	—	Class 1, 2	Class 1, 2	Class 1, 2
<b>DATA MODEM</b>				
	No	No	No	No
<b>INTERFACE</b>				
Printer Interface	—	Centronics parallel (w/o cable) MULTI-FUNCTION LINK PRO	Centronics parallel (w/o cable) MULTI-FUNCTION LINK PRO	Centronics parallel (w/o cable) MULTI-FUNCTION LINK PRO
PC Interface	RS-232C (8-pin modular connector) MULTI-FUNCTION LINK	—	—	—
Extended I/O Interface	—	—	RS-232C and RS-422 (supported by an optional serial interface board RS-100M)	RS-232C and RS-422 (supported by an optional serial interface board RS-100M)
<b>Simultaneous</b>				
Sends FAX and Prints	—	Yes	Yes	Yes
Receives FAX and Prints	—	Yes	Yes	Yes
Receives FAX and Scans	—	Yes	Yes	Yes
Prints and Scans	—	Yes	Yes	Yes
Receives FAX and Copies	—	Yes	Yes	Yes
Prints and Copies	—	Yes	Yes	Yes

\* CCITT#1 Chart in the Standard Mode, MMR

MODEL	FAX3650	MFC4450	MFC4550plus	MFC7650MC
<b>FAX</b>				
Coverpage	Yes, Super	Yes, Super	Yes, Super	Yes, Super
Polling Type	Std/Del/Seq	Std/Del/Seq	Std/Del/Seq	Std/Del/Seq
Delayed Transmission	Yes, 13 timings	Yes, 3 timings	Yes, 3 timings	Yes, 13 timings
Call Reservation	Yes	Yes (with External)	Yes	Yes
Callback Message	Yes	Yes	Yes	Yes
Page Memory (TX)*	1 MB (100 pgs: MMR)	300 KB (30 pgs: MMR)	300 KB (30 pgs: MMR)	800 KB (80 pgs: MMR)
Out-of-paper Reception*	1.1 MB (110 pgs: MMR)	600 KB (60 pgs: MMR)	600 KB (60 pgs: MMR)	1.0 MB (100 pgs: MMR)
Super Quick Scan	Yes	Yes	Yes	Yes
ECM	Yes	Yes	Yes	Yes
Broadcasting	Yes	Yes	Yes	Yes
Multi Transmission	No	Yes	Yes	No
<b>MESSAGE CENTER</b>				
ICM Recording Time	No	No	No	Hardware: 30 min.
Paging	Yes (Hardware & PC)	Yes (Hardware & PC)	Yes (Hardware & PC)	Yes (Hardware & PC)
Toll Saver	No	No	No	Yes (Hardware & PC)
OGM	No	No	No	Yes (Hardware & PC)
Mail Box	No	No	Yes (PC only)	Yes (PC only)
Fax-on-demand	No	No	No	Yes (PC only)
Voice-on-demand	No	No	No	Yes (PC only)
FAX Forwarding	Yes	Yes	Yes	Yes
FAX Retrieval	Yes	Yes	Yes	Yes
<b>MACHINE MEMORY</b>				
	2 MB	1 MB	1 MB	2 MB
<b>OPTIONAL MEMORY (FAX &amp; PRINTER FLEX)</b>				
	1 or 2 MB	No	1 or 2 MB	1 or 2 MB
<b>PC FAX (Send/Receive)</b>				
Standard	Option	Yes (by M/L)	Yes (by M/L)	Yes (by M/L)
	—	SMSI	SMSI	SMSI
<b>DATA MODEM</b>				
	No	No	No	No
<b>INTERFACE</b>				
Printer Interface	—	Centronics parallel (w/o cable) MULTI-FUNCTION LINK PRO	Centronics parallel (w/o cable) MULTI-FUNCTION LINK PRO	Centronics parallel (w/o cable) MULTI-FUNCTION LINK PRO
PC Interface	RS-232C (8-pin modular connector) MULTI-FUNCTION LINK	—	—	—
Extended I/O Interface	—	—	—	RS-232C and RS-422 (supported by an optional serial interface board RS-100M)
<b>Simultaneous</b>				
Sends FAX and Prints	—	Yes	Yes	Yes
Receives FAX and Prints	—	Yes	Yes	Yes
Receives FAX and Scans	—	Yes	Yes	Yes
Prints and Scans	—	Yes	Yes	Yes
Receives FAX and Copies	—	Yes	Yes	Yes
Prints and Copies	—	Yes	Yes	Yes

\* CCITT#1 Chart in the Standard Mode, MMR

MODEL	FAX8000P	MFC9000	MFC9500	FAX8200P
<b>FAX</b>				
Coverpage	Yes, Super	Yes, Super	Yes, Super	Yes, Super
Polling Type	Std/Del/Seq/Sec	Std/Del/Seq/Sec	Std/Del/Seq/Sec	Std/Del/Seq/Sec
Receive password	Yes/Plus	Yes/Plus	Yes/Plus	Yes/Plus
Delayed Transmission	Yes, 3 timings	Yes, 3 timings	Yes, 3 timings	Yes, 3 timings
Call Reservation	Yes	Yes	Yes	Yes
Callback Message	Yes	Yes	Yes	Yes
Page Memory (TX)*	300 KB (30 pgs: MMR)	300 KB (30 pgs: MMR)	300 KB (30 pgs: MMR)	1 MB (100 pgs: MMR)
Out-of-paper Reception*	400 KB (40 pgs: MMR)	600 KB (40 pgs: MMR)	600 KB (60 pgs: MMR)	1.1 MB (110 pgs: MMR)
Super Quick Scan	Yes	Yes	Yes	Yes
Auto Reduction	Yes	Yes	Yes	Yes
ECM	Yes	Yes	Yes	Yes
Broadcasting	Up to 140 destinations	Up to 124 destinations	Up to 124 destinations	Up to 190 destinations
Multi Transmission	Yes	Yes	Yes	Yes
<b>MESSAGE CENTER</b>				
TAD Feature	No	No	Yes (Hardware & PC)	No
ICM Recording Time	No	No	Hardware: 15 min.	No
Paging	No	No	Yes (Hardware & PC)	No
Toll Saver	No	No	Yes (Hardware & PC)	No
OGM	UK/SWISS/AUS/GER	UK/SWISS	Yes (Hardware & PC)	UK/SWISS/GER
Mail Box	No	No	Yes (PC only)	No
Fax-on-demand	No	No	Yes (PC only)	No
Voice-on-demand	No	No	Yes (PC only)	No
FAX Forwarding	Yes	Yes	Yes	Yes
FAX Retrieval	Yes	Yes	Yes	Yes
<b>MACHINE MEMORY</b>				
	0.75 MB	1 MB	1 MB	2 MB
<b>OPTIONAL MEMORY (FAX &amp; PRINTER FLEX)</b>				
	1 or 2 MB	1 or 2 MB	1 or 2 MB	1 or 2 MB
<b>PC FAX (Send/Receive)</b>				
Standard	Option	Yes	Yes	Option
	—	Class 2	Class 2	—
<b>DATA MODEM</b>				
	No	No	No	No
<b>INTERFACE</b>				
Printer Interface	—	Centronics parallel (w/o cable) MULTI-FUNCTION LINK PRO	Centronics parallel (w/o cable) MULTI-FUNCTION LINK PRO	—
PC Interface	RS-232C (8-pin modular connector) CONNECT 5000 INTERFACE	—	—	RS-232C (8-pin modular connector) CONNECT 5000 INTERFACE
Extended I/O Interface	—	RS-232C and RS-422 (supported by an optional serial interface board RS-100M)	RS-232C and RS-422 (supported by an optional serial interface board RS-100M)	—
<b>Simultaneous</b>				
Sends FAX and Prints	—	Yes	Yes	—
Receives FAX and Prints	—	Yes	Yes	—
Receives FAX and Scans	—	Yes	Yes	—
Prints and Scans	—	Yes	Yes	—
Receives FAX and Copies	—	Yes	Yes	—
Prints and Copies	—	Yes	Yes	—

\* CCITT#1 Chart in the Standard Mode, MMR

# **CHAPTER II.**

# **INSTALLATION**

## CONTENTS

1. INSTALLING THE UPDATE DATA TO THE FACSIMILE EQUIPMENT..... II-1

# 1. INSTALLING THE UPDATE DATA TO THE FACSIMILE EQUIPMENT

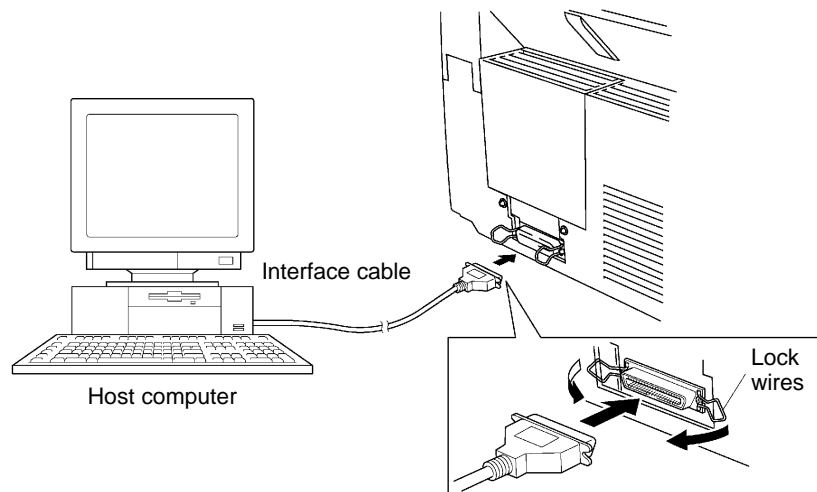
If the program version is updated or the main PCB is replaced, install the update program onto the flash ROM of the main PCB.

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

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

## Connecting the equipment to your computer

- (1) Make sure that the equipment's power cord is unplugged from a wall socket.
- (2) Make sure that your computer is powered off.
- (3) Connect the interface cable to the parallel interface port on the back of the equipment and secure it with the lock wires.
- (4) Connect the other end of the interface cable to the printer port of your computer and secure it with the two screws.
- (5) Power on your computer.
- (6) Plug the equipment's power cord into a wall socket.





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

- (1) Load the floppy disk which stores the update data and transfer utility into the floppy disk drive of your computer.  
(Or, copy the update data and transfer utility onto the same directory of the hard disk.)
- (2) Click the Start button, point to Programs, and then click MS-DOS Prompt to open an MS-DOS window.
- (3) Type the drive letter where the update data and transfer utility are located. If it is a floppy disk drive, type `A:\` from the command line and press the **ENTER** key.
- (4) Check that your computer is connected with the facsimile equipment correctly.
- (5) To start the transfer utility transmitting the update data to the flash ROM of the facsimile equipment, type the following:

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

Then press the **ENTER** key.

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

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

During downloading, the equipment beeps *intermittently*.

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

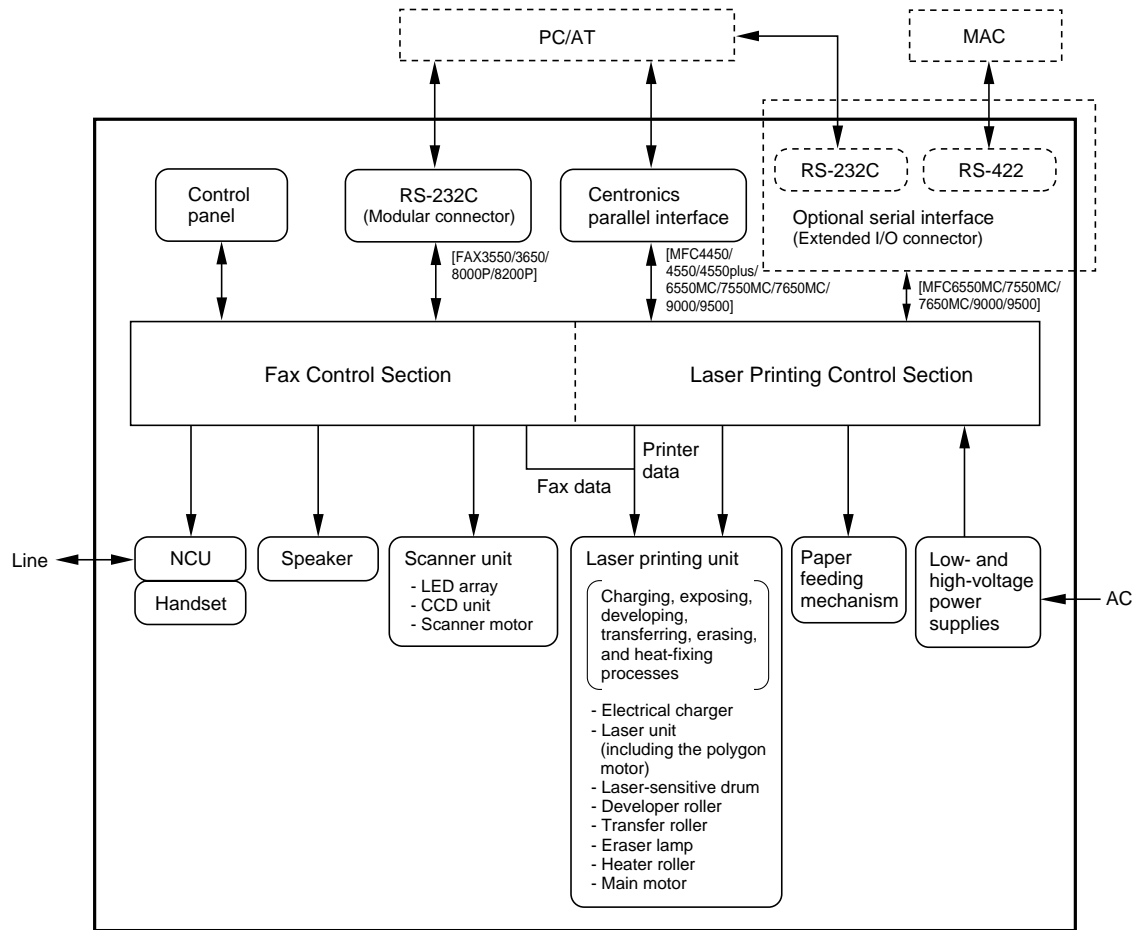
# CHAPTER **III**.

## THEORY OF OPERATION

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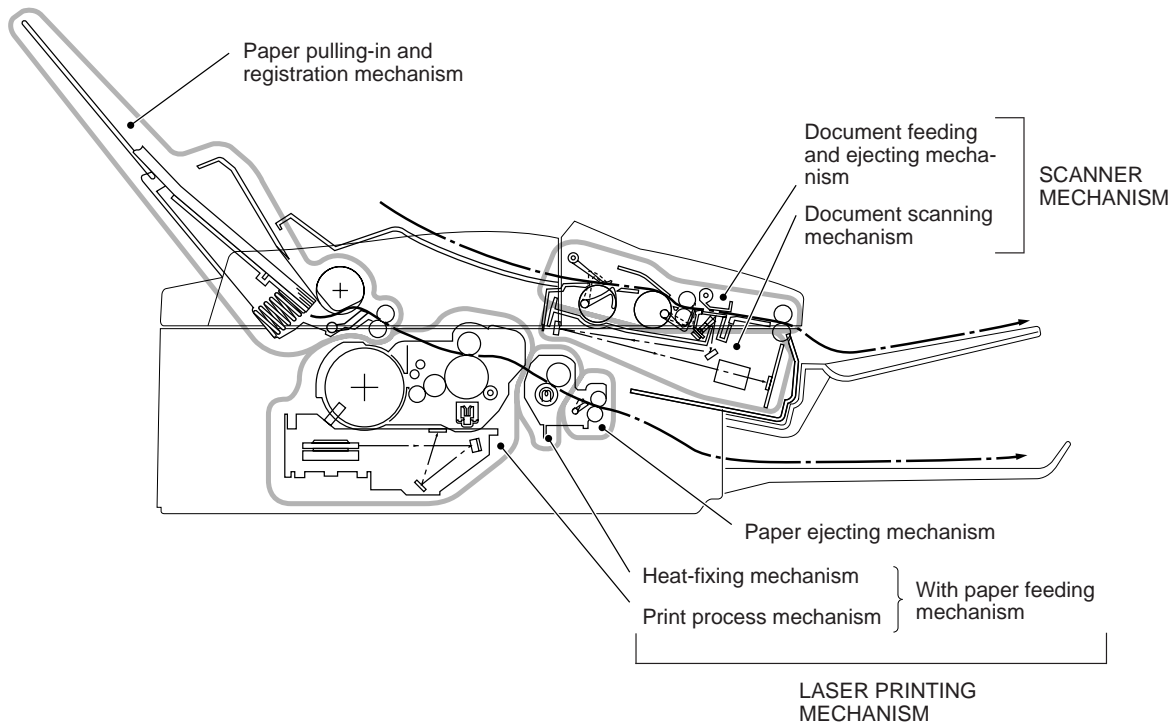
# 1. OVERVIEW



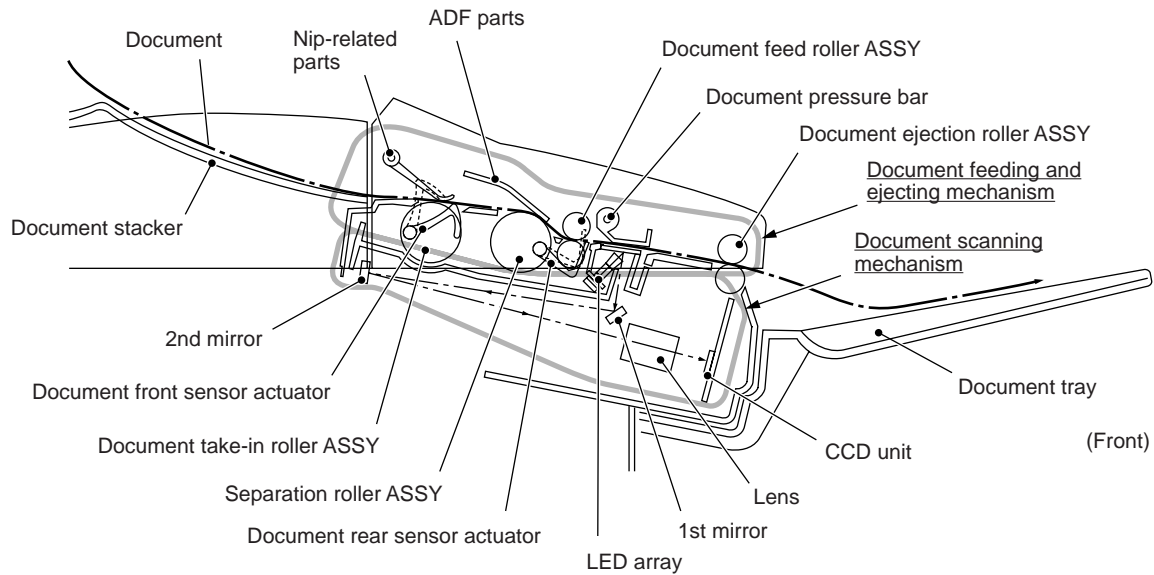
## 2. MECHANISMS

The equipment is classified into the following mechanisms:

- SCANNER MECHANISM
  - Document feeding and ejecting mechanism
  - Document scanning mechanism
  
- LASER PRINTING MECHANISM
  - Paper pulling-in, registration, feeding, and ejecting mechanisms
  - Print process mechanism (consisting of charging, exposing, developing, transferring, and erasing processes)
  - Heat-fixing mechanism
  
- SENSORS AND ACTUATORS



## 2.1 Scanner Mechanism



### 2.1.1 Document feeding and ejecting mechanism

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

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

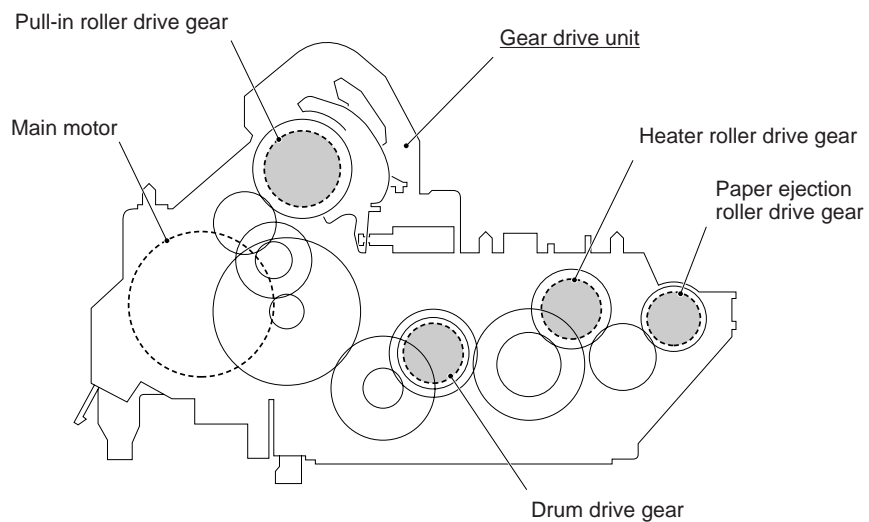
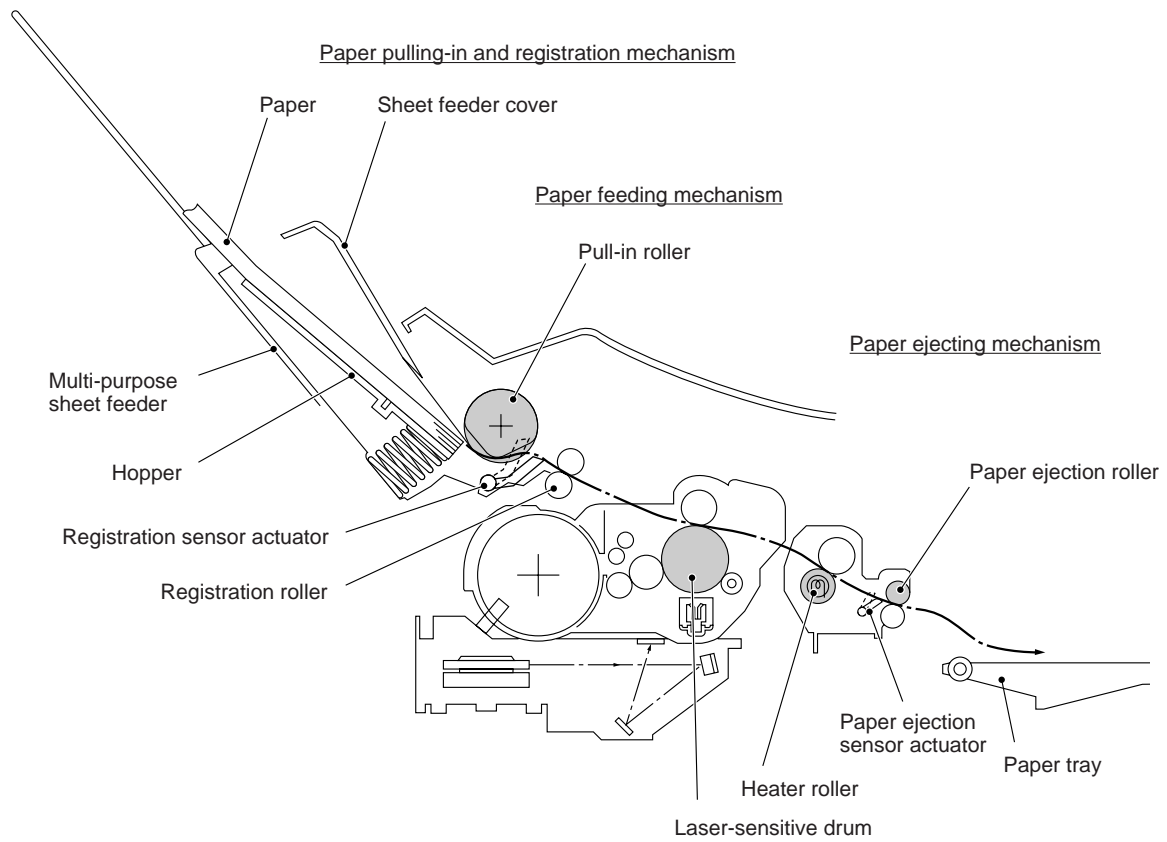
### 2.1.2 Document scanning mechanism

The scanner uses a charge coupled device (CCD) image sensor.

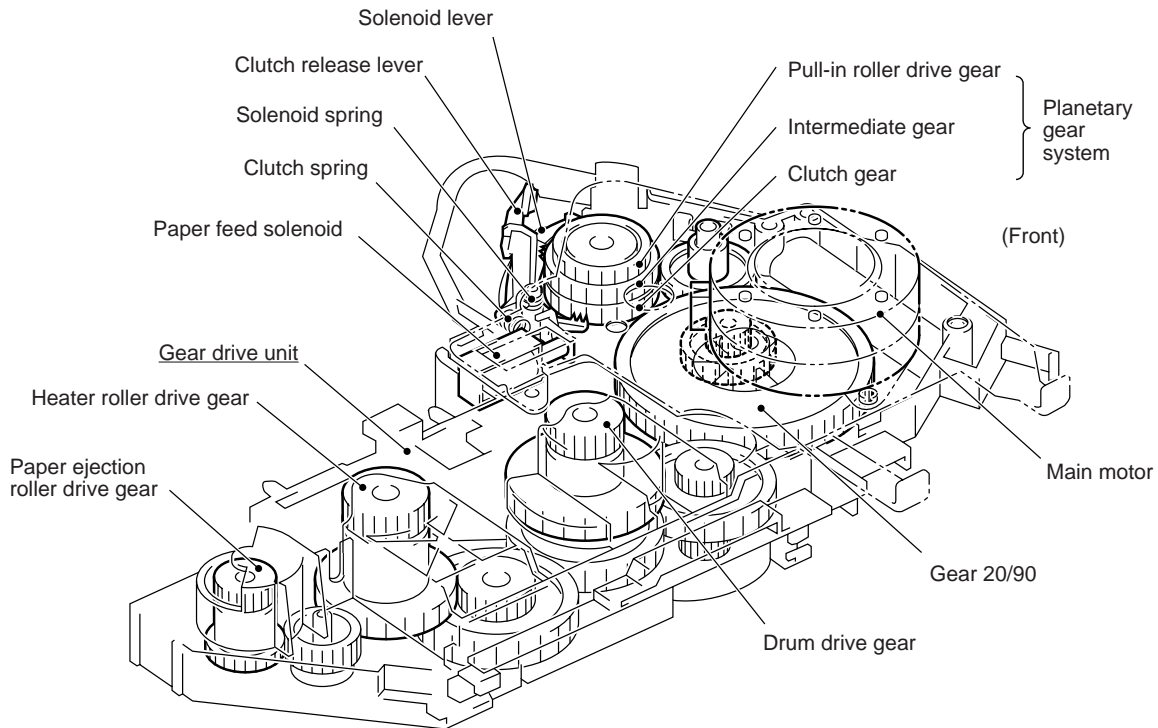
As illustrated above, the LED array illuminates a document and the reflected light of the scanned image data is transmitted via the mirrors into the lens which reduces the scanned data so as to form the image on the CCD.

## 2.2 Laser Printing Mechanism

### 2.2.1 Paper pulling-in, registration, feeding, and ejecting mechanism



### Paper pulling-in and registration mechanism



The paper pulling-in and registration mechanism consists of the pull-in roller gear (incorporated in the multi-purpose sheet feeder), planetary gear system, paper feed solenoid, solenoid lever, clutch release lever, and registration sensor. (For the details about the sensor, refer to Section 2.3.)

If the main motor rotates clockwise, the rotation is transmitted to the intermediate gear of the planetary gear system. As the intermediate gear rotates, the pull-in roller drive gear also rotates since the clutch gear is locked by the solenoid lever and the clutch release lever. Accordingly, the pull-in roller in the multi-purpose sheet feeder rotates to pull in paper into the equipment, a sheet at a time.

If the paper feed solenoid is retracted and the clutch release lever is operated according to the cam profile of the pull-in roller gear so as to release the clutch gear, the clutch gear rotates and the pull-in roller drive gear does not rotate. In this way, the clutch gear switches the transmission of the motor rotation on and off to the pull-in roller drive gear.

The solenoid on/off timing and the clutch release lever timing allow this mechanism to pull in a sheet and register it against the registration roller.

### Paper feeding and ejecting mechanism

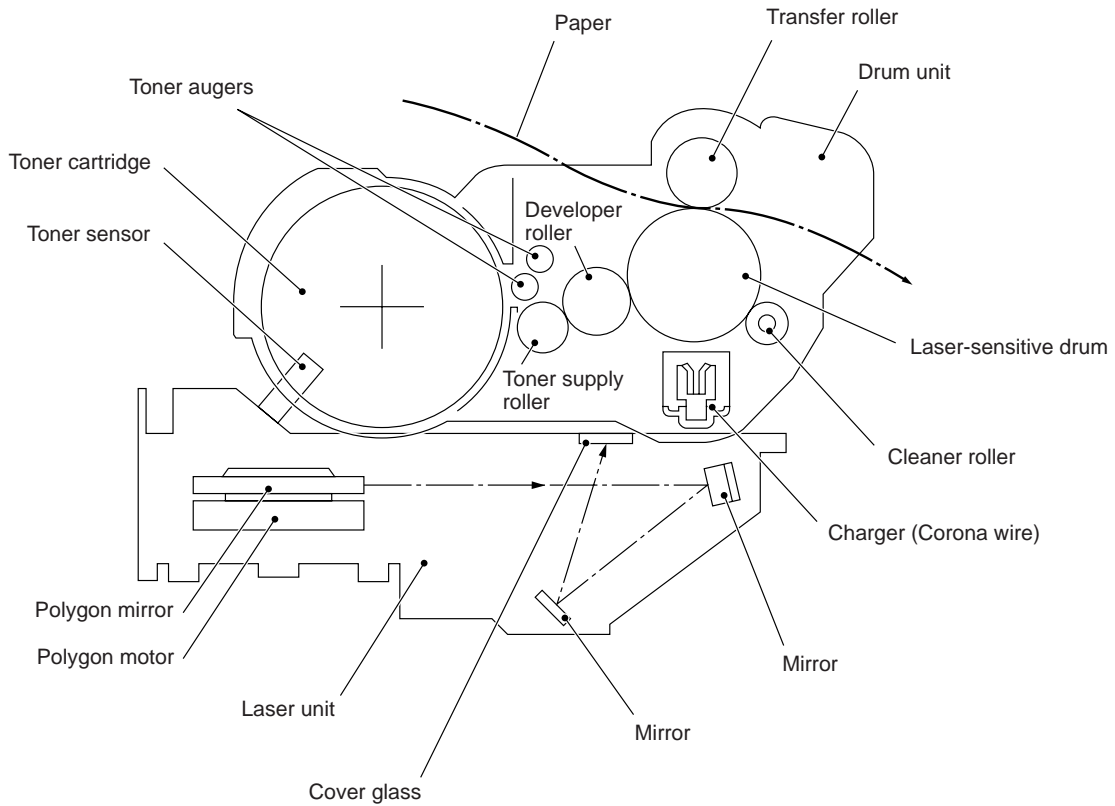
If the main motor rotates clockwise, the rotation is transmitted via the gear train to the drum drive gear, heater roller drive gear, and paper ejection roller drive gear.

After the paper passes through the heat-fixing process, it will be ejected onto the paper tray.

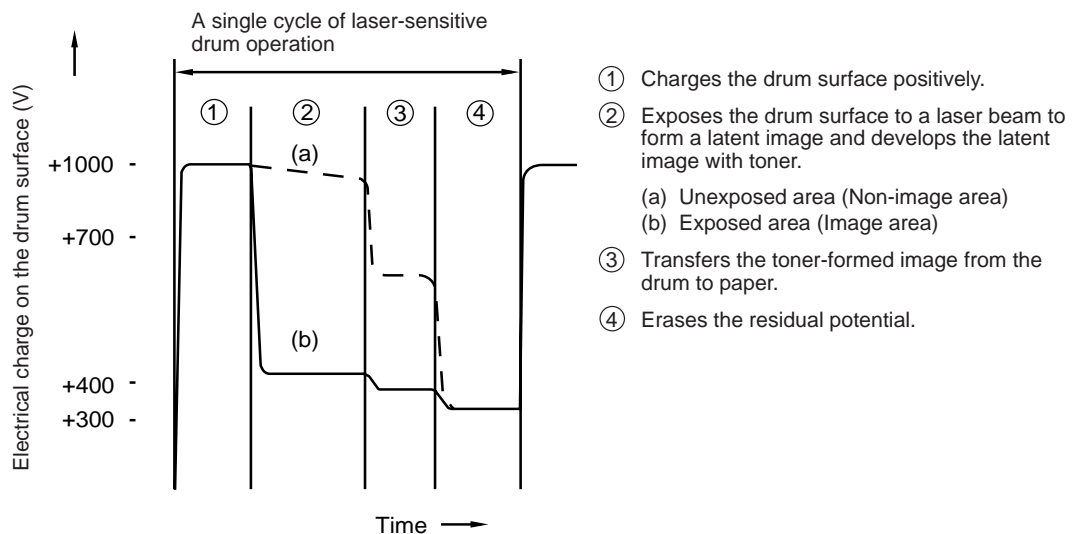
If the leading edge of the paper pushes up the actuator of the paper ejection sensor, the photo sensor becomes opened, signaling the start of paper ejection. If the trailing edge has passed through the sensor actuator, the sensor becomes closed, signaling the completion of paper ejection. Then, the main motor stops rotation.



## 2.2.2 Print process mechanism

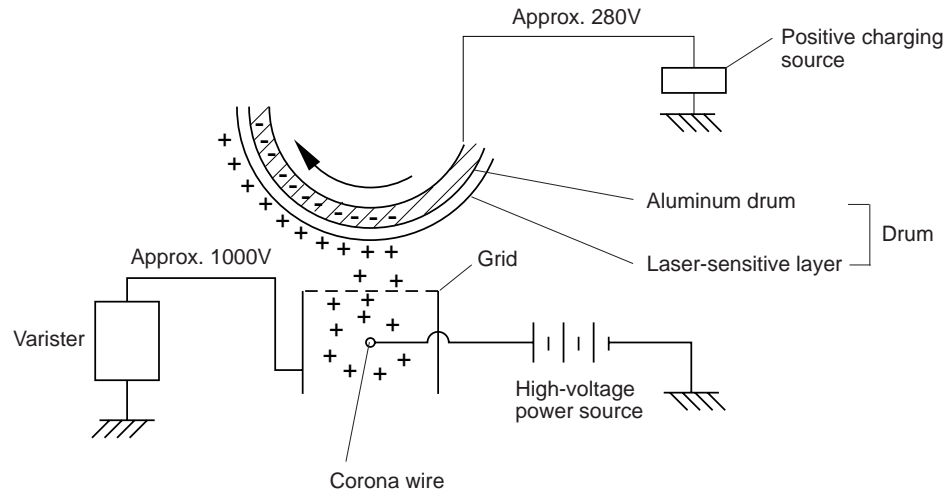


The print process unit works with laser beam, electrical charges, and toner. The graph below shows the transition of electrical charge on the surface of the laser-sensitive drum through the five processes: charging, exposing, developing, transferring, and erasing processes.



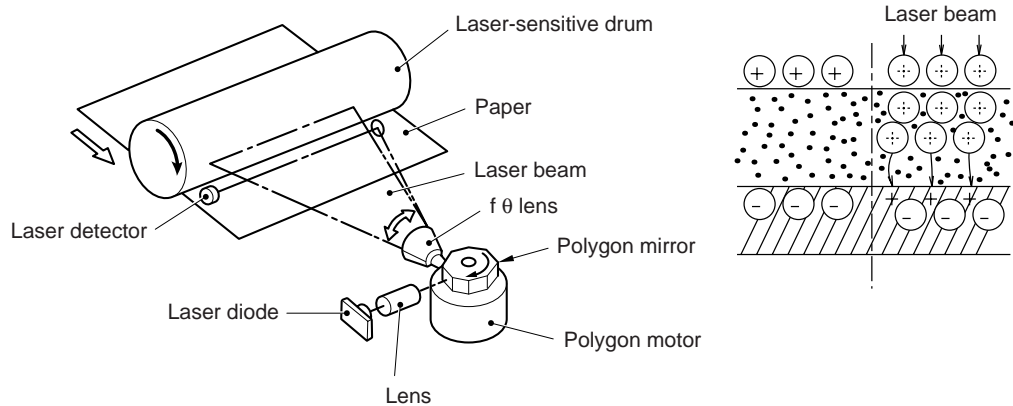
### (1) Charging process

The high-voltage power supply applies DC bias to the corona wire to generate ion on the grid. The ion uniformly charges the surface of the laser-sensitive drum to approx. 1000V which is kept by the varistor grounding the grid to the frame.



### (2) Exposing process

When the laser-sensitive drum holds a positive electrical charge, the laser beam issued from the laser unit scans the drum according to the print image to expose the drum surface for neutralizing the spots where black should be, forming an electrostatic latent image.



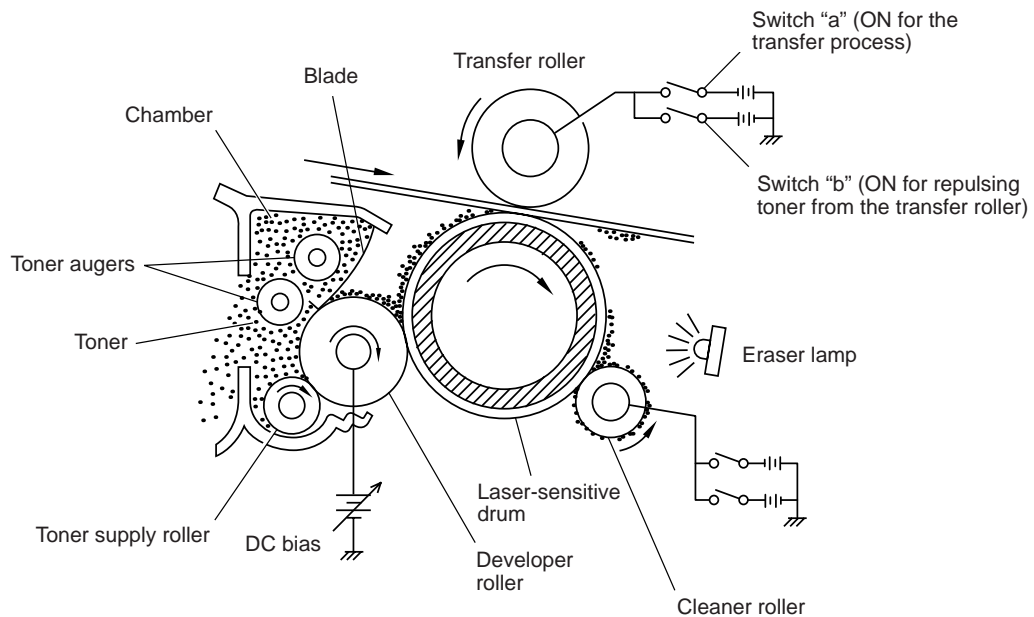
### (3) Developing process

The developing process develops an electrostatic latent image formed on the drum in the exposing process, into a toner image.

The developer roller attracts the toner particles fed from the toner cartridge by the toner supply roller, and then conveys them to the contact section with the laser-sensitive drum.

On the contact section between the developer roller and drum, the positive toner particles stick to the neutralized spots on the drum according to the principles of attraction and repulsion, transforming a latent image into a toner image.

The toner augers (which agitate toner particles in the chamber) and the blade allow toner particles to be fed onto the developer roller at an even thickness.



### (4) Transferring process

When a paper passes between the drum and the transfer roller, the switch "a" (see the above illustration) is turned on to negatively charge the transfer roller. The toner is positive, so the toner image formed on the drum will be transferred onto the paper according to the same principle as for the developing process.

If the toner image fails to stick to the paper due to paper jam or other errors, it will stick to the transfer roller. To repulse this toner, the switch "b" (see the above illustration) is turned on to positively charge the transfer roller. The toner returns from the transfer roller to the drum.

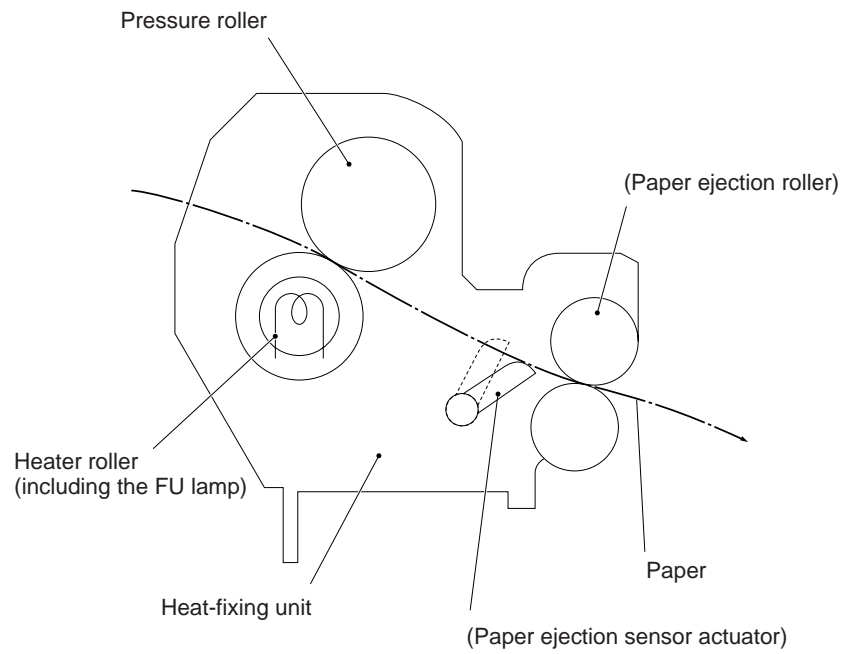
#### Cleaning the drum

In the transferring process, not all the toner particles on the drum are transferred onto the paper but some toner particles remain on the drum. The cleaner roller cleans the drum surface and collects the residual toner. When printing starts or during non-printing, the toner collected on the cleaner roller will be discharged onto the drum and returned to the chamber through the developer roller for recycling in the subsequent developing process.

### (5) Erasing process

The eraser lamp emits light to expose the drum surface, which erases the residual electrical charge.

### 2.2.3 Heat-fixing mechanism



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

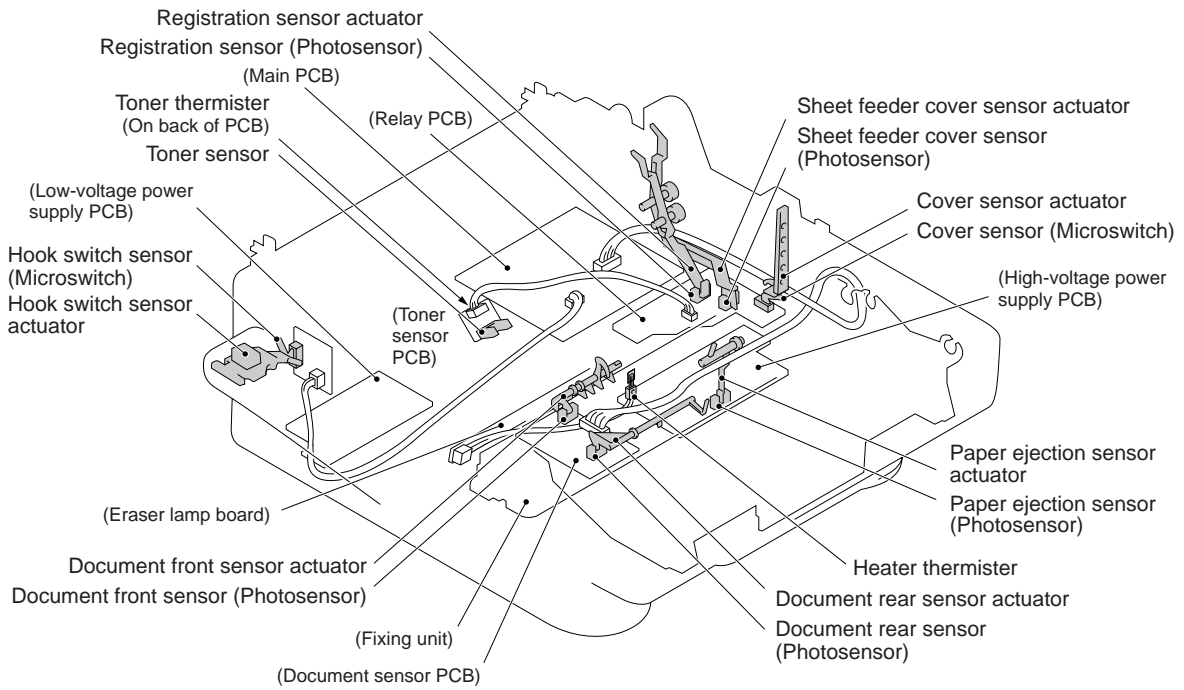
## 2.3 Sensors and Actuators

This equipment has ten sensors: two microswitches, six photosensors and two thermisters as described below.

Sensor name	Type	Located on
Hook switch sensor	Microswitch	Hook switch PCB
Cover sensor	Microswitch	Relay PCB
Registration sensor	Photosensor (PC1)	Relay PCB
Sheet feeder cover sensor	Photosensor (PC2)	Relay PCB
Paper ejection sensor	Photosensor (PC1)	High-voltage power supply PCB
Document front sensor	Photosensor (PC1)	Document sensor PCB
Document rear sensor	Photosensor (PC2)	Document sensor PCB
Toner sensor	Photosensor (PH1)	Toner sensor PCB (on the laser unit)
Toner thermister	P1	Toner sensor PCB (on the laser unit)
Heater thermister	—	Fixing unit

- Hook switch sensor which detects whether the handset is placed on the handset mount.
- Cover sensor which detects whether the top cover is closed.
- Registration sensor which detects the leading and trailing edges of paper, which allows the controller to determine the registration timing and check paper jam.
- Sheet feeder cover sensor which detects whether the sheet feeder cover is closed.
- Paper ejection sensor which detects whether the recording paper goes out of the equipment.
- Document front sensor which detects the presence of documents.
- Document rear sensor which detects the leading and trailing edges of pages to tell the control circuitry when the leading edge of a new page has reached the starting position and when the scan for that page is over.
- Toner sensor which detects whether there is toner or a toner cartridge is loaded.
- Toner thermister which detects the temperature of the toner cartridge.
- Heater thermister which detects the temperature of the heater roller of the fixing unit.

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

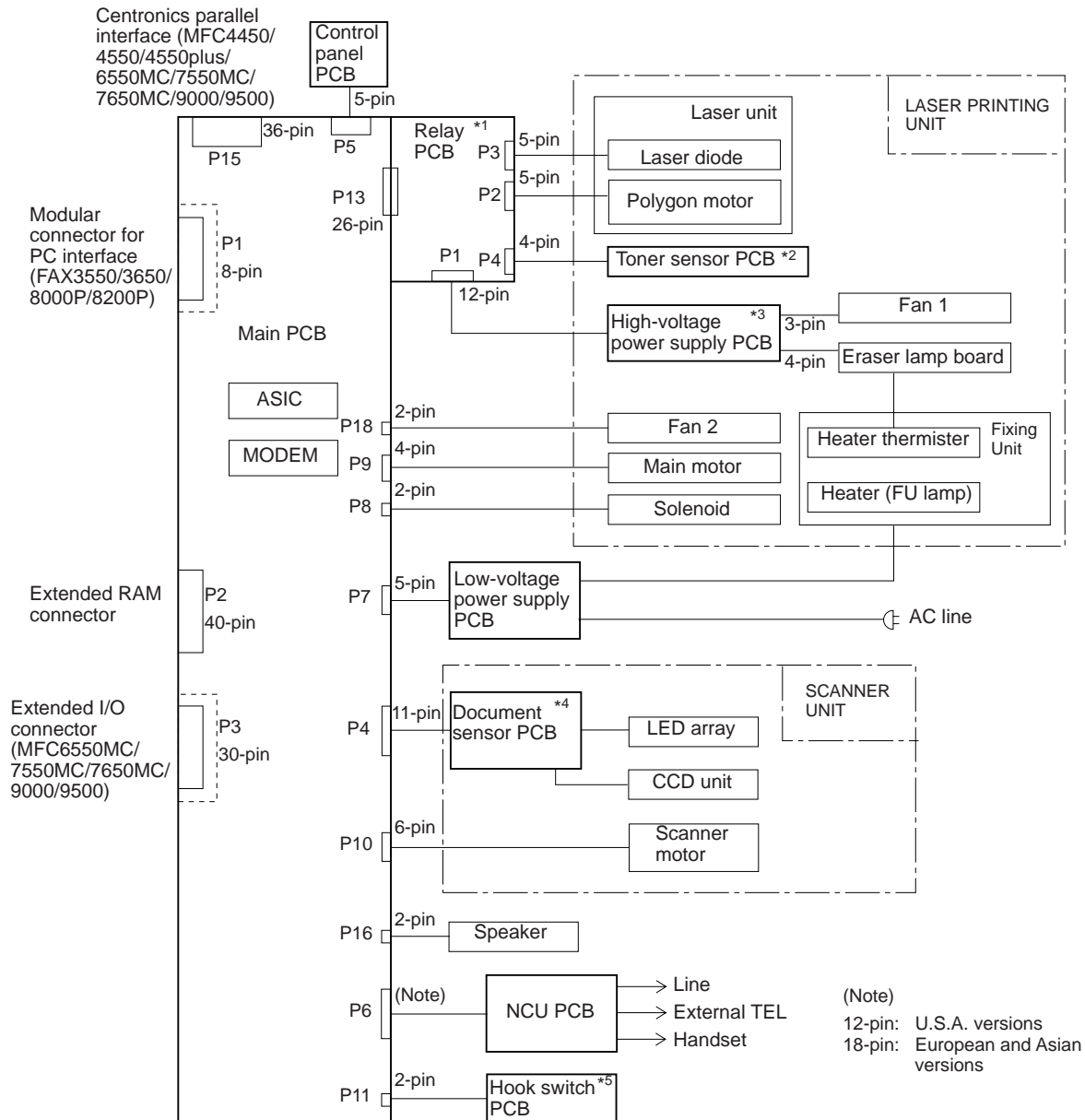


**Location of Sensors and Actuators**

# 3. CONTROL ELECTRONICS

## 3.1 Configuration

The configuration of the facsimile equipment is shown below.



\*1 On the relay PCB are these sensors:

- Cover sensor
- Sheet feeder cover sensor
- Registration sensor

\*2 On the toner sensor PCB are these sensors:

- Toner sensor
- Toner thermister

\*3 On the high-voltage power supply PCB is the paper ejection sensor.

\*4 On the document sensor PCB are these sensors:

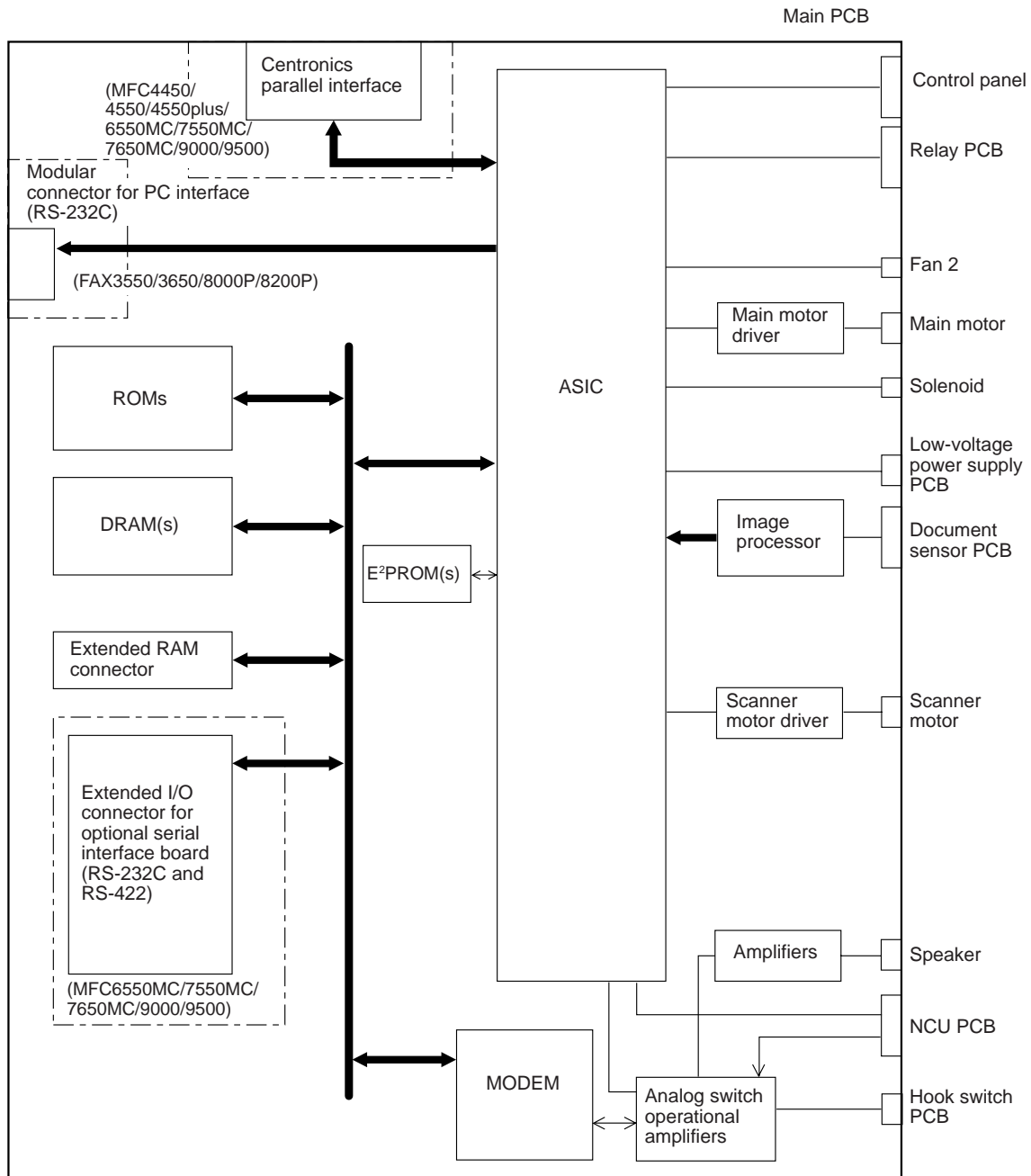
- Document front sensor
- Document rear sensor

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

### Configuration

### 3.2 Main PCB

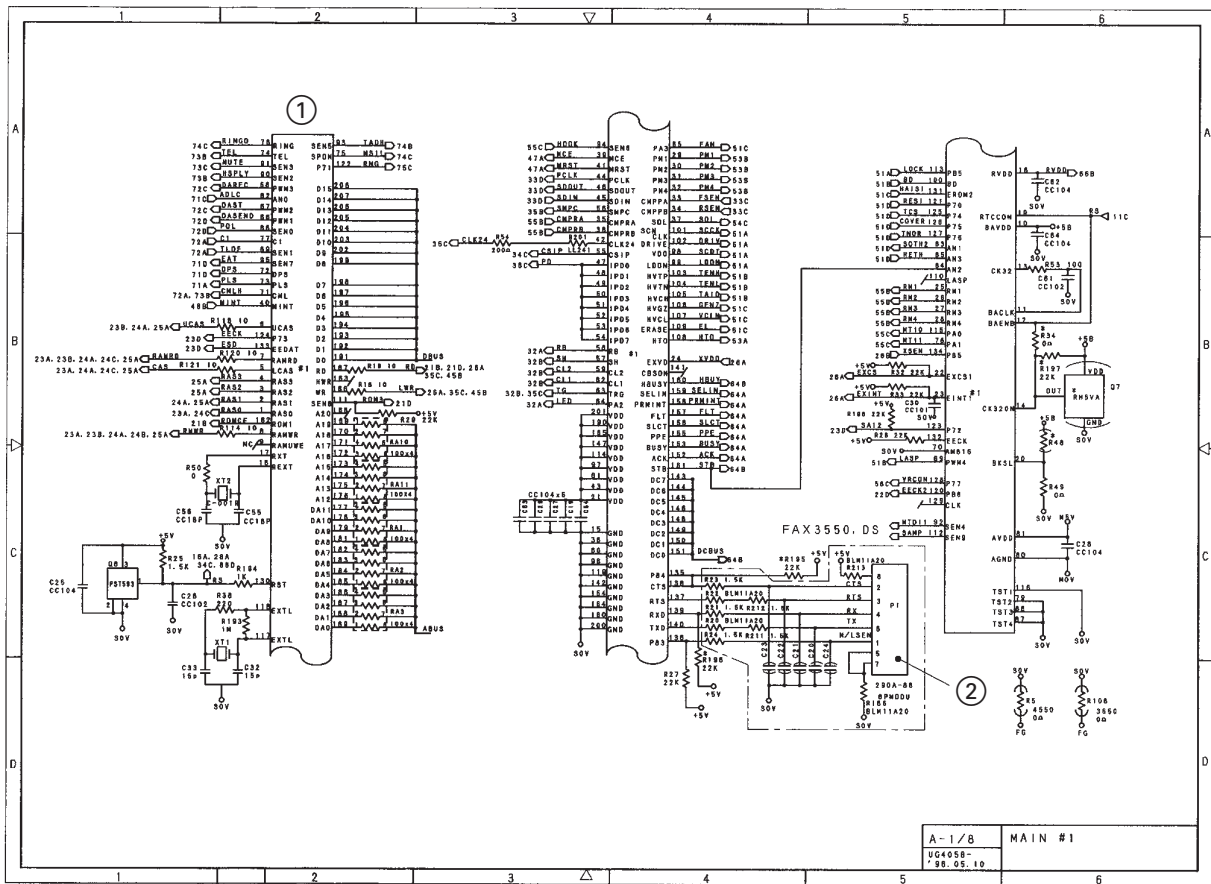
The main PCB, which is the nucleus controlling the entire operation of the equipment, consists of a FAX engine (ASIC), memories, MODEM, motor drive circuits, sensor detection circuitry, and analog circuits for scanning, printing, and power transmission shifting.



E<sup>2</sup>PROM: Electrically Erasable Programmable Read-only Memory  
 DRAM: Dynamic Random Access Memory

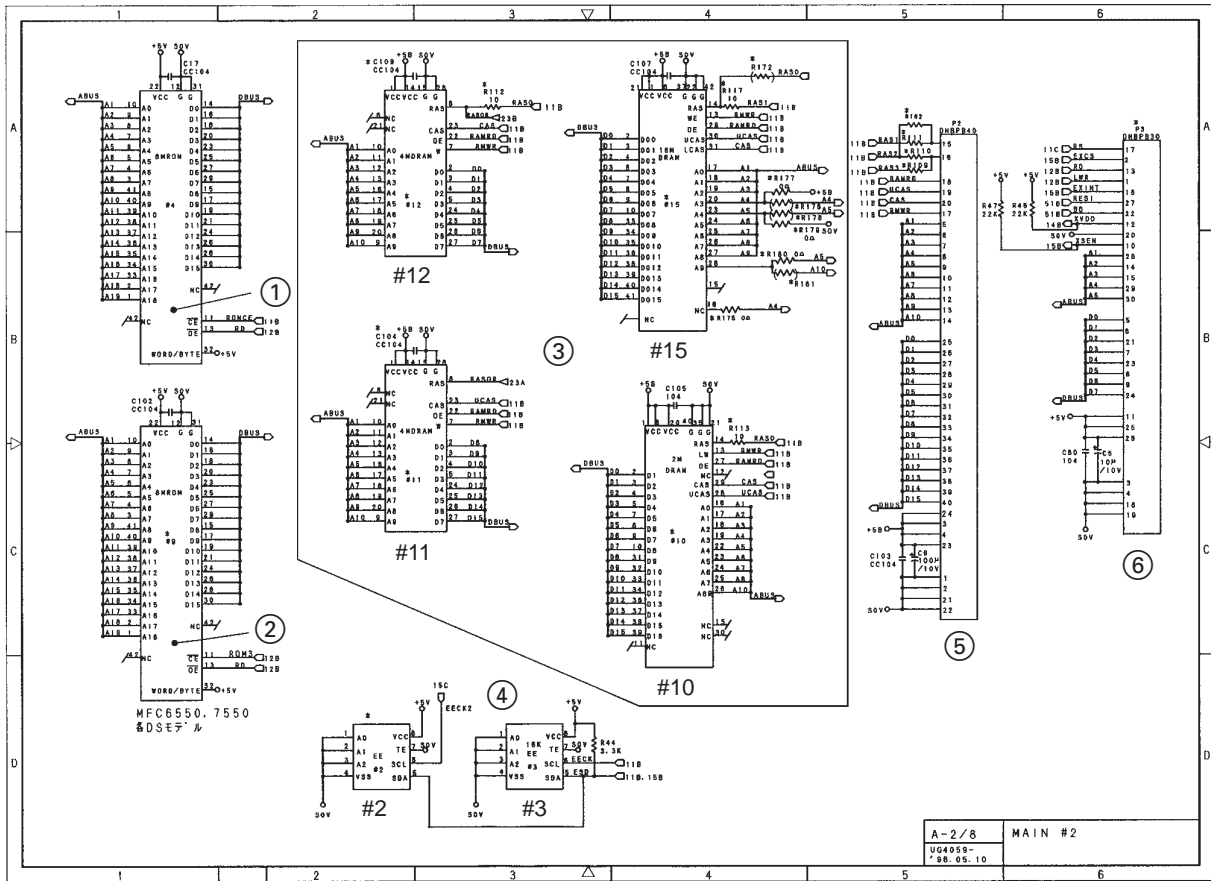
**Block Diagram of Main PCB**





Main PCB Circuit Diagram 1/7

- ① FAX engine (ASIC) which manages the I/Os, memories, drivers and image processor as well as controlling the laser printing unit.
- ② 8-pin modular connector for the PC interface (RS-232C), provided on the FAX3550/3650/8000P/8200P.



Main PCB Circuit Diagram 2/7

- ① FAX3550/3650/8000P/8200P/MFC4450/4550/6550MC/7550MC/9000/9500:  
ROM (8-megabit, 512K x 16 bits) which stores programs.  
MFC4550plus/7650MC: Flash ROM (8-megabit) which stores programs.
- ② ROM (8-megabit, 512K x 16 bits)  
FAX3550/3650/8000P/8200P/MFC4450/4550/4550plus:  
This ROM is used only on the qualification machines for demonstration.  
MFC6550MC/7550MC/7650MC/9000/9500:  
This ROM stores the PCL4 (Driver programs for high-quality print).
- ③ DRAMs  
FAX3550/8000P/MFC4550/6550MC/7550MC/9000/9500:

DRAM No.	#10	#11	#12	#15
Model				
FAX3550/MFC4550	—	4M x 8 bits	4M x 8 bits	—
FAX8000P/MFC6550MC/ 9000/9500	—	4M x 8 bits	4M x 8 bits	—
MFC7550MC	—	—	—	16M x 16 bits

FAX3650/8200P/MFC4450/4550plus/7650MC:

DRAM No.	#10	#15
Model		
FAX3650/8200P	—	16M x 16 bits
MFC4450	4M x 16 bits	4M x 16 bits
MFC4550plus	4M x 16 bits	4M x 16 bits
MFC7650MC	—	16M x 16 bits

— : Not installed

— : Not installed

- ④ E<sup>2</sup>PROMs which store user settings.

FAX3550/8000P/MFC4550/6550MC/7550MC/9000/9500:

E <sup>2</sup> PROM No.	#2	#3
Model		
FAX3550	16K x 1 bit	16K x 1 bit
MFC4550	—	16K x 1 bit
MFC6550MC	—	16K x 1 bit
FAX8000P/MFC6550MC/ 9000/9500	16K x 1 bit	16K x 1 bit

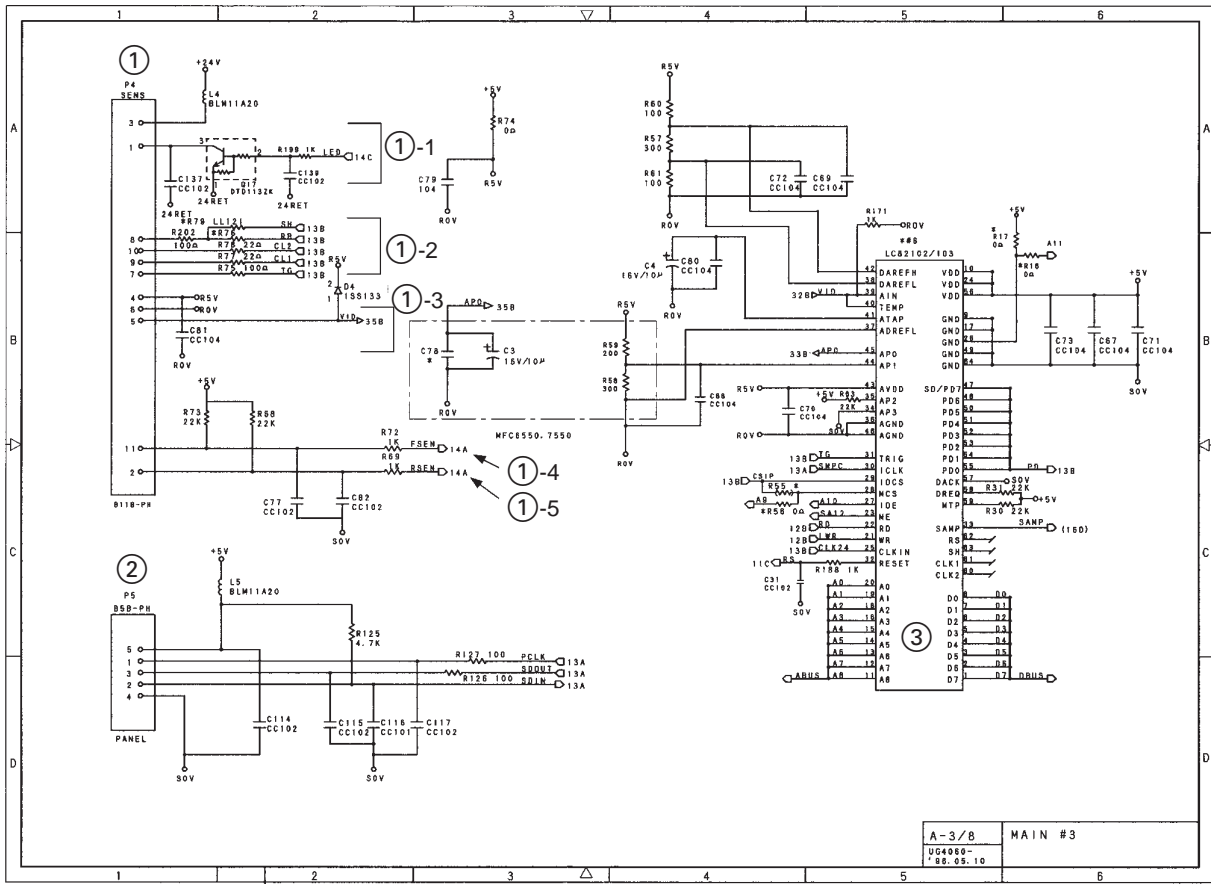
— : Not installed

FAX3650/8200P/MFC4450/4550plus/7650MC:

E <sup>2</sup> PROM No.	#2	#3
Model		
FAX3650/8200P	16K x 1 bit	16K x 1 bit
MFC4450	—	16K x 1 bit
MFC4550plus	—	16K x 1 bit
MFC7650MC	—	32K x 1 bit

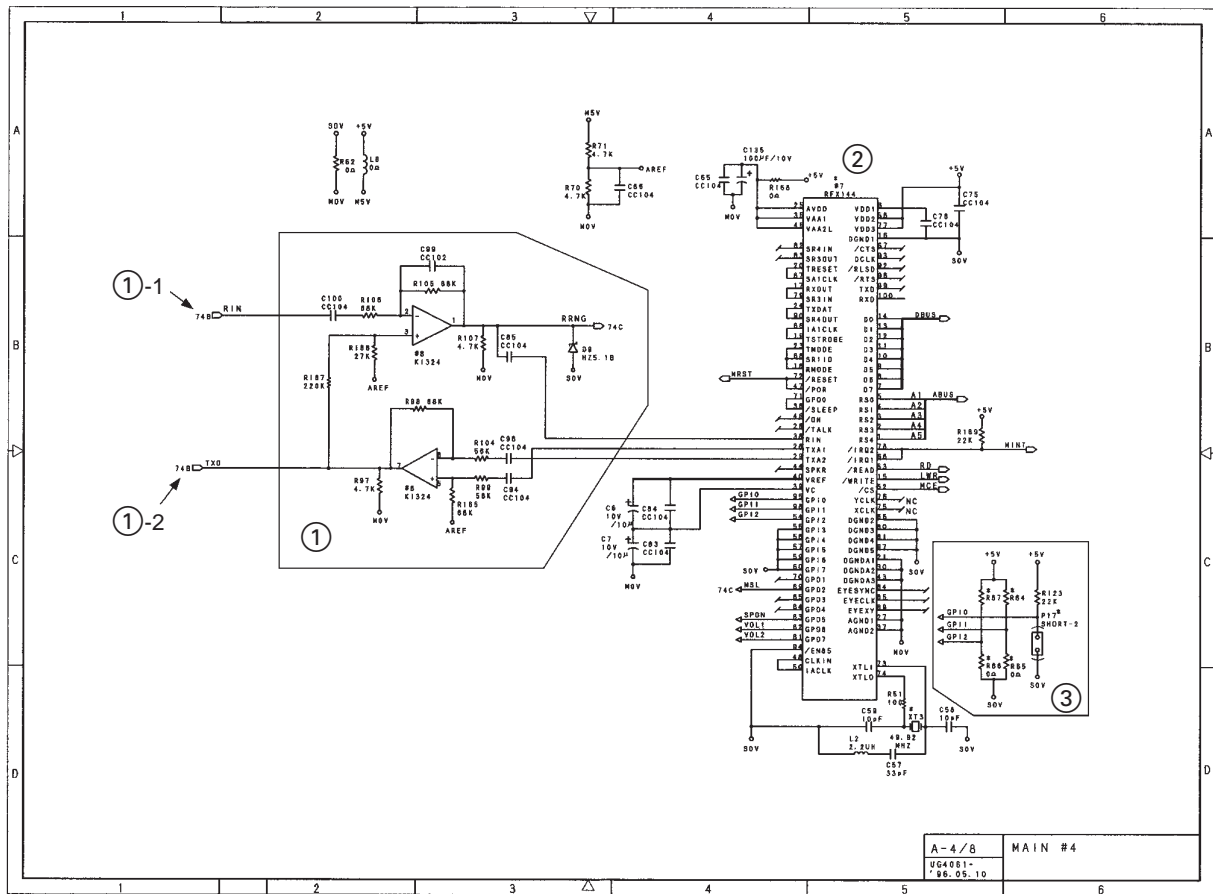
— : Not installed

- ⑤ Extended RAM port which allows you to add a memory up to two megabytes.
- ⑥ Extended I/O connector for an optional serial interface board RS-100M which supports the RS-232C and RS-422. (Only for the MFC6550MC/7550MC/7650MC/9000/9500)



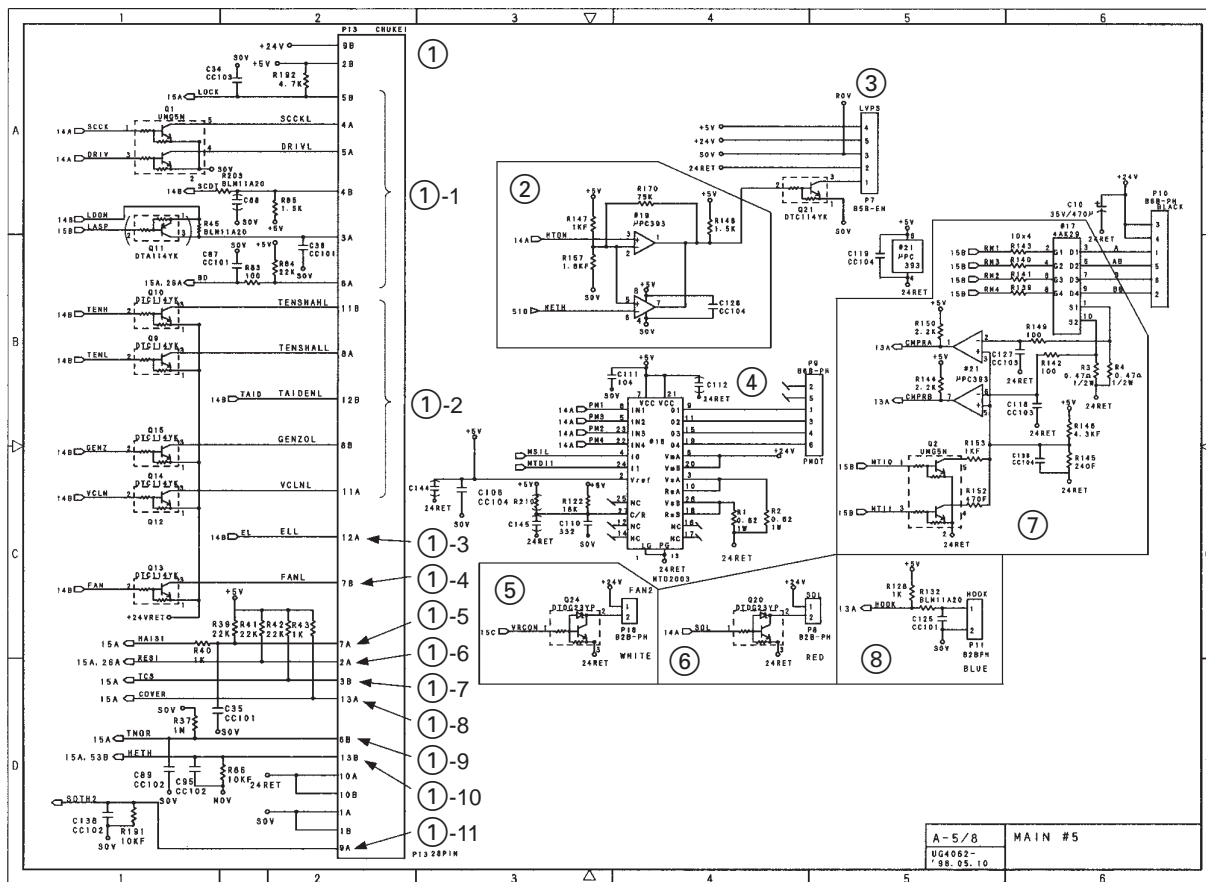
**Main PCB Circuit Diagram 3/7**

- ① Connector for the document sensor PCB
    - ①-1: Current sink transistor for driving the LED array
    - ①-2: Synchronous clocks for the CCD unit
    - ①-3: Image signal from the CCD unit
    - ①-4: Signal from the document front sensor
    - ①-5: Signal from the document rear sensor
  - ② Connector for the control panel
  - ③ Image signal processor
- FAX3550/3650/8000P/8200P/MFC4450/4550/4550plus: 200 dpi  
 MFC6550MC/7550MC/7650MC/9000/9500: 300 dpi



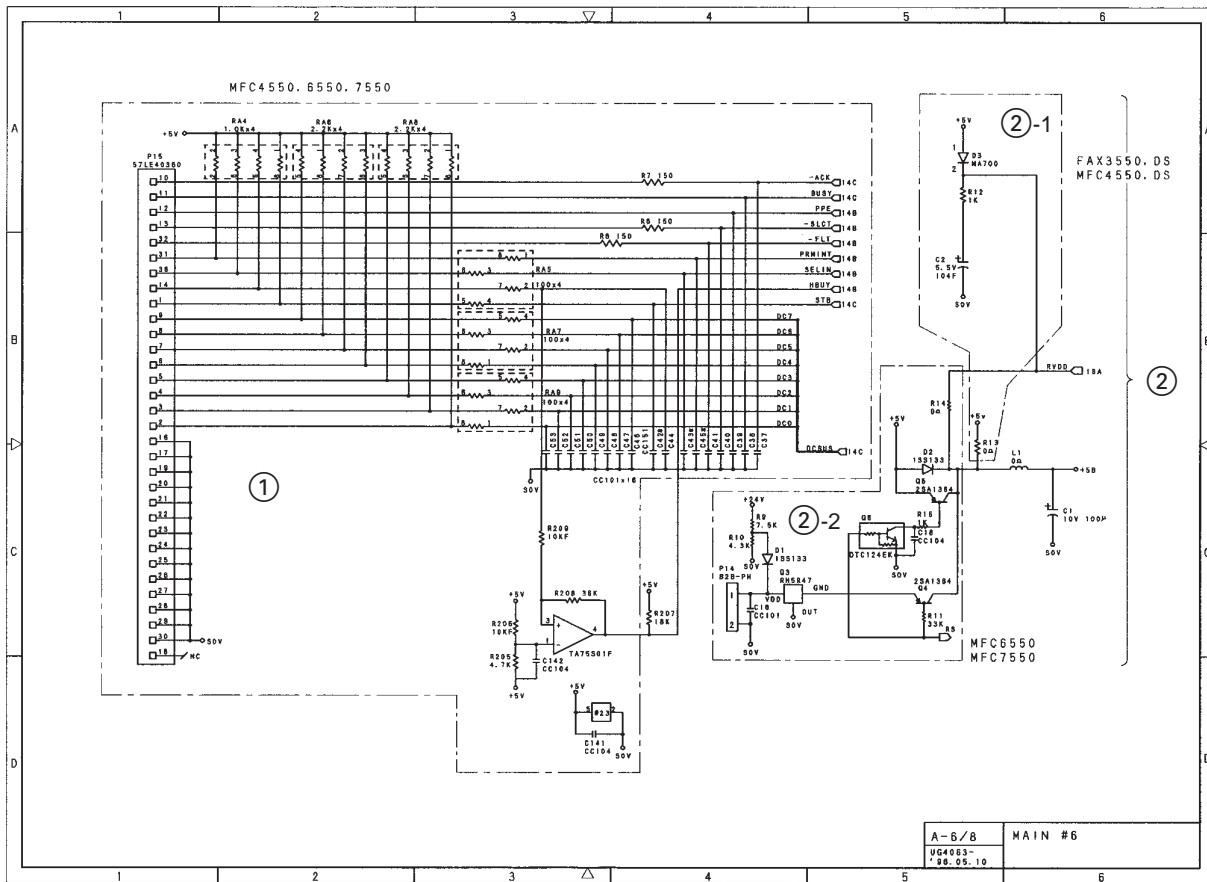
**Main PCB Circuit Diagram 4/7**

- ① Operational amplifiers for modem-to-line interface
  - ①-1: RIN, signal from line to modem
  - ①-2: TXO, signal from modem to line
- ② Modem
- ③ Short pin
  - Mounted on the Turkish versions only.



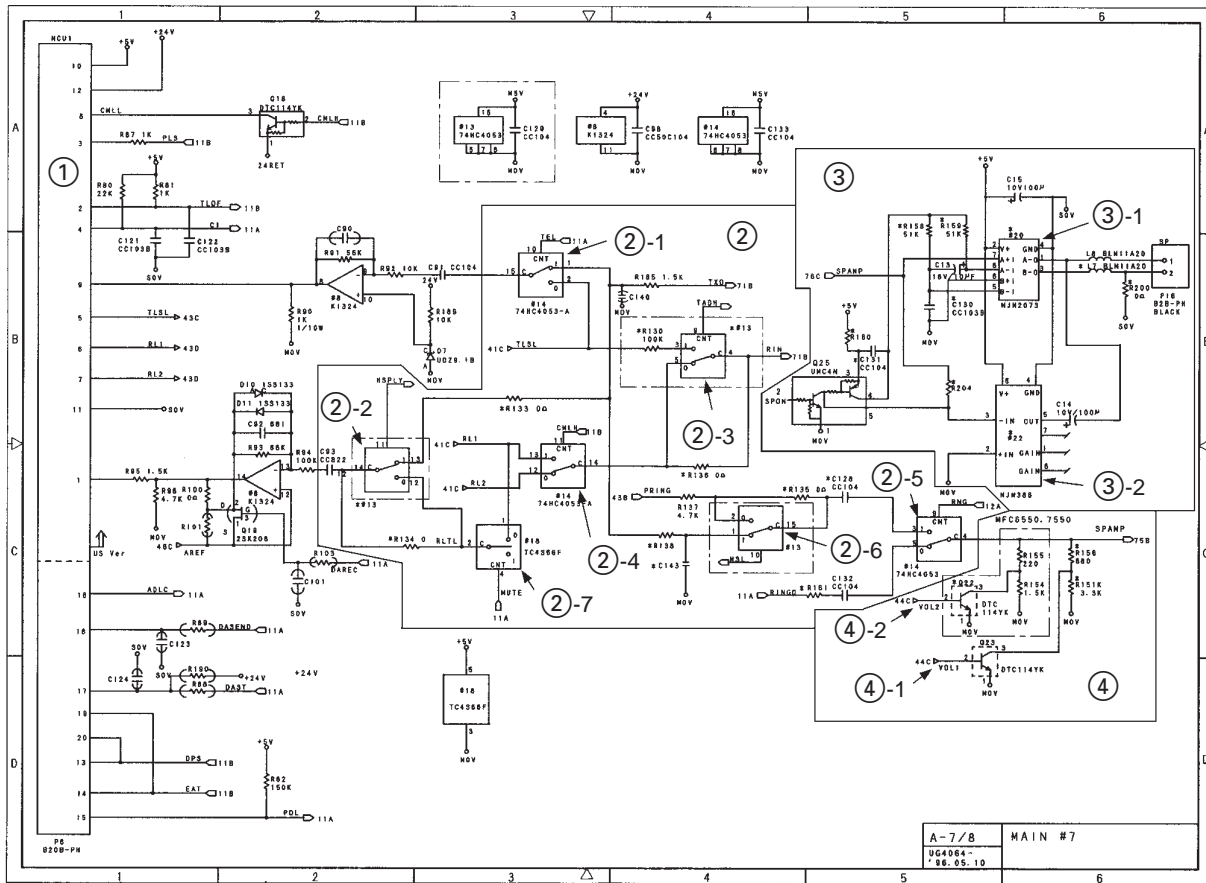
Main PCB Circuit Diagram 5/7

- ① Connector for the relay PCB
  - ①-1: Laser drive signals
  - ①-2: High-voltage power supply control signals
  - ①-3: Eraser lamp ON/OFF signal
  - ①-4: Fan 1 control signal
  - ①-5: Signal input from the paper ejection sensor
  - ①-6: Signal input from the registration sensor
  - ①-7: Signal input from the sheet feeder cover sensor
  - ①-8: Signal input from the cover sensor
  - ①-9: Signal input from the toner sensor
  - ①-10: Signal input from the heater thermister
  - ①-11: Signal input from the toner thermister
- ② Heater control circuit which prevents the heater from overheating due to ASIC or software malfunction. (The ASIC controls the HTON signal with the hysteresis characteristics for stabilized heater control.)
- ③ Connector for the low-voltage power supply
- ④ Main motor driver which controls recording paper feeding and drum rotation.
- ⑤ Fan 2 driver circuit
- ⑥ Paper pull-in solenoid circuit
- ⑦ Scanner motor driver and its control circuitry
- ⑧ Signal input from the hook switch



**Main PCB Circuit Diagram 6/7**

- ① Centronics parallel interface circuitry (for the MFC4450/4550/4550plus/6550MC/7550MC/7650MC/9000/9500)  
Connector P15 is compatible with the standard Centronics parallel interface.
- ② Backup circuit for the calendar clock of the control panel
  - ②-1: For FAX3550/3650/8000P/8200P/MFC4450/4550/4550plus/9000
  - ②-2: For MFC6550MC/7550MC/7650MC/9500 (This circuit backs up also the image and voice data.)



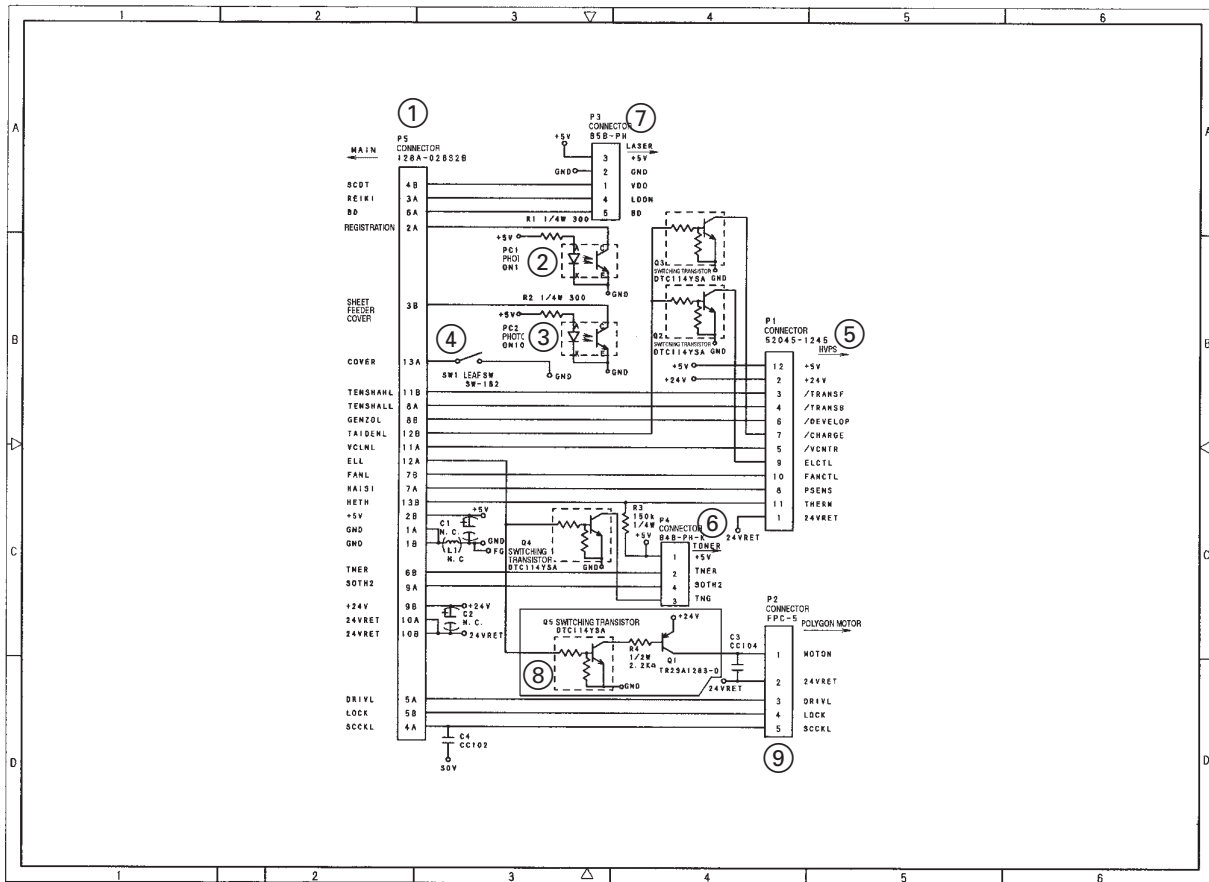
Main PCB Circuit Diagram 7/7

- ① Connector for the NCU PCB
    - CMLL: NCU relay ON/OFF signal
    - PLS: Dial pulse output
    - TLOF: Off-hook signal which is active Low for the external telephone.
    - CI: Call signal which is active Low.
    - TXD: Line output signal from the MODEM
    - TLSL: Handset microphone signal
    - RL1: Line input signal to the MODEM
    - RL2: Line monitor signal
    - ADLC: Line current detection input
    - DASEND: Output level matching signal
    - DAST: Side tone level matching signal
    - DPS: External telephone switching signal
    - EAT: Earth function signal
    - POL: Polarity inversion detection signal
- (Only in the European versions.)



- ② Switching devices that are controlled by the ASIC
  - ②-1: Device TEL. If 0, the equipment works as a telephone; if 1, it sends a facsimile message.
  - ②-2: Device HSPLY. If 0, the equipment works as a telephone; if 1, it plays back a TAD recorded message.
  - ②-3: Device TADH. If 0, the equipment works regularly; if 1, it allows you to record a message through the microphone.
  - ②-4: Device CMLH. If 0, the equipment is placed in monitor mode; if 1, it is normally connected to the line.
  - ②-5: Device RNG. If 0, the speaker rings; if 1, it transfers control to the device MSL.
  - ②-6: Device MSL. If 0, the speaker works for converting line signals to sound; if 1, it works for playing back a TAD recorded message.
  - ②-7: Device MUTE that mutes the receiver tone.
- ③ Speaker amplifiers
  - ③-1: For FAX3550/3650/8000P/8200P/MFC4450/4550/4550plus/9000
  - ③-2: For MFC6550MC/7550MC/7650MC/9500
- ④ Speaker volume control circuitry
  - ④-1: VOL1 that controls the speaker volume to two levels: High and Low.
  - ④-2: VOL2 that augments VOL1 to handle four levels: High, Medium-high, Medium-low, and Low. (MFC6550MC/7550MC/7650MC/9500 only)

### 3.3 Relay PCB

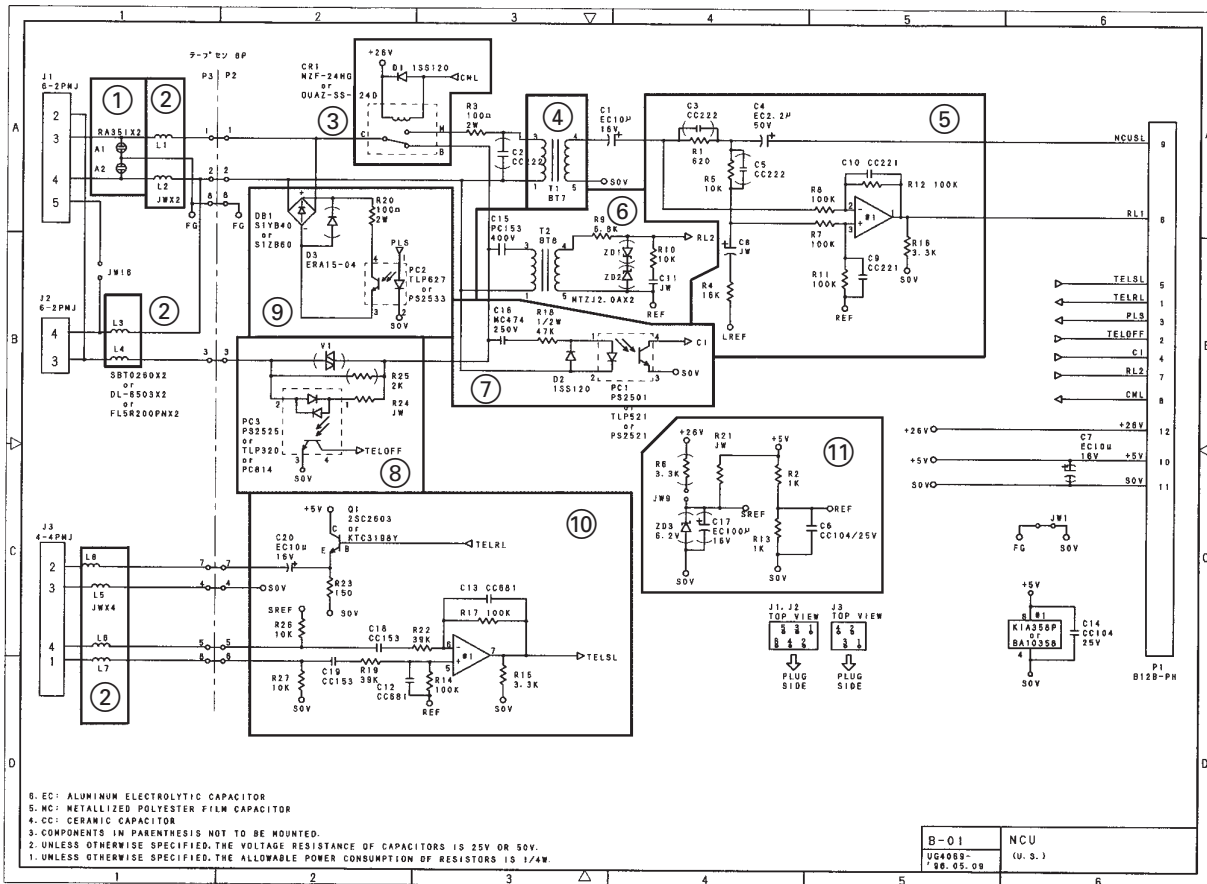


Relay PCB Circuit Diagram

- ① Connector for the main PCB
- ② Registration sensor (PC1) circuit
- ③ Sheet feeder cover sensor (PC2) circuit
- ④ Cover switch (SW1)
- ⑤ Connector for the high-voltage power supply PCB
- ⑥ Connector for the toner sensor PCB
- ⑦ Connector for the laser diode of the laser unit
- ⑧ Switching circuit which feeds 24V power to the polygon motor during the printing process.
- ⑨ Connector for the polygon motor

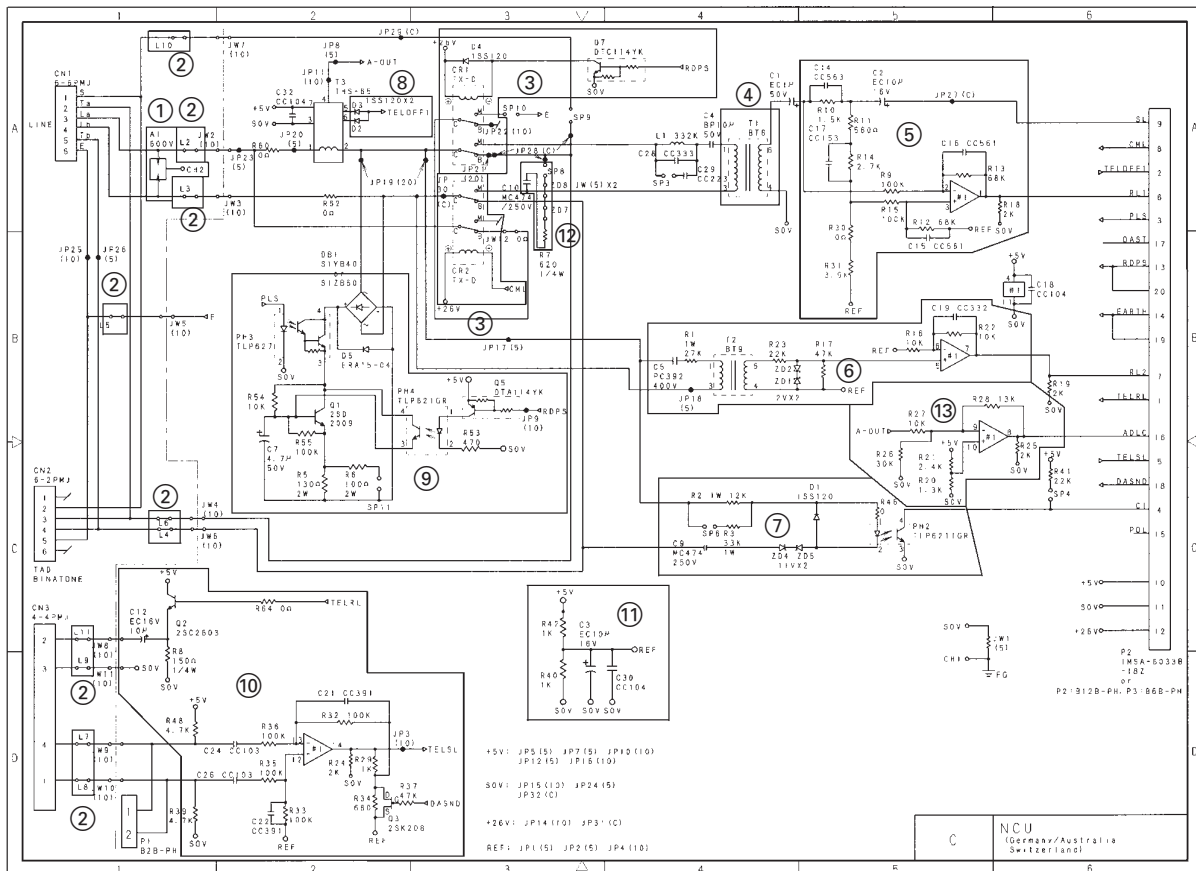
### 3.4 NCU PCB

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



NCU PCB Circuit Diagram (U.S.A. versions)

- ① Surge absorber
- ② Noise filters
- ③ Line relay (CML relay)
- ④ Line transformer
- ⑤ Circuit related to the line transformer
- ⑥ High-impedance transformer circuit
- ⑦ Calling signal detector
- ⑧ Loop current detector
- ⑨ Dial pulse generator
- ⑩ Telephone circuit
- ⑪ Reference voltage generation circuit for the operational amplifier in ⑤.



NCU PCB Circuit Diagram (European versions)

- ① Surge absorber
- ② Noise filters
- ③ Line relay (CML relay)
- ④ Line transformer
- ⑤ Circuit related to the line transformer
- ⑥ High-impedance transformer circuit
- ⑦ Calling signal detector
- ⑧ Loop current detector
- ⑨ Dial pulse generator & loop current detector
- ⑩ Telephone circuit
- ⑪ Reference voltage generation circuit for the operational amplifier in ⑤.
- ⑫ Pulse shaper
- ⑬ Line current detection input circuit

- The primary function of the NCU (which is shared by facsimile and telephone units) is to switch a line to the facsimile unit or to the telephone, which is carried out by the line relay.
- Since the direct connection of a facsimile equipment to the line is not allowed for protecting the line, it is essential to insert a line transformer between the line and the facsimile equipment to insulate them from each other in the direct current band.

The above two components, line relay and line transformer, are the minimum requirements for the NCU of the facsimile equipment.

- If an external telephone is connected to the facsimile equipment, the NCU should have a loop current detector to identify the hook state by detecting the loop current.
- If the facsimile equipment has an automatic answering facility (TAD), the NCU should be equipped with a calling signal detector which detects a calling signal and tells it to the CPU in the FAX engine (ASIC).
- The circuit related to a line transformer allows the line transformer to be invariant by selecting the constants of the parts in this circuit so as to conform to the communications regulations or codes of each country.

In addition to the above basic components of the NCU, the following components are also required depending upon additional functions of the facsimile equipment:

- The dial pulse generator generates dial pulses within the facsimile equipment.
- The surge absorber is a protection circuit which absorbs lightning surges.
- The noise filter eliminates noise including radiation noise in order to prevent them from flowing out onto the communications line.
- The high-impedance transformer circuit detects the remote activation, and F/T switching sent from the line in ON-HOOK state without any interference to the line.
- The telephone circuit includes an amplifier that amplifies output signals of the handset microphone. It also includes a transistor that amplifies receive signals from the communications lines to sound the handset receiver.

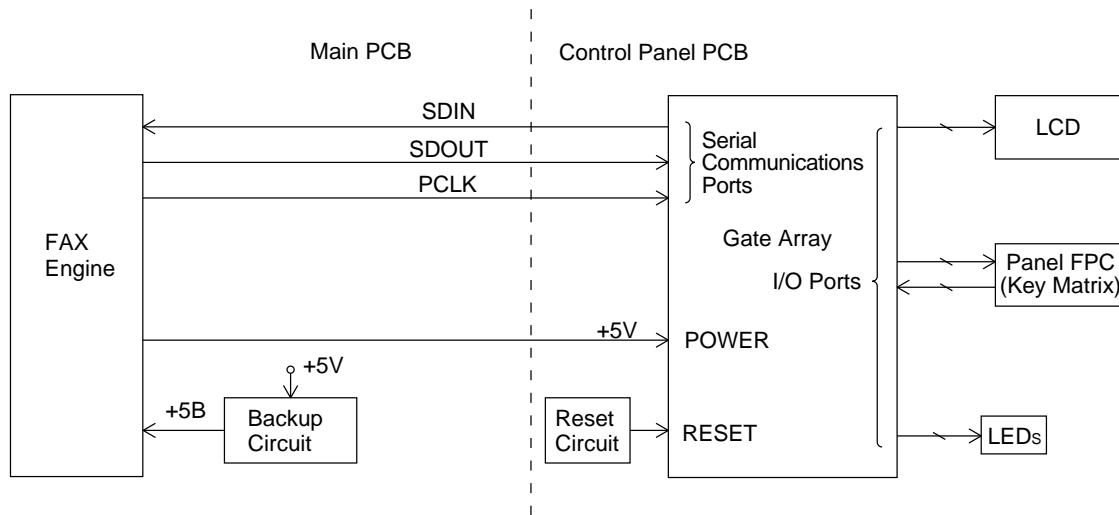
### 3.5 Control Panel PCB

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

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

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

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



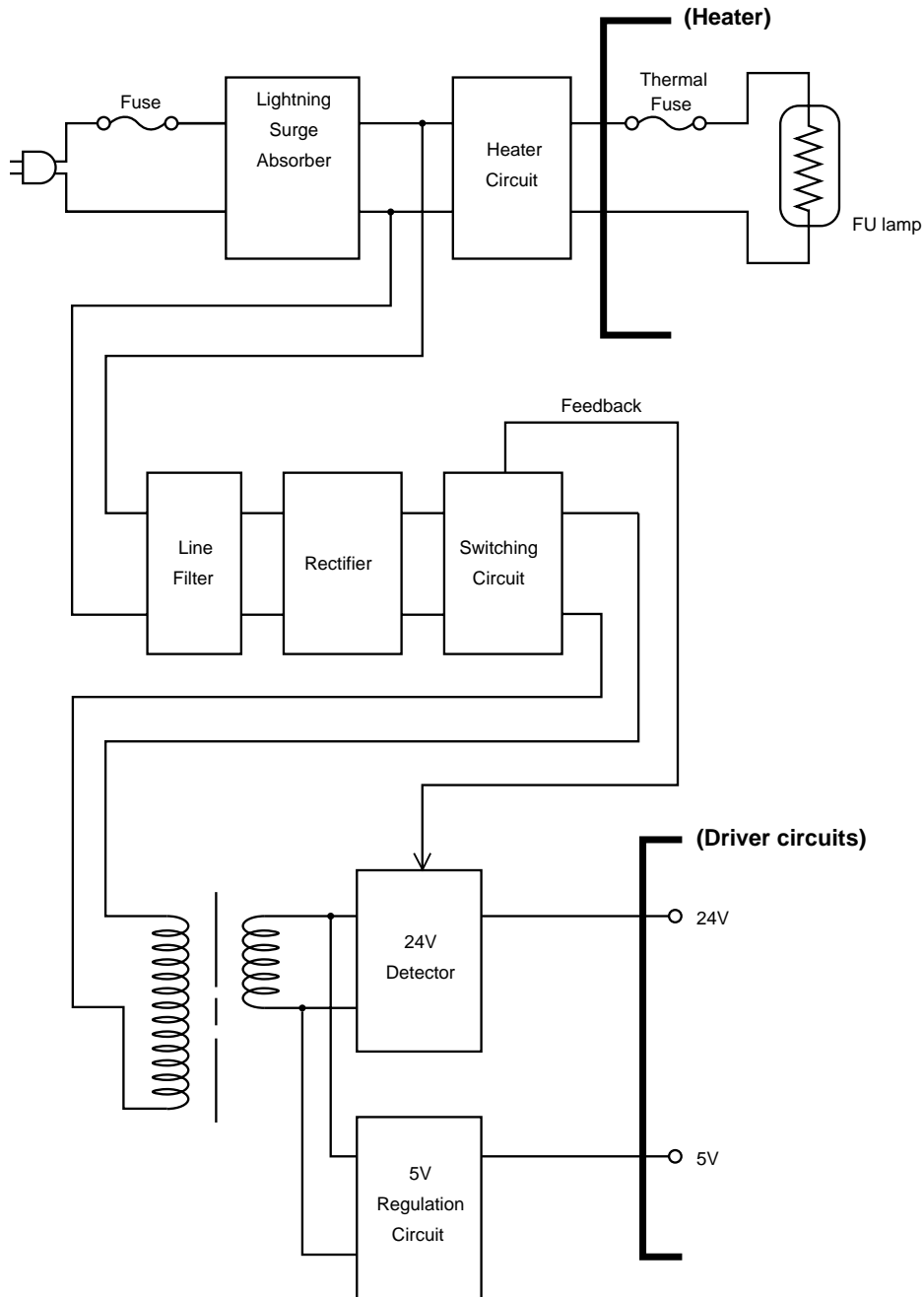
Control Panel PCB and its Related Circuit

### 3.6 Power Supply PCBs

#### [ 1 ] Low-voltage power supply PCB

The low-voltage power supply uses the switching regulation system to generate DC power (+5V and +24V) from a commercial AC power supply for the driver circuits. The +5V source is fed to the logic, control panel, sensors, CCD unit, etc.; the 24V source is fed to the motors, solenoid, fans, LED array, and the high-voltage power supply PCB.

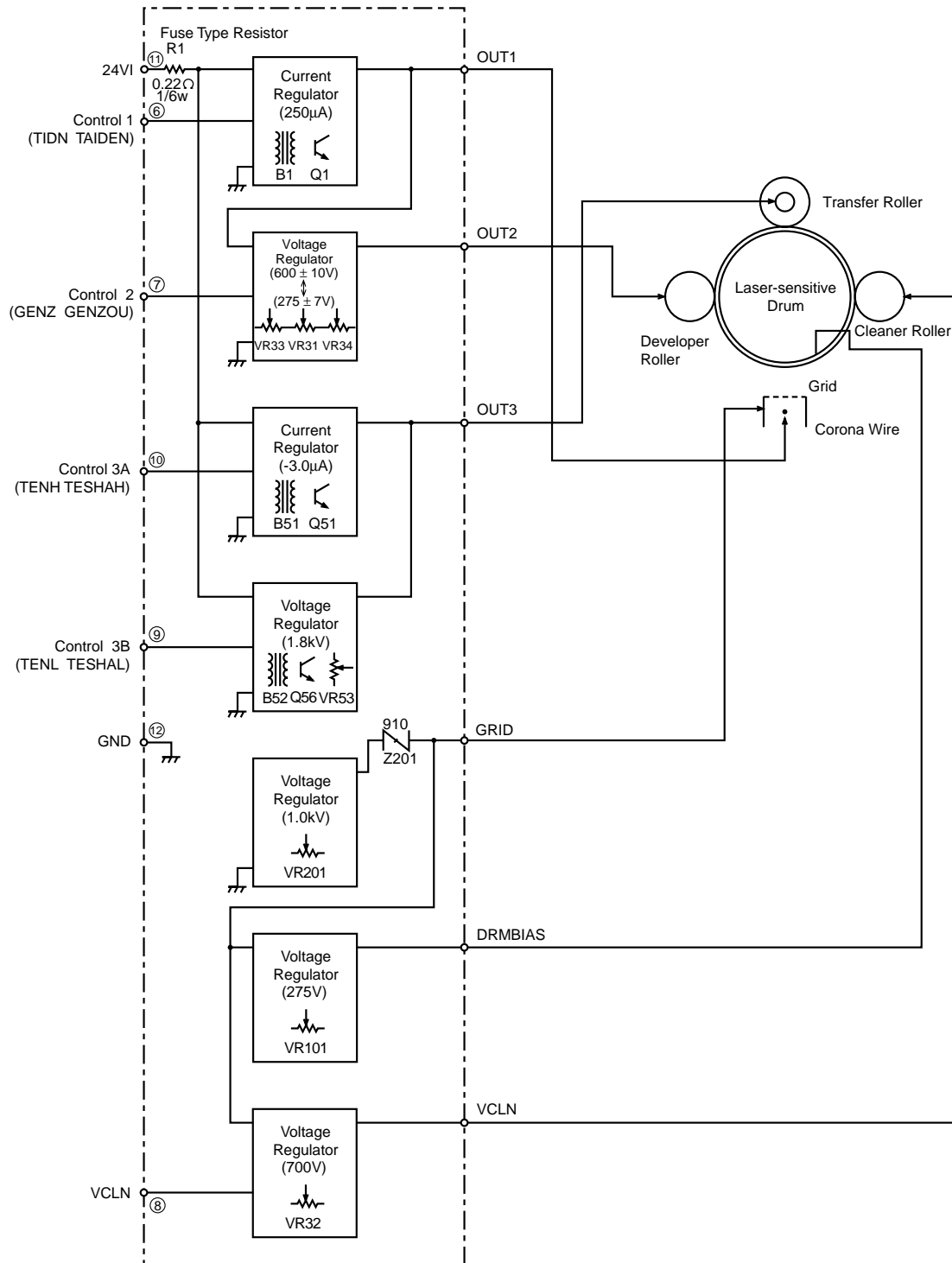
The low-voltage power supply also feeds AC power to the heater of the fixing unit.



Low-voltage Power Supply Circuit

## [ 2 ] High-voltage power supply PCB

This power supply generates high-voltage power sources from the 24V source fed from the low-voltage power supply for charging, developing, and transferring in the laser printing process.



High-voltage Power Supply Circuit



# CHAPTER IV.

## DISASSEMBLY/REASSEMBLY AND LUBRICATION

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# 1. DISASSEMBLY/REASSEMBLY

## ■ Safety Precautions

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

- (1) Always unplug the power cord before replacing parts or units. 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 watches and rings before working on the printer. A reflected beam, though invisible, can permanently damage your eyes.
- (3) If the equipment has been printing, allow the fixing unit sufficient time to cool down. 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 LF roller ASSY or 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 equipment 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.

### WARNING

For the MFC6550MC/7550MC/7650MC/9000/9500 which has a nickel-hydrogen battery on the main PCB, be sure to remove that battery before transporting the PCB (in aluminium foil). Failure to do so may result in a short circuit, overcurrent flow, or fire.

- (9) Be sure to reinsert self-tapping screws correctly, if removed.
- (10) Tighten screws to the torque values listed on the next page.
- (11) 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.
- (12) Before reassembly, apply the specified lubricant to the specified points. (Refer to Section 2 in this chapter.)
- (13) After repairs, check not only the repaired portion but also that the connectors and other related portions function properly before operation checks.

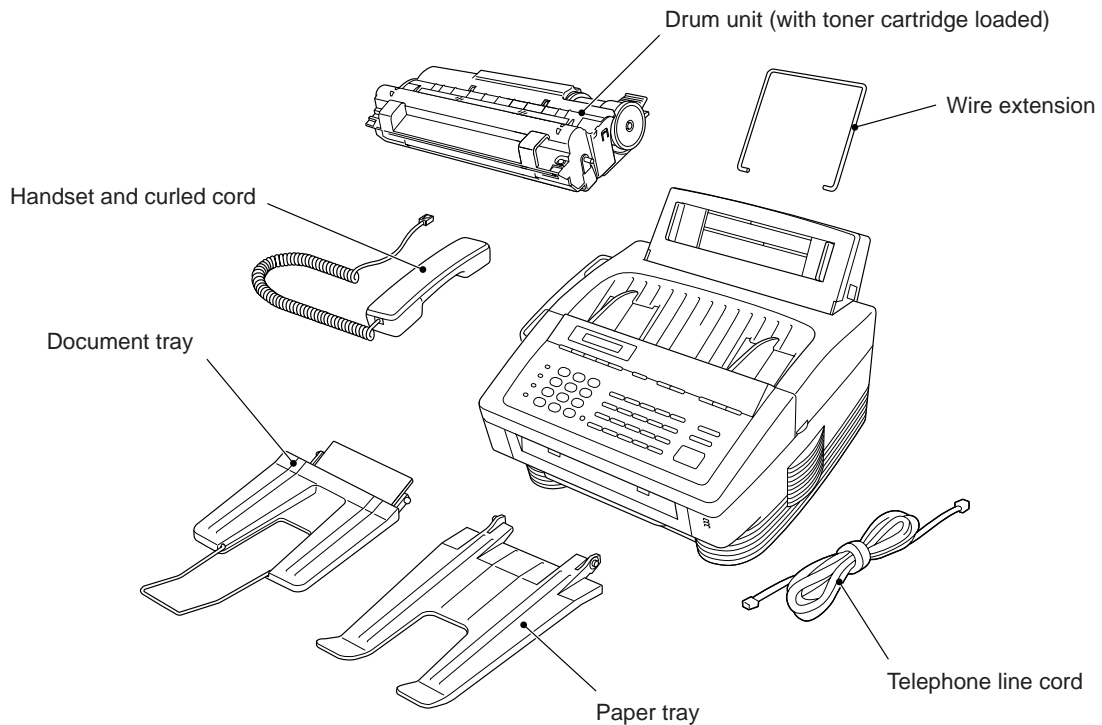
## Tightening Torque List

Location	Screw type	Q'ty	Tightening torque (kgf•cm)
Handset mount	Taptite, cup B M3x10	2	5 ±1
Hook switch PCB	Taptite, cup B M3x6	1	5 ±1
Panel rear cover	Taptite, cup B M3x8	2	3 ±1
Inner cover	Taptite, cup B 4x12	2	8 ±1
	Taptite, cup B 3x10	3	8 ±1
Scanner motor	Screw, pan (washer) 3x8DB	1	7 ±2
Fixing unit	Taptite, bind B 4x12	1	10 ±1
	Taptite, bind B 3x10	2	8 ±1
Laser unit	Taptite, bind B 4x12	3	8 ±1
Toner sensor PCB	Taptite, cup B 3x8	1	6 ±1
Bottom plate (On the main shield bracket) (On the gear drive unit)	Taptite, cup B 4x12	5	8 ±1
	Taptite, cup S 3x6	2	5 ±1
	Taptite, cup S 3x6	2	8 ±1
Grounding wire	Screw, pan (washer) 4x8DB	1	7 ±2
Low-voltage power supply PCB	Taptite, bind 4x12	1	10 ±1
High-voltage power supply PCB	Taptite, bind 4x12	1	10 ±1
Interface plate	Taptite, bind 3x6	3	5 ±1
Relay PCB	Taptite, bind B 4x12	1	10 ±1
Shield bracket	Taptite, cup B 3x10	3	5 ±1
NCU PCB ASSY	Taptite, cup B 3x10	1	5 ±1
Drive unit	Taptite, cup B 4x20	3	12 ±1
	Taptite, bind B 4x12	1	10 ±1

## ■ Preparation

Prior to proceeding to the disassembly procedure,

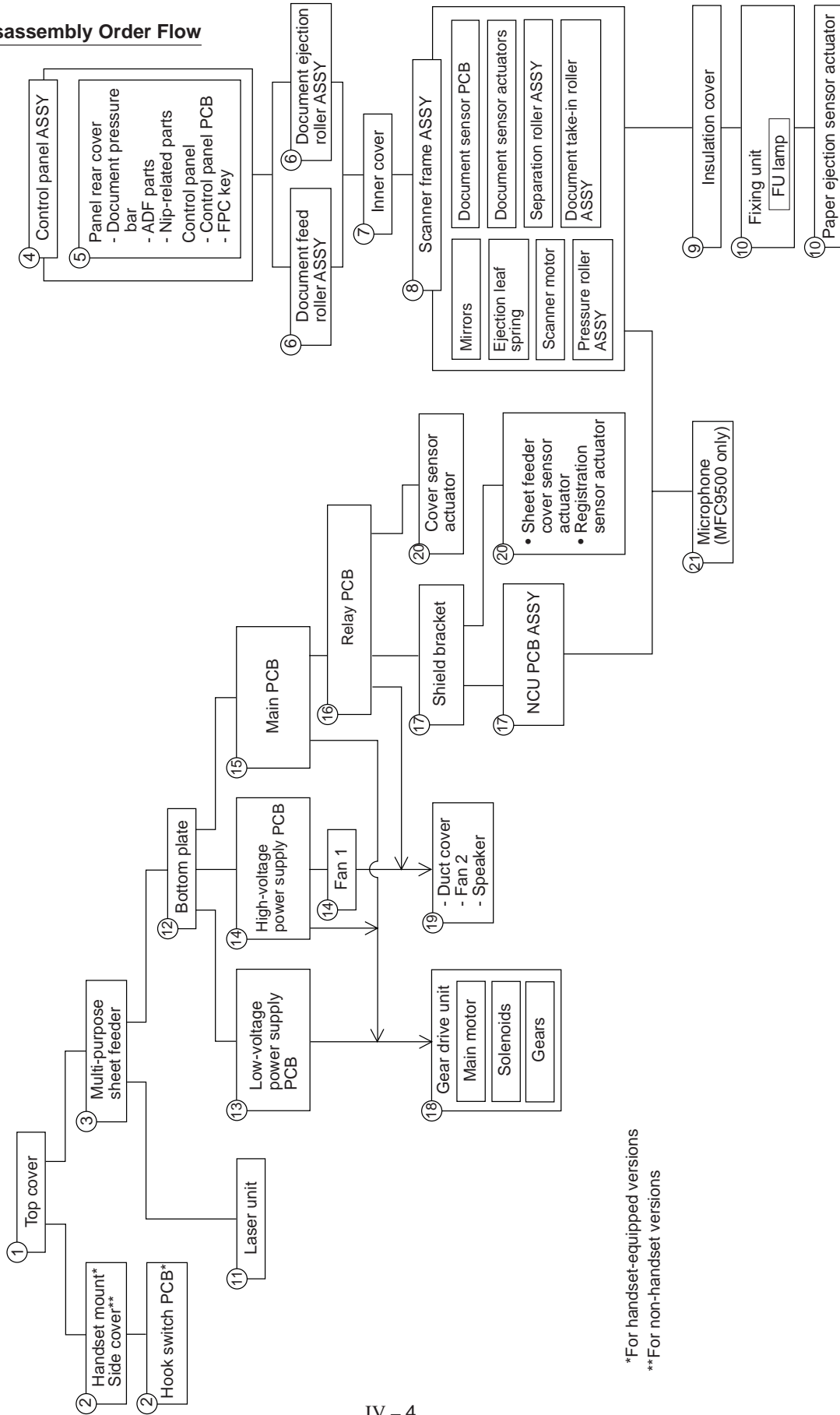
- (1) Unplug
  - the modular jack of the telephone line,
  - the modular jack of the curled cord (and remove the handset), and
  - the modular jack of an external telephone set if mounted. (Not shown below.)
- (2) Remove
  - the wire extension,
  - the document tray,
  - the paper tray, and
  - the drum unit (with the toner cartridge loaded).



## ■ How to Access the Object Component

- On the next page is a disassembly order flow which helps you access the object component. To remove the relay PCB, for example, first find it on the flow and learn its number (⑩ in this case). You should remove parts numbered ①, ③, ⑫, and ⑮ so as to access the relay PCB.
- Unless otherwise specified, the disassembled parts or components should be reassembled in the reverse order of removal.

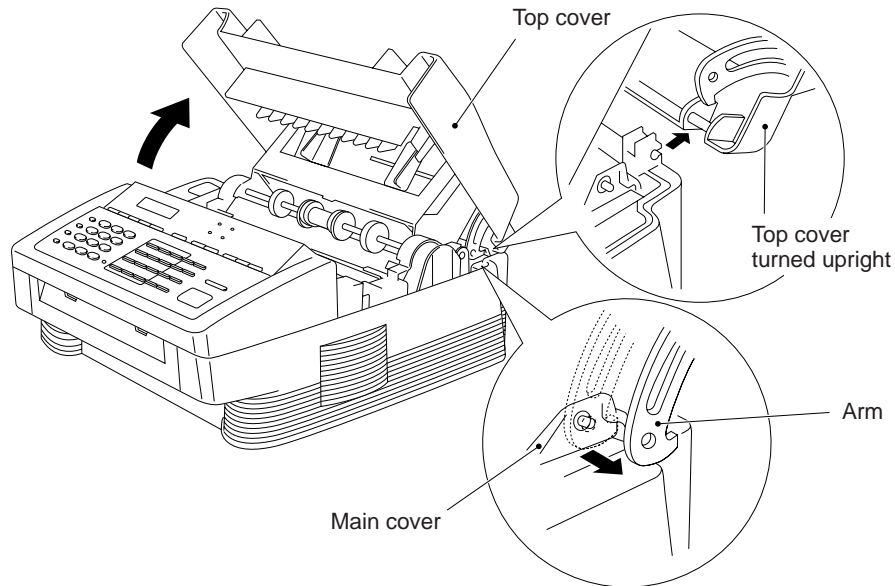
■ Disassembly Order Flow



\*For handset-equipped versions  
 \*\*For non-handset versions

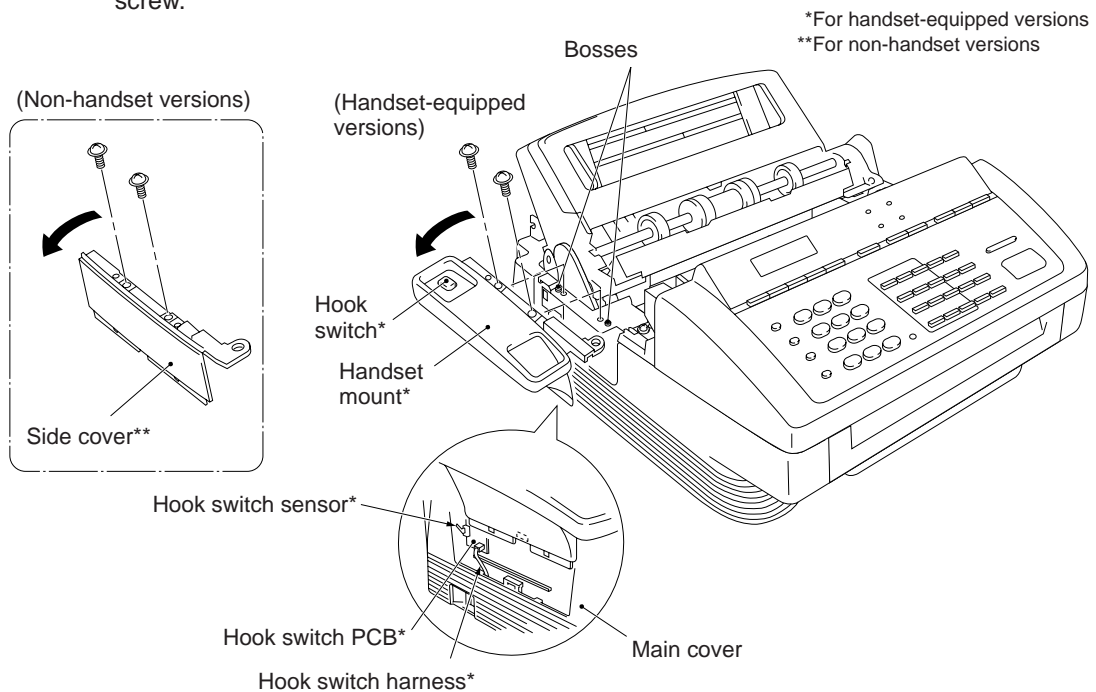
## 1.1 Top Cover

- (1) Open the top cover.
- (2) Push the arm of the top cover outwards with your thumb to unhook it from the main cover.
- (3) Turn the top cover upright and slide it to the rear.



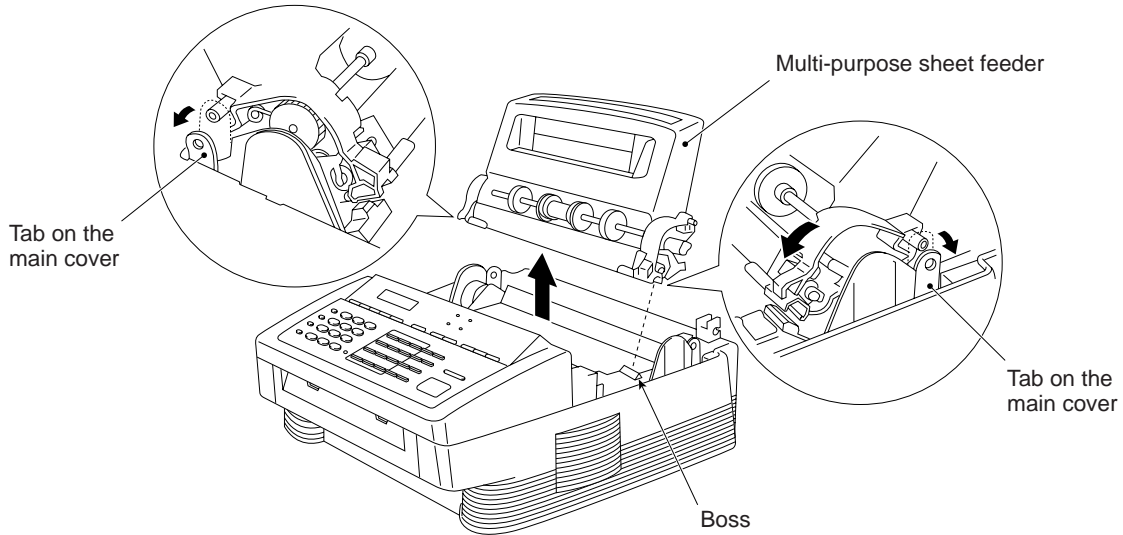
## 1.2 Handset Mount and Hook Switch PCB (for handset-equipped versions) Side Cover (for non-handset versions)

- (1) Remove the two screws from the handset mount\* or the side cover.\*\*
- (2) Twist the handset mount\* or the side cover\*\* so that it tilts over to the left and its upper end works out of the bosses provided on the main cover.
- (3) To remove the hook switch PCB\*, disconnect the hook switch harness\* and remove the screw.



### 1.3 Multi-purpose Sheet Feeder

- (1) Pull either one of the right and left tabs provided on the main cover outwards and slightly lift up the multi-purpose sheet feeder, then release the other end of the sheet feeder also.
- (2) Take up the sheet feeder.

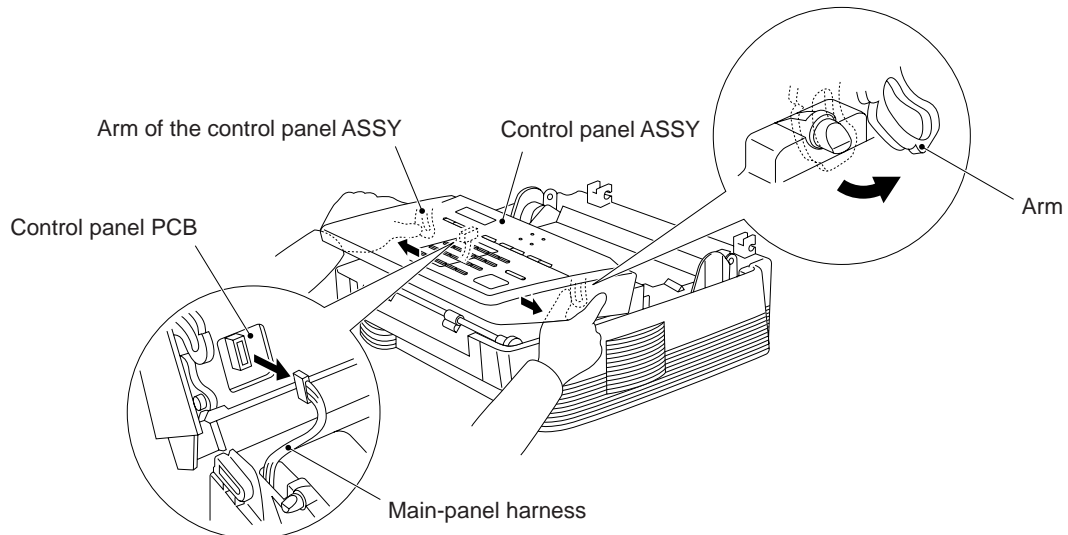


#### ■ Reassembling Notes

- To install the sheet feeder, align the right and left end of the front edge with the bosses of the main cover and then push down the rear.

### 1.4 Control Panel ASSY

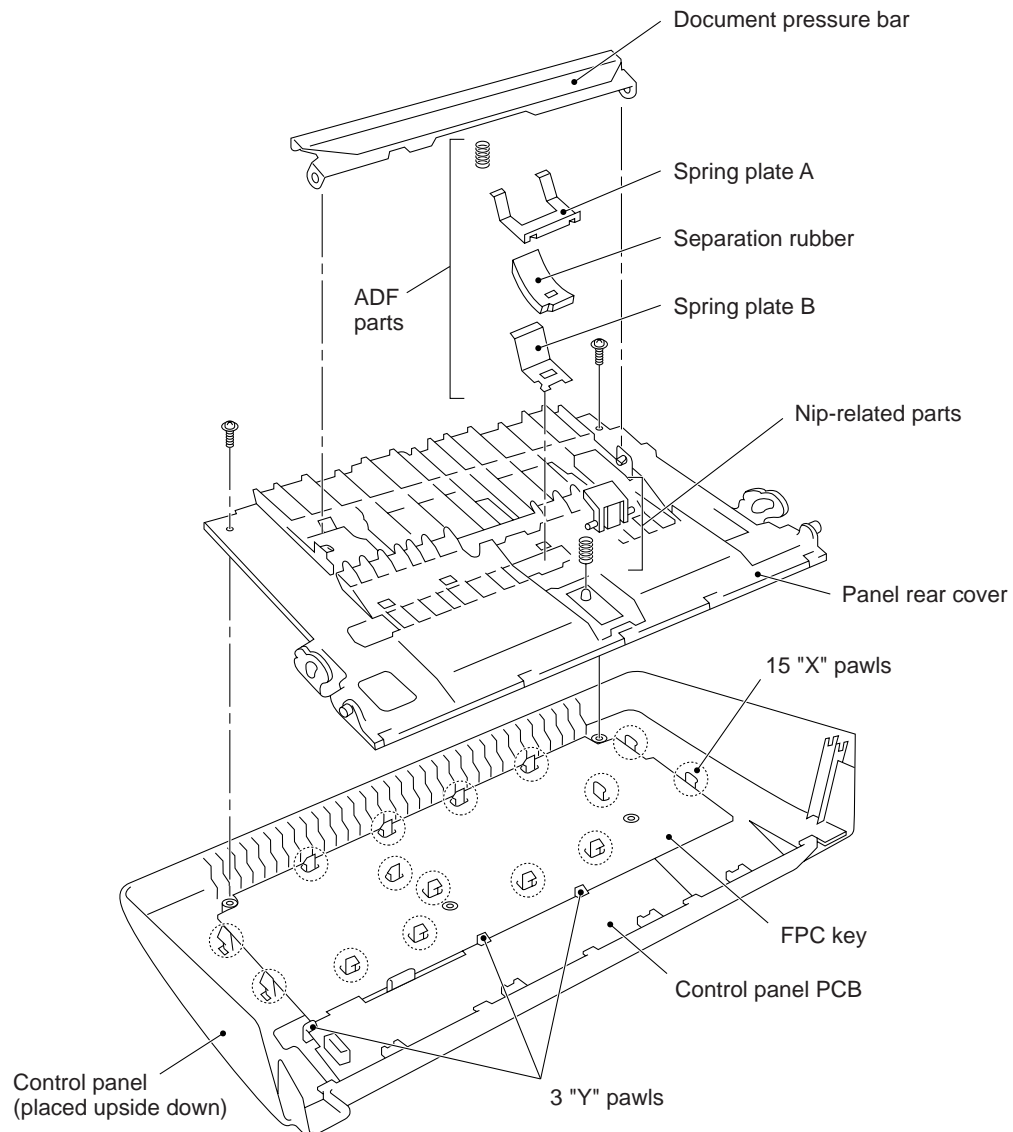
- (1) Slightly open the control panel ASSY as shown below.
- (2) Push the right and left arms of the control panel ASSY outwards with your thumbs to unhook them from the bosses provided on the main cover, then slide the control panel ASSY to the rear.
- (3) Disconnect the main-panel harness from the control panel PCB.





## 1.5 Panel Rear Cover and Control Panel

- (1) Place the control panel ASSY upside down.
- (2) Remove the document pressure bar, ADF parts, and nip-related parts from the panel rear cover.
- (3) Remove the two screws from the panel rear cover.
- (4) While lifting up the front edge of the panel rear cover, unhook it from the 15 pawls "X" provided on the control panel.
- (5) Unhook the control panel PCB from the three pawls "Y" on the control panel and take it out together with the FPC key.

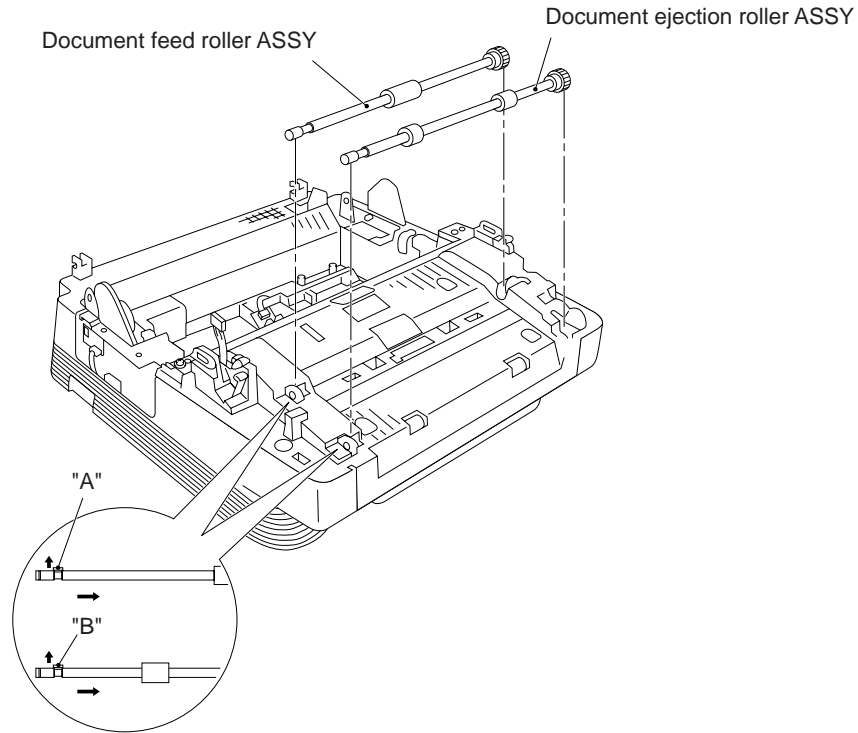


### ■ Reassembling Notes

- When installing the spring plate B and separation rubber, align their cutouts with the boss on the panel rear cover.

## 1.6 Document Feed Roller ASSY and Ejection Roller ASSY

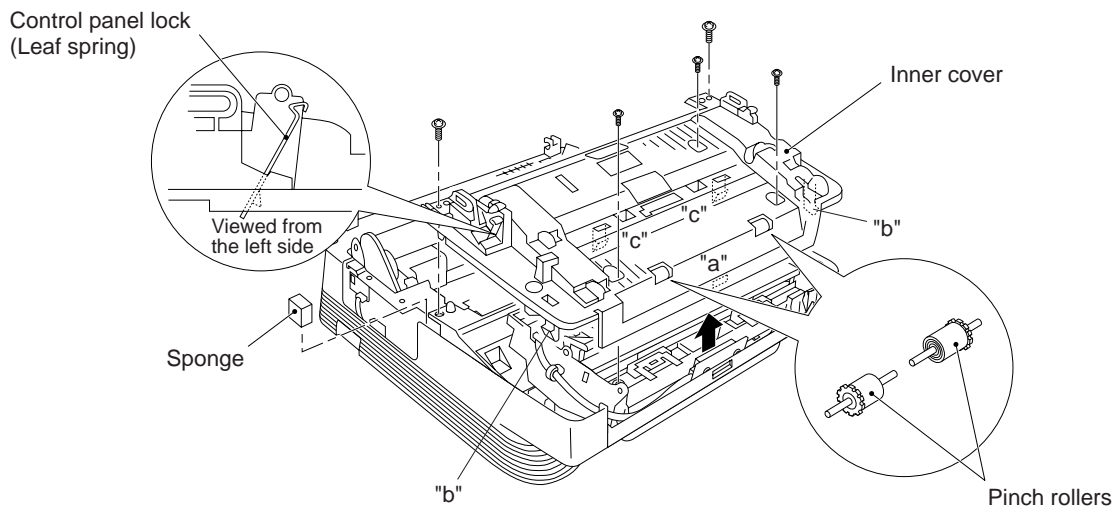
- (1) Push arm rib "A" to the rear, then shift the document feed roller ASSY to the right and upwards.
- (2) Push arm rib "B" to the rear, then shift the document ejection roller ASSY to the right and upwards.



## 1.7 Inner Cover

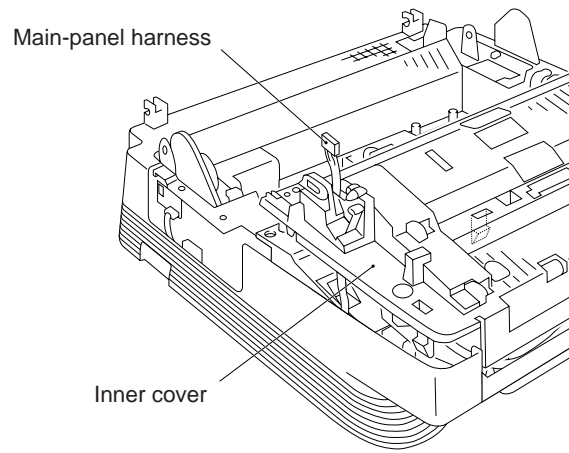
- (1) Remove the five screws.
- (2) Unlatch the pawl "a" by hand.
- (3) While lifting up the inner cover, unlatch the four pawls "b" and "c."

NOTE: Take care not to scratch or drop the cover glass on the scanner frame ASSY.



### ■ Reassembling Notes

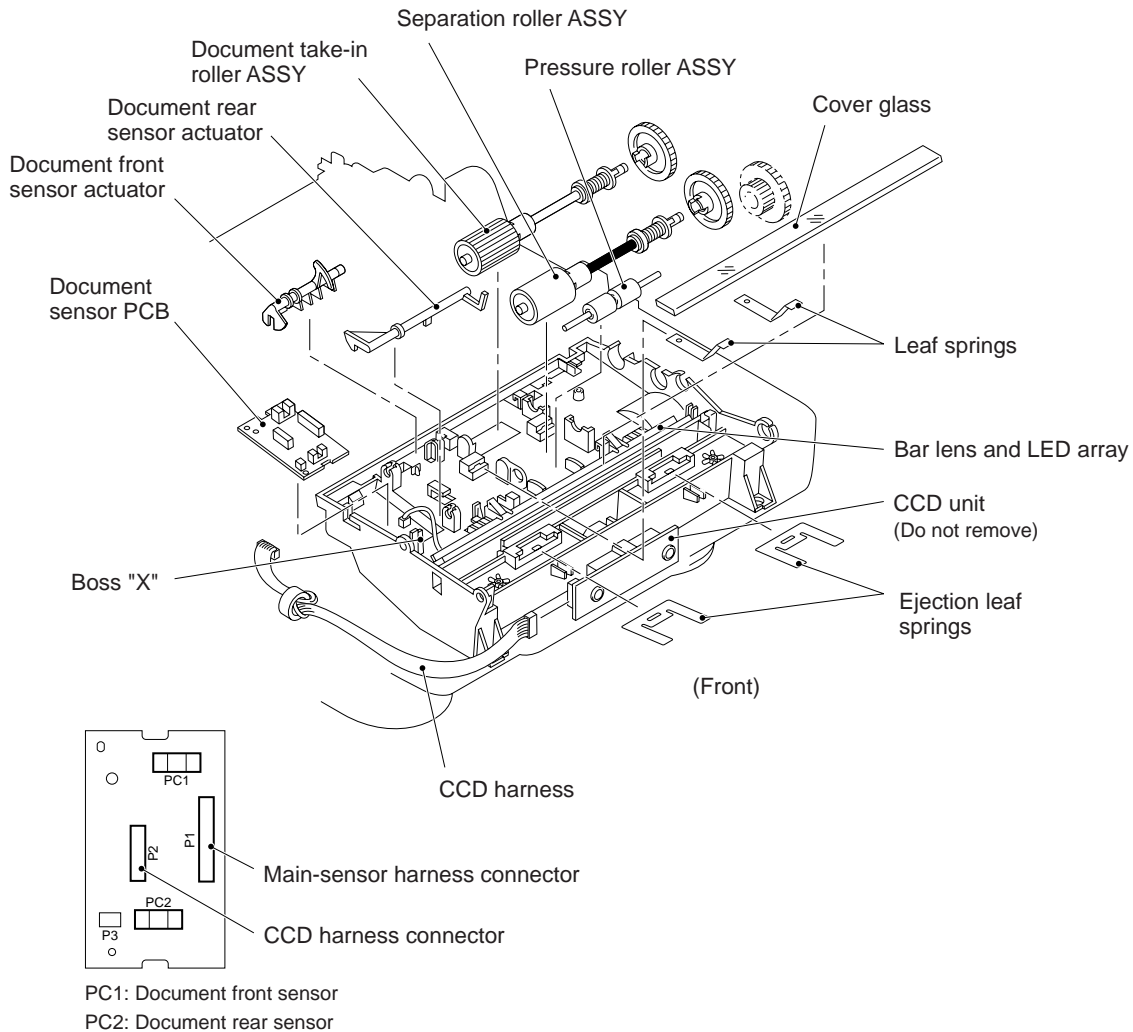
- Before putting the inner cover on the main cover, make sure that:
  - The control panel locks (leaf springs) are set in the inner cover as shown on the previous page.
  - The pinch rollers are set with their fringes facing outwards as shown on the previous page.
  - The main-panel harness connector comes out from the cutout provided in the inner cover as shown below.



- After installing the inner cover, be sure to put the sponge back into place.

## 1.8 Scanner Frame ASSY

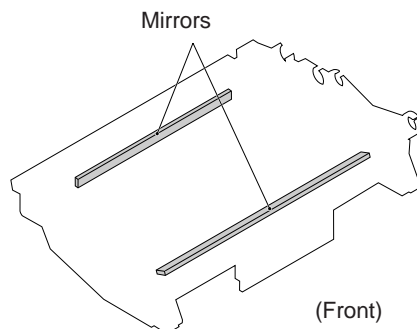
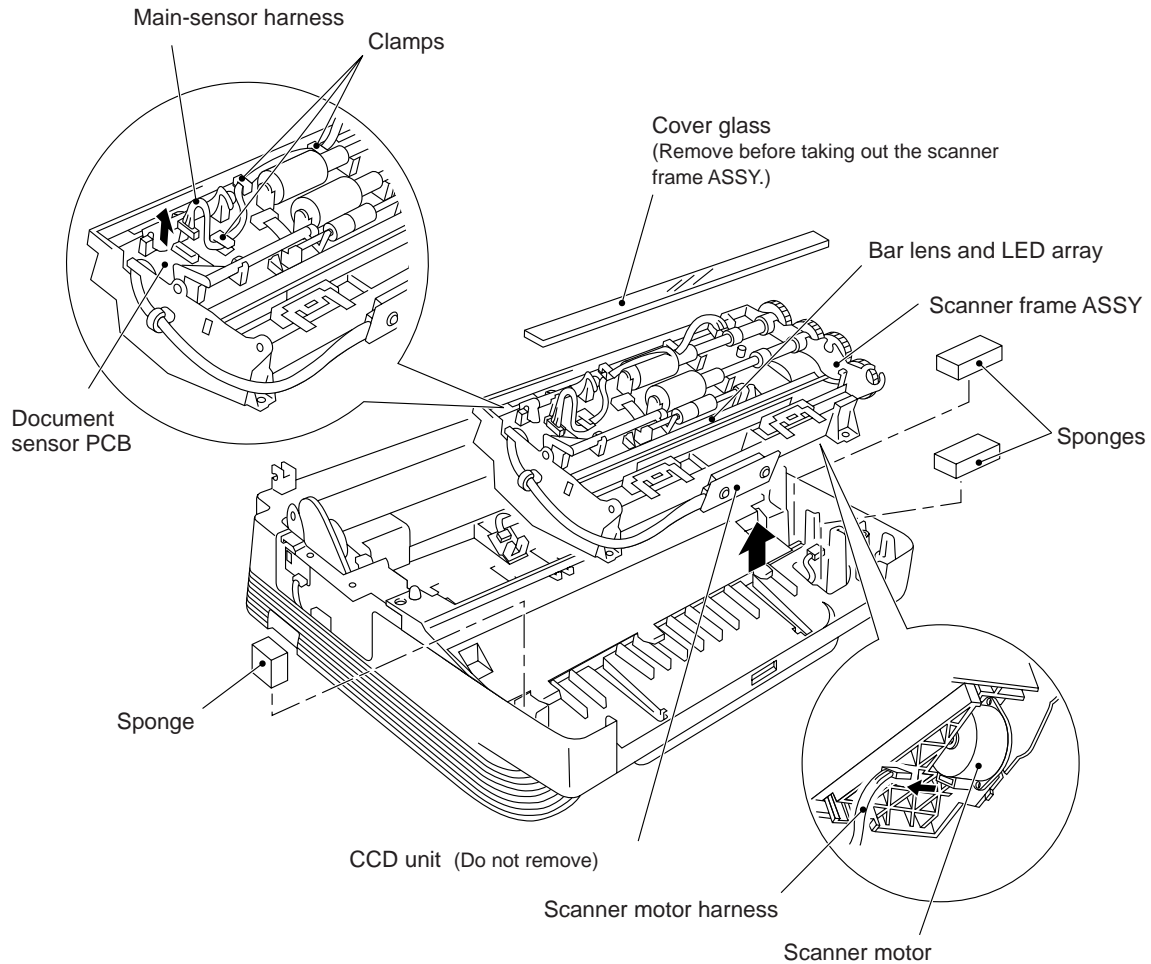
- (1) You can remove the following parts from the top of the scanner frame ASSY without taking out the ASSY from the main cover:
- Cover glass. Turn the cover glass up towards you.
  - Ejection leaf springs. Remove them while slightly pulling up the front edges.
  - Document take-in roller ASSY. Unhook the latch of the gear, take it off, and lift up the ASSY.
  - Separation roller ASSY. First unhook the latch of the adjacent gear and take it off, and then remove the separation roller ASSY in the same way as for the document take-in roller ASSY.
  - Pressure roller ASSY. While pressing down the leaf springs, remove the ASSY.
  - Bar lens and LED array.
  - Document front sensor actuator.
  - Document rear sensor actuator. While pressing down the leaf spring and pulling the boss "X" provided on the scanner frame ASSY to the front, slightly move the actuator to the left and lift it up.
  - Document sensor PCB. Disconnect the CCD harness and LED array harness from the document sensor PCB. Take the main-sensor harness out of the three clamps (see the illustration on the next page) and then disconnect it from the PCB.



- (2) Before taking out the scanner frame ASSY, make sure that the cover glass is removed and the main-sensor harness is disconnected.
- (3) Slightly lift up the scanner frame ASSY and disconnect the scanner motor harness from the motor, then take out the ASSY.

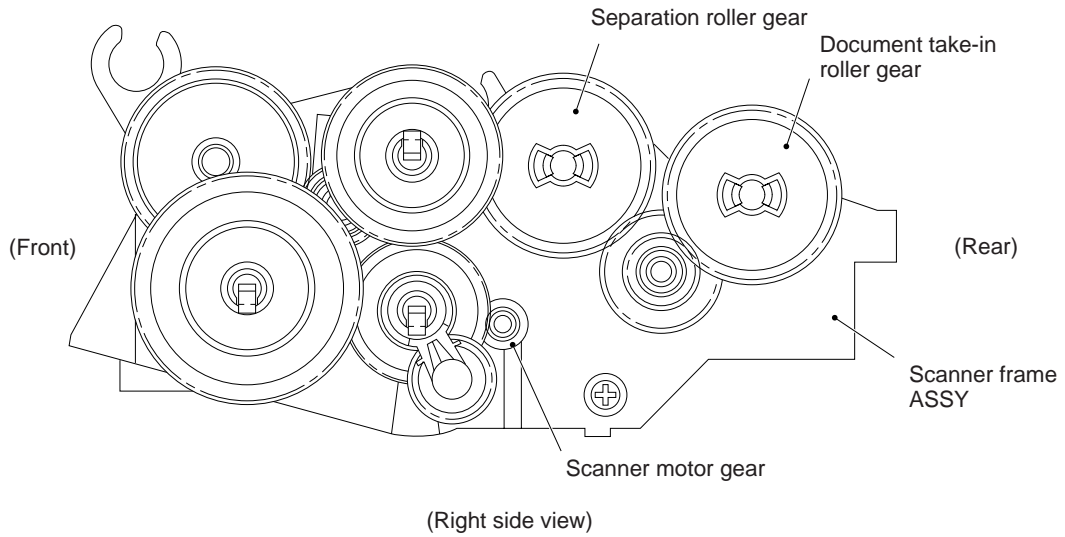
NOTE: Take care not to scratch the mirrors (see the illustration below), CCD unit, or bar lens.

NOTE: NEVER remove or replace the CCD unit. Its mounting position has been adjusted in the factory.



### ■ Reassembling Notes

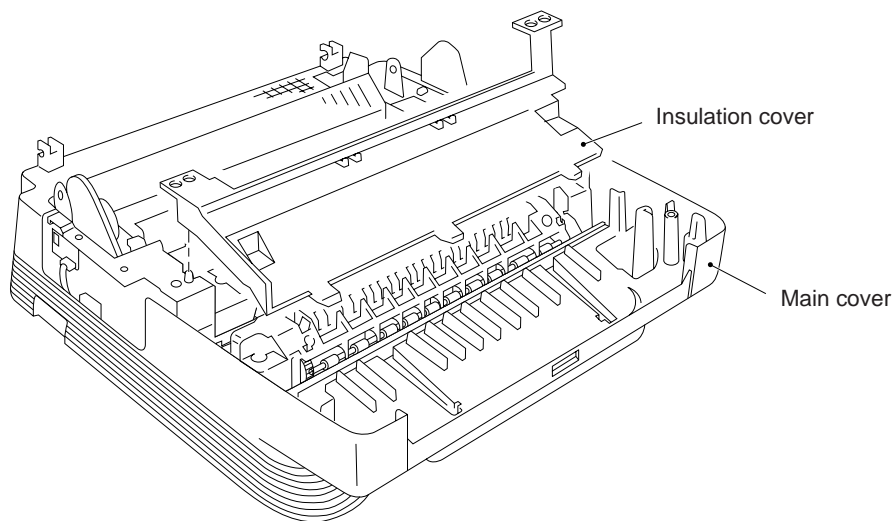
- Check that the mirrors and cover glass are not stained. Wipe them with a soft cloth if necessary.
- If you have disassembled the gear train on the right side of the scanner frame ASSY, re-assemble it referring to the illustration below.



- After installing the scanner frame ASSY, be sure to put the sponges back into place as shown on the previous page.

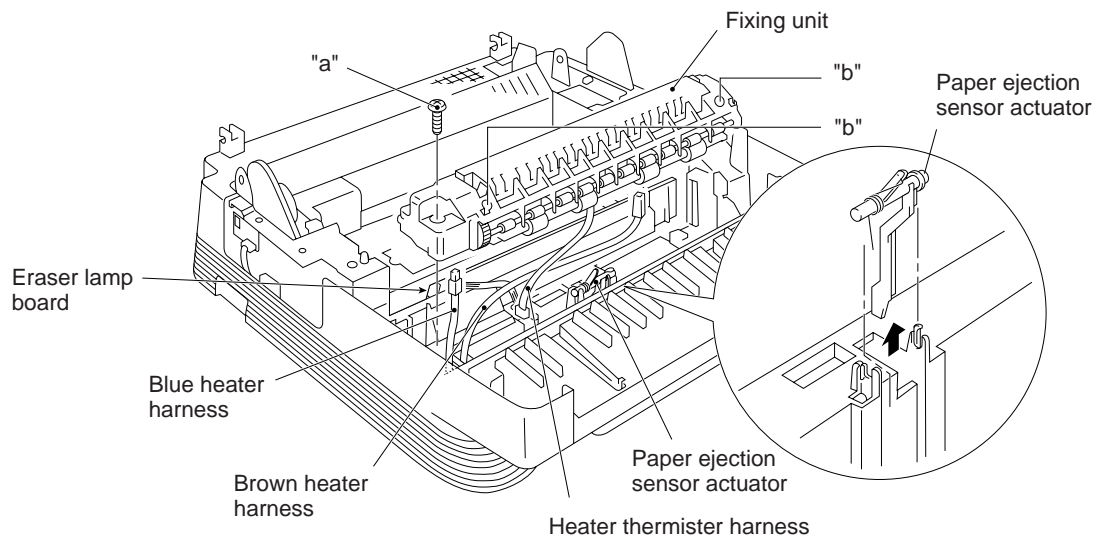
## 1.9 Insulation Cover

- (1) Lift up the insulation cover.



## 1.10 Fixing Unit, FU Lamp, and Paper Ejection Sensor Actuator

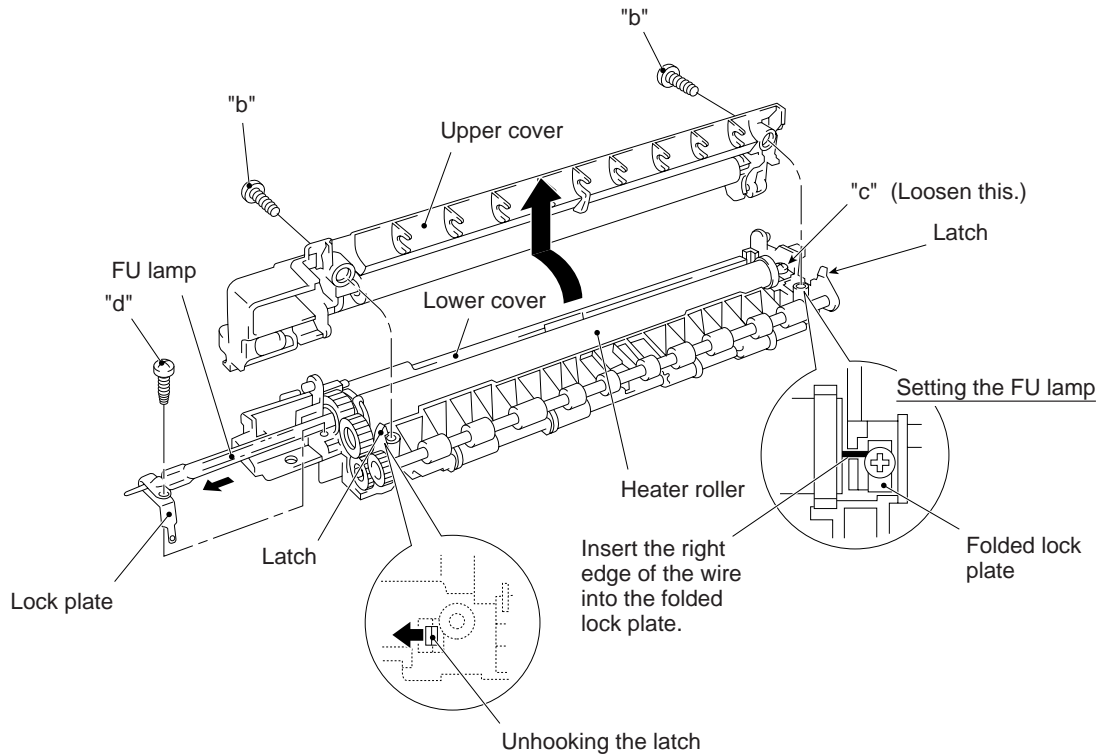
- (1) Remove the screw "a."
- (2) Lift up the fixing unit and then disconnect the heater harness (blue and brown wires). Disconnect the heater thermister harness from the eraser lamp board.



- (3) Remove the paper ejection sensor actuator from the main cover.
- (4) To take out the FU lamp from the fixing unit, remove the two screws "b" from the fixing unit.
- (5) Unhook the two latches outwards with the tip of a small flat screwdriver and open the upper cover. (See the next page.)
- (6) Fully open the upper cover and remove it.

- (7) Remove the screw "d" and loosen the screw "c."
- (8) Take the lock plate of the FU lamp with your fingers and pull out the FU lamp from the heater roller to the left.

CAUTION: Never touch the FU lamp. If you touch it, clean it thoroughly with alcohol.



#### ■ Reassembling Notes

- When setting the FU lamp into the fixing unit, be sure to insert the right edge of the wire into the folded lock plate.
- When installing the paper ejection sensor actuator, hook the spring as shown on the previous page.

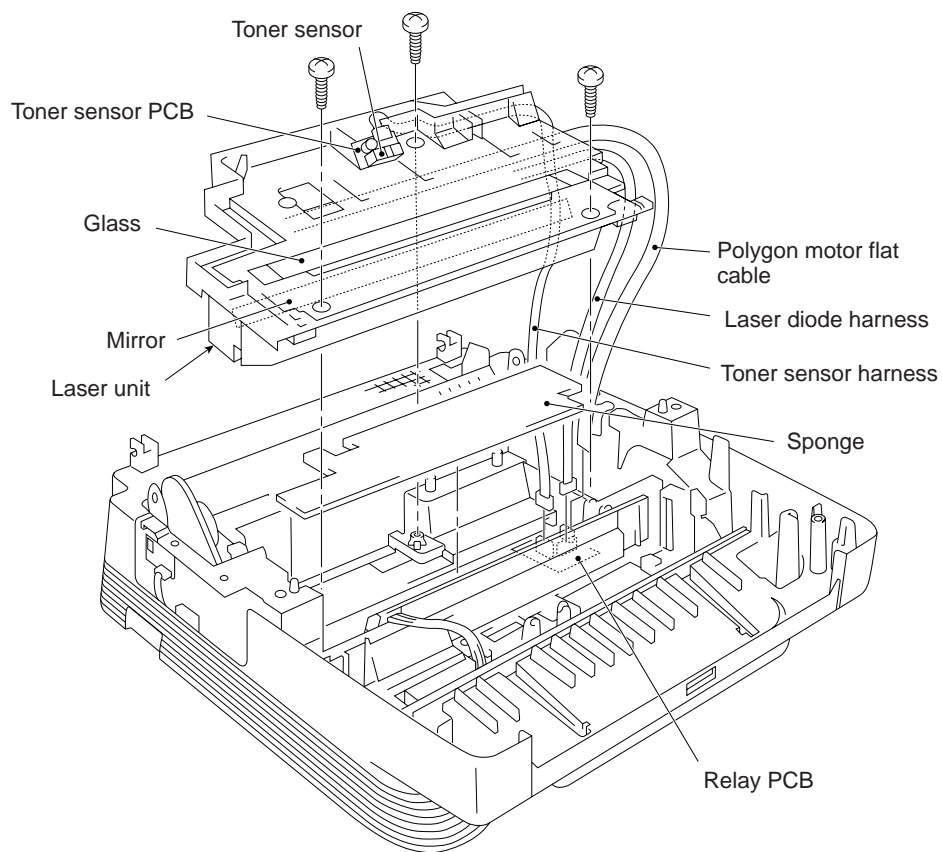


## 1.11 Laser Unit

- (1) Remove the three screws.
- (2) Slightly lift up the laser unit and disconnect the following three things from the relay PCB:
  - Laser diode harness (5-pin)
  - Polygon motor flat cable (5-pin)
  - Toner sensor harness (4-pin)

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

On the small PCB at the right side of the laser unit is a 2-pin connector which is for the adjustment in the factory. Do not disturb it.

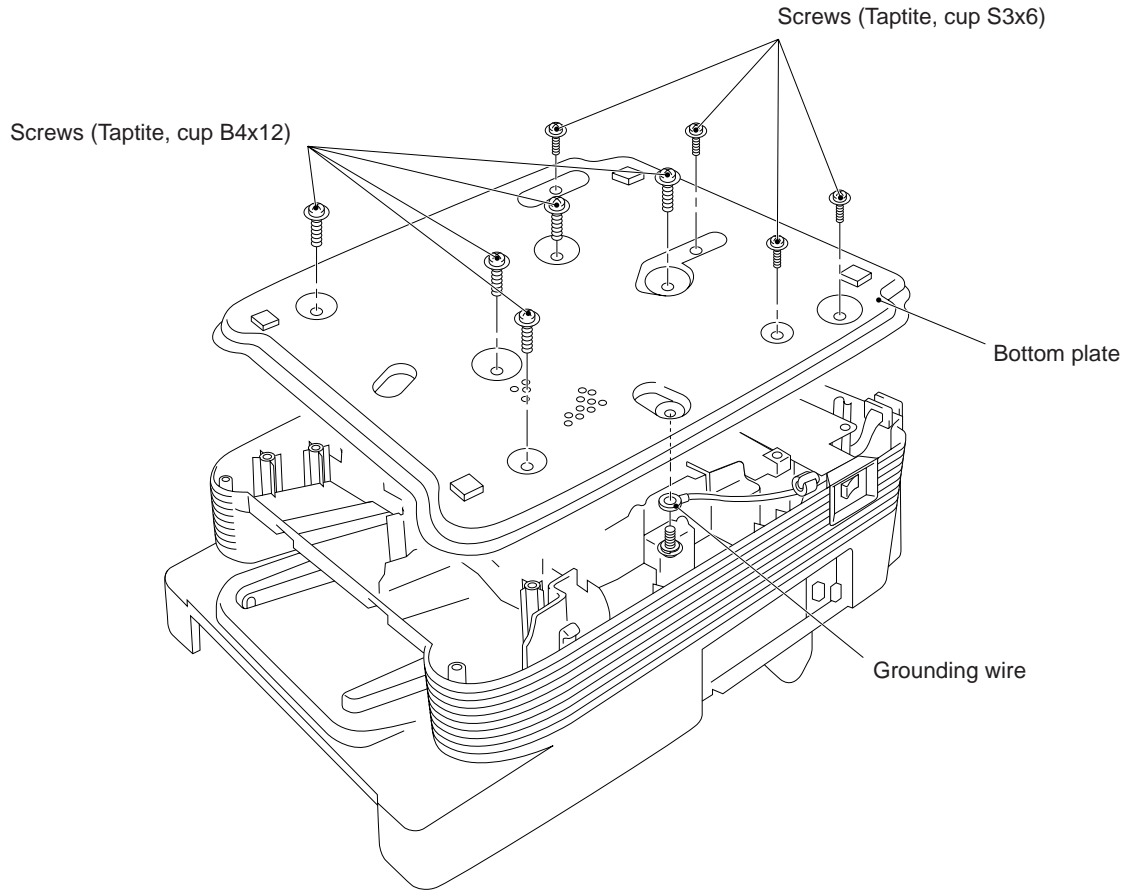


### ■ Reassembling Notes

- Before putting the laser unit back into place, check for any toner particles, paper dust or dirt, and clean them out.
- When installing the laser unit, make sure that the toner sensor harness is routed through the groove as shown above.
- Make sure that the sponge is placed below the laser unit.

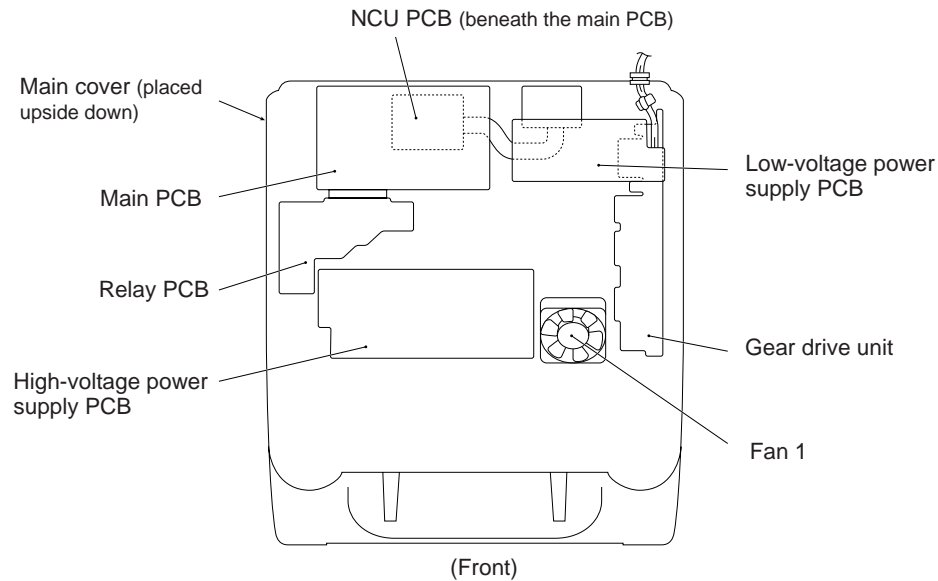
## 1.12 Bottom Plate

- (1) Make sure that the drum unit, top cover, and multi-purpose sheet feeder have been removed.
- (2) Turn the machine upside down.
- (3) Remove the nine screws.
- (4) Slightly lift up the bottom plate and disconnect the grounding wire.

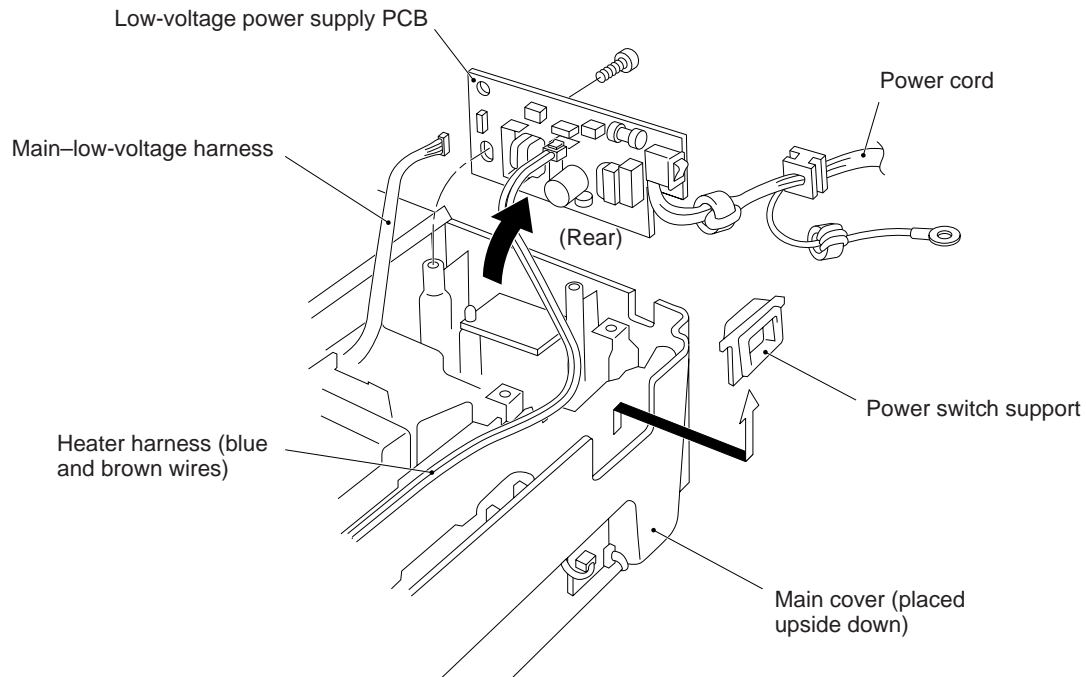


### 1.13 Low-voltage Power Supply PCB

The illustration below shows the location of the PCBs.



- (1) Remove the screw from the low-voltage power supply PCB.
- (2) Slightly lift up the low-voltage power supply PCB and pull out the power switch support.
- (3) Disconnect the main–low-voltage harness and heater harness (of the blue and brown wires) from the low-voltage power supply PCB.



#### ■ Reassembling Notes

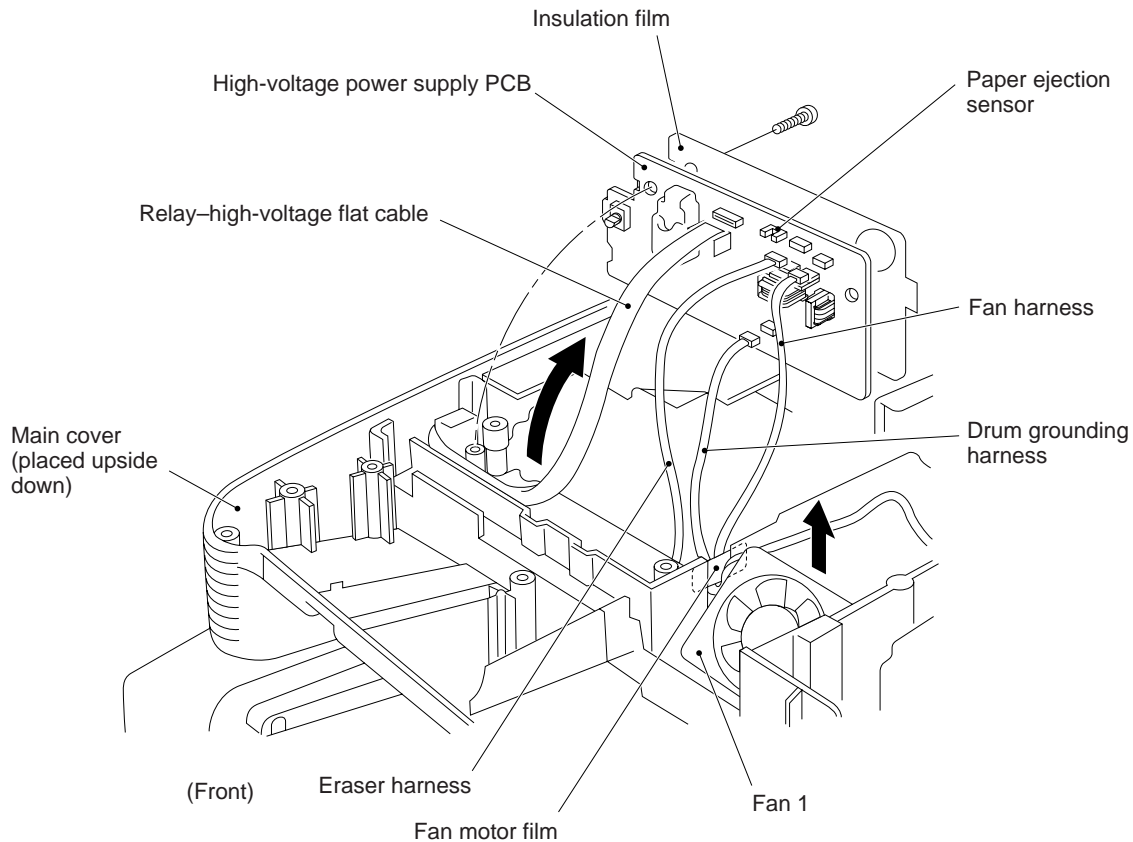
- When reassembling the above parts, make sure that the above harnesses are routed through the clamps provided on the main cover as illustrated in Section 1.23.

## 1.14 High-voltage Power Supply PCB and Fan 1

- (1) Remove the screw and the insulation film.
- (2) While pressing down the high-voltage power supply PCB, slightly shift it to the front of the machine.
- (3) Slightly lift up the high-voltage power supply PCB and disconnect the following four things:
  - Relay–high-voltage flat cable (12-pin)
  - Eraser harness (4-pin)
  - Fan harness (3-pin)
  - Drum grounding harness (2-pin)

NOTE: The fan harness and the drum grounding harness pass through the slot below the fan motor film.

- (4) Take out the fan 1.

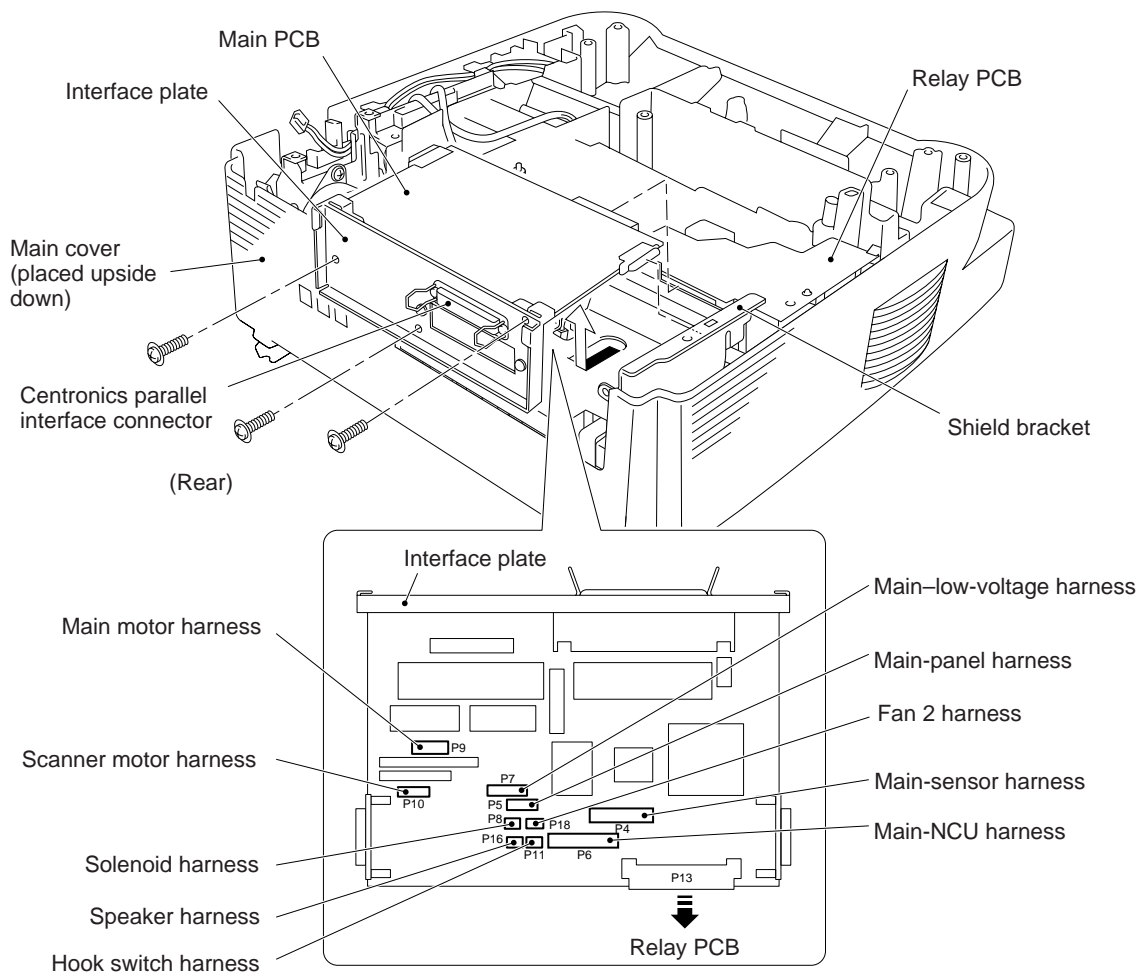


### ■ Reassembling Notes

- 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.
- When reassembling the above parts, make sure that the harnesses are routed on the main cover as illustrated in Section 1.23.
- Once the fan motor film is removed, you are recommended to use a new film.
- When setting the fan 1, be careful with the installation direction. The name plate should be face-up (when the equipment is placed upside down).

## 1.15 Main PCB

- (1) Remove the three screws from the interface plate.
- (2) Pull out the interface plate to the rear of the machine and take out the main PCB from the shield bracket.
- (3) Slightly lift up the main PCB and disconnect the following ten harnesses:
  - Main motor harness (4-pin), P9
  - Scanner motor harness (6-pin), P10
  - Main-low-voltage harness (5-pin), P7
  - Main-panel harness (5-pin), P5
  - Solenoid harness (2-pin), P8
  - Fan 2 harness (2-pin), P18
  - Speaker harness (2-pin), P16
  - Hook switch harness (2-pin), P11
  - Main-NCU harness (12-pin), P6
  - Main-NCU harness (6-pin), P6 (on the European and Asian versions only)
  - Main-sensor harness (11-pin), P4

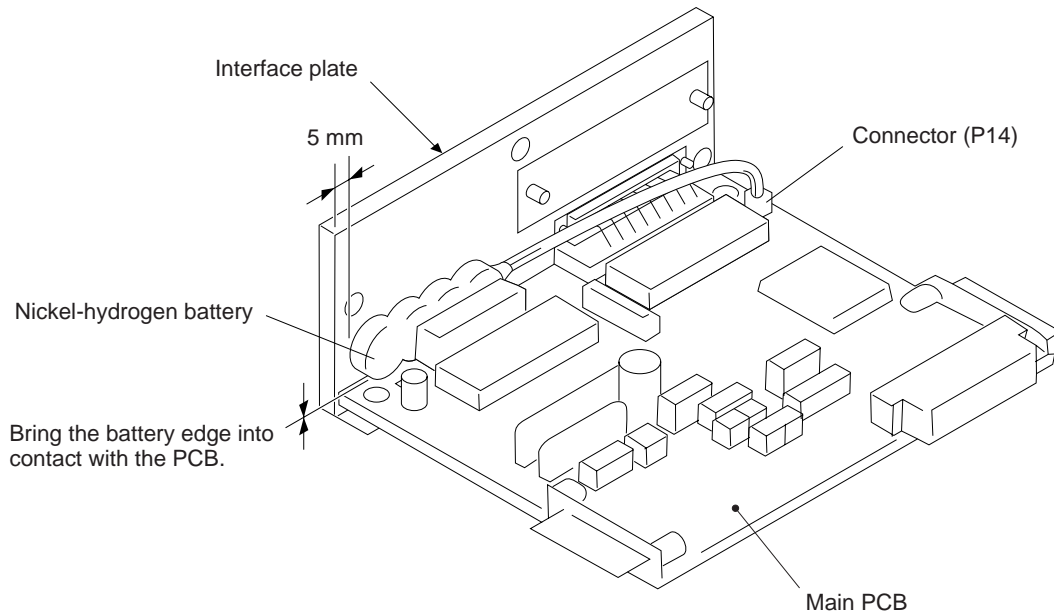


### ■ Reassembling Notes

- When reinstalling the main PCB, make sure that the harnesses are routed on the main cover as illustrated in Section 1.23.
- For the MFC6550MC/7550MC/7650MC/9500 which has a nickel-hydrogen battery on the main PCB, be sure to remove the battery from the PCB when transporting the PCB. Failure to do so may result in a short circuit, overcurrent flow, and fire.

When installing the nickel-hydrogen battery on the main PCB, bring its edge into contact with the surface of the PCB and attach it to the interface plate 5 mm inwards from the plate edge as shown below.

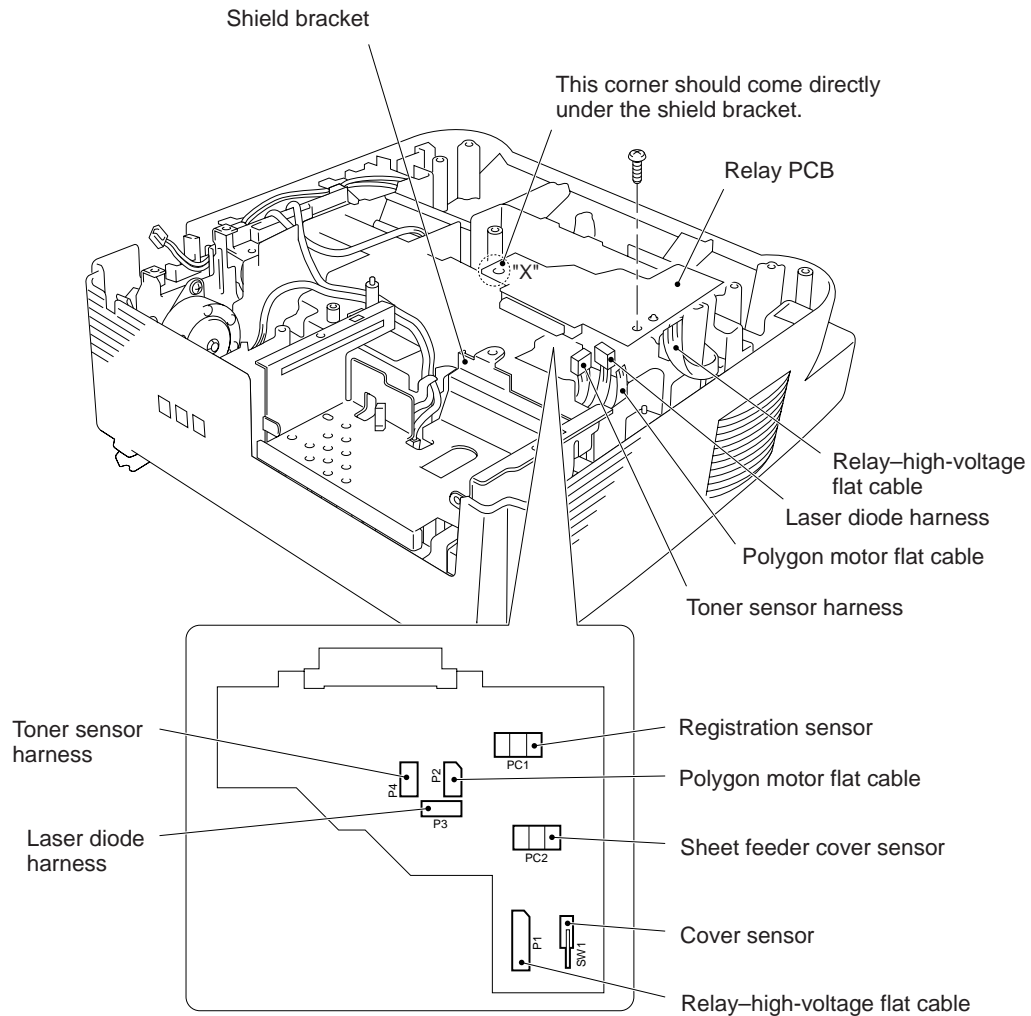
- For the MFC4550plus/7650MC, if you replace the main PCB with a new one, be sure to install the update data onto the flash ROM of the new main PCB (refer to Chapter II).



(MFC6550MC/7550MC/7650MC/9500)

## 1.16 Relay PCB

- (1) Remove the screw.
- (2) Slightly lift up the relay PCB and disconnect the following four things:
  - Toner sensor harness (4-pin), P4
  - Laser diode harness (5-pin), P3
  - Polygon motor flat cable (5-pin), P2
  - Relay-high-voltage flat cable (12-pin), P1

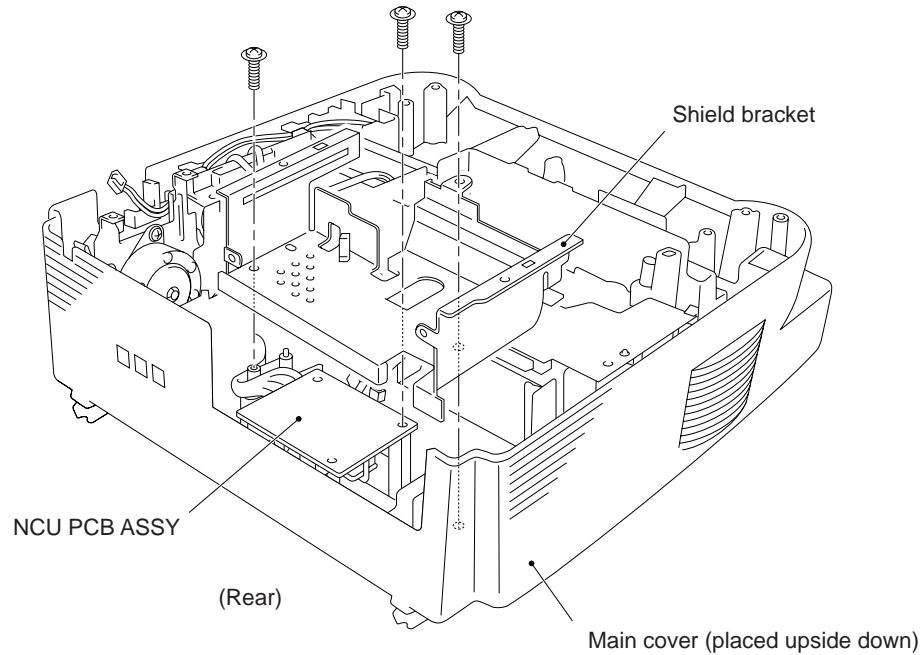


### ■ Reassembling Notes

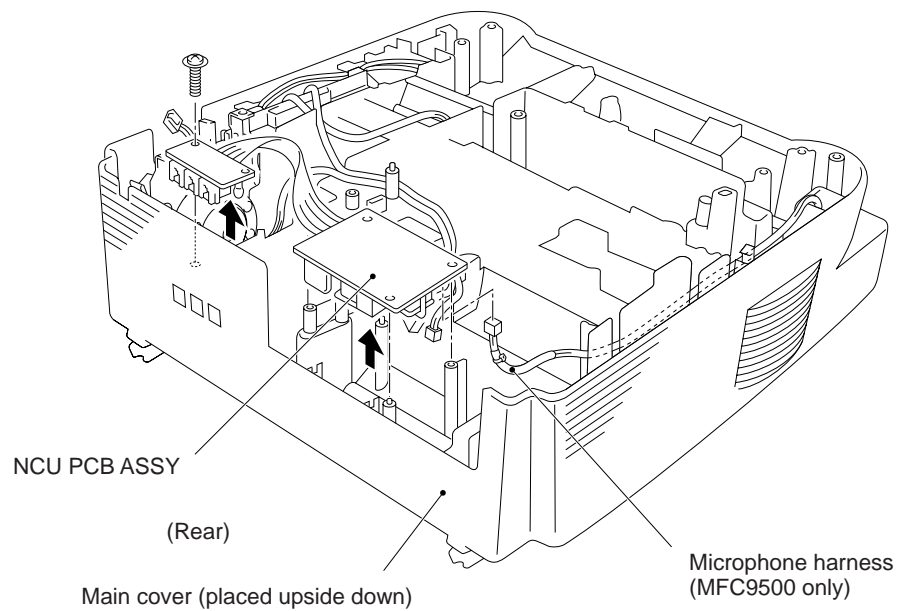
- When reinstalling the relay PCB, be sure that corner "X" shown above comes directly under the shield bracket.

## 1.17 Shield Bracket and NCU PCB ASSY

- (1) Remove the three screws and take out the shield bracket.



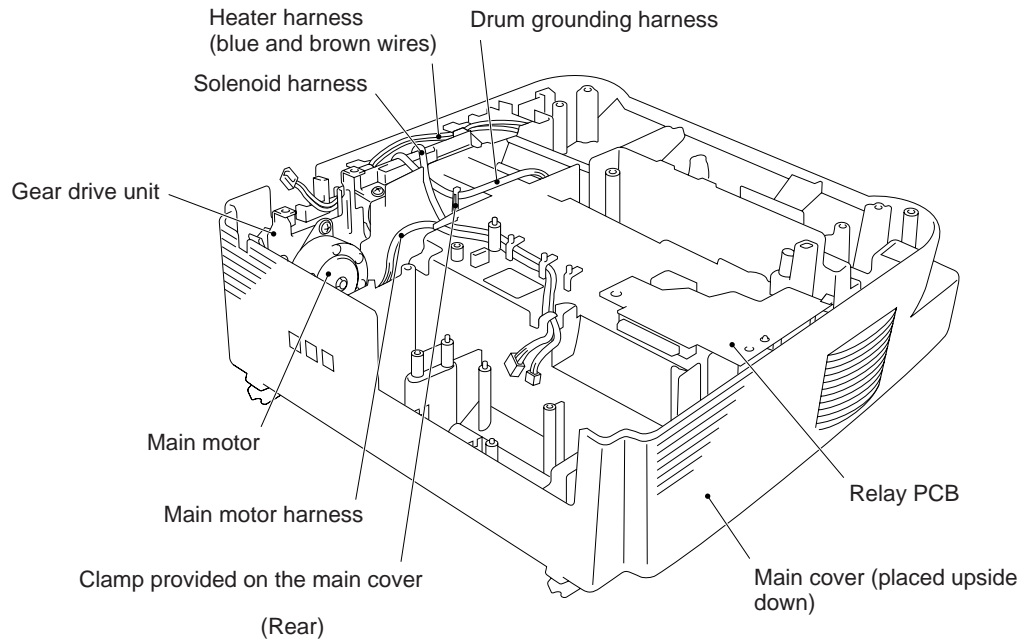
- (2) Remove the screw and take out the NCU PCB ASSY.  
For the MFC9500, disconnect the microphone harness from the NCU PCB.



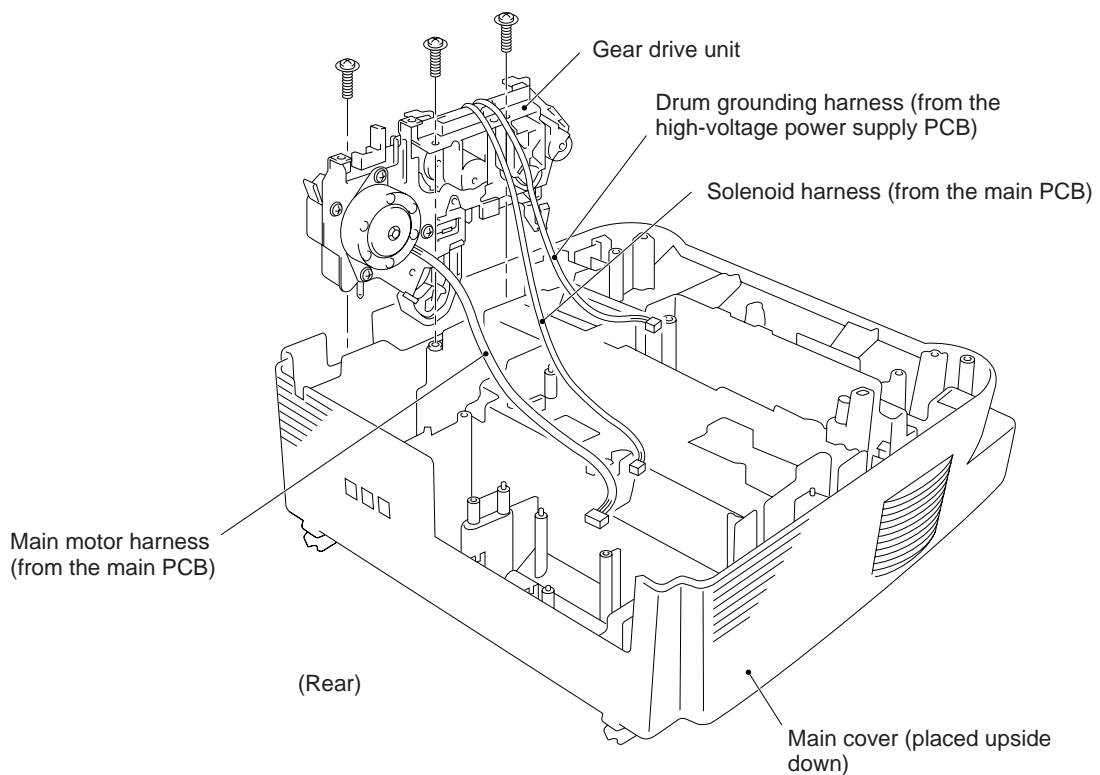


## 1.18 Gear Drive Unit

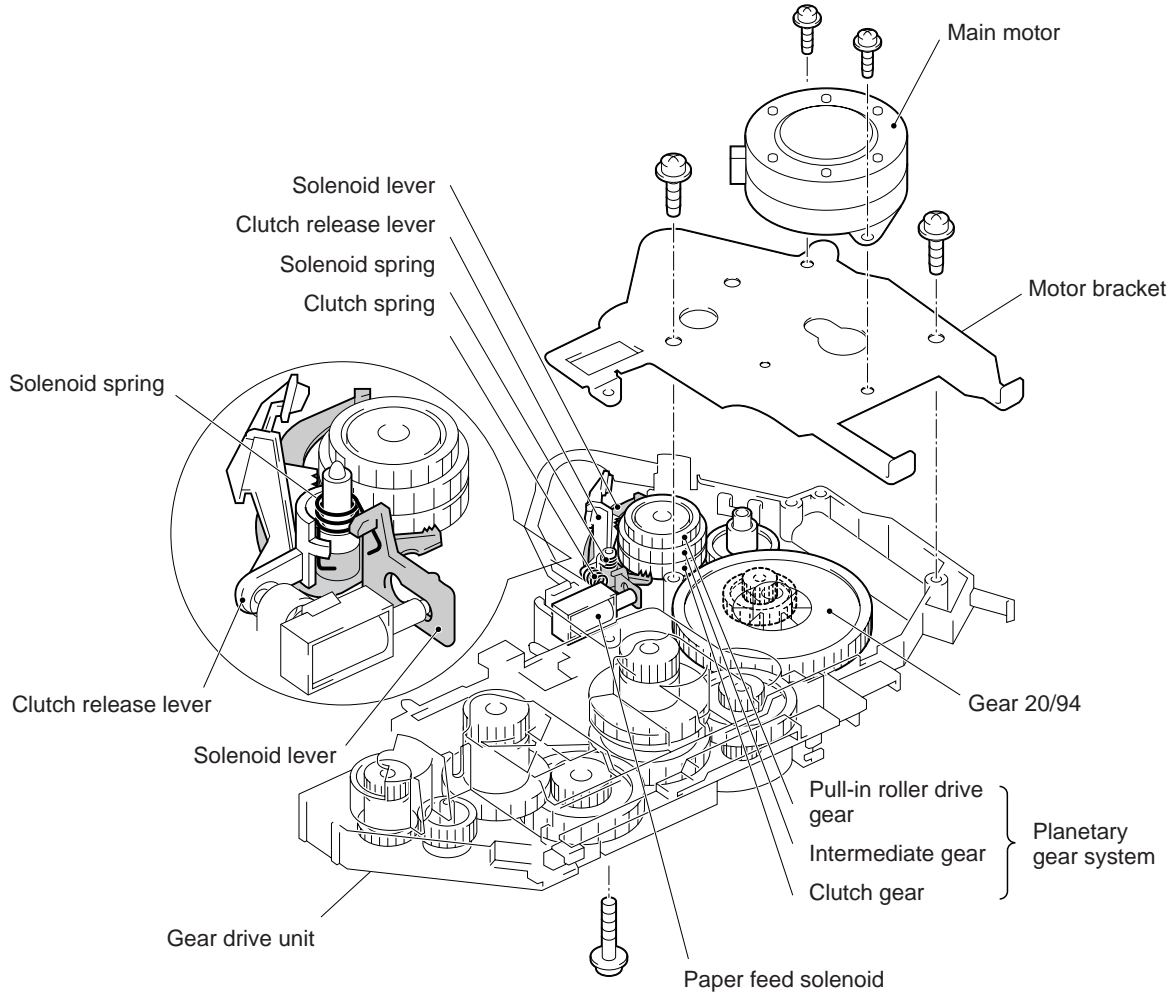
- (1) Take out the heater harness (blue and brown wires) from the clamps provided on the gear drive unit.
- (2) Take out the main motor harness, solenoid harness, and drum grounding harness from the clamp provided on the main cover.



- (3) Remove the three screws and take out the gear drive unit.



- (4) To replace the paper feed solenoid, solenoid lever or clutch release lever, remove the three screws and take off the motor bracket.
- (5) To remove the main motor from the bracket, remove two screws.

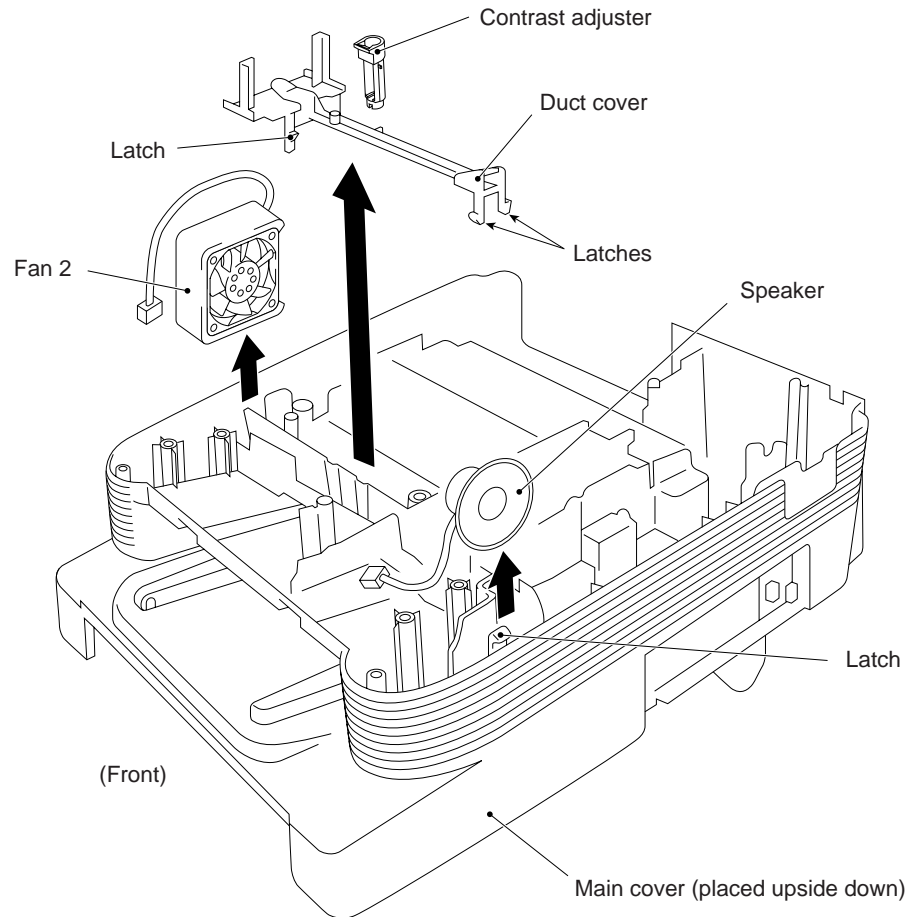


#### ■ Reassembling Notes

- If the paper feed solenoid, solenoid lever, or clutch release lever has been removed, assemble the removed parts as shown above.

## 1.19 Duct Cover, Fan 2, and Speaker

- (1) Unhook the three latches of the duct cover and lift it up. Take out the fan 2.
- (2) Unhook the latch and lift up the speaker.

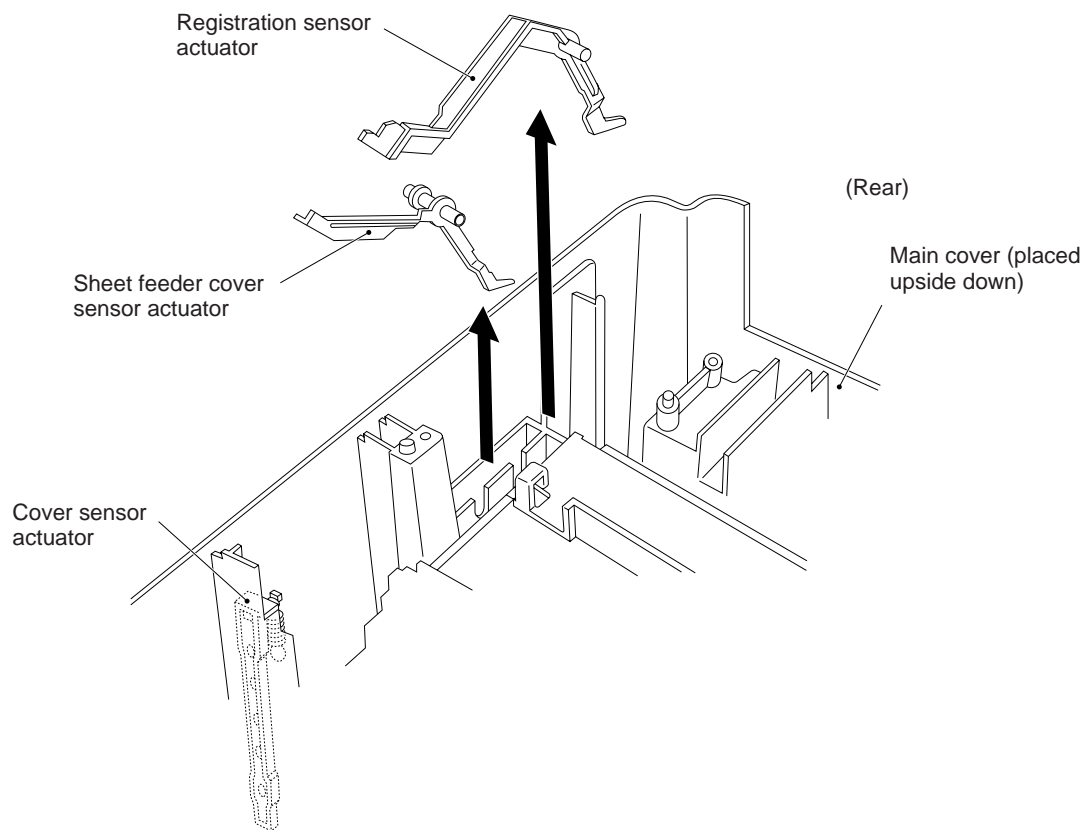


### ■ Reassembling Notes

- After reinstalling the duct cover, make sure that the harnesses are routed as illustrated in Section 1.23.
- When setting the fan 2, be careful with the installation direction. The name plate should face outwards.

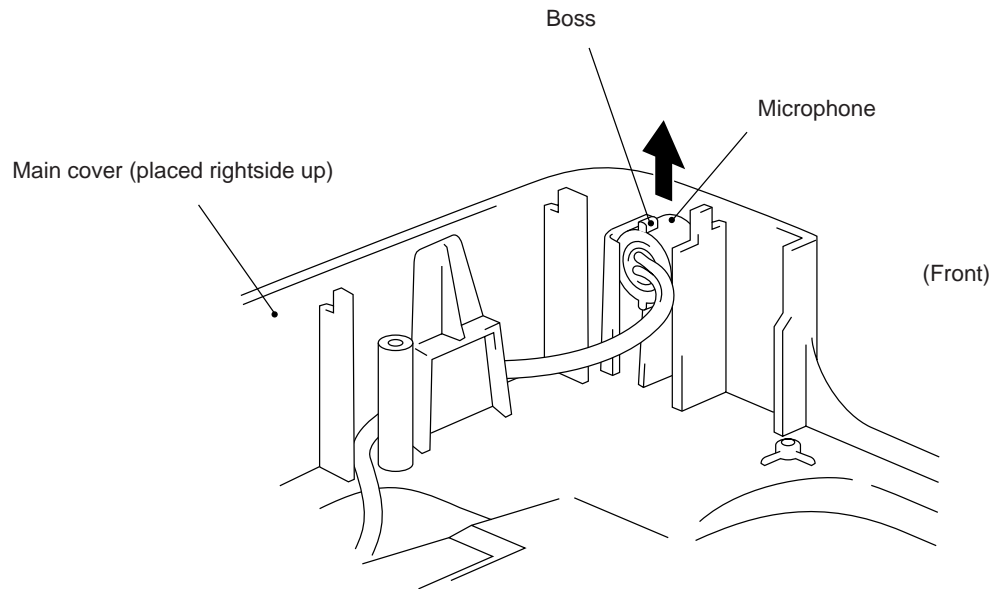
## 1.20 Sheet Feeder Cover Sensor Actuator, Registration Sensor Actuator, and Cover Sensor Actuator

- (1) Pull up the sheet feeder cover sensor actuator.
- (2) Pull up the registration sensor actuator.
- (3) Unhook the spring and take out the cover sensor actuator.



## 1.21 Microphone (MFC9500 only)

- (1) Disconnect the microphone harness from the NCU PCB and remove the NCU PCB ASSY. (Refer to Section 1.17.)
- (2) Turn the equipment rightside up.
- (3) Lift up the microphone from the main cover.

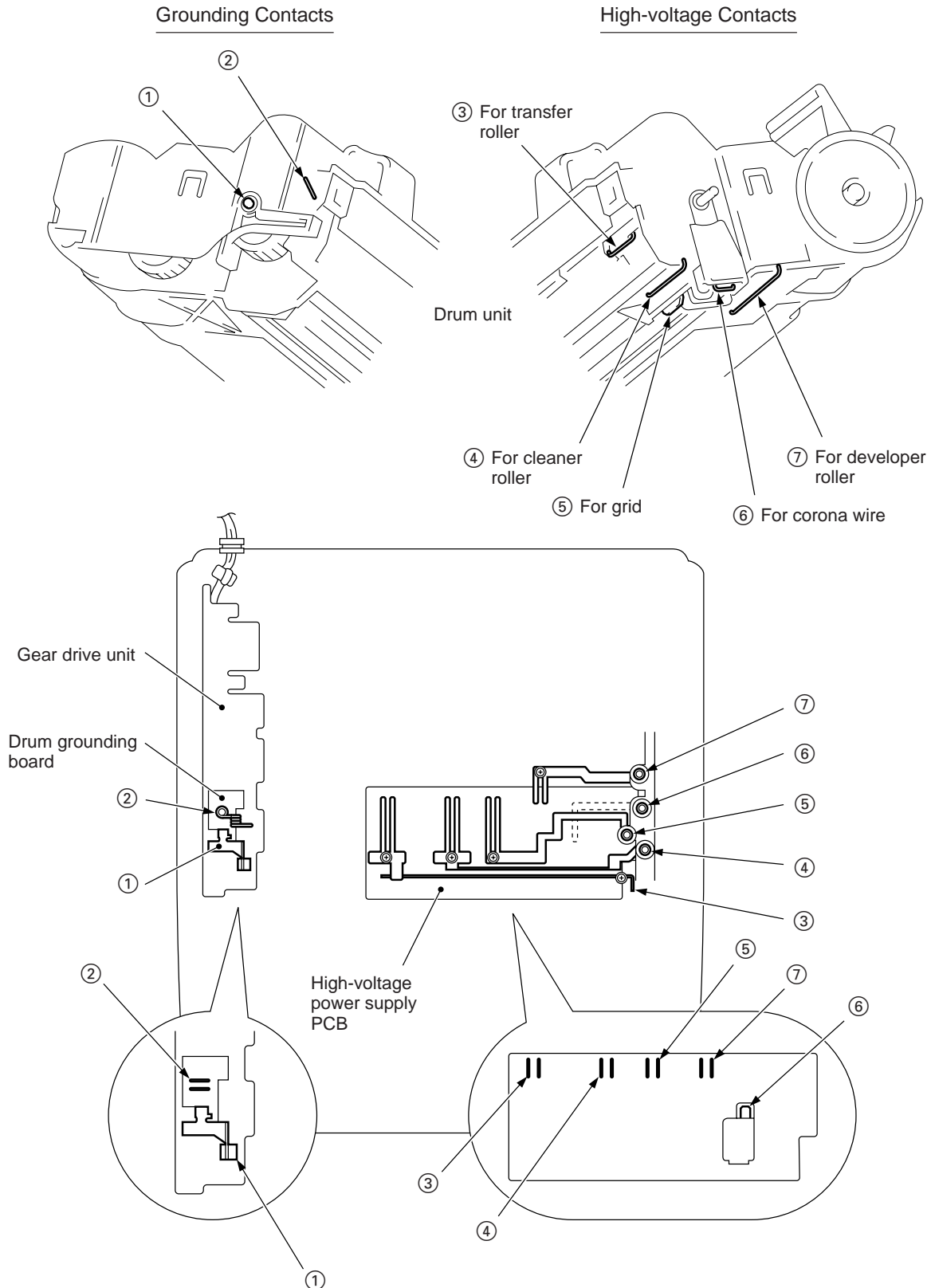


### ■ Reassembling Notes

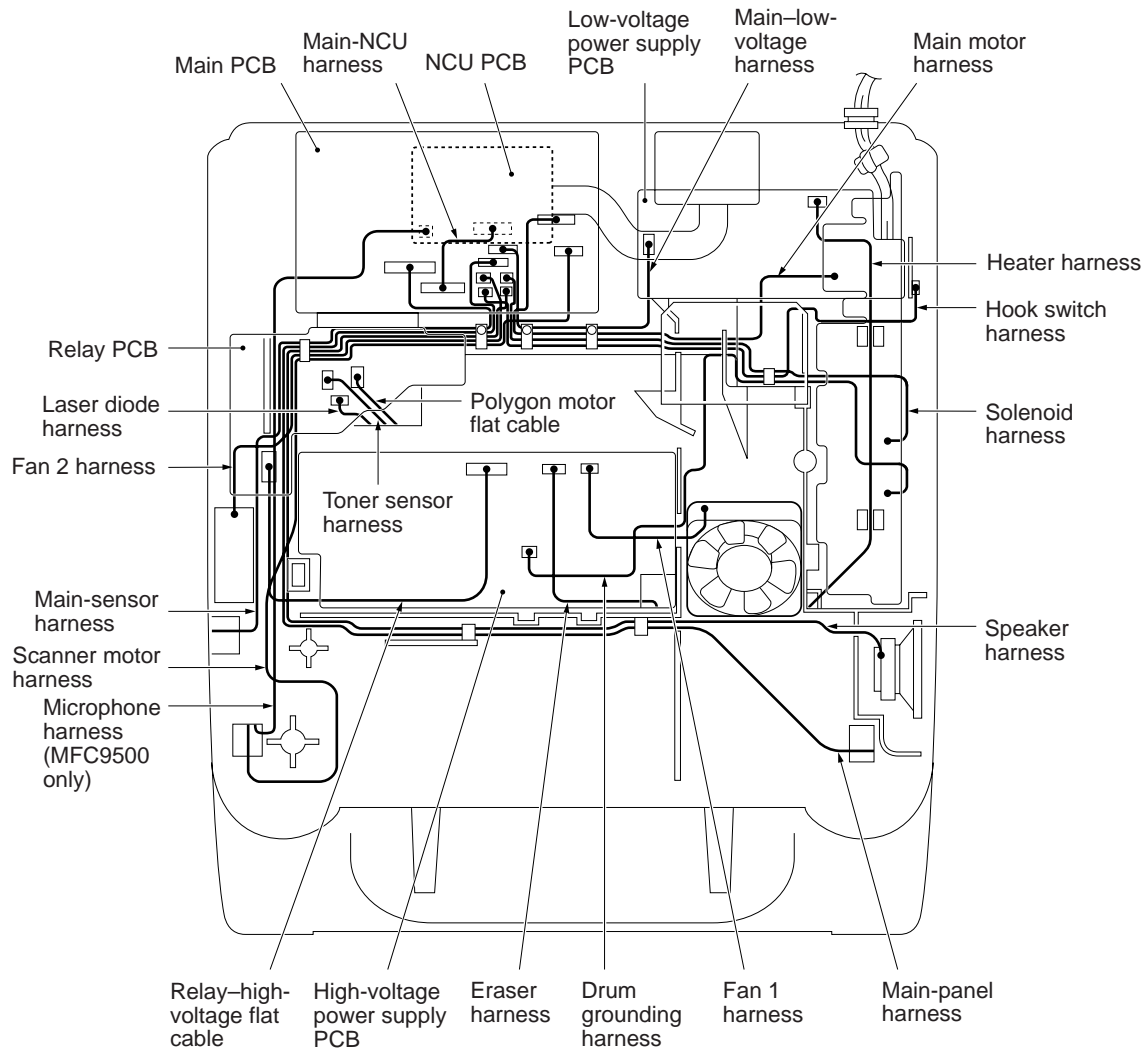
- Put the microphone back into place with either boss facing up.

## 1.22 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.



## 1.23 Harness Routing



(Front)





# CHAPTER V.

## MAINTENANCE MODE

# CONTENTS

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# 1. ENTRY INTO THE MAINTENANCE MODE

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

← Within 2 seconds →

The equipment beeps for approx. 3 seconds and displays "MAINTENANCE" on the LCD, indicating that it is placed in the initial maintenance mode, a mode in which the equipment is ready to accept entry from the keys.

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

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

## 2. LIST OF MAINTENANCE-MODE FUNCTIONS

Maintenance-mode Functions

Function Code	Function	Reference Subsection (Page)
01	E <sup>2</sup> PROM Parameter Initialization	3.1 (V-4)
02	Scanning Compensation Data Initialization	3.2 (V-5)
03	_____	_____
04	_____	_____
05	Printout of Scanning Compensation Data	3.3 (V-6)
06	_____	_____
07	_____	_____
08	ADF* Performance Test	3.4 (V-8)
09	Test Pattern 1	3.5 (V-9)
10	Firmware Switch Setting	3.6 (V-10)
11	Printout of Firmware Switch Data	3.6 (V-46)
12	_____	_____
13	Operational Check of Control Panel PCB (Check of Keys and Buttons)	3.7 (V-47)
14	_____	_____
15	_____	_____
32	Sensor Operational Check	3.8 (V-48)
55	CCD Scanner Area Setting	3.9 (V-49)
82	Equipment Error Code Indication	3.10 (V-49)
87	Output of Transmission Log to the Line	3.11 (V-50)
91	E <sup>2</sup> PROM Parameter Initialization (except the telephone number storage area)	3.1 (V-4)

\* 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, 82, and 91) are shaded in the above table. Function code 10 accesses the firmware switches WSW01 to WSW34, 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 3.6.

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

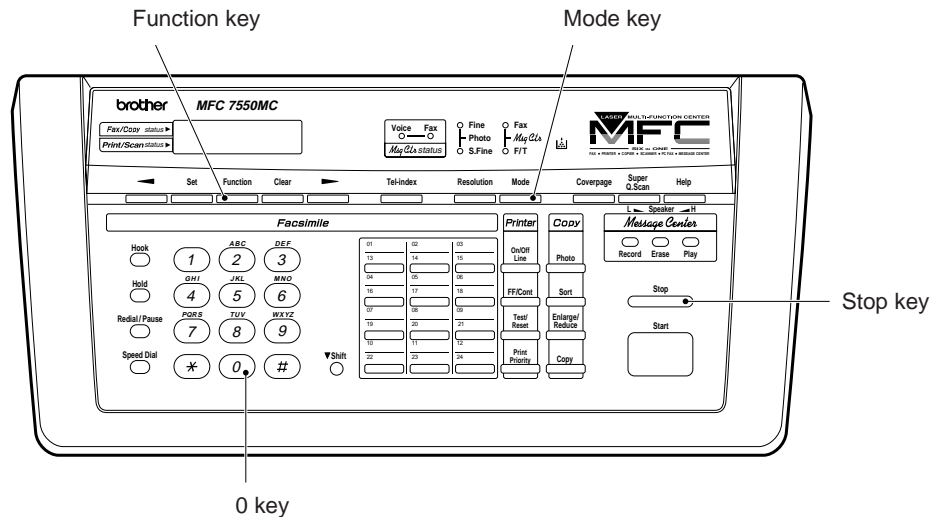
- (1) Press the **Function** key and the **Mode** key in this order.

The LCD clears the current display.

NOTE: The **Mode** key is inoperable during standby for redialing, timer, paging, and forwarding.

- (2) Press the **0** key.
- (3) Enter the desired function code (10, 11, 82, or 91) with the numerical keys.

For function code 10, access the desired firmware switch according to the operating procedure described in Subsection 3.6.



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

# 3 DETAILED DESCRIPTION OF MAINTENANCE-MODE FUNCTIONS

## 3.1 E<sup>2</sup>PROM Parameter Initialization

### ■ Function

The equipment initializes the parameters, user switches, and firmware switches registered in the E<sup>2</sup>PROM, to the initial values. Entering the function code 01 initializes all of the E<sup>2</sup>PROM areas, but entering 91 does not initialize some areas, as listed below.

Function code	01	91
Data item		
Maintenance-mode functions	All of these will be initialized.	These will be initialized.
User switches		
Firmware switches		
Remote activation code		
Activity report		
Distinctive ringing patterns registered (only for the U.S.A. versions)		
Station ID data		These will <u>not</u> be initialized.
Cover page comments		
Outside line number		
Telephone function registration		
One-touch dialing		
Speed dialing		
Group dialing		

### ■ Operating Procedure

- (1) Press the 0 and 1 keys (or the 9 and 1 keys according to your need) in this order in the initial maintenance mode.  
The "PARAMETER INIT" will appear on the LCD.
- (2) Upon completion of parameter initialization, the equipment returns to the initial maintenance mode.

## 3.2 Scanning Compensation Data Initialization

### ■ Function

The equipment scans the white pressure bar and writes the scanned compensation data onto the E<sup>2</sup>PROM, so said data can be used for compensation of individual CCD properties in the scanning operation.

### ■ Operating Procedure

- (1) Press the  and  keys in this order in the initial maintenance mode.  
The "WHITE LEVEL INIT" will appear on the LCD.
- (2) Upon completion of compensation data initialization, the equipment returns to the initial maintenance mode.

NOTE: If any error occurs in the E<sup>2</sup>PROM white level data, the "SCANNER ERROR" or "CLEAN UP SCANNER" will appear on the LCD.

### 3.3 Printout of Scanning Compensation Data

#### ■ Function

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

#### ■ Operating Procedure

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

- (1) Press the **[0]** and **[5]** keys in this order in the initial maintenance mode.  
The "WHITE LEVEL 1" will appear on the LCD.
- (2) The equipment prints out the scanning compensation data list containing the following:  
FAX3550/3650/8000P/8200P/MFC4450/4550/4550plus (200 dpi)
  - a) 2-value quantization white level data (208 bytes)
  - b) 2-value quantization black level data (1 byte)
  - c) Photo-mode white level data (208 bytes)
  - d) Photo-mode black level data (1 byte)
  - e) LED light intensity value, 2-value quantization LED light intensity value, and photo-mode LED light intensity value (3 bytes)
  - f) 2-value quantization A/D-high and photo-mode A/D-high values (2 bytes)MFC6550MC/7550MC/7650MC/9000/9500 (300 dpi)
  - a) 2-value quantization white level data (1664 bytes)
  - b) 2-value quantization black level data (1 byte)
  - c) Photo-mode white level data (1664 bytes)
  - d) Photo-mode black level data (1 byte)
  - e) LED light intensity value, 2-value quantization LED light intensity value, and photo-mode LED light intensity value (3 bytes)
  - f) 2-value quantization A/D-high, photo-mode A/D-high and A/D-low values (3 bytes)
- (3) Upon completion of recording of the compensation data list, the equipment returns to the initial maintenance mode.

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



```

C200 : B2 B5 BD BD BC C2 C9 CC D1 D7 DA D9 DC DD D7 D7
C210 : DC DA DF E0 E3 E9 E8 E6 E5 E3 E5 E1 E6 E7 EE F1
C220 : F0 F2 F2 EE EC EC EA E7 EE EE EF F1 F0 F0 EE EC
C230 : E9 E8 E5 E4 E4 E1 E7 EA EC E6 E8 E3 E2 DF DD DB
C240 : DE DB DB DC DD DF E3 DD DE DD DB DA DB D9 DA DB
C250 : DD DD E2 E2 E4 DE DC DA D9 DB D8 D7 D7 DA DB DB
C260 : DC DD DF DE D9 DE 83 88 84 85 88 85 88 88 88
C270 : 88 88 88 87 88 86 87 88 AD DC E0 E6 E8 E7 E7 E2
C280 : E0 DD DF DF DE DD E0 E2 E4 E9 E7 E4 E3 DD DE DD
C290 : DD DD E1 E1 E5 E6 EB EE EB EA E5 E7 E6 E7 E9 EE
C2A0 : EC F0 F0 F3 F9 F6 F6 F0 EF EB EF F1 F2 F7 F9 FB
C2B0 : FB F7 F6 F0 F2 F2 F2 F1 F3 F7 F4 F4 ED EC E9 E6
C2C0 : E4 E1 E5 E7 E9 E7 E5 E5 E0 DD D9 D7 D4 CF C8 C4

```

C200 : 16

```

C200 : AB B0 B3 B4 B3 B9 C1 C3 C5 C8 C7 CB C9 C4 C8 CD
C210 : CE D1 D2 D5 D9 DB DF DE DD DE DE DF DF E2 E4 E4
C220 : E6 E6 EA E7 E2 DF DE E1 DF E1 E5 E5 E4 E7 E5 E6
C230 : E5 E3 E4 E0 E3 E0 E0 E5 E3 E5 E4 E2 DF DE DB DB
C240 : DB D7 D7 D5 D8 D9 DB DF E0 E0 E0 E0 E0 DC DD DC
C250 : DC DF DF DE DF E0 E0 DE E2 DF DF DB DC DA D8 D7
C260 : D7 D9 DD DA E3 E3 E7 E6 E6 E8 E5 E7 E8 E5 E6 E8
C270 : E8 E8 EC EA EC EB EE ED EA EB EA EA E6 E5 E2 E5
C280 : E6 E6 E7 E9 E9 E8 E9 EA EB E7 EA E2 E3 E0 E0 E0
C290 : E4 E7 E9 EC EF EB EA EE EB EB E9 E9 EB ED F0 F2
C2A0 : F2 F4 F6 F8 F9 F9 F3 EE F1 ED F2 F0 F0 F9 F7 F9
C2B0 : F9 FA F7 F5 F3 F4 F3 F1 F5 F4 F3 F5 F3 F0 EF EC
C2C0 : EC ED E9 EA EB E9 EB EA E5 E2 E1 DB D9 D3 CD C8

```

C200 : 16

C200 : 3F 3F 34

C200 : 2F 29

### Scanning Compensation Data List (200 dpi)

### 3.4 ADF Performance Test

#### ■ Function

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

#### ■ Operating Procedure

- (1) Set documents. (Allowable up to the ADF capacity.)  
The "DOC. READY" will appear on the LCD.
- (2) Press the  and  keys in this order.  
The equipment
  - i) copies the 1st document and displays "P.01" on the LCD,
  - ii) feeds in and out the 2nd through 4th documents while counting without copying them as the LCD shows the corresponding count,
  - iii) copies the 5th document and displays "P.05" on the LCD,
  - iv) feeds in and out the 6th through 9th documents while counting without copying them as the LCD shows the corresponding count, and
  - v) copies the 10th document and displays "P.10" on the LCD.
- (3) Upon completion of feeding in and out all of the documents, the final count appears on the LCD.
- (4) Press the  key to return the equipment to the initial maintenance mode.

### 3.5 Test Pattern 1

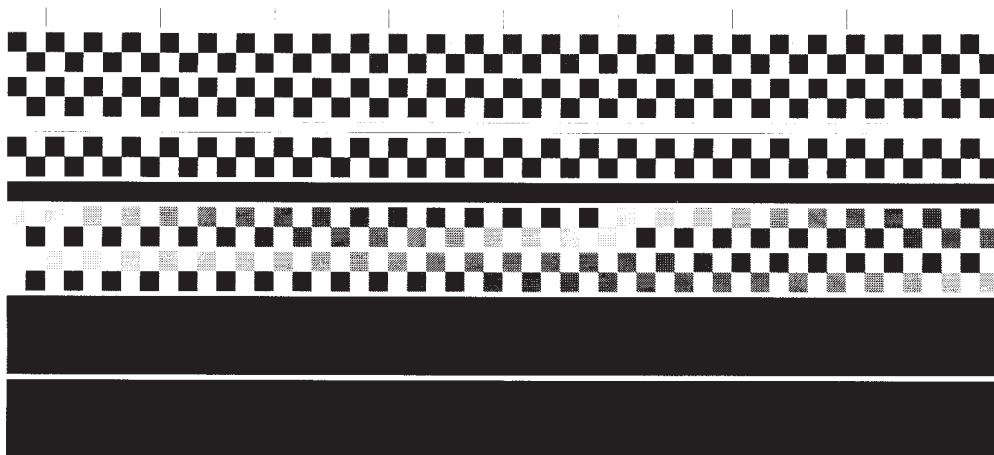
#### ■ Function

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  and  keys in this order in the initial maintenance mode.

The figure below shows test pattern 1.



Test Pattern 1

## 3.6 Firmware Switch Setting and Printout

### [ A ] Firmware switch setting

#### ■ Function

The facsimile equipment incorporates the following firmware switch functions (WSW01 through WSW34) which may be activated with the procedures using the control panel keys and buttons.

The firmware switches have been set at the factory in conformity to the communications standards and codes of each country. Do not disturb them unless necessary. Some firmware switches may not be applicable in some versions. The firmware switch data list indicates "Not used." for those inapplicable switches.

**Firmware Switches (WSW01 through WSW34)**

WSW No.	Function	Reference Page
WSW01	Dial pulse setting	V-12
WSW02	Tone signal setting	V-13
WSW03	PABX mode setting	V-14
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	Communications setting 1	V-34
WSW23	Communications setting 2	V-35
WSW24	TAD setting 2	V-36
WSW25	TAD setting 3	V-37
WSW26	Function setting 4	V-38
WSW27	Function setting 5	V-39
WSW28	Function setting 6	V-40
WSW29	Function setting 7	V-41
WSW30	Function setting 8	V-42
WSW31	Function setting 9	V-43
WSW32	Function setting 10	V-43
WSW33	Function setting 11	V-44
WSW34	Function setting 12	V-45

## ■ **Operating Procedure**

- (1) Press the **1** and **0** keys in this order in the initial maintenance mode.  
The equipment displays the "WSW00" on the LCD and becomes ready to accept a firmware switch number.
- (2) Enter the desired number from the firmware switch numbers (01 through 34).  
The following appears on the LCD:  
WSWxx    0 0 0 0 0 0 0
- (3) Use the **◀** and **▶** keys to move the cursor to the selector position to be modified.
- (4) Enter the desired number using the **0** or **1** key.
- (5) Press the **Set** key. This operation saves the newly entered selector values onto the E<sup>2</sup>PROM and readies the equipment for accepting a firmware switch number.
- (6) Repeat steps (2) through (5) until the modification for the desired firmware switches is completed.
- (7) Press the **Set** or **Stop** key to return the equipment to the initial maintenance mode.

NOTES:

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

## ■ **Note**

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

■ Detailed Description for the Firmware Switches

WSW01 (Dial pulse setting)

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

● Selectors 1 and 2: Dial pulse generation mode

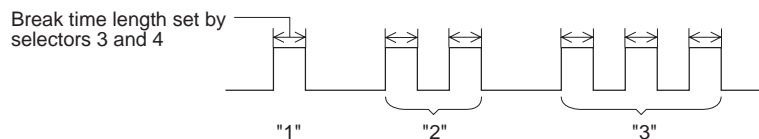
These selectors set the number of pulses to be generated in pulse dialing.

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

● Selectors 3 and 4: Break time length in pulse dialing

These selectors set the break time length in pulse dialing.

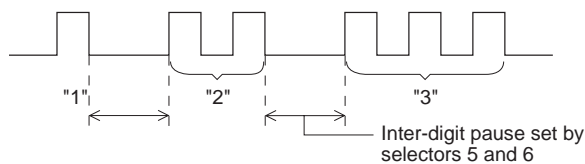
(Example: If "1", "2", and "3" are dialled when N is set by selectors 1 and 2.)



● Selectors 5 and 6: Inter-digit pause

These selectors set the inter-digit pause in pulse dialing.

(Example: If "1", "2", and "3" are dialled when N is set by selectors 1 and 2.)

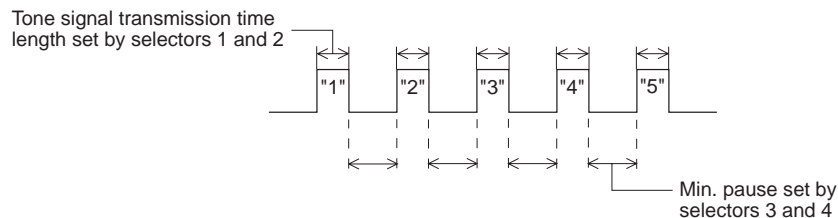


- **Selector 7: Switching between pulse (DP) and tone (PB) dialing, by the function switch**  
This selector determines whether or not the dialing mode may be switched between the pulse (DP) and tone (PB) dialing by using the function switch.
- **Selector 8: Default dialing mode, pulse (DP) or tone (PB) 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 be also 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 dialled.)



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

**WSW03 (PABX\* mode setting)**

Selector No.	Function	Setting and Specifications																																													
1	Not used.																																														
2   4	Min. detection time length of PABX dial tone, required for starting dialing	<table> <tr> <td>No.</td> <td>2</td> <td>3</td> <td>4</td> <td></td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>: 50 ms</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>1</td> <td>: 210 ms</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>0</td> <td>: 500 ms</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>1</td> <td>: 800 ms</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>0</td> <td>: 900 ms</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>1</td> <td>: 1.5 sec.</td> </tr> <tr> <td></td> <td>1</td> <td>1</td> <td>0</td> <td>: 2.0 sec.</td> </tr> <tr> <td></td> <td>1</td> <td>1</td> <td>1</td> <td>: 2.5 sec.</td> </tr> </table>	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.
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	Not used.																																														
6 7	Dial tone detection in PABX	<table> <tr> <td>No.</td> <td>6</td> <td>7</td> <td></td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>: No detection (3.5 sec. WAIT)</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>: No detection (5 sec. WAIT)</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>: No detection (7 sec. WAIT)</td> </tr> <tr> <td></td> <td>1</td> <td>1</td> <td>: Detection (Frequency only)</td> </tr> </table>	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)																									
No.	6	7																																													
	0	0	: No detection (3.5 sec. WAIT)																																												
	0	1	: No detection (5 sec. WAIT)																																												
	1	0	: No detection (7 sec. WAIT)																																												
	1	1	: Detection (Frequency only)																																												
8	"R" key function	<table> <tr> <td>0:</td> <td>1st dial tone detection add</td> <td>1:</td> <td>No 1st dial tone detection</td> </tr> </table>	0:	1st dial tone detection add	1:	No 1st dial tone detection																																									
0:	1st dial tone detection add	1:	No 1st dial tone detection																																												

\* PABX: Private automatic branch exchange

NOTE: The WSW03 is not applicable in those countries where no PABX is supported, e.g., U.S.A.

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

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

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

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

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

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

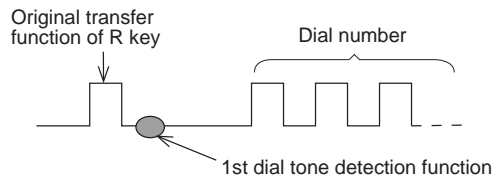
Other setting combinations deactivate the dial tone detection function so that the equipment starts dialing after the specified WAIT (3.5, 5.0, or 7.0 sec.) without detection of a dial tone when a line is connected.



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

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

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



**WSW04 (TRANSFER facility setting)**

Selector No.	Function	Setting and Specifications
1	Earth function in transfer facility	0: Provided 1: Not provided
2 3	Dual tone detection frequency in ICM recording	No. 2 3 0 0 : 350 + 440 Hz (A) 0 1 : 440 + 480 Hz (B) 1 x : 480 + 620 Hz (C)
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 1 and 5 through 8 are not applicable in those countries where no transfer facility is supported.

Selectors 2 and 3 are applicable to those models equipped with a built-in TAD or in the U.S.A.

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

This selector determines whether or not the earth function is added to the transfer setting menu to be accessed by the function switch.

- **Selectors 5 and 6: Earth time length for earth function**

These selectors set the short-circuiting time length of the telephone line (La or Lb) to ground. This setting is effective only when the earth function is selected for the R key by using the function switch.

- **Selectors 7 and 8: Break time length for flash function**

These selectors set the break time length.

This setting is effective only when the flash function is selected for the R key by using the function switch.

### WSW05 (1st dial tone and busy tone detection)

Selector No.	Function	Setting and Specifications
1   3	1st dial tone detection	No. 1 2 3 0 0 0 : 3.5 sec. WAIT 0 0 1 : 7.0 sec. WAIT 0 1 0 : 10.5 sec. WAIT 0 1 1 : 14.0 sec. WAIT 1 0 0 : 17.5 sec. WAIT 1 0 1 : 21.0 sec. WAIT 1 1 0 : 24.5 sec. WAIT 1 1 1 : Detection (Without WAIT)
4	Max. pause time allowable for remote ID code detection	0: 2 seconds 1: 1 second
5 6	Busy tone detection in automatic sending mode	No. 5 6 0 0 : No detection 0 1 : Detection only after dialing 1 0 : No detection 1 1 : Detection before and after dialing
7	Busy tone detection in automatic receiving mode	0: Yes 1: No
8	DTMF detection time	0: 40 ms min. 1: 100 ms min.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**WSW06 (PAUSE key setting and 2nd dial tone detection)**

Selector No.	Function	Setting and Specifications
1   3	PAUSE key setting and 2nd dial tone detection	No. 1 2 3 0 0 0 : No pause 0 0 1 : 3.5 sec. WAIT 0 1 0 : 7 sec. WAIT 0 1 1 : 10.5 sec. WAIT 1 0 0 : 14 sec. WAIT 1 0 1 : 17.5 sec. WAIT 1 1 0 : 2nd dial tone detection only in pulse dialing (DP) system 1 1 1 : 2nd dial tone detection both in DP and push-button (PB) dialing systems
4   6	Detection of international tone	No. 4 5 6 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
7	No. of 2nd dial tone detection times	0: Once      1: Twice
8	2nd dial tone interrupt detecting time	0: 30 ms      1: 50 ms

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

● **Selectors 1 through 3: PAUSE key setting and 2nd dial tone detection**

Selectors			
1	2	3	
0	0	0	No WAIT is inserted even if the PAUSE key is pressed.
0	0	1	Pressing the PAUSE key inserts WAIT in pulse dialing, as defined in the above table.
0	1	0	
0	1	1	If the PAUSE key is pressed repeatedly, the equipment beeps a refusal sound and refuses the entry.
1	0	0	In hook-up dialing, however, the equipment allows repeated pressing with an acceptance sound, but inserts WAIT only for the first pressing.
1	0	1	
1	1	0	Each time the PAUSE key is pressed, the equipment detects a 2nd dial tone.  If no 2nd dial tone is inputted within the specified time, the equipment disconnects the line in automatic dialing, or it starts transmitting the dial signal if given after depression of the PAUSE key in hook-up dialing.  (In those countries where no dial tone detection function is supported, setting these selectors to "1, 1, 0" or "1, 1, 1" inserts a WAIT of 3.5 seconds.)
1	1	1	

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

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

This setting is effective only when the 2nd dial tone detection function is activated by selectors 1 through 3 (Setting 1, 1, 0 or 1, 1, 1).

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

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

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

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

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

### WSW07 (Dial tone setting 1)

Selector No.	Function	Setting and Specifications
1 2	Frequency band range	No. 1 2 0 0 : Narrows by 10 Hz 0 1 : Initial value 1 X : Widens by 10 Hz
3	Line current detection	0: No      1: Yes
4   6	2nd dial tone detection level (Z = 600 Ω)	No. 4 5 6 0 0 0 : -21 dBm 0 0 1 : -24 dBm 0 1 0 : -27 dBm 0 1 1 : -30 dBm 1 0 0 : -33 dBm 1 0 1 : -36 dBm 1 1 0 : -39 dBm 1 1 1 : -42 dBm
7	1st dial tone interrupt detecting time	0: 30 ms      1: 50 ms
8	Not used.	

NOTE: WSW07 is not applicable in those countries where no dial tone 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 equipment should detect a line current before starting dialing.

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

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

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

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

### WSW08 (Dial tone setting 2)

Selector No.	Function	Setting and Specifications
1   3	1st dial tone detection time length	No. 1 2 3 0 0 0 : 50 ms 0 0 1 : 210 ms 0 1 0 : 500 ms 0 1 1 : 800 ms 1 0 0 : 900 ms 1 0 1 : 1.5 sec. 1 1 0 : 2.0 sec. 1 1 1 : 2.5 sec.
4 5	Time-out length for 1st and 2nd dial tone detection	No. 4 5 0 0 : 10 sec. 0 1 : 20 sec. 1 0 : 6 sec. (in the U.S.A. versions) 15 sec. (in other versions) 1 1 : 30 sec.
6   8	Detection level of 1st dial tone and busy tone before dialing (Z = 600 Ω)	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: WSW08 is not applicable in those countries where no dial tone detection is supported, e.g., U.S.A.

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

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

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

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

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

**WSW09 (Protocol definition 1)**

Selector No.	Function	Setting and Specifications
1	Frame length selection	0: 256 octets 1: 64 octets
2	Not used.	
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 : 50 sec. 0 1 : 70 sec. 1 0 : 90 sec. 1 1 : 35 sec.

- **Selector 1: Frame length selection**

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

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

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

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

- **Selector 6: T1 time**

This selector sets the time length for the T1 timer.

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

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



**WSW10 (Protocol definition 2)**

Selector No.	Function	Setting and Specifications	
1	Switching of DPS, following the CML ON/OFF	0: No	1: Yes
2	Time length from transmission of the last dial digit to CML ON	0: 100 ms	1: 50 ms
3	Time length from CML ON to CNG transmission	0: 2 sec.	1: 4 sec.
4	Time length from CML ON to CED transmission (except for facsimile-to-telephone switching)	0: 0.5 sec.	1: 2 sec.
5 6	No. of training retries	No. 5 6	
		0 0 : 1 time	
		0 1 : 2 times	
		1 0 : 3 times	
		1 1 : 4 times	
7	Encoding system (Compression)	MR	0: Allowed 1: Not allowed
8		MMR	0: Allowed 1: Not allowed

- **Selector 1: Switching of DPS, following the CML ON/OFF**  
Setting this selector to "1" automatically switches DPS following the CML ON/OFF operation. This function is provided to conform to the Swedish standard.
- **Selector 2: Time length from transmission of the last dial digit to CML ON**  
This selector sets the time length from when the equipment transmits the last dial digit until the CML relay comes on.
- **Selector 3: Time length from CML ON to CNG transmission**  
This selector sets the time length until the equipment transmits a CNG after it turns ON the CML relay.
- **Selector 4: Time length from CML ON to CED transmission**  
This selector sets the time length until the equipment transmits a CED after it turns ON the CML relay. This setting does not apply to switching between facsimile and telephone.
- **Selectors 5 and 6: No. of training retries**  
These selectors set the number of training retries to be repeated before automatic fallback.
- **Selectors 7 and 8: Encoding system (Compression)**  
This selector determines whether or not use of the MR coding system will be allowed. (Swiss version only)

### 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, e.g., U.S.A.

The setting of WSW11 is effective only when selectors 5 and 6 of WSW05 are set to "0, 1" or "1, 1" (Busy tone detection).

- **Selectors 1 and 2: Frequency band range**

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

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

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

**WSW12 (Signal detection condition setting)**

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

\* 1000 ms in Chinese or Hong Kong versions.

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

If the equipment detects the OFF state of calling signal (Ci) for the time length which is above the value set by selectors 1 and 2 and less the value set by selectors 3 and 4, it interprets the Ci signal as OFF.

● **Selectors 5 and 6: Detecting time setting**

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

● **Selector 7: Delay**

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

### WSW13 (Modem setting)

Selector No.	Function	Setting and Specifications
1 2	Cable equalizer	No. 1 2 0 0 : 0 km 0 1 : 1.8 km 1 0 : 3.6 km 1 1 : 5.6 km
3 4	Reception level (Z = 600 Ω)	No. 3 4 0 0 : -43 dBm 0 1 : -47 dBm 1 0 : -49 dBm 1 1 : -51 dBm
5   8	Modem attenuator	0: 0 dB      1: 8 dB 0: 0 dB      1: 4 dB 0: 0 dB      1: 2 dB 0: 0 dB      1: 1 dB

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

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

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

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

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

These selectors set the optimum receive signal level.

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

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

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 0 : 70 Hz 1 1 : 70 Hz
5   8	No. of rings in AUTO ANS mode	No. 5 6 7 8 0 0 0 0 : Fixed to once 0 0 0 1 : Fixed to 2 times 0 0 1 0 : Fixed to 3 times 0 0 1 1 : Fixed to 4 times 0 1 0 0 : 1 to 2 times 0 1 0 1 : 1 to 3 times 0 1 1 0 : 1 to 4 times 0 1 1 1 : 1 to 5 times 1 0 0 0 : 2 to 3 times 1 0 0 1 : 2 to 4 times 1 0 1 0 : 2 to 5 times 1 0 1 1 : 2 to 6 times 1 1 0 0 : 1 to 10 times 1 1 0 1 : 2 to 10 times 1 1 1 0 : 3 to 5 times 1 1 1 1 : 4 to 10 times

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

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

- **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 time 0 0 1 0 : 2 times 0 0 1 1 : 3 times   1 1 1 1 : 15 times 
7 8	Not used.	

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

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

### WSW16 (Function setting 1)

Selector No.	Function	Setting and Specifications
1	Not used.	
2	CCITT superfine recommendation	0: OFF      1: ON
3	Remote reception	0: Only from the connected external telephone      1: From all telephones connected
4 5	Not used.	
6	Exclusive line mode	0: OFF      1: ON
7	Max. document length limitation	0: 400 cm      1: 90 cm
8	Not used.	

- **Selector 2: CCITT superfine recommendation**

If this selector is set to "1," the equipment communicates in CCITT recommended superfine mode (15.4 lines/mm). If it is set to "0," it communicates in native superfine mode.

- **Selector 3: Remote reception**

Setting this selector to "0" allows the facsimile equipment to receive data from the directly connected external telephone only. Setting it to "1" allows the equipment to receive data from all telephones sharing a modular wall socket with the equipment, as well as from the directly connected external telephone.

If any of the following problems occurs frequently, set this selector to "0":

- Dialing from any of the telephones sharing a modular wall socket starts the facsimile equipment.
- Picking up the handset for any telephones sharing a modular wall socket while the equipment is in receiving operation disrupts the received image due to the superimposed noise.

- **Selector 6: Exclusive line mode**

Setting this selector to "1" connects the equipment to the exclusive line, which enables transmission merely by pressing the **Start** key without dialing operation at both the calling and called terminals.

- **Selector 7: Max. document length limitation**

This selector is used to select the maximum length of a document to be sent.

### WSW17 (Function setting 2)

Selector No.	Function	Setting and Specifications
1 2	Off-hook alarm	No. 1 2 0 0 : No alarm 0 1 : Always valid 1 X : Valid except when 'call reservation' is selected.
3	Power failure report output	0: ON 1: OFF
4	Calender clock/prompt alternate display	0: NO 1: YES
5	Calendar clock type	0: U.S.A. type 1: European type
6	Error indication in activity report	0: NO 1: YES
7	Non-ring reception	0: OFF 1: ON
8	Not used.	

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

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

- **Selector 3: Power failure report output**

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

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

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

- **Selector 5: Calendar clock type**

If this selector is set to "0" (U.S.A.), 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 6: Error indication in activity report**

This selector determines whether or not a communications error code will be printed in the activity report.

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

Setting this selector to "1" makes the equipment receive calls without a 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	<table> <tr> <td>No.</td> <td>2</td> <td>3</td> <td></td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>40 sec.</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>0 sec. (No detection)</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>5 sec.</td> </tr> <tr> <td></td> <td>1</td> <td>1</td> <td>80 sec.</td> </tr> </table>	No.	2	3			0	0	40 sec.		0	1	0 sec. (No detection)		1	0	5 sec.		1	1	80 sec.
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	<table> <tr> <td>No.</td> <td>7</td> <td>8</td> <td></td> </tr> <tr> <td></td> <td>0</td> <td>X</td> <td>: No monitoring</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>: Up to phase B at the calling station only</td> </tr> <tr> <td></td> <td>1</td> <td>1</td> <td>: All transmission phases both at the calling and called stations</td> </tr> </table>	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				
No.	7	8																				
	0	X	: No monitoring																			
	1	0	: Up to phase B at the calling station only																			
	1	1	: All transmission phases both at the calling and called stations																			

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

After the line is connected via the external telephone, the equipment can detect a CNG signal or no tone for the time length specified by these selectors.

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

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

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

These selectors set the 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	Not used.	
8	V.17 mode	0: Permitted 1: Prohibited

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

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

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

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

### WSW20 (Overseas communications mode setting)

Selector No.	Function	Setting and Specifications
1	EP* tone prefix	0: OFF      1: ON
2	Overseas communications mode (Reception)	0: 2100 Hz    1: 1100 Hz
3	Overseas communications mode (Transmission)	0: OFF      1: Ignores DIS once.
4 5	Min. time length from reception of CFR to start of transmission of video signals	No. 4 5
		0 0 : 100 ms
		0 1 : 200 ms
		1 0 : 300 ms
		1 1 : 400 ms
6 7	Chattering elimination for CNG detection	No. 6 7
		0 0 : During CNG ON and OFF (A)
		0 1 : During CNG OFF only (B)
		1 X : No elimination (C)
8	Not used.	

\* EP: Echo protection

- **Selector 1: EP tone prefix**

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

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

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

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

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

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

### WSW21 (TAD setting 1)

Selector No.	Function	Setting and Specifications
1   5	Max. waiting time for voice signal	No. 1 2 3 4 5 0 0 0 0 0 : No detection 0 0 0 0 1 : 1 sec. 0 0 0 1 0 : 2 sec. 0 0 0 1 1 : 3 sec. 0 1 0 0 0 : 8 sec. 1 1 1 1 1 : 31 sec.
6 7	Two-way recording	No. 6 7 0 0 : A (for U.S.A.) 0 1 : B (Except for U.S.A.) 1 0 : C (without beep) 1 1 : D (OFF)
8	Erasure of message stored in the memory after the message transfer	0: YES      1: NO

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

In the TAD mode, the equipment waits for voice signal for the time length specified by these selectors before it automatically shifts to the facsimile message receive mode or disconnects the line.

If the external TAD is connected to the equipment, the total length of the maximum waiting time specified by these selectors and the delay time specified by WSW25 (selectors 1 and 2) should not exceed 40 seconds.

- **Selectors 6 and 7: Two-way recording (For those models equipped with a built-in TAD)**

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

- **Selector 8: Erasure of message (For those models equipped with a built-in TAD)**

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

### WSW22 (Communications setting 1)

Selector No.	Function	Setting and Specifications
1   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 %

- **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 2)

Selector No.	Function	Setting and Specifications
1	Starting point of training check (TCF)	0: From the head of a series of zeros 1: From any arbitrary point
2 3	Allowable training error rate	No. 2 3 0 0 : 0% 0 1 : 0.5% 1 0 : 1% 1 1 : 2%
4 5	Decoding error rate for transmission of RTN	No. 4 5 0 0 : 16% 0 1 : 14% 1 0 : 10% 1 1 : 8%
6	Issue of RTN at the occurrence of a pagination error	0: YES      1: NO
7	Resolution level for reception	0: YES      1: NO
8	Limitation of attenuation level	0: YES      1: NO

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

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

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

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

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

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

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

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

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

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

- **Selector 7: Resolution level for reception**

This selector determines whether the resolution should be limited at the start of reception in the sleep mode.

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

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

This setting has priority over the settings selected by WSW02 (selectors 5 through 8) and WSW13 (selectors 5 through 8).

### WSW24 (TAD setting 2)

Selector No.	Function	Setting and Specifications
1 2	Maximum OGM recording time	No. 1 2 0 0 : 15 sec. 0 1 : 20 sec. 1 0 : 30 sec. 1 1 : 50 sec.
3 4	Time length from CML ON to start of pseud ring backtone transmission	No. 3 4 0 0 : 4 sec. 0 1 : 3 sec. 1 0 : 2 sec. 1 1 : 1 sec.
5   8	Attenuator for playback of ICM/OGM to the line (Selectable from the range of 0-15 dB)	0: 0 dB      1: 8 dB 0: 0 dB      1: 4 dB 0: 0 dB      1: 2 dB 0: 0 dB      1: 1 dB

- **Selectors 1 and 2: Maximum OGM recording time (For those models equipped with a built-in TAD)**

These selectors set the allowable maximum recording time for an OGM.

- **Selectors 3 and 4: Time length from CML ON to start of pseud ring backtone transmission**

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

In those versions which have an OGM facility instead of pseud ring backtone, these selectors set the length of time from CML-ON up to the start of OGM transmission.

- **Selectors 5 through 8: Attenuator for playback of ICM/OGM to the line (For those models equipped with a built-in TAD)**

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

This setting will not be limited by selector 8 of WSW23.

**WSW25 (TAD setting 3)**

Selector No.	Function	Setting and Specifications																																																						
1   4	Not used.																																																							
5   7	Pause between paging number and PIN	<table> <tr> <td>No.</td> <td>5</td> <td>6</td> <td>7</td> <td></td> <td></td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>:</td> <td>2 sec.</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>1</td> <td>:</td> <td>4 sec.</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>0</td> <td>:</td> <td>6 sec.</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>1</td> <td>:</td> <td>8 sec.</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>0</td> <td>:</td> <td>10 sec.</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>1</td> <td>:</td> <td>12 sec.</td> </tr> <tr> <td></td> <td>1</td> <td>1</td> <td>0</td> <td>:</td> <td>14 sec.</td> </tr> <tr> <td></td> <td>1</td> <td>1</td> <td>1</td> <td>:</td> <td>16 sec.</td> </tr> </table>	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.
No.	5	6	7																																																					
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	0	1	0	:	6 sec.																																																			
	0	1	1	:	8 sec.																																																			
	1	0	0	:	10 sec.																																																			
	1	0	1	:	12 sec.																																																			
	1	1	0	:	14 sec.																																																			
	1	1	1	:	16 sec.																																																			
8	Automatic shift to facsimile message receive mode in ICM recording mode	0: YES      1: NO																																																						

- **Selectors 5 and 7: Pause between paging number and PIN (For those models equipped with a built-in TAD)**

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

- **Selector 8: Automatic shift to facsimile message receive mode in ICM recording mode (For those models equipped with a built-in TAD)**

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

**WSW26 (Function setting 4)**

Selector No.	Function	Setting and Specifications
1   3	Not used.	
4  5	No. of CNG cycles to be detected (when the line is connected via the external telephone except in the external TAD mode)	No. 4 5 0 0 : No detection (OFF) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
6  7	No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode or via the facsimile equipment in F/T or TAD mode)	No. 6 7 0 0 : 0.5 (A) 0 1 : 1 (B) 1 0 : 1.5 (C) 1 1 : 2 (D)
8	Not used.	

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

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

● **Selectors 6 and 7: No. of CNG cycles to be detected (For those models not equipped with a built-in TAD)**

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



### WSW27 (Function setting 5)

Selector No.	Function	Setting and Specifications
1	Definition of programmable key	0: TEL key    1: TEL/POLLING key
2	Ringer OFF setting	0: YES        1: NO
3	Automatic playback of OGM at the start time of OGM ON mode	0: OFF        1: ON
4	Detection of distinctive ringing pattern	0: OFF        1: ON
5	Automatic erasure of voice alarm	0: YES        1: NO
6 7	Not used.	
8	Toner save mode.	0: YES        1: NO

- **Selector 1: Definition of programmable key**

This selector defines a programmable key as a TEL key or TEL/POLLING key.

Setting this selector to "1" allows the programmable key to function as either a TEL or POLLING key if pressed when the handset is off or on the hook, respectively.

This setting is effective only for those models having a programmable key.

- **Selector 2: Ringer OFF setting**

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

- **Selector 3: Automatic playback of OGM at the start time of OGM ON mode (For those models equipped with a built-in TAD)**

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

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

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

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

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

### WSW28 (Function setting 6)

Selector No.	Function	Setting and Specifications
1 2 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 5 6		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		0: Standard resolution statement 1: Non-standard resolution statement
8		Not used.

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

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

- **Selector 7: Resolution definition**

This selector determines whether the equipment issues a standard or non-standard (fine/superfine) resolution statement when the empty space of the memory shared by the receive buffer and recording buffer becomes insufficient to receive data at high resolution.

If this selector is set to "0," the equipment issues a standard resolution statement which informs the calling station that the station called can receive data only at the standard resolution.

If it is set to "1," the FAX3550/8000P/MFC4450/4550/4550plus/6550MC issues a fine resolution statement and the FAX3650/8200P/MFC7550MC/7650MC/9000/9500 issues a superfine resolution statement. (NOTE: The FAX3550/8000P/MFC4550/4550plus/6550MC having an optional memory issues a superfine resolution statement.)

**WSW29 (Function setting 7)**

Selector No.	Function	Setting and Specifications
1   7	Not used.	
8	Beep at the time of full activity report data	0: No      1: Yes

- **Selector 8: Beep at the time of full activity report data (for the European versions only)**

If this selector is set to "1," the equipment will beep when 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 2 3	Detection level of dial tone or busy tone for the built-in TAD operation	No. 1 2 3 0 0 0 : -38.0 dBm (A) 0 0 1 : -39.5 dBm (B) 0 1 0 : -41.0 dBm (C) 0 1 1 : -42.5 dBm (D) 1 0 0 : -44.0 dBm (E) 1 0 1 : -45.5 dBm (F) 1 1 0 : -47.0 dBm (G) 1 1 1 : -48.5 dBm (H)	
4		Not used.	
5		Speaker output level	0: Higher 1: Lower
6 7		Cooling fan control mode	No. 6 7 0 0 : A 0 1 : B 1 x : C
8			Not used.

- **Selectors 1 through 3: Detection level of dial tone or busy tone for built-in TAD operation (For those models equipped with a built-in TAD)**

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

- **Selector 5: Speaker output level (For those models equipped with a built-in TAD)**

This selector determines the speaker output level when the speaker volume switch is set to HIGH or LOW, as listed below.

Selector 5 of WSW30 Speaker Volume Switch Position	0 (Higher)	1 (Lower)
HIGH	High	Medium-High
LOW	Medium-Low	Low

### 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: 50%
3 4	Not used.	
5	Minimum short-OFF duration in distinctive ringing	0: 130 ms    1: 90 ms
6   8	Not used.	

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

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

If it is set to "0," the equipment records one-page data at full size (100%) without reduction; if it is set to "1," the equipment records it at half size (50%).

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

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

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

### WSW32 (Function setting 10)

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

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

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

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

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

**WSW33 (Function setting 11)**

Selector No.	Function	Setting and Specifications
1   3	Detection threshold level for voice signals inputted via the network in the built-in TAD operation	No. 1 2 3 0 0 0 : -42.5 dBm (A) 0 0 1 : -44.0 dBm (B) 0 1 0 : -45.5 dBm (C) 0 1 1 : -47.0 dBm (D) 1 0 0 : -48.5 dBm (E) 1 0 1 : -50.0 dBm (F) 1 1 0 : -51.5 dBm (G) 1 1 1 : -53.0 dBm (H)
4 5	First communications speed choice for PCI	No. 4 5 0 0 : 14,400 bps 0 1 : 12,000 bps 1 0 : 9,600 bps 1 1 : 7,200 bps
6	Report output of polled transmission requests	0: YES      1: NO
7 8	Not used.	

NOTE: The WSW33 is applicable to those models equipped with a built-in TAD.

- **Selectors 4 and 5: First communications speed choice for PCI**

These selectors are used to set the first communications speed choice with which the equipment attempts to synchronize the data transmission via the PC interface. If the synchronization fails, the equipment automatically steps down to the next lowest speed.

- **Selector 6: Report output of polled transmission requests**

This function does not apply in the U.S.A. versions.

**WSW34 (Function setting 12)**

Selector No.	Function	Setting and Specifications
1   3	ICM recording time to be erased preceding the tone detection when the equipment automatically disconnects the line because no voice signal has been received	No. 1 2 3 0 0 0 : 0 second 0 0 1 : 1 second 0 1 0 : 2 seconds 0 1 1 : 3 seconds 1 0 0 : 4 seconds 1 0 1 : 5 seconds 1 1 0 : 6 seconds 1 1 1 : 7 seconds
4 5	Not used.	
6 7	Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation	No. 6 7 0 0 : 3 0 1 : 2 1 0 : 1 1 1 : OFF
8	Not used.	

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

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

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

## [ B ] Printout of firmware switch data

### ■ Function

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

### ■ Operating Procedure

- (1) Press the 1 key twice in the initial maintenance mode.  
The "PRINTING" will appear on the LCD.
- (2) The equipment prints out the configuration list as shown in the figure below.
- (3) Upon completion of printing, the equipment returns to the initial maintenance mode.

#### CONFIGURATION LIST

MODEL: 5X5-219  
TIME: 01/01/1997 04:32  
REV.: UG4177001 VER.0  
PCI : 5.00  
SUM : 8E7C 2FE0

WSW01 = 00000000	
1-2. DIAL FORMAT	: NORMAL
3-4. BREAK TIME	: 60 MS
5-6. INTERDIGIT PAUSE	: 800 MS
7. DP/PB CHANGE IN USER SW	: YES
8. DP/PB FIXING SELECTION	: PB
WSW02 = 11111010	
1-2. ON TIME	: 100 MS
3-4. OFF TIME	: 140 MS
5-8. LINE BEEP ATTENUATOR	: 10 DB
WSW03 = 00000000	
1-8. NOT USED	
WSW04 = 00010101	
1-8. NOT USED	
WSW05 = 00000010	
1-3. DIAL TONE DETECTION	: 3.5 SEC WAITING
4. REMOTE ID DETECTION TIMEOUT	: 2 SEC
5-7. NOT USED	
8. DTMF DETECTION	: 40 MS
WSW06 = 00101100	
1-3. PAUSE KEY	: 3.5 SEC WAITING
4-8. NOT USED	
WSW07 = 01001100	
1-8. NOT USED	
WSW08 = 01100100	
1-8. NOT USED	
WSW09 = 00000000	
1. ECM FRAME	: 256 OCTET
2. NOT USED	
3-4. TIMES OF FALL BACK	: 4
5. T5 TIMER	: 300 SEC
6. T1 TIMER	: 35 SEC
7-8. CALLING TIMEOUT	: 50 SEC
WSW10 = 00010100	
1. DPS LINK WITH OML	: NO
2. TIMING OF LAST DIGIT-MODEM CHANGE	: 100 MS
3. TIMING OF OML ON CNG TRANSMISSION	: 2 SEC
4. TIMING OF OML ON CED TRANSMISSION	: 2 SEC
5-6. TRAINING RETRIES	: 2
7. CODING METHOD MR	: ON
8. CODING METHOD MMR	: ON
WSW11 = 01011000	
1-8. NOT USED	
WSW12 = 10011010	
1-2. OFF DETECTION TIME	: 700 MS
3-4. AUTO ANS OFF DETECTION TIME	: 7 SEC
5-6. ON DETECTION TIME	: 250 MS
7. DELAY	: OFF
8. NOT USED	
WSW14 = 01110110	
1-2. CALLING SIGNAL RANGE (LOW)	: 15 Hz
3-4. CALLING SIGNAL RANGE (HIGH)	: 70 HZ
5-8. DELAY TIMES	: 1 - 4
WSW15 = 00001100	
1-2. INTERVAL TIME	: 5 MIN
3-6. RETRIES	: 3
7-8. NOT USED	
WSW16 = 01100010	
1. NOT USED	
2. CCITT S.FINE	: ON
3. REMOTE ACTIVATION	: ALL CASES
4-5. NOT USED	
6. DIRECT CONNECTION MODE	: OFF
7. DOCUMENT LENGTH LIMIT	: 90 CM
8. NOT USED	
WSW17 = 00100011	
1-2 OFF HOOK ALARM	: OFF
3. POWER FAILURE REPORT	: OFF
4. ALTERNATE DISPLAY	: NO
5. DATE DISPLAY	: USA
6. ERROR CODE ON ACT.REPORT	: OFF
7. NOT CALL RECEPTION	: YES
8. NOT USED	

#### Configuration List



### 3.7 Operational Check of Control Panel PCB

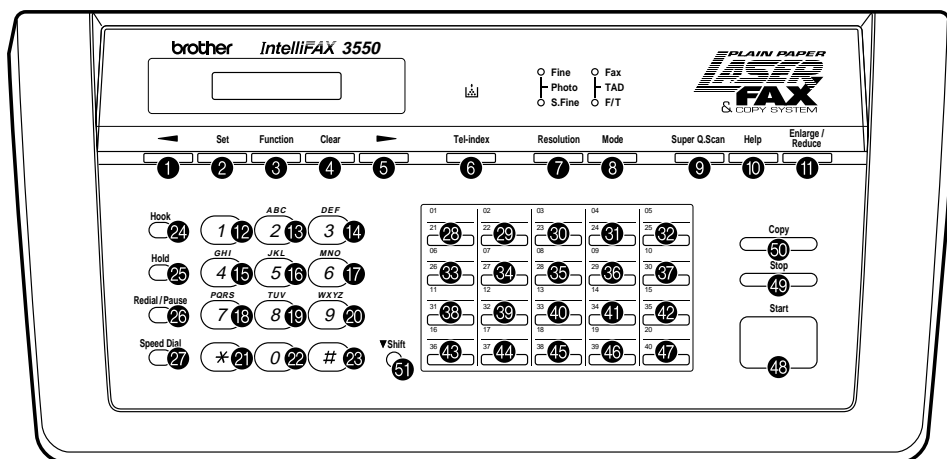
#### ■ Function

This function checks the control panel PCB for normal operation.

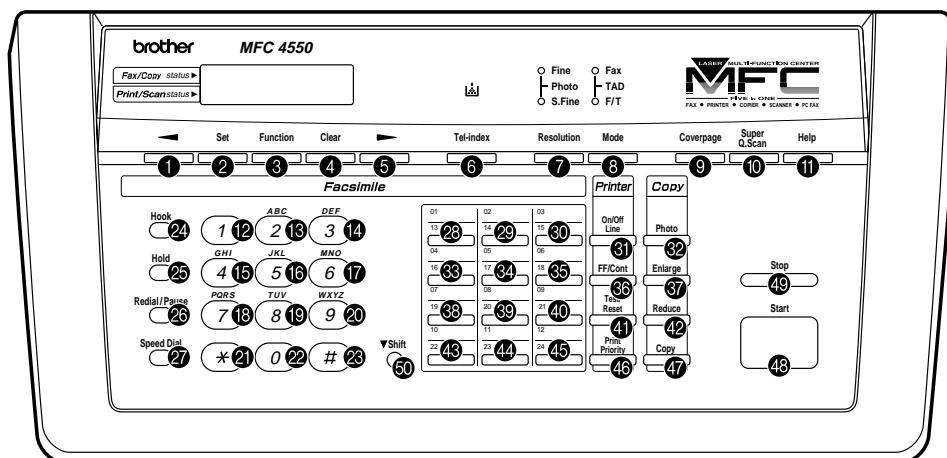
#### ■ Operating Procedure

- (1) Press the **1** and **3** keys in this order in the initial maintenance mode.  
The "00 " will appear on the LCD.
- (2) Press the keys and buttons in the order designated in the illustration shown below.  
The LCD shows the corresponding number in decimal notation each time a key or button is pressed. Check that the displayed number is correct by referring to the illustration below.  
If a key or button is pressed out of order, the equipment beeps and displays the "INVALID OPERATE" on the LCD. To return to the status ready to accept key & button entry for operational check, press the **Stop** key.
- (3) After the last number key or button is pressed, the equipment beeps for 1 second.
- (4) To terminate this operation, press the **Stop** key. The equipment returns to the initial maintenance mode.

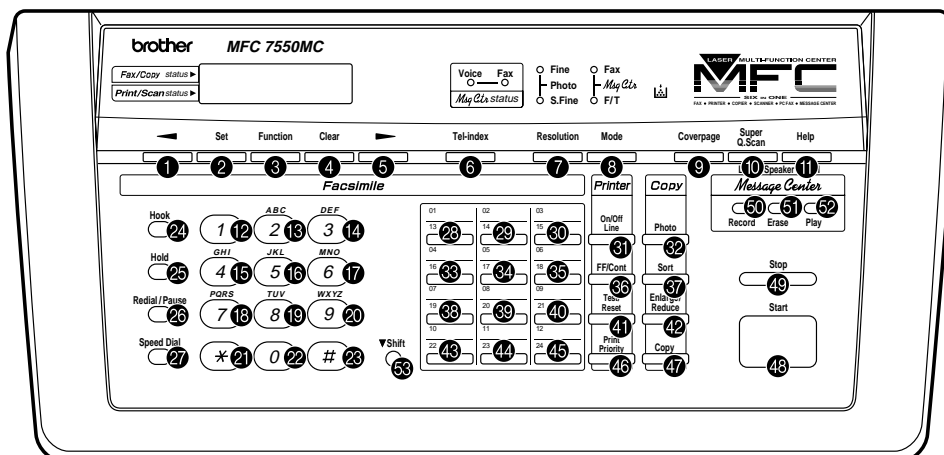
FAX3550/3650/8000P/8200P



MFC4450/4550/4550plus/9000



Key & Button Entry Order (1)



Key &amp; Button Entry Order (2)

### 3.8 Sensor Operational Check

#### ■ Function

This function allows you to check whether the eight sensors (document front sensor, document rear sensor, sheet feeder cover sensor, cover sensor, registration sensor, paper ejection sensor, toner sensor, and hook switch sensor) operate normally.

The LED shows the "FRRETCCVRGHATNHK" when

- the document front sensor detects no paper (FR),
- the document rear sensor detects no paper (RE),
- the sheet feeder cover is closed (TC),
- the top cover is closed (CV),
- the registration sensor detects no paper (RG),
- the paper ejection sensor detects no paper (HA),
- the toner sensor detects toner (TN), and
- the hook switch sensor detects the on-hook state (HK).

#### ■ Operating Procedure

- (1) Press the 3 and 2 keys in this order in the initial maintenance mode.  
The LCD should show "FRRETCCVRGHATNHK" if the detecting conditions of the nine sensors are as defined above.
- (2) Change the detecting conditions (e.g., insert paper through the document sensors or the registration sensor, open the sheet feeder cover or the top cover, jam paper at the paper outlet, remove the toner cartridge, and lift up the handset), and then check that the indication on the LCD changes according to the sensor states.
- (3) To stop this operation and return the equipment to the initial maintenance mode, press the Stop key.

### 3.9 CCD Scanner Area Setting

#### ■ Function

The equipment sets the CCD scanner area and stores it into the E<sup>2</sup>PROM.

#### ■ Operating Procedure

- (1) Press the  key twice in the initial maintenance mode.  
The "SCANNER AREA SET" will appear on the LCD.  
The equipment checks and sets the area to be scanned.  
If no error is noted, the equipment returns to the initial maintenance mode.  
If any error is noted, the "SCANNER ERROR" will appear on the LCD. To return the equipment to the initial maintenance mode, press the  key.

### 3.10 Equipment Error Code Indication

#### ■ Function

This function displays the error code for the last error on the LCD.

#### ■ Operating Procedure

- (1) Press the  and  keys in this order in the initial maintenance mode.  
The LCD shows "MACHINE ERROR XX."
- (2) To stop this operation and return the equipment to the initial maintenance mode, press the  key.

### 3.11 Output of Transmission Log to the Telephone Line

#### ■ Function

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

#### ■ Operating Procedure

- (1) If the user's equipment has a transmission-related problem, call the user's equipment at a remote location from your equipment.
- (2) If the telephone line is connected, have the user perform the following:
  - 1) Press the Function key and the Mode key in this order.
  - 2) Press the 0, 8, and 7 keys.

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

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

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

# CHAPTER VI.

## ERROR INDICATION AND TROUBLESHOOTING

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# 1. ERROR INDICATION

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

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

## 1.1 Equipment Errors

If an equipment error occurs, the facsimile equipment emits an audible alarm (continuous beeping) for approximately 4 seconds and shows the error message on the LCD. For the error messages, see [ 1 ] below. As one of the error messages, "MACHINE ERROR xx" includes an error code which indicates the detailed error causes listed in [ 2 ]. To display an error code for the other latest error message, make the equipment enter the maintenance mode and press [ 8 ] and [ 2 ] keys (for details, refer to Chapter V, Section 3.11).

### [ 1 ] Error messages on the LCD

Messages on the LCD	Probable Cause
CHECK PAPER	Even after paper pulling-in operation, the registration sensor does not detect paper.
COVER OPEN	The cover sensor detects that the top cover is not closed or the sheet feeder cover sensor detects that the sheet feeder cover is not closed.
PRINTER JAM	(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. (2) The paper ejection sensor stays ON even after it has come ON and the paper has been fed by the specified amount.
DOCUMENT JAM	■ Document jam (1) The document length exceeds the limitation (400 or 90 cm) registered by firmware switch WSW16. (Refer to Chapter V, Section 3.6.) (Both the document front and rear sensors stay ON after the document has been fed by the registered length.) (2) The document rear sensor detects no trailing edge of a document after the document has been fed by 400 cm. (The document rear sensor stays ON even after the document has been fed when the document front and rear sensors were OFF and ON, respectively.)

Messages on the LCD	Probable Cause
DOCUMENT JAM	<ul style="list-style-type: none"> <li>■ Document loading error</li> <li>(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.)</li> <li>(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.)</li> </ul>
CLEAN UP SCANNER	In the scanning compensation data list printed by the maintenance-mode function No. 05, less than fifty percent of the white level data is faulty.
SCANNER ERROR	In the scanning compensation data list printed by the maintenance-mode function No. 05, fifty percent or more of the white level data is faulty.
CHANGE TONER TONER EMPTY	The toner sensor has detected that there is no toner. If this message appears, recording is no longer possible.
CHANGE TONER	The toner sensor has detected that there is not enough toner.
SET CARTRIDGE	The toner sensor has detected that no toner cartridge is loaded.
COOLING DOWN PLEASE WAIT	The toner thermister has detected that the toner temperature exceeded the specified level. If the temperature exceeds the preset level, recording is no longer possible.
MACHINE ERROR XX	"XX" indicates an error code. Refer to [ 2 ] on the next page.

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



[ 2 ] Error codes shown in the “MACHINE ERROR xx” message

Error Code xx (Hex.)	Error factor
71	Laser scanner motor does not lock.
72	Cannot detect Beam Detect signal.
73	No toner cartridge loaded.
74	Toner empty.
75	In-house temperature error.
76	Fixing heater harness disconnected or broken.
77	Heater thermister shortcircuit.
78	Heater thermister harness disconnected or broken.
79	Toner thermister disconnected or broken.
80	Paper size setting error.
82	Paper feeding error.
( 83	Paper jam. The registration sensor remains ON.)
( 84	Paper jam. The paper ejection sensor remains ON. )
87	Fails to complete the recording operation sequence.
( 88	Paper jam. Even after the registration sensor has gone OFF, the paper ejection sensor still stays OFF.)
8B	Overheating error.
( A1	Top 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. )
A5	Faulty operation of DMA0 during scanning.
A6	Faulty operation of DMA1 during scanning.
A7	One-line feeding time-out error.
A8	One-line scanning time-out error.
A9	Abnormal scanning reference voltage.
AB	Document feed-in amount measuring error.
AC	Less than 50% faulty of white level data.
B1	CODEC LSI error.
( B8	Amplifier gain error. )
( B9	Light emission intensity error of the LED array. )
( BA	Scanning error: The left-hand black reference line which is marked on the document pressure bar for scanning width setting is not detected.)

Error codes in parentheses do not appear in the “MACHINE ERROR xx”, since those errors are displayed as messages described in “[ 1 ] Error messages on the LCD.” Those error codes appear in the communications error list if an equipment error occurs during communications. Refer to Section 1.2, (13).

Error Code xx (Hex.)	Error factor
( BB	Scanning error: The right-hand black reference line which is marked on the document pressure bar for scanning width setting is not detected.)
( BC	Scanning error: Reduction miss)
( BD	Scanning error: Enlargement miss)
D1	The MODEM setup bit sticks to High.
D2	CTS stays OFF or ON if the MODEM RTS is turned ON or OFF, respectively.
D3	Bit B1A of the MODEM stays OFF.
D4	Bit RX of the MODEM stays OFF.
D5	The MODEM fails to complete the command transmission sequence.
D6	No MODEM interrupt for 60 seconds.
E1	Microprocessor (MPU) error on the control panel PCB.
( E4	Out of recording paper. )
( E5	Recording paper set error. )
E6	Write error in E <sup>2</sup> PROM.
E8	Data scanning error during transmission.
( EA	Document removed at phase B.)
F3	Voice message recording or playing-back not started.
F4	Peripheral CNG detection adjustment error.
F5	EOL not found in page memory transmission mode.
FF	Interface error of page memory command.

Error codes in parentheses do not appear in the "MACHINE ERROR xx", since those errors are displayed as messages described in "[ 1 ] Error messages on the LCD." Those error codes appear in the communications list if an equipment error occurs during communications. Refer to Section 1.2, (13).

## 1.2 Communications Errors

If a communications error occurs, the facsimile equipment

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

■ Definition of Error Codes on the Communications List

(1) Calling

Code 1	Code 2	Causes
10	08	Wrong number called.
11	01	No dial tone detected.
11	02	Busy tone detected before dialing.
11	03	2nd dial tone not detected.
11	05	No loop current detected. *
11	06	Busy tone detected after dialing or called.
11	07	No response from the remote station in sending.
11	10	No tone detected after dialing.
17	07	No response from the calling station in receiving.

\* Available in Germany and Austria only.

(2) Command reception

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

**(3) Compatibility [checking the NSF and DIS]**

Code 1	Code 2	Causes
32	01	Remote terminal only with V.29 capability in 2400 or 4800 bps transmission.
32	02	Remote terminal not ready for polling.
32	10	Remote terminal not equipped with password function or its password switch OFF.
32	11	Remote terminal not equipped with or not ready for confidential mail box function.
32	12	Remote terminal not equipped with or not ready for relay broadcasting function.
32	13	No confidential mail in the remote terminal.
32	14	The available memory space of the remote terminal is less than that required for reception of the confidential or relay broadcasting instruction.

**(4) Instructions received from the remote terminal [checking the NSC, DTC, NSS, and DCS]**

Code 1	Code 2	Causes
40	02	Illegal coding system requested.
40	03	Illegal recording width requested.
40	05	ECM requested although not allowed.
40	06	Polled while not ready.
40	07	No document to send when polled.
40	10	Nation code or manufacturer code not coincident.
40	11	Unregistered group code entered for relay broadcasting function, or the specified number of broadcasting subscribers exceeding the limit.
40	12	Retrieval attempted when not ready for retrieval.
40	13	Polled by any other manufacturers' terminal while waiting for secure polling.
40	17	Invalid resolution selected.

**(5) Command reception [checking the NSF and DIS after transmission of NSS and DCS]**

Code 1	Code 2	Causes
50	01	Vertical resolution capability changed after compensation of background color.

**(6) ID checking**

Code 1	Code 2	Causes
63	01	Password plus "lower 4 digits of telephone number" not coincident.
63	02	Password not coincident.
63	03	Polling ID not coincident.
63	04	Entered confidential mail box ID uncoincident with the mail box ID.
63	05	Relay broadcasting ID not coincident.
63	06	Entered retrieval ID uncoincident with that of the mail box ID.

**(7) DCN reception**

Code 1	Code 2	Causes
74		DCN received.

**(8) TCF transmission/reception**

Code 1	Code 2	Causes
80	01	Fallback impossible.

**(9) Signal isolation**

Code 1	Code 2	Causes
90	01	Unable to detect video signals and commands within 6 seconds after CFR is transmitted.
90	02	Received PPS containing invalid page count or block count.

**(10) Video signal reception**

Code 1	Code 2	Causes
A0	03	Error correction sequence not terminated even at the final transmission speed for fallback.
A0	11	Receive buffer empty. (5-second time-out)
A0	12	Receive buffer full during operation except receiving into memory.
A0	13	Decoding error continued on 500 lines.
A0	14	Decoding error continued for 10 seconds.
A0	15	Time-out: 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 and command detected for 60 seconds.
A0	18	Receive buffer full on memory reception.
A8	01	RTN, PIN, or ERR received at the calling terminal. *
A9	01	RTN, PIN, or ERR received at the called terminal. *

\* Available in Germany and Austria only.

**(11) General communications-related**

Code 1	Code 2	Causes
B0	01	Polarity inversion detected.
B0	02	Unable to receive the next-page data.
B0	03	Unable to receive polling even during turn-around transmission due to call reservation.
B0	04	PC interface error.



**(12) Maintenance mode**

Code 1	Code 2	Causes
E0	01	Failed to detect 1300 Hz signal in burn-in operation.
E0	02	Failed to detect PB signals in burn-in operation.
E0	03	Failed to detect any command from the RS-232C interface in burn-in operation.

**(13) Equipment error**

Code 1	Code 2	Causes
FF	XX	Equipment error (For XX, refer to Subsection 1.1, [ 2 ].)

## 2. TROUBLESHOOTING

### 2.1 Introduction

This section gives the service personnel some of the troubleshooting procedures to be followed if an error or malfunction occurs with the facsimile equipment. It is impossible to anticipate all of the possible problems which may occur in future and determine the troubleshooting procedures, so this section covers some sample problems. However, those samples will help service personnel pinpoint and repair other defective elements if he/she analyzes and examines them well.

### 2.2 Precautions

Be sure to observe the following to prevent the secondary troubles from happening:

- (1) Always unplug the AC power cord from the outlet when removing the covers and PCBs, adjusting the mechanisms, or conducting continuity testing with a circuit tester.
- (2) When disconnecting the connectors, do not pull the lead wires but hold the connector housings.
- (3)
  - Before handling the PCBs, touch a metal portion of the machine to discharge static electricity charged in your body.
  - When repairing the PCBs, handle them with extra care.

After repairing the defective section, be sure to check again if the repaired section works correctly. Also record the troubleshooting procedure so that it would be of use for future trouble occurrence.

### 2.3 Checking prior to Troubleshooting

Prior to proceeding to the troubleshooting procedures, check that:

- (1) Each voltage level on AC input lines and DC lines is correct.
- (2) All cables and harnesses are firmly connected.
- (3) None of the fuses are blown.

## 2.4 Troubleshooting Procedures

### [ 1 ] Control panel related

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

### [ 2 ] Telephone related

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

**[ 3 ] Communications related**

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



**[ 4 ] Paper/document feeding related**

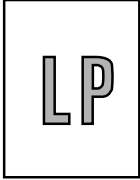

Trouble	Check:
(1) Neither "COPY: PRESS COPY" nor "FAX: NO. & START" message appears although documents are set.	<ul style="list-style-type: none"><li>• Sensors by using the maintenance-mode function No. 32. (Refer to Chapter V, Section 3.8.)</li><li>• Actuators of the document front and rear sensors</li><li>• Main PCB</li></ul>
(2) Document not fed.	<ul style="list-style-type: none"><li>• ADF and its related sections</li><li>• Scanner motor and its harness</li><li>• Document feed rollers and their related gears</li><li>• Main PCB</li></ul>
(3) Document double feeding	<ul style="list-style-type: none"><li>• ADF parts</li><li>• Nip-related parts</li></ul>
(4) Recording paper not fed.	<ul style="list-style-type: none"><li>• Multi-purpose sheet feeder</li><li>• Drum unit</li><li>• Heat-fixing unit</li><li>• Gear drive unit</li><li>• Main PCB</li></ul>

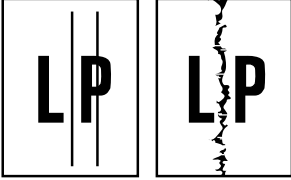

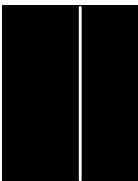

**[ 5 ] Print-image related**


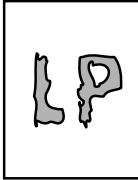
If the received or sent image has any problem, first make a copy with the facsimile equipment.

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

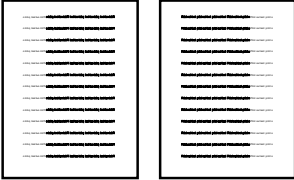

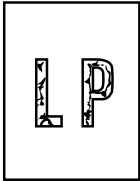
Trouble	Action to be taken
<p>(1) Completely blank</p> 	<p><u>At the scanner</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> <li>- CCD harness</li> <li>- Main-sensor harness between the main PCB and the document sensor PCB</li> <li>- Main PCB</li> <li>- Scanner unit</li> </ul> <p><u>At the printer side</u></p> <ul style="list-style-type: none"> <li>• Clean the high-voltage contacts for the developer roller on the drum unit, main cover, and high-voltage power supply PCB. (Contacts ⑦ in the illustration given on page VI-20)</li> <li>• Check the connection of the laser diode harness on the relay PCB.</li> <li>• Replace the main PCB.</li> </ul>
<p>(2) All black</p> 	<p><u>At the scanner</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> <li>- CCD harness</li> <li>- LED array harness</li> <li>- Main-sensor harness between the main PCB and the document sensor PCB</li> <li>- Scanner unit</li> <li>- Main PCB</li> </ul> <p><u>At the printer side</u></p> <ul style="list-style-type: none"> <li>• Clean the high-voltage contacts for the grid and corona wire on the drum unit, main cover, and high-voltage power supply PCB. (Contacts ⑤ and ⑥ in the illustration given on page VI-20)</li> <li>• Check the connection of the relay-high-voltage flat cable.</li> <li>• Replace the drum unit.</li> <li>• Replace the main PCB.</li> </ul>

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"> <li>- Scanner unit</li> <li>- Main PCB</li> </ul> <p><u>At the printer side</u></p> <ul style="list-style-type: none"> <li>• Check the setting position of the print density dial.</li> <li>• Replace the toner cartridge with a new one and print 4 to 5 pages. If the problem persists, proceed to the next step.</li> <li>• Remove the toner cartridge and start printing. If printing takes place, clean the toner sensor or replace the toner sensor PCB.</li> <li>• Clean the high-voltage contacts for the transfer roller on the drum unit, main cover, and high-voltage power supply PCB. (Contacts ③ in the illustration given on page VI-20)</li> <li>• Clean the high-voltage contacts for the developer roller on the drum unit, main cover, and high-voltage power supply PCB. (Contacts ⑦ in the illustration given on page VI-20)</li> <li>• Clean the grounding contacts on the drum unit, gear drive unit, and main cover. (Contacts ① and ② in the illustration given on page VI-20)</li> <li>• Check the connection of the relay–high-voltage flat cable.</li> <li>• Check the connection between the relay PCB and the main PCB.</li> <li>• Replace the drum unit.</li> <li>• Replace the high-voltage power supply PCB.</li> <li>• Replace the main PCB.</li> </ul>
<p>(4) Dark</p> 	<p><u>At the scanner</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> <li>- Scanner unit</li> <li>- Main PCB</li> </ul> <p><u>At the printer side</u></p> <ul style="list-style-type: none"> <li>• Check the setting position of the print density dial.</li> <li>• Slide the wire cleaner tab to clean the corona wire inside the drum unit.</li> <li>• Clean the high-voltage contacts for the grid and corona wire on the drum unit, main cover, and high-voltage power supply PCB. (Contacts ⑤ and ⑥ in the illustration given on page VI-20)</li> <li>• Replace the drum unit.</li> </ul>

Trouble	Action to be taken
<p>(5) Black and blurred vertical stripes</p> 	<p><u>At the scanner</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> <li>- Scanner unit</li> <li>- Mirrors on the scanner unit for stains</li> </ul> <p><u>At the printer side</u></p> <ul style="list-style-type: none"> <li>• Clean the paper path which may be contaminated with toner.</li> <li>• Slide the wire cleaner tab to clean the corona wire inside the drum unit.</li> <li>• Make sure that the wire cleaner tab is returned to its home position.</li> <li>• Replace the drum unit.</li> <li>• Replace the heat-fixing unit.</li> </ul>
<p>(6) Black and blurred horizontal stripes</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> <li>• If the horizontal stripes appear at 94-mm or 17-mm intervals, replace the drum unit.</li> <li>• If they appear at 54-mm intervals, replace the heat-fixing unit.</li> </ul>
<p>(7) White vertical streaks</p> 	<p><u>At the scanner</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> <li>- Scanner unit</li> <li>- Mirrors on the scanner unit for stains</li> </ul> <p><u>At the printer side</u></p> <ul style="list-style-type: none"> <li>• Clean the cover glass of the laser unit with a dry soft cloth.</li> <li>• Replace the drum unit.</li> </ul>
<p>(8) Dropout</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> <li>• Check the connection of the relay–high-voltage flat cable.</li> <li>• Check the connection between the relay PCB and the main PCB.</li> <li>• Replace the drum unit.</li> <li>• Replace the high-voltage power supply PCB.</li> </ul>

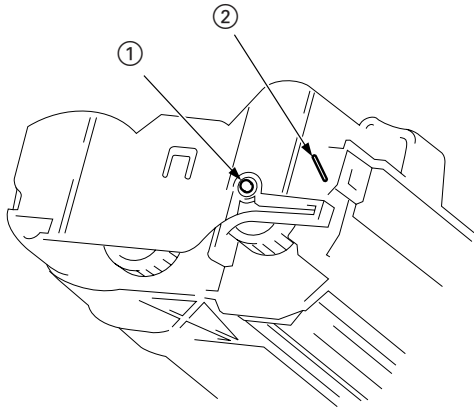
Trouble	Action to be taken
<p>(9) Faulty image registration (Leading edge of image starts too late on paper)</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> <li>• Instruct the user not to load paper exceeding the limit mark on the multi-purpose sheet feeder.</li> <li>• Instruct the user to use the recommended types of paper.</li> <li>• Replace the multi-purpose sheet feeder.</li> <li>• Replace the gear drive unit.</li> </ul>
<p>(10) 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"> <li>- Error code displayed. (Refer to Section 1, "ERROR INDICATION" in this chapter.)</li> <li>- NCU PCB</li> <li>- Main PCB</li> </ul> <p><u>At the scanner</u></p> <p>Check the following components:</p> <ul style="list-style-type: none"> <li>- Separator roller and its related sections</li> <li>- Document feed rollers and their related gears</li> <li>- Scanner motor and its harness</li> <li>- Main PCB</li> </ul> <p><u>At the printer side</u></p> <ul style="list-style-type: none"> <li>• Check that the laser unit is secured with the screws without looseness.</li> <li>• Check the connection of the polygon motor flat cable on the relay PCB.</li> <li>• Replace the laser unit.</li> </ul>



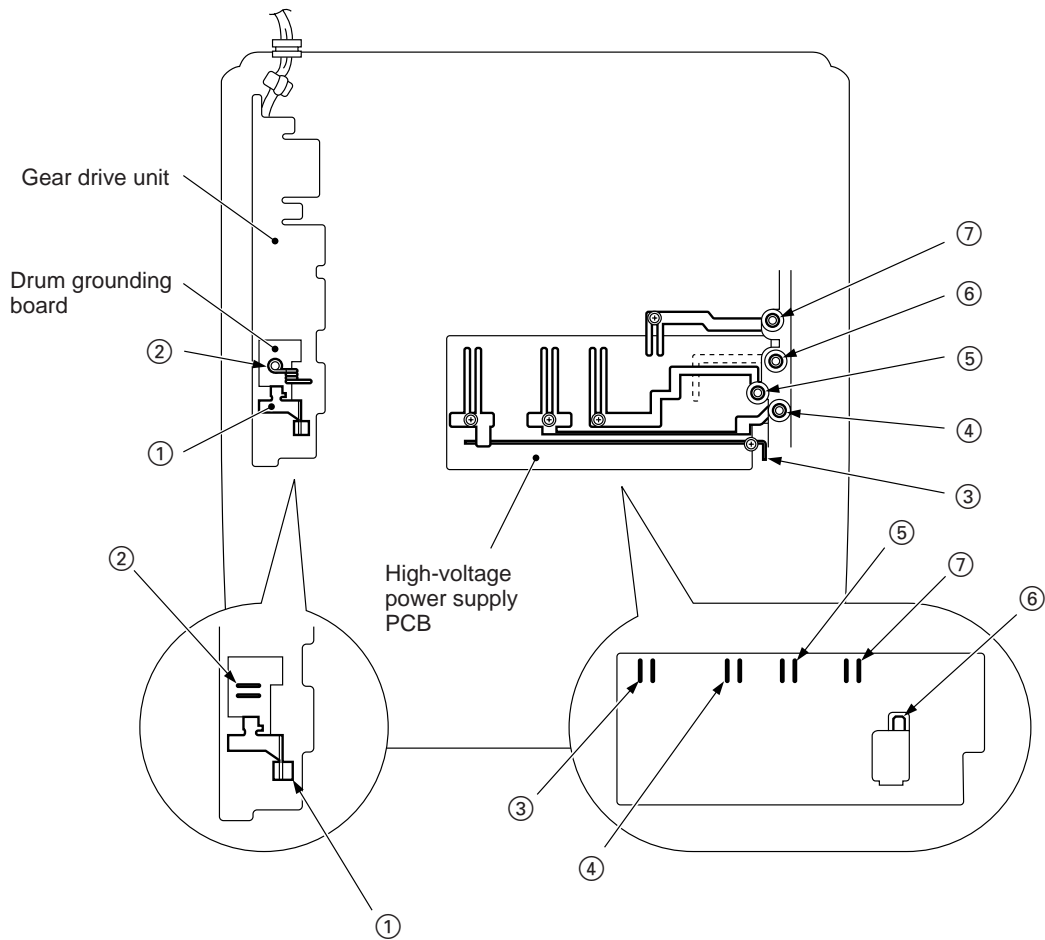
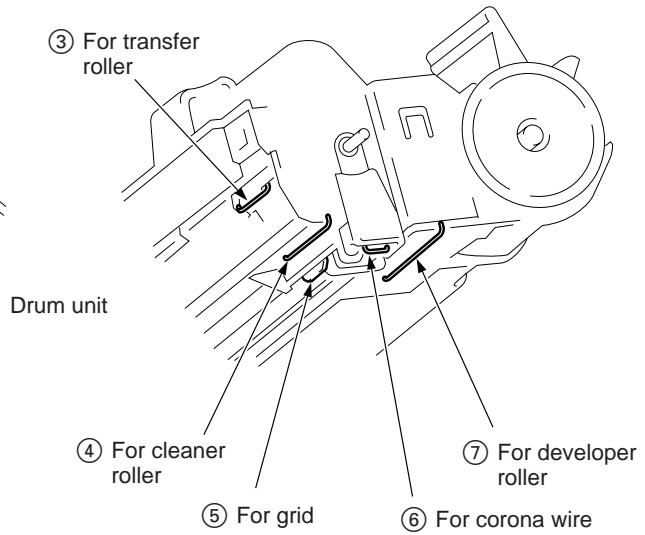
Trouble	Action to be taken
<p>(11) Blurred at either side</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> <li>• Shake the toner cartridge. If the problem persists, replace it.</li> <li>• Check that the equipment is placed on a flat surface.</li> <li>• Shake the drum unit from left to right and front to back.</li> </ul>
<p>(12) Dirt back of paper</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> <li>• Replace the drum unit.</li> <li>• Replace the heat-fixing unit.</li> </ul>
<p>(13) Poor fixing</p> 	<p><u>At the printer side</u></p> <ul style="list-style-type: none"> <li>• Instruct the user to use paper of the recommended weight (less than 36 lb./m<sup>2</sup>).</li> <li>• Replace the heat-fixing unit.</li> </ul>

## Location of High-voltage Contacts and Grounding Contacts

Grounding Contacts



High-voltage Contacts



**FAX3550/3650/8000P/8200P  
MFC4450/4550/4550plus/6550MC/7550MC/7650MC  
MFC9000/9500**

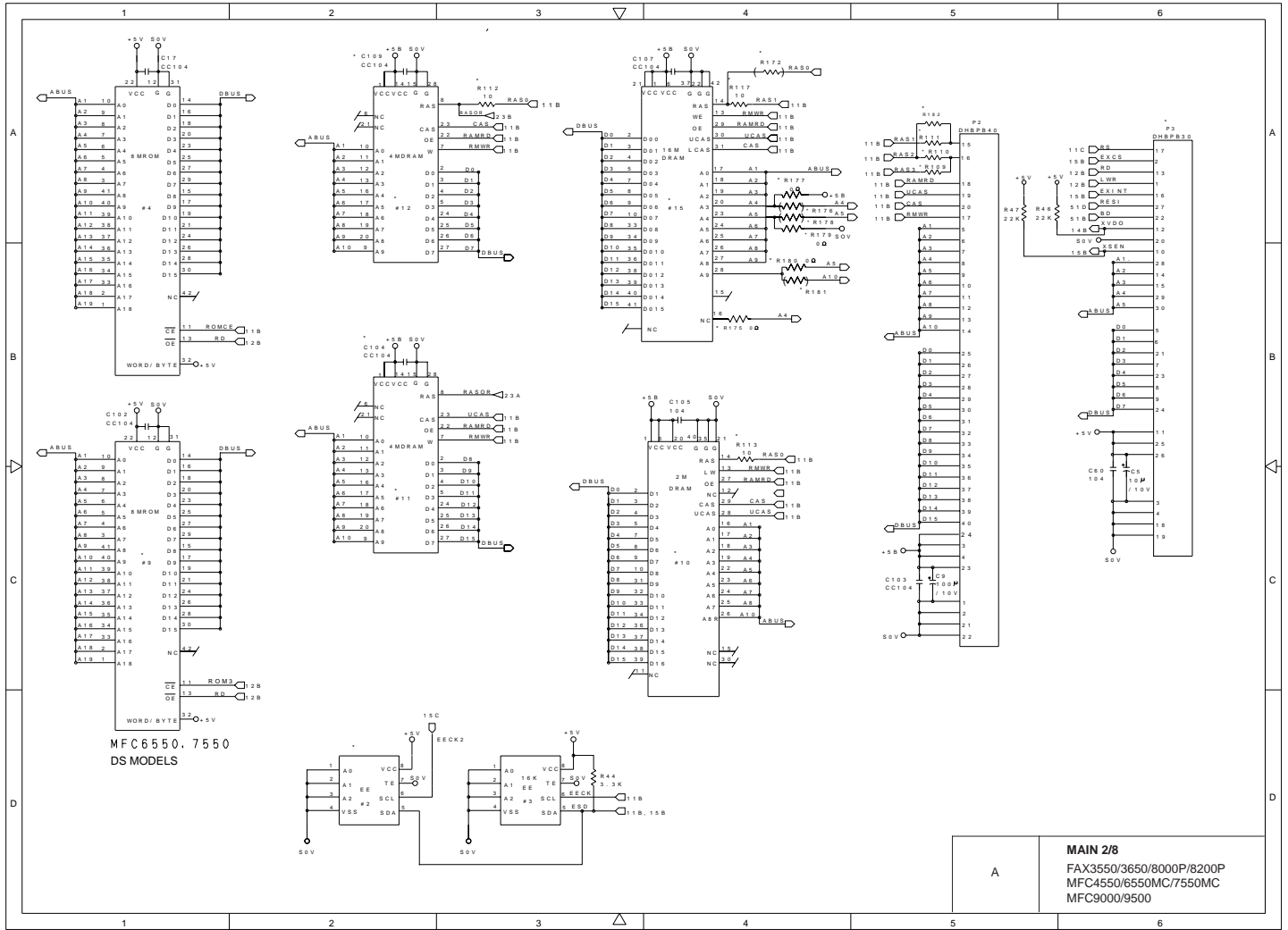
**APPENDICES**

Circuit Diagrams

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

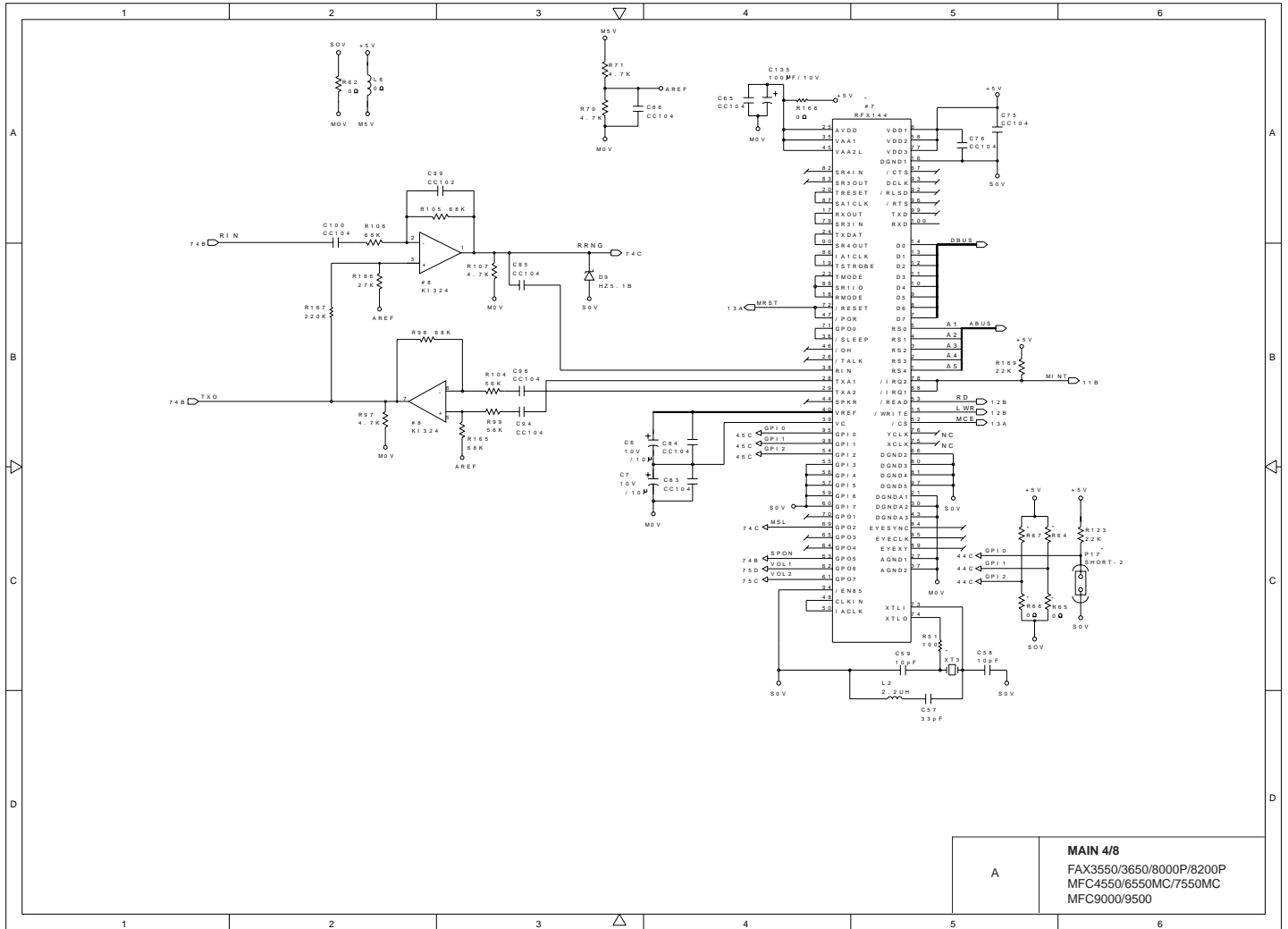
Low-voltage power supply  
High-voltage power supply



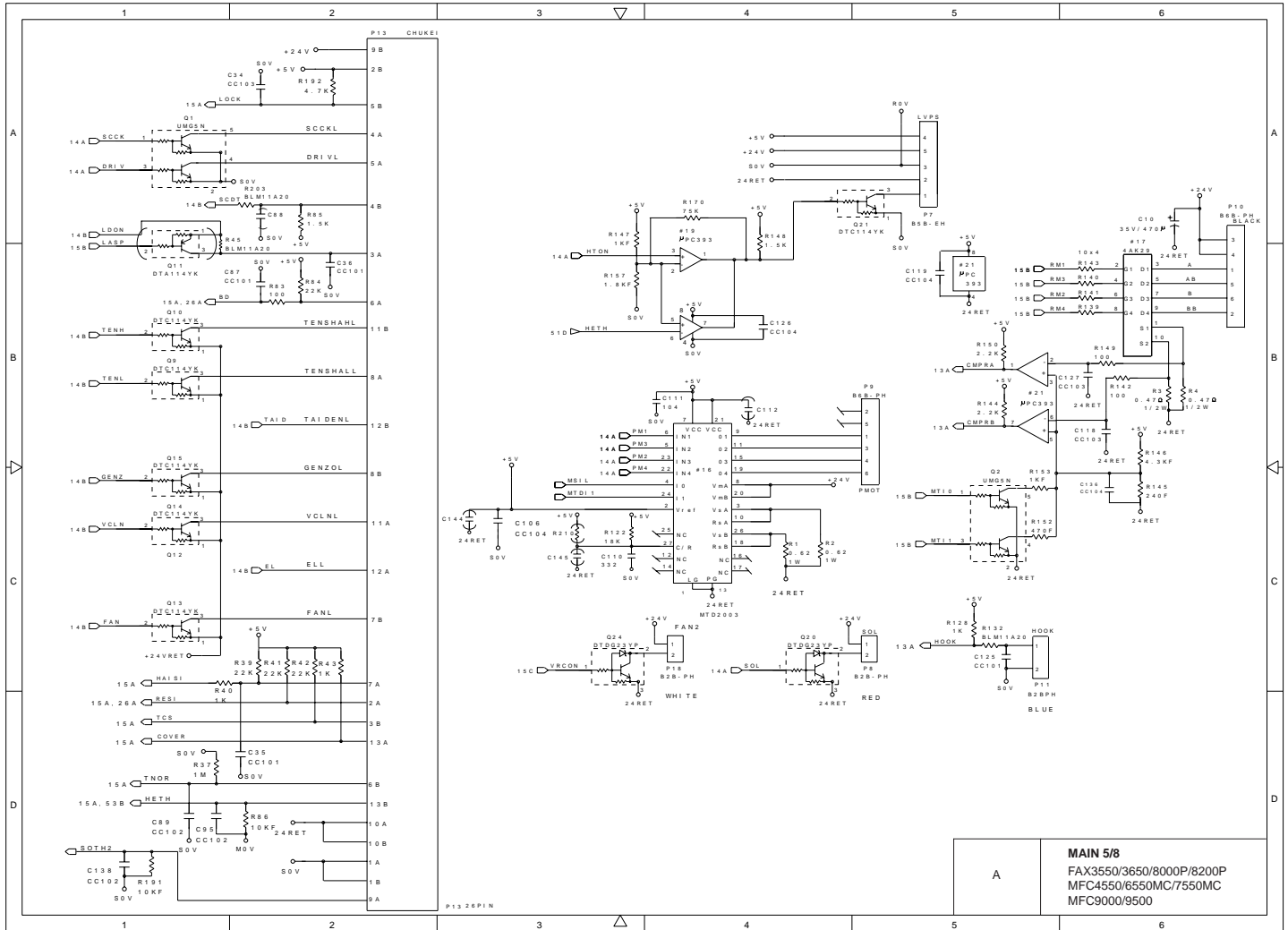


A  
**MAIN 2/8**  
 FAX3550/3650/8000P/8200P  
 MFC4550/6550MC/7550MC  
 MFC9000/9500

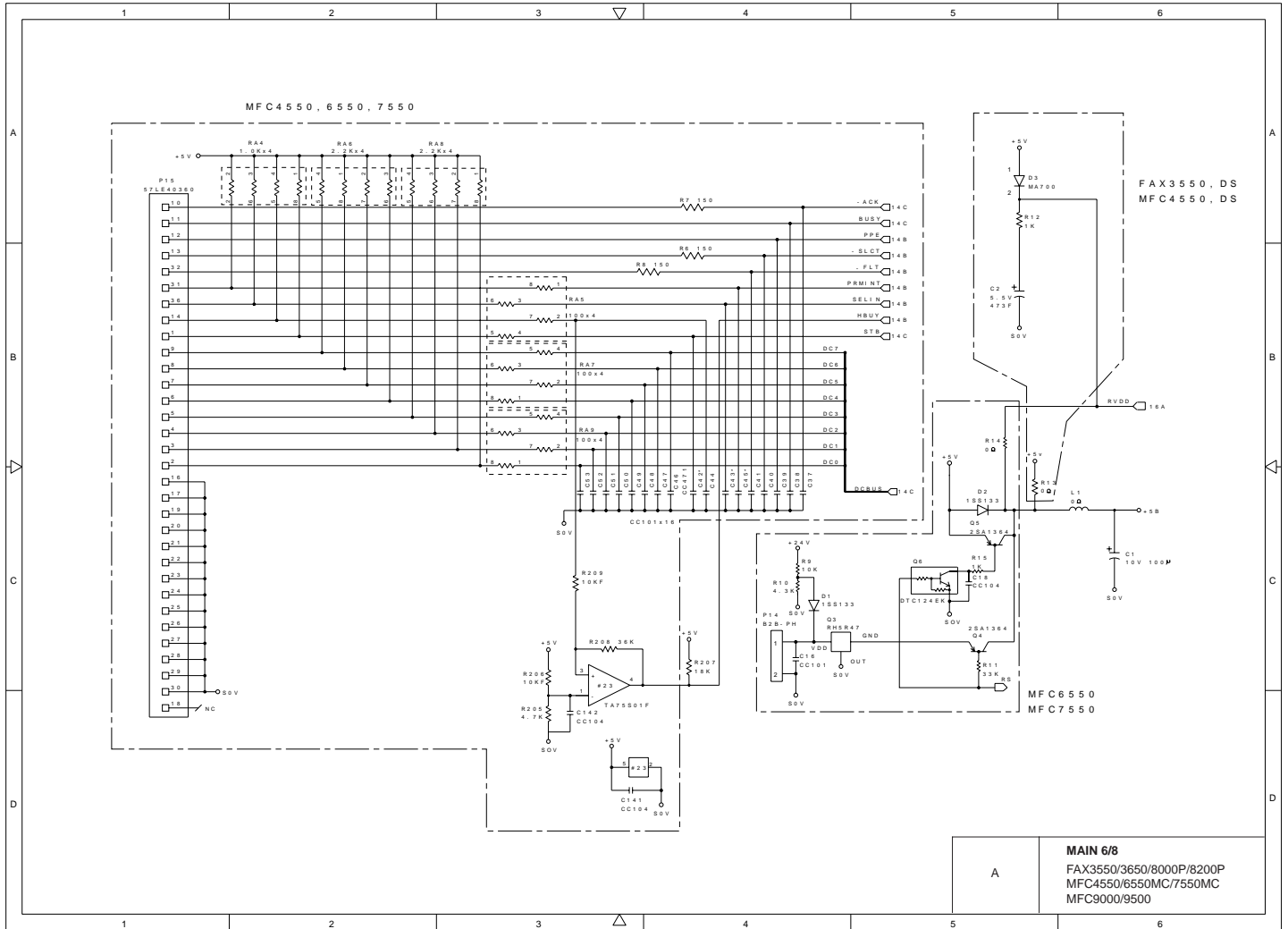


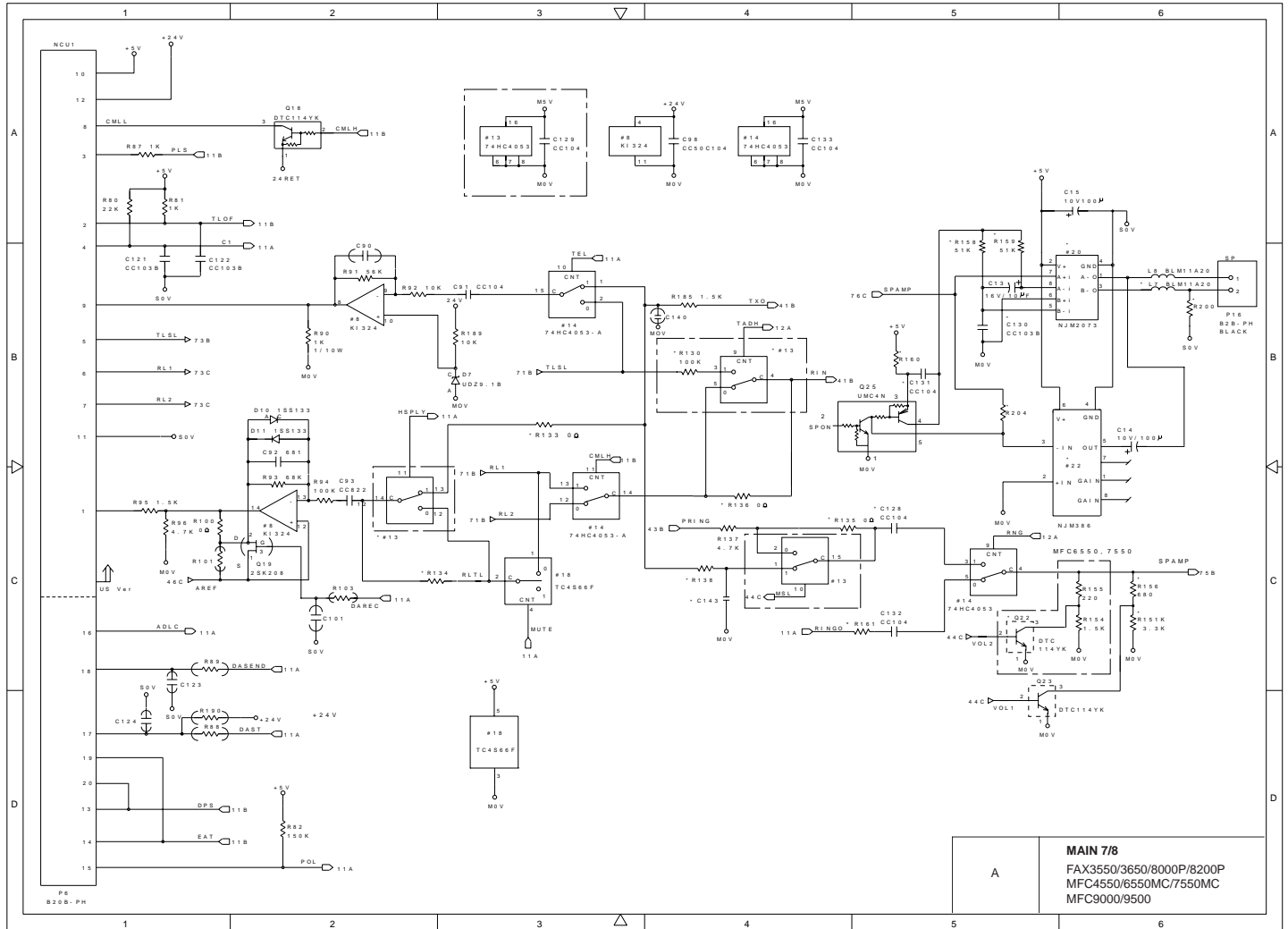


A  
**MAIN 4/8**  
 FAX3550/3650/8000P/8200P  
 MFC4550/6550MC/7550MC  
 MFC9000/9500





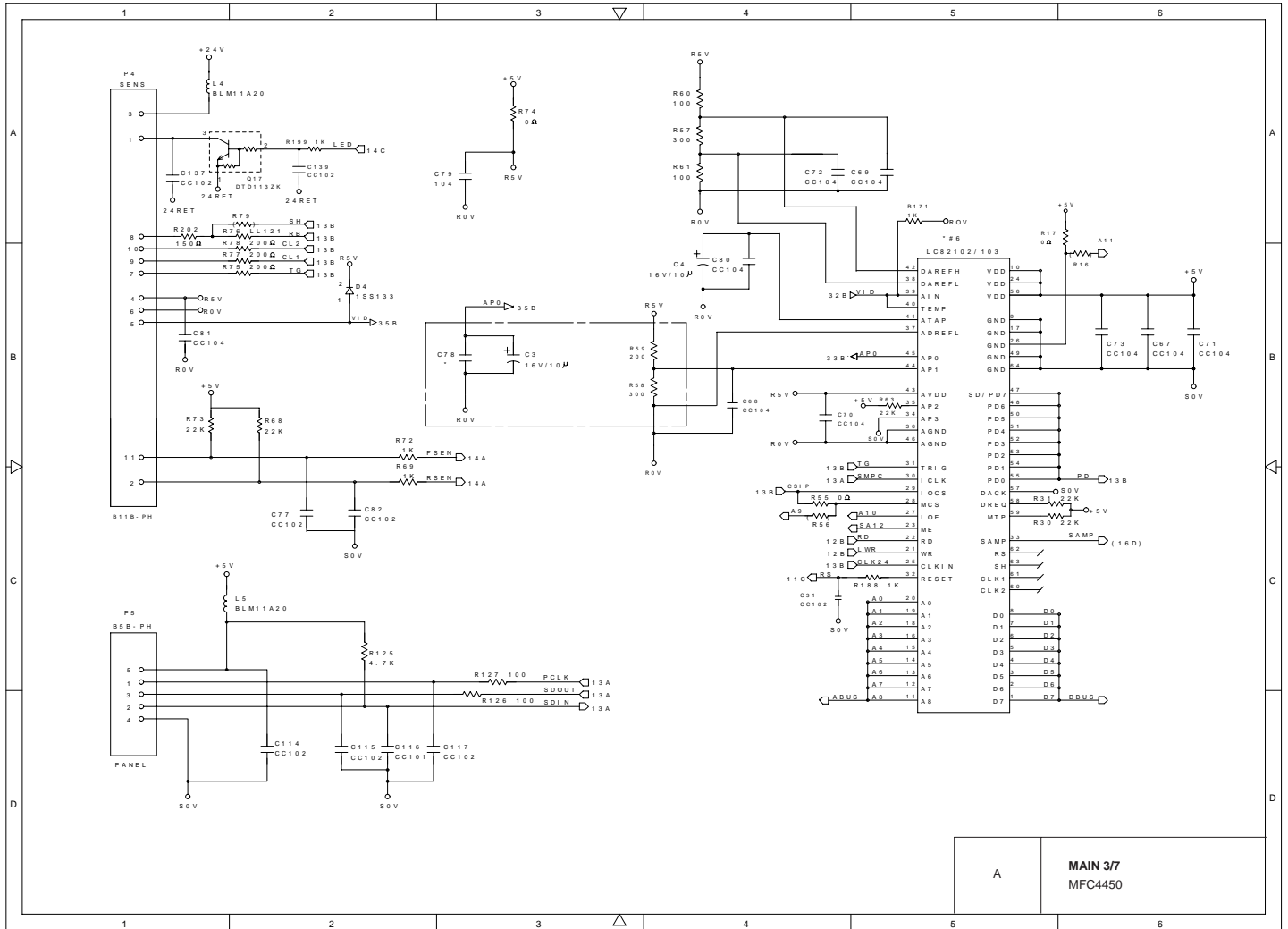




	SYMBOL	PPF3550_DS 0.75MDRAM	PPF3550_DS 1MDRAM	MFC4550_DS 0.75MDRAM	MFC4550_DS 1MDRAM	MFC6550	MFC7550
Page1	C21.C23	C101.CERAMIC	C101.CERAMIC	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED
	R197	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	1/16W22Kα	1/16W22Kα
	R195.R196	NOT MOUNTED	NOT MOUNTED	1/16W22Kα	1/16W22Kα	1/16W22Kα	1/16W22Kα
	R5	NOT MOUNTED	NOT MOUNTED	0α	0α	0α	0α
	R108	0α	0α	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED
Page2	R34	0α	0α	0α	0α	NOT MOUNTED	NOT MOUNTED
	#11.#12	NOT MOUNTED	4MDRAMX8	NOT MOUNTED	4MDRAMX8	NOT MOUNTED	NOT MOUNTED
	#10	4MDRAMX16	NOT MOUNTED	4MDRAMX16	NOT MOUNTED	4MDRAMX8	NOT MOUNTED
	#15	2MDRAMX16	NOT MOUNTED	2MDRAMX16	NOT MOUNTED	NOT MOUNTED	16MDRAMX16
	#2	EEPROM16K	NOT MOUNTED	EEPROM16K	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED
	P3	NOT MOUNTED	NOT MOUNTED	DHB-PB30	DHB-PB30	EEPROM16K	EEPROM16K
	C104.C109	NOT MOUNTED	C104.CERAMIC	NOT MOUNTED	C104.CERAMIC	DHB-PB30	DHB-PB30
	R172	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	C104.CERAMIC	NOT MOUNTED
	R109.R113.R117.R182	1/16W10α	NOT MOUNTED	1/16W10α	NOT MOUNTED	NOT MOUNTED	1/16W10α
	R175.R177.R179.R180	0α	NOT MOUNTED	0α	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED
	R176.R178.R181	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED
	R110.R111.R112	NOT MOUNTED	1/16W10α	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED
	Page3	#6	LC82102	LC82102	LC82102	LC82102	LC82103
R76		LL121	LL121	LL121	LL121	LL121	LL121
R79		NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	0α	0α
R16.R56		NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED
R17.R55		0α	0α	0α	0α	NOT MOUNTED	NOT MOUNTED
Page4	#7	ModemV12	ModemV12	ModemV12	ModemV12	ModemV24	ModemV24
	X13	36.864MHZ	36.864MHZ	36.864MHZ	36.864MHZ	49.92MHZ	49.92MHZ
	R64	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	1/16W22Kα	1/16W22Kα
	R65	0α	0α	0α	0α	NOT MOUNTED	NOT MOUNTED
	R66	NOT MOUNTED	0α	NOT MOUNTED	0α	NOT MOUNTED	0α
	R67	1/16W22Kα	NOT MOUNTED	1/16W22Kα	NOT MOUNTED	1/16W22Kα	NOT MOUNTED
	C43.C45	0α	0α	C101.CERAMIC	C101.CERAMIC	C101.CERAMIC	C101.CERAMIC
Page6	C42	0α	0α	C151.CERAMIC	C151.CERAMIC	C151.CERAMIC	C151.CERAMIC
	#20	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NJM2073	NJM2073
	#22	NJM386	NJM386	NJM386	NJM386	NOT MOUNTED	NOT MOUNTED
	#13	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	HC4053	HC4053
	L7	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	BLM11A20	BLM11A20
	C130	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	C103B.CERAMIC	C103B.CERAMIC
	C128	C104.CERAMIC	C104.CERAMIC	C104.CERAMIC	C104.CERAMIC	C473.CERAMIC	C473.CERAMIC
	C131	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	C104.CERAMIC	C104.CERAMIC
	C143	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	C103.CERAMIC	C103.CERAMIC
	R158.R159	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	1/16W51Kα	1/16W51Kα
	R130	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	1/16W100Kα	1/16W100Kα
	R133.R160	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	0α	0α
	R134.R135.R136.R200.R204	0α	0α	0α	0α	NOT MOUNTED	NOT MOUNTED
Page7	R138	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED	1/16W4.7Kα	1/16W4.7Kα
	R151	1/16W4.3Kα	1/16W4.3Kα	1/16W4.3Kα	1/16W4.3Kα	1/16W3.3Kα	1/16W3.3Kα
	R156	1/16W470α	1/16W470α	1/16W470α	1/16W470α	1/16W680α	1/16W680α
	R161	1/16W150Kα	1/16W150Kα	1/16W150Kα	1/16W150Kα	1/16W330Kα	1/16W330Kα
	R200	BML11A20	BML11A20	BML11A20	BML11A20	NOT MOUNTED	NOT MOUNTED





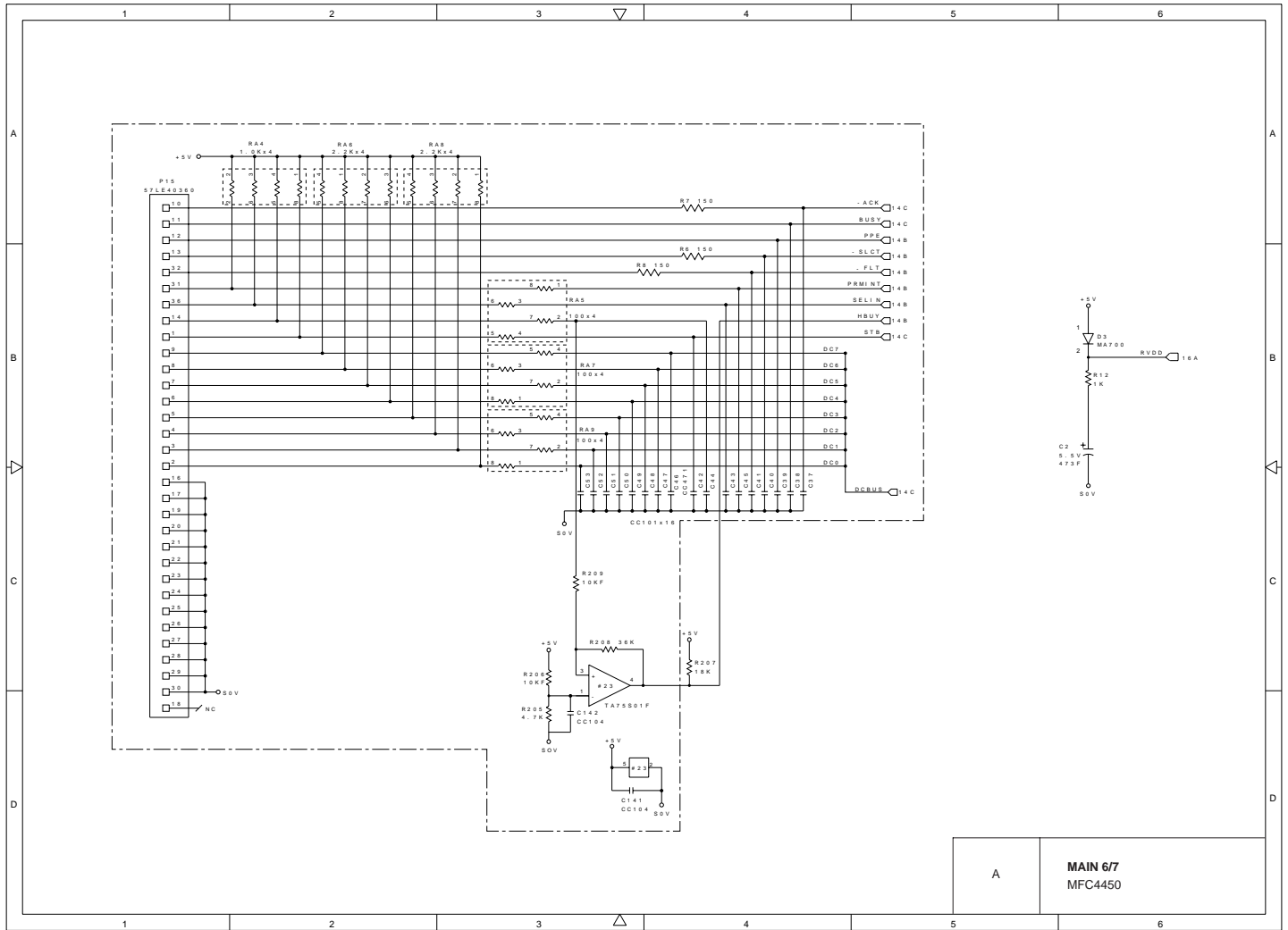


A MAIN 3/7 MFC4450

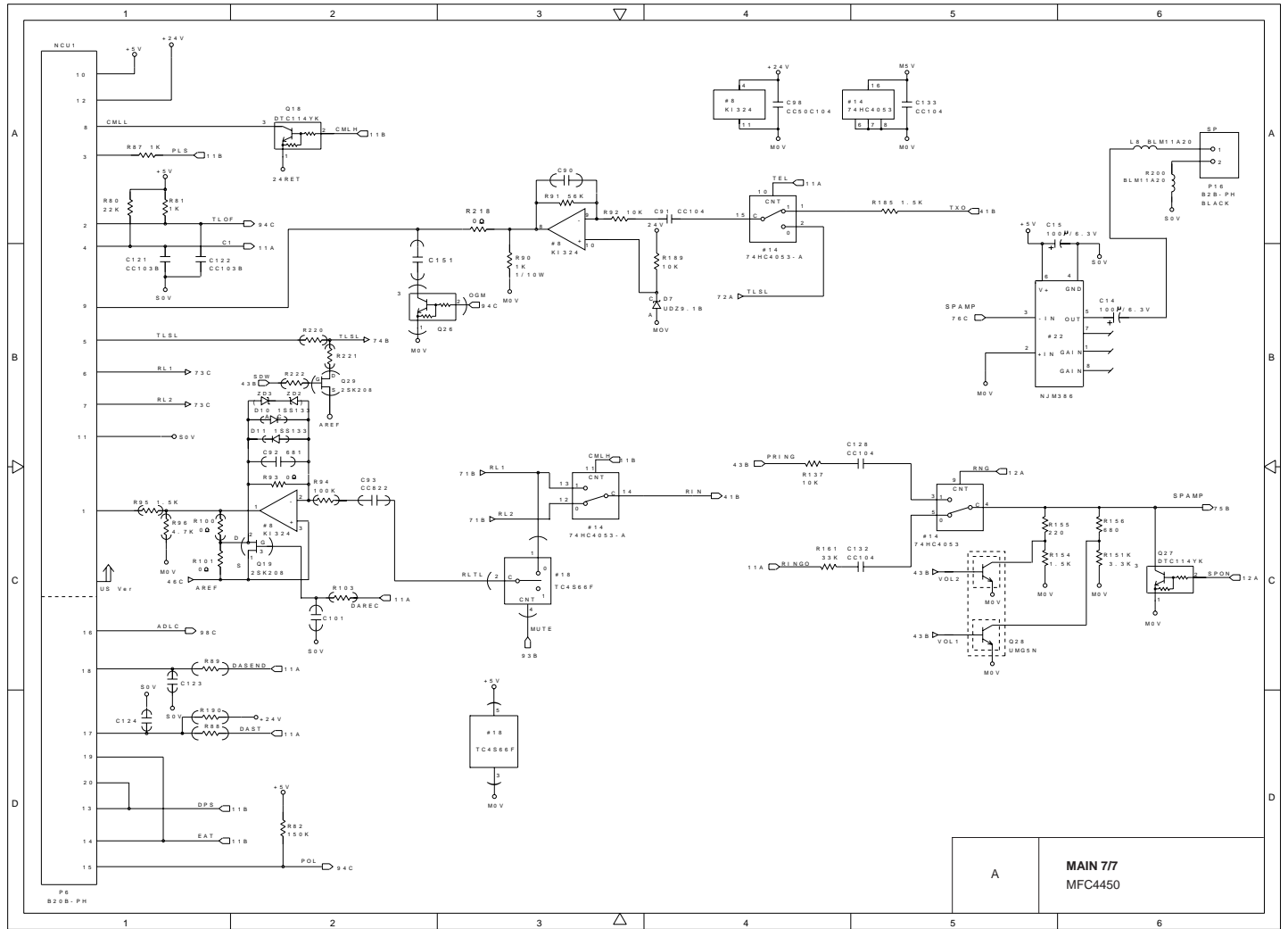




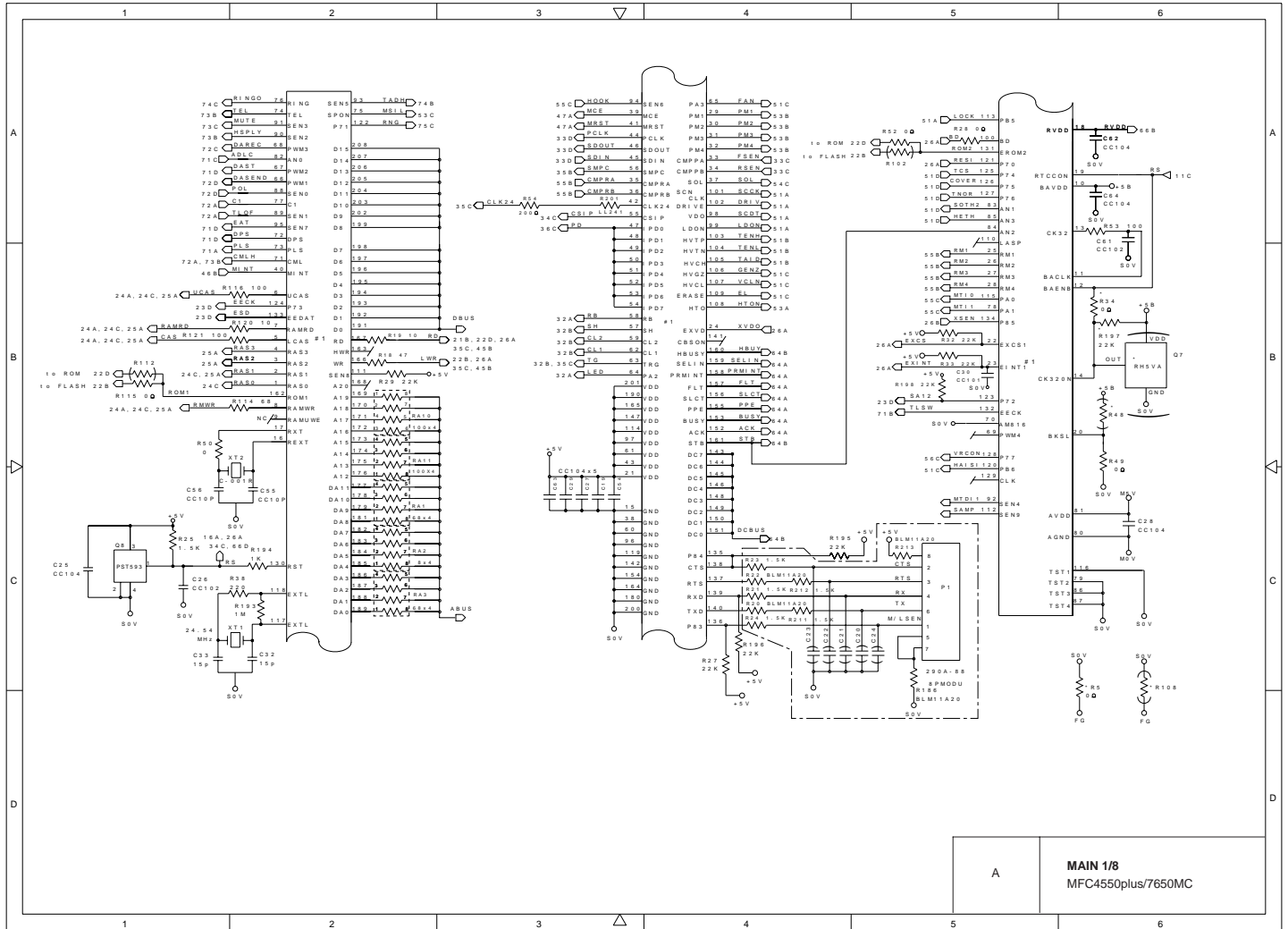


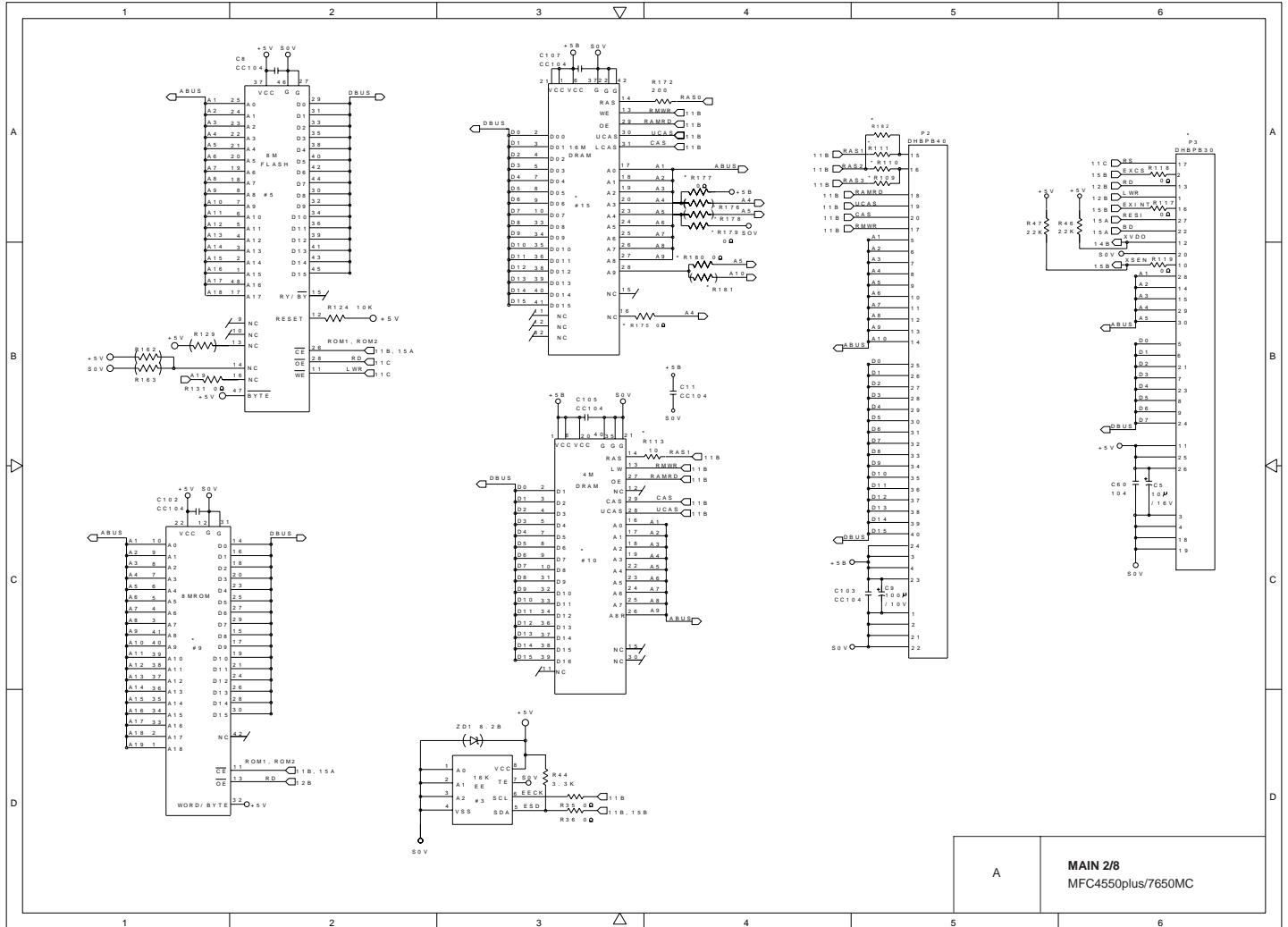


A	<b>MAIN 6/7</b> MFC4450
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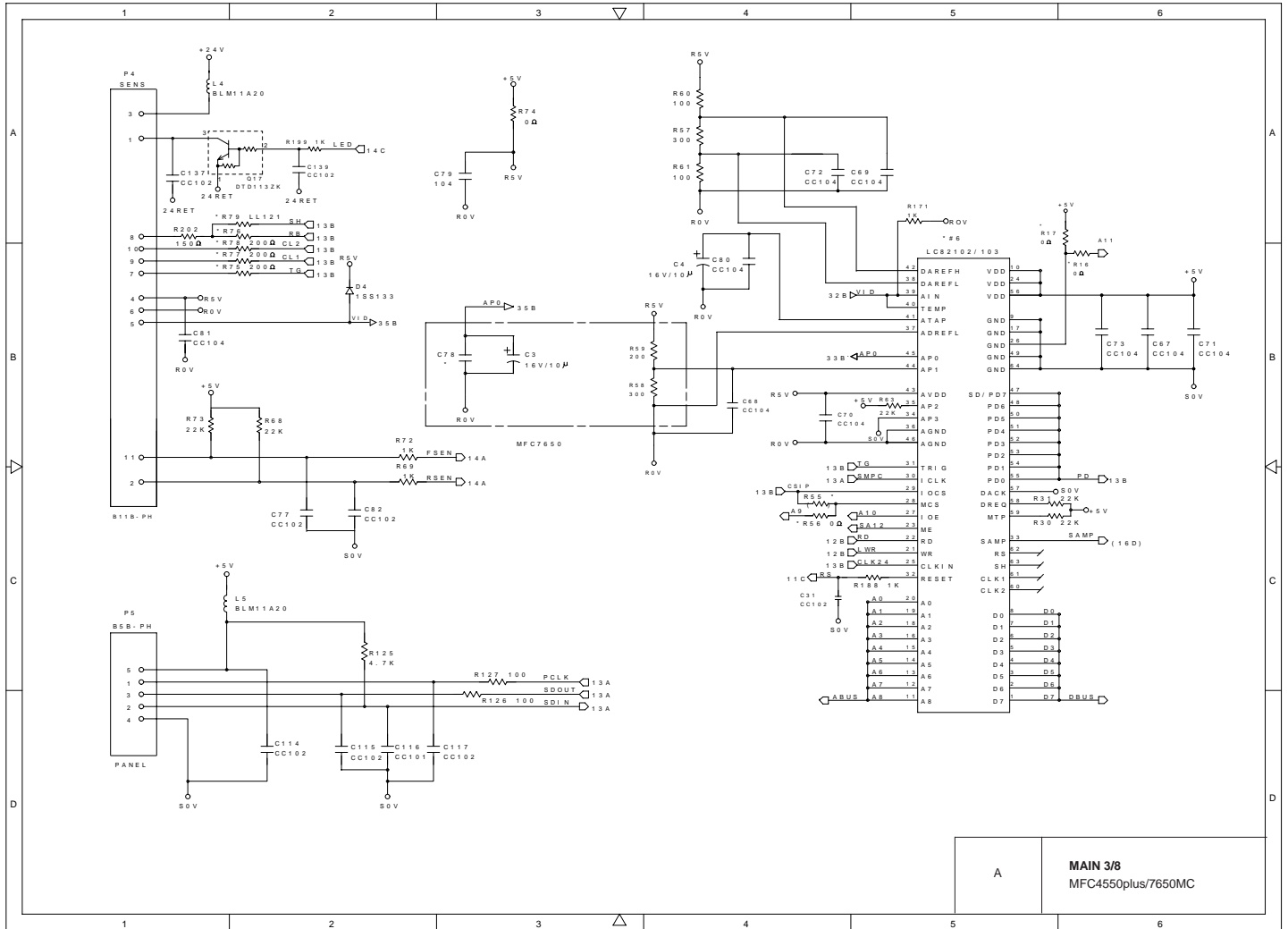


A  
**MAIN 777**  
**MFC4450**

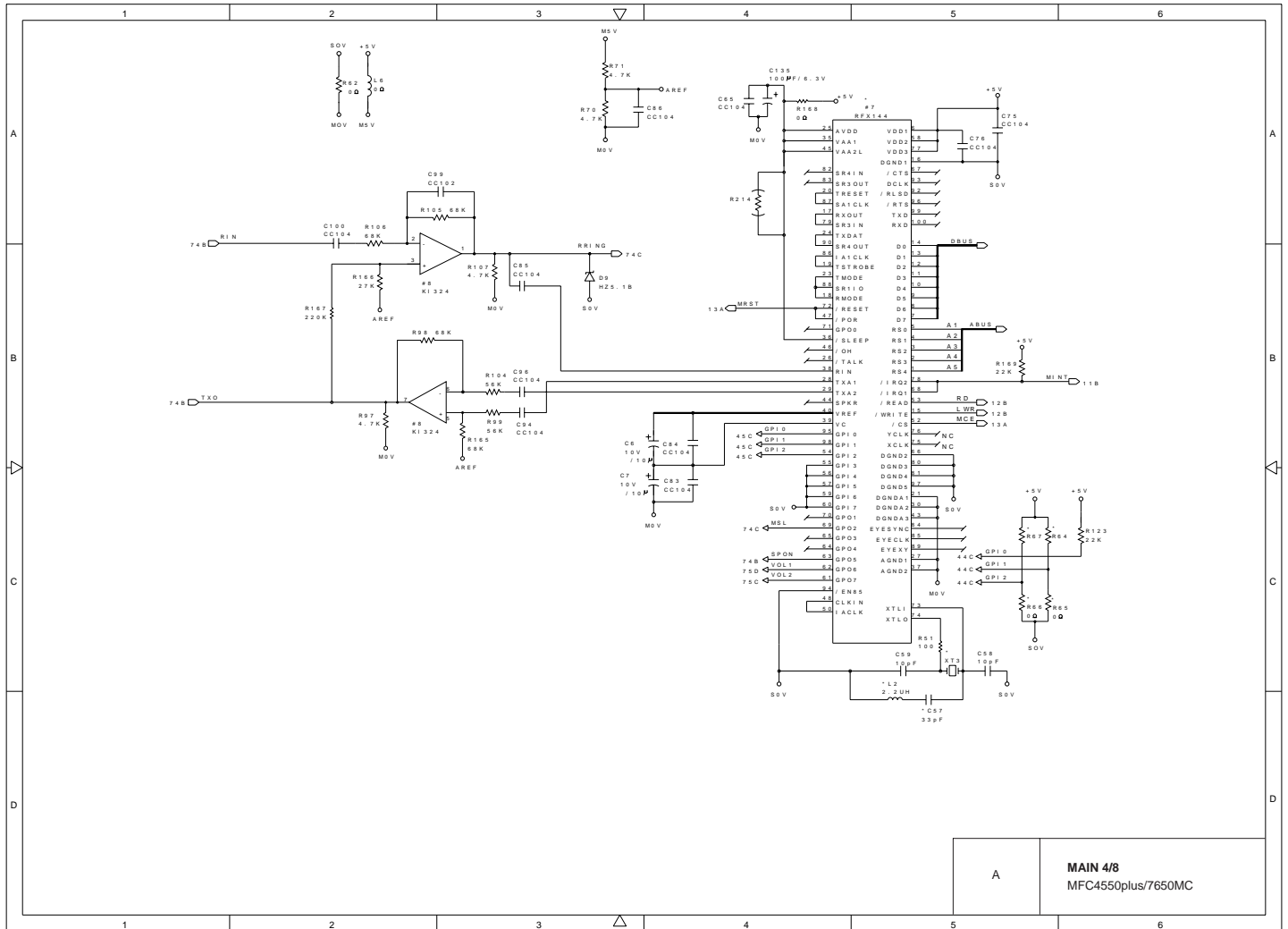




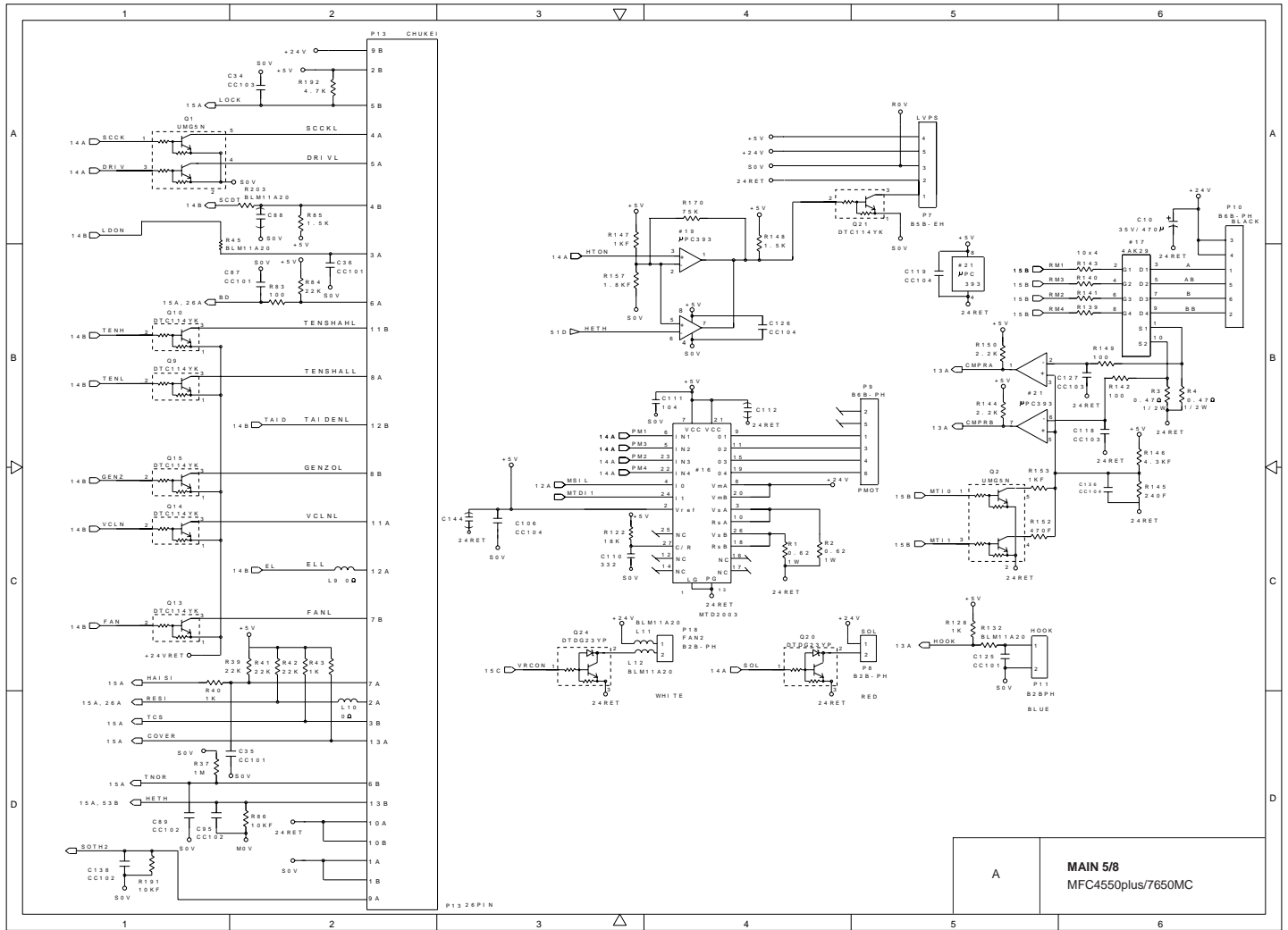
A  
**MAIN 2/8**  
 MFC4550plus/7650MC



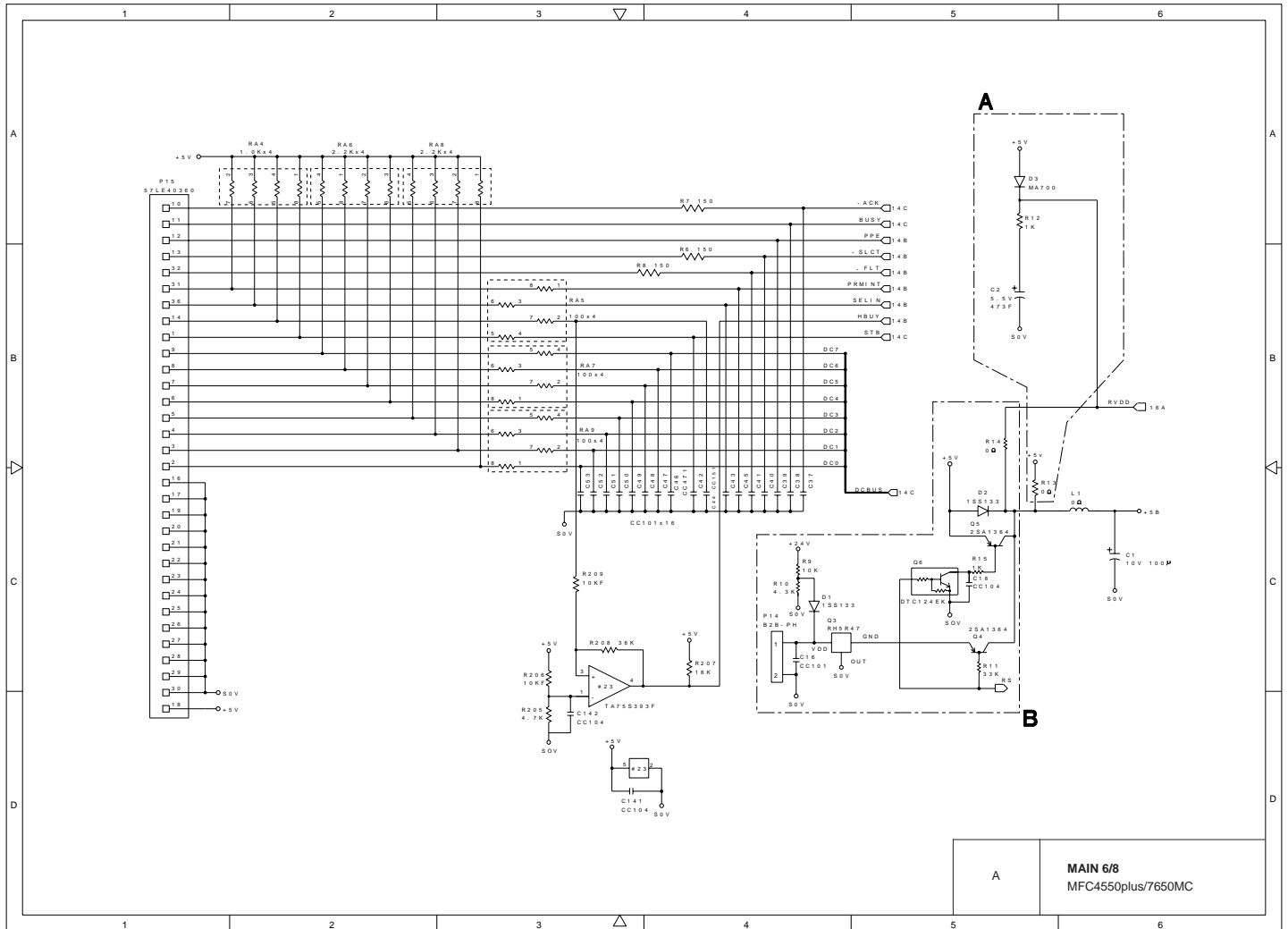
A MAIN 3/8 MFC4550plus/7650MC



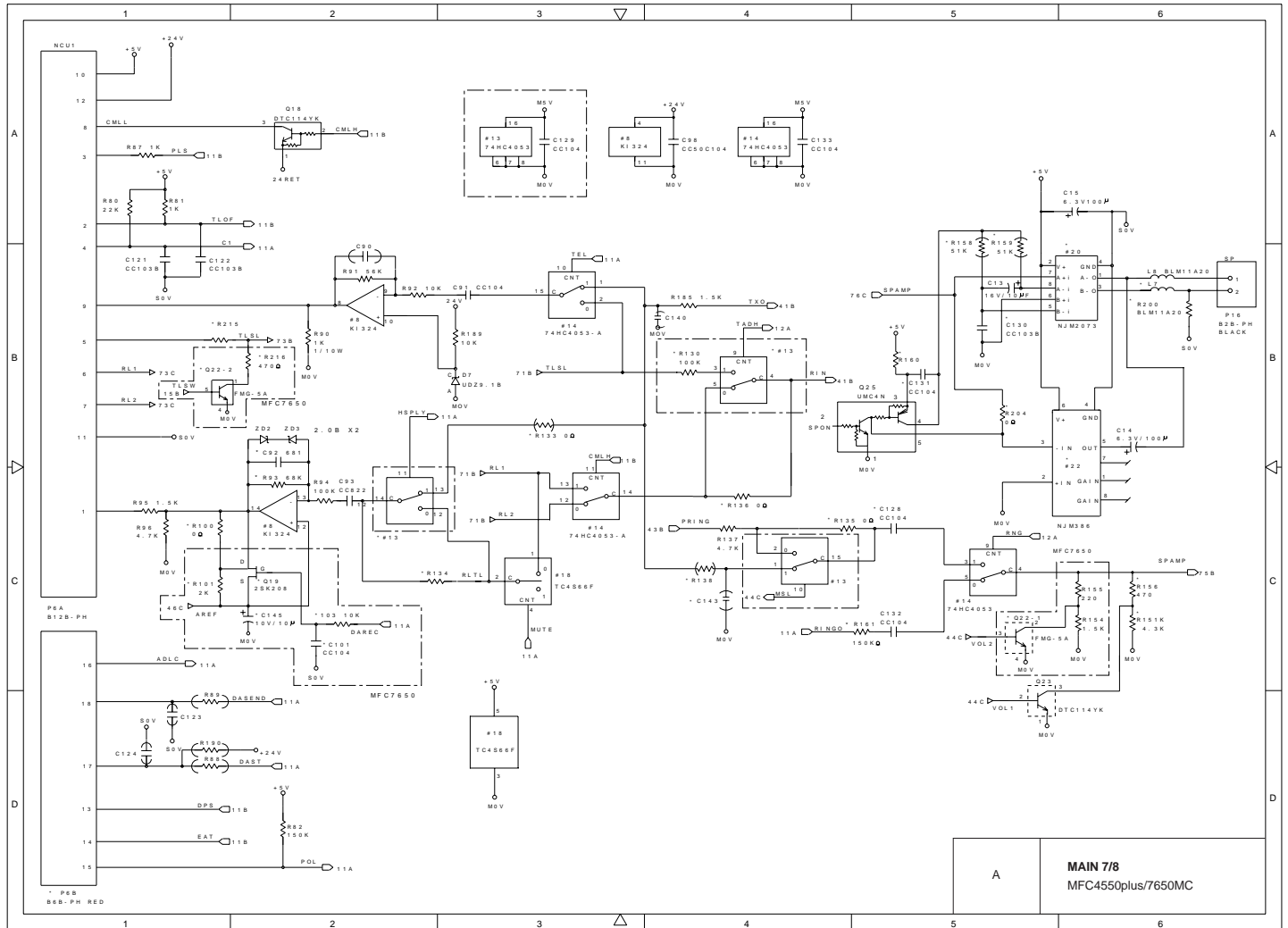
A  
**MAIN 4/8**  
MFC4550plus/7650MC



A  
**MAIN 5/8**  
MFC4550plus/7650MC

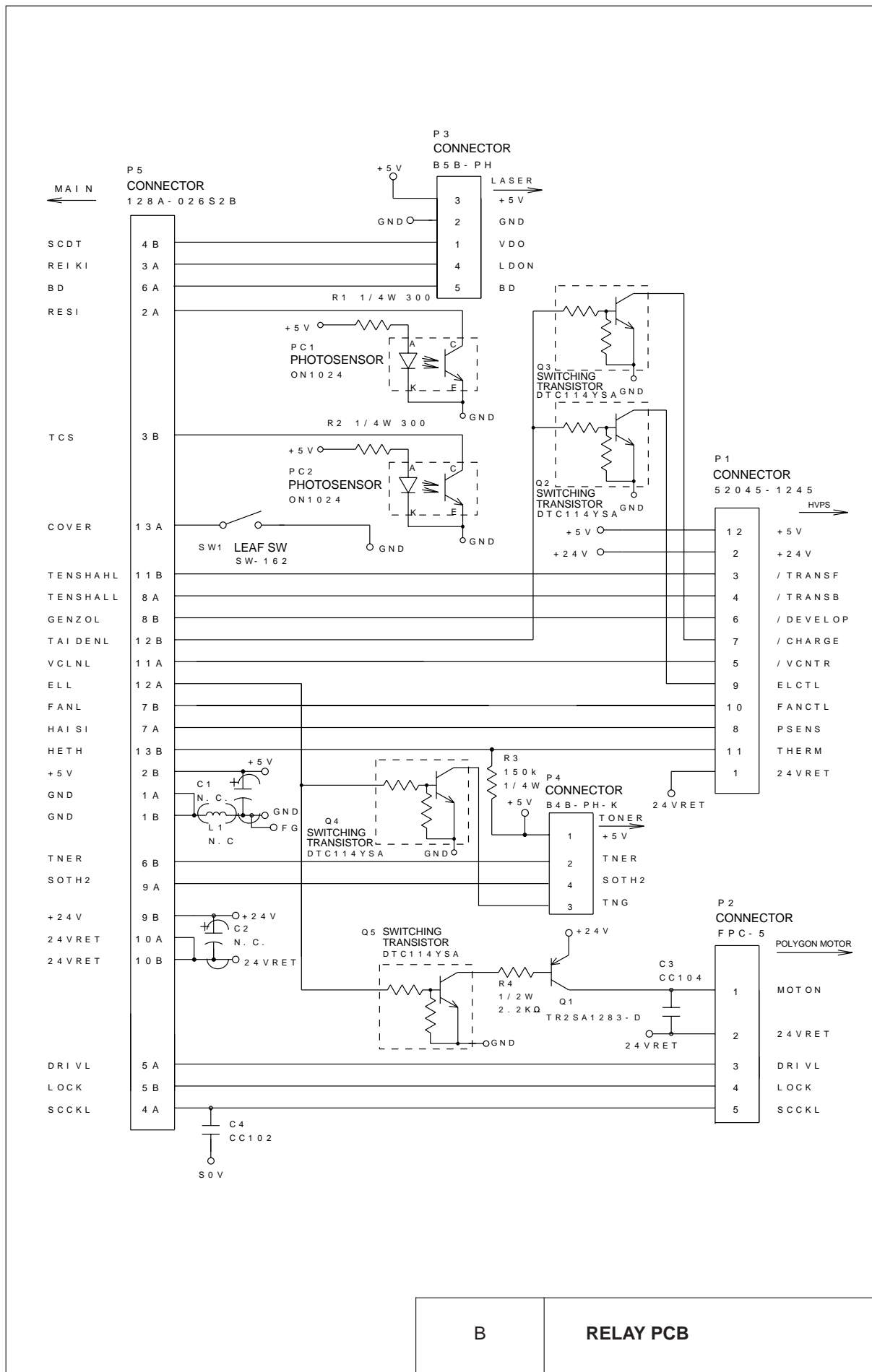


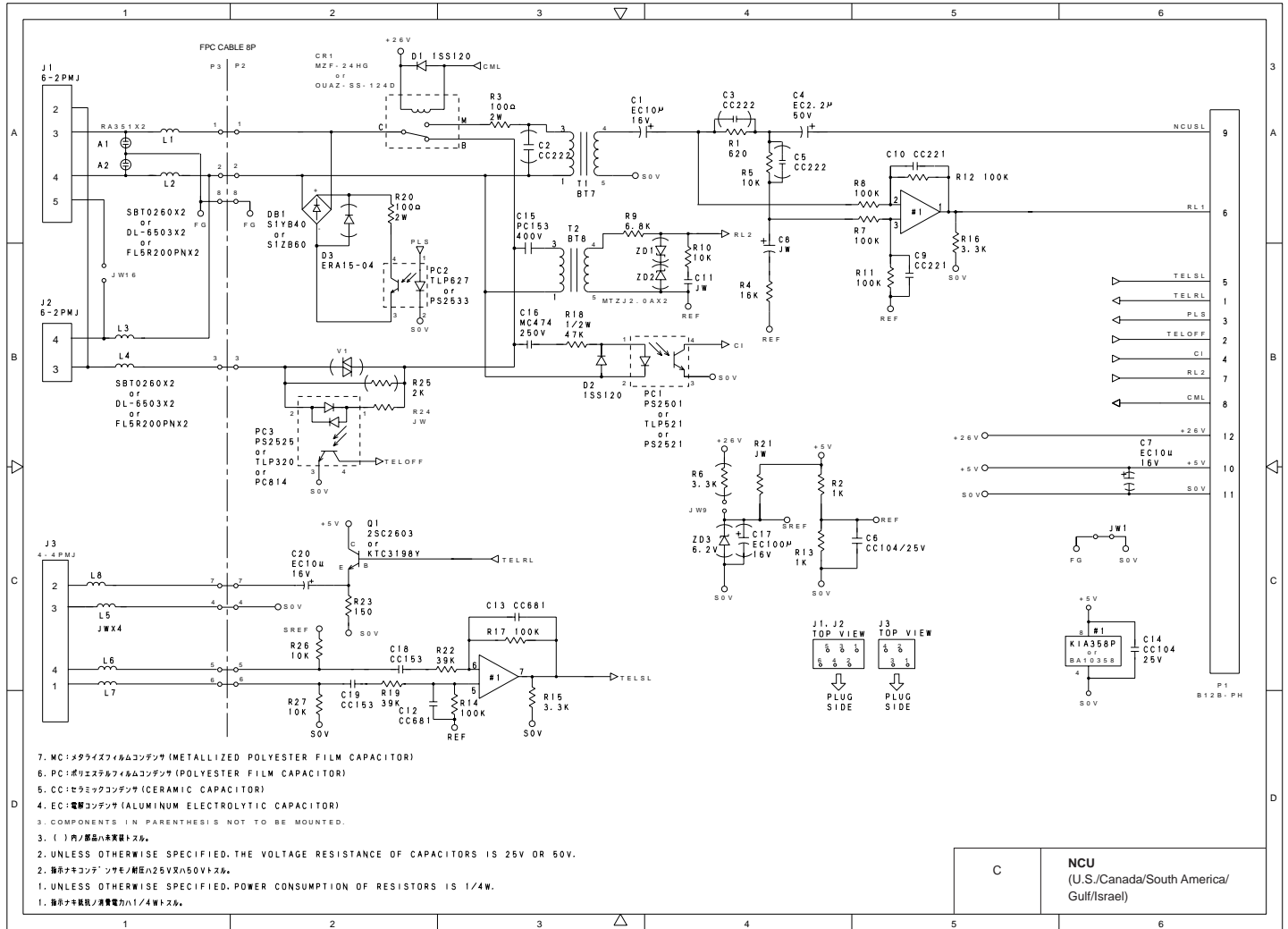


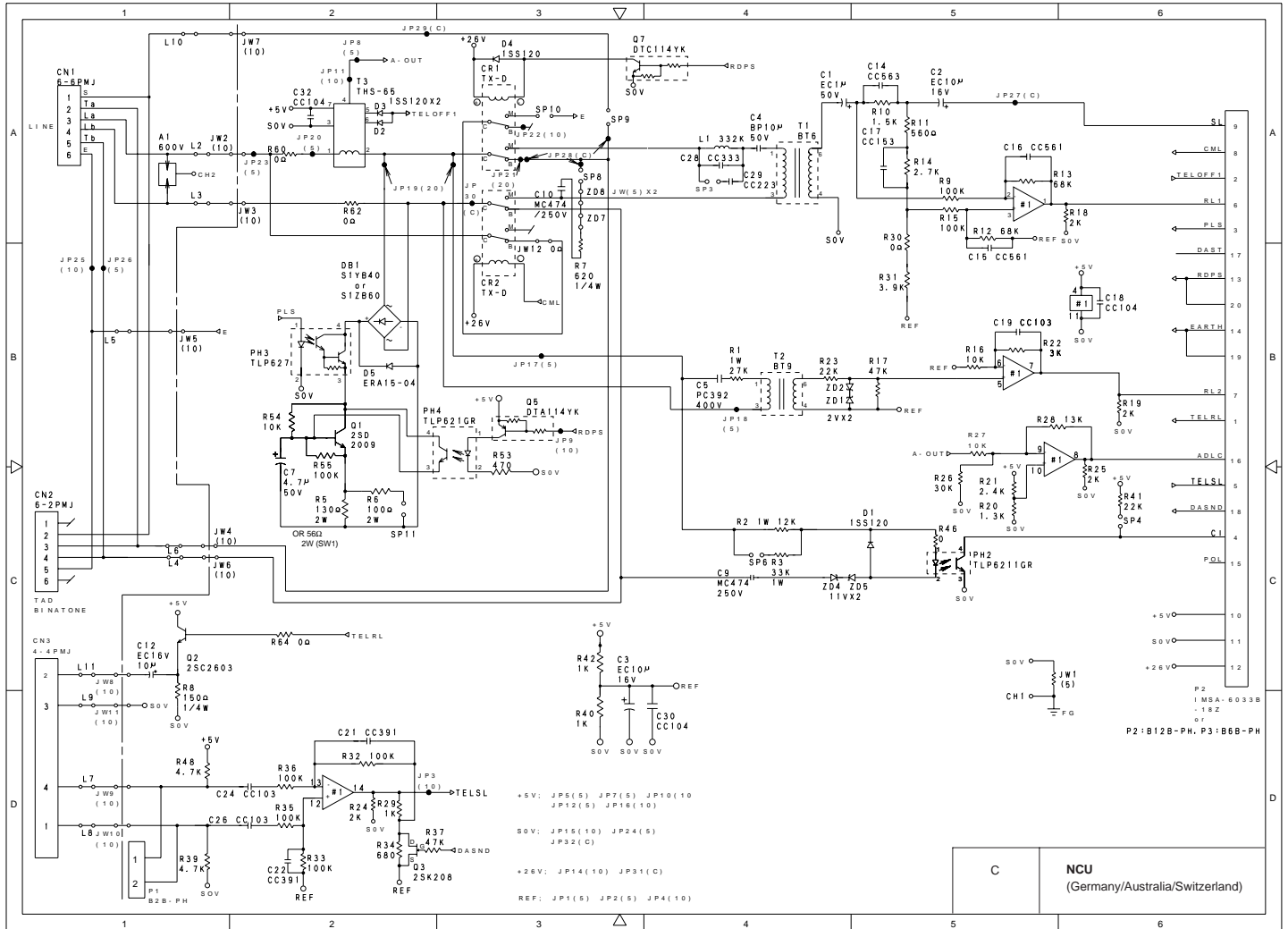


	1	2	3	4	5	6
	SYMBOL		MFC4550PLUS	MFC4550PLUS_DS	MFC7650	
1 Page	R34	0Ω	0Ω	NOT MOUNTED		
	R197	NOT MOUNTED	NOT MOUNTED	22KΩ		
	R5	0Ω	0Ω	0Ω		
	R108	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED		
2 Page	#15	4MDRAMX16	4MDRAMX16	16MDRAMX16		
	#10	4MDRAMX16	4MDRAMX16	NOT MOUNTED		
	#9	NOT MOUNTED	42-PIN IC SOCKET	42-PIN IC SOCKET		
	#3	EEPROM16K	EEPROM16K	EEPROM32K		
	R176, R178, R181	NOT MOUNTED	NOT MOUNTED	0Ω		
	R175, R177, R179, R181	0Ω	0Ω	NOT MOUNTED		
	R109, R182	0Ω	0Ω	NOT MOUNTED		
	R110, R111	NOT MOUNTED	NOT MOUNTED	0Ω		
	R113	10Ω	10Ω	NOT MOUNTED		
3 Page	R75	200Ω	200Ω	100Ω		
	R77, R78	200Ω	200Ω	22Ω		
	R5	LC82102	LC82102	LC82103		
	R76	LL121	LL121	NOT MOUNTED		
	R79	NOT MOUNTED	NOT MOUNTED	LL121		
	R16, R56	NOT MOUNTED	NOT MOUNTED	0Ω		
	R17, R55	0Ω	0Ω	NOT MOUNTED		
4 Page	#7	ModemV12	ModemV24	ModemV24		
	XT3	36.864MHz	36.864MHz	49.92MHz		
	L2	2.2μH	2.2μH	1.2μH		
	C57	33pF	33pF	1000pF		
	R64	NOT MOUNTED	NOT MOUNTED	22KΩ		
	R65	0Ω	0Ω	NOT MOUNTED		
	R66	0Ω	0Ω	0Ω		
	R67	NOT MOUNTED	NOT MOUNTED	NOT MOUNTED		
6 Page	<b>A</b>	MOUNTED	MOUNTED	NOT MOUNTED		
	<b>B</b>	NOT MOUNTED	NOT MOUNTED	MOUNTED		
7 Page	#20	NOT MOUNTED	NOT MOUNTED	NJM2073		
	#22	NJM386	NJM386	NOT MOUNTED		
	#13	NOT MOUNTED	NOT MOUNTED	HC4053		
	L7	NOT MOUNTED	BLM11A20	BLM11A20		
	C130	NOT MOUNTED	NOT MOUNTED	C103B, CERAMIC		
	C128	C104, CERAMIC	C104, CERAMIC	G473, CERAMIC		
	C131	NOT MOUNTED	NOT MOUNTED	C104, CERAMIC		
	C143	NOT MOUNTED	NOT MOUNTED	C103, CERAMIC		
	R158, R159	NOT MOUNTED	NOT MOUNTED	51KΩ		
	R130	NOT MOUNTED	NOT MOUNTED	100KΩ		
	R133, R160	NOT MOUNTED	NOT MOUNTED	0Ω		
	R134, R135, R136, R200, R204	0Ω	0Ω	NOT MOUNTED		
	R138	NOT MOUNTED	NOT MOUNTED	4.7KΩ		
	R151	4.3KΩ	4.3KΩ	3.3KΩ		
	R156	470Ω	470Ω	880Ω		
	R161	150KΩ	150KΩ	330KΩ		
	R200	BLM11A20	BLM11A20	NOT MOUNTED		
	R215	0Ω	0Ω	470Ω		
	R100	0Ω	0Ω	1KΩ		
	C92, R93	C681, CERAMIC 68KΩ	C681, CERAMIC 68KΩ	C182, CERAMIC 22KΩ		

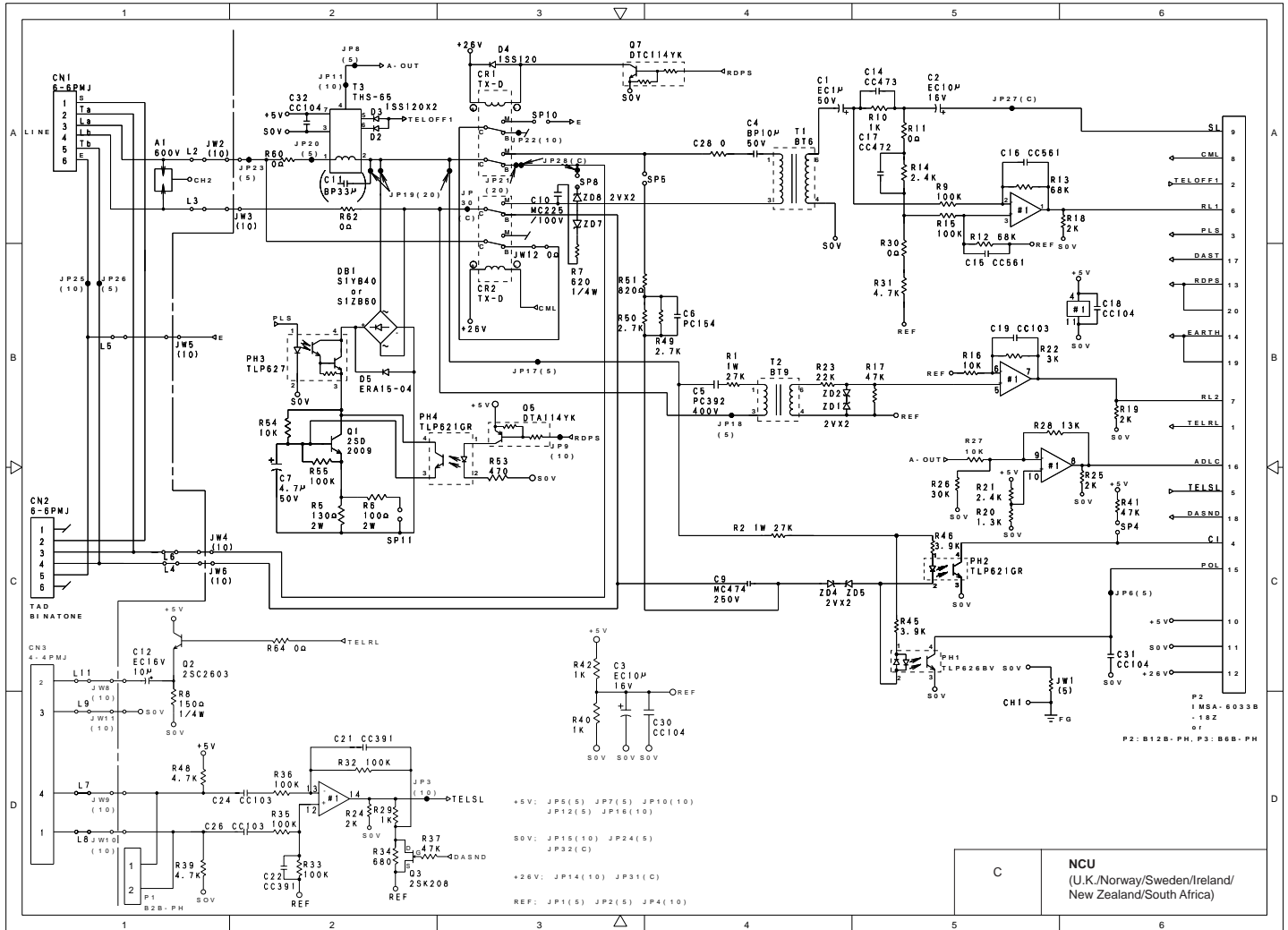
A MAIN 8/8  
MFC4550plus/7650MC

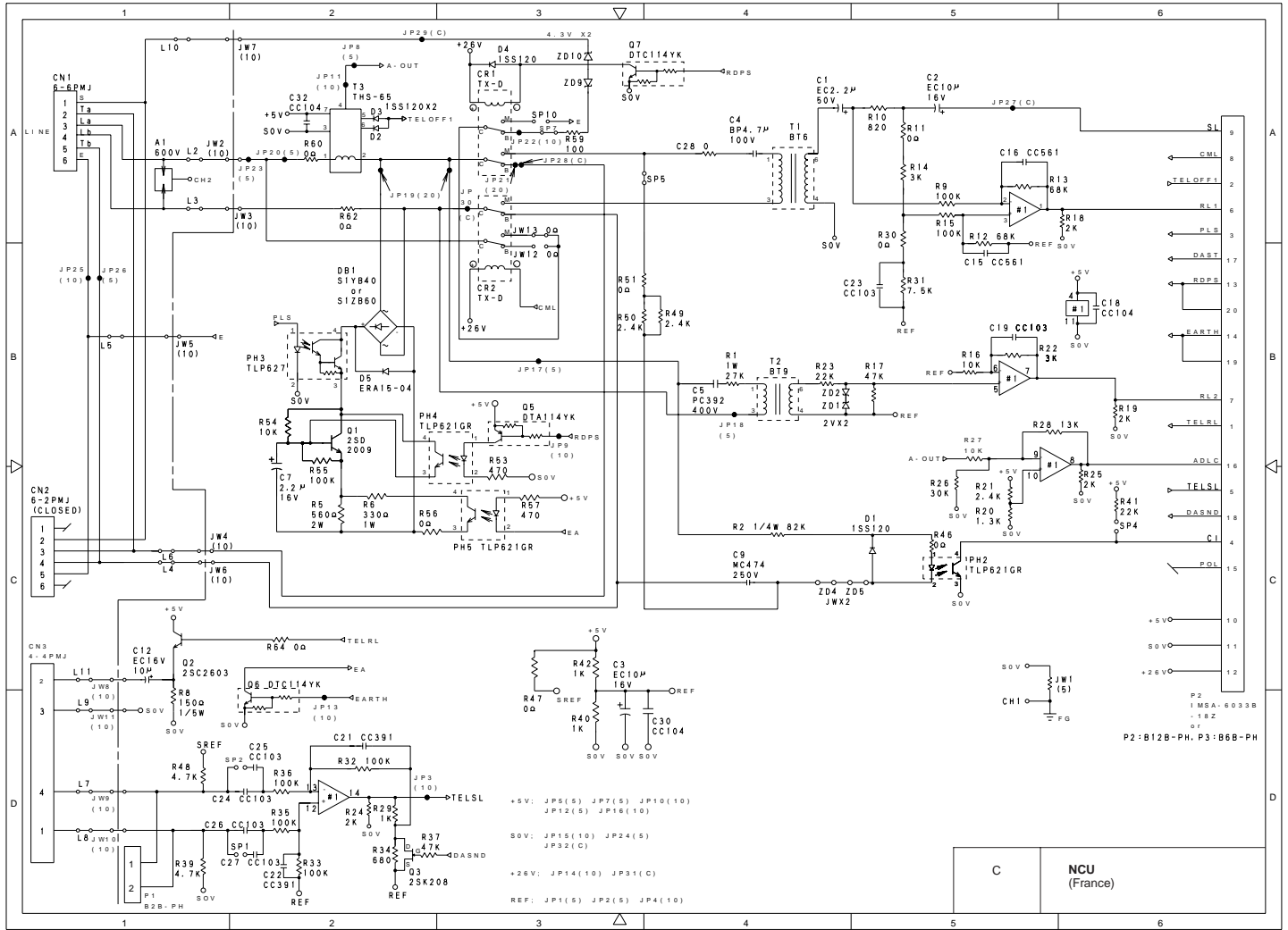


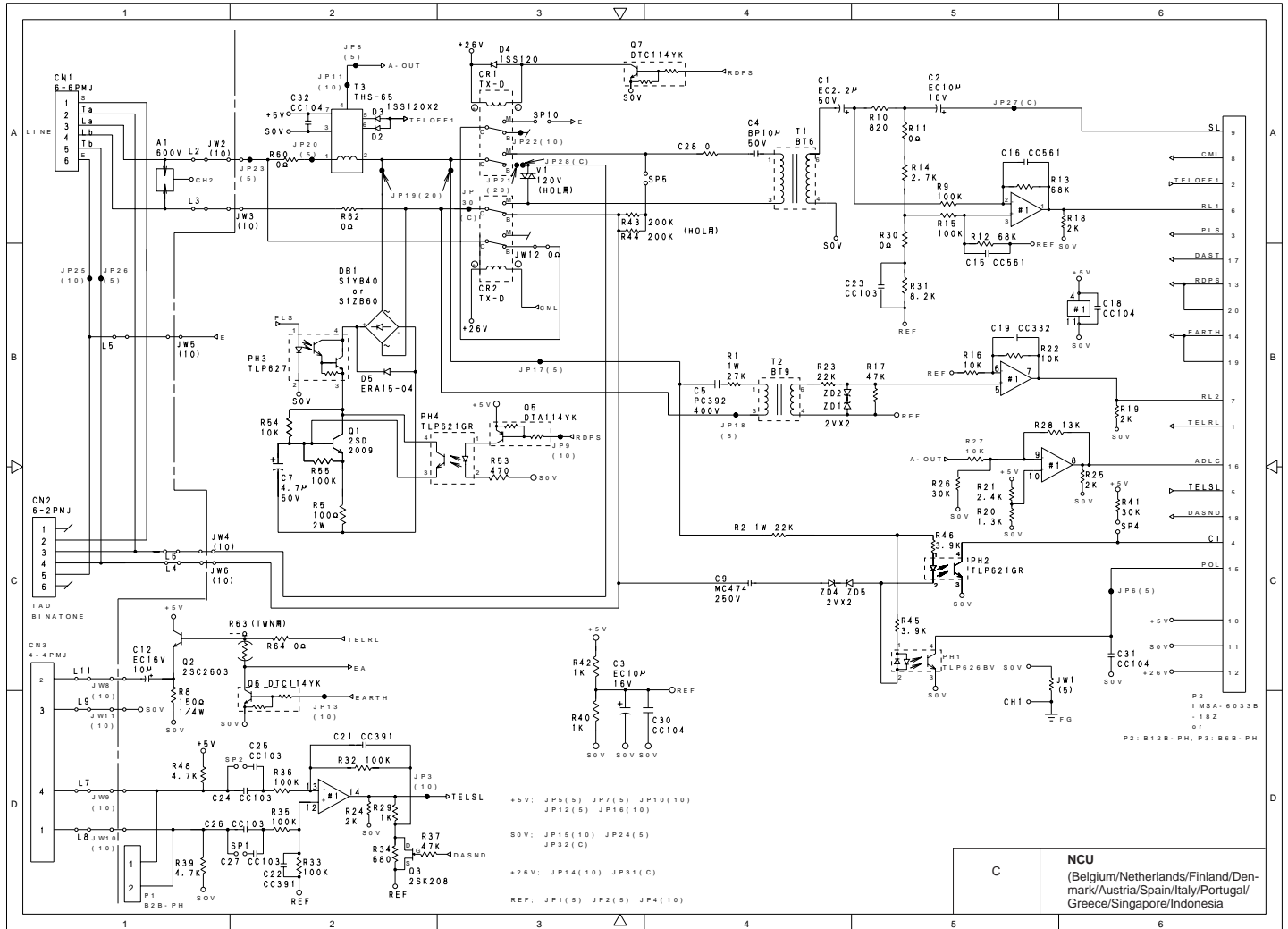




C	NCU (Germany/Australia/Switzerland)
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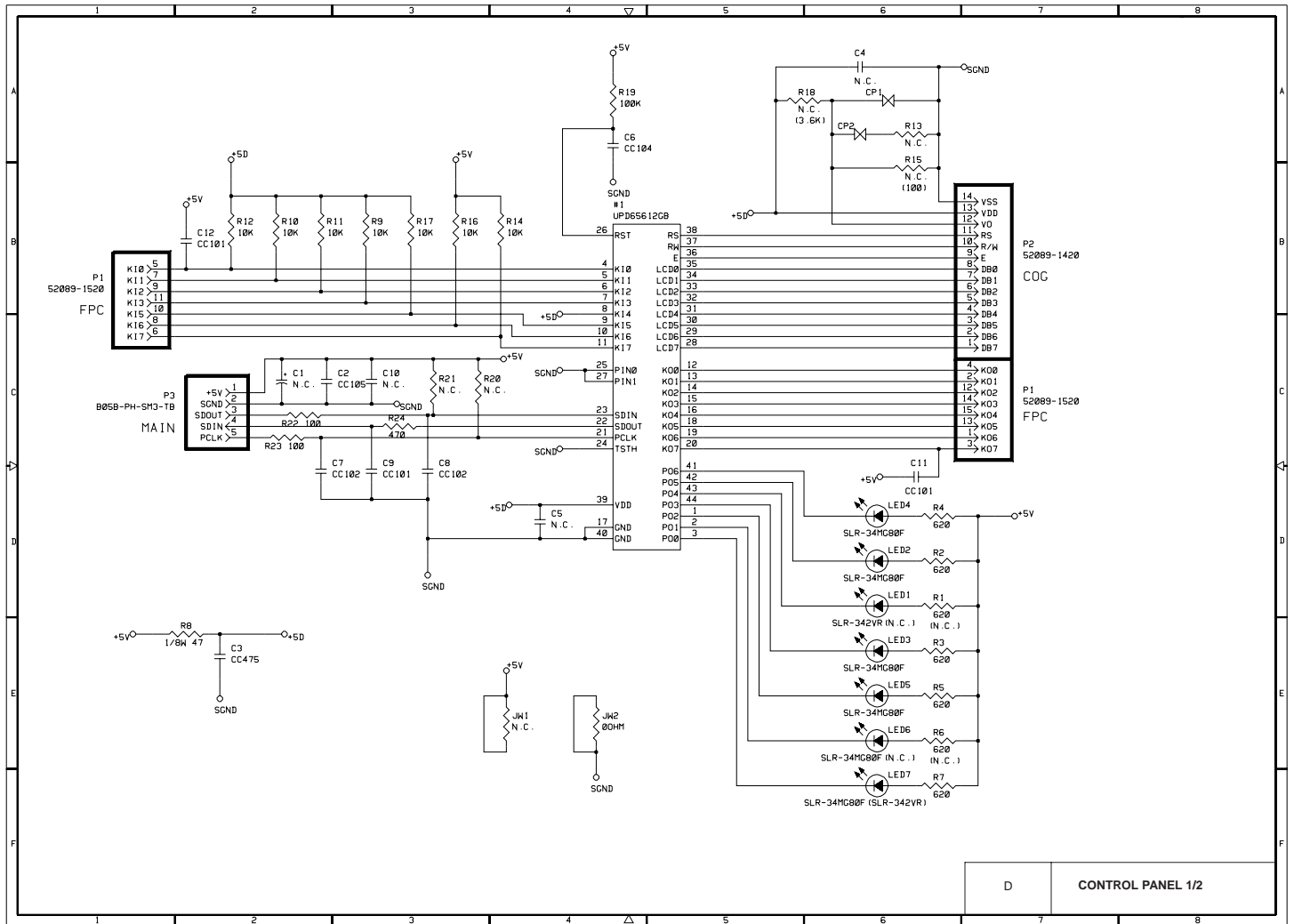






**C NCU**  
 (Belgium/Netherlands/Finland/Denmark/Austria/Spain/Italy/Portugal/Greece/Singapore/Indonesia)



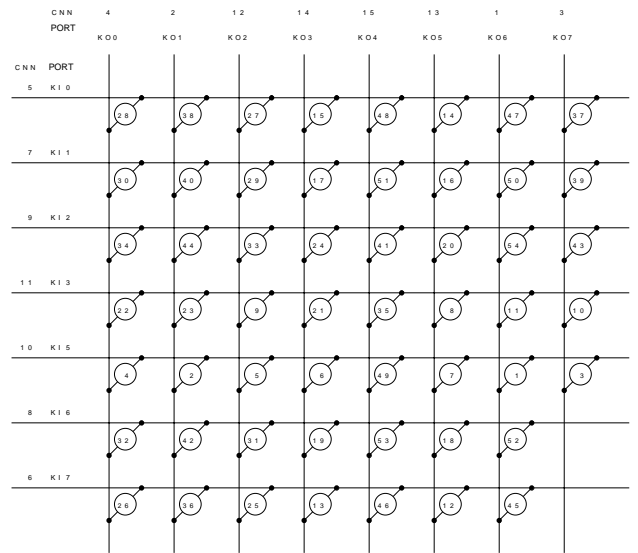


D CONTROL PANEL 1/2

MFC2 PANEL KEY MATRIX REFERENCE TABLE			
KEY NO	PPF3550	MFC	KEY CODE
1	◀	◀	3B
2	Set	Set	0E
3	Function	Function	3E
4	Clear	Clear	06
5	▶	▶	16
6	Tel-index	Tel-index	1E
7	Resolution	Resolution	2E
8	Mode	Mode	2C
9	Super Q. Scan	Cover page	14
10	Help	Super Q. Scan	3C
11	Enlarge/Reduce	Help	34
12	Hook	Hook	30
13	10KEY-1	10KEY-1	20
14	10KEY-2/ABC	10KEY-2/ABC	29
15	10KEY-3/DEF	10KEY-3/DEF	19
16	1TOUCH-01/21	1TOUCH-01/13	2A
17	1TOUCH-02/22	1TOUCH-03/15	1A
18	1TOUCH-03/23	1TOUCH-03/15	2F
19	1TOUCH-04/24	On/Off Line	1F
20	1TOUCH-05/25	Photo	2B
21	-	* Record	1C
22	-	* Erase	04
23	-	* Play	0C
24	Copy	-	1B
25	Hold	Hold	18
26	10KEY-4/GHI	10KEY-4/GHI	08
27	10KEY-5/JKL	10KEY-5/JKL	11
28	10KEY-6/MNO	10KEY-6/MNO	01
29	1TOUCH-06/26	1TOUCH-04/16	12
30	1TOUCH-07/27	1TOUCH-05/17	02
31	1TOUCH-08/28	1TOUCH-06/18	17
32	1TOUCH-09/29	FF/Cont	07
33	1TOUCH-10/30	Soft	13
34	Stop	Stop	03
35	Redial/Pause	Redial/Pause	24
36	10KEY-7/PQRS	10KEY-7/PQRS	10
37	10KEY-8/TUV	10KEY-8/TUV	39
38	10KEY-9/WXYZ	10KEY-9/WXYZ	09
39	1TOUCH-11/31	1TOUCH-07/19	3A
40	1TOUCH-12/32	1TOUCH-08/20	0A
41	1TOUCH-13/33	1TOUCH-09/21	23
42	1TOUCH-14/34	Test/Reset	0F
43	1TOUCH-15/35	Enlarge/Reduce	3B
44	Start	Start	0B
45	Speed Dial	Speed Dial	38
46	10KEY-*	10KEY-*	28
47	10KEY-0	10KEY-0	31
48	10KEY-#	10KEY-#	21
49	Shift	Shift	26
50	1TOUCH-16/36	1TOUCH-10/22	32
51	1TOUCH-17/37	1TOUCH-11/23	22
52	1TOUCH-18/38	1TOUCH-12/24	37
53	1TOUCH-19/39	Print Priority	27
54	1TOUCH-20/40	Copy	33

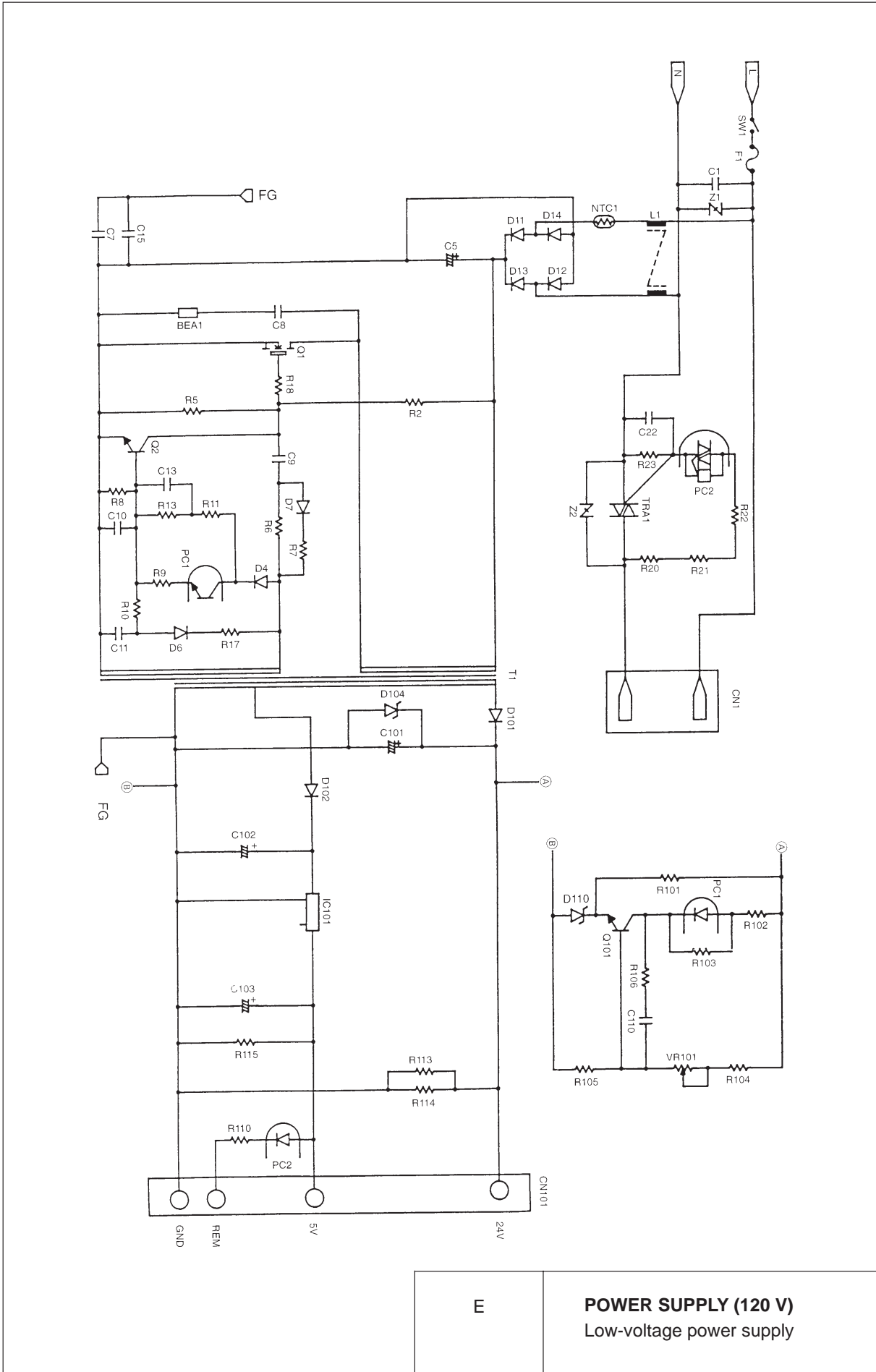
MFC: MFC4550 / MFC6550MC / MFC7550MC  
 \* : only for MC model

P 1 14 P



FPC NO B53K259

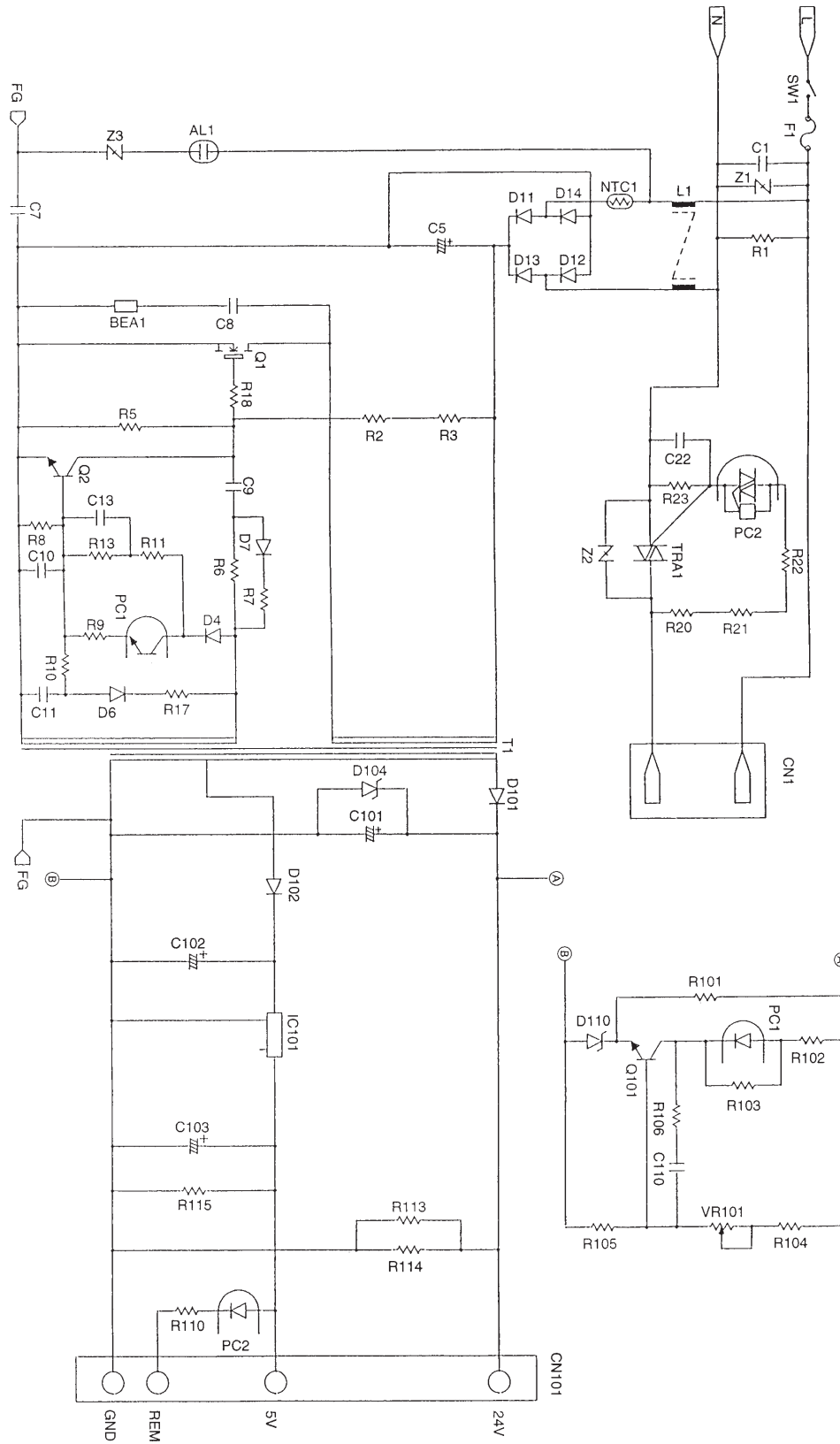
D CONTROL PANEL 2/2



E

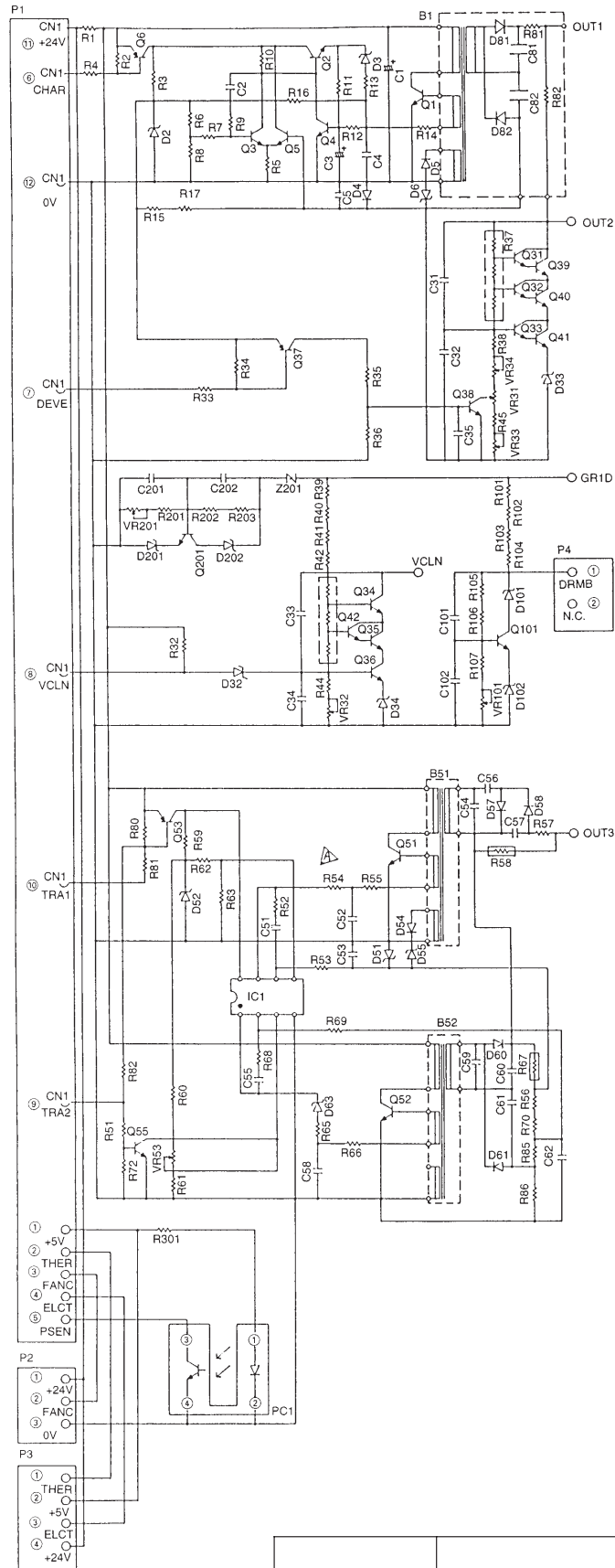
**POWER SUPPLY (120 V)**  
Low-voltage power supply





E

**POWER SUPPLY (200-240 V)**  
 Low-voltage power supply  
 (Asian versions)



E

**POWER SUPPLY**  
High-voltage power supply

**brother**®

Sept. '98  
5X5201②  
Printed in Japan