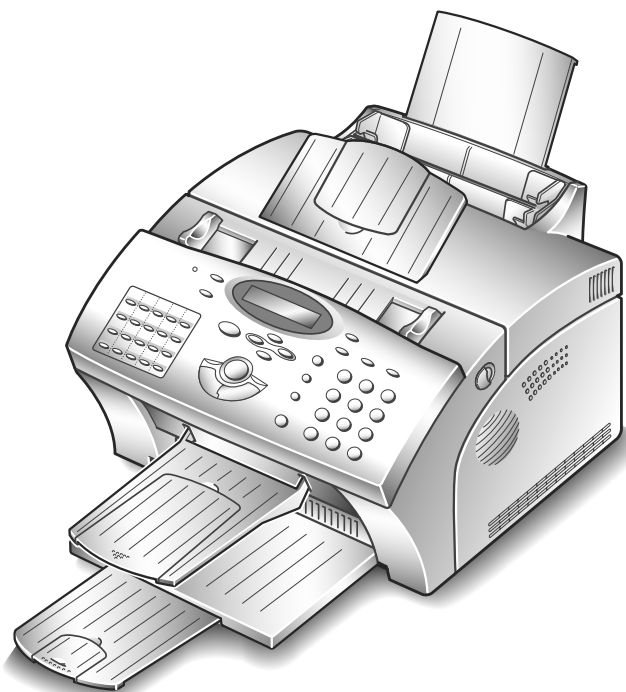# SAMSUNG FACSIMILE

Msys 5150/5200
SF-5800/5800P

SERVICE *MANUAL*

FACSIMILE

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SAMSUNG

1. Precautions

Follow these safety, ESD, and servicing precautions to prevent personal injury and equipment damage.

1-1 Safety Precautions

1. Be sure that all built-in protective devices are in place. Restore any missing protective shields.

2. Make sure there are no cabinet openings through which people- particularly children- might insert fingers or objects and contact dangerous voltages.

3. When re-installing chassis and assemblies, be sure to restore all protective devices, including control knobs and compartment covers.

4. Design Alteration Warning:
   Never alter or add to the mechanical or electrical design of this equipment, such as auxiliary connectors, etc. Such alterations and modifications will void the manufacturer's warranty.

5. Components, parts, and wiring that appear to have overheated or are otherwise damaged should be replaced with parts which meet the original specifications. Always determine the cause of damage or overheating, and correct any potential hazards.

6. Observe the original lead dress, especially near sharp edges, AC, and high voltage power supplies. Always inspect for pinched, out-of-place, or frayed wiring. Do not change the spacing between components and the printed circuit board.

7. Product Safety Notice:
   Some electrical and mechanical parts have special safety-related characteristics which might not be obvious from visual inspection. These safety features and the protection they provide could be lost if a replacement component differs from the original. This holds true, even though the replacement may be rated for higher voltage, wattage, etc.

   Components critical for safety are indicated in the parts list with symbols   ⚠ ⚠ . Use only replacement components that have the same ratings, especially for flame resistance and dielectric specifications. A replacement part that does not have the same safety characteristics as the original may create shock, fire, or other safety hazards.

1-2 ESD Precautions

Certain semiconductor devices can be easily damaged by static electricity. Such components are commonly called "Electrostatically Sensitive (ES) Devices", or ESDs. Examples of typical ESDs are integrated circuits, some field effect transistors, and semiconductor "chip" components.
The techniques outlined below should be followed to help reduce the incidence of component damage caused by static electricity.

CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

1. Immediately before handling a semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, employ a commercially available wrist strap device, which should be removed for your personal safety reasons prior to applying power to the unit under test.

2. After removing an electrical assembly equipped with ESDs, place the assembly on a conductive surface, such as aluminum or copper foil, or conductive foam, to prevent electrostatic charge buildup in the vicinity of the assembly.

3. Use only a grounded tip soldering iron to solder or desolder ESDs.

4. Use only an "anti-static" solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESDs.

5. Do not use Freon-propelled chemicals. When sprayed, these can generate electrical charges sufficient to damage ESDs.

6. Do not remove a replacement ESD from its protective packaging until immediately before installing it. Most replacement ESDs are packaged with all leads shorted together by conductive foam, aluminum foil, or a comparable conductive material.

7. Immediately before removing the protective shorting material from the leads of a replacement ESD, touch the protective material to the chassis or circuit assembly into which the device will be installed.

8. Maintain continuous electrical contact between the ESD and the assembly into which it will be installed, until completely plugged or soldered into the circuit.

9. Minimize bodily motions when handling unpackaged replacement ESDs. Normal motions, such as the brushing together of clothing fabric and lifting one's foot from a carpeted floor, can generate static electricity sufficient to damage an ESD.

1-3 Lithium Battery Precautions

1. Exercise caution when replacing a Lithium battery. There could be a danger of explosion and subsequent operator injury and/or equipment damage if incorrectly installed.

2. Be sure to replace the battery with the same or equivalent type recommended by the manufacturer.

3. Lithium batteries contain toxic substances and should not be opened, crushed, or burned for disposal.

2. Specification

2-1 Facsimile

Machine type :	Desk Top
Applicable line :	Public Switched Telephone Network (PSTN) or behind PABX
Compatibility :	CCITT Group 3
Data coding :	MH / MR / MMR
Modem speed :	14400/12000/9600/7200/4800/2400 bps
Transmission speed :	Approx. 6 sec.
Effective scanning width :	8.3 inches (210 mm)
Effective printing width :	8.2 inches (208 mm : LTR)
Scanning method :	Sheet-fed scanning using a Contact Image Sensor (CIS)
Memory :	Msys 5150 1 MByte/Msys 5200 2 MByte
	SF-5800 1 MByte/SF-5800P 2 MByte
Halftone :	64 levels
Printing speed :	8 PPM (Letter size)
Automatic document feeder :	30 pages ($75g/m^2$)
Documents size :	Width : 148 to 216 mm
	Length : 128 to 1500mm (Single Page)
	279 to 297mm (Multi Pages)
	Weight : 50 to 100 g/m^2 (Single Page)
	50 to 90 g/m^2 (20 Pages)
	75 g/m^2 (30 Pages)
One-touch dial :	20 locations
LCD :	16 characters x 2 lines

2-2 SCANNER

Scanning Method :	Sheet-fed scanning by CIS and feeding of the document by a stepping motor
Resolution	
Horizontal	11.8 lines/mm (300 dpi)
Vertical	STANDARD : 3.85 lines/mm (98 Lpi)
	FINE : 7.7 lines/mm (196 Lpi)
	SUPER FINE : 11.8 lines /mm (300 Lpi)
Photo Scale :	256 shades
Scanning period :	STANDARD : 2.5 ms/line
	FINE : 2.5 ms/line
	SUPER FINE : 2.5 ms/line

2-3 Printer

Print Speed	8 PPM (A4 Size, 5% Charcter Pattern)	At Copy Mode
Resolution	600 X 600 DPI	
Source of Light	Laser Diode(LSU)	
Print Method	Non-impact Electrophotography,	Laser Beam
Feed Method	Multi-Purpose Feeder and Manual	
Feed Reference	Center Reference Loading	
Paper	Size	Bin Type

Normal Paper : A4,Letter,Legal,B5,

Executive, A5

Envelope : Normal Envelope

Length   : 149 ~ 356mm

W idth   : 100 ~ 216mm

W eight : For MPF,   60 ~ 90g/m^2

　　　　　　For Manual,   60 ~163g/m^2

Paper Capacity	MPF : 150 Sheets (based on 75g/m^2)	

Manual Slot :   1 Sheet

Paper Stacker Capacity	Face up : 100 Sheets (75g/m^2,20 lb)	
W arming up Time		
First Printing Time	Stand-By : 20 Sec	

Power Save Mode : 30 Sec

Power Rating	AC 110V ~127V ± 15% 50/60Hz ± 3Hz,	

AC 220V ~ 240V ± 15% 50/60Hz ± 3Hz

Power Consumption	Avr. 170Wh	
Power Saving Consumption	Avg. 13Wh	Sleeping Mode
Certification & Compliance	FCC,UL,CSA,CE,CB	
Acoustic Noise	Standby : Less than 36dB	

Sleep Mode : Less than 29dB

Operating : Less than 50dB

Reliability   MTBJ : 2,000 Sheets(75g/m^2)

                                     MTBF : 50,000 Sheets

Toner Cartridge   One-Cartridge type

Expected Life Span   50,000 Sheets

Operating Environment   Temperature : 10 ~ 32 °C

                                     Humidity   : 20 ~ 80%

Storage Environment   Temperature : –20 ~ 40 °C

                                     Humidity   : 10 ~ 95%RH

W eight   Net : Max. 9kg

                                     Gross : Max. 14kg

External Dimension   355(W) X 415(D) x 238(H)mm (without Handset)

                                     424(W) X 415(D) x 238(H)mm (with Handset)

Developer   .Life Span : 5% Pattern,Min. 5,000 Sheets

                                     .Developing : Non-magnetic

                                                   Contact Developing

                                     .Charging : Conductive Roller Charging

                                     .Density Adjustment : Dark, Medium

                                     .Toner Supply Method : Exchanging

                                                        Toner Cartridge

                                     .New Developer Checkable

                                     .Transfer System : Pre-transfer By LED &

                                                    Conductive Roller Transfer

                                     .Fusing System : Temperature & Pressure

                                     OZONE Emission : Max. 0.1 PPM(8 Hours)

2-4 Quality

Conditions

    Paper   Normal Paper $75g/m^2$

    Environment   Temperature : $20 \sim 25\,^{\circ}$C

                           Humidity   : $40 \sim 60$%

Print Quality

    Image Density   Min. 1.3

                           Min. 1.0(Temperature : $10 \sim 15\,^{\circ}$C)

    Background   Max. 0.2

    Uniformity   Max. 0.2(Including Continuous Print)

    Fusing   Min. 75% (All Black)

    Start Position   Top : x ± 4.23mm, Side : y ± 4 m m   From Left

    Skew   Top : Max. ± 1 . 5mm / 2 0 0mm

                           Side : Max. ± 2 . 0mm / 2 5 0mm

    Orthogonality   ± 1 . 0mm

    Horizontal Scan   ± 0 . 6mm / 2 0 8mm

                           (Bowed Line Skew : Pattern 1)

    Special Paper Exception   Image Density : Min 1.0 (Envelope)

                           Fusing : Min. 70% (All Black)

                           (Envelope/OHP/Postcard)

    Paper Jam   Less than 1/1,000($75g/m^2$ Paper)

    Paper Curl   First : Less than 16mm (10 Sheets, $75g/m^2$ Paper)

                         After Cooling : Less than 16mm (10 Sheets, $75g/m^2$ Paper)

Reliability

    Insulation Resistance   Less than 10 MΩ (at DC 500V)

    Dielectric Strength   AC 1000V (DC 1420V), 10mA

    Ground Continuous   Less than 0.1Ω

    Voltage DIP   Rated Voltage ± 1 5%

    AC Impulse Noise   AC 1000V 10, 100, 200, 400, 1000ns   Rated Power

    Leakage Current   Less than 3.5mA

    Surge   6 KV, 500A

    OZONE Emission   Less than 0.1 ppm (8 Hours)

    Top Cover Open   Isolating the input power of the LSU,

                         High Voltage Part, and Fuser

    Overcurrent Protect   Fuse inside the Engine Controller

Fusing System

    Trouble Sensing   .The temperature doesn't rise to the specific   Indicate the

                         temperature in the specific time.   Fuser error

                         .The temperature is too high.

    Overheat Sensing $240 \sim 250\,^{\circ}$C (The thermostat cuts off the Fuser

                                 from the power)

                         Thermistor Open Sensing : W ithout the initial

                                   temperature change of the Fuser

2-5 SMPS (Switching Mode Power Supply)

Input (AC)

AC Input Voltage	European	American
Minimum	198V	90V
Typical	230V	120V
Maximum	264V	135V
Max. AC Input Current	2.5Amps	3Amps
Max. Inrush Current	Ap-p (at 20℃)	

Output (DC)

Line Regulation	24V ± 10%	
	12V ± 5%	
Road Regulation	-12V ± 5%	
	5V ± 5%	
Ripple Noise	24V : Peak 500mV	
	12V : Peak 500mV	
	-12V : Peak 500mV	
	5V : Peak 300mV	
Over Current Protect	24V : 2.7A ± 10% (by Circuit)	
	5V : 3A ± 10% (by Circuit)	
Over Voltage Protect	24V : 33VDC	
	5V : 5.6VDC	

Memo

3-8 System Data Set-up

There are system data settings that are set by the user in the user-mode, and system data settings set by the technician in the tech mode.

3-8-1 System Data Settings in User-mode

The fax machine has various user-selectable functions. These functions are usually selected during the initial setup of the machine, and there should be little need to change them there after.

Note : Before you begin, print out the system data list to see the current settings. To print the system data list, press **Menu**, and '**System Data**' on the one-touch keypad.

1. Press **Menu**, then press '**System Data**' on the one-touch keypad.

   The LCD displays user-selectable options.

2. Scroll to the options by pressing „ or repeatedly.

3. When the option you want appears in the display, enter the number for the desired status. You can use ^ or ¤ button and press **Enter** to select the desired status.

3-8-2 User-Selectable Options

These instructions assume you've followed the steps under 'System Data Settings in User-mode' and the machine is asking if you want to change one of the options listed here.

- Paper Size-Select the paper size you will use for the recording paper.

  Press 1 for letter (LTR), 2 for A4, or 3 for legal (LGL) size paper.

- Message Confirmation Report-A confirmation report shows whether the transmission was successful or not, how many pages were sent, etc.

  Press 1 to print out journal automatically each time you send a fax.

  Press 2 to print only when an error occurs and the transmission was not successful.

- Auto Print Journal-A journal report shows specific information concerning transmission and reception activities, the time and dates up to 50 of the most recent transmission and reception.

  Press 1 to print journal automatically after every 50 transmission and receptions.

  Press 2 to print journal manually.

- Remote Receive Start Code-The remote receive code allows you to initiate fax receive from an extension phone plugged into the EXT.TEL jack. If you pick up the extension phone and hear fax tones, enter the remote receive code and the fax will start receiving. The password is preset to *9* at factory.

  Enter the desired code 0 to 9 on the number keypad.

• Power Saving Mode (SF-5800P only) -The power saving menu item lets you reduce power usage when the printer is idle.

Press 1 to turn the feature ON. The display asks you to determine the length of time the printer waits after a job is printed before it goes to a reduced power state:
Press 1 for 10 minutes, 2 for 15 minutes, 3 for 30 minutes, 4 for 45 minutes, or 5 for 60 minutes.

If your printer is used constantly, press 2 to turn the feature OFF. It keeps the printer ready to print with the minimum warm-up time.

• ECM Mode (Error Correction Mode)-This mode compensates for poor line quality and ensures accurate, error-free transmission with any other ECM-equipped facsimile machine. If the line quality is poor, transmission time may be increased when ECM is enabled.

Press 1 to turn the Error Correction mode on.

Press 2 to turn the Error Correction mode off.

• RX Reduction-When receiving a document as long as or longer than the paper installed in your machine, the machine can reduce the data in the document to fit into your recording paper size.

Turn on this feature if you want to reduce an incoming page that may otherwise need to be divided into two pages with only a few centimeters on the second page. If the fax machine cannot reduce the data to fit into one page with the feature enabled, the data is divided and printed in actual size on two or more sheets if needed.

Press 1 to turn this feature on. Note that this feature does not apply to the copy mode.

Press 2 to turn this feature off. The overflow data will be printed out on a second page.

• H.(Horizontal) Reduction-If you turn the RX reduction feature on, you are allowed to set the horizontal reduction feature on or off. When you set the horizontal reduction to be on, the machine will reduce an incoming page containing overflow data only in vertical as shown below.

Original   Received data
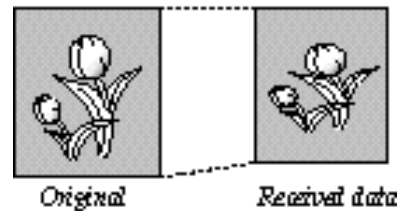
If you want to reduce both in vertical and horizontal at the same rate in order to maintain height to width relationships, turn the horizontal reduction feature off. If you turn off this feature, the machine reduces the data as shown below.

Original   Received data
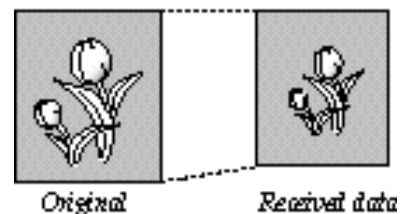
Press 1 to turn this feature on.

Press 2 to turn this feature off.

• Discard Size-When receiving or copying a document as long as or longer than the paper installed in your fax machine, you can set the fax machine to discard any excess image at the bottom of the page to fit into the recording paper size.

If the received page is outside the margin you set, it will be printed on two sheets of paper at the actual size.

If the data is within the margin, and the Auto Reduction feature is turned on, it will be reduced to fit into the appropriate size paper (Discard does not take place). If the Auto Reduction feature is turned OFF or fails, the data within the margin will be discarded.

Enter the desired discard size using the number keypad, and press Enter.

- Redial interval-Your machine can automatically redial a remote fax machine if it was busy or does not answer the first call.

  Enter the number of minutes (from 01 to 15) using the number keypad.

- Redials-Enter the number of attempts (from 0 to 9) to redial the number before giving up.

  If you enter 0, the machine will not redial.

- Answer Rings-You can select the number of times your machine rings before answering an incoming call. If you are using your machine as both a telephone and a fax machine, we suggest you set the ring count to at least 4 to give you time to answer.

  Enter a number from 1 through 7 on the number keypad.

- DRPD (Distinctive Ring Pattern Detection) Mode-'Distinctive Ring' is a telephone company service which enables a user to use a single telephone line to answer several different telephone numbers. The particular number someone uses to call you on is identified by different ringing patterns, which consist of various combinations of long and short ringing sounds. This feature is often used by answering services who answer telephones for many different clients and need to know which number someone is calling in on to properly answer the phone.

  Using the Distinctive Ring Pattern Detection feature, your fax machine can 'learn' the ring pattern you designate to be answered by the FAX machine. Unless you change it, this ringing pattern will continue to be recognized and answered as a FAX call, and all other ringing patterns will be forwarded to the extension telephone or answering machine plugged into the EXT.LINE jack.

  You can easily suspend or change Distinctive Ring Pattern Detection at any time.

  Before using the Distinctive Ring Pattern Detection option, Distinctive Ring service must be installed on your telephone line by the telephone company.To setup Distinctive Ring Pattern

Detection, you will need another telephone line at your location, or someone available to dial your FAX number from outside.

Press 1 to turn this feature on.

Press 2 to turn this feature off

Press 3 to setup the Distinctive Ring Pattern Detection. The LCD displays 'WAITING RING'. Call your fax number from another telephone. It is not necessary to place the call from a fax machine. When your machine begins to ring, do not answer the call. The machine requires several rings to learn the pattern.

When the machine completes 'learning', the LCD displays 'END DRPD SETUP'.

With the DRPD feature active, 'DRPD' appears in the display and the previously set reception mode is ignored. If you turn DRPD off, the machine returns to any previously set reception mode.

Notes:
- DRPD must be set up again if you re-assign your fax number, or connect the machine to another telephone line.

- After DRPD has been set up, call your fax number again to verify that the machine answers with a fax tone, then have a call placed to a different number assigned to that same line to be sure the call is forwarded to the extension telephone or answering machine plugged into the EXT.LINE jack.

- Send from Memory-If you are annoyed that you have to wait until documents in the feeder are sent out when you try to send or reserve another fax, turn this feature on. This feature enables all transmission documents are automatically scanned into memory before transmission.

  Press 1 to turn this feature on.

  Press 2 to turn this feature off.

3-8-3 Confiming System Data Settings

Confirm the system data settings by printing out a system data list.

- Local ID-This feature allows the machine to automatically print the page number, and the date and time of the reception at the bottom of each page of a received document.

  Press 1 to turn this feature on.

  Press 2 to turn this feature off

- Priority Term (Msys 5150/5200, SF-5800P) -When you want to print a PC document while the machine prints a received fax on the recording paper, you can interrupt the printing and print the PC document. Press the PRINT PRIORITY button to enable the feature. The LCD displays 'PP' on the lower line, right corner. The interrupted fax data will be stored in memory.To disable, press the PRINT PRIORITY button again. 'PP' on the LCD disappears.

  You can set your machine to turn the feature off automatically if there is no further data printed within 30 minutes or 8 hours after PC printing.

  Press 1 to select 8 hours. The machine turns off automatically 8 hours after PC printing is completed.

  Press 2 to select 30 minutes. The machine turns off automacally 30 minutes after PC Printing is completed.

- Dial Mode (SF-5800/5800P Tech mode) -Select the type of dial system your fax machine is connected to.

  Press 1 if the fax machine is connected to a tone (Touch Tone) dial line.

  Press 2 if the fax machine is connected to a pulse (Rotary) dial line.

1. If not in the tech mode, press **Menu**,**#**,**1**,**9**,**3**,**4** in sequence to initiate the tech mode.

2. Press **Menu**.

3. Press one of the one-touch PRINT keys. The LCD displays the lists you can print out.

4. Press „ or   until you find 'SYSTEM DATA LIST'.

5. Press **Enter**. The machine prints the system data list.

   The system data list printed in the tech mode contains the system data set in the tech mode as well as in the user mode. The model number and software version will be printed at the bottom of the system data list

3-8-4 System Data Settings in Tech-mode

Various technical features of fax machine are provided with optional parameters. Set the features to the user's need according to the following procedure.

1. If not in the tech mode, press **Menu**,**#**,**1**,**9**,**3**,**4** in sequence to initiate the tech mode.

2. Press **Menu**, and press '**System Data**' on the one-touch keypad.

   The LCD displays 'TECH MODE SYSTEM D ATA?'.

3. To set the system data available in tech mode, press **Enter**.

   If you want to set the system data available in the user mode, press **Stop**. The LCD displays 'USER MODE SYSTEM DATA?'. Press **Enter** to set the system data available in the user mode.

4. The LCD displays the options you can choose. In tech mode, the LCD displays the technician-selectable options as well as all the user-selectable options.

5. Scroll to the options by pressing „ or repeatedly.

6. When the option you want appears in the display, enter the number for the desired status. You can use ‹ or ¤ button and press **Enter** to select the desired status.

   You can exit from setup mode at any time by pressing **Stop**. When you press **Stop**, the machine stores the options you've already changed and returns to Standby mode.

FEATURE	PARAMETER	FUNCTION
Modem Speed	14400/12000 9600/7200 4800/2400 bps	The maximum Tx speed can be limited to 14400, 12000, 9600, 7200, 4800 or 2400 bits per second. When the Tx speed is set to 14400, 12000 the Rx speed can be either V.33 or V.17 speed. When the Tx speed is set to 9600 or 7200, the Rx speed can be either V.29 or V.27ter speed. When the Tx speed is set to 4800 or 2400, the Rx speed can be any V.27ter speed.
Error Rate	5%, 10%	If the error rate exceeds the chosen rate, fall back occurs which will lower the baud rate automatically down to as low as 2400 baud until the error rate is less than the chosen rate.
Tx Level	-4 ~ -15 dBm	You can set the level of transmission signal. Typically, Tx level should be under -12 dBm. The level within the range of -4 dBm to -15 dBm is acceptable. Enter the desired value using the dial keypad.
Receive Sensitivity	High/Normal	High sensitivity is between -5 and -49 dBm. Normal sensitivity is -43 dBm.
Super Fine Scan to Memory	200/300 dpi	This feature allows the machine to scan documents in super fine resolution (200 x 400 dpi, 300 x 300 dpi). The other machine can receive super fine image. If the remote machine is not capable of receiving super fine data, your machine fails to send documents and displays 'INCOMPABLE ERROR'.
Silence Time	12sec/Unlimit	

3-9 LCD Display

3-9-1 During Communication

In user mode, the LCD shows the remote machine's TTI number, TX or RX communication type, (modem speed), and page number.

In service mode, the display shows the communication type, abbreviations for the CCITT Group 3 T.30 protocol as they occur, the protocol type (G3), baud rate in kbps, and line time.

3-9-2 If a Communication Problem Occurs:

In user mode, the display shows one of the following:
PAPER JAM, COMM.ERROR, LINE ERROR.

In service mode, the display shows all error messages available in user mode, as plus additional error messages available only in Service Mode.

Error messages shown in service mode only are as follows:

PRE-MESSAGE ERROR : problem occurred during phase B of session.
POST-MESSAGE ERROR : problem occurred during phase D of session.
MESSAGE ERROR : problem occurred during phase C of session.
LINE ERROR : machine cannot connect or has lost connection with the remote machine.

Additional messages, not shown above, will appear in the TX/RX journal printed in service mode.

Memo
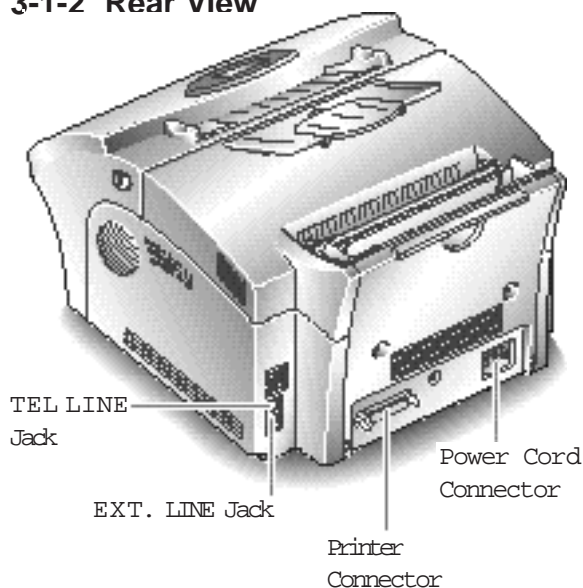
3. Setup and Installing

3-1 Control Locations and Functions

Take a moment to familiarize yourself with the main components and understand their functions.
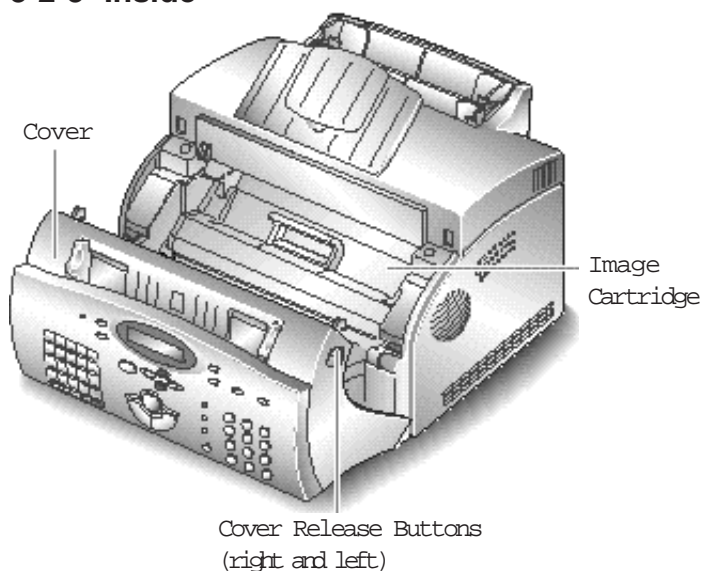
3-1-1 Front View

Paper Extension

Paper Guides

Automatic Paper Feeder

Document Tray

Manual Paper Feeder

Control Panel

Document Guides

Document Exit Tray

Note: Your machine may look slightly different than the illustration.

Print Exit Tray

3-1-2 Rear View

3-2-3 Inside

Cover

Image Cartridge

TEL LINE Jack

EXT. LINE Jack

Power Cord Connector

Printer Connector

Cover Release Buttons (right and left)
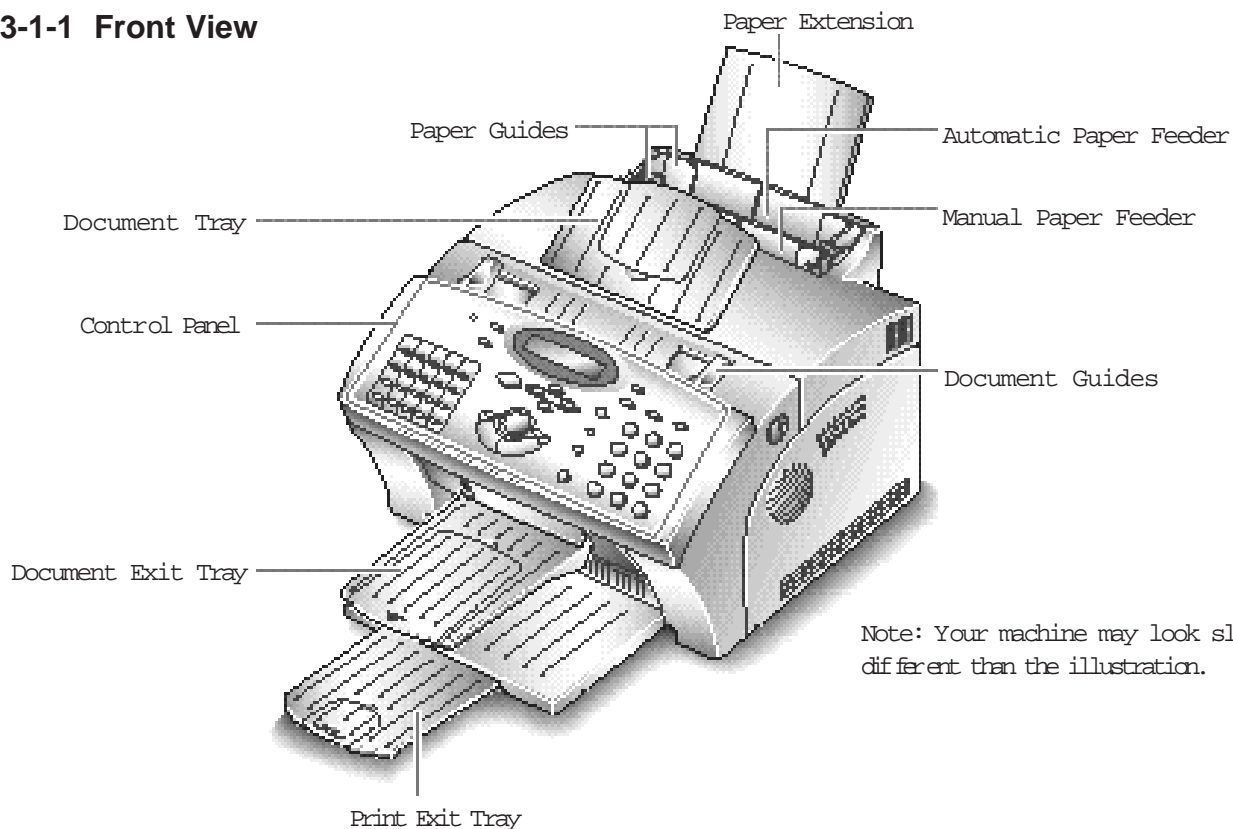
3-1-4 Using the Control Panel

Msys 5150/5200
SF-5800P

On/Off Line and Lamp
Turn your machine On-line or Off-line.
The lamp lights while the machine is
on-line, indicating the machine is ready
for printing a PC file.

Print Priority
Use to give print priority to PC file
while the machine prints
a received fax.

SF-5800

Power Save
The power saving menu item lets you
reduce power usage when the printer is
idle.

Reset
Restores user-selectable options to the
default value.

One-Touch Dial and
Special Function Buttons
Use to call most frequently used
numbers with one button. Also, use
these buttons with Menu button to set
up special functions or print lists.

LCD Display
The display shows the current status of your
machine and guides you through various tasks
using a menu system for each of operation.

SAMSUNG

On/Off Line

Print Priority

Multifunction LASER Fac

01	02		04	05
System Data	System ID	Date & Time	System Setup	Memory Clear
06	07	08	09	1
Delay TX	Memory TX	Priority TX		olling
11	12	13	14	15
Add/Cancel	Group Dial	Maintenance	Journal	elp List
16	7	18	19	20
TX Confirm	Schedul Job	Phone Book	em List	

Menu   Volume
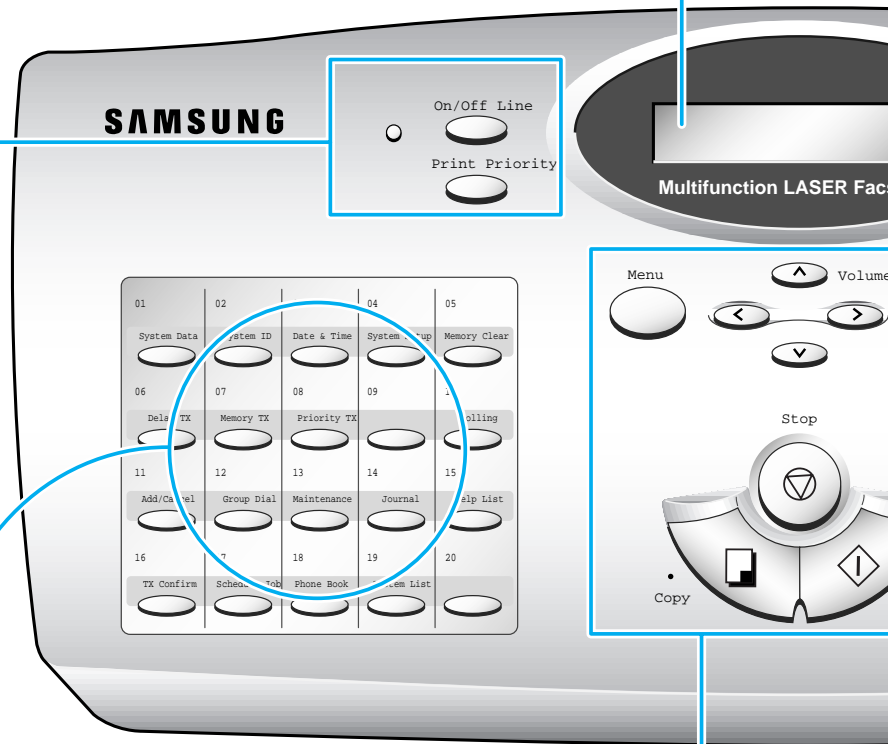
Stop

Copy

Up („) and Down ( )
Use to display the next or last menu item. Also,
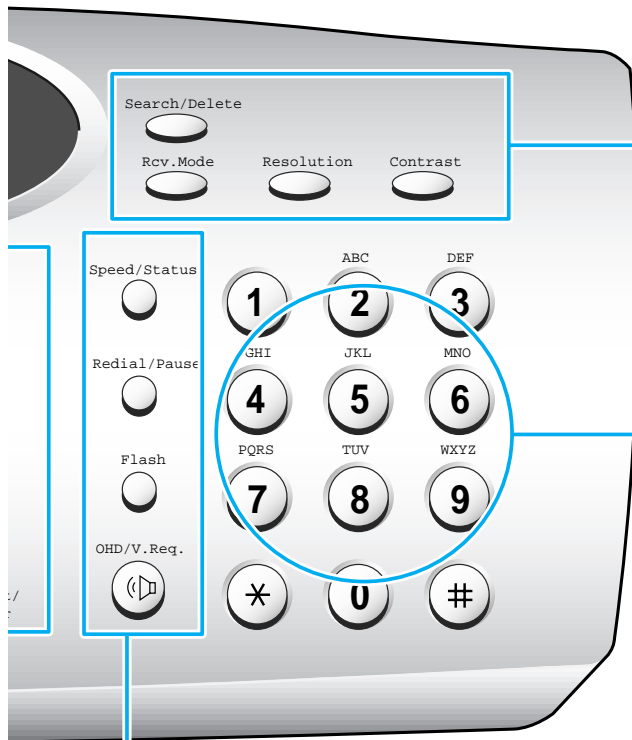use to adjust audible volume.

Menu
Use to choose special functions.

Left (^) and Right (¤)
Use to move cursor left or right
through the display.

Stop
Use to stop an operation at any time.

Copy
Use to copy a document.

Start/Enter
Use to start a job. Also use to activate the
selection shown in the display.

Search/Delete
Use to search for numbers in memory. Or use to delete
digits in the edit mode.

Rcv.Mode (Receive Mode)
Use to choose the receive mode you want to use.
The selected mode is displayed.

Resolution
Use to choose the resolution of copied or transmitted
documents.

Contrast
Use to choose the contrast of copied or transmitted
documents.

Number Keypad
Use to dial numbers manually or to enter letters.

Speed/Status
Use to dial calls and send fax documents by entering a 2-digit number.
Also use to switch the LCD while performing dual jobs.

Redial/Pause
Use to redial the last phone number called. You can also use it to add a pause when storing a number in
memory.

Flash (R/Recall)
Use to perform a switch-hook operation such as call waiting.

O H D (On-Hook Dial) / V .Req. (Voice Request)
Use to dial numbers without picking up the handset. Also use it
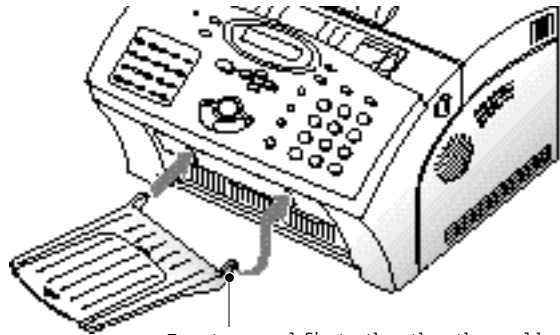to make a voice call after sending or receiving a fax.

3-2 Setting Up Your Machine

3-2-1 Document Tray

Insert two tabs on the tray into the slots as shown. Fold out the extender on the tray, if necessary.
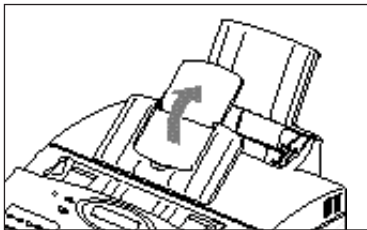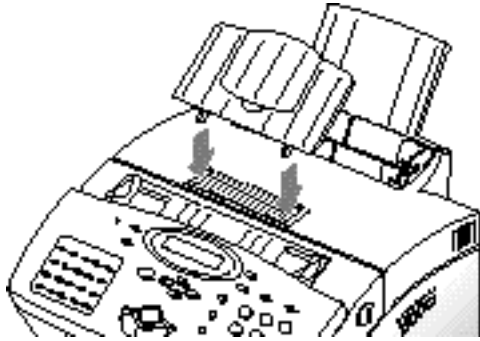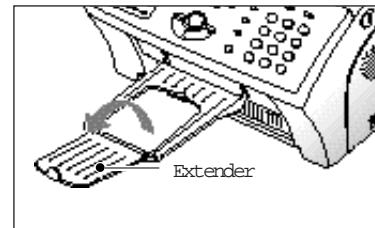
3-2-2 Document Exit Tray

Insert the two tabs on the document exit tray into the slots on the front of your machine. Fold out the extender, if necessary.

Insert one end first, then the other end by pulling this leg inward to make the tray easy to insert.

Extender

3-2-3 Handset and Handset Cradle

(only for SF-5800/5800P equipped with handset)

1. Plug one end of the coiled cord into the jack on the handset. Then plug the other end into the modular jack on the bottom of the handset cradle.

Note: If you want to remove the handset, pushing Ⓐ in the bottom, slide it down, then take it out.
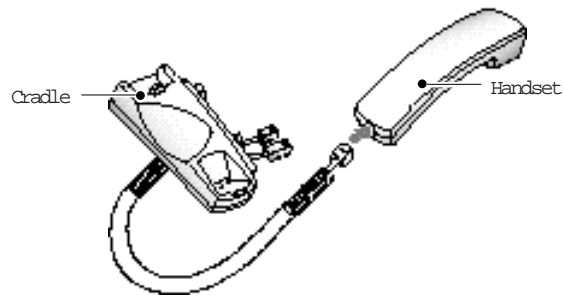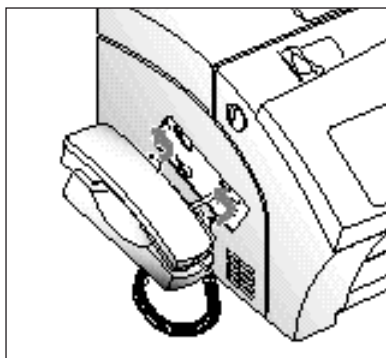
Cradle ——

Handset

2. Plug the cradle's modular cords into the modular jacks on the left side of your machine.
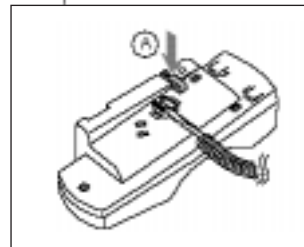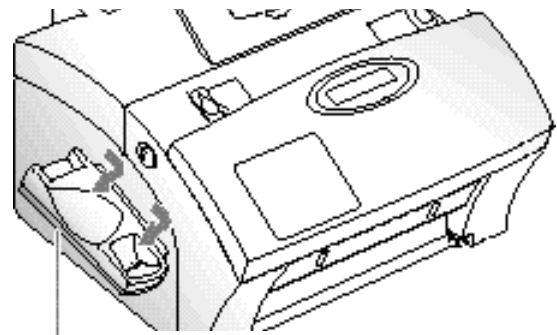
   Attach the handset cradle to the main body. Insert the three tabs of the cradle into the slots on the left side of the main body as shown, and push it up.

Black cord
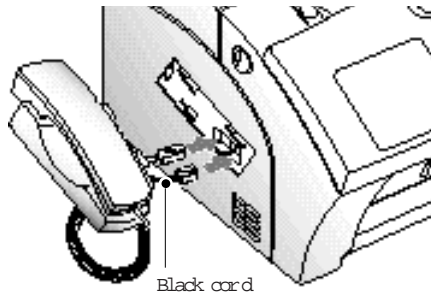
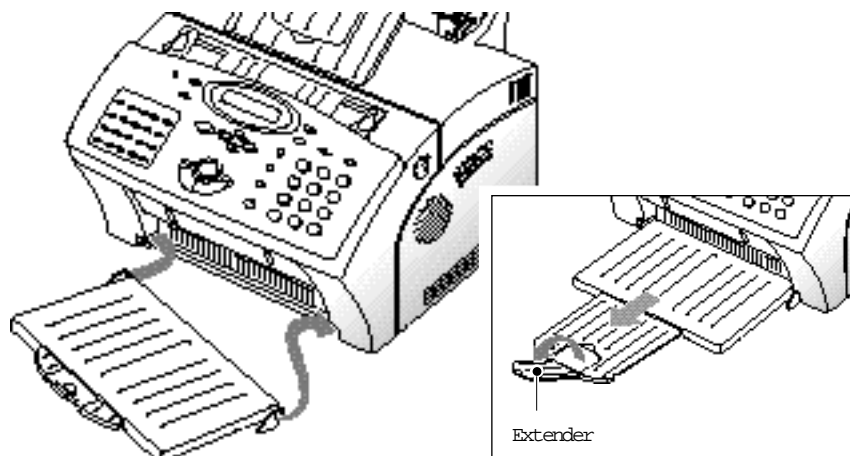Route the excess cord so that it could be inserted into the cradle.

3-2-4 Printer Exit Tray

Holding the flexible side end, insert two tabs on the side ends into the corresponding slots. Fold out the extender, if necessary.

Extender

3-2-5 Telephone Line

Plug one end of the telephone line cord into the TEL LINE jack and the other end into a standard phone wall jack.
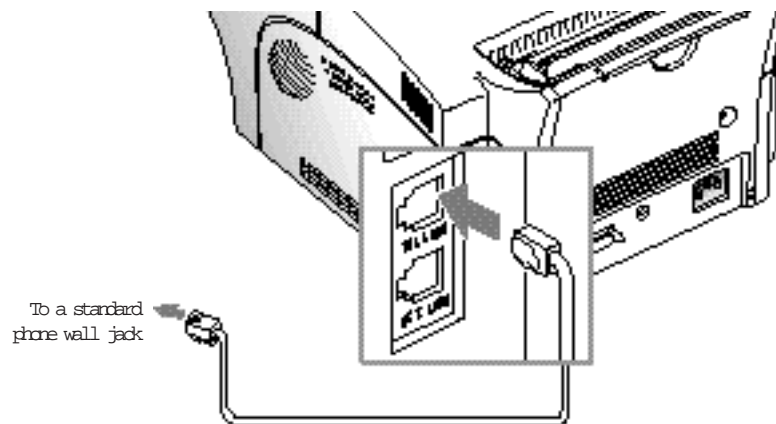
Extension Phone

If you want to use a regular phone or answering machine with your machine, connect the phone into the EXT.LINE jack.

Plug the cord of your extension phone or answering machine into the socket marked EXT.LINE on the back of the machine.

3-2-6 Printer Cable
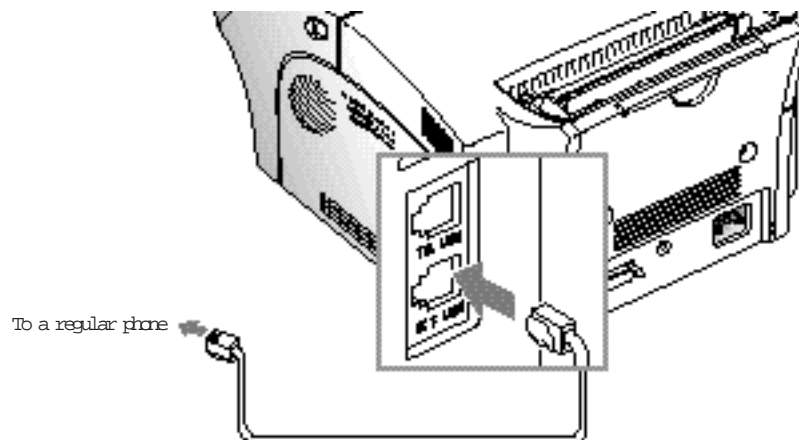
Your Msys 5150/5200, SF-5800P has a parallel interface port, which allows you to use it with IBM PCs and compatible computers. You have to purchase a Centronics parallel interface cable that supports bi-directional communications (IEEE standard 1284). Ask your dealer for assistance if you need help selecting the right cable.

To connect the printer to the computer, follow the steps below:

1. Make sure that both the Msys 5150/5200, SF-5800P and the computer are turned off

2. Plug the cable into the connector on the back of the printer. Push the metal clips down to fit inside the notches on the cable plug.
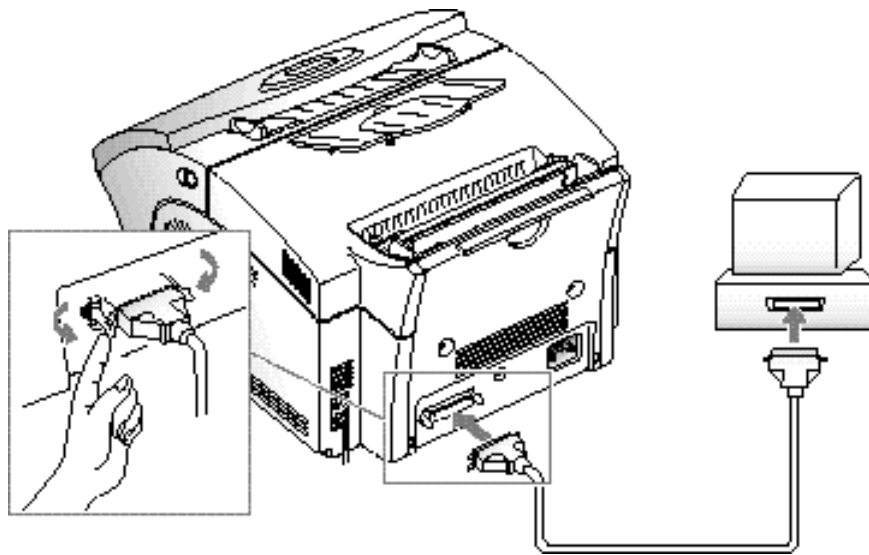
3. Connect the other end of the cable to the parallel interface port on your computer. See your computer documentation if you need help.

3-2-7 AC Power Cord

Plug one end of the cord into the back of the machine and the other end into a standard AC power outlet.

The machine turns on. If there is no cartridge installed, or no paper, the display shows 'DOOR OPEN or NO TONER!!!' or [NO PAPER].
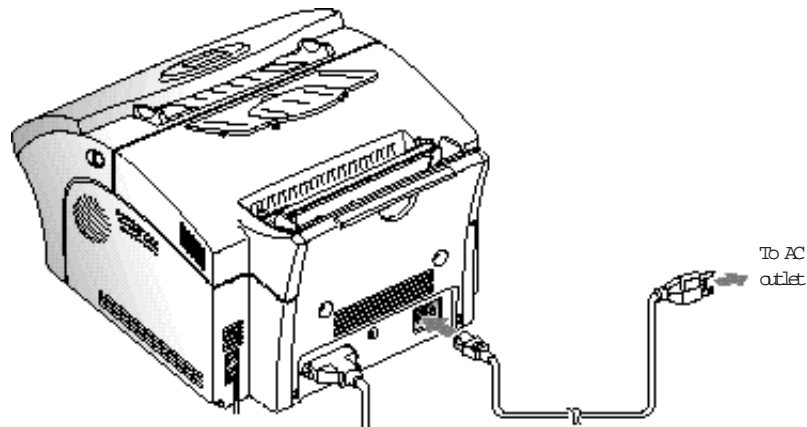
If you want to turn it off, unplug the power cord.

3-2-8 Installing the Image Cartridge

1. Pulling the cover release button toward you, open the cover.

3. Shake the cartridge from side to side 5 or 6 times to distribute the toner evenly inside the cartridge.
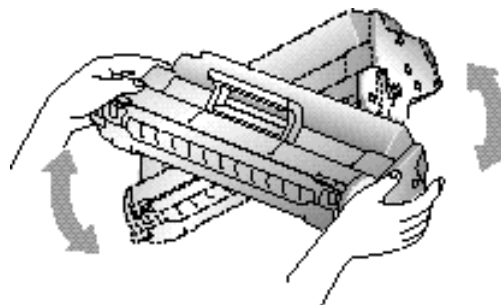
4. Find the cartridge slots inside the printer, one on each side.

2. Unpack the image cartridge, then carefully remove the sealing tape.
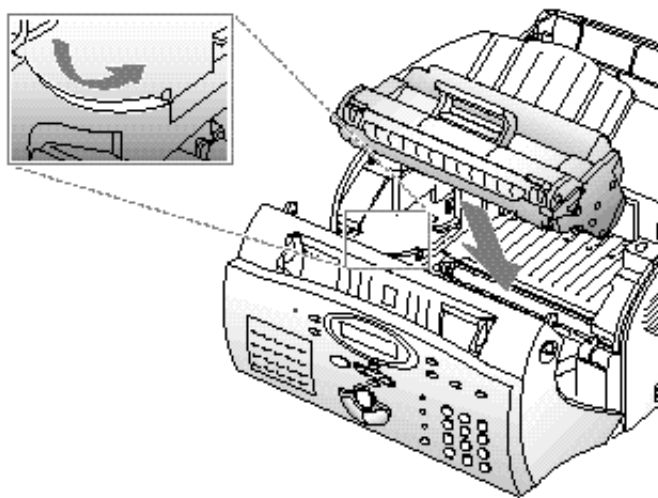
5. Grasp the handle and slide the cartridge down between the cartridge slots, until it drops into place.
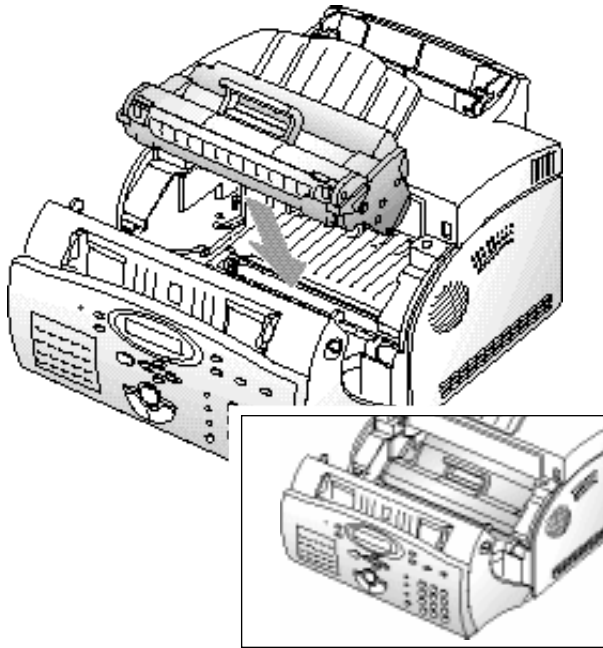
6. Close the cover. Make sure that the cover is securely closed.
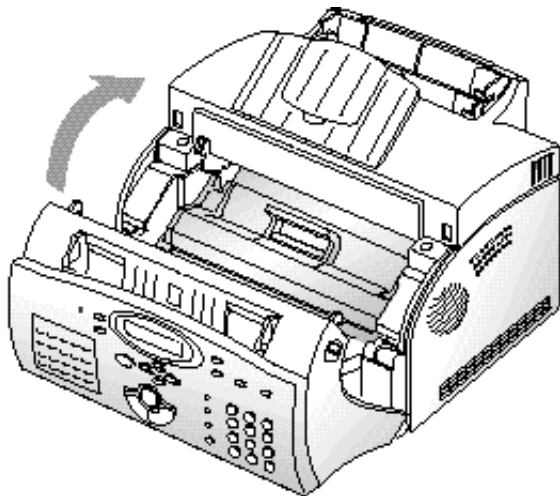
3-3 System Setup

In Tech mode (press Menu # 1 9 3 4), you can access the following setup menu function :

•Ringer Volume

•Default settings

•Sound control

•Remote Diagnosis Protection

•Select Language

•Econo Mode Setting

•Page Count Clear

•Flash Download

To access system setup menu function.

1. Press **Menu** in tech mode.

2. Press **System setup** on the one-touch keypad. The first setup menu 'RINGER VOLUME?' appears in the display.

3. Press „ or repeatedly to choose the desired setup menu.

4. When the desired setup item is displayed, use ^ or ¤ to select the desired status, and press **Enter**.

   To change the status, you can also press the number of the status in the display.

5. The display shows the next setup menu. If you return to Standby mode, press **Stop**.
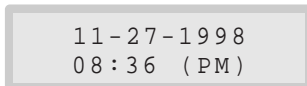
Function	Description	Value
Ringer Volume	You can adjust the volume of the ringer.	The display shows the loudness level with > symbol. The more, the louder.
Default Setting •Resolution •Contrast	The print resolution and contrast can be set to their most frequently used modes. Whenever a document is sent or copied, the home contrast and resolution mode will be activated unless otherwise changed by using Resolution or Contrast button on the control panel.	Home Resolution •STANDARD-use with most documents. •FINE-use for documents with fine detail, such as small print. •SUPER FINE-use for documents that have extremely fine detail. Home Contrast •NORMAL-use with documents of average or normal contrast. •DARKEN-use with documents with low contrast or light images. •LIGHTEN-use with documents with high contrast or dark images. •PHOTO-for obtaining maximum image quality with documents that contain pictures or photographs with shades of gray.
Sound Control •Alarm Sound •Key Sound	You can choose an alarm tone to sound when an error occurs (ALARM SOUND) or any key is pressed (KEY SOUND).	1: ON 2: OFF
Remote Diagnosis Protection	Remote diagnosis feature allows your machine to be checked out by service company at a remote place through phone line. If you do not want to use the remote diagnosis feature and want to protect your machine from being open by an unauthorized person, you can enable this remote diagnosis protection feature.	1: ON 2: OFF
Select Language	You can select the LCD display language between English, German, etc.	1: English 2: German ⋮

Function	Description	Value
Econo Mode Setting	To get the most from your toner supply, set the Econo mode to On. If set to On, you can preserve the toner supply. The print quality may be reduced.	1: ON 2: OFF
Page Count clear	You can reset the page counter to zero (0). To reset the counter, passcode is required. Enter 1934.	
Flash Download	This function allows you to download newly updated ROM into the machine.	1: ON 2: OFF

3-4 Setting the Date and Time
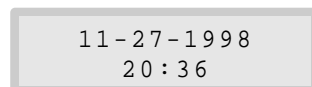
The current date and time are shown in the display when the machine is on and ready for use (Standby mode). The date and time are printed on all faxes you send.

1. Press **Menu**, then press **Date & Time** on the one-touch keypad.
   The display shows the currently set date and time.

   ```
   11-27-1998
   08:36 (PM)
   ```

   e.g. 12 HOURS format

   ```
   11-27-1998
   20:36
   ```

   e.g. 24 HOURS format

2. Enter the correct date and time using the number keypad.

DD (Day)	= 01~31
MM (Month)	= 01~12
YY (Year)	= four digits (1990~2089)
HH (Hour)	= 00~23 (24 HOURS format)
	= 01~12 (12 HOURS format)
MM (Minute)	= 00~59
AM (Ante Meridiem)	
PM (Post Meridiem)	

3. Press **Enter** when the date and time in the display is correct.

   If you enter an invalid number, the machine beeps and doesn't proceed to the next step. If this happens, just reenter the correct number.

   The display shows the date and time you have set, then returns to Standby mode.

3-5 Setting the System ID
(Your Number and Name)

The System ID will be printed at the top of each page sent from your machine.

1. Press **Menu**, then press **System ID** on the one-touch keypad. The display asks you to enter the telephone number.

   If there is a number previously registered, the number appears.

2. Enter the telephone number (up to 20 digits) which your machine is connected to. You can include the space using **Pause** button.

   If you make a mistake, press ^ or ¤ to move the cursor under the wrong digit, then enter the correct number to change or press **Delete** to delete the number.

3. Press **Enter** when the number in the display is correct. The display asks you to enter your ID name.

4. Enter your ID name (up to 20 characters).

   You can enter alphanumeric characters using the number keypad, and include special symbols such as + by pressing **0** repeatedly.

   If you want to enter the same letter or number in succession (e.g. SS, AA, 777), enter one digit, then move the cursor by pressing Right, and enter the next digit.

   If you want to insert a space in the name, you can also use ¤ button to move the cursor to skip the position.

5. Press **Enter** when the name in the display is correct.

3-6 Installing Software

3-6-1 Printer Driver

Before you can use any printer with your computer, you must install a printer driver. The printer driver tells the computer what kind of a printer you are using, and also controls the various settings, such as print quality and paper type. You define these settings within the printer driver, which then communicates the settings to both the computer and the printer.

To use the Msys 5150/5200, SF-5800P as your printer, you must install the printer driver supplied with your machine in your computer. After installing the printer driver, make sure the Msys 5150/5200, SF-5800P is selected as the default printer to use the machine as your printer.

3-6-2 System Requirement

Before you start, make sure that you have the following minimum computer setup:

• IBM or compatible, with 486SX 33MHz or higher processor

• Free disk space of at least 4MB

• 8MB or higher RAM for Windows 3.1x, or 16MB for Windows 95 and Windows 98.

• Windows 3.1x, Windows 95, Windows 98

3-6-3 Installation Procedure

Before you start, make sure your computer meets or exceeds the system requirement for the driver and application program you want to install.

IN WINDOWS 95

1. Make sure the Msys 5150/5200, SF-5800P is plugged in and connected to your computer. See page 3-8.

2. Start your Windows.

3. Insert the setup diskette #1 into the floppy disk drive A (or B).

4. From the **Start** menu, select **Run**.

5. Type **a:\setup** (or **b:\setup**), and click **OK**.
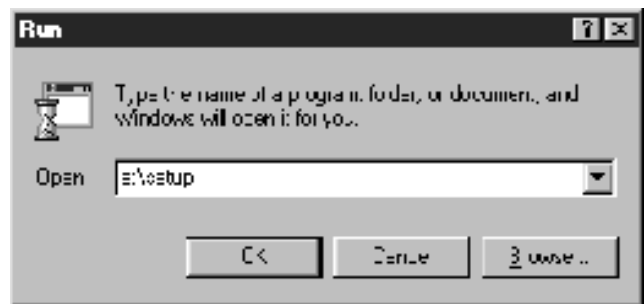
6. Follow the instructions on the screen. After installing, the Msys 5150/5200, SF-5800P is automatically selected as the default printer.

If you do not select this printer as the default printer when you install it, you must select it before attempting to print a document using your Msys 5150/5200, SF-5800P.

IN WINDOWS 3.1X

1. Make sure the Msys 5150/5200, SF-5800P is plugged in and connected to your computer.

2. Start your Windows.

3. Insert the setup disk 1 into your floppy drive A (or B).

4. From the **Program Manager**, select **Run** from the **File** menu. The Run dialog box appears.
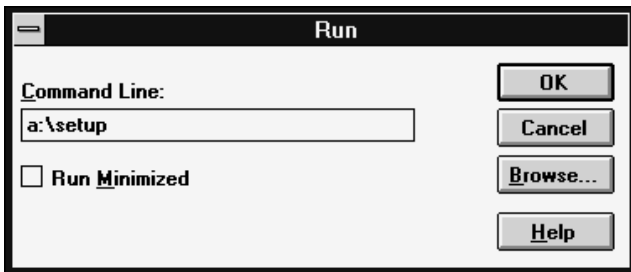
5. In the command line, type **a:\setup** (or **b:\setup**) and then click **OK**.

6. Follow the instructions on the screen. After installing, the Msys 5150/5200, SF-5800P is automatically selected as the default printer.

   If you do not select this printer as the default printer when you install it, you must select it before attempting to print a document using your Msys 5150/5200, SF-5800P.

IN WINDOWS 98

1. Make sure the Msys 5150/5200, SF-5800P is plugged in and connected to your computer.

2. Start your Windows.

3. If Update Device Driver Wizard box is displayed, insert the setup diskette 1 into your floppy drive A (or B), and then click **Next**.

When you get the screen looking like this, click **Other Locations**.

4. In the command line, type **a:\setup** (or **b:\setup**) and then click **OK**.

5. Follow the instructions on the screen. After installing, the Msys 5150/5200, SF-5800P is automatically selected as the default printer.

   If you do not select this printer as the default printer when you install it, you must select it before attempting to print a document using your Msys 5150/5200, SF-5800P.

3-6-4 Uninstalling

Uninstall is only required if you are upgrading from an older software, or updating the software, or if your installation fails.

IN WINDOWS 95/98

1. Start Windows if not already started.

2. From the **Start** menu, select **Programs**.

3. Choose **Msys 5150/5200** or **SF-5800P**.

4. Choose **Uninstall**. The Uninstall dialog box appears. Follow the instructions on the screen to complete uninstallation.

IN WINDOWS 3.1X

1. Start Windows if not already started.

2. From the **Program Manager**, double click the **Msys 5150/5200** or **SF-5800P** icon.

3. Double click the **Uninstall** icon. The Uninstall dialog box appears.

4. Follow the instructions on the screen to complete uninstallation.

3-7 Memory Clear

3-7-1 Memory Clear in User Mode

In the user mode, you can selectively clear information stored in this machine's memory. The list of data you can clear is as follows:

1. SYSTEM ID : your terminal ID number and name are erased from the machine's memory.
2. SYSTEM DATA : restores user-selectable options to the default value.
3. PHONEBK/DELAY : clears the One-Touch, Speed Dial, or Group Dial numbers stored in memory. In addition, all the delayed time operations you have reserved are also canceled.
4. TX-RX JOURNAL : clears all records of transmissions & receptions.

1. If the machine is in the tech mode, return to the user mode by pressing **Menu**,**#**,**1**,**9**,**3**,**4** in sequence.

2. Press **Menu**, and '**Memory Clear**' on the one-touch keypad.

   The LCD displays the type of memory you can choose.

3. Scroll to the options by pressing „ or until you find the one you want to clear. When the cursor blinks under the memory you want to clear, press **Enter**.

   Otherwise, you can enter the number of the memory.

4. The LCD prompts you to confirm your selection. Press **1** to choose 'YES'.

3-7-2 Memory Clear in Tech Mode

Memory clear, contained in the tech mode, is used for clearing all the user's data in memory and setting to default status.

1. If not in the tech mode, Press **Menu**,**#**,**1**,**9**,**3**,**4** in sequence to initiate the tech mode.

2. Press **Menu**, and '**Memory Clear**' on the one-touch keypad.

   Depending on country, you may be asked to select the country before clearing memory. Select the country when the display prompts to.

   Then, the LCD displays 'MEMORY ALL CLEAR' on the one-touch keypad.

3. Press **1** to clear all memory.

   If you want to cancel, press **2**. The machine returns to Standby Mode.

4. Theory of Operation

4-1 Engine Configuration

4-1-1 Video Controller Board

Video Controller Board receives image data from the host computer and converts them to a bitmap(binary) image, which is sent to the Engine(Controller) Board.

4-1-2 Engine Controller Board

Engine Board receives the video data from the Controller Board, and then that sends current image to LSU and controls the electrophotography process for printing.

4-1-3 HVPS Board

HVPS board generates THV/MHV/BIAS high voltages, apply it to Developer unit. And LSU, Cover Open Sensor interface signals connect via this board from Engine Control Board to each units.

4-1-4 Joint Board

Joint Board Contains Main Motor and Clutch and Pre-Transfer Lamp driving circuit, New Developer and Paper Empty, Paper Exit Sensing circuit, and connects with Engine Controller Board.

4-1-5 Developer Cartridge

Developer (Cartridge) creates the image via the electrophotography process. The Charge Roller, OPC Drum, Developer Roller, Supply Roller and Toner constitute a single unit.

4-1-6 LSU(Laser Scanner Unit)

Under control of the Engine, controls the laser beam and the OPC Drum exposure and rotation. The OPC Drum is synchronized and rotating with the same speed as the paper. When laser beam reaches the position of the Scanning Mirror, it creates a line. Synchronization Signal(HSYNC), which is sent to the Engine Board which transfers image data to LSU and synchronizes the vertical scanning line with the printed page.

4-1-7 Transfer

It constitutes the PTL(Pre-transfer Lamp) and the Transfer Roller. The PTL exposes the light to the OPC drum and lowers the OPC drum surface potential, and transfer efficiency become higher. The Transfer Roller transfers Toner on the OPC Drum to the paper.

4-1-8 Fuser

It constitutes the Heat Lamp, Heat Roller, Pressure Roller and Thermistor, thermostat, and causes the Toner to adhere to the paper.

ORION Paper Path

PAPER

DOCUMENT
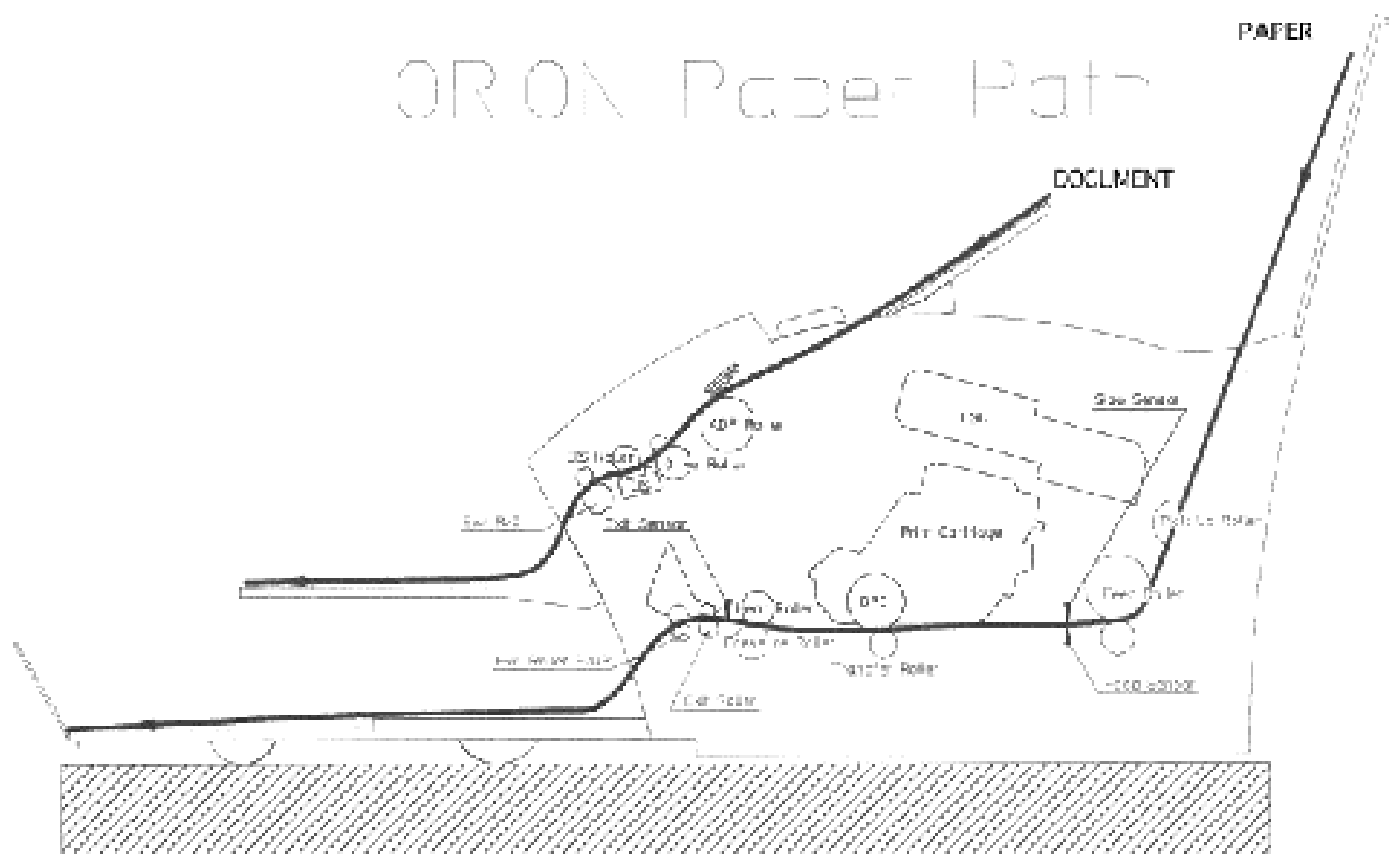
4-2 Development Processing

4-2-1 Charging
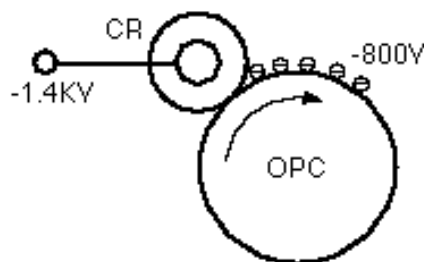
A negative voltage is applied to the surface of the OPC Drum. This is the first step   in creating an electrophotograph. The high voltage section of the Engine Board supplies (-)1.4KV to the Charge Roller and transfers a charge of approximately (-)800 V to the OPC Drum.

4-2-2 Exposure
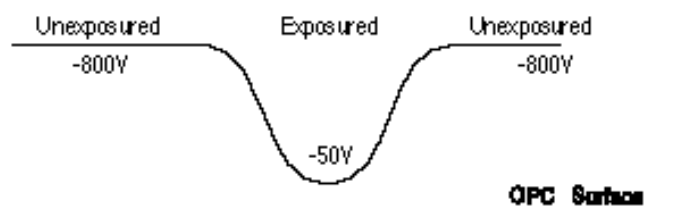
LSU receives the transferred bitmap image data from the Engine Board and turns the LSU's laser diode on and off, exposing the OPC Drum. If there is no data to print the Laser Diode remains off and the OPC Drum is not exposed. Portions of the OPC Drum exposed charged to approximately (-)50V by the laser beam while unexposed portions charge to (-)800V. The image formed by the exposed laser beam is invisible, and is called a latent image.

4-2-3 Development
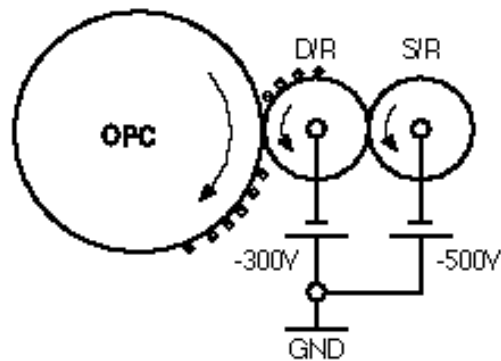
Surface moves between the DEV Roller and the OPC Drum. Negatively charged Toner is attracted to the high voltage(-50V) of the exposed portions of the OPC Drum and is exposed more easily than the more negative (-800V) surface voltage of   unexposed areas of the OPC Drum, resulting in a latent image.

4-2-4 Transfer
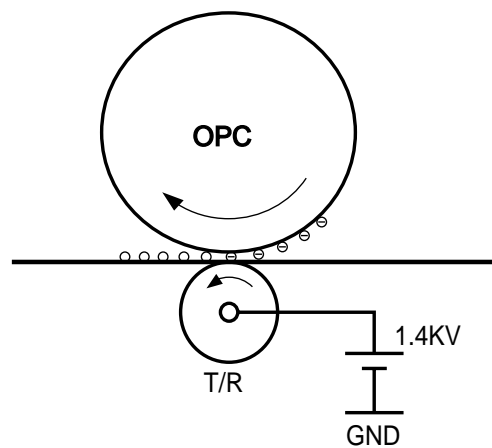
Toner moves from the surface of the OPC Drum to the paper via the Transfer Roller. Toner on the surface of the OPC DRUM will be attracted by the Transfer Roller, which is charged to approximately + 1.5 kV (600 ~ 2800V), depending upon temperature, and humidity. Toner then moves from the OPC DRUM to the paper.

4-2-5 Fixing
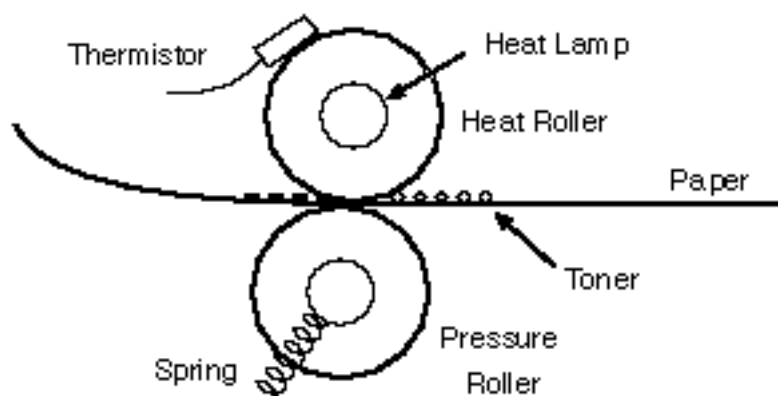
Toner image on the surface of the paper is in a low state electronically, so it can be scattered easily. By heating the paper to a high temperature(180°C) and applying pressure(4Kg), the Toner becomes permanently fixed to the paper, and this fixed image will remain forever. The Heat Roller transfers the heat of Lamp within the Roller to the paper. The effect of Teflon-coating is to prevent the melted toner from staying on it. The lower Roller is the Pressure Roller, and is made of silicon resin. Its surface is also Teflon-coated. The thermistor senses the temperature of the surface of the heat roller, and feeds back the information to maintain 180°C while printing, and 135°C during standby. The thermostat prevents the overheat as disconnecting the main power if the Heat lamp was overheated.

4-2-6 Exit

Printed paper passes through the Exit Sensor after the electrophotography process is completed. The paper also contacts an Actuator during printing out. This signal is transferred to the Engine Board and indicates paper position. The Actuator and Exit Sensor must report the correct position information, or a Paper Jam error will be indicated.

Memo

5-3 OPE PBA

5-3-1 SUMMARY

OPE Board is separated functionally from the main board and operated by the micom(Z8601) in the board. OPE and the main use UART (universal asynchronous receiver/transmitter) channel to exchange information. OPE reset can be controlled by the main. OPE micom controls key-scanning and LCD and LED display, detects documents and senses SCAN position. If there occurs an event in OPE (such as key touch and sensor level change), it sends specific codes to the main to respond to the situation and the main analyzes these codes and operates the system. For example, if the main is to display messages in OPE, the main transmits data through U A RT line to OPE according to the designated format and OPE displays this on LCD, LED. OPE's sensing is also transmitted to the main through UART line and then the main drives necessary operation.

5-3-2

OPE PBA consists of U1 (MICOM, Z8601), LCD, key matrix, LED indicators, SCAN position sensor and the document detect sensor. Refer to OPE Schematic Diagram and Wiring Diagram sections of this manual.

- Signals from the key matrix are delivered to U1X/Y input pin group (P1-x).
- U1 pin 4 (TX D ATA) is the UART code sent to MAIN PBA.

- Display from the controller is received at U1 pin 5 (RX DATA).
- LCD drive signals are sent from U1 P2-x pin group, P3-4~P3-6 pins.
- Machine status LED drive signals are sent from U1 P0-x pin group.
- Document detect sensor output is received at U1 pin 33 (P3-3).
- Scan position sensor output is received at U1 pin 43 (P3-1).
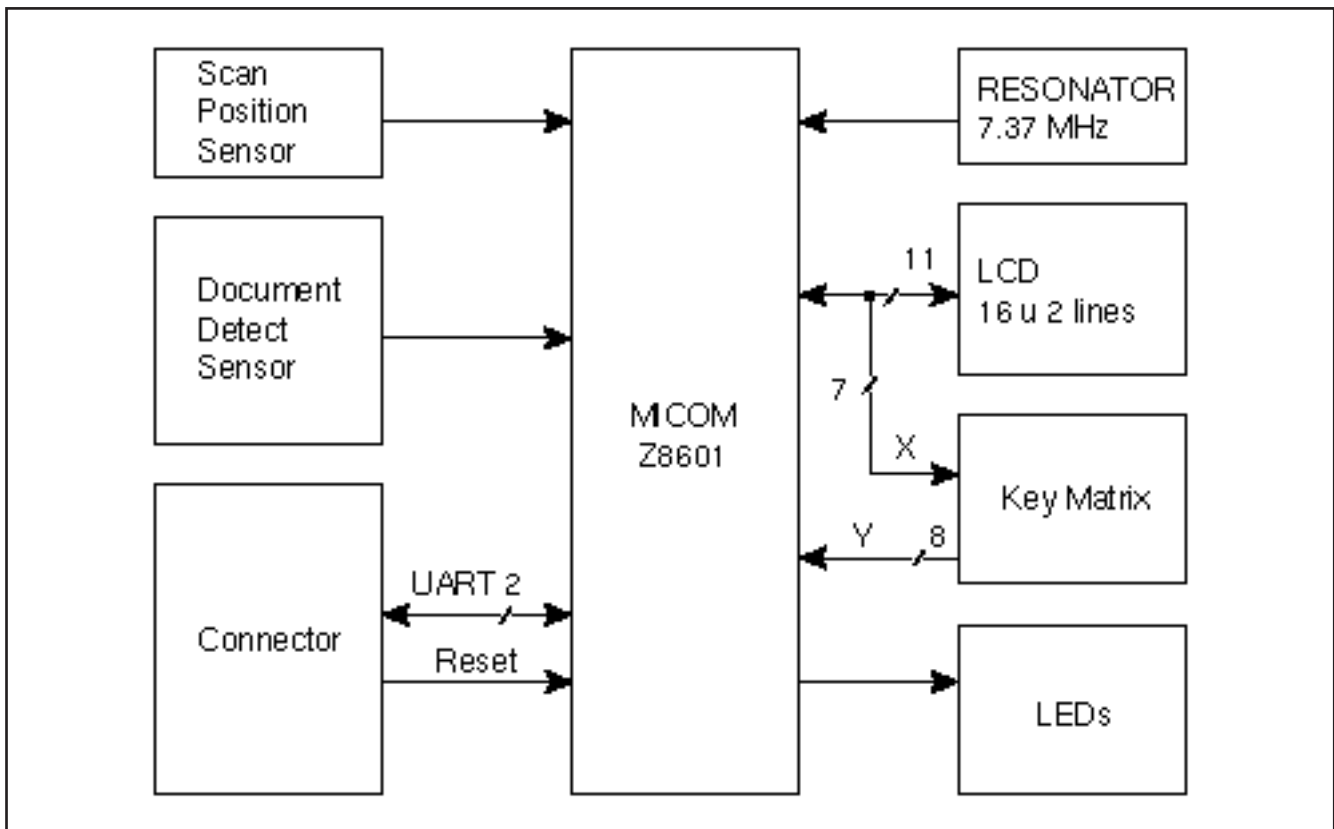
OPE BLOCK DIAGRAM

5-4 LIU PBA

5-4-1 Summary

LIU(Line Interface Unit) circuit added only to Msys 5200 ,Msys 5150, SF-5800, SF-5800P is controlled by the main circuit.
It monitors telephone line and helps interface between the system and the telephone line. It uses 1-LIU(STI9510) to control the whole LIU, MODEM/LINE INTERFACE, RING SIGNAL DETECTOR, DIALER, LINE CURRENT DETECTOR, and SERIAL INTERFACE.

5-4-2 Modem/Line Interface

This is the path through which transmitted and received data of modem is put in and out.
- CML1 Relay: It divides telephone line into external telephone and fax.
- U3-3 TIT(Transformer Input from Transformer): This single ended input receives image signals from modem through transformer T2 and transmits them on telephone line.
- U3-40 ROT(Receive Output Transformer): This output transformer receives signals on telephone line and delivers them to modem through transformer T1. It has AC impedance of 10Kohm or over.
- AC impedance: Normal operation range of U3(STI9510) is from 15mA to 100mA. DC characteristics depend on the voltage of U3-37 LI(Line Input) terminal and the voltage of resistance R48 between U3-37 LI(Line Input) terminal and U3-39 LS terminal.

5-4-3 Ring Signal Detector

- U3-28(MO) terminals are ring signal output terminals. Q4 and Q5 put out ring signals and drive Piezzo, but Msys 5200 ,Msys 5150, SF-5800, SF-5800P does not use Piezzo. It has only the functions related to ring detection such as driving the photocoupler of U4 and delivering ring signals to MFP controller of the main.

5-4-4 Dialer

5-4-4-1. MF DIAL

- Default mode it is set in DP.You can change it to MF mode by control of MFP controller.
- MF signal can be measured at (tone level of low group: typical - 14dBm) U3-4 MFO(DTMF Generator Output). The signal is adjustable by R40, R41 and C29. The adjusted signal enters U3-9 MFI (DTMF Amplifier Input) and is amplified to be transmitted on telephone line.
- U3-39 LS(Line Current Sense Input) terminals show the final signals transmitted to telephone line.

5-4-4-2. DP DIAL

- If U3-2(DMS) is made Vcc by R42, it is set at 33:67 D P signal. If it is made Vss by R43, it is set at DP signal. This product is set at DP signal.
- D P signal is made by U3-27(DPn) terminals. This signal turns on/off Q1. The signal made at that time turns on/off Q2, which interrupts DC current on telephone line and puts out pulse signal on telephone line.
- U3-35 CS terminals : It makes Make Resistance by shorting telephone line with Vss during Make period of DP dial.

5-4-5 Line Current Detector

- When CML1 relay connects telephone line, U3 (STI9510) of LIU board and MFP controller of the main board (U16) start communication through U A RT. U3 of LIU board sends signal that includes information of line current value, whenever it receives orders or data from U16 of the main board.

5-4-6 Serial Interface

- This part does serial communication with MFP controller of the main board (MAIN PBA:U16) that controls the whole system. It controls LIU by giving and taking all control orders and line status.
- U3-11 RxD : Schmitt Trigger input, Receiving terminal.
- U3-29 TxD : Open Drain output terminal
- Standard UART communication
  - Baud Rate : 9600bps
  - Start, Stop bit : 1bit each
  - Data bits : 8 bit
  - Parity bit : none

5-4-7 MAJOR FUNCTIONS OF PARTS

1) U3 : STI9510
   - Key part of LIU board. Speech Network, Dialer, Ringer and UART are built in one IC package.
2) U5 : PC817
   - Photo coupler. It enables UART of U3(STI9510) to receive control signal or dialing information from MFP controller of the main board (U15).
   - Insulation Detween primary and secondary circuit part.
3) U6 : PC817
   - Photo coupler. It enables UART(U3-29:TxD) of U3(STI9510) to deliver telephone line status or response signal about control signal or dialing information from LIU MFP controller of the main board (U15).
   - Insulation Detween primary and secondary circuit part.

4) U4 : PC817
   - It senses and delivers ring signal to the main board.
   - Insulation Detween primary and secondary circuit part.
5) U2 : PC814
   - It senses hook-off (Line connection) of the external telephone and delivers it to the main board.
   - Insulation Detween primary and secondary circuit part.
6) BD1 : BRIDGE DIODE
   - Regardless of the polarity of DC power from telephone line, the voltage put out on Pin.1 has always + polarity against pin Pin.2. So DC loop forms always in the same direction regardless of the polarity of the telephone line.
7) T2,T3 : TRANSFORMER
   - It delivers signals from the telephone line to modem or signals from modem to the telephone line.
   - Insulation Detween primary and secondary circuit part.

5-5 SMPS (Switching Mode Power Supply)

5-5-1 AC Input Stage

AC Input power path is the Fuse(F201) for A C current limit, the Varistor(TNR201) for by-passing high voltage surge, the discharge resistor(R201), the AC Impulse Noise Filtering Circuit(C201/L201/C202), the Common Mode Grounding Circuit(C203/C204), the 2'nd noise filter(L202), and the thermistor(TH201). When power is turned on, TH201 limits Power-On-Inlush-Current by it's high resistance, and when it's temperature rise, it's resistance become about zero ohm.

5-5-2 SMC (Switched Mode Control)

The AC input voltage is rectified and filtered by DB201 and C207 to create the DC high voltage applied to the primary winding of T201. T201 pin #1 is driven by the SMPS device TOP226(U201). U201 auto-starts and chops the DC voltage. The U201 is PWM SMPS IC and has internally a SMC(switched mode control) IC and a MOSFET output stage. The SMC IC has a Auto-restart without a Power Supply for the IC and a Thermal Shutdown function and so on. C208/R208/D202 clamp leading- edge voltage spikes caused by transformer leakage inductance. The power secondary winding(pin #11-12) is rectified and filtered by D252,C251,L251, and C255, C259 to create the 5V output voltage. The bias winding(pin #4-5) is rectified and filtered by D203 and C213 to create U201 bias voltage. The secondary output 5V is regulated through the path of the voltage divide by R253/R254 – U251 switching – PC252 – the bias voltage of U201 – U201 PWM duty cycle – T201 secondary voltage. C209 filters internal pin, determines the auto-restart frequency, and together with R251 and R210, compensates the control loop. Q251 of the secondary stage 24V is the Low Power-loss Regulator with built-in overcurrent protection function and overheat protection function, and consists a control IC and a drive transistor. It switches the input DC voltage and the switched DC voltage is filtered by C257. D204 and D205 clamp impulse noises.

5-5-3 Fuser Drive

Fuser is drived by the Triac(Q201) that AC input power is applied directly and the Photo-triac(PC251) that is controlled by Engine controller. The Thermistor resistance changes according to Heat Roller in Fuser, the voltage in temperature sensing circuit changes according to this resistance change, and this feedbacks to Engine Controller, it controls temperature by PID method.

5-6 Engine Controller

5-6-1 Power On Reset

The reset circuit initializes the CPU(U3) at power on and prevents unstable operation due to power fluctuations. It consists of LM393(U5) - voltage comparator-, and RC for reset timing.When a DC 3.8V or higher are applied to LM393's pin #3, the 'RESET' signal goes 'HIGH' and the CPU begins the initialization procedure, 'RESET' is active for approximately 122ms.

5-6-2 CPU(+5V)

The used CPU is a 8bit microprocessor, SAMSUNG KS88C4316(U3). This is operated at 6.944MHz and controls all ICs. The shape is a 64pin DIP type.

5-6-3 EPROM (+5V)

The EPROM, 27C256(U2), has the storage capability of 256KBits and the access time is 150ns. The EPROM stores the program data that controls the Engine part.

5-6-4 Address Latch

There contain Address and Data in CPU port[1.7:1.0] signals. This signals are applied to LS574(U4) and Addresses synchronize with "AS"(Address Strobe) and output to EPROM(U2).

5-6-5 Extended Output Ports

HC259(U12) is composed of 3-to-8 Decoder and Output Latch. Address x8000 to x8007 are mapped Output Port, the D0 value is latched ports. This outputs control the clutch, LSU, HVPS.

5-6-6 NVRAM Control

The NVRAM(U1) stores "Used Sheet Count" for SET and Developer unit. To control it, it is selected by "CS", and "DI"/"DO" synchronizes with "SK" clock writes in/reads out the serial data to/from the NVRAM.

5-6-7 Motor Driving(+24V)

The Motor Driver, SLA7029M(U207), is used to drive the Main Stepping Motor.An SLA7029M(U207) receives Motor Drive Enable and two phase signals from the CPU. It then generates a constant-current unipolar pulsed signal for Motor driving, applied to the Motor through R5(1Ω, 5%, 3W) and R6(1Ω, 5%, 3W).

5-6-8 Solenoid Clutch(+24V)

The Solenoid controls the paper Pick-up Clutch. The Solenoid receives control signal from U12 Q0. KSC1008-Y(Q4) is the driving transistor, and 1N4003(D1) protects KSC1008-Y(Q4) from the noise pulse generated by deenergizing the Solenoid

5-6-9 Fuser Control(+24V, AC Power)

The Fuser Temperature Control circuit reads the Heat Roller's Thermistor voltage at CPU port 5.0, and turns the Fuser unit on and off via CPU port 6.4 and KSC1008 (Q3). If CPU port 6.4 or LM393(U5) pin #7 are 'LOW', KSC1008 is off and the Fuser Lamp is off. LM393's pin #5 is proportional to fixing unit's temperature. LM393 pin #6 is the 'OVERHEAT' signal. If LM393 pin #5 is less than its pin #6, its pin #7 output is 'LOW', keeping the fixing unit off. The 'Fuser on' signal of Q3 turns the Triac through the Photo LED on inside the Photo Coupler(PC251). And PC151 trigger input signal supplies into the Triac Thyristor(Q201), then the Fuser's Heat Lamp turns on.

5-6-10 Cover Open Sensing(+24V)

"Cover Open Sensor" is placed on the left top of Printer. If the front cover is open or Developer unit is placed in, the Printer does not operate.

5-6-11 Paper Sensing(+5V)

There are three Sensors for the paper in the Printer:

1) Paper Empty Sensing

   It is placed in Paper Cassette, and senses if there are papers in Cassette.

2) Paper Feed Sensing

   It is placed before Transfer process, and senses if the paper is feeding. When the paper feeding is sensed by it, Printer image data is output to LSU.

3) Paper Check

   It is placed on the side of paper path. When narrow paper(width is more than ???mm) is feeding, the paper don't touch the actuator, and it is sensed the narrow paper. The Printer Engine check resistance of Transfer Roller and the feeding paper, if the feeding paper width is narro w, THV according to the resistance outputs higher voltage than wide paper.

4) Exit Sensing

   It is placed in the exit of Printer, and senses the paper exit.

5-6-12 LSU Control

LSU is composed of a polygon mirror motor and a laser gun part. The polygon mirror motor starts rotation by 'PMOTOR" signal and reaches the constant speed, "LREADY" signal outputs "High" from LSU. And when video image signal fro m Video Controller is applied to Laser Gun, it fire the laser beam. And the polygon mirror reflects and scans the beam horizontally. When the scanned laser beam reaches at the side of LSU, "HSYNC" outputs one pulse. Video controller synchronizes this signal, and outputs the left edge of image.

5-6-13 Toner Check

Toner sensor is placed in the rear of Developer unit to check the toner supply. During warming up and printing, the controller checks the output signal of toner sensor. If toner is sufficient, the output signal of toner sensor is High, and if not, the output signal is Low. When the output signal of toner sensor remains low for more than 5 seconds, controller judges. Toner is insufficient, and displays 'Toner low'. In toner low condition, the printer prints approximately 300 sheets. Then the controller displays 'Toner Empty'.

5-7 H.V.P.S. (High Voltage Power Supply)

5-7-1 Output Specifications

Item	Printing/Initial	DCU On
Supply Voltage	-500V	-500V
Bias Voltage	-300V	-300V
THV(Transfer High Voltage) (-)	-1KV	-1KV
THV(Transfer High Voltage) (+)		
MHV(Main High Voltage)	-1.4KV	-1.4KV

5-7-2 Transfer High Voltage(THV)

THV output is a series circuit of positive and negative voltage generation part. Negative output is for cleaning the OPC Drum and positive output is for drawing the Toner on the paper. High voltage is generated by DC-DC Converter that is composed of a PWM Control Circuit, a Blocking Oscillator and 4 times voltage rectifying circuit. the "THV-EA" goes to "low" positive and negative parts operate. And this state, THV positive output is controlled by "THV-PWM" duty cycle, when it goes to "High", positive part outputs 0V, and negative part only output -1000V. When some duty cycle is applied to the PWM input of H.V.circuit, THV terminal outputs positive voltage.

5-7-3 Main and Bias High Voltage(MHV,SUPPLY,DEV)

MHV generation part is composed of blocking oscillator and double voltage rectifying circuit. When "MHV-EA" signal goes to "High", the MHV outputs, and this state, when "SUPPLY-EA" or "DEV-EA" input goes to "Low", SUPPLY or DEV terminal corresponding it outputs the voltage that is generated by dropping MHV. DEV output voltage is selectable 300V or 350V.

5. Circuit Description

5-1 Main PBA

5-1-1 Summary

The main circuit that consists of CPU, MFP controller (built-in 32bit RISC processor core: ARM7TDMI) including various I/O device drivers, system memory, scanner, printer, motor driver, PC I/F, and FA X transceiver controls the whole system. The entire structure of the main circuit is as follows:
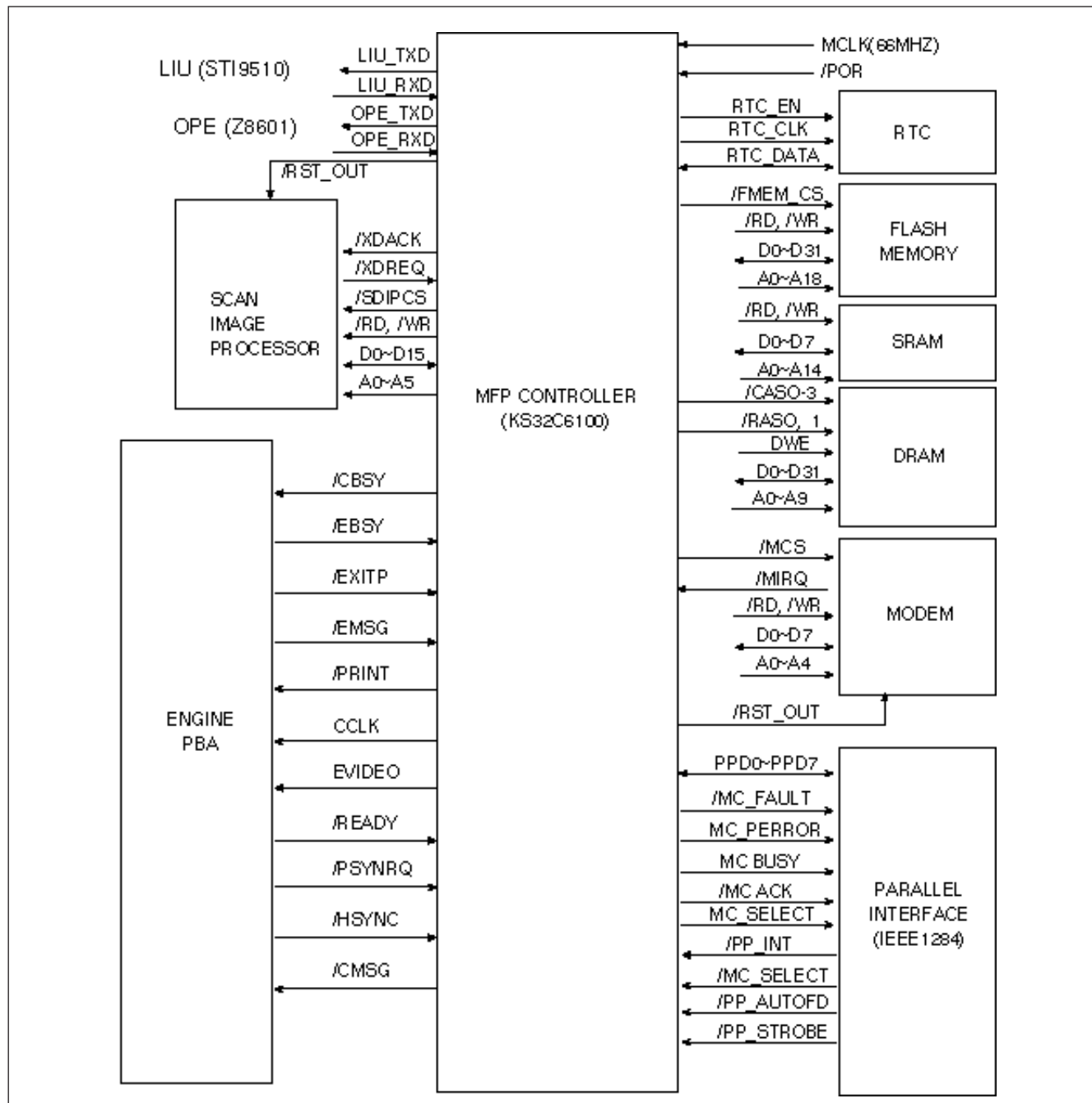
Fig.5-1. Entire Structure of Main Circuit for Each Key Signal

5-1-2 MFP Controller (KS32C6100 : U1)

SYSTEM CLOCK

The internal clock frequency is 33MHz 66MHz system clock (MCLK) supplied from the outside is used being divided inside.

DATA & ADDRESS BUS CONTROL

- /RD & /FMEM_WR, /WR
  /RD & /FMEM_WR signals are synchronized with MCLK(33MHz) and become LOW ACTIVE.
  These signals are strobe signals used to read and write data when each CHIP SELECT is connected with /RD and /WR pin of RAM, ROM, MODEM and the outside devices and becomes active.
  /WR is strobe signal used only write signal for SCAM image processor.

- CHIP SELECT (/SDIP_CS, /RCS0, /RCS2, /MCS, /SCS
- /SDIP_CS : SCAN MEMORY CHIP SELECT (LOW ACTIVE)
- /RCS0 : FLASH MEMORY CHIP SELECT (LOW ACTIVE)
- /RCS2 : MASK ROM CHIP SELECT (LOW ACTIVE)
- /MCS : MODEM CHIP SELECT (LOW ACTIVE)
- /SCS : SRAM CHIP SELECT (LOW ACTIVE)

- D0 – D31
  – 32bit data bus

- A0 – A23
  –ADDRESS BUS (A22 – A23 are reserved.)

SERIAL COMMUNICATION PART

UART (Universal Asynchronous Receiver/Transmitter) at KS32C6100 enables the main and LIU, main and OPE to transmit serial data. The block diagram of UART is as follows:
KS32C6100 has two UART channels. The baud rate is 9600bps.
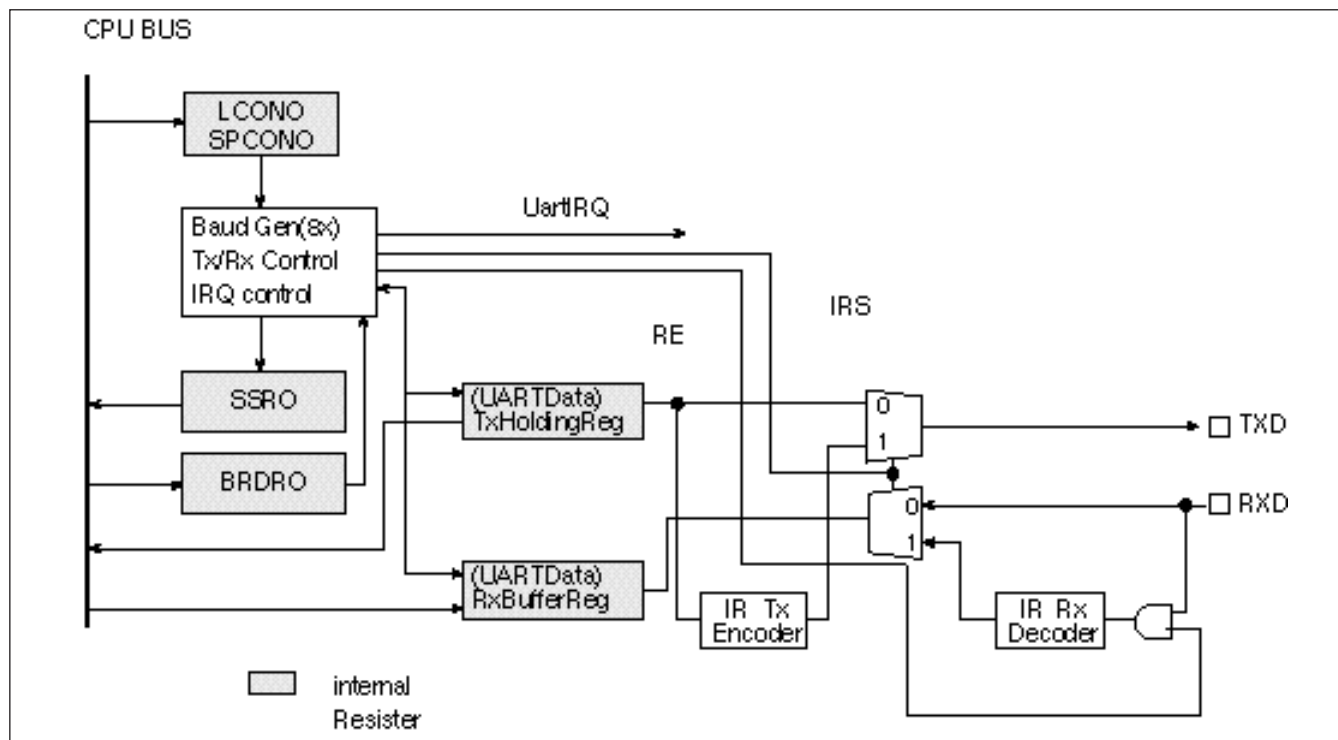
Fig.5-2. Uart Block Diagram

Fig.5-3. Uart Data Format

EXTERNAL DMA

It brings data from an external device (SCAN_IP:U31) through EXTDMA channel 1. When the DMA REQUEST is sent from an external device to KS32C6100, DMA ACKNOWLEDGE signal is activated and DMA channel 1 is driven to produce CHIP SELECT and READ STROBE (/RD) and data is brought from the external device. It generates the address, CHIP SELECT and WRITE STROBE (/WR) in order to move this data to destination memory, and then stores the data.

In other words, when the external DMA is requested by an external device, KS32C6100 drives internal DMA controller, DMA channel 1 is assigned to external channel, the data is sent from memory to memory or from external device to memory.

Following timing shows that when DMA REQUEST (/XDREQ) is generated, DMA ACKNOWLEDGE (/XDACK) is sent after 2 cycles and the 2 Word Data is read from external device, and is written into memory. After that if the DMA REQUEST is maintained continuously, DMA ACKNOWLEDGE signal is generated after 4 cycles and the same operation is repeated.

Following diagram shows one DMA cycle. The external device (SCAN_IP) using the DMA maintains continuously DMA request to be activated until second DMA is performed, so one request brings 2 Word.
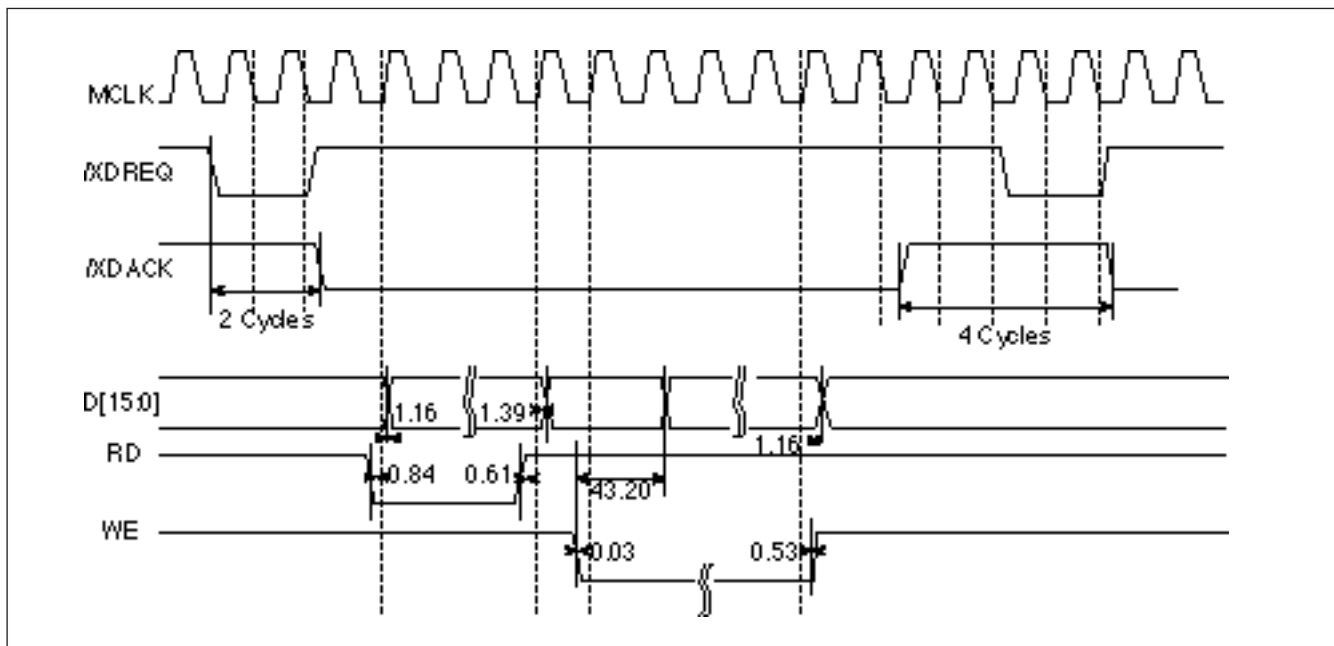
Fig.5-4. External DMA Timing Diagram

Circuit Description

DRAM CONTROLLER

As KS32C6100 has DRAM controller, DRAM can be
connected with external memory.
The control mode of DRAM controller can access
EARLY WRITE, NORMAL READ, PAGE MODE, and
BYTE/HALF, and supports EDO DRAM as well as
normal DRAM.
DRAM READ/WRITE signals use /DWE signal to
control system buses. It supports CAS BEFORE RAS
for DRAM REFRESH. Connected with common
/CAS(0-3), /RAS(1:0), it consists of 2 banks and each
may be connected with up to 2M - 8M halfword, the
default setting of this system is 8MB.
The field of DRAM is in figure 5-1 (Entire Structure of
Main Circuit for Each Key Signal), related timing
diagram is in figure 5-4.

RTC (REAL TIME CLOCK)

RTC circuit maintains current time information, and it
operates in both primary power mode and battery
back-up mode. As RTC does not in MFP controller,
RTC IC is needed separately. This circuit (RTC-4513)
receives clock source from an internal 32.768 kHz
crystal, and divides it into hours, minutes, seconds,
year, month, and day. RTC_EN, DATA and CLK
control the RTC IC. RTC_EN is CHIP SELECT signal,
D ATA is bidirectional signal and used to select mode,
write address, read/write data. CLK reads or output
data in rising edge.

PARALLEL PORT INTERFACE

KS32C6100 has parallel port interface enabling
parallel interface with PC. This part connected with
the computer through the centronics connector makes
possible parallel interface with the computer. It
generates control signal and consists of /ERROR, PE,
BUSY, /ACK, SLCT, /INIT, /SLCTIN, /AUTOFD,
and /STB.
Data is transmitted according to the standard of IEEE
P1284 (http://www.fapo.com/ieee 1284.html). The
controller supports compatibility mode which is the
traditional way to transmit print data, nibble mode
(4bit data) to upload data to the computer, and ECP
(Extended Capabilities Port: 8bit data transmission)
duplex high-speed transmission with the computer.
Compatibility mode, called as Centronics mode, is
protocol which used to transmit data from PC to
printer. ECP mode is protocol which supports rapid
bidirectional communication with input/output
device such as printer, scanner. ECP mode supports 2
cycles for bidirectional communication: Data cycle
and Command cycle. Command cycle is formed run-
length count and channel addressing. RLE (Run
Length Encoding) mode can compress data, and be
used to transmit raster image to printer or scanner.

This system uses RLE method for high-speed
transmission. It enables data to be printed, uploaded,
and downloaded. It also monitors system.
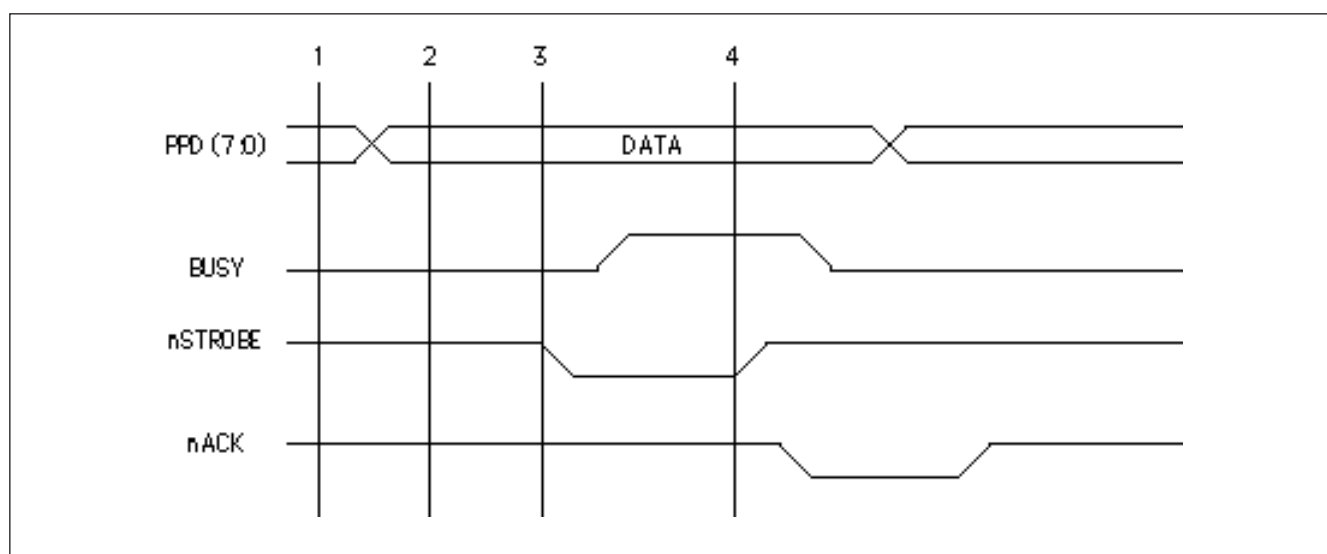
Fig.5-5 Compatibility Hardware handshaking Timing

1. Write the data to the data register.

2. Program reads the status register to check that the printer is not BUSY.

3. If not BUSY, then Write to the Control Register to assert the STROBE line.

4. Write to the Control register to de-assert the STROBE line.
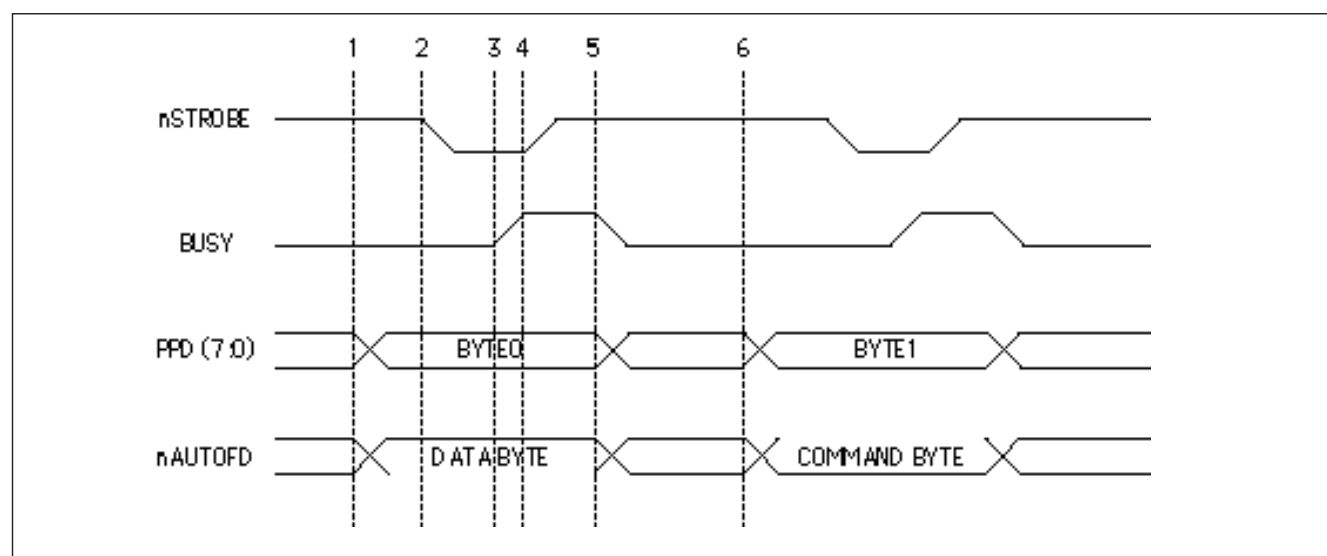
Fig.5-6 ECP Hardware Handshaking Timing (forward)

1. The host places data on the data lines and indicates a data cycle by setting nAUTOFD.

2. Host asserts nSTROBE low to indicate valid data.

3. Peripheral acknowledges host by setting BUSY high.

4. Host sets nSTROBE high. This is the edge that should be used to clock the data into the Peripheral.

5. Peripheral sets BUSY low to indicate that it is ready for the next byte.

6. The cycle repeats, but this time it is a command cycle because nAUTOFD is low.
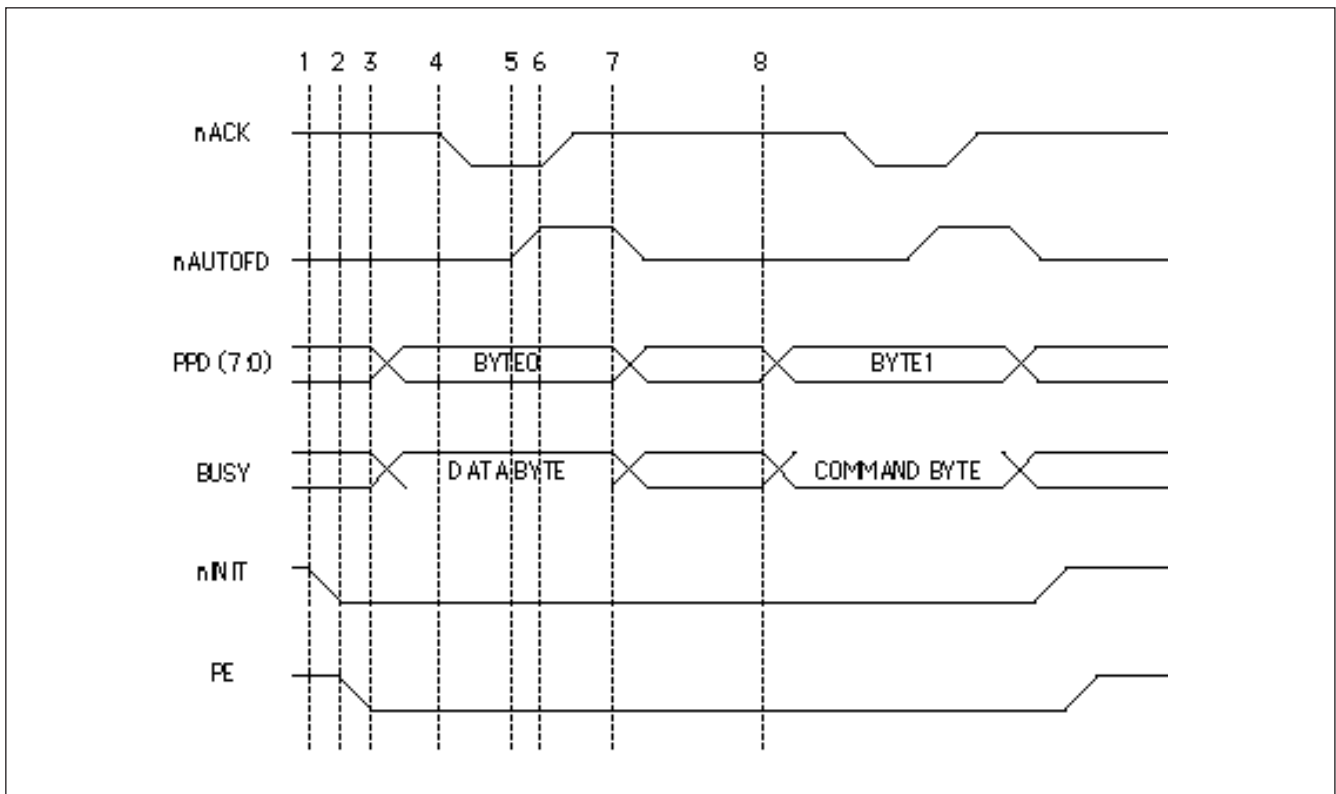
Fig.5-7 ECP Hardware Handshaking Timing (reverse)

1. The host request a reverse channel transfer by setting nINIT low.

2. The peripheral signals that it is OK to proceed by setting PE low.

3. The peripheral places data on the data lines and indicates a data cycle by setting BUSY high.

4. Peripheral asserts nACK low to indicate valid data.

5. Host acknowledges by setting nAUTOFD high.

6. Peripheral sets nACK high. This is the edge that should be used to clock the data into the host.

7. Host sets nAUTOFD low to indicate that it is ready for the next byte.

8. The cycle repeats, but this time it is a command cycle because BUSY is low.

ENGINE CONTROLLER

• Message Communication

The print interface uses CnPMSG and CnEMSG to transmit and receive 8-bit message, CnPBSY and CnEBSY to indicate the direction of data transfer and COMCLK to pace data transmissions. PIFC does not employ handshaking, but asserts CnPBSY and CnEBSY before the actual data transmission to provide sufficient time for the logic to prepare for the subsequent data.

COMCLK remains inactive until either CnPBSY or CnEBSY is asserted and then goes through eight periods for 8-bit data transmission or reception.

Three registers, TBR (Transmit Buffer Register), RBR (Receive Buffer Register), are used for message communication. The TBR and RBR contain the 8-bit command to be transmitted to the printer engine through the CnEMSG pin and the 8-bit engine message received for the printer engine through the Cnemsg pin, respectively. The CMOD contain a transmit enable bit (TX) to make CnPSBY signal active, a read-only status bit (RX) to indicate the Cnebsy signal status and 5-bit prescaler value used to generate COMCLK clock. In message reception, the RX bit is cleared when a low-to-high transition occurs on CnEBSY, and at the meantime an interrupt signal INT_BUSY is posted to indicate that one-byte engine message has been received by PIFC.

<Command Message Transfers from KS32C6100 to Printer Engine>

<Engine Message transfers from Engine to KS32C6100>
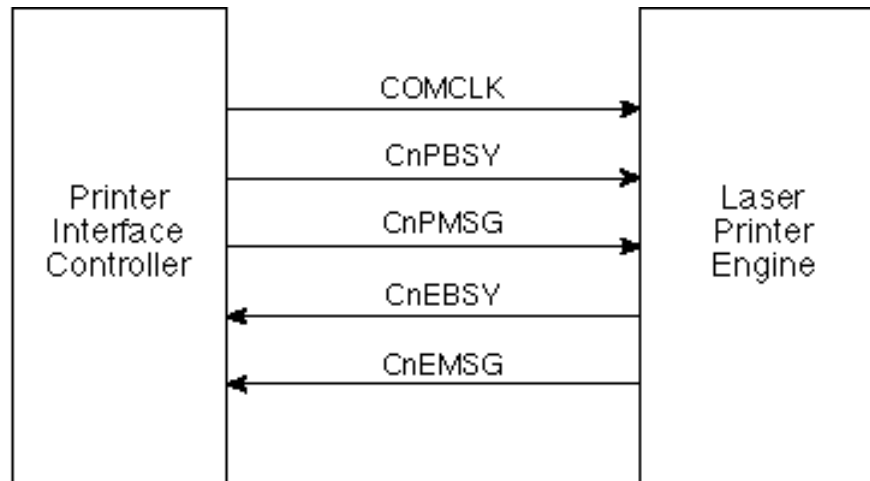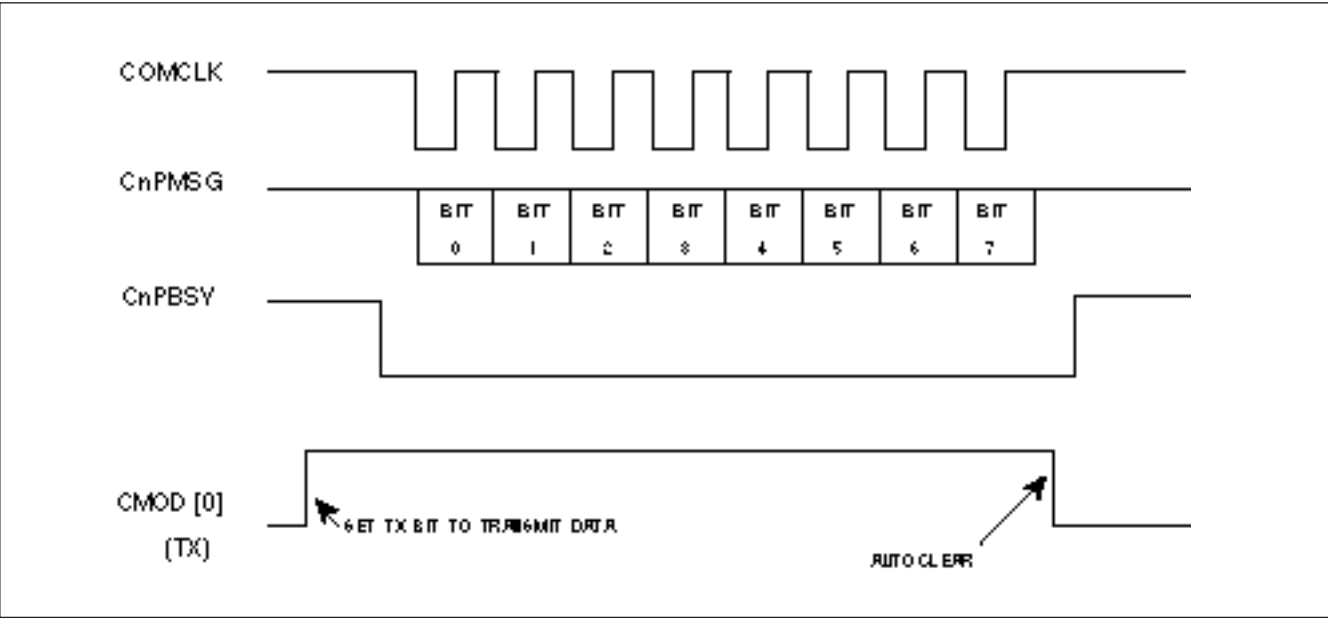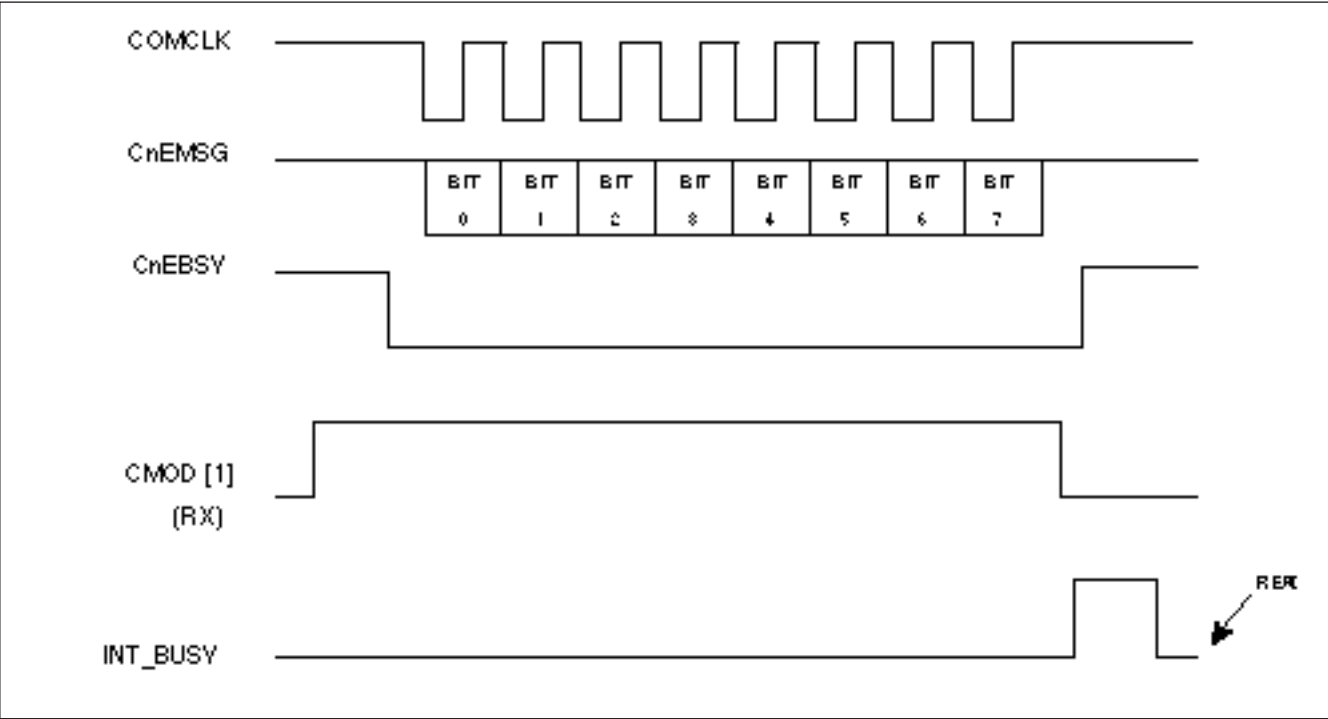
GENERAL PURPOSE I/O PORT OF KS32C6100

PIN NAME	CIRCUIT NAME	I/O	STATE	DESCRIPTION
GPI00/EXTDRQ0	/OPE_RST	O	L	Z8201 OPE MICOM RESET OUTPUT
GPI01/EXTDRQ1	/SDREQ	I	L	SDIP DMA REQUEST SIGNAL INPUT
GPI02/EXTDRQ2	RY/BY	O	H	SET FLASH MEMORY WRITE MODE
			L	SET FLASH MEMORY READ MODE
GPI03/EXTACK0	/RST_OUT	O	L	EXTERNAL I/O RESET OUTPUT
GPI04/EXTACK1	/SDACK	O	L	SDIP DMA ACKNOWLEDGE SIGNAL OUTPUT
GPI05/EXTACK2	RTC_CE	O	L	RTC-4513 CHIP SELECT OUTPUT
GPI06/EXTIREQ0	TX_INT	I	H	SDIP MOTOR INTERRUPT REQUEST INPUT
GPI07/EXTIREQ1	/MIRQ	I	L	MODEM INTERRUPT REQUEST INPUT
GPI08/EXTIACK0	RTC_CLK	O		RTC-4513 CLOCK OUTPUT
GPI09/EXTIACK1	RTC_DATA	I/O		RTC-4513 DATA INPUT/OUTPUT
GPI010/PPDOE	/WR_FLASH	O	L	FLASH MEMORY WRITE CONTROL SIGNAL OUTPUT
GPI011/nCPUPWR	TONER CNT	O	L	TONER SENSOR VCC CONTROL
GPI012/nENGPWR	/E-RST			UNUSED
GPI013/TECLK	/EXITP	O	L	
GPI014	/TONER_DET	I	L	TONER CHECK INPUT
GPI015/TIMEOUT0	KEYCLICK	O		KEY CLICK OUTPUT SIGNAL

SIGNAL DESCRIPTIONS

Table 1-1 KS32C6100 Signal Descriptions

SIGNAL	PIN No.	Type	Description
MCLK	206	I	External master clock input. It has a 50% duty cycle and an operating frequency up to 33MHz.
CLKSEL	201	I	Clock select. When CLKSEL is "1" (High level), MCLK is used as internal master clock directly. When CLKSEL is "0" (Low level), the external MCLK frequency is divided by two and then used as the internal master clock.
nRSTO	194	O	Reset signal output from watch dog timer.
nRESET	195	I	Not reset. nRESET is the global reset input for the KS32C6100. To reset system, nRESET must be held to Low level for at least 65 machine cycles.
nBK0HW	198	I	Bank 0 data bus width select. When nB0HW is "0", the bank 0 data bus is recognized as 16-bit wide. When nB0HW is "1", the bank 0 data bus is recognized as 32-bit wide.
TMODE	197	I	Test pin. For normal operation, this pin should be connected to GND.
TCK	208	I	TAP controller clock.
TMS	204	I	TAP controller mode select.
TDI	202	I	TAP controller data input.
TDO	203	O	TAP controller data output.
TnRST	196	I	TAP controller reset signal.
XA[23:0]/ ExtMA[23:0]	40~45 47~51 54~60 63~68	I/O	The 24-bit address data bus, XA[23:0], acts as an output when the ARM core or DMA is accessing the chip-select banks and covers the full 16M-word (32-bit) address range of each ROM and SRAM bank, and 64K-byte external I/O address range; or it acts as an input in external master mode and corresponds to ExtMA[23:0], the lower 24 bits out of 28-bit external master address bus ExtMA[27:0].
XD[31:0]	75~79 81~87 89~94 96~102 106~112	I/O	External bi-directional three-state 32-bit data bus. The KS32C6100 data bus supports external 8-bit, 16-bit, and 32-bit bus connection.
nRCS[3:0]	69 72~74	O	Not ROM chip select. The KS32C6100 can access up to four external ROM banks. nRCS0 corresponds to ROM bank 0, nRCS1 to bank 1, and so on.
nSCS	28	O	Not RSAM chip select. Selection to access external SRAM bank.
nECS[3:0]	29~32	O	Not external chip select. Four I/O banks are provided for memory-mapped external I/O operations, each of which contains up to 16K bytes. The four nECS signals are used to select the four I/O banks respectively.
nOE	37	O	Not data output enable for ROM/SRAM/External IO. Whenever a memory access for ROM/SRAM/External IO occurs, the nOE output controls the output enable port of the specific device.

Table 1-1 KS32C6100 Signal Descriptions (Cont.)

SIGNAL	PIN No.	Type	Description
nWE[3:0]/ ExtMnDB[3:0]	33~36	O	Not data write enable for SRAM/External IO. Whenever a memory access for SRAM/External IO occurs, the four nWE outputs indicate the byte selections and control the write enable port of the specific devices. In external bus master mode, it acts as ExtMnDB[3:0] to indicate the byte latch for external master accessing memory.
DA[12:0] / ExtMA[27:24] ExtMBST ExtMAS[1:0] ExtMRnW	128~133 135~141 128~131 138 139~140 141	I/O	DA[12:0] acts as an output for the 13-bit DRAM address bus. In external master mode, it acts as an input, in which ExtMA[27:24] corresponds to the higher 4 bits out of 28-bit external master address bus ExtMA[27:0]; ExtMBST is burst mode selection signal; ExtMRnW is R/W control signal; and ExtMAS[1:0] is memory access size control signal which is used to inform KS32C6100's memory controller that the external master will access memory in byte (00), halfword (10). Note the state (11) for ExtMAS [1:0] is not used.
nRAS[5:0]	122~127	O	Not row address strobes for DRAM banks. The KS32C6100 supports up to six DRAM banks. One nRAS output is provided for each bank.
nCAS[3:0]	116~118 121	O	Not column address strobes for DRAM. The four nCAS outputs indicate the byte selections whenever a DRAM bank is accessed.
nDOE	115	O	Not output enable for DRAM. Whenever a DRAM access occurs, the nOE output controls the output enable port of the specific DRAM.
nDWE	114	O	Not write enable for DRAM. Whenever a DRAM access occurs, the nWE output controls the write enable port of the specific DRAM.
nSRD[1:0]	144, 146	O	Not special I/O read strobe with address latch.
nSWR[1:0]	145, 147	O	Not special I/O write strobe with address latch.
ExtMREQ	23	I	External master request. The ExtMREQ input signal indicates that the external master requests to hold KS32C6100 system bus.
ExtMACK	24	O	Acknowledge for external master holding request. This output signal indicates that the external master holding request has been accepted.
ExtMnDL	25	I/O	External master data latch signal.
UCLK	156	I	The external UART clock source input. Usually, MCLK is used as the UART clock source.
RXD	151	I	Receive data input for the UART. RXD is the UART's input signal for receiving serial data.
DTR	149	I	Data terminal ready. DTR input signals the KS32C6100 that the peripheral (or host) is ready to transmit or receive serial data.
TXD	150	O	Transmit data output for the UART. TXD is the UART's output for transmitting serial data.
DSR	148	O	Data set ready. DSR output signals the host (peripheral) that the KS32C6100 UART is ready to transmit or receive serial data.

Table 1-1 KS32C6100 Signal Descriptions (Cont.)

SIGNAL	PIN No.	Type	Description
SIO_RXD	153	I	Receive data input for the serial I/O. Rxd is the SIO's input signal for receiving serial data.
SIO_TXD	152	O	Transmit data input for the serial I/O. TXD is the SIO's output for transmitting serial data.
nSELECTIN	11	I	Not select information. This input signal is used by parallel port interface to request "on-line" status information.
nSTROBE	12	I	Not strobe. The nSTROBE input indicates when valid data is present on the parallel port data bus, PPD[7:0].
nAUTOFD	13	I	Not autofeed. The nAUTOFD input indicates whether data on the parallel port data bus, PPD[7:0], is an autofeed command. Otherwise, the bus signal are interpreted as data only.
nINITIAL	14	I	Not initialization. This input signal initializes the parallel port's input control.
nACK	15	O	Not parallel port acknowledge. The nACK output signal is issued whenever a transfer on the parallel port data bus is completed.
BUSY	16	O	Parallel port busy. The BUSY output signal indicates that the KS32C6100 parallel port is currently busy.
SELECT	17	O	Parallel port select. The SELECT output signal indicates whether the device connected to the KS32C6100 parallel port is "on-line" or "off-line".
PERROR	18	O	Parallel port paper error. PERROR output indicates that a problem exists with the paper in the laser printer. It could indicate that the printer has a paper jam or that the printer is out of paper.
nFAULT	19	O	Not fault. The nFAULT output indicates that an error condition exists with the laser printer. This signal can be used to indicate that the printer is out of toner or to inform the user that the printer is not turned on.
PPD[7:0]	3~10	I/O	Parallel port data bus. This 8-bit, tri-state bus is used to exchange data between the KS32C6100 and an external host (peripheral).
COMCLK	158	O	Command clock. COMCLK is used to synchronize command data that the KS32C6100 sends to the printer engine, as well as the status messages that the KS32C6100 receives from the printer engine. Whenever the KS32C6100 receives status data, it selects itself (COMCLK) as the source of the synchronization signal. Whenever the KS32C6100 sends a command, the data is synchronized with COMCLK.
CnPBSY	160	O	Not command busy. This output signal indicates that the KS32C6100 is sending command data to the printer engine. When CnPBSY goes active, the command data, which is COMCLK, is sent to the engine.
CnPMSG	161	O	Not command message. The CnPMSG output is used to send a one-byte command, synchronized with COMCLK, to the printer engine. The command data from the KS32C6100 is sent MSB-first.
CnEBSY	162	I	Not engine busy. This signal indicates whether or not the laser printer engine ready to send a 1-byte status message in response to a command from the KS32C6100. When CnEBSY is active, the STATUS data is sent, synchronized with COMCLK.

Table 1-1 KS32C6100 Signal Descriptions (Cont.)

SIGNAL	PIN No.	Type	Description
CnEMSG	163	I	Not engine message. This input signal is used by the printer engine to send a 1-byte status message in response to a command from the KS32C6100. When CnEBSY is active, the STATUS data is sent, synchronized with COMCLK.
VCLK[1:0]	164, 165	I	Video shift clock. The VCLK input is a free-running signal that is used to drive transfers of video data. The two VCLK signals can supplied by the laser printer engine or by an on-board oscillator.
nENGPRQ	166	I	Not page synchronize signal request. The nENGPRQ input informs the KS32C6100 that the LBP engine is ready to receive the nCPUPSYNC signal. When the printer engine receives the nCPUPRINT command from the KS32C6100, it enables nENGPRQ within a preset time interval. nENGPRQ is disabled whenever the nCPUPSYNC level goes active Low.
nENGHSYNC	169	I	Not engine horizontal synchronize. The nENGHSYNC input is used to synchronize signals with the horizontal scanning line of a printer engine. A new line starts with each nENGHSYNC pulse. When nENGHSYNC goes active, the KS32C6100 sends one row of data to the engine, thereby maintaining synchronization with video out (VIDEO_OUT).
nCPUPSYNC	170	O	Not page synchronize. The nCPUPSYNC output is used to synchronize signals with the print of one page. The printer engine waits until nCPUPSYNC goes active. After a predetermined time interval has elapsed, the KS32C6100 must send image data synchronized with nENGHSYNC.
nENGREADY	171	I	Not engine print ready. This nENGREADY input signal indicates that the printer engine is ready to print. nENGREADY goes active when certain status conditions in the printer engine are met.
nCPUPRINT	172	O	Not start print. The nCPUPRINT output is a print command issued by the KS32C6100. When nCPUPRINT goes active, the printer engine starts printing. the KS32C6100 must then hold nCPUPRINT to its active state until nCPUPSYNC becomes inactive.
VIDEO_OUT	173	O	Video data output. The VIDEO-OUT signal carries the actual image data to be printed by the laser printer. VIDEO-OUT must be synchronized with nCPUPSYNC for vertical scanning and with nENGHSYNC for horizontal scanning.
GPIO[15:0]	175~182 185~192	I/O	Programmable I/O ports. Each of the sixteen I/O ports can be mapped to a specific signal name (to external interrupts, for example). The port assigments that follow are used as one example of such an I/O port map.
GPIO[15]: TIMEOUT0	192	O	Timer 0 output. When a timer 0 time-out occurs, the TIMEOUT0 pulse is output in predefined time intervals.
GPIO[13]: TECLK	190	I	External timer clock input.
GPIO[12]: nENGPWR	189	I	Engine power ready. nENGPWR is a status signal from the printer engine. Actually, any I/O port pin can be mapped to input nENGPWR without any modifications.

Table 1-1 KS32C6100 Signal Descriptions (Cont.)

SIGNAL	PIN No.	Type	Description
GPIO[11]: nCPUPWR	188	O	KS32C6100 power ready. nCPUPWR is a status nCPUPWR signal that is output to the laser printer engine. Actually, any I/O port pin can be mapped to output this signal without any modifications.
GPIO[10]: PPDOE	187	O	Parallel data output enable. When PPDOE is PPDOE "1", the parallel port data bus, PPD[7:0], is in output mode. Otherwise it is in input mode.
GPIO[9]: ExtlACK1	186	O	Interrupt acknowledge for external ExtiACK1 interrupt request ExitREQ1.
GPIO[8]: ExtlACK0	185	O	Interrupt acknowledge for external interrupt ExtiACK0 request ExitREQ0.
GPIO[7]: ExtlREQ1	182	I	External interrupt request input 1. For a valid ExtiREQ1 request, this signal must be held active for at least four machine cycles.
GPIO[6]: ExtlREQ0	181	I	External interrupt request input 0. For a valid request, this signal must be held active for at least four machine cycles.
GPIO[5]: ExtDACK2	180	O	D M A acknowledge for external DMA2 request . The active output signal is generated whenever a DMA transfer on GDMA1 is completed.
GPIO[4]: ExtDACK1	179	O	D M A acknowledge for external DMA1 request . The active output signal is generated whenever a DMA transfer on GDMA0 is completed.
GPIO[3]: ExtDACK0	178	O	D M A acknowledge for external DMA0 request . The active output signal is generated whenever a DMA transfer on GDMA is completed.
GPIO[2]: ExtDREQ2	177	I	External DMA2(GDMA1) request. ExtDREQ2 is asserted by a peripheral device to request a data transfer using GDMA1. This signal must be held active for at least four machine cycles.
GPIO[2]: ExtDREQ1	176	I	External DMA1(GDMA0) request. ExtDREQ1 is asserted by a peripheral device to request a data transfer using GDMA0. This signal must be held active for at least four machine cycles.
GPIO[2]: ExtDREQ0	175	I	External DMA0(GDMA) request. ExtDREQ0 is asserted by a peripheral device to request a data transfer using GDMA. This signal must be held active for at least four machine cycles.

NOTE: The I/O port pin assignments described in this table are presented as only one example. You can modify the port map as necessary in order to meet the requirements of a specific application.

5-1-3 Reset Circuit

Reset circuit consists of power reset including primary reset (/F_POR), secondary reset (/POR) and reset (/RSTO) by watch dog timer. Primary reset is used to initialize flash memory when the system power turn on, secondary reset is used to initialize all the system by initializing MFP controller (U1) after initializing flash memory.

In primary reset, flash memory is read mode enabling to fetch program code, in secondary reset, MFP controller (KS32C6100) is waked up and external peripheral is initialized, the system is activated. Figure 5-2 is block diagram related all the system reset, figure 5-4 is timing diagram.
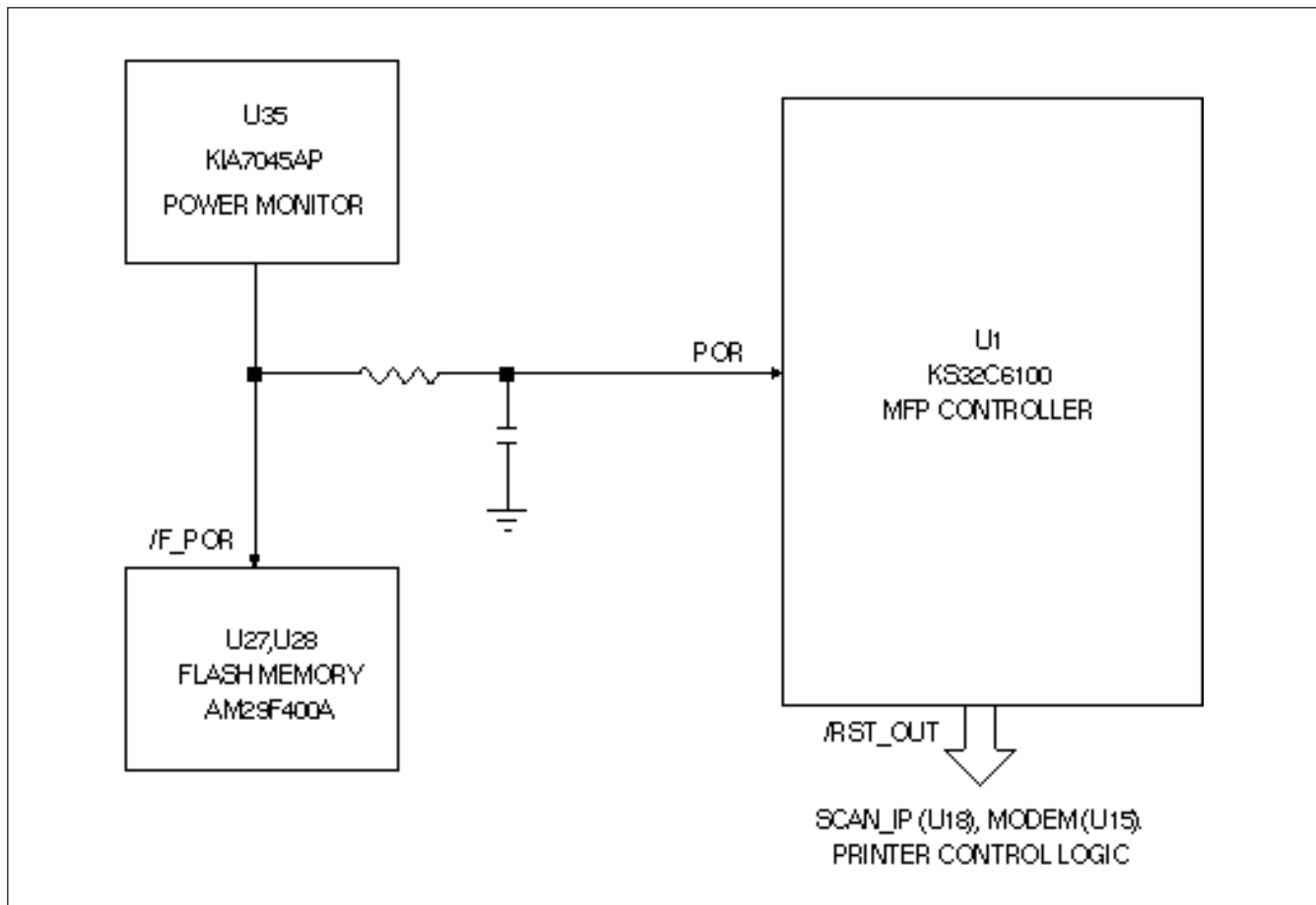
Fig.5-8 Power Reset Block Diagram
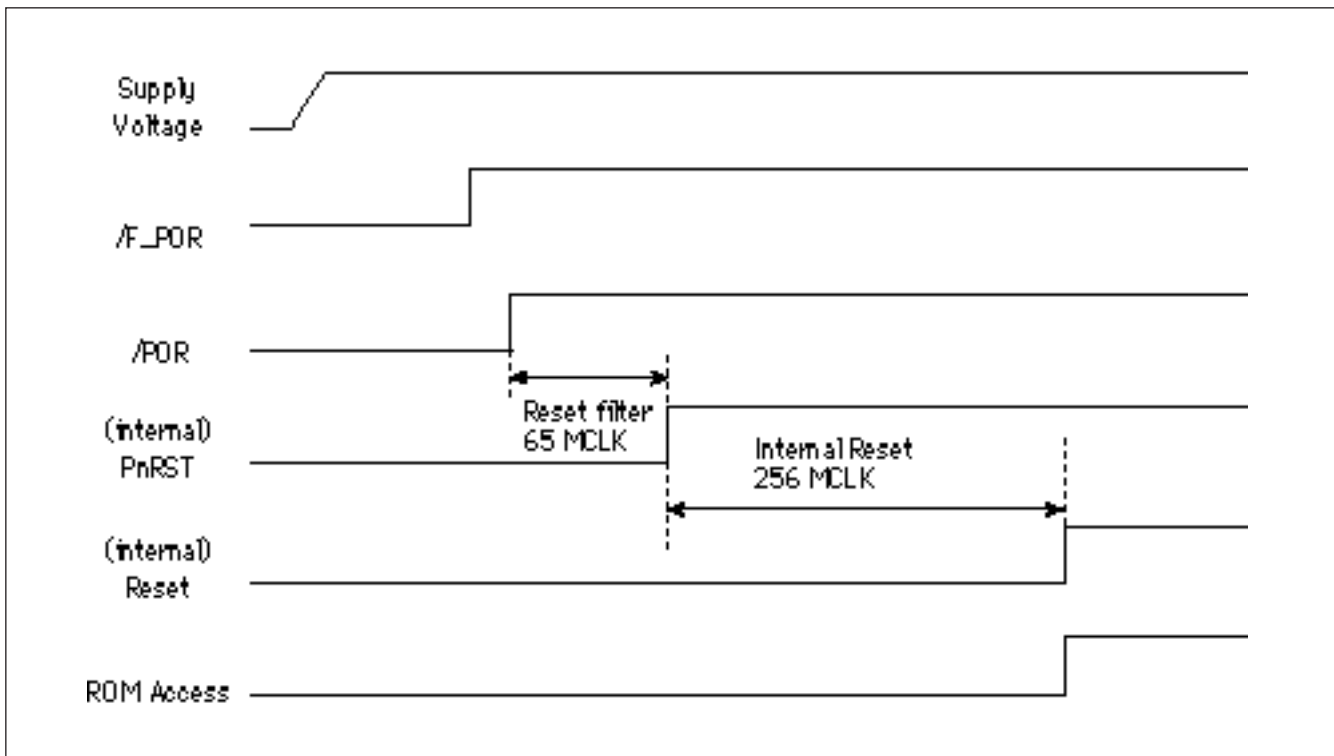
Fig.5-9   Power Reset Timing Diagram

Main power (+5V) drops to +4.5, power monitor (U103) perceive this condition and output changes low (0V) to high (+5). The reset signal inputs into reset pin of flash memory built in booting program.   Flash memory switches read mode by this signal, the signal will access in MFP controller.

After that reset signal inputs into MFP controller (KS32C6100) and MFP controller wakes up. Reset signal to MFP controller (U16) inputs into internal circuit (after 65MCLK) by internal filter. Reset is completed after 256 MCLK, then program access is started. Reset of external device is dissolved in initial booting program.

5-1-4 Power Monitor (U35: KIA7045AP)

If 5V power to KIA7045F drops to between +4.65V and +4.35V (typically 4.5V), power failure will be indicated and the output of KIA7045F will go 'low'. This cause the flash memory (U27M28) and KS32C6100 (U1) to became active ('low'=reset). The flash memory and KS32C6100 reset causes the SCAN-IP connected to /RST_OUT terminal, modem, print controller to be reset. The output terminal of KIA7045AP is an open-drain configuration, output through a 5.1K pull-up resistor.

5-1-5 Watch Dog Output (/RSTO)

W atch dog timer is programmable counter in the KS32C6100. As initial state is enable, set the state to be disable. After system switches to initialize mode, set the state to be enable. If the watch dog reset and power on, according to default setting,

5-1-6 Memory

SUMMARY

System memory consists of 2MB flash memory, 32KB SRAM, 8MB DRAM. MASKROM is selected optional.

MEMORY STRUCTURE

Flash memory and DRAM are selected by chip select (/RCSO-1, /FMEM_CS, /RASO-1, /SCS, /CASO-3) lines, and data is accessed by the units position of the word.

5-1-7 Modem and TX-and RX Related Circuits

<u>M O D E M</u>

These circuits control signal transmission between the internal modem and the LIU or a remote modem. The KS16117 modem is a signal-chip fax-modem having features to detect and generate DTMF tones. TX OUT (pin44) is the modem output port, and RXIN (pin45) is the input port. /PORI (pin67) from KS32C6100 is the signal which enables modem initialization at system power on.

D0~D7 (pin8~15) are the data bus RS0~RS4 (pin56~60) are internal resister select signals which determine the mode.

/CS (pin54) is chip select, /RD (pin55), /WR (pin53) are read and write control signals. /IRQ (pin52) is modem interrupt output signal. The transmission speed of KS16117 is maximum 14.4 Kbps.

<u>TRANSMIT CIRCUIT</u>

This circuit controls transmission of analog signals from the modem (KS16117).
Output voltage from the modem (TXOUT:44) is buffered through LIU board and OP-AMP after signal smoothing and filtering, and finally output to the line.

<u>RECEIVE CIRCUIT</u>

In receive mode, analog signals from the LIU board are amplified and transferred to RXIN:45 through the smoothing filter.
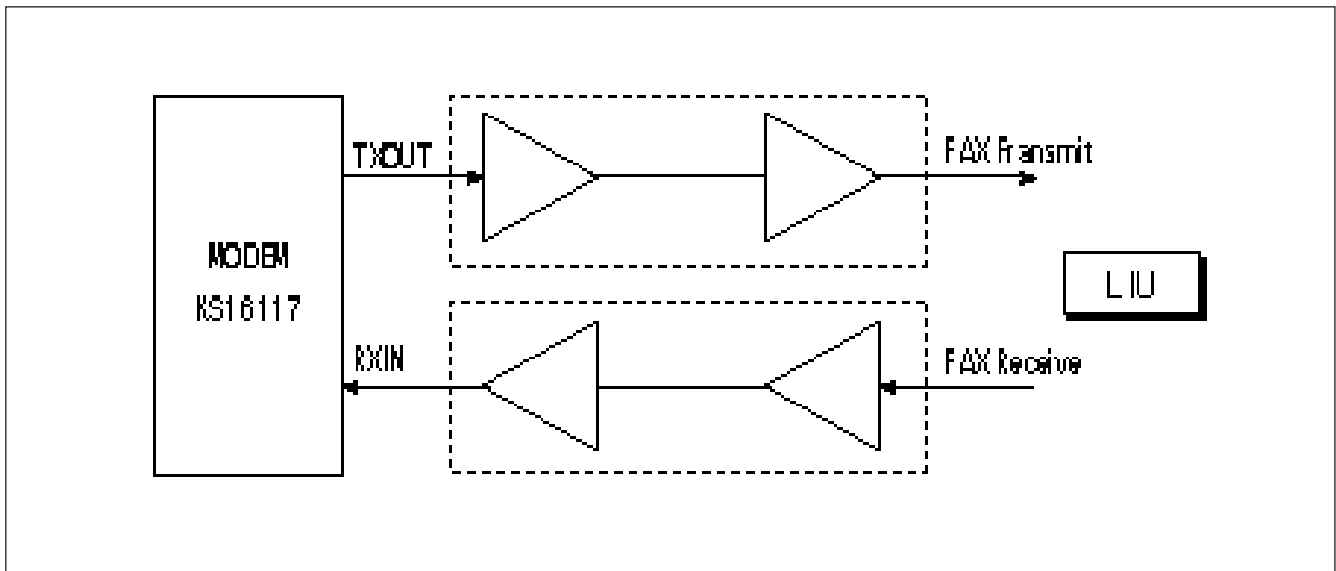
Fig.5-10 TX and RX Part

H A R D W A R E INTERFACE SIGNALS DESCRIPTIONS

Table 2-1 Hardware Interface Signal Descriptions

SIGNAL	PIN No.	Type	Description
RS4 RS3 RS2 RS1 RS0	56 57 58 59 60	I	Register select bus These lines are used to address interface memory registers within the modem. When CS is active, the modem decodes RS0 through RS4 to address one of its 32 internal interface memory registers. RS4 is the most significant bit. In a typical design, RS0-RS4 are connected to A0-A4 address lines of the host microprocessor.
D7 D6 D5 D4 D3 D2 D1 D0	8 9 10 11 12 13 14 15	I/O	Data bus These bi-directional data bus lines provide parallel data transfer between the modem and the host microprocessor. D7 is the most signification bit. The direction of the D0-D7 data bus is controlled by the $\overline{READ}$-φ2 and $\overline{WRITE}$-R/$\overline{W}$ signals. When not being written into or read from, D0-D7 assume the high impedance state.
$\overline{CS}$	54	I	Chip select The modem is selected and decodes RS0-RS4 when $\overline{CS}$ becomes active at which time data transfer between the modem and the host can take place over the parallel data bus. Typically, $\overline{CS}$ is driven by address decode logic.
$\overline{READ}$-φ2	55	I	Read enable (bus mode) or phase2 (6500 bus mode) If 8085 bus mode is selected ($\overline{EN85}$ is connected to ground), this signal acts as the $\overline{READ}$ input. If 6500 bus mode is selected ($\overline{EN85}$ is pulled-up to +5V), this signal acts as the Phase 2 clock input.
$\overline{WRITE}$-R/$\overline{W}$	53	I	Write enable (bus mode) or R/$\overline{W}$ (6500 bus mode) If 8085 bus mode is selected ($\overline{EN85}$ is connected to ground), this signal acts as the $\overline{WRITE}$ input. If 6500 bus mode is selected ($\overline{EN85}$ is pulled-up to +5V), this signal acts as the R/$\overline{W}$ strobe.
$\overline{IRQ}$	52	O	Interrupt request The modem can use $\overline{IRQ}$ to interrupt the host microprocessor program execution. $\overline{IRQ}$ can be enabled in the modem interface memory to be asserted in response to a specified change of conditions in the modem status. $\overline{IRQ}$ is an open drain output and must be connected to an external pull up resistor of suitable value (typically, a 5.6KW, 1/4 watt, 5% resistor is adequate).
TXDI	79	I	Transmit data input TXDI is the modem's transmit data serial input. When configured for serial data mode (PDME bit is reset) the modem accepts data bits for transmission via this input. When transmitting data, the modem reads the TXDI pin on the rising edge of DCLK. When the modem is configured for parallel data mode (PDME bit is set), the TXID pin is ignored and transmit data is accepted by the modem via the DBFR register.
RXDO	95	O	Receive data output RXDO is the modem receive data output. Received data is output to the DTE via the RXDO pin in both serial and parallel data modes (PDME bit set or reset). When receiving data, the modem outputs a data bit on the falling edge of DCLK. The center of RXDO bits coincides with the rising edge of DCLK, thus, the DTE should read RXDO on the rising edge of DCLK.

Table 2-1 Hardware Interface Signal Descriptions (Cont.)

SIGNAL	PIN No.	Type	Description
RTS	64	I	Request to send When the RTS input is forced low, the transmitter starts transmitting the modem training sequence has been transmitted (signaled by the CTS pin and CTSB bit becoming active), data present at either the TXDI input pin in serial mode (PDME bit is reset) or written into the DBFR register in parallel mode (PDME bit is set) is modulated and transmitted. The RTS input pin is logically ORed with the RTSB bit in the interface memory.
CTS	78	O	Clear to send CTS is used to indicate of that the transmission training sequence has been completed and the modem is ready to transmit any data present at either the TXID input pin in serial mode (PDME bit is reset) or in DBFR in parallel mode (PDME bit is set).
RLSD	79	O	Received line signal detector RLSD becomes active at the end of the reception of the training sequence indicating the beginning of data reception. If no training is detected but the received energy level is above the RLSD off-to-on threshold, RLSD will become active.
XTALI XTALO	68 69	I O	Oscillator In/Out An external 24.00014MHz (KS16116) or 38.00053 MHz (KS16117) crystal and two capacitors are connected to the XTALI and XTALO. Alternatively, an external crystal oscillator of the appropriate frequency can be connected to the XTALI input leaving XTALO unconnected. In order to minimize electromagnetic emissions and ensure proper oscillator start up and operation, the crystal and the capacitors should be placed as close as possible to the XTALI and XTALO pins. Further, the circuit board traces connecting the crystal and capacitors to XTALI and XTALO should be as short as possible. The use of circuit board bias should be avoided in the crystal oscillator circuitry and circuit board traces should be routed using curved turns.
PORI	67	I	Power On reset In When power is first applied to the modem, PORI is held low for approximately 350ms. The modem is turn ready for normal operation 15ms after the low to high transition of PORI.
V_{DD}	22, 72	Power	+5V Digital voltage supply This pin must be connected to +5V □ 5% supply. The +5V Digital power supply voltage ripple should not exceed $100mV_{PP}$.
V_{cc}	46	Power	+5V Analog voltage supply This pin must be connected to +5V □ 5% supply. The +5V Analog power supply voltage ripple should not exceed $100mV_{PP}$.
GNDD	6, 7, 16, 23, 50, 66, 77, 80, 81, 89, 92, 97	GND	Digital ground These pins must be connected to digital ground.
GNDA	17, 21, 30, 43, 47	GND	Analog ground These pins must be connected to analog ground.

Table 2-1 Hardware Interface Signal Descriptions (Cont.)

SIGNAL	PIN No.	Type	Description
EN85	65	I	Enable 8085 bus mode When EN85 is connected to ground, 8085 bus mode is selected and the modem can interface directly to an 8085 compatible microprocessor bus using READ and WRITE. When EN85 is pulled-up to +5V, 6500 bus mode is selected and the modem can interface directly to a 6500 compatible micro-processor using $\phi2$ and R/W.
XCLKO	70	O	XCLKO output This output pin is a 12 MHz (KS16116) or 19 MHz (KS16117) square wave output derived from XTALI.
YCLKO	71	O	YCLKO output This output pin is a 6 MHz (KS16116) or 9.5 MHz (KS16117) square wave output derived from XTALI.
SEPXO SEPYO	86 90	O	Serial eye pattern bit data These two outputs provide two serial bit streams containing eye pattern display data for the oscilloscope X and Y axis. The data words are 9 bits long with the sign bit shifted out first and the bits clocked by the rising edge of SEPCLK.
SEPCLKX	84	O	Serial eye pattern bit clock SEPCLK is a 230.4 KHz clock used to shift the eye pattern data into the serial-to-parallel converters. SEPXO and SEPYO are shifted out by the modem on the rising edge of SEPCLKX.
SEPWCLK	83	O	Serial eye pattern word clock SEPWCLK (9600Hz) provides SEPXO and SEPYO 9-bit word timing and its rising edge is used for copying the output of the serial to parallel converters into the X and Y digital-to-analog converters.
TXAO	44	O	Transmitter analog output The TXAO can supply a maximum of 2.5 ∟015 volts into a load resistance of 10KΩ (minimum). An external analog smoothing filter with transfer function 28735.63/(S+11547.34) is required.
RXAI	45	I	Receiver analog input The input impedance of RXAI is greater than 1MΩ. An external analog anti-aliasing filter with transfer function 21551.72/(S+11547.34) is required between the line interface and the modem RAXI input. The maximum input signal level into the anti-aliasing filter should not exceed 0 dBm.
SEPCLK ECLKIN1 RCVO SWGAINO	85 25 98 99	O I O O	Digital Loopback Over-sampling Clock Output. 2.304MHz clock output. Normally tied to ECLKIN1. Over-sampling Clock Input. Input to the AFE's over-sampling clock input pin. Normally connected to SEPCLK. Disable Transmitter Output. "1" on this pin disables AFE's transmitter. Normally connected to RCVI. Externally connected to SWGAINI pin.

Table 2-1 Hardware Interface Signal Descriptions (Cont.)

SIGNAL	PIN No.	Type	Description
TXATT[3:1]	38, 39, 40	I	Auxiliary Signals Analog Transmit Attenuation. The host can cause the modem to attenuate the transmit analog output in steps of 2dB from 0dB by using the three encoded TXATT[3:1] inputs as follows: TXATT3 TXATT2 TXATT1 Attenuation (dB) 0 0 0 0 0 0 1 2 0 1 0 4 0 1 1 6 1 0 0 8 1 0 1 10 1 1 0 12 1 1 1 14 The TXATT[3:1] lines may be connected directly to 0V or 5V, or to three GPIO lines used as outputs to select the attenuation under the host program control.
BYPASS	36	I	Receiver Highpass Filter Bypass Enable. The state of this pin does not have any effect on the operation of the modem, but it should tied to either +5V or ground.
GP13, GP11 GP[7:2] GP[21:19] GP[17:16]	61, 63 5, 4, 3, 2 1, 100 91, 93, 94 76, 75	I/O I	General Purpose I/O General Purpose Input/Output General Purpose Input
N C	19, 20, 27 28, 29, 31 32, 33, 41 51, 62, 73		Unbonded Pins (These are not connected to the internal logic) No Connection
SYNCIN1 SYNCIN2	26 74	I I	Eye Sync Input 1, connect to SEPWCLK. Eye Sync Input 2, connect to SEPWCLK.
V C RCVI RXAMPI SWGAINI VREFN	48 37 18 24 42	O I I I O	Analog Interface Center Voltage. 2.5V output and it needs an external capacitor. Transmitter Disable. When tied to "1", it disables the transmitter side of AFE. Receiver Amplifier Input. This internally tied to pin17 which is Analog Ground. Externally connected to SWGAINI pin. Negative Reference Voltage
A O U T	49	O	Externally connected to bypass capacitor to ground.
A D I N A D O U T D A I N D A O U T	87 35 34 88	I O I O	Analog Loopback Interface Analog-to-digital Data In. 1-bit input to the internal decimation filter. Analog-to-digital Data Out. 1-bit input to the internal AFE's RXPATH. Digital-to-analog Data In. 1-bit input to the internal AFE's RXPATH. Digital-to-analog Data Out. 1-bit output from the internal digital interpolation filter.

5-1-8 SCAN_IP Block Diagram

SCAN_IP internal consists of A/D converter, scanner controller, and image processor. A/D converter changes image signal to digital signal. Scanner controller supplies interface signal between host controller, and CIS driver signal. Image processor performs shading correction of image signal, gamma correction, and logic.
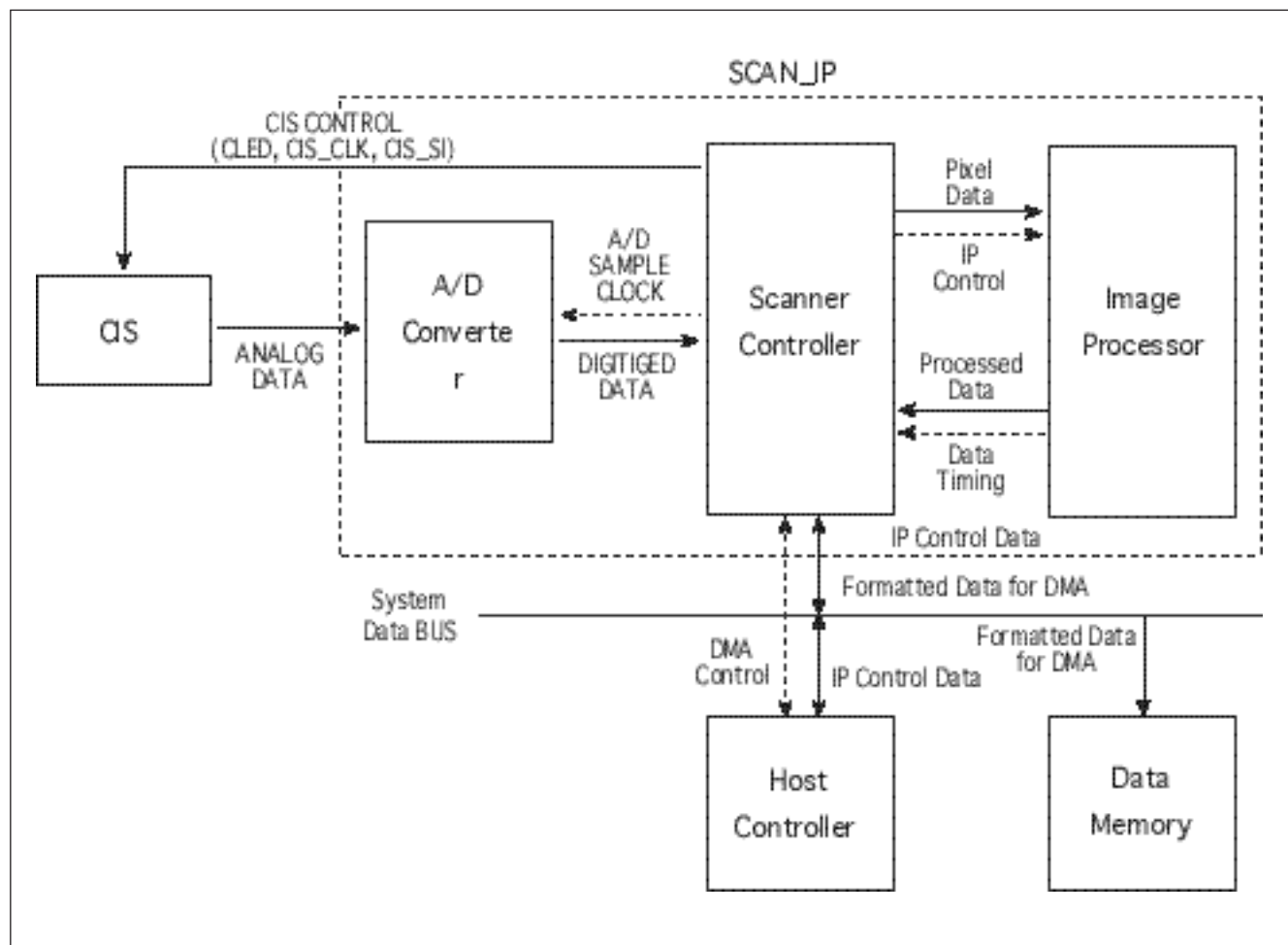
Fig.5-11 SCAN_IP Block Diagram

I/O PORT OF SCAN IP

SIGNAL	PIN No.	Type	Circuit Name	Description	
				H	L
GIP 0	23	I	Reserved		
GIP 1	28	I	Reserved		
GIP 2	37	I	Reserved		
GIP 3	43	I	Reserved		
GIP 4	48	I	Reserved		
GIP 5	84	I	/RING_DET		Ring detection from tel line.
GIP 6	92	I	/HOOK_OFF	External phone hook on.	External phone hook off
GIP 7	113	I	Reserved		
GOP 0	26	O	Reserved		
GOP 1	31	O	RX_CTL	Connected remote path.	Connected modem RX path.
GOP 2	40	O	SOUND_CTL	Connected modem TX path to speaker path.	Connected modem RX path to speaker path.
GOP 3	46	O	SPK_CTL	Sound on.	Sound off
GOP 4	51	O	CLED_CTL	CIS LED on.	CIS LED off
GOP 5	87	O	CML1	C M L relay on.	CML relay off
GOP 6	103	O	Reserved		
GOP 7	116	O	Reserved		
GPIO 0	24	O	VOL_C	Adjust speaker volume.	
GPIO 1	25	O	VOL_B	Adjust speaker volume.	
GPIO 2	29	O	VOL_A	Adjust speaker volume.	
GPIO 3	30				
GPIO 4	38				
GPIO 5	39				
GPIO 6	44				
GPIO 7	45				
GPIO 8	49				
GPIO 9	50				
GPIO 10	85				
GPIO 11	86				
GPIO 12	93				
GPIO 13	95				
GPIO 14	114				
GPIO 15	115				

PIN Name	PIN No.	Description
XCLK	35	IP_CLK(30MHz) input from OSC.3
/RESET	2	/RST_OUT input from U1-178
SI	89	From line scanning to start signal output at 2.5mS intervals
CLKI	91	Supply 1MHz to CIS clock output
/TRDREQ	118	External DMA request signal output
/TRDACK	117	External DMA acknowledge input
VREKDAC	97	Top standard voltage (+Vref) input of A/D converter
ADCIN	96	Analog signal input of CIS
VREFADC	102	Bottom standard voltage (-Vref) input of A/D converter
TX_A1	105	Scan motor driver control signal, TMIA0 output
TX_B1	106	Scan motor driver control signal, TMIA1 output
TX_A2	107	Scan motor driver control signal, TMIB0 output
TX_B2	108	Scan motor driver control signal, TMIB1 output
TX_EN1	109	Scan motor driver control signal, TMPHA output
TX_EN2	110	Scan motor driver control signal, TMPHB output
TX_INT	111	Scan motor interrupt output

5-2 Scanner Part

5-2-1 Summary

Scanner part consists of image sensor which input graphic signal using CIS (Contact Image Sensor), scanner control signal, image processing by using image processor, SCAN_IP. Data flow of scanner part, block diagram of SCAN_IP, I/O port and circuit description are as follows.

5-2-2 CIS Driver, Input Processor

CIS driver consists of /LED_GND1, 2, 3, CIS_CLK, CIS_SH. CIS driver power supply is 12V, LED driver power supply is 5V. Especially, /LED_GND1, 2, 3 are enable to control voltage from U18 using Q1 in CLED signal.

As CIS input signal, minimum (-V_ref)values supply about 0, Maximum (+V_ref)values supply about 1.5V to voltage divider (R70, R71) through OP-AMP (U16-3, 1).

Image signal from CIS supply to U31-96 through CN3-1, U5-5, U5-7, and R75.
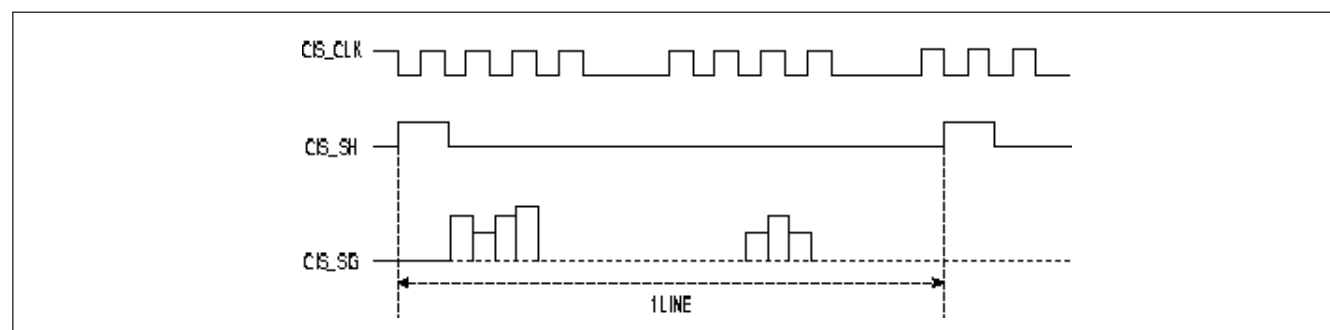
Fig.5-12 CIS Driver Clock Timing

6. Repair Information

6-1. Removal Procedures

Cautions:

- Be sure to unplug the power cord whenever you are working on the machine with one of the covers removed.

- Be sure to remove the toner cartridge before you repair parts.

- The close proximity of cables to moving parts makes proper routing a must. If components are removed or replaced, any cables disturbed by the procedure must be replaced as close as possible to their original positions. Before removing any component from the machine, note the cable routing that will be affected.

- If the machine is equipped with handset, remove the handset and cradle.

Releasing Plastic Latches

Many of the parts are held in places with plastic latches. The latches break easily; release them carefully. To remove such parts, press the hook end of the latch away from the part to which it is latched.
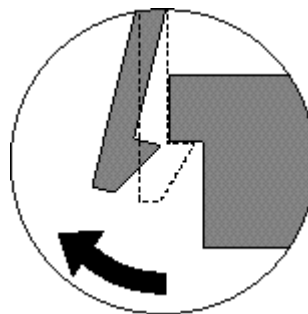
6-2. White Roller

1. Lift the control panel using hand.

2. Push the bushing on both ends of the roller slightly inward, then rotate it until it reaches the slot. Then lift the roller out.

Note : Check the roller for any dirt. If dirty, wipe it off with soft cloth dampened with water. If the roller is heavily worn, replace it with a new one.

white roller
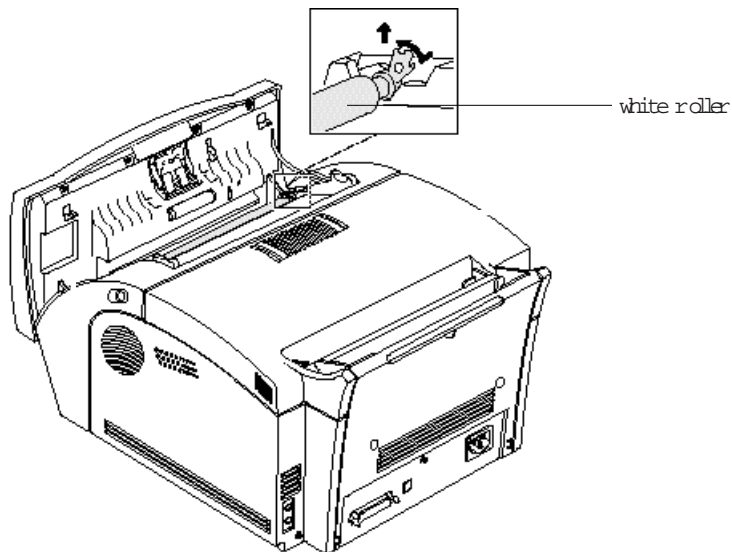
6-3. OPE Cover

1. Pull the cover release button on both sides of the machine, and open the front cover.
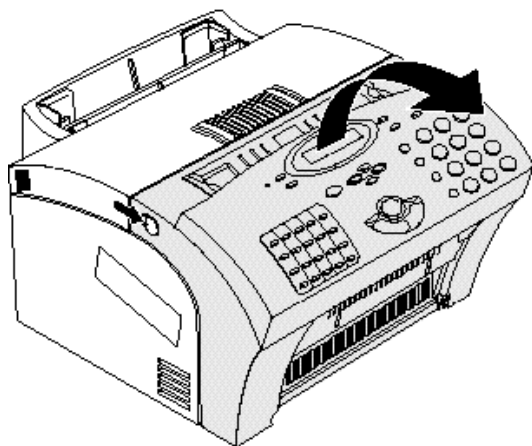
3. Remove the cover stopper securing the OPE unit. To remove the stopper, slide it until it reaches the slot at the center, then pull it out.
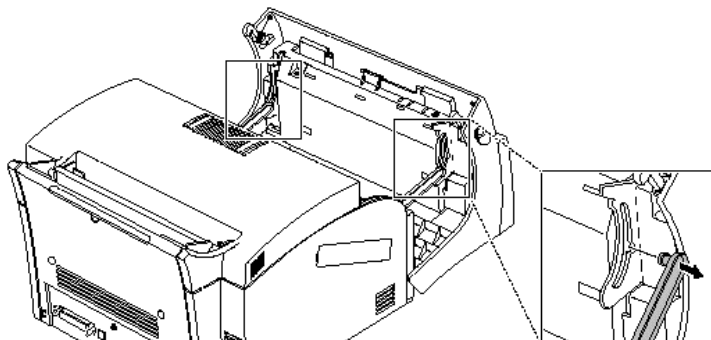
2. Remove the duct cover.
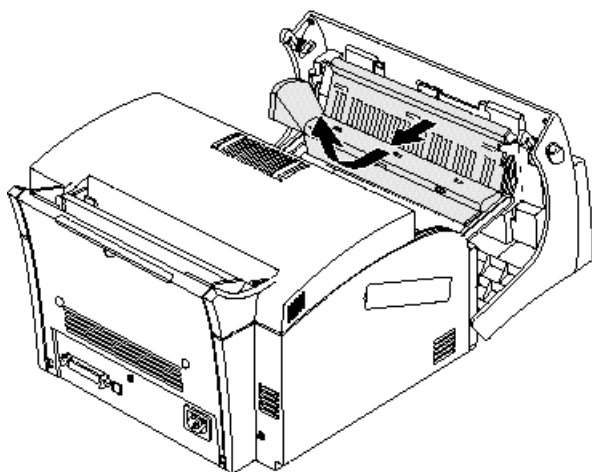
4. Wide open the cover. Pull the bottom left end of the cover toward you to unlatch the OPE cover, and take it out.
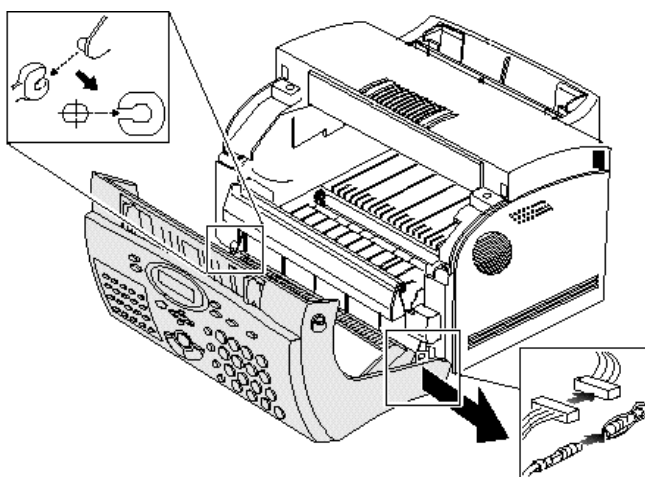
5. Remove two screws, then remove the scan cover.
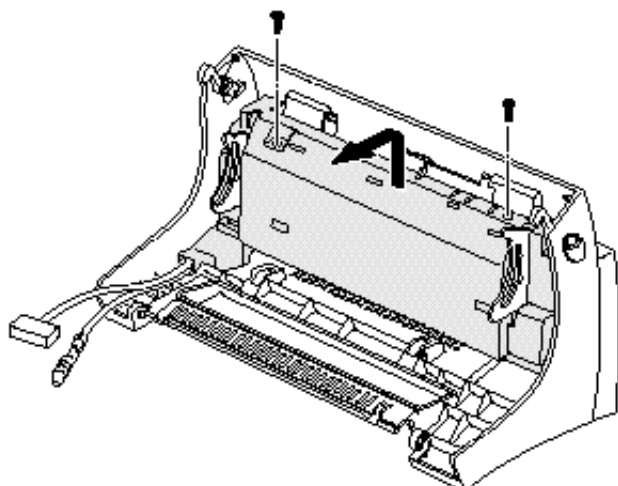
6. Unplug the OPE connector from the scan board, and remove ground screw.

7. Lift the control panel using hand.
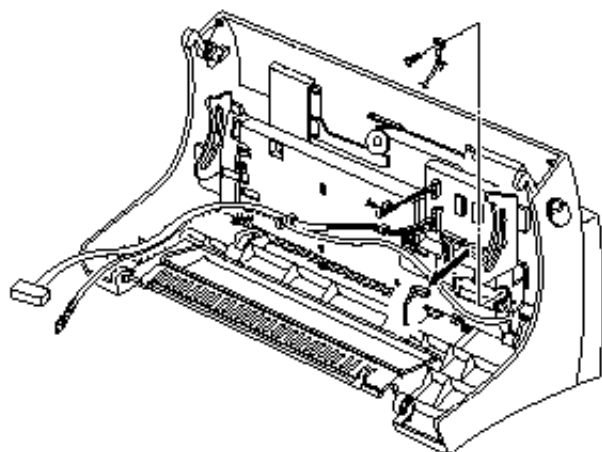
8. Remove the stopper holding the OPE cover.

9. Unlatch the bottom ends, then remove the OPE cover.
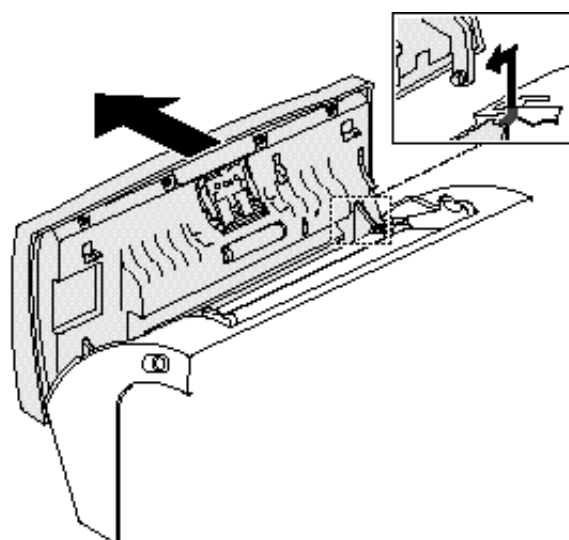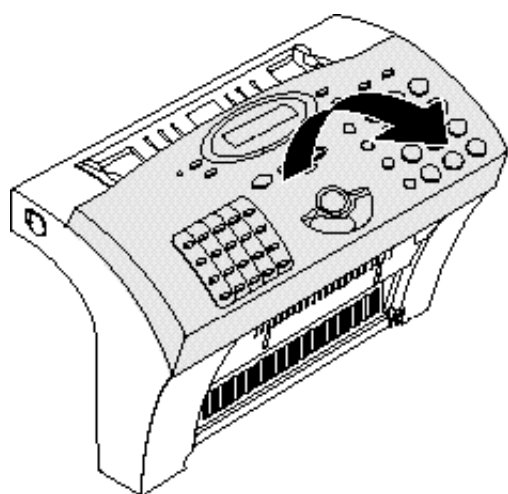
6-4. ADF Rubber

1. Before you remove the rubber, you should
   remove:
   –OPE cover (see page 6-3)

2. Push the ADF stopper up from the bottom side of
   the scan frame. When the stopper is released,
   remove the ADF rubber.
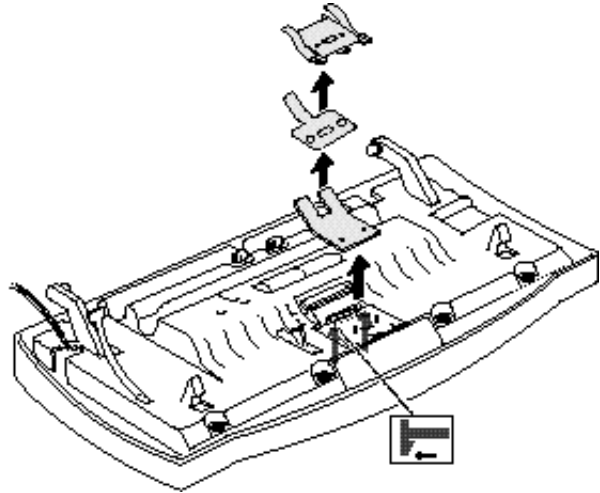
6-5. OPE Board

1. Before you remove the board, you should
   remove:
   –OPE Cover (see page 6-3)

2. Remove five screws, then remove the scan upper
   frame.

3. Remove eleven screws securing the board, then
   remove the board.
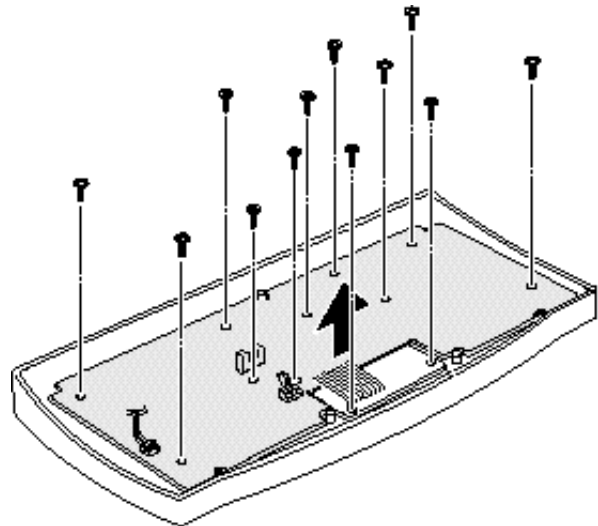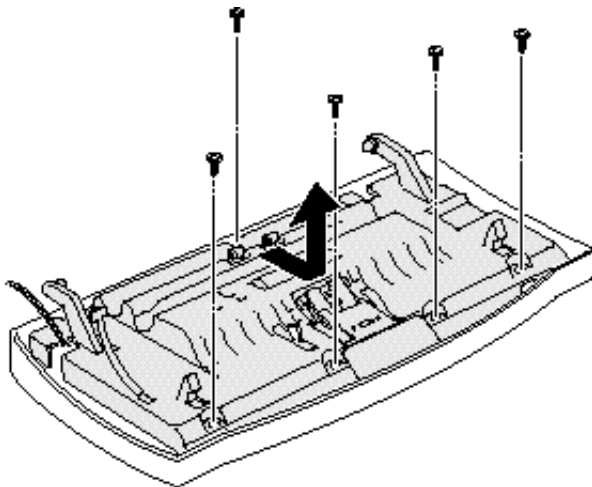
6-6. Roll Pinch

1. Before you remove the roll pinch, you should remove:
   –OPE Cover (see page 6-3)

2. Remove five screws, then remove the scan upper frame.

3. Turn the scan upper frame over, and remove three screws. Then, remove the sensor bracket, pinch spring, and roll pinch. When you remove the spring pinch, make sure that the spring pinch is properly latched. For the roll pinch, push it up from the bottom side.
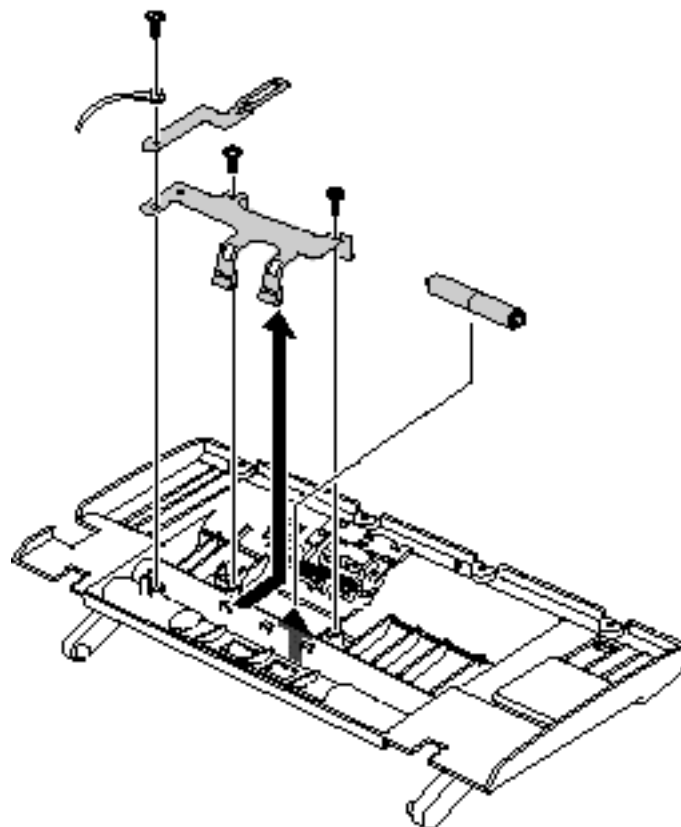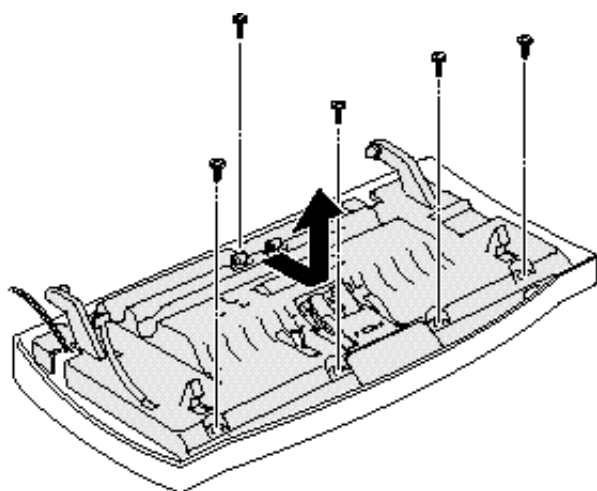
6-7. Scan Board

1. Pull the cover release button on both sides of the machine, and open the front cover.
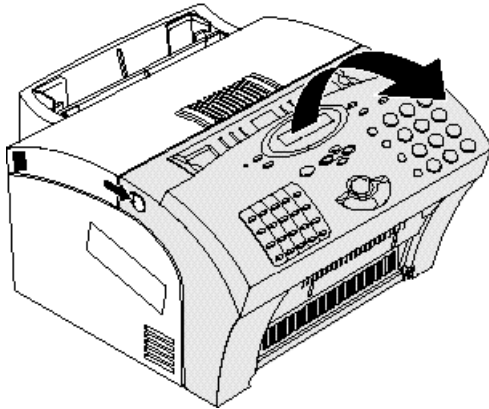
2. Remove the duct cover.
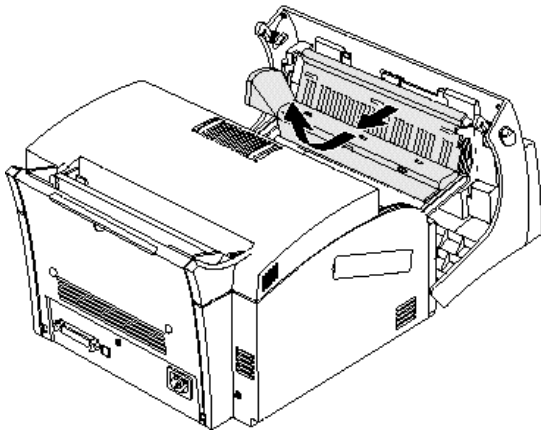
3. Remove the cover stopper securing the OPE unit. To remove the stopper, slide it until it reaches slot at the center, then take it out.
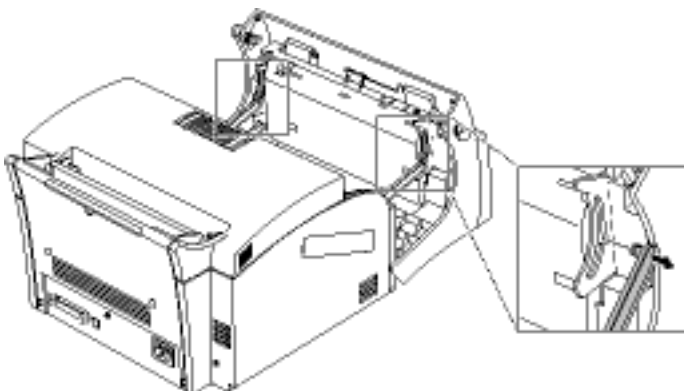
4. Wide open the cover. Pull the bottom left end of the cover toward you to unlatch the OPE cover, and take it out.
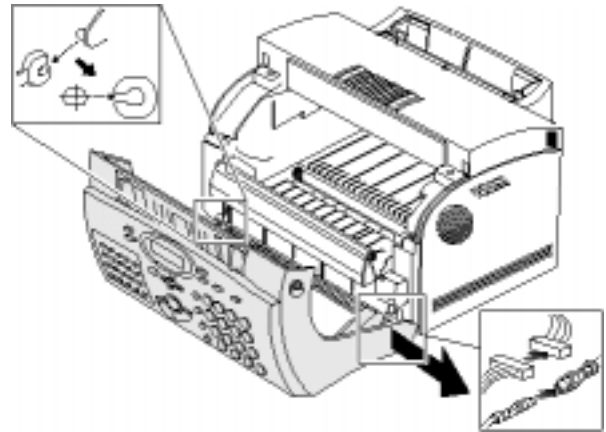
5. Remove two screws, then remove the scan cover.
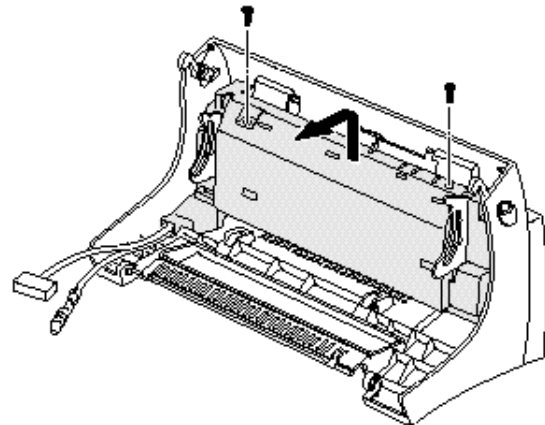
6. Unplug all connectors from the scan board, remove one screw, then remove the board. and remove ground screw.
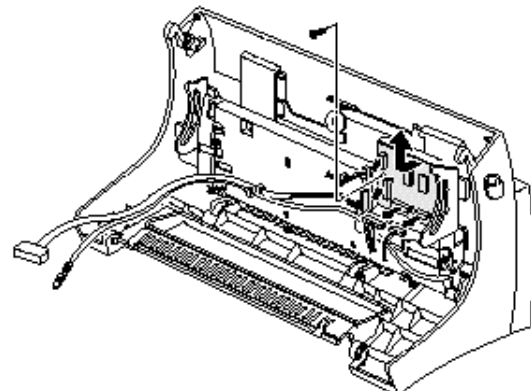
6-8. Rollers

1. Pull the cover release button on both sides of the machine, and open the front cover.
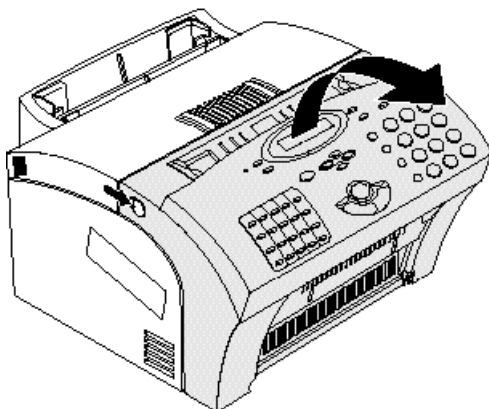
2. Remove the duct cover.

3. Remove the cover stopper securing the OPE unit. To remove the stopper, slide it until it reaches slot at the center, then take it out.

4. Wide open the cover. Pull the bottom left end of the cover toward you to unlatch the OPE cover, and take it out.
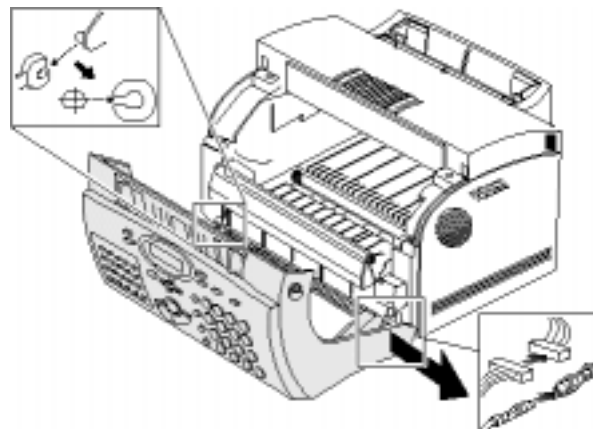
5. Remove two screws, then remove the scan cover.

6. Unplug the OPE connector from the scan board, and remove ground screw.

7. Lift the control panel using hand.

8. Remove the stopper holding the OPE cover.
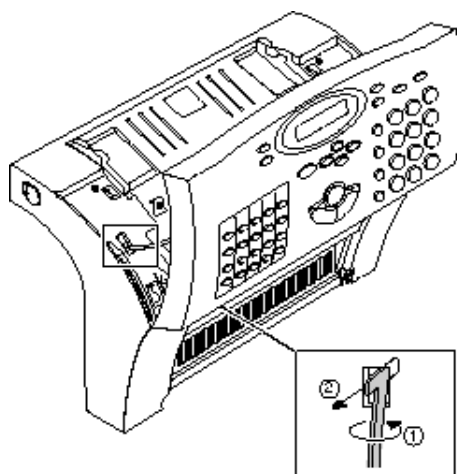
9. Unlatch the bottom ends, then remove the OPE cover.
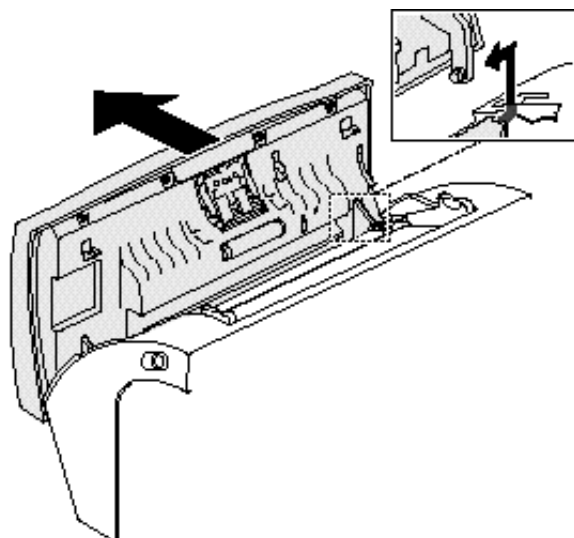
10. Open the control panel using hand, then remove four screws.
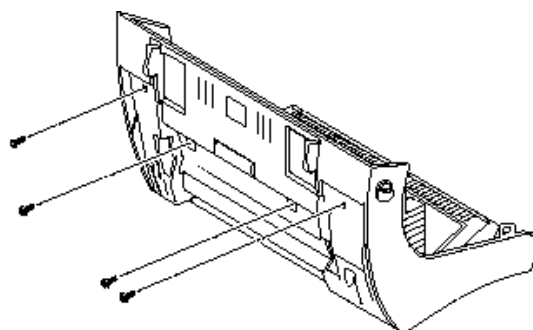
11. Lift the scan lower frame up.
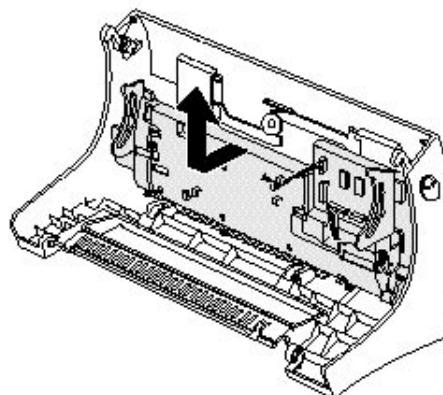
12. Remove three rollers. Use extreme caution when you remove rollers to prevent the gears on the right end of the rollers from being damaged.
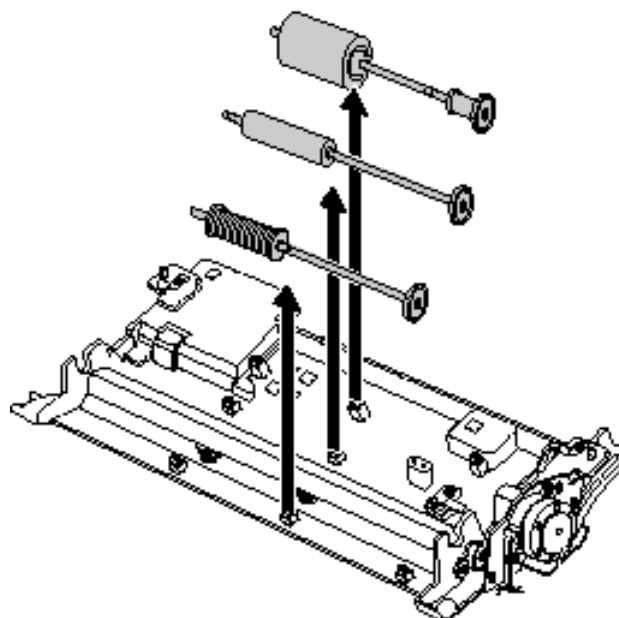
6-9. Scan Motor

1. Remove the scan lower frame by following the instructions on page 6-7 'Rollers'.

2. Remove two screws securing the motor, unplug the motor connector from the scan board, then remove the motor.
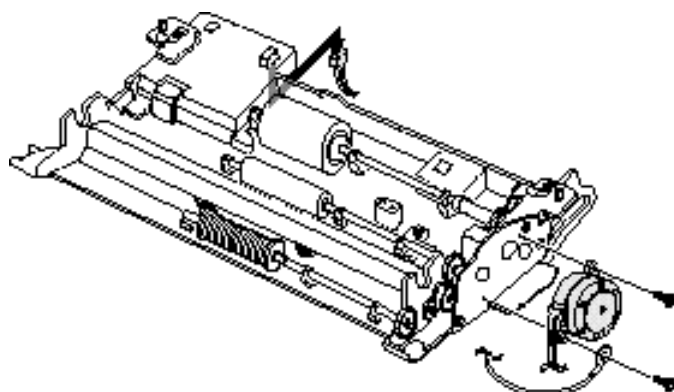
6-10. CIS

1. Remove the scan lower frame by following the instructions on page 6-7 'Rollers'.

2. Remove one screw, unplug one connector, then remove the CIS.
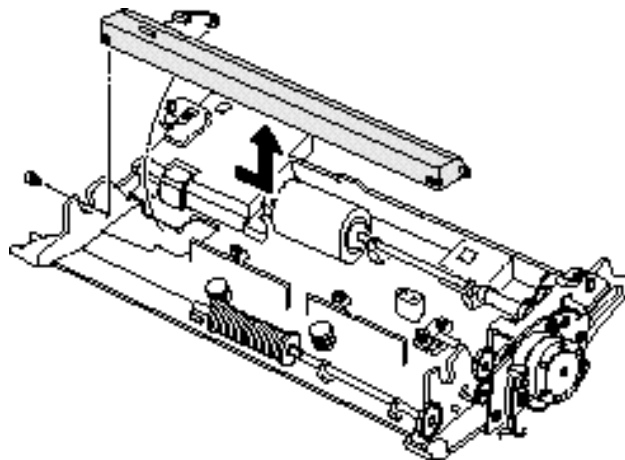
6-11. Front Cover

1. Pull the cover release button on both sides of the machine, and open the front cover.
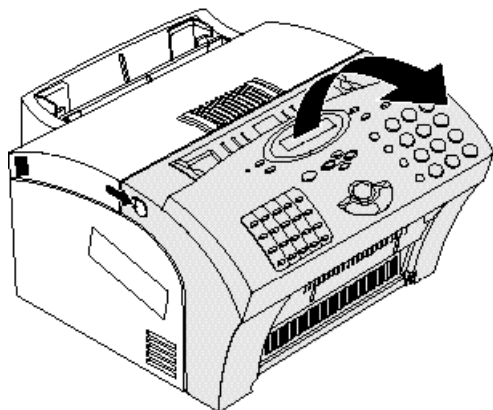
3. Remove the cover stopper securing the OPE unit. To remove the stopper, slide it until it reaches slot at the center, then take it out.
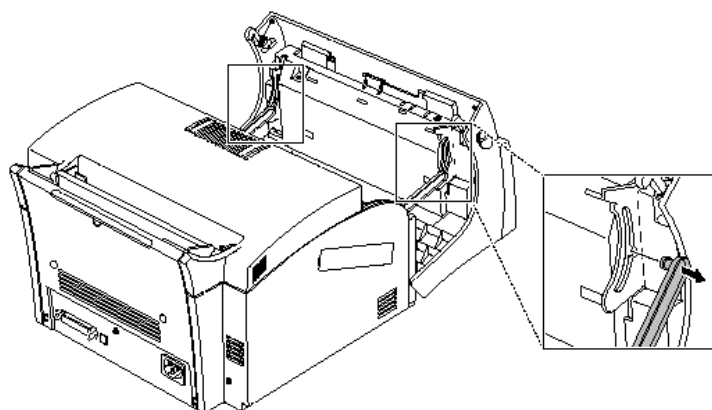
2. Remove the duct cover.
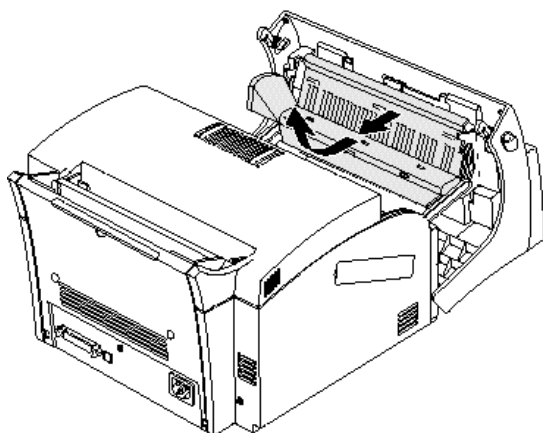
4. Wide open the cover. Pull the bottom left end of the cover toward you to unlatch the OPE cover, and take it out.
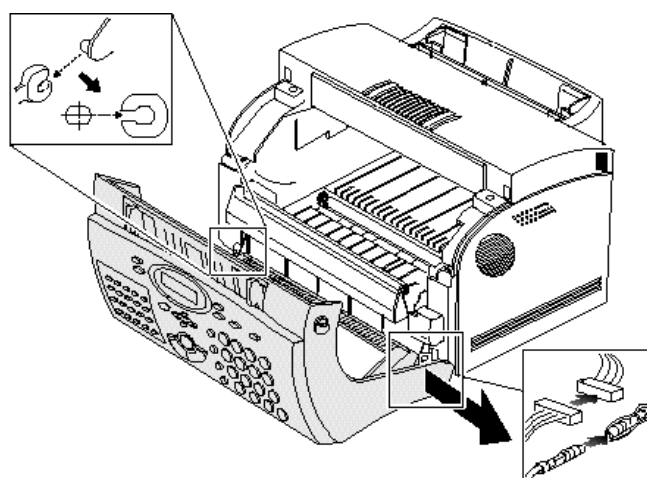
5. Remove two screws, then remove the scan cover.
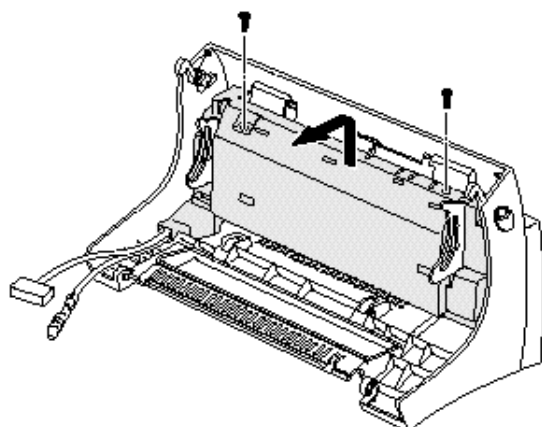
6. Remove one ground screw, unplug one connector from the scan board, then remove the front cover.
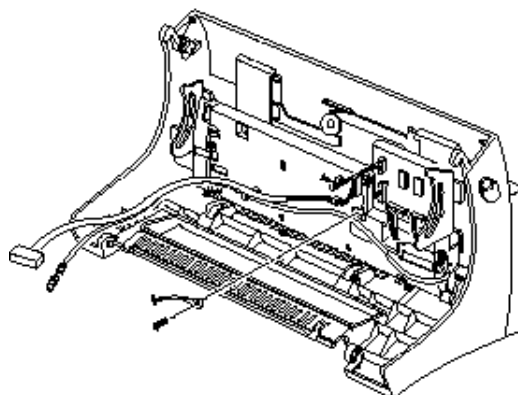
6-12. Rear Cover

1. Remove three screws.
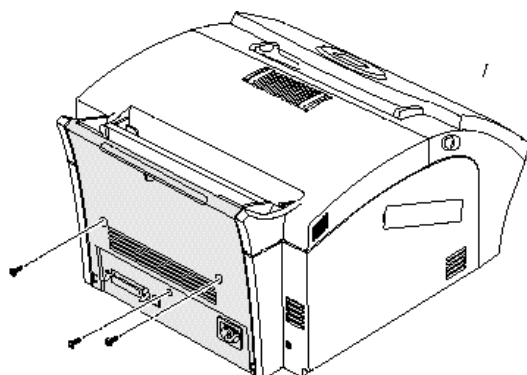
2. Unlatch the bottom ends, then remove the rear cover.
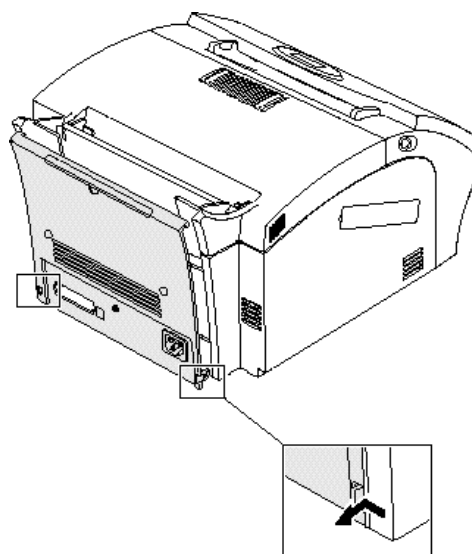
6-13. Top Cover

1. Before you remove the cover, you should remove:
   —Rear cover (see page 6-11)

2. Pull the cover release button on both sides of th
   machine, and open the front cover.

3. Remove two screws.
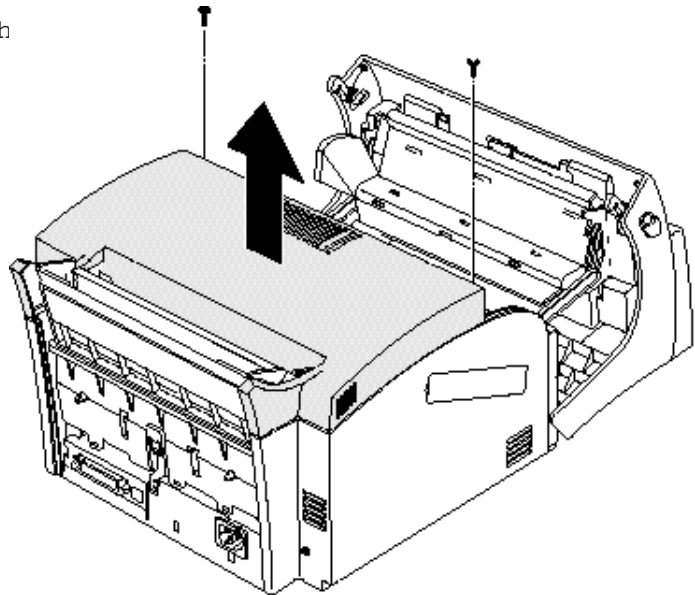
6-14. LSU

1. Before you remove the LSU, you should remove:
   —Top cover (see above)
   —Rear cover (see page 6-11)

2. Remove four screws, unplug all connectors fro m
   the LSU, then remove the LSU.
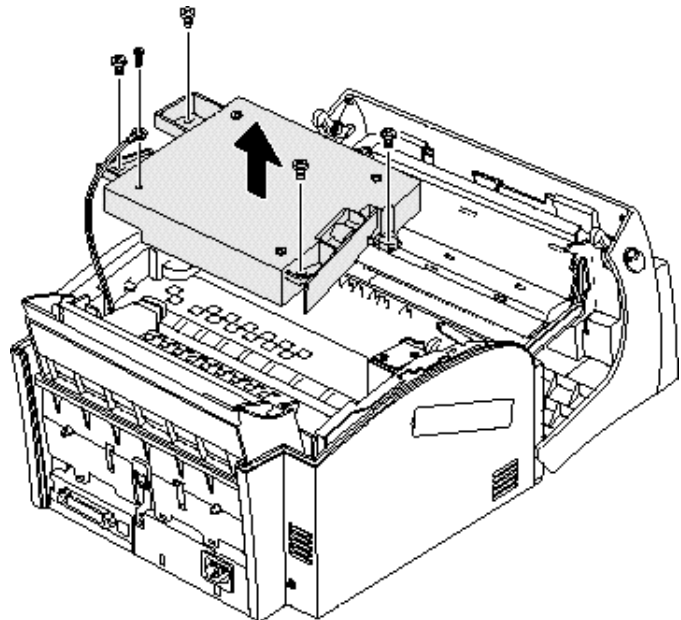
6-15. Side Covers

1. Before you remove the left and right side covers, you should remove:
   –Top cover (see page 6–12)
   –Rear cover (see page 6–11)
   –Front cover (see page 6–10)

2. Remove two screws.

3. Spread the rear bottom to unlatch the rear side, then pull the covers in the direction of arrow.
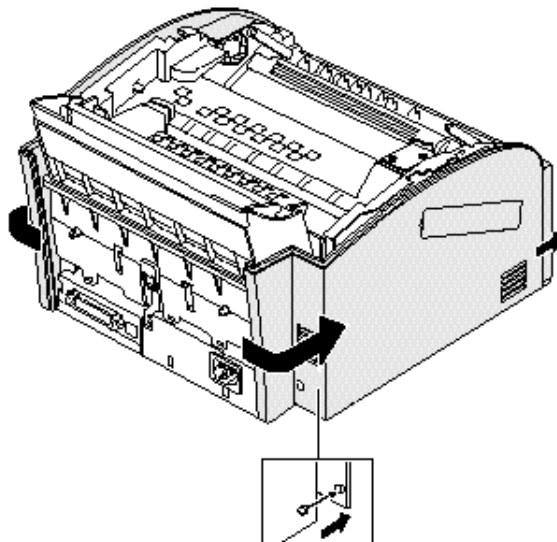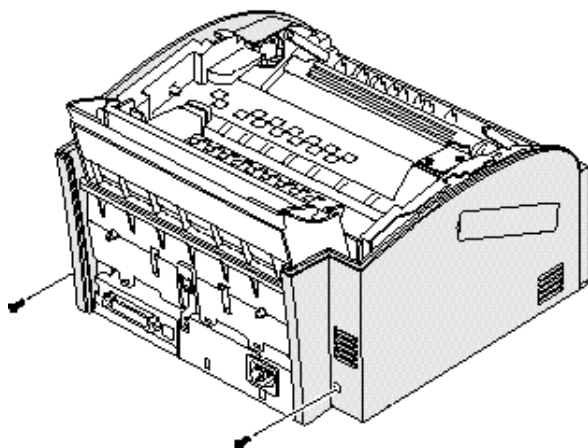
6-16. Transfer Roller

1. Pull the cover release button on both sides of the machine, and open the front cover.

2. Hold the cap at the both end of the roller, then remove the roller.
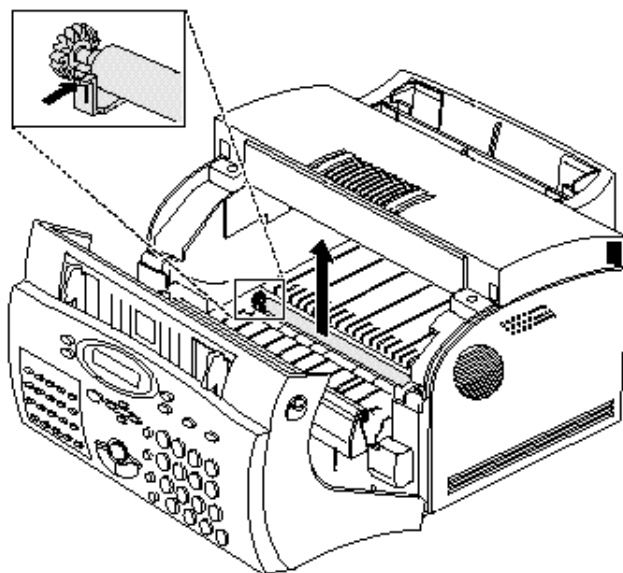
6-17. SMPS/Engine Control Board Removal

1. Turn the machine over.

2. Remove three screws securing the shield, then remove the shield.
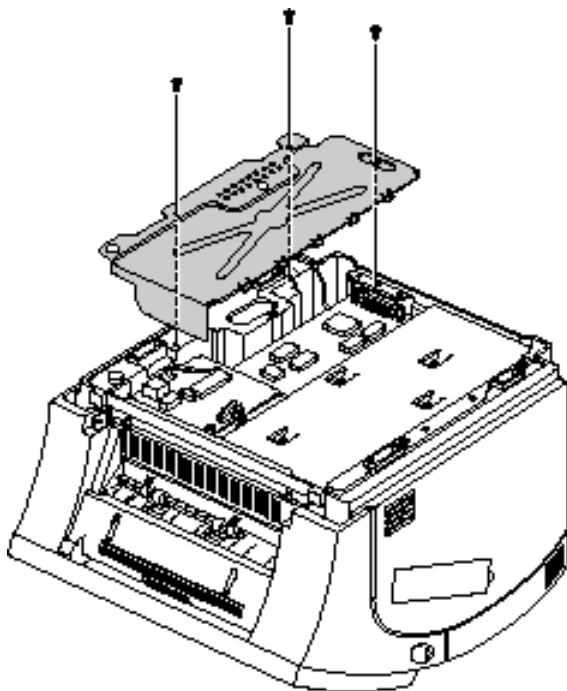
3. Remove seven screws, and unplug two connectors.
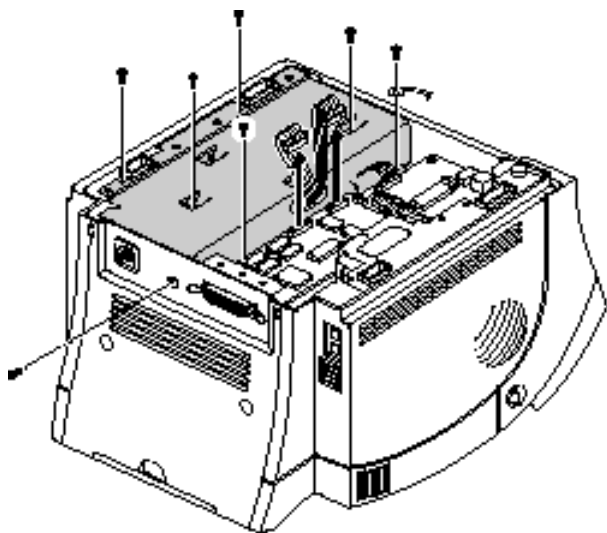
4. Remove two screws, unplug all connectors from the LIU board, then remove the LIU board. Remove one ground screw.
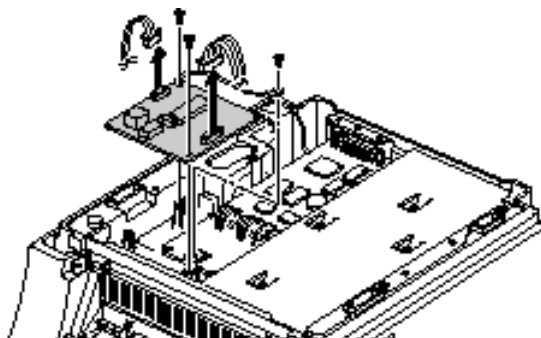
5. Remove two screws, unplug all connectors from the main board, then remove the main board.
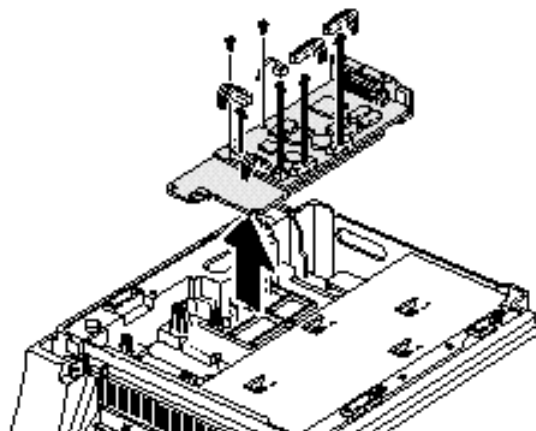
6. Unplug four connectors, then remove the SMPS and the engine board.
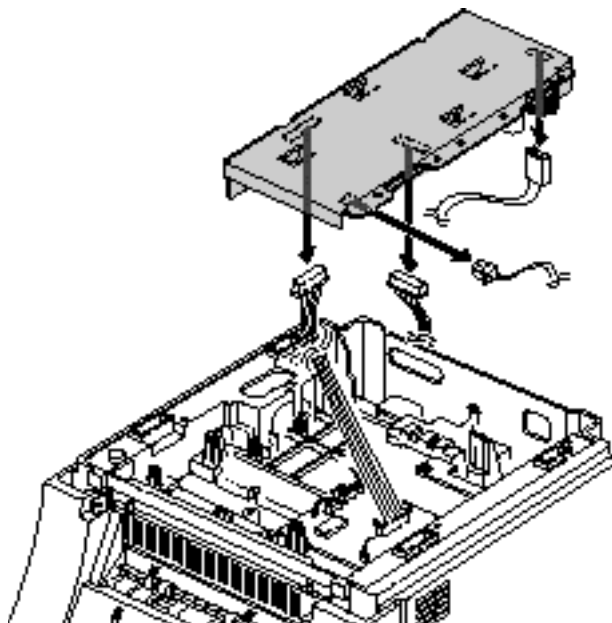
6-18. LIU Board

1. Turn the machine over.

2. Remove three screws securing the shield, then remove the shield.

3. Remove two screws, unplug all connectors from the board, then remove the board. Remove one ground screw.
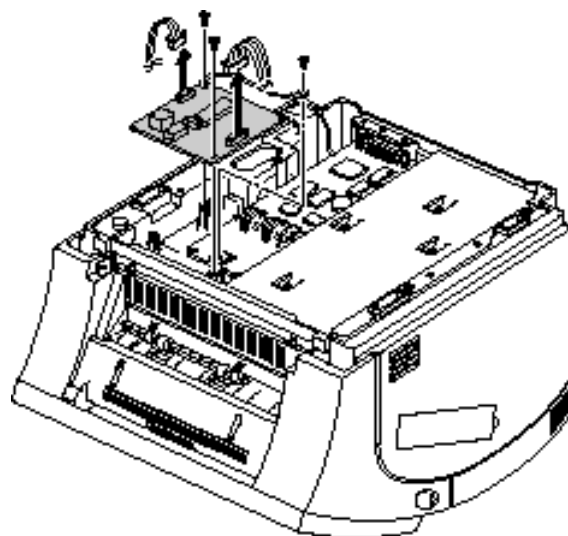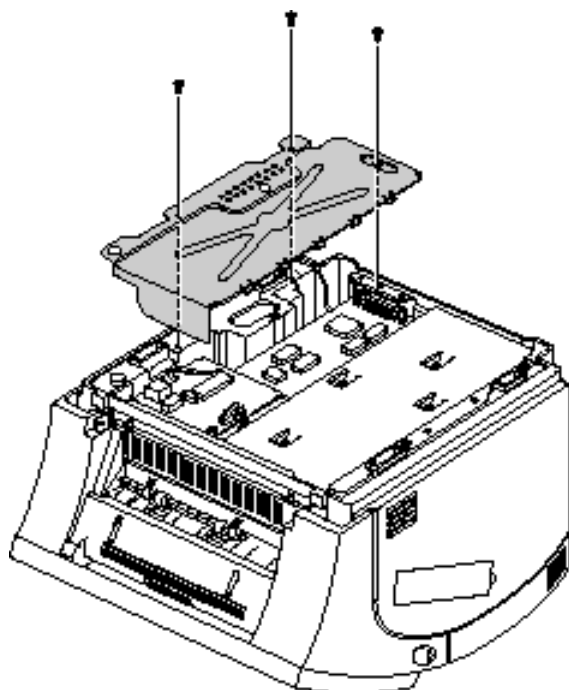
6-19. Main Board

1. Before you remove the main board, you should remove:
   -LIU board (see page 6-15)

2. Remove two screws from the board.
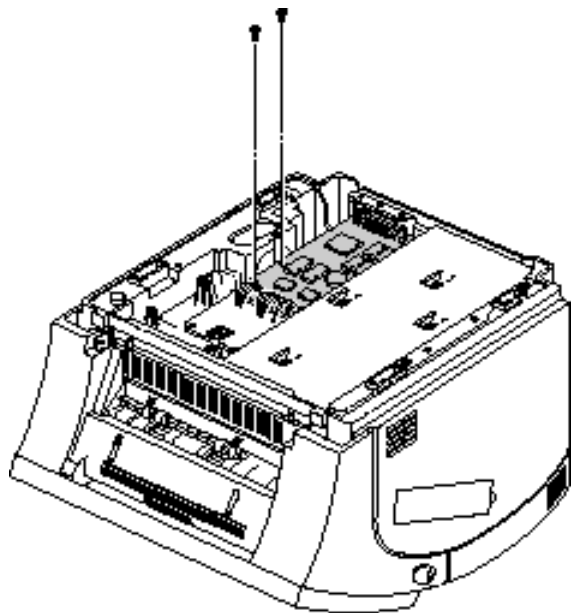
3. Remove two screws securing the printer connector.
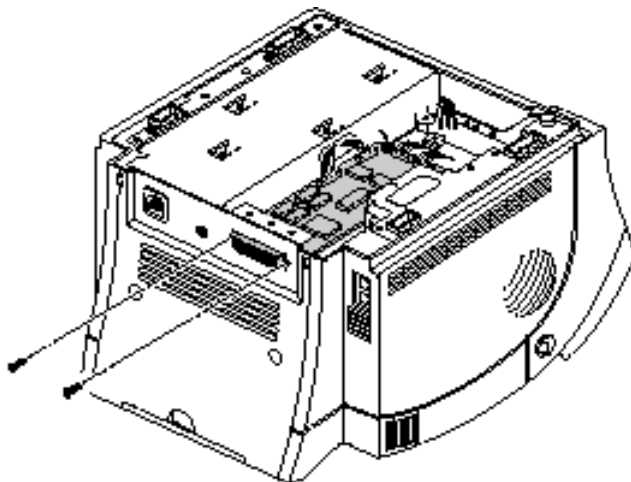
4. Unplug all connectors from the main board, then remove the board.
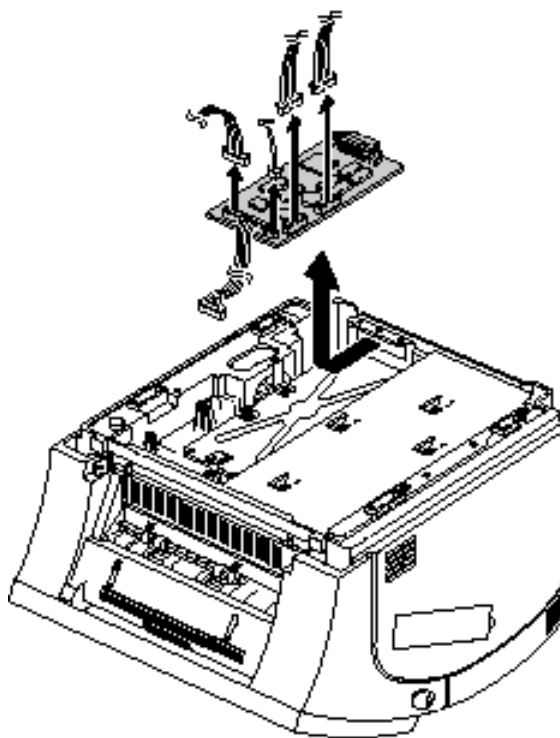
6-20. Joint Board

1. Before you remove the board, you should
   remove:
   -SMPS/Engine control board (see page 6-14)

2. Unplug all connectors from the board, remove
   three screws, then remove the board.
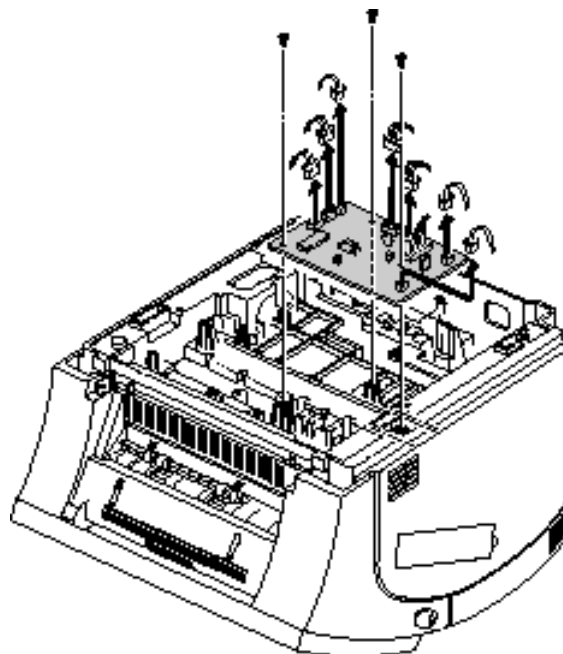
6-21. Sensor Board

1. Before you remove the board, you should
   remove:
   -SMPS/Engine control board (see page 6-14)

2. Remove two screws, unplug one connector fro m
   the joint board, then remove the sensor board.
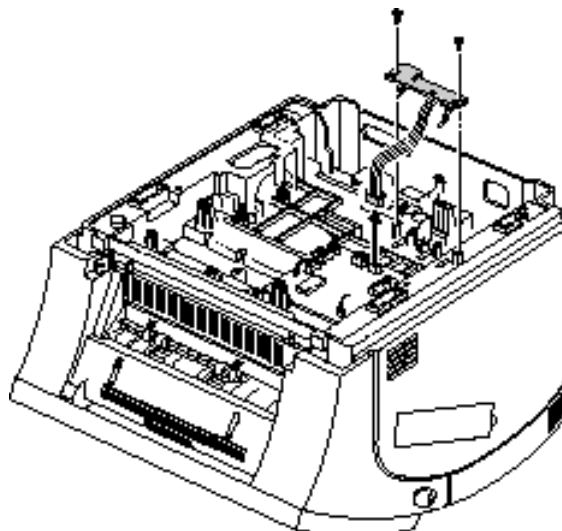
6-22. Gear Bracket

1. Before you remove the gear bracket, you should
   remove:
   –All covers (see pages 6–2, 6–10 to 6–13)

2. Remove six screws securing the gear bracket,
   unplug the connector from the motor, then
   remove the gear bracket.
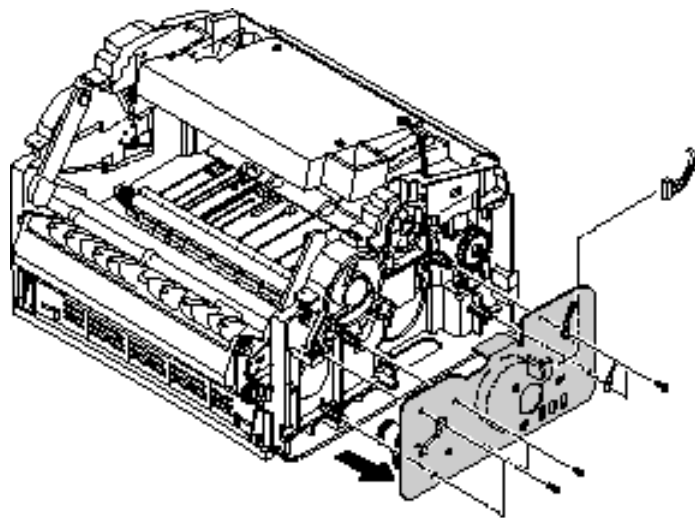
6-23. Motor

1. Before you remove the motor, you should
   remove:
   –All covers (see pages 6–2, 6–10 to 6–13)
   –Gear bracket (see above)

2. Remove three screws, then remove the motor.
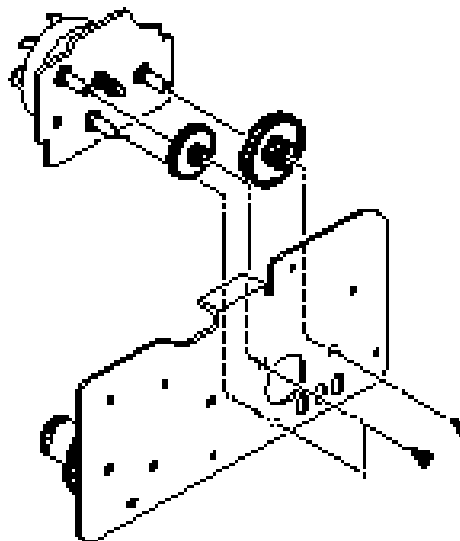
6-24. HVPS Board

1. Before you remove the HVPS board, you should remove:
   –All covers (see pages 6–2, 6–10 to 6–13)

2. Remove five screws from the HVPS board.

3. Unplug all connector from the HVPS board, then remove the board.
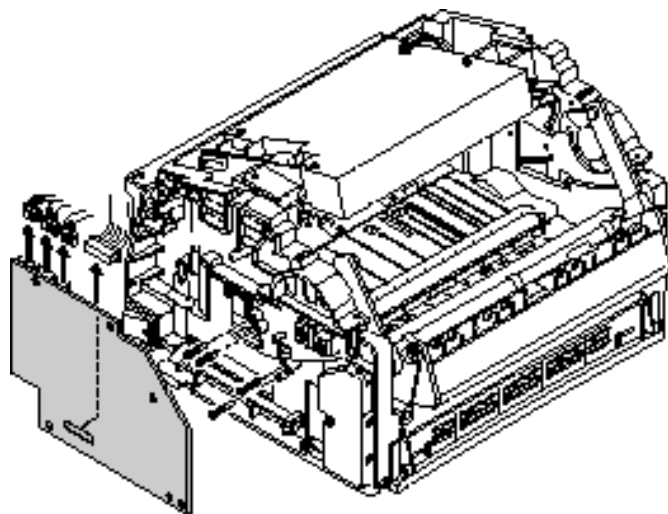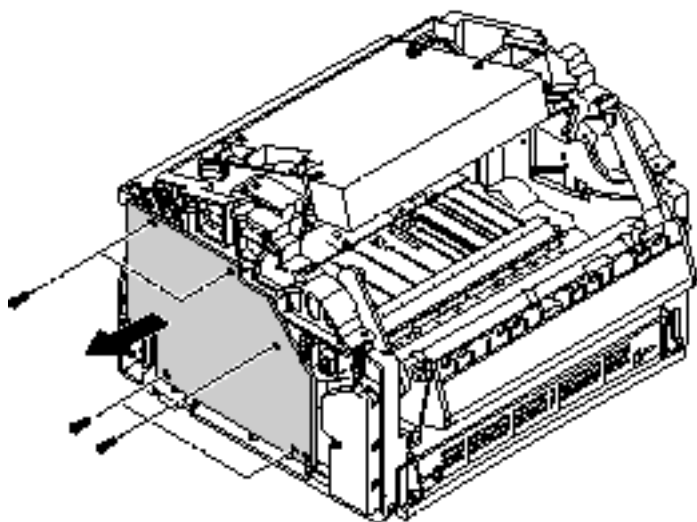
Note: When you reassemble the HVPS board, make sure that the high voltage electrodes are placed correctly.

6-25. Fuser

1. Before you remove the fuser, you should remove:
   –All covers (see pages 6–2, 6–10 to 6–13)

2. Remove the exit guide.
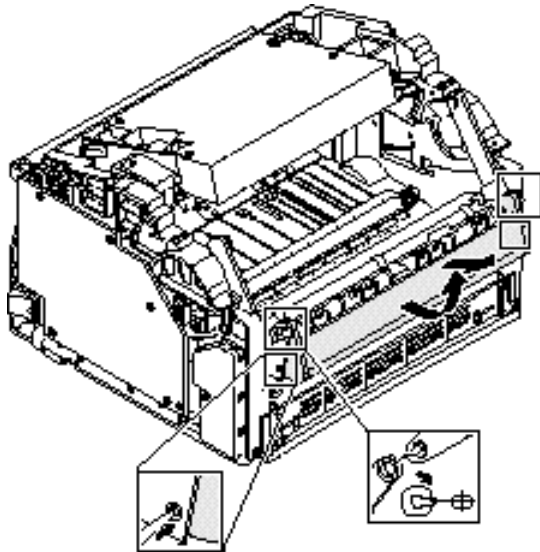
4. Remove four screws.
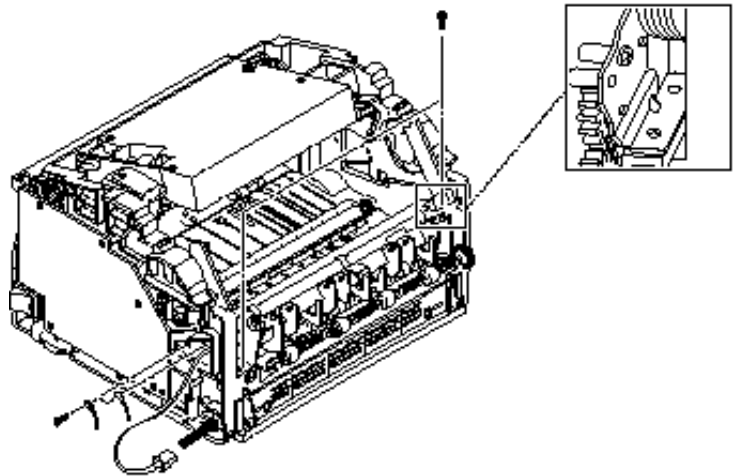
5. Unlatch the fuser using a proper tool.

3. Unlatch the wire cap, then remove the cap at the left side of the frame.
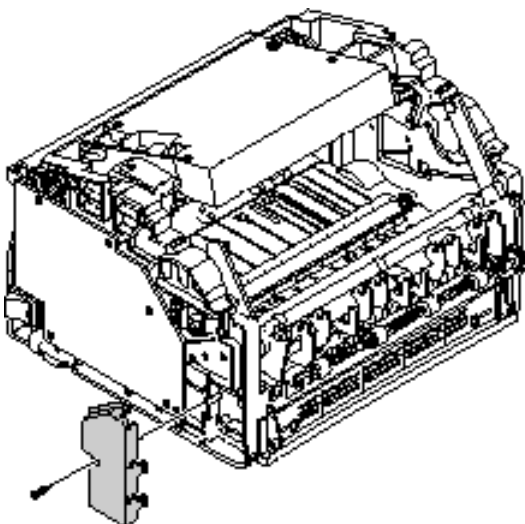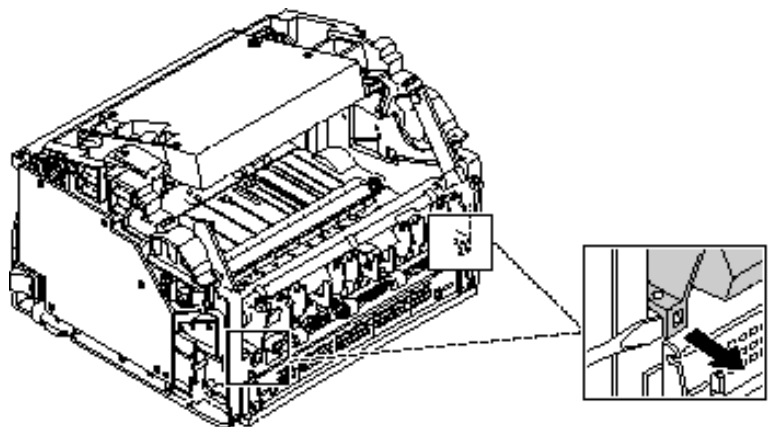
6. Unlatch the right end, then push the right end slightly inward.
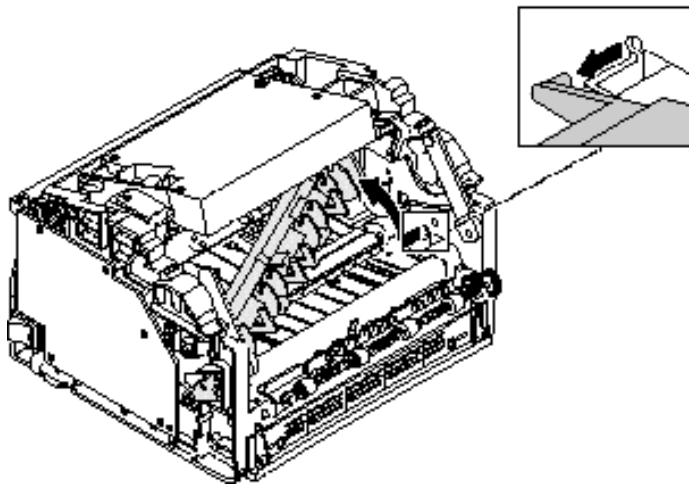
7. Release the left end, then remove the fuser.
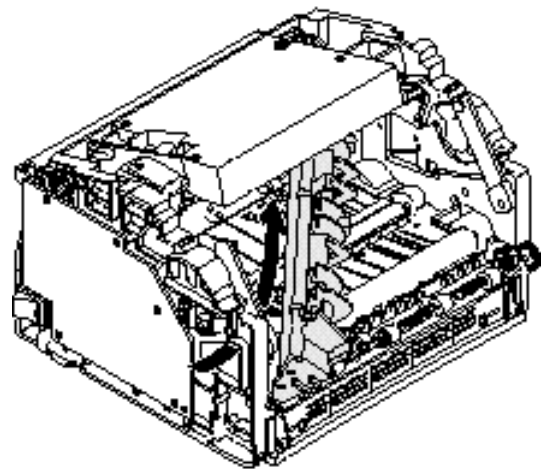
6-26. Pressure Roller

1. Before you remove the roller, you should remove:
   –All covers (see pages 6–2, 6–10 to 6–13)
   –Fuser (see page 6–20)

2. Remove the roller.
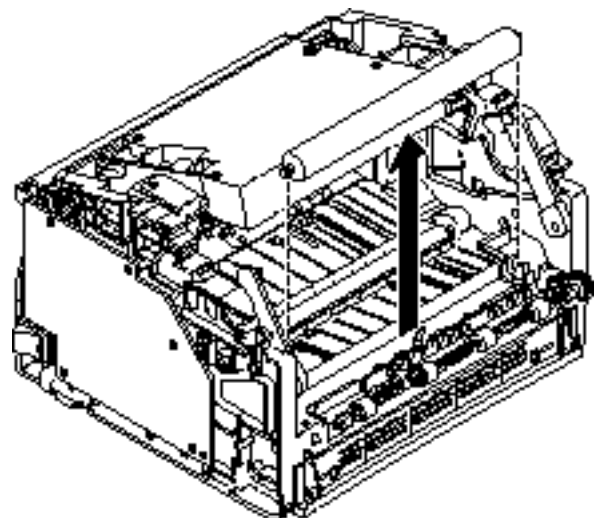
6-27. Upper Frame

1. Before you remove the upper frame, you should
   remove:
   –All covers (see pages 6–10 to 6–13)
   –HVPS board (see page 6–19

2. Remove eleven screws.
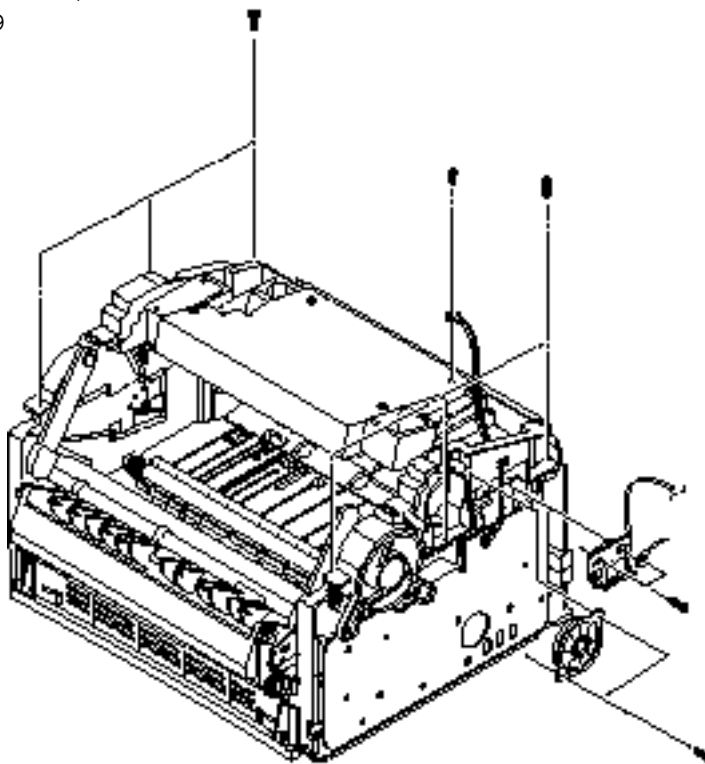
3. Unlatch the front end, then lift the upper frame up.
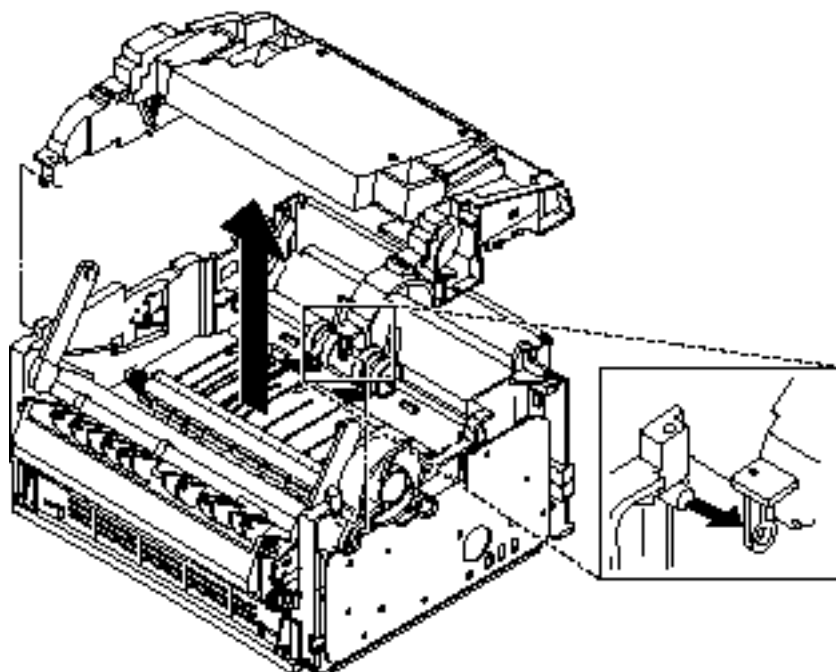
6-28. Pickup Roller

1. Before you remove the pickup roller, you should remove:
   -All covers (see pages 6-2, 6-10 to 6-13)
   -HVPS Board (see page 6-19)
   -Upper Frame (see page 6-22)
   -Gear Bracket (see page 6-18)

2. Remove the pickup cap.
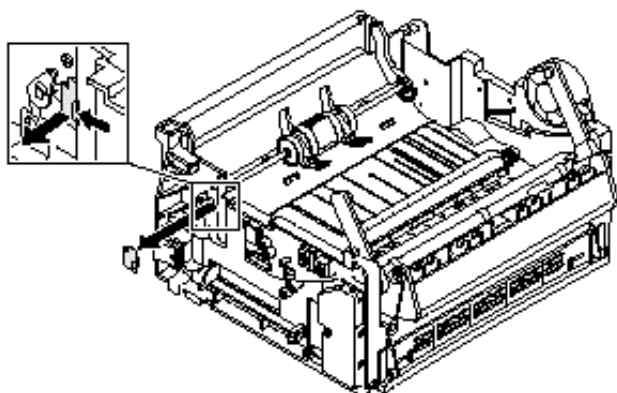
3. Remove one screw, then rotate the pick-up bushing at the left end of the roller clock-wise.
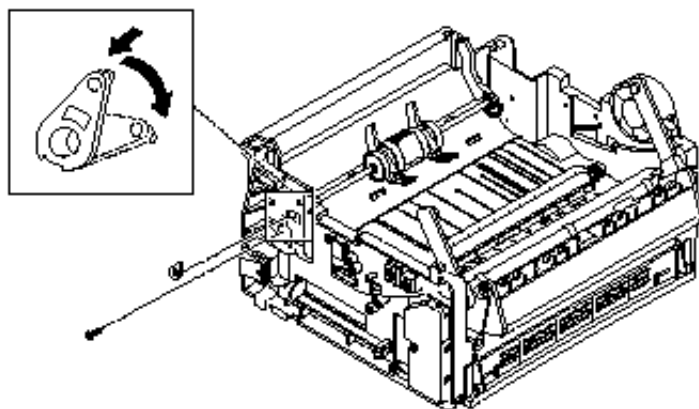
4. Remove E-ring at the right end of the roller, then remove the gear.
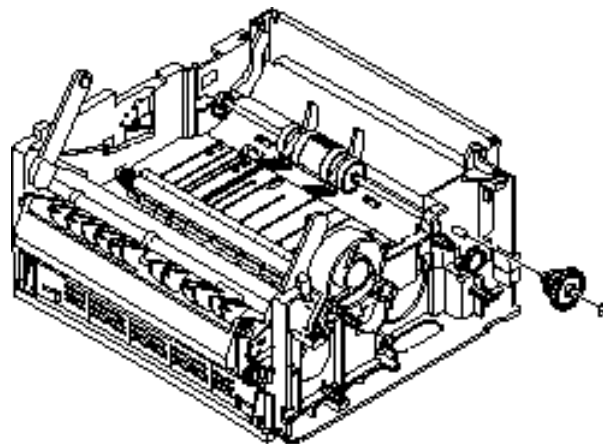
5. Pull the shaft to left to view a pin at the right end, and remove the pin passing through the shaft. Then pull the roller shaft to right, and lift it up.
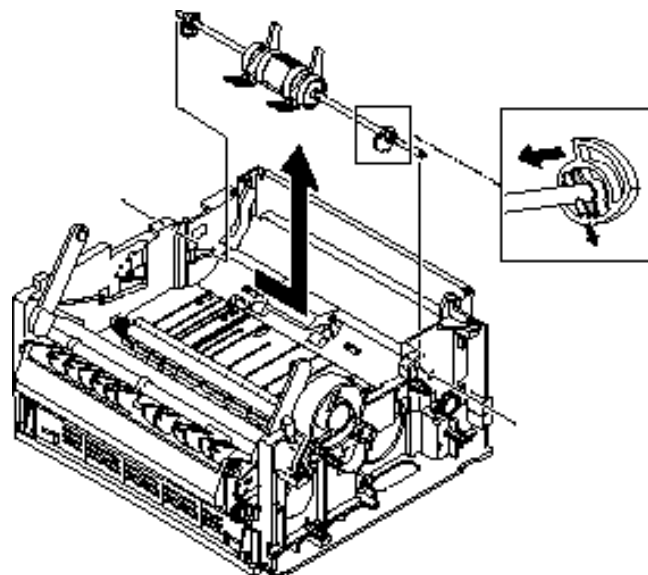
6-29. Halogen Lamp

1. Before you remove the lamp, you should remove:
   -Fuser assembly (see page 6-20)

4. Remove the halogen lamp.

2. Remove two screws from the fuser assembly.
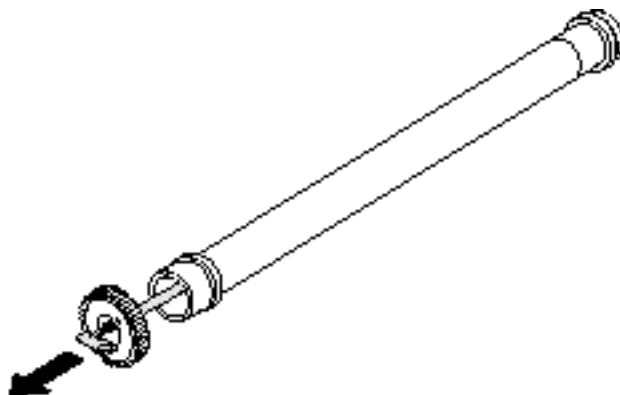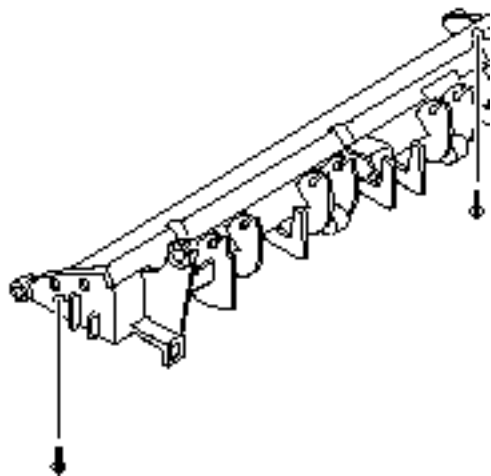
3. Remove the heat roller.
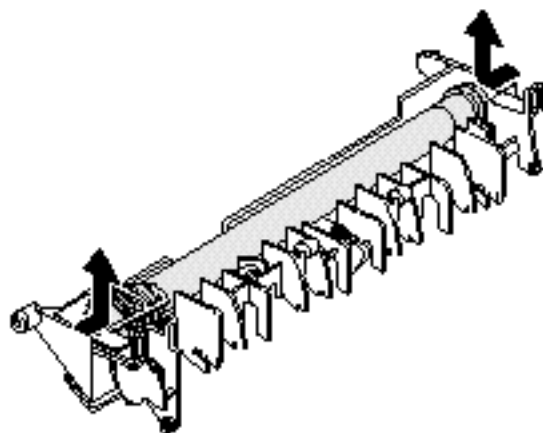
6-30. Thermistor

1. Before you remove the thermistor, you should remove:
   –Fuser assembly (see page 6-20)

2. Remove two screws from the fuser assembly.
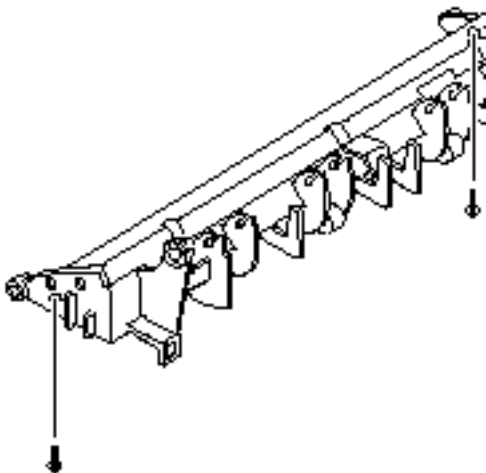
3. Remove the heat roller.
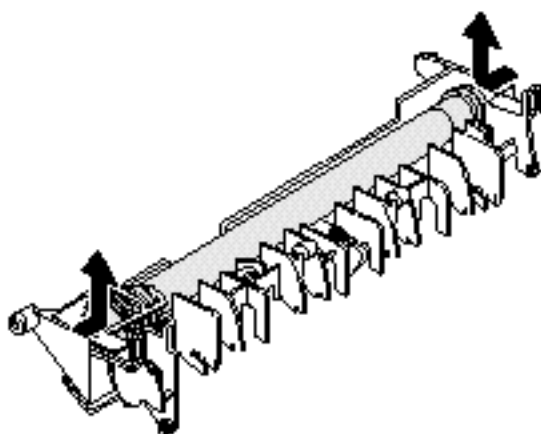
4. Remove two screws, then remove the thermistat.
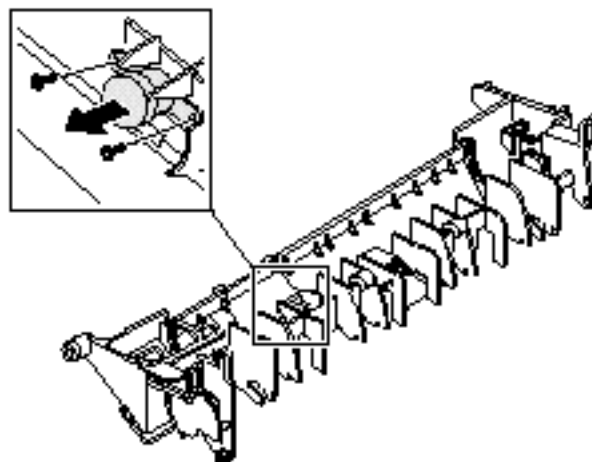
5. Unlatch the fuser cover, then take it out.
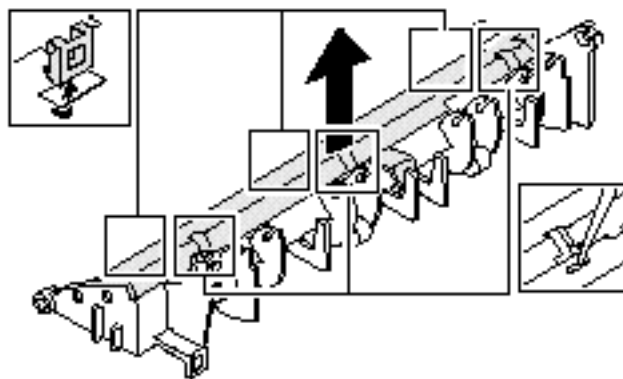
6. Remove one screw securing the thermistor, then remove the thermistor.
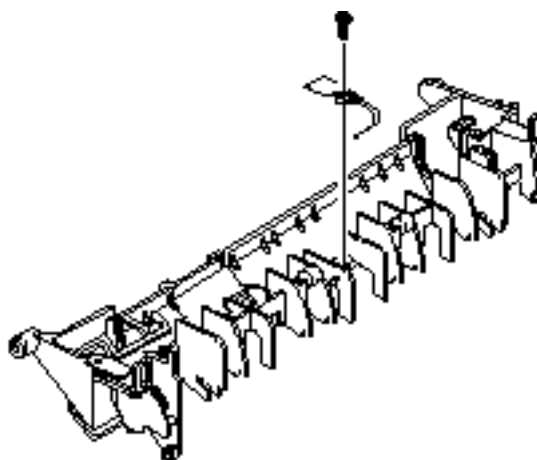
6-31. Exit Guide Assembly

1. Pull the cover release button on both sides of the machine, and open the front cover.
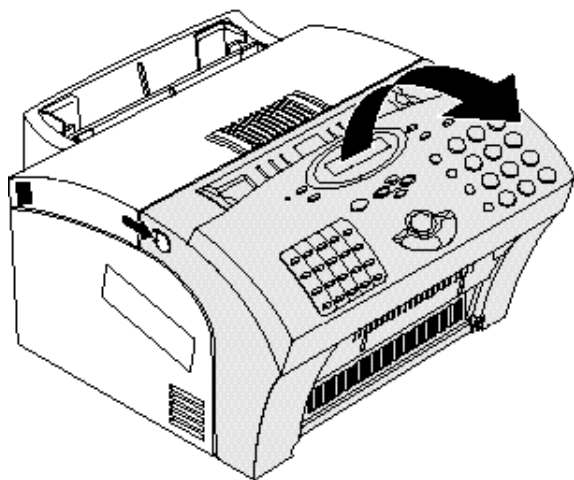
3. Unlatch the guide, then take it out.
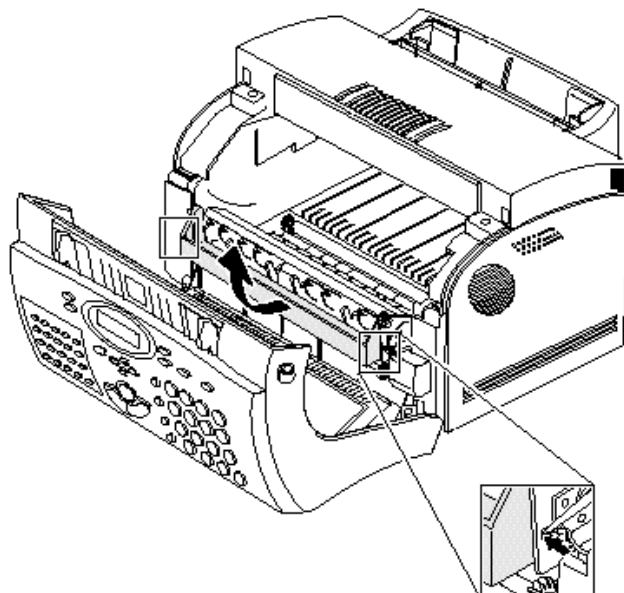
2. Remove the duct cover.
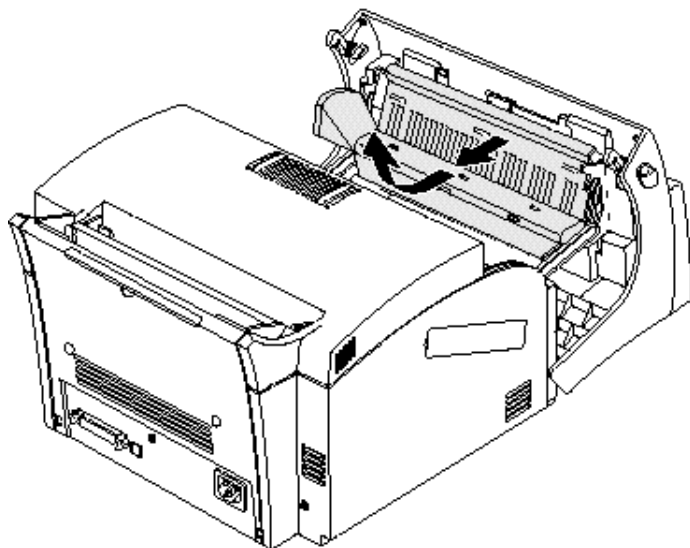
6-32. Exit-Lower Unit

1. Before you remove the exit-lower assembly, you should remove:
   -All covers (see pages 6-2, 6-10 to 6-13)

2. Unlatch the wire cap, then remove the cap at the left side of the frame.
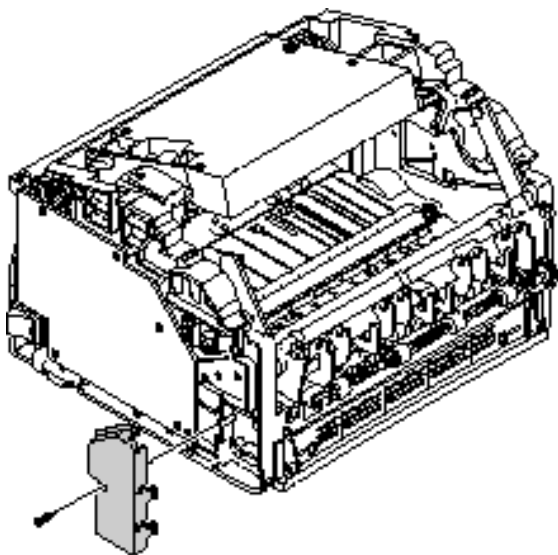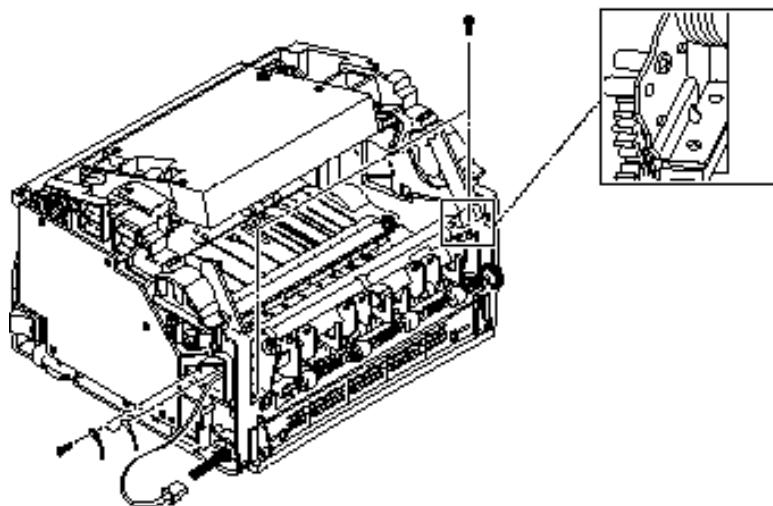
4. Unlatch the fuser using a proper tool.
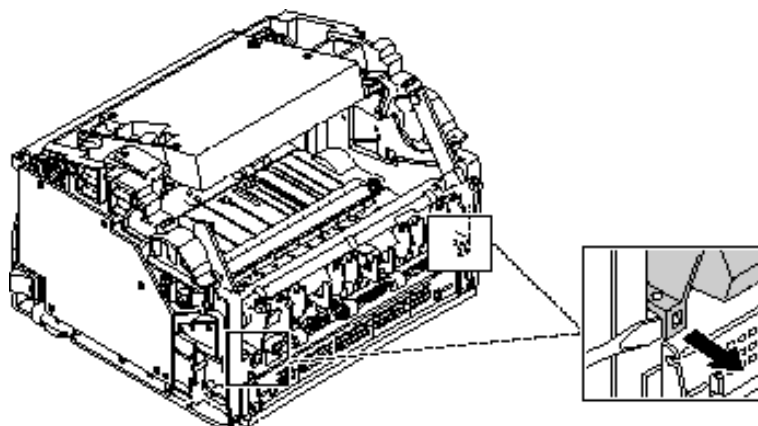
5. Remove one screw, then remove the exit-lower assembly.

3. Remove four screws.
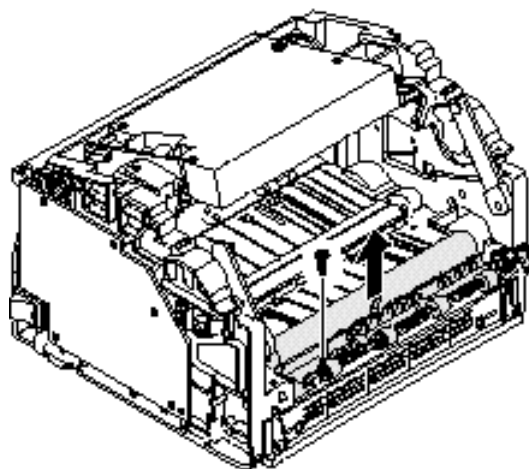
6-33. Speaker Assembly

1. Before you remove the speaker, you should remove:
   - All covers except for left side cover
     (see pages 6-2, 6-10 to 6-13)
   - SMPS/Engine control board (see page 6-14)

2. Remove two screws from the speaker bracket,
   then remove the speaker.

Speaker
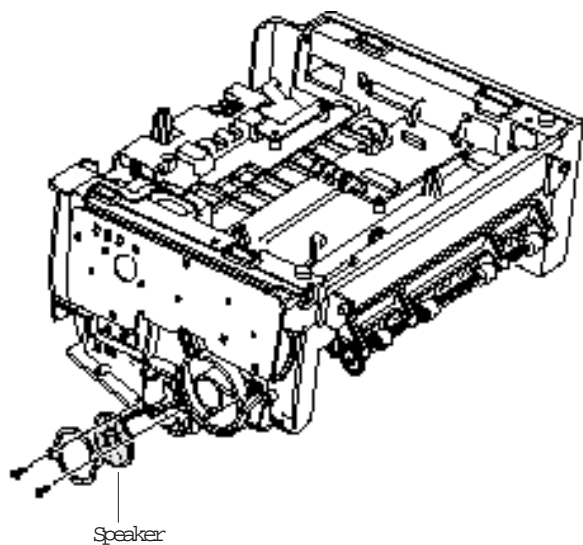
6-34. Solenoid or Fan Motor

1. Before you remove them, you should remove:
   -All covers except for left side cover
     (see pages 6- 2, 6-10 to 6-13)
   - SMPS/Engine control board (see page 6-14)

To remove the solenoid:

Remove two screws securing the solenoid,
unplug one connector from the joint board, then
remove the solenoid.
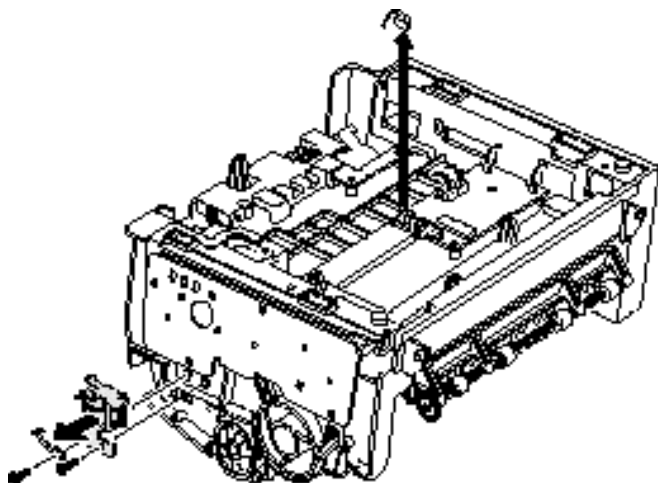
To remove the fan motor:

Remove two screws securing the fan, unplug
one connector from the joint board, then remove
the fan.
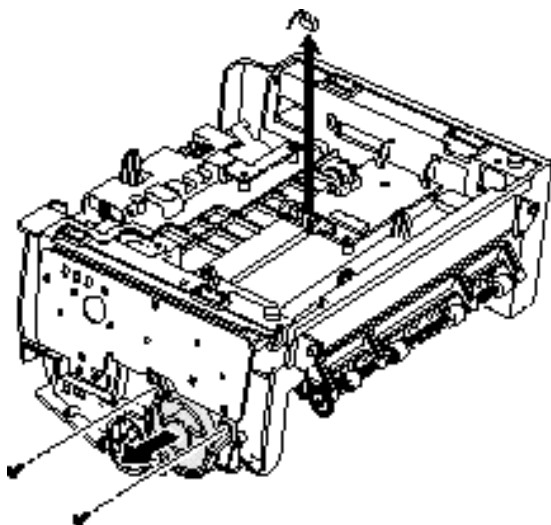
6-35. Frame Unit, P-Empty Assembly, Paper Separator, P-Empty Actuator

1. Before you remove them, you should remove:
   - All covers (see pages 6-2, 6-10 to 6-13)
   - SMPS and Engine board (see page 6-14)

2. Remove two screws, unplug one connector from the joint board, then remove the sensor board.
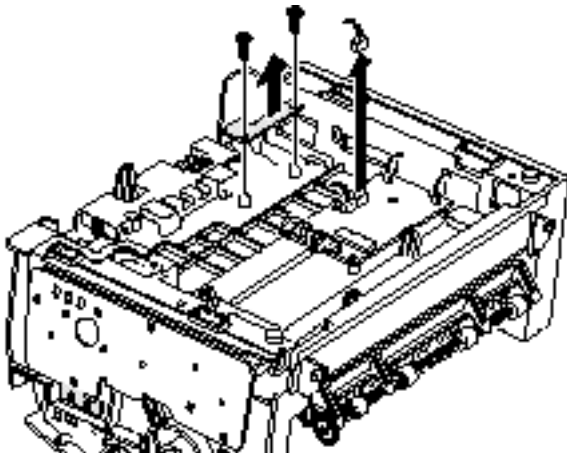
3. To remove the paper empty assembly:

   Remove two screws, unplug one connector from the joint board, then remove the frame unit.
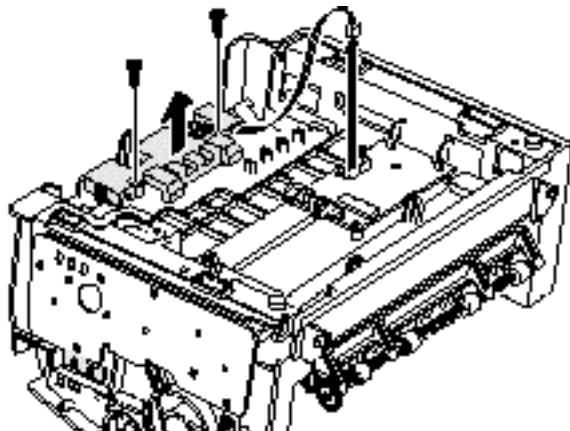
   Then, unlatch the paper empty assembly, and take it out.
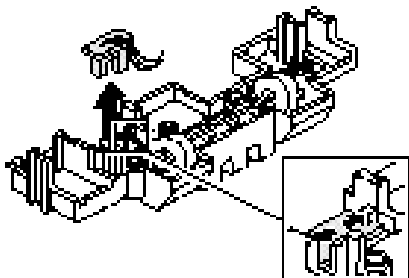
To remove the P-Empty actuator:

Unlatch the P-Empty actuator, then take it out.
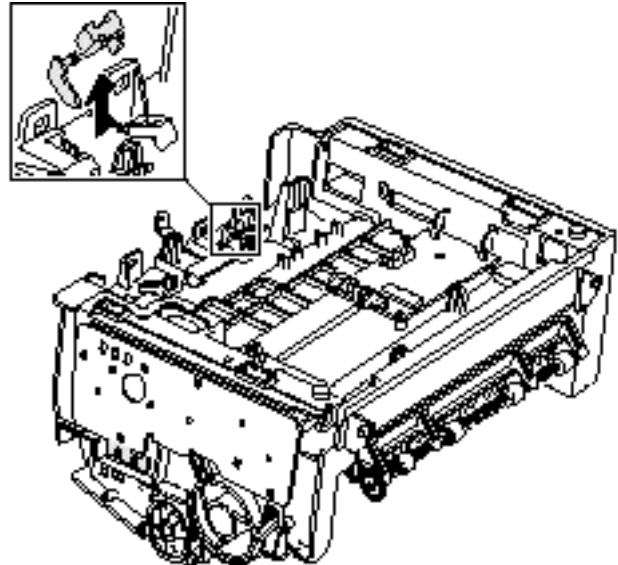
To remove the paper separator:

Unlatch the paper separator, then take it out.
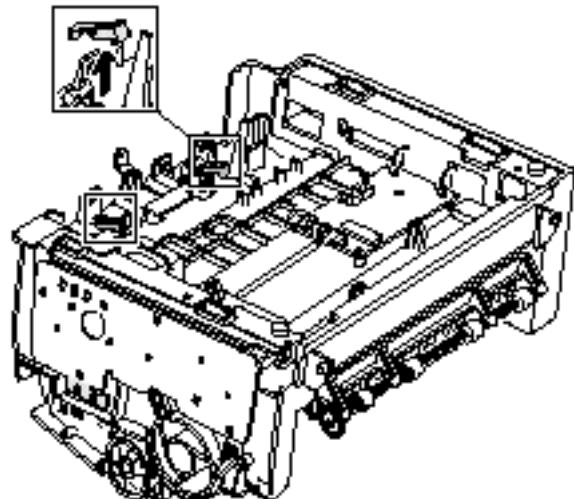
6-36. Knockup Spring, Spring Holder, Separate Unit, Knockup Unit

1. Before you remove them, you should remove:
    - All covers (see pages 6–2, 6–10 to 6–13)
    - Gear bracket (see page 6–18)
    - HVPS board (see page 6–19)
    - Upper frame (see page 6–22)
    - Pickup roller (see page 6–23)

2. Release the springs at both sides of the unit, then remove the knockup unit.
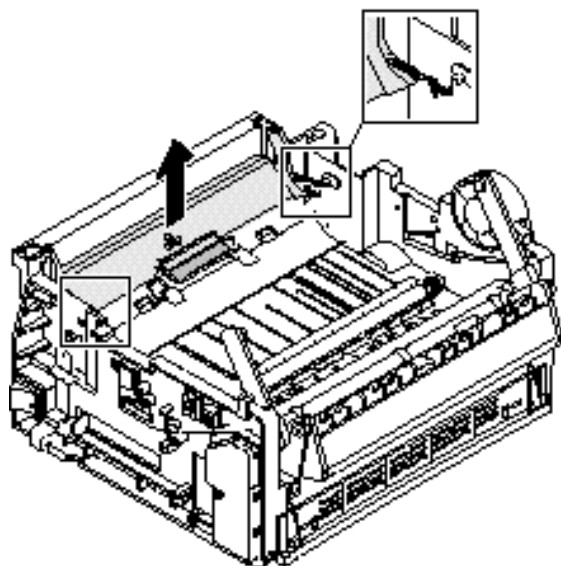
3. Remove the knockup spring.
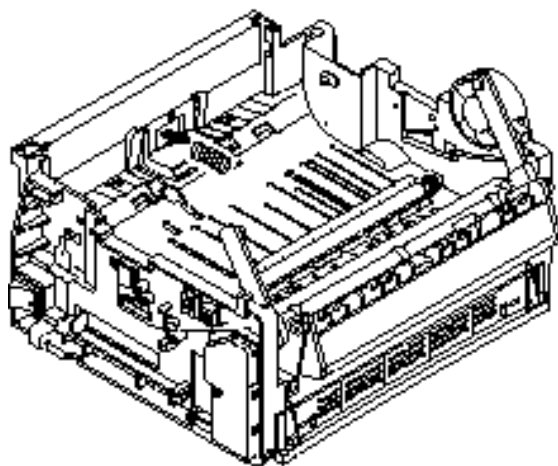
4. Remove the separate unit.
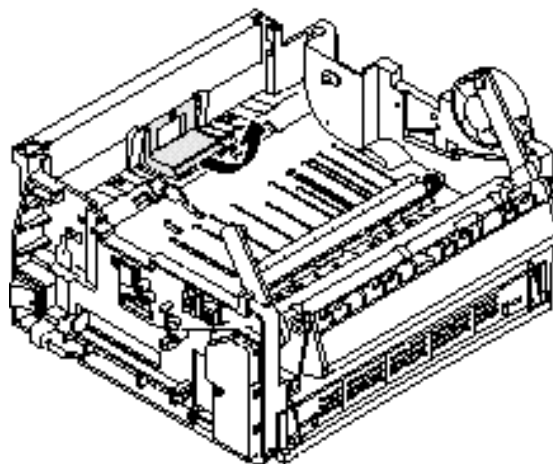
5. Remove the holder spring k–up.
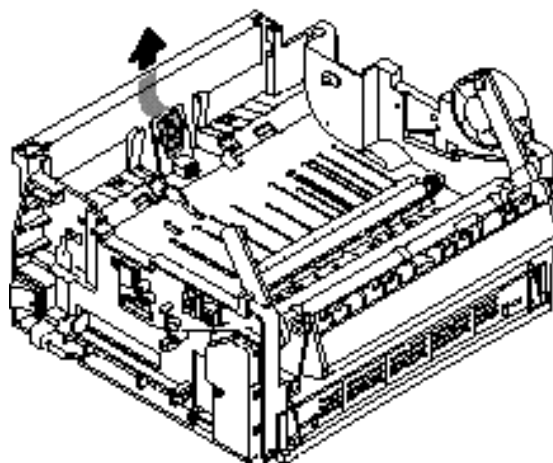
6-37. Paper Separate Units (Left, Right)

1. Before you remove them, you should remove:
   - All covers (see pages 6–2, 6–10 to 6–13)
   - Gear bracket (see page 6–18)
   - HVPS board (see page 6–19)
   - Upper frame (see page 6–22)

2. Unlatch the separate units, then take them out.
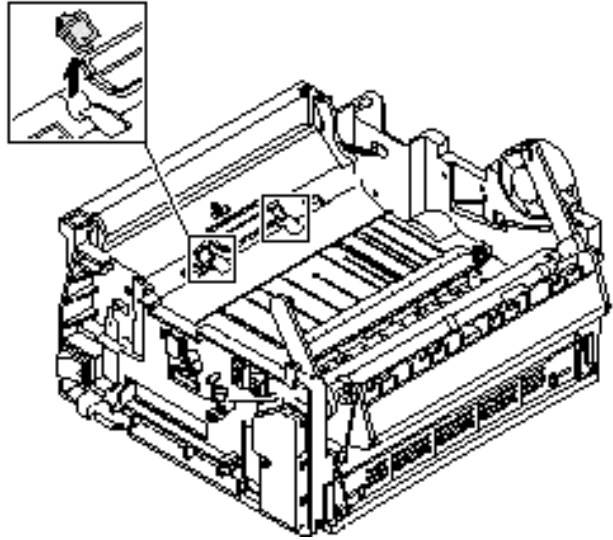
6-38. Gear Feed

1. Before you remove the gear feed, you should remove:
   - All covers   (see pages 6–2, 6–10 to 6–13)
   - Gear bracket (see page 6–18)

2. Remove two screws, then remove the gear feed.
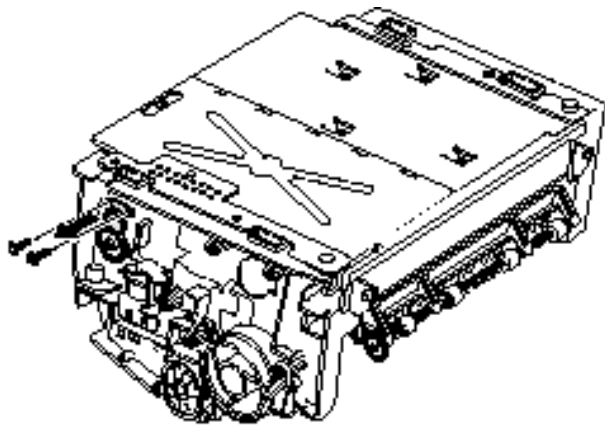
6-39. PTL Unit

1. Before you remove PTL unit, you should remove:
    -All boards (see pages 6–14 to 6–17)
    – Rear cover (see page 6–11)
    -Top cover (see page 6–12)

2. Remove one scre
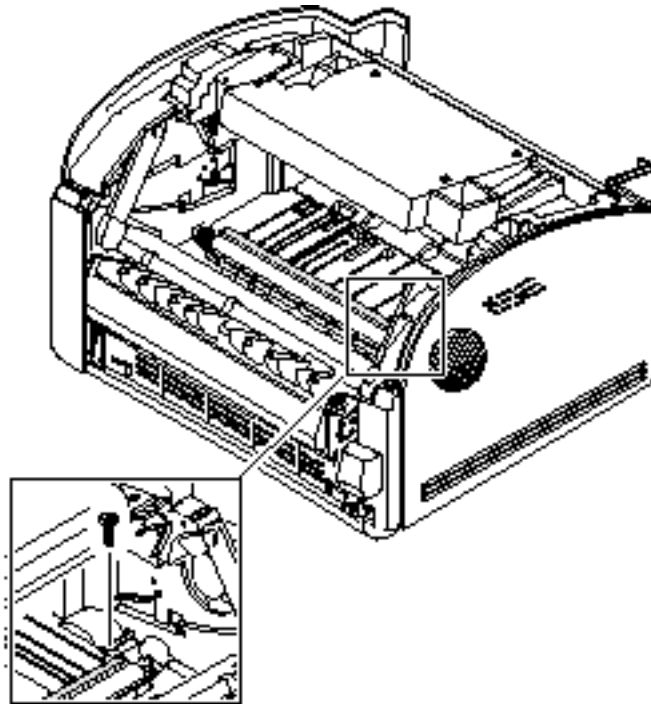
3. Unlatch the PTL unit, then take it out.
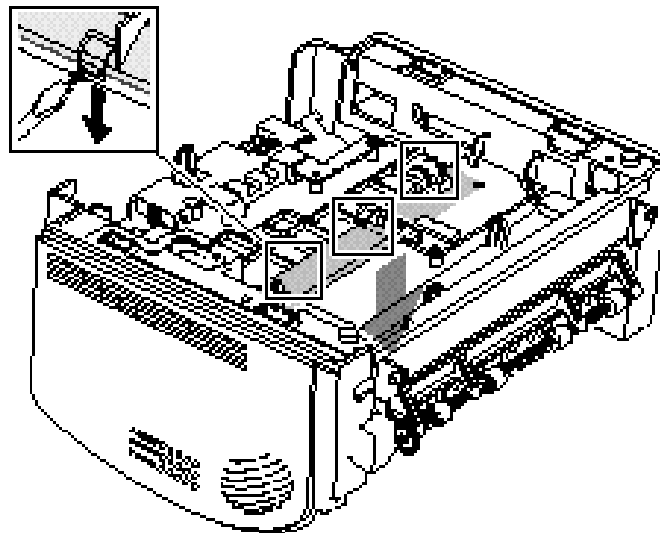
6-40. Fuse Sensor

1. Before you remove the fuse sensor, you should remove:
   - All covers (see pages 6-2, 6-10 to 6-13)
   - HVPS board (see page 6-19)

2. Turn the machine over, then remove the main board. See page 6-29.
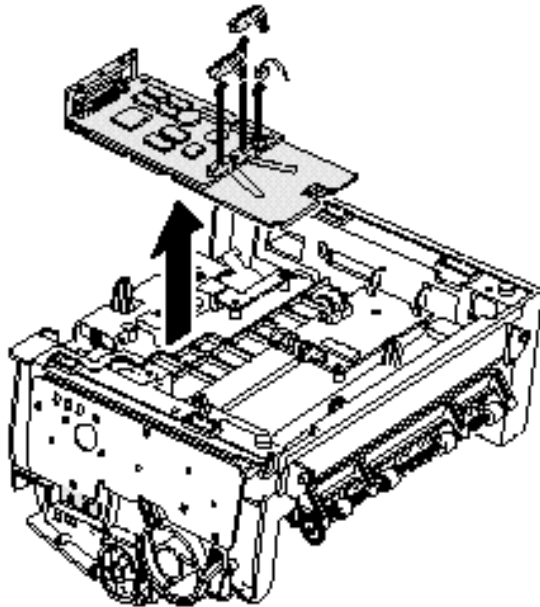
4. Remove one screw, then remove the fuse sensor.

3. Unplug the connector from the joint board.
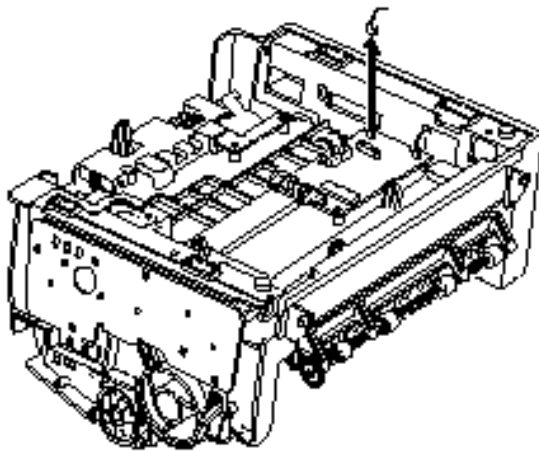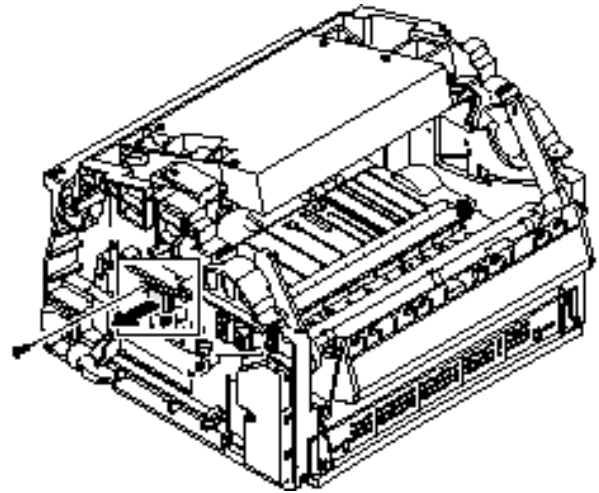
7. Maintenance & Troubleshooting

7-1 Preventative Maintenance

The cycle period outlined below is a general guideline for maintenance. The example list is for an average usage of 50 transmitted and received documents per day. Environmental conditions and actual use will vary these factors. The cycle period given below is for reference only.

	COMPONENT	CLEANING CYCLE	REPLACEMENT CYCLE	SOLUTION
SCANNER	ADF Rubber	6 Months	10,000 Pages	
	ADF Roller	1 Year	20,000 Pages	
	Drive Roller	1 Year	50,000 Pages	
	White Roller	6 Months	50,000 Pages	
	CIS	6 Months		
PRINTER	Cartridge		5,000 Pages	
	Pickup Roller	1 Year	50,000 Pages	
	Feed Roller	1 Year	50,000 Pages	
	Transfer Roller		50,000 Pages	
	Fuser		30,000 Pages	
	Driver		50,000 Pages	

7-2 Diagnostics

This section describes methods and procedures to isolate the cause of a malfunction in the machine. This machine displays diagnostic information on the LCD. In addition, it can perform a series of tests that allow the machine to observe individual machine functions.

7-2-1 Error Messages

Error Message	Description	Solution
BUSY! REDIAL?	The machine is waiting the programmed interval to automatically redial.	You can press START to immediately redial, or STOP to cancel the redial operation.
COMM. ERROR	A problem with the facsimile communications has occurred.	Try again.
DOCUMENT JAM	Loaded document has Jammed in the feeder	Clear the document Jam.

Error Message	Description	Solution
DOOR OPEN or NO TONER	The top cover is not securely latched.	Replace the cover firmly until it clicks in place.
	No toner cartridge in the fax machine. The machine stops.	Install the toner cartridge in place properly.
GROUP NOT AVAILABLE	You have tried to select a group location where only a single location number can be used, such as when adding locations for a multi-dial operation.	Try again, check location for group.
LINE ERROR	Your unit cannot connect with the remote machine, or has lost contact because of a problem on the phone line.	Try again. If failure persists, wait an hour or so for the line to clear then try again.
LOAD DOCUMENT	You have attempted to set up a sending operation with no document loaded.	Load a document and try again.
MEMORY FULL	The memory has become full.	Either delete unnecessary documents, or retransmit after more memory becomes available, or split the transmission into more than one operation.
NO ANSWER	The remote machine was not answered after all the redial attempts.	Try again. Make sure the remote machine is OK.
NO. NOT ASSIGNED	The one-touch or speed dial location you tried to use has no number assigned to it.	Dial the number manually with the keypad, or assign the number.
NO PAPER	The recording paper has run out. The printer system stops.	Load the recording paper in the paper feeder.
OVERHEAT	The printer part has overheated.	Your unit will automatically return to the standby mode when it cools down to normal operating temperature. If failure persists, call service.
PAPER JAM 0	Recording paper has jammed in paper feeding area.	Press STOP and clear the jam.
PAPER JAM 1	Recording paper has jammed inside the unit.	Clear the jam.

Error Message	Description	Solution
PAPER JAM 2	The jammed paper still remains inside the unit.	Clear the jam.
POLL CODE ERROR	When setting up to poll another fax machine, you have used an incorrect poll code.	Enter the correct poll code.
POLLING ERROR	The remote fax machine you want to poll is not ready to respond to your poll.	The remote operator should know in advance that you are polling and have their fax unit loaded with the original document.
POWER FAILURE	A power failure has occurred.	If there has been documents stored in memory. Power failure report will be printed automatically when the power is restored.
PLEASE WAIT	The machine is warming up and is off line.	Wait until the machine is on-line.
FUSER ERROR	There is a problem in the Fuser unit.	Refer to troubleshooting "FUSER ERROR".
ENGINE ERROR	There is a problem in the LSU (Laser scanning unit)	Refer to troubleshooting "ENGINE ERROR".

7-2-2 Test Mode

The test mode is used to test certain functions of the machine. The available tests are:

- • User mode : Self Test
- • Tech mode : Switch Test → Modem Test → Memory Test → ROM Test → DRAM Test → Pattern Test

To enter the Test Mode:

1. Get into the Tech mode by pressing **Menu**,**#**,**1**, **9**,**3**,**4**.

2. In Tech mode, press **Menu**, and 'Maintenance' on the one-touch keypad.

3. Scroll to the options by pressing „ or repeatedly until you find the one you want.

4. Press **Enter** to initiate the test mode.

CLEANING FUSER

This procedure removes excess toner on the OPC drum.

1. Make sure that paper is loaded in the automatic feeder.

2. Press Menu, and Self-Test on the one-touch keypad.

3. Press Enter. The machine automatically pulls in a sheet of paper, and prints out. The toner particles on the OPC drum surface is fixed to the paper.

MAKE SHADING

This procedure is needed to set (make) a new shading reference value. The reference value is preset at factory. However, when the CIS or the main board is replaced with new one, the reference value must be set again.
Load the white, letter-sized paper into the feeder and perform the test mode (MENU+ONE-TOUCH 04 'SYSTEM SETUP'). Follow the next steps as instructed through the LCD window. After the shading value is newly set, the shading value pattern is automatically printed. The shading value pattern shows the value of the white reference level of the Contact Image Sensor. Check for the

waveform in the pattern. It is best when the wave form is level. If there are many points sharply broken, perform the Make shading procedure several times until you get a level waveform.

SWITCH TEST

This test checks the operation of the LCD display and the LED indicators that interface the switches on the operation panel.

MODEM TEST

This test causes the machine to generate a particular frequency to verify the operation of the modem control circuits and the modem.

MEMORY TEST

This test is used for checking the Random Access Memory (RAM) on the main PBA. If all memory is working normally, the LCD shows TESTING OK!. When this testing is carried out, any picture data stored in memory is erased.

ROM TEST

This test mode will display and check the current ROM level in your machine.

```
FLASH VER. : 1.0.0
ENGINE VER : 1.0.1
```

DRAM TEST

This test checks the DRAM memory status and shows if it is functioning properly

PATTERN TEST

1. Pattern Test ?
2. Pattern 1 ? - There are 4 different pattern tests. Scroll to the options by pressing „ or repeatedly until you find the one you want.
3. Press STA RT key.
4. Key in the number of pages.
5. Press STA RT key.

7-2-3 Maintenance List

A number of reports can be printed from the fax machine within the test mode. The protocol list and memory dump list all contain detailed information which may be required when contacting technical support.

To printout the protocol and memory dump lists:

1. Get into the Tech mode by pressing **Menu**,**#**,**1**, **9**,**3**,**4**.

2. In Tech mode, press **Menu**, and '**Tx. Confirm**' on the one-touch keypad.

3. Press „ or ⸗ repeatedly until you find the Protocol Dump List. When you find 'PROTOCOL REPORT?', press ENTER. SAMPLE OF A PROTOCOL DUMP LIST

SAMPLE OF A PROTOCOL DUMP LIST

7-3 Print Quality

Error Status	Check	Solution
Vertical black line and band	1. Bad blade of Toner cartridge 2. LSU	1. Change Toner cartridge 2. Replace LSU
Vertical white line	1. LSU window contamination 2. Toner cartridge	1. Clean LSU window 2. If not LSU, change Toner cartridge
No image	1. Seal tape is removed? 2. GND OPC is well grounded? 3. LSU running well? 4. Biss voltage is normal? 5. Lower toner? 6. Is there video data from controller?	1. Removing seal tipe 2. Measure the resistance between frame ground and the ground spring attached frame. Confirm stable ground. Unless bad ground, detach cabinet, check where is bad point 3.Adjust LSU or replace it 4. Normal Dev bias = -300V 5. Shake toner cartridge and print.If a liitke good, toner is empty 6. Test engine test pattern with DCU, replace Video board
Light image	1. Check seal tape removing 2. LSU light power normal? 3. Enough toner? 4. High charger voltage? 5. Lower bias voltage 6. Contamination of high voltage contact 7. Transfer volatge and roller	1. Check and remove tape 2. LSU light power check is difficult. Compare with new one and check. 3. Check toner and developer counter 4~5. Measure all high voltage output 6. Leakage toner cause bad contact and increase contact resistance. Clean contaminated area.
Dark image	1. LSU light power normal? 2. Bias voltage output is high? 3. Video data is always supplied?	1. Check the rated level and replace 2. Set to power rating 3. Replace defected board
Background	1. High voltage output is normal? 2. C/R of Toner cartridge is contaminated?	1. Adjust to the rated status 2. Replace Toner cartridge
Ghost	1. High voltage output 2. Pre-Transfer Lamp 3. Bad high voltage contact	1. Check every high voltage 2. Check the turn-on PTL, LED crash 3. Clean the inside machine or replace toner cartridge

Error Status	Check	Solution
Stains on back of paper	1. Contamination of transfer roller 2. Stains of paper path 3. Pressure roller's contamination	1. Clean the transfer roller with vaccum cleaner 2. Clean the area of paper path with cloth or air cleaner. 3. Remove fuser and replace it
Poor Fusing	1. Use recommended paper? 2. Check fusing temperature 3. The machine was under the low temperature for a long time?	1. Should use recommended paper 2. Check engine controller board. If you have not thermometer, measure the thermistor voltage to CPU, If 2.98V±5% in printing CPU works well. Then, disassemble fuser and check the thermistor contact and thermistor. 3. Re-check after putting the machine in the warm place for certain period.
Partial blank image (not periodic)	1. Toner is low? 2. The toner cartridge is out of position?	1. Replace Toner cartridge 2. Checkand adjust
Partial blank image (periodic)	1. Develope roller scar or particle 2. Scar or particle (94 mm) 3. Transfer roller scar or particle (47 mm)	1~2. Replace toner cartridge 3. Replace transfer roller
Different image density (left and right)	1. Charge roller's pressure force unbalance 2. Dev. roller and OPC or Dev. roller and blade's pressure force unbalance 3. Transfer roller's pressure force unbalance of each side	1~2. Change toner cartridge 3. Check left and right spring of transfer roller and the spring pressing the developer inside the machine
Horizonral band	1. Unstable high voltage contact 2. Charge roller's contamination 3. Contamination of heat roller 4. Malfunction of LSU	1. Clean each contact and check good contact 2. Clean charge roller 3. Replace fuser unit 4. Check engine controller

No	Roller	Abnormal image period	Kind of abnormal image
1	OPC Drum	96.2mm	White spot
2	Charge Roller	37.7mm	Black spot
3	Supply Roller	31.3mm	Horizontal density band
4	Develope Roller	46.1mm	Horizontal density band
5	Transfer Roller	47.1mm	Black side contamination/transfer fault
6	Heat Roller	56.4mm	Black spot, White spot
7	Pressure Roller	56.5mm	Black side contamination

No Image

Flowchart:

No image? — NO → A on next page

No image? — YES →

Self test pattern prints? — NO → Self testing is possible via DCU?

Self test pattern prints? — YES → Check connection to computer or replace controller

Self testing is possible via DCU? — NO → Re-test after replacing the conector or controller board

Self testing is possible via DCU? — YES → Take out the cartridge and prepare the tester for electronic connection

↓

Is the OPC terminal of machine is well-connected to Frame? — NO → Repair or replace the GND terminal

Is the OPC terminal of machine is well-connected to Frame? — YES →

Does the video data line to LSU transit to High/Low when printing? — NO → Check the path between video controller, engine board and HVPS. Repair or replace the defective component or board

Does the video data line to LSU transit to High/Low when printing? — YES → The mirror in LSU might be misplaced so the light path to the OPC deviates -> Repair or replace LSU or remove any deffective matters in the machine

A

Trnasfer voltage OK? (on the transfer roller shaft)

NO

YES

Are the connection terminal and connection correct?

NO

Repair or replace terminal

YES

Replace HVPS or repair defective component

Developing (-300 V) and supplying (-500V) voltage are OK?

NO

Is the connection terminal OK?

NO

Repair or replace terminal

YES

YES

Replace HVPS or repair defective component

Sealing tape is removed from the cartridge?

NO

Remove the tape

YES

Does the counter indicate over the toner's guarranty life

NO

Transfer roller might be out of its location
-> Locate the roller into its place

This could occurrs when he power of LSU is low or the density is low due to the obstacles on the window
-> Replace LSU or clean the window

YES

Replace the toner cartridge

All Black

```
                                                   Does the
    All black in          NO              Video data line to LSU      NO        Check the path among video
    printing area?                        transit to High Low  when             controller, engine board,
                                          printing?                             HVPS, LSU for the shortage
                                                                                or open -> Repair or replace
         YES                                        YES                          the boards

                                            Replace LSU


    Is transfer            NO                                           Repair or replace HVPS
    voltage supplied
    from HVPS?

         YES


    Is the                 NO                                           Replace LSU
    Hsync/signal received
    in LSU?

         YES


    Transfer parts contact
    is bad -> Repair or
    replace toner cartridge
```

Vertical White Line (Band)

```
┌─────────────┐              ┌──────────────────┐              ┌────────────────────────┐
│  White line │     NO       │  Check if the    │     NO       │ The ribs in fuser or   │
│   missing    ├────────────→│  printout is     ├────────────→│ toner on the roller    │
│ definitely?  │              │ still has the    │              │ may involve the image  │
└──────┬──────┘              │ same problem     │              │ problem -> Replace the │
       │ YES                  │ even right after │              │ fuser cover or the     │
       │                      │ passed through   │              │ defective part         │
       │                      │ the transfer     │              │                        │
       │                      │    roller        │              │ The image is originally│
       │                      └────────┬─────────┘              │ black or the black     │
       │                               │ YES                    │ part is far close to   │
       │                               │                        │ the top -> Use the     │
       ↓                               ↓                        │ pattern which has the  │
┌─────────────────────┐    ┌──────────────────────┐            │ image below bigger     │
│ Dirt or dust stuck  │    │ Toner material might  │            │ than 10mm from the top │
│ onto the window of  │    │ be stuck to blade in  │            └────────────────────────┘
│ internal lens of LSU│    │ the developer inside  │
│ -> Clean it or      │    │ and it prevents toner │
│ replace LSU         │    │ supply -> Replace the │
│                     │    │ developer             │
│ Preventive obstacles│    │                       │
│ through the path    │    │ Check both if the     │
│ between OPC of       │    │ toner cartridge's     │
│ developer and LSU   │    │ counter is over its   │
│ prevent the path    │    │ guaranty and amount   │
│ -> Remove the       │    │ of the toner material │
│ obstacles           │    │ -> Replace the toner  │
└─────────────────────┘    │ cartridge             │
                           └──────────────────────┘
```

Dark Image

```
                    ┌──────────────────┐
         NO         │  Dark selected   │
    ┌───────────────│    via RCP?      │
    │               └──────────────────┘
    │                       │ YES
    │                       ▼
    │               ┌──────────────────┐
    │               │    Change to      │
    │               │  Normal and test  │
    │               └──────────────────┘
    │                       │
    │                       ▼
    │               ┌──────────────────┐      NO     ┌────────┐
    │               │  Same at Normal?  │───────────▶│  END   │
    │               └──────────────────┘             └────────┘
    │                       │ YES
    │                       ▼
    │               ┌──────────────────┐
    │               │   Works cor       │     NO     ┌──────────────────────────┐
    └──────────────▶│ with -300V of Bias│──────────▶│ Repair or replace the     │
                    │    voltage?       │           │ defective component       │
                    └──────────────────┘           └──────────────────────────┘
                            │ YES
                            ▼
                    ┌──────────────────┐           ┌──────────────────────────┐
                    │     Works         │     NO    │ Toner over supply due to  │
                    │  correctly after  │──────────▶│ the adjustment fault of   │
                    │  replaced LSU?    │           │ metering blade in developer│
                    └──────────────────┘           │ -> Replace developer      │
                            │ YES                   └──────────────────────────┘
                            ▼
                    ┌──────────────────┐
                    │ The power of LSU  │
                    │ is set high or    │
                    │ internal problem  │
                    │ -> Replace LSU or │
                    │ adjust voluem     │
                    └──────────────────┘
```

Background

Ghost

Is it regular interval of 94mm?
NO → Is it regular interval of 48mm?
NO → Is it regular interval of 47mm? (as transfer roller interval)

YES ↓ (94mm)

PTL lamp works OK?
NO → Replace PTL assembly

YES ↓

Transfer voltage is set to standard?
NO → Check HVPS contacts and HVPS's self-output
→ If failed, repair/replace HVPS

YES ↓

Bias voltage is OK? (-300V)
NO → Adjust the Bias voltage or replace HVPS

YES ↓

Operating/storage temperature is too low or not recommended paper used?
NO → There may be a problem in toner layer control in toner cartridge
→ Replace the developer

YES ↓

Use the machine with recommended paper and at condition

(48mm branch) YES ↓

Developing/supplying voltage normal? (-300V / -500V)
NO → - Repair or replace HVPS
- Check and Repair or replace the terminal contacts

YES ↓

Irregularity of NIP between rollers in developer
→ Replace developer

(47mm branch) YES ↓

A specific part of the transfer roller has ruined or its resistance value is changed
→ Replace transfer roller

Transfer roller cannot force regularly due to the gears eccentricity of transfer roller
→ Replace the defective component

Black Dot

```
┌─────────────────┐        ┌──────────────────┐        ┌──────────────────┐        ┌──────────────────┐
│  Is it regular  │   NO   │   When taking    │   NO   │    Bad image     │   NO   │  The problem     │
│ interval of 38mm?│ ─────▶ │ out the cartridge,│ ─────▶ │  removes by      │ ─────▶ │ randomly occured │
│                 │        │   toner leaks?   │        │   scratching?    │        │ due to the toner │
└────────┬────────┘        └────────┬─────────┘        └────────┬─────────┘        │ fallen -> Clean the│
         │ YES                      │ YES                       │ YES              │ machine          │
         ▼                          ▼                           ▼                  └──────────────────┘
┌─────────────────┐        ┌──────────────────┐        ┌──────────────────┐
│ The problem occured│     │ Toner leaks and toner│     │ Check toner is stuck onto│
│ since the obstacles│     │ material dropped onto│     │ the P/R or H/R in fuser│
│ stuck to charge roller│   │ the paper -> Replace the│   │ -> Clean it or replace│
│ -> Replace developer│    │ developer        │        └──────────────────┘
│ and C/R         │        └──────────────────┘
└─────────────────┘
```

Horizontal Band

```
Black band? ──NO──▶ Black band          ──NO──▶ The OPC is damaged under the
   │                is far about 10mm from        direct sunlight for around 5
   │                white band?                   minutes -> If the same problem
  YES                  │                          persists in 10 hours, replace
   │                   │                          the developer
   │                  YES
   │                   │
   │                   ▼
   │                Problem of internal
   │                contacts in OPC
   │                -> Replace developer
   ▼
The black      ──NO──▶  This occurs when no
band has regular         Hsync/ at LSU
interval?                -> Replace LSU
   │
  YES
   │
   ▼
94mm interval? ──NO──▶ Does it appear      ──NO──▶ Problems of terminal contact,
   │                   at every 56.1mm at           transfer voltage supplying,
   │                   specific place?               and transfer roller's due to the
  YES                     │                          charge roller is ruined (38mm)
   │                     YES                         -> Repair/replace HVPS,
   │                      │                              developer
   ▼                      ▼
The OPC is damaged due to    Heat roller is ruined
the irregular transfer voltage  -> Replace the roller
of HVPS
-> Repair/replace HVPS
-> If the same problem persists,
   replace the developer
```

Irregular Density

```
┌─────────────────┐   NO   ┌─────────────────┐   NO   ┌─────────────────┐   NO   ┌──────────────────────┐
│   OK after      │ ─────> │  When gray      │ ─────> │   transfer/     │ ─────> │ Defective agitator in│
│  taking out and │        │ pattern printing,│       │ charge/developing│       │ the toner supplying part│
│  rocking the toner│      │ irregular density│       │ voltage drops while│     │ of developer         │
│  cartridge?     │        │  persists?      │        │  printing?      │        │ -> Replace the developer│
└─────────────────┘        └─────────────────┘        └─────────────────┘        │                      │
        │ YES                      │ YES                      │ YES               │ Check if the 'guide deve│
        │                          │                          │                   │ spring' works OK and  │
        │                          │                          │                   │ repair/replace        │
        │                          │                          ▼                   └──────────────────────┘
        │                          │                  ┌─────────────────┐
        │                          │                  │ Check high voltage│
        │                          │                  │ output and repair/│
        │                          │                  │ replace terminals, HVPS│
        │                          │                  └─────────────────┘
        ▼                          ▼
┌─────────────────┐        ┌─────────────────┐   NO   ┌─────────────────┐
│ It is over the guaranty│ │   PTL lamp      │ ─────> │  Replace lamp   │
│ life of toner cartridge│ │  works OK?      │        └─────────────────┘
│ (Check the counter     │ └─────────────────┘
│ and replace it.)       │         │ YES
└─────────────────┘                │
                                   ▼
                          ┌─────────────────┐   NO   ┌─────────────────┐   NO   ┌──────────────────────┐
                          │  Any obstacles  │ ─────> │  Bad images     │ ─────> │ Irregualrity of toner│
                          │ on the PTL lamp?│        │ around the no image│      │ supply from developer│
                          └─────────────────┘        │  area?          │        │ -> Replace developer │
                                  │ YES              └─────────────────┘        └──────────────────────┘
                                  │                          │ YES
                                  ▼                          ▼
                          ┌─────────────────┐        ┌──────────────────────┐
                          │ Clean the window of PTL│  │ Light distortion due to│
                          └─────────────────┘        │ the mirror ruined or  │
                                                     │ LSU's diffused reflection│
                                                     │ -> Replace LSU        │
                                                     └──────────────────────┘
```

White Spot

```
┌─────────────────┐          ┌─────────────────┐          ┌──────────────────────────┐
│  Is it regular  │   NO     │    Transfer     │   NO     │ Too high voltage supplied │
│ interval of 94mm? ├───────▶│ voltage is normal? ├───────▶│ due to the setting error of │
└────────┬────────┘          └────────┬────────┘          │ transfer voltage          │
         │ YES                        │ YES               │ -> Adjust/replace HVPS    │
         ▼                            ▼                    └──────────────────────────┘
┌─────────────────────┐      ┌──────────────────────┐
│ Obstacles stuck on  │      │ D/R in developing unit has │
│ OPC's surface       │      │ the defect            │
│ -> Clean the OPC and│      │ -> Replace the developer │
│    machine or replace│     └──────────────────────┘
│    developer        │
│                     │
│ When putting in/out the │
│ developer, scratch is made │
│ -> Replace the developer │
└─────────────────────┘
```

Trembling at the End When OHP Printing

Poor Fusing Grade

7-4 Malfunction

Error Status	Check	Solution
No power	1. Check power is supplying 2. Check fuse F1 open	1. If supplying power differs from machine's power rating, replace the machine. 2. Replace it.
Fuser Error	1. Thermostat open 2. AC wire open 3. Thermistor wire open 4. Engine Controller	1. Detach AC connector and measure the resistane between pin 1 and 2. If it is megohm, thermostat is open, Replace it. 2. Check bad connector contact or wire is cut. 3. Check thermistor wire and its connection. 4. Replace Engine Control board
Cover open	1. When close Top cover, check the lever is pressed 2. Micro switch's contact 3. CPU and related circuit	1. Open top cover and press the lever with pen. If Controller detects cover close, there is some mechanical trouble in top cover and lever's assembly. If not so there is electrical problem.
Jam 0	Check where Jam 0 happens 1. Paper is not picked up 2. Paper is located in feed sensor 3. Happened when inserting specific papers such as envelope into the MPF (Multipurpose Paper Feeder)? 4. Happened when inserting specific papers such as envelope into the Manual Feeder? 5. Is the Stacker Extender is folded out? 6. Does not the Guide Adjust distort the papers	1. Check whether solenoid is working or not by using DCU mode #6 (Acoustic judgement) 2. Check feed sensor malfunction. Check if it is misplaced with paper width sensor. 3. Re-try inserting a fewer papers. •fan the papers and align •take out the loaded papers and insert them reverse direction 4. Take out the loaded papers and insert them reverse direction •inserted papers as recommended for Manual Feeding? •When loading, tap the papers until paper detect sensor senses loading 5. When using long papers, use the Stacker Extender 6. Adjust Guide to fit the paper width
Jam 1	Paper is stopped in just after of fuser unit.	1. It is mostly resulted from double feeding. Check paper is well stocked in feeder. 2. Check feed actuator position and actuator's operating. There may be stiff movind or double reflection. If not so, check the operation of feed sensor by DCU mode #8. 3. Check exit lever operation. Remore jam and check actuator moving by hand. If actuator is too stiff, paper is wrapped around the heat roller. Remove obstacles or replace.

Error Status	Check	Solution
Jam 2	Check where Jam 2 happens 1. Paper is curled and cannot exit. 2. Paper is curled in the exit cover?.	1. Remove paper using pinset or some tool and watch if separate claws have any troble. Clean around fuser. 2. Check locking works wells. Watch whether the ribs of exit cover hace any burr or resisitive edge. If they do, remove obstacles or replace.
Jam 2 at face-up tray	1. Tried to print and stack pages which are not allowed for specific paper type? 2. Does the too thin paper, which passed through the fuser, touch the Cover Fornt?	1. When using the thick paper such as envelope, card stock, label and OHP, one-sheet printing is recommended 2. To use thin paper, face-down is recommended
Jam 2 at face-down tray	1. Then paper is not drawn in because of the stack of papers in the Out tray 2. Does it curl while coming out?	1. Load recommended quantity of papers 2. Open the Cover Front and check whether roller or spring, which are related to paper out, is not out of position. If so, re-locate or replace.
Cutch error	1. Check the spring of solenoid 2. Check the armature assembly/cushion 3. Electrical check	1. Check whether the spring is expanded or not. 2. Check armature is well installed. It may be unstable assemble. 3. Remove the Joint board.
High voltage error	1. Check the terminal output voltage 2. Check HVPS	1. Remove the Toner cartridge and open the cover and press cover open switch lever and measure the voltage with high voltage probe and sending printing data. If the voltage is normal, change the toner cartridge. 2. Disassemble the left side cover, and check HV of the solder side of HVPS and change it.
Feeding obstacles	1. Does the black film in MPF prevent the paper loading? 2. Does the Plate-knockup prevent the paper loading?	1. Re-insert the film neatly into the front. When inserting it, the Plate-knockup needs to be aligned to the front. 2. Turn the power off and on. Open and close the Top cover to return to the original state.
Skew	Is the Guide adjust set to the paper width?	Fit the paper width using the Guide adjust.

Error Status	Check	Solution
Stacking	1. Took out the Stacker extender to support long papers? 2. Stacked too many papers more than Stacker can hold? 3. Face-up stacker does not neatly stack the papers and stack not in order.	1. Use extender as per the paper length. 2. The Face-up stacker normally can hold 100 pages when using $75g/m^2$, however, stacking capacity can be lowered depending on the type of papers. 3. Face-down stacking is recommended for specific papers and one-sheet feed. So, the multiple page stacking is not guaranteed.
Engine Error	1. Check CBF Harness_5P/6P. (HVPS B'D to LSU) 2. Check CBF Harness-24P. (ENGINE B'D to HVPS B'D) 3. Check CBF Harness-20P. (ENGINE B'D to JOINT B'D)	Refer to troubleshooring "ENGINE ERROR".

No Power (LCD NO display LED Off)

Fuser Error


```
┌─────────────────────────┐
│ Measure the resistance  │
│ at the both ends of AC  │
│ Line with covers open   │
└─────────────────────────┘
            │
            ▼
        ╱Less than 10W?╲  ──NO──►  ┌──────────────────────────────────┐
        ╲             ╱            │ Thermostat is open due to the    │
            │                      │ heat etc.                        │
           YES                     │ -> Replace the thermostat        │
            │                      └──────────────────────────────────┘
            ▼
┌─────────────────────┐
│ Remove the covers   │
└─────────────────────┘
            │
            ▼
    ╱AC is being supplied?╲ ──NO──► ┌──────────────────┐   ┌─────────────────────┐
    ╲                    ╱          │ Re-assemble the  │   │ Check the PC land   │
            │                       │ top cover and    │──►│ fusing control part │
           YES                      │ close it         │   │ and CN202 on the    │
            │                       └──────────────────┘   │ engine board        │
            ▼                                               │ -> Replace the      │
    ╱The voltage          ╲                                 │ component or replace│
    ╱of pin #46 of U5      ╲ ──NO──► ┌──────────────────┐   │ the engine board    │
    ╲(CPU) on the engine    ╱        │ Thermistor,      │   └─────────────────────┘
    ╲is about 3.0V when    ╱         │ connecting point │
       ╲printing?        ╱           │ or engine board  │
            │                        │ defect -> Repair/│
           YES                       │ replace the      │
            │                        │ component/board  │
            ▼                        └──────────────────┘
        ┌───────┐
        │  END  │
        └───────┘
```

Paper Jam (Mis-feeding)

Sounds the solenoid on when starts print?
— NO → The engine board and joint board defected → Replace boards

The solenoid defected → Replace it

YES ↓

Does the paper move?
— NO → The pick-up unit is assembled wrong → Re-assemble or replace the unit

YES ↓

Does the paper move more than 100mm?
— NO → Too many papers in the feeder?
— YES → Reduce the amount and re-test

YES ↓

Feeder sensor and paper width detect sensor are assembled reverse?
— NO → The sensor and joint boards defected → Repair/replace

YES ↓

Switch them

Paper guides fit the paper width?
— NO → Take out the paper and re-insert

YES ↓

Paper end curled?
— NO → Does the extender pulled out?
— NO → Pull out the extender

— YES ↓ (Paper end curled?)
Use the recommended and quality paper

— YES ↓ (Does the extender pulled out?)
<Recommendation>
Use the MPF for the thick paper such as envelope and cardstock

Paper Jam (Jam1)

Paper stopped before the OPC? **NO** → Paper stopped before the fuser? **NO** → The actuator of paper exit sensor works OK? **NO** → Check the actuator exists and its operation and around the engine board → Replace

Paper stopped before the OPC? **YES** → Check the LSU and if it has the defect replace it

The actuator of paper exit sensor works OK? **YES** → Is the paper rolled around the pressure roller? **NO** → Feeds multiple pages? **NO** → Check the roller and ribs of fuser are in place, and remove burrs, if any → Remove the factors of jam

Is the paper rolled around the pressure roller? **YES** → Remove the fuser, remove the paper and replace the pressure roller, if necessary

Feeds multiple pages? **YES** → Remove any factors

Paper stopped before the fuser? **YES** → Severe slow when feeding? **NO** → The paper came out through between fuser and developer? **NO** → Check the input path to the fuser (such as mis-assembly)

Severe slow when feeding? **YES** → Adjust the paper guides to fit the paper width

The force of springs pressing the developer is weak → Check guide-DEVE

The paper came out through between fuser and developer? **YES** → Too thin or sensitive paper to static electricity? **NO** → Check guide transfer is grounded Check the shutter prevents feeding

Too thin or sensitive paper to static electricity? **YES** → Use the recommended paper

Engine Error

```
        ┌──────────────┐
        │    Check     │
        │ CBF Harness-5P/6P │──NO──┐
        │  (HVPS B'D to │      │
        │     LSU)     │      │
        └──────┬───────┘      │
            YES│              │
        ┌──────▼───────┐      │        ┌──────────────────────┐
        │    Check     │      │        │ Try again to connector│
        │ CBF Harness-24P │──NO──┼───────▶│ or                   │
        │ (ENGINE B'D to │      │        │ Replace connector    │
        │   HVPS B'D)  │      │        └──────────────────────┘
        └──────┬───────┘      │
            YES│              │
        ┌──────▼───────┐      │
        │    Check     │      │
        │ CBF Harness-20P │──NO──┘
        │ (ENGINE B'D to │
        │  JOINT B'D)  │
        └──────┬───────┘
            YES│
        ┌──────▼───────┐
        │    Check     │
        │ HVPS B'D CN3-3, │──NO──────────▶┌──────────────────┐
        │ P_MOTOR Signal │              │ Replace ENGINE B'D│
        │    (⎍)       │              └──────────────────┘
        └──────┬───────┘
            YES│
        ┌──────▼───────┐
        │    Check     │
        │ HVPS B'D CN3-4, │──NO──────────▶┌──────────────┐
        │ LREADY Signal │              │ Replace LSU  │
        │    (⎍)       │              └──────────────┘
        └──────┬───────┘
            YES│
        ┌──────▼───────┐
        │    Check     │
        │ HVPS B'D CN4-4, │──NO──────────▶┌──────────────────┐
        │ LDON Signal  │              │ Replace ENGINE B'D│
        │    (⎍)       │              └──────────────────┘
        └──────┬───────┘
            YES│
        ┌──────▼───────┐
        │    Check     │
        │ HVPS B'D CN4-1, │──NO──────────▶┌──────────────┐
        │ HSYNC Signal │              │ Replace LSU  │
        │   (⎍⦀⦀⦀)    │              └──────────────┘
        └──────┬───────┘
            YES│
        ┌──────▼───────┐
        │     END      │
        └──────────────┘
```

Memo

8. Exploded Views and Parts Lists

8-1. Main Assembly

Main Assembly Parts Lists

Location No.	Description	SEC. Code	Q'ty	Remark
0		SF-5800PI/XAR		
		SF-5800PIR/XAR		
1	MEA UNIT-CHUTE ASSY	JC97-01187B	1	
1-1	PMO-DUMMY CHUTE	JG72-40931B	1	
1-2	PMO-CHUTE	JG72-40932B	1	
2	PMO-SIDER R COVER	JC72-41297B	1	
3	PM0-TOP COVER	JC72-41298B	1	
4	PMO-SIDE L COVER	JC72-41296B	1	
5	PMO-DUMMY SIDE	JC72-41342B	1	
6	MEA UNIT-COVER REAR	JC97-01153C	1	
6-1	PMO-TRAY TX	JC72-41095C	1	
6-2	PMO-COVER REAR	JC72-41085C	1	
7	PRA ETC-DEVE ASSY	JC96-00938B	1	
8	ELA HOU-OPE ASS'Y	JC96-00978A	1	
9	ELA HOU-FRAME LOWER	JC96-00966B	1	
9-1	ELA UNIT-MOTOR	JC96-01200A	1	
9-2	ELA UNIT-FRAME UPPER	JC96-01199A	1	
10	PMO-COVER BOTTOM	JC72-41089C	1	
11	ELA HOU-FRONT ASSY(S)	JC96-01252B	1	
12	MEA UNIT-TX STACKER	JC97-01185B	1	
12-1	PMO-STACKER TX(B)	JC72-41331B	1	
12-2	PMO-STACKER TX(A)	JC72-41308B	1	
13	MEA UNIT-RX STACKER	JC97-01186B	1	
13-1	PMO-STACKER RX(A)	JC72-41309B	1	
13-2	PMO-STACKER RX(B)	JC72-41310B	1	
13-3	PMO-STACKER FLIP	JG72-40812A	1	
14	PMO-SCAN COVER	JC72-41299B	1	
15	MEA UNIT-DUCT ASS'Y	JC97-01188B	1	
16	MEA-UNIT TRAY	JC97-01135E	1	
17	IPR-SHIELD EMI	JC70-11013A	1	
18	PBA MAIN CTRL-MAIN	JC92-01036C	1	
19	PBA MAIN-LIU	JC92-01040F	1	
20	PBA SUB-JOINT_LICOH	JC92-01001B	1	
21	PBA MAIN-ENGINE	JC92-01037B	1	
22	SMPS-ORION(110V), AC/DC, 50W	JC44-10504A	1	
23	TELEPHONE CRADLE	JB96-00959A	1	OPTION
24	TELEPHONE	JB96-00960A	1	OPTION
25	TELEPHONE COILED CORD	JG39-60504A	1	OPTION
26	LIU-CRADLE HARNESS	JC39-40593A	1	OPTION
27	UNIT-LSU	JC59-10505A	1	

8-2. OPE Unit Assembly
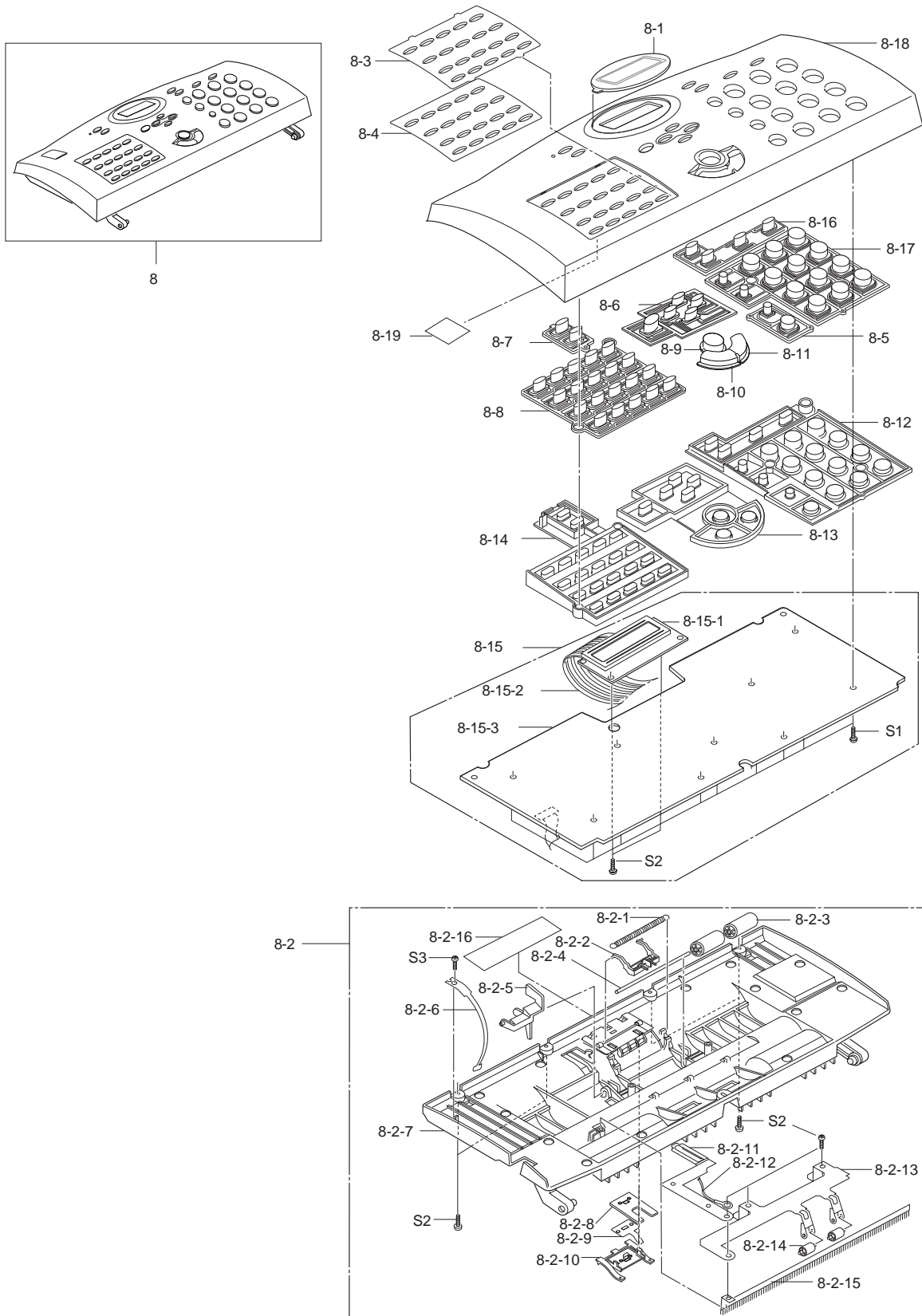
OPE Unit Assembly Parts Lists

Location No.	Description	SEC. Code	Q'ty	Remark
8	ELA HOU-OPE ASS'Y	JC96-00978A	1	
8-1	PMO-WINDOW LCD	JC72-00020A	1	
8-2	ELA HOU-SCAN UPPER	JC96-01250A	1	
8-2-1	ICT-SPRING COIL	JG70-40514A	1	
8-2-2	PMO-SUPPORT ADF	JG72-41083A	1	
8-2-3	PMO-ROLL PINCH	JG72-40663A	2	
8-2-4	ICT-SHAFT PINCH	JF70-40521B	1	
8-2-5	PMO-LEVER SENSOR	JC72-41322A	1	
8-2-6	PMO-TIE STOPPER	JG72-40717A	1	
8-2-7	PMO-SCAN UPPER	JC72-41313A	1	
8-2-8	RPR-RUBBER ADF	JG73-10003A	1	
8-2-9	PPR-SHEET ADF	JB72-10908A	1	
8-2-10	PMO-HOLDER ADF	JG72-40044A	1	
8-2-11	NPR-BRKT SENSOR	JC71-10907A	1	
8-2-12	CBF HARNESS-GROUND	JC39-40611A	1	
8-2-13	MEC-PINCH	JG75-10015A	1	
8-2-14	PMO-ROLLER PINCH	JG72-40663A	1	
8-2-15	MEC-BRUCH ANTISTATIC	JG75-10004A	1	
8-3	MPR-COVER ADDRESS	JG74-10543A	1	
8-4	MPR-PAPER ADDRESS	JC74-10912E	1	
8-5	PMO-KEY OHD	JG72-41056A	1	
8-6	PMO-KEY SCROLL	JC72-00023A	1	
8-7	PMO-KEY MODE(B)	JC72-41320B	1	
8-8	PMO-KEY OT	JG72-41059A	1	
8-9	PMO-KEY STOP	JC72-00018A	1	
8-10	PMO-KEY COPY	JC72-00016A	1	
8-11	PMO-KEY START	JC72-00017A	1	
8-12	RMO-RUBBER TEL	JC73-40911A	1	
8-13	RMO-RUBBER SCROLL	JC73-00004A	1	
8-14	RMO-RUBBER ONE TOUCH	JC73-40912A	1	
8-15	PBA MAIN-OPE	JC92-01038B	1	
8-15-1	DISPLAY LCD	JG07-20001A	1	
8-15-2	CBF HARNESS-LCD	JG39-40012A	1	
8-15-3	PCB MAIN-OPE	JC41-10544B	1	
8-16	PMO-KEY MODE(A)	JC72-41319B	1	
8-17	PMO-KEY TEL	JC72-41402B	1	
8-18	PMO-COVER OPE	JC72-00019A	1	
S1	SCREW-TAPTITE BH,+,B,M3,L5	6003-000114	1	

Location No.	Description	SEC. Code	Q'ty	Remark
S2	SCREW-TAPTITE BH+,B,M3,L8	6003-000119	14	
S3	SCREW-TAPTITE PWH,+,B,M3,L6	6003-000264	1	
8-19	PPR-JACK DUMMY	JF72-10619A	1	
8-2-16	RPR-SHEET OPE	JC73-00005A	1	

8-3. Frame Lower Assembly
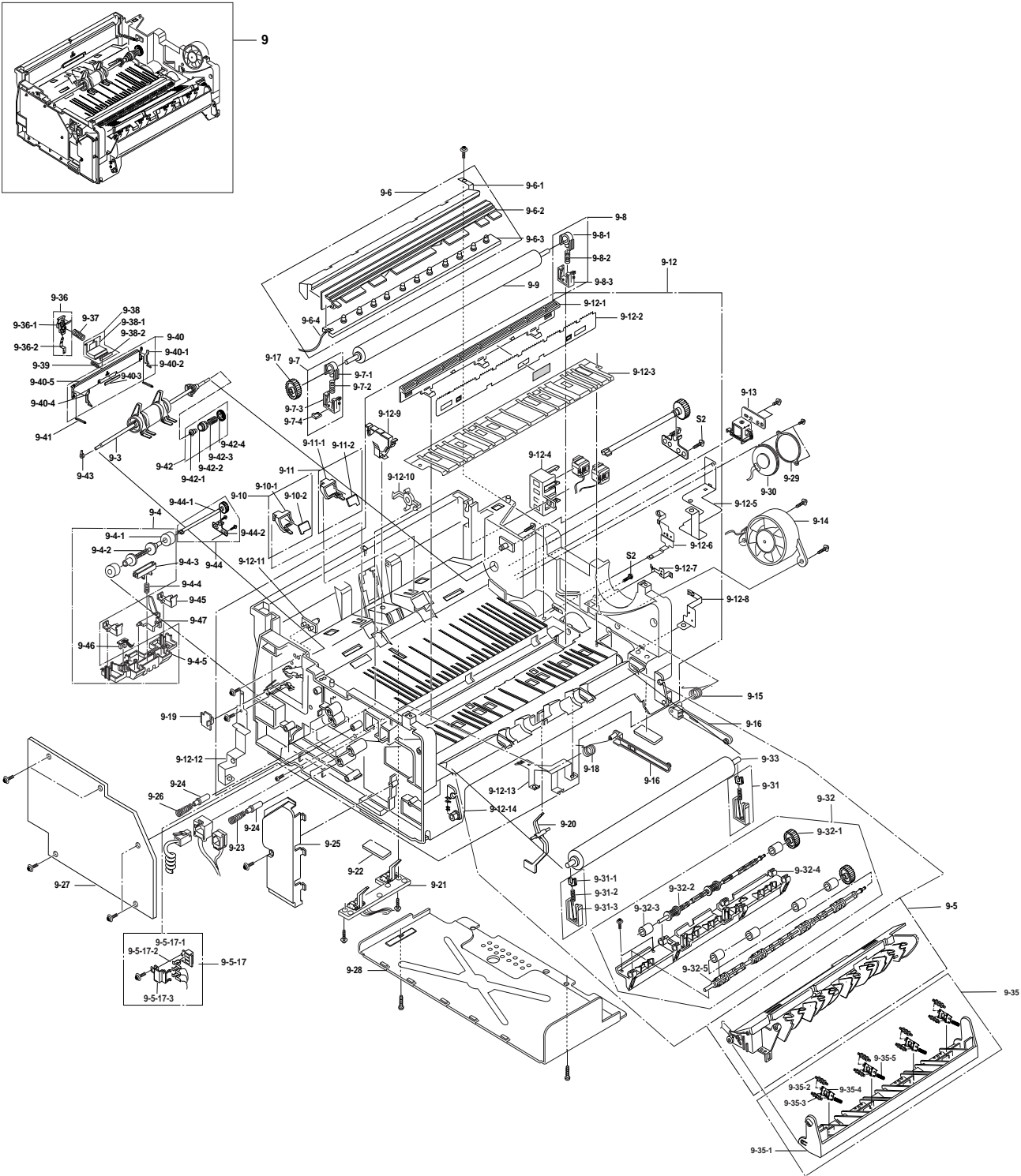
Frame Lower Assembly Parts Lists

Location No.	Description	SEC. Code	Q'ty	Remark
9	ELA HOU-FRAME LOWER	JC96-01257A	1	
9-4	MEA UNIT-FRAME SUP	JC97-01128A	1	
9-4-1	RPR-RUBBER FEED	JC73-10931A	2	
9-4-2	PMO-SHAFT IDLE FEED	JC72-41157A	1	
9-4-3	PMO-BEARING SHAFT, FE	JC72-41160A	1	
9-4-4	SPRING-SPRING FEED	JC61-70959A	1	
9-4-5	PMO-SUPPORT FR/FEED	JC72-41158A	1	
9-5	ELA HOU-FUSER ASS'Y	JC96-00967A	1	
9-5-17	ELA UNIT-FUSE SENSOR	JC96-00976A	1	
9-5-17-1	PMO-CAP PLATE FU L	JC72-41136A	1	
9-5-17-2	IPR-PLATE FUSER DEVE	JC70-11004A	3	
9-5-17-3	PMO-CAP PLATE FU U	JC72-41137A	1	
9-6	ELA UNIT-PTL	JC96-01190A	1	
9-6-1	IPR-GROUND PLT PAPER	JC70-11012A	1	
9-6-2	PMO-COVER QUENCHING	JC72-41176A	1	
9-6-3	LED	0601-001234	16	
9-6-4	CBF HARNESS-2P	JC39-40557A	1	
9-7	MEA UNIT-HOLDER TR L	JC97-01160A	1	
9-7-1	PMO-BUSHING TR	JC72-41142A	1	
9-7-2	SPRING-TR	JC61-70958A	1	
9-7-3	PMO-TRANSFER HOLDER	JC72-41145B	1	
9-7-4	IPR-PLATE TR	JC70-11053A	1	
9-8	MEA UNIT-HOLDER TR	JC97-01112A	1	
9-8-1	PMO-BUSHING TR	JC72-41142A	1	
9-8-2	SPRING-TR R	JC61-70967A	1	
9-8-3	PMO-TRANSFER HOLDER	JC72-41145A	1	
9-9	MEC-ROLLER TRANSFER	JC75-10963A	1	
9-10	MEA UNIT-SEPERATE(L)	JC97-01133B	1	
9-10-1	PMO-HOLDER PAD, L	JC72-41245B	1	
9-10-2	RPR-PAD SEPERATE PA	JC73-10929A	1	
9-11	MEA UNIT-SEPERATE(R)	JC97-01134B	1	
9-11-1	PMO-HOLDER PAD, R	JC72-41246B	1	
9-11-2	RPR-SEPERATE(R)	JC73-10938A	1	
9-12	MEA UNIT-FRAME LOWER	JC97-01238A	1	
9-12-1	PMO-HOLDER PLATE SAW	JC72-41144A	1	
9-12-2	IPR-PLATE SAW	JC70-10232A	1	
9-12-3	IPR-GUIDE TRANSFER	JC70-11063A	1	
9-12-4	PMO-DUMMY JACK	JC72-41304A	1	

Location No.	Description	SEC. Code	Q'ty	Remark
9-12-5	IPR-GROUND MOTOR	JC70-11008A	1	
9-12-6	IPR-GROUND G PAPER	JC70-11007A	1	
9-12-7	IPR-GROUND OPC	JC70-11010A	1	
9-12-8	IPR-GROUND FU	JC70-11006A	1	
9-12-9	PMO-CAP TR	JC72-41292A	1	
9-12-10	PMO-GUIDE BOSS DEVE	JC72-41243A	1	
9-12-11	PMO-HOLDER SPRING	JC72-41156A	2	
9-12-12	IPR-GROUND HVPS	JC70-11009A	1	
9-12-13	IPR-GROUND PLATE SAW	JC70-11011A	1	
9-12-14	PMO-FRAME BASE LOWER	JC72-41140A	1	
9-13	SOLENOID-UNIT	JC33-10004A	1	
9-14	FAN-DC FAN MOTOR	JC31-30502A	1	
9-15	SPRING-STOPPER R	JC61-70971A	1	
9-16	PMO-STOPPER COVER	JC72-41305A	2	
9-17	GEAR-TRANSFER(24)	JC66-40943A	1	
9-18	SPRING-STOPPER L	JC61-70970A	1	
9-19	PMO-CAP PICK UP	JC72-41244A	1	
9-20	PMO-ACTUATOR_EXIT	JC72-41130A	1	
9-21	PBA SUB-SENSOR	JC92-01017A	1	
9-22	RPR-RUBBER FOOT	JC73-10926A	2	
9-23	SPRING-HV LARGE	JC61-70929A	1	
9-24	ICT-SHAFT HV LARGE	JC70-40912A	1	
9-25	PMO-COVER WIRE FU	JC72-41138A	1	
9-26	SPRING-HV SMALL	JC61-70930A	1	
9-27	PBA SUB-HVPS	JC92-01002B	1	
9-28	IPR-SHIELD SIMM	JC70-11015A	1	
9-29	IPR-BRKT SPEAKER	JC70-11061A	1	
9-30	ELA HOU-SPK ASS'Y	JC96-01300A	1	
9-31	MEA ETC-HOLDER P/R	JC97-01204A	2	
9-31-1	BEARING-PRESSURE R	JC66-10205A	1	
9-31-2	SPRING-CS, BEARING PR	JC61-70972A	1	
9-31-3	PMO-HOLDER_P/R BEARI	JC72-41129A	1	
9-32	MEA UNIT-EXIT(LOWER)	JC97-01205A	1	
9-32-1	GEAR-EXIT	JC66-40209A	1	
9-32-2	PMO-GEAR EXIT(18)	JC66-40956A	1	
9-32-3	PMO-EXIT SHAFT	JC72-41343A	1	
9-32-4	RMO-RUBBER EXIT	JC73-40915A	6	
9-32-5	PMO-SUPPORT EXIT	JC72-41315A	1	
9-32-6	PMO-SHAFT EXIT F/DO	JC72-41133A	1	

Location No.	Description	SEC. Code	Q'ty	Remark
9-35	ELA HOU-EXIT ASS'Y	JC96-01254A	1	
9-35-1	PMO-GUIDE EXIT	JC72-41314A	1	
9-35-2	PMO-EXIT_DOWN_S	JC72-41179A	4	
9-35-3	PMO-EXIT_DOWN_L	JC72-41178A	4	
9-35-4	PMO-HOLDER EXIT P/D	JC72-41401A	4	
9-35-5	SPRING-HV SMALL	JC61-70930A	4	
9-36	HOLDER K/SPRING ASS'Y	JC97-01169A	1	
9-36-1	PMO-HOLDER SPR P/UP	JC72-41153A	1	
9-36-2	IPR-GND KNOCKUP	JC70-11016A	1	
9-37	SPRING-KNOCK, UP	JC61-70934A	1	
9-38	MEA UNIT-SEPERATE	JC97-01132A	1	
9-38-1	PMO-HOLDER SEP P/UP	JC72-41152A	1	
9-38-2	RPR-PAD SEPERATE P/U	JC73-10930A	1	
9-39	SPRING-SEPERATE P/UP	JC61-70935A	1	
9-40	MEA UNIT-KNOCK UP	JC97-01127A	1	
9-40-1	PMO-HOLDER K/UP, R	JC72-41166A	1	
9-40-2	IPR-BRKT HOLDER K UP	JC70-11055A	2	
9-40-3	RPR-PAD KNOCK, UP	JC73-10928A	1	
9-40-4	PMO-HOLDER K/UP, L	JC72-41165A	1	
9-40-5	IPR-PLATE KNOCKUP	JC70-11017A	1	
9-41	SPRING-EXTENSION	JC61-70950A	2	
9-42	MEA UNIT-CLUTCH	JC97-01129A	1	
9-42-1	PMO-HUB CLUTCH	JC72-41167A	1	
9-42-2	PMO-COLLAR CLUTCH	JC72-41293A	1	
9-42-3	SPRING-SPRING CLUTCH	JC61-70960A	1	
9-42-4	GEAR-PICK UP(41)	JC66-40944A	1	
9-43	PMO-BUSHING SHAFT	JG72-40849A	1	
9-44	MEA UNIT-GEAR FEED	JC97-01131A	1	
9-44-1	GEAR-FEED(24)	JC66-40941A	1	
9-44-2	PMO-BRKT FEED GEAR	JC72-41159A	1	
9-45	PMO-SEPERATE PAPER	JC72-41155A	2	
9-46	ASS'Y-P. EMPTY	JC92-01044A	1	
9-47	PMO-ACTUATOR EMPTY	JC72-41151A	1	
S2	SCREW-TAPTITE, BH, +, M3, L8	6003-000119	6	

8-4. Motor Assembly
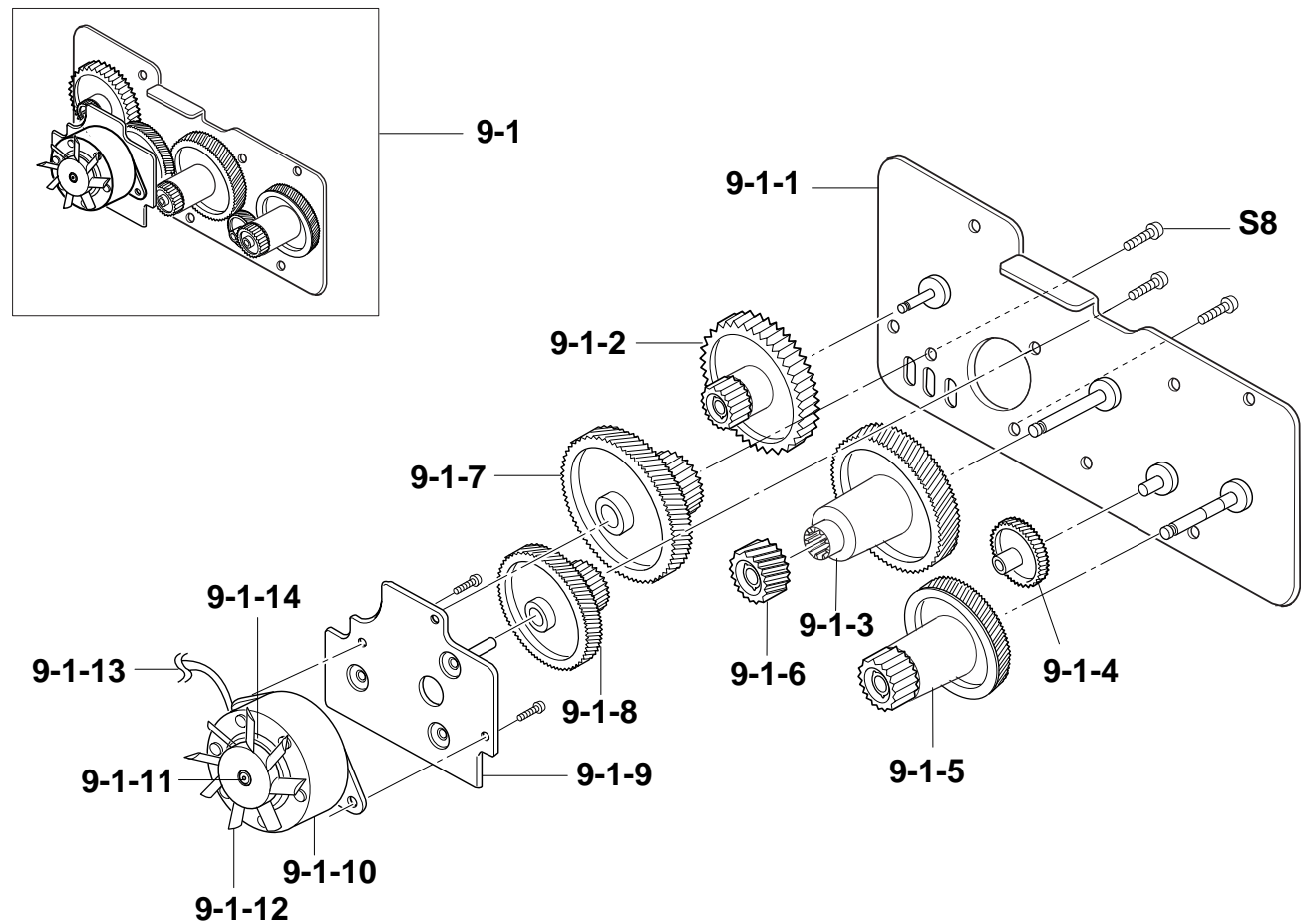
Motor Assembly Parts Lists

Location No.	Description	SEC. Code	Q'ty	Remark
9-1	ELA UNIT-MOTOR	JC96-01200A	1	
9-1-1	IPR-BRKT GEAR	JC60-11019A	1	
9-1-2	GEAR-DRIVE FEED	JC66-40937A	1	
9-1-3	GEAR-OPC DRIVE	JC66-40372A	1	
9-1-4	GEAR-IDLE1(31)	JC66-40942A	1	
9-1-5	GEAR-DRIVE FUSER	JC66-40938A	1	
9-1-6	GEAR-OPC DRV2	JC66-40010A	1	
9-1-7	GEAR-DRIVE2	JC66-40940A	1	
9-1-8	GEAR-DRIVE1	JC66-40939A	1	
9-1-9	IPR-BRKT MOTOR	JC70-11020A	1	
9-1-10	MOTOR-STEP, 7.5 deg, 24 V	3101-001130	1	
9-1-11	WASHER-PLAIN, M3, ID2.5, OD6	6031-000005	1	
9-1-12	PMO-AIRFOIL	JC72-41174A	1	
9-1-13	CBF HARNESS-6 P	JC39-40556A	1	
9-1-14	WASHER-PLAIN, M3, ID3.2, OD5.0	6031-000006	1	
S8	SCREW-MACHINE, BH, +, M3, L6	6001-000131	3	

8-5. Frame Upper Unit Assembly
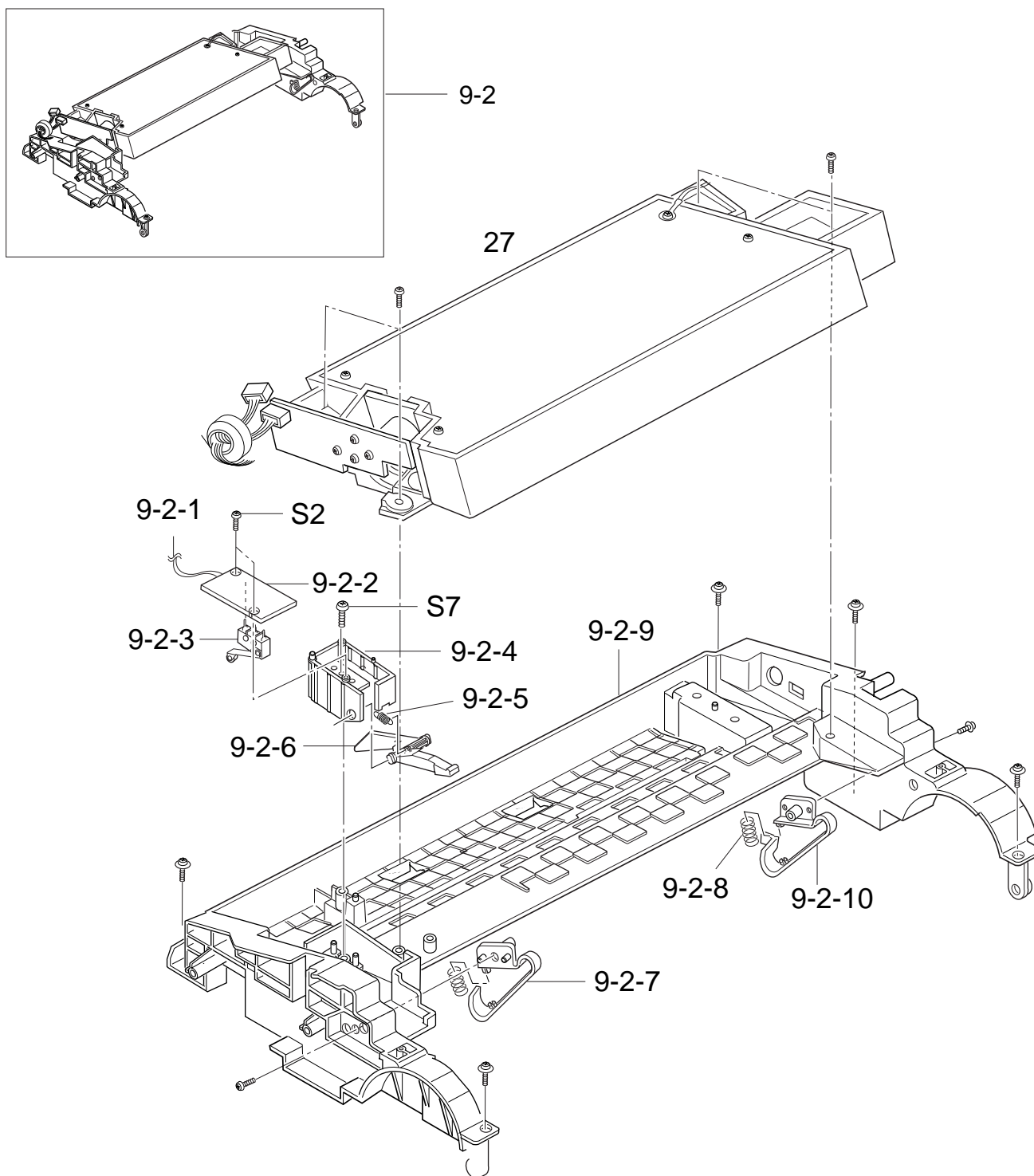
Frame Upper Unit Assembly Parts Lists

Location No.	Description	SEC. Code	Q'ty	Remark
9-2	ELA UNIT-FRAME UPPER	JC96-01199A	1	
9-2-1	CBF HARNESS-3P, 2WIRE	JC39-40551A	1	
9-2-2	PCB-SWITCH_B'D	JC41-10539A	1	
9-2-3	SWITCH-MICRO, 125V, 5A	3405-000125	1	
9-2-4	PMO-COVER CO	JC72-41139A	1	
9-2-5	SPRING-COVER OPEN	JC61-70931A	1	
9-2-6	PMO-ACTUATOR C/O	JC72-41134A	1	
9-2-7	PMO-CAP PLTE G/DEV L	JC72-41173A	1	
9-2-8	SPRING-GUIDE DEVE	JC61-70932A	2	
9-2-9	PMO-FRAME BASE UPPER	JC72-41141A	1	
9-2-10	PMO-CAP PLATE G/DEV R	JC72-41135A	1	
S2	SCREW-TAPTITE BH,+,B,M3,L8	6003-000119	2	
S7	SCREW-TAPTITE, BH, +, B, M4, L10	6003-000003	1	
27	UNIT-LSU	JC59-10505A	1	

8-6. PICK-UP Unit Assembly
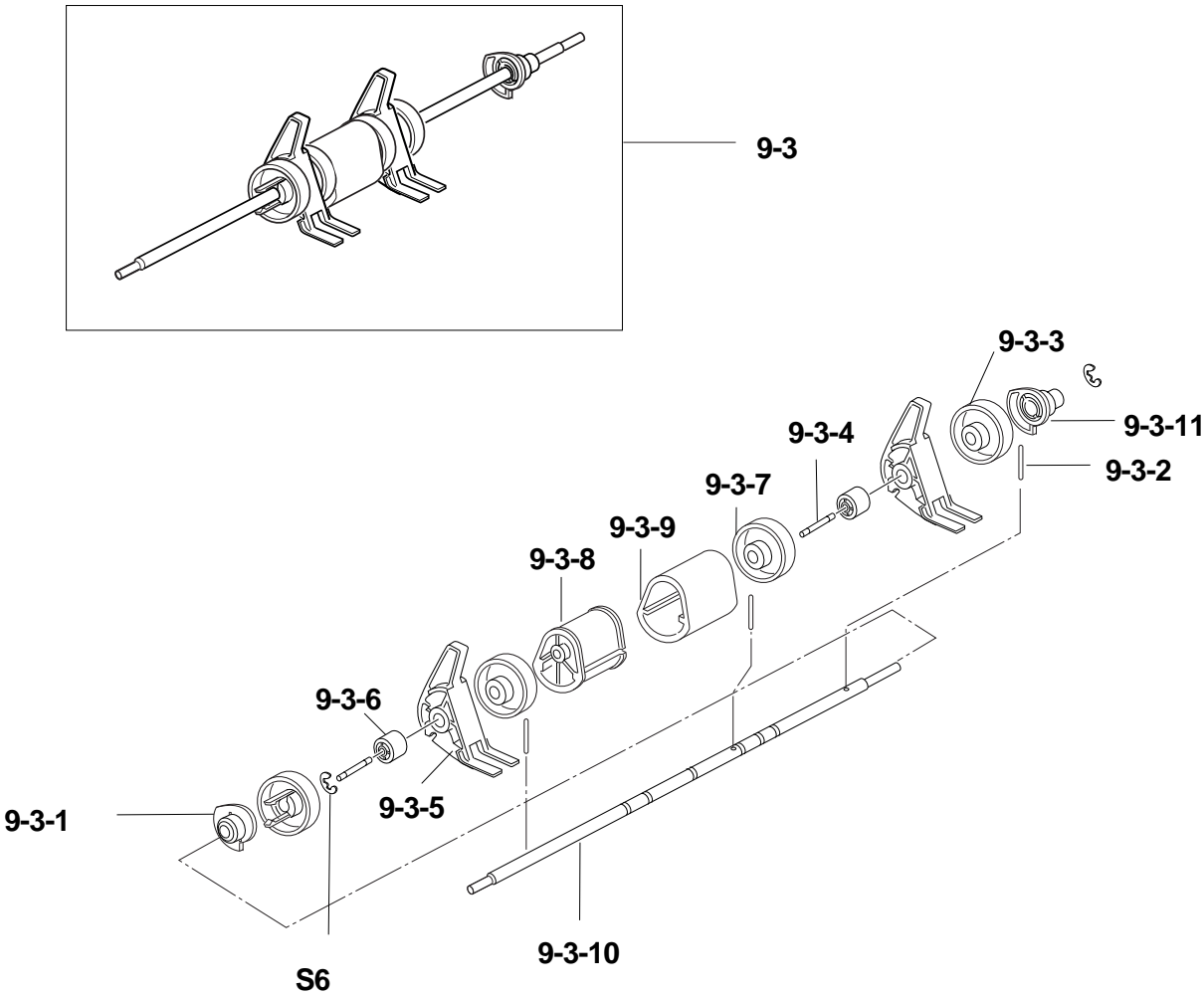
Pick-up Unit Assembly Parts Lists

Location No.	Description	SEC. Code	Q'ty	Remark
9-3	MEA UNIT-PICK UP	JC97-01130A	1	
9-3-1	PMO-CAM KNOCKUP, L	JC72-41161A	1	
9-3-2	ICT-PIN P/UP SHAFT	JC70-40914A	3	
9-3-3	PMO-GUIDE ROLL PA, LA	JC72-41169A	2	
9-3-4	IPR-SHAFT FEED IDLER	JC70-10230A	2	
9-3-5	PMO-GUIDE PAPER, FEED	JC72-41164A	2	
9-3-6	PMO-ROLLER FEED L	JC72-40261A	2	
9-3-7	PMO-GUIDE ROLL, PAPER	JC72-41163A	2	
9-3-8	PMO-HOUSING PICK UP	JC72-41154A	1	
9-3-9	RPR-RUBBER PICK/UP	JC73-10932A	1	
9-3-10	ICT-SHAFT PICK UP	JC70-40915A	1	
9-3-11	PMO-CAM KNOCKUP, 4	JC72-41162A	1	
S6	RING-C, ID5, OD11, 50.6	6044-000156	2	

8-7. Fuser Assembly
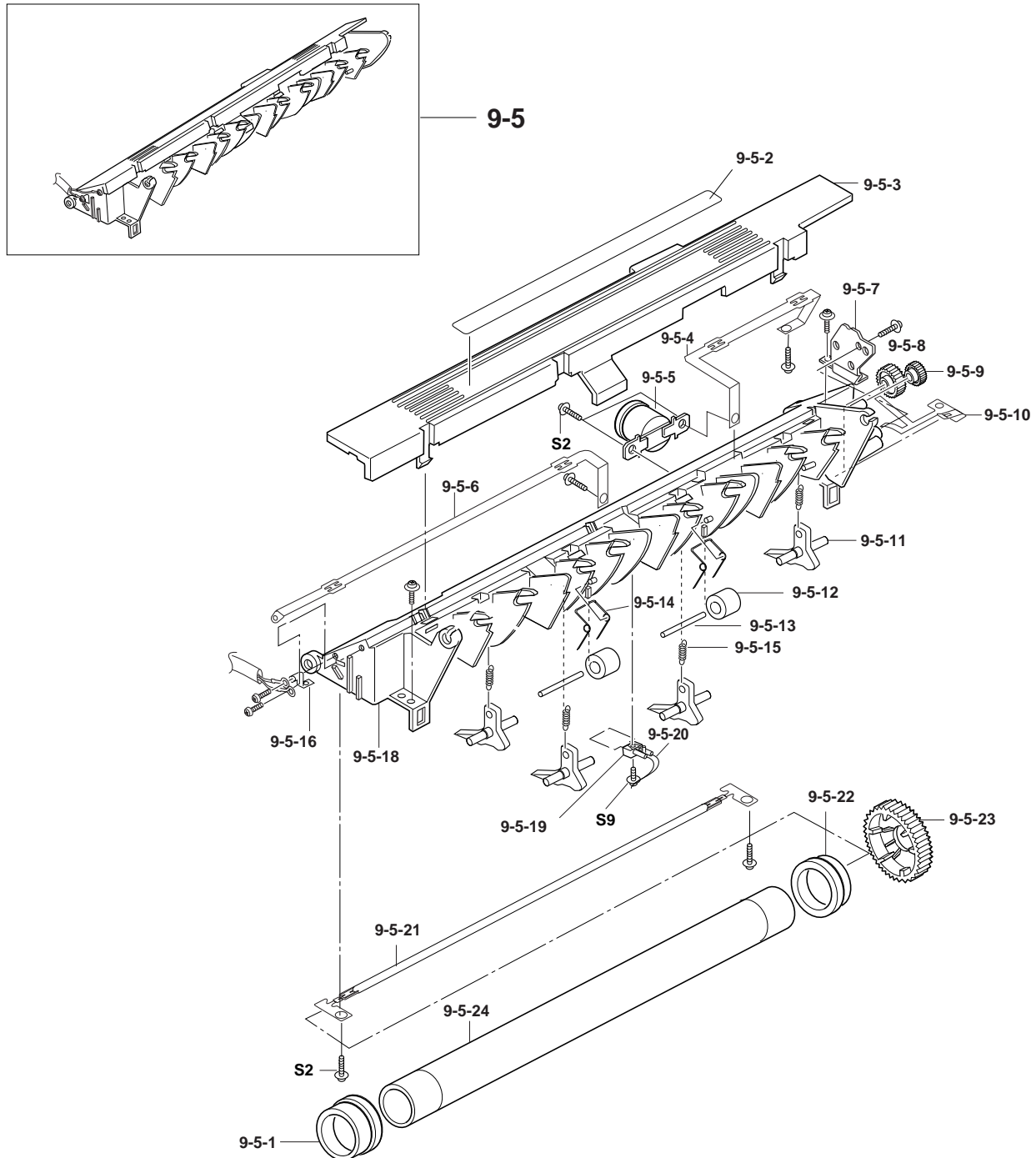
Fuser Assembly Parts Lists

Location No.	Description	SEC. Code	Q'ty	Remark
9-5	ELA HOU-FUSER ASS'Y	JC96-00967A	1	
9-5-1	BEARING-H/R L	JC66-10203A	1	
9-5-2	LABEL(4)-CAU_HOT_FU	JC68-30928A	1	
9-5-3	PMO-COVER FUSER	JC72-41131A	1	
9-5-4	NPR-ELECTRODE_R, AC	JC71-10904A	1	
9-5-5	THERMOSTAT, 125/250V, 15/7.5A	4712-000001	1	
9-5-6	NPR-ELECTRODE_L, AC	JC71-10903A	1	
9-5-7	IPR-BRKT HOLDER, FU	JC70-11056A	1	
9-5-8	GEAR-IDLE2(19)	JC66-40945A	1	
9-5-9	GEAR-IDLE3(14)	JC66-40946A	1	
9-5-10	IPR-GROUND PLATE	JC70-11003A	1	
9-5-11	PMO-GUIDE CLAW	JC72-41128A	4	
9-5-12	PEX-ROLLER EXIT F_UP	JC72-20901A	2	
9-5-13	IEX-SHAFT IDLE, F/UP	JC70-20901A	2	
9-5-14	SPRING-EXIT, F_UP	JC61-70936A	2	
9-5-15	SPRING-ES, GUIDE CLAW	JC61-70962A	4	
9-5-16	NPR-TERMINAL, LAMP	JC71-10905A	1	
9-5-18	PMO-FRAME FUSER	JC72-41127A	1	
9-5-19	THERMISTOR-NTC, 2.11 Kohm, 5%	1404-001128	1	
9-5-20	CBF HARNESS-3P, 2WIRE	JC39-40600A	1	
9-5-21	LAMP-HALOGEN, 115V, 400W	4713-001081	1	
9-5-22	BEARING-H/R R	JC66-10207A	1	
9-5-23	GEAR-FUSER	JC66-40379A	1	
9-5-24	NEX-ROLLER HEAT	JC71-20903A	1	
S2	SCREW-TAPTITE, BH, +, M3, L8	6003-000119	2	

8-8. Front Assembly
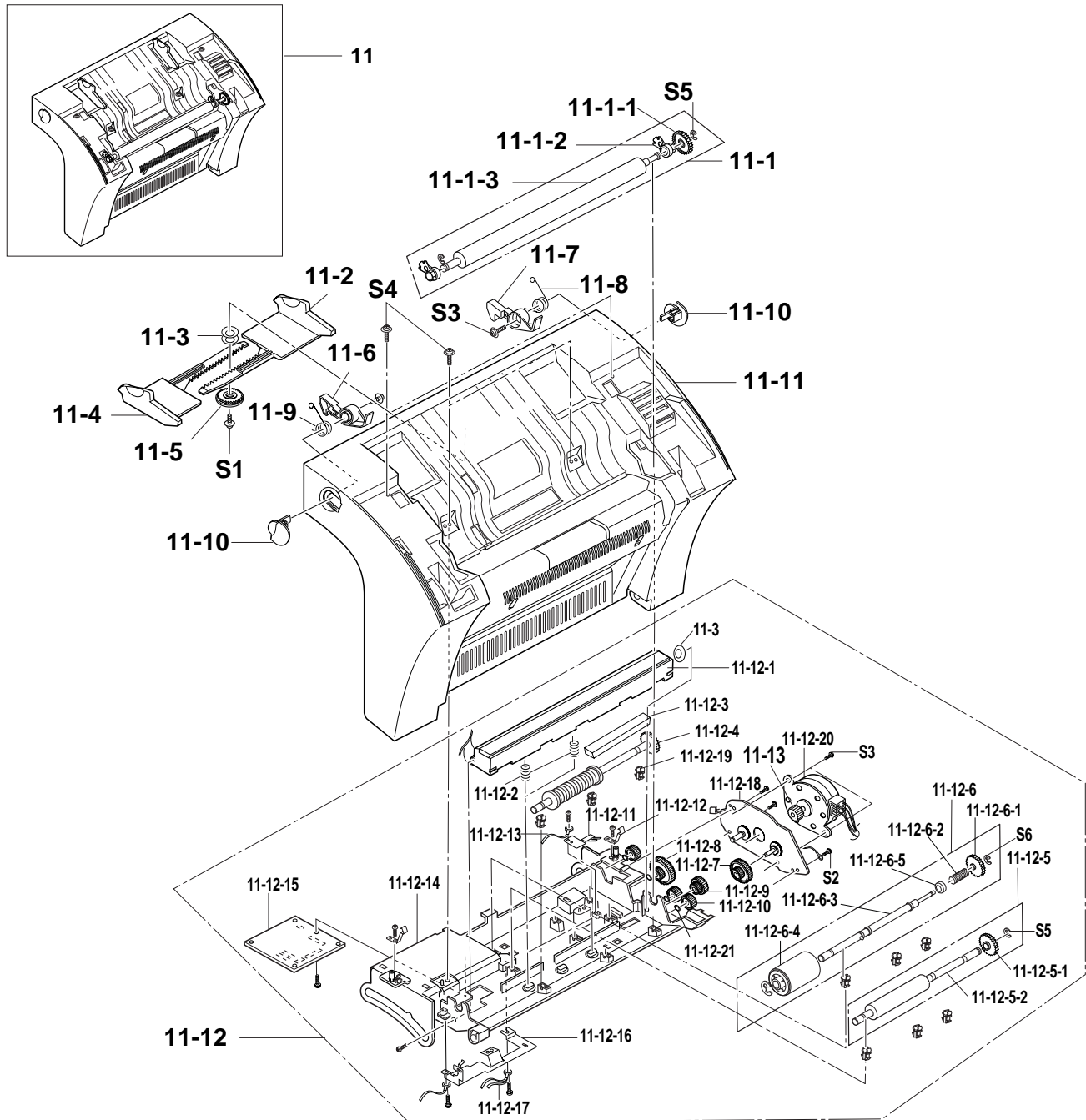
Front Assembly Parts Lists

Location No.	Description	SEC. Code	Q'ty	Remark
11	ELA HOU-FRONT ASSY	JC96-01252B	1	
11-1	MEC-WHITE ROLLER 6000	JG75-10538A	1	
11-1-1	PMO-GEAR DRIVE (B4)	JG72-40740A	1	
11-1-2	PMO-BUSHING WHITE	JF72-41036A	2	
11-1-3	MEC-ROLLER CIS	JG75-10535A	1	
11-2	PMO-GUIDE DOC(R)	JC72-41336B	1	
11-3	IPR-WASHER SPRING CU	JF70-10616A	3	
11-4	PMO-GUIDE DOC(L)	JC72-41335B	1	
11-5	GEAR-PINION	JG66-40003A	1	
11-6	PMO-LOCKER L	JC72-41301A	1	
11-7	PMO-LOCKER R	JC72-41302A	1	
11-8	SPRING-LOCKER R	JC61-70969A	1	
11-9	SPRING-LOCKER L	JC61-70968A	1	
11-10	PMO-OPEN BUTTON	JC72-41303B	2	
11-11	PMO-COVER FRONT	JC72-41311B	1	
11-12	ELA HOU-SCAN LOWER	JC96-01251B	1	
11-12-1	CONTACT IMAGE SENSOR	0609-001103	1	
11-12-2	SPRING-CIS(CANON)	JG61-70533A	2	
11-12-3	PPR-SHEET CIS	JG72-10542A	1	
11-12-4	PMO-SHAFT EXIT	JG72-40042A	1	
11-12-5	MEC-DRIVE ROLLER6000	JG75-10537A	1	
11-12-5-1	PMO-GEAR DRIVE (B4)	JG72-40740A	1	
11-12-5-2	MEC-ROLLER DRIVE 6000	JG75-10536A	1	
11-12-6	MEA ETC-ADF ROLLER	JC97-01249A	1	
11-12-6-1	PMO-GEAR ADF	JG72-40659A	1	
11-12-6-2	ICT-SPRING CLUTCH	JG70-40534A	1	
11-12-6-3	ICT-SHAFT ADF	JG70-40547A	1	
11-12-6-4	MEC-ROLLER ADF	JG75-10016A	1	
11-12-6-5	PMO-BUSHING	JG72-40732A	1	
11-12-7	PMO-GEAR TRANS(B4)	JG72-40741A	1	
11-12-8	GEAR-IDLE4920	JG66-40040A	1	
11-12-9	GEAR-IDLE3315	JG66-40041A	1	
11-12-10	GEAR-SPUR	JG66-40001A	3	
11-12-11	IPR-GROUND DRIVE	JG70-10006A	1	
11-12-12	LCOKER-TX	JG64-30001A	2	
11-12-13	CBF HARNESS, CIS-SCAN	JG39-40145A	1	
11-12-14	PMO-SCAN LOWER	JC72-41312A	1	
11-12-15	PBA MAIN-SCAN	JC92-01039B	1	

Location No.	Description	SEC. Code	Q'ty	Remark
11-12-16	NPR-GROUND-CIS	JG71-10001A	1	
11-12-17	CBF HARNESS-FG, SCAN-FG	JC39-40587A	1	
11-12-18	IPR-BRKT MOTER	JC70-11060A	1	
11-12-19	PMO-BUSHING TX(B4)	JG72-40744A	9	
11-12-20	MOTOR-STEP, 75 DEG, 24V	3101-001146	1	
11-12-21	WASHER-PLAIN, M4, ID4.1, OD7.0	6031-001051	5	
11-13	GEAR-PINION	JG66-40003A	1	
S1	SCREW-TAPTITE BH, +, B, M3, L5	6003-000114	2	
S2	SCREW-TAPTITE, BH, +, B, M3, L8	6003-000119	9	
S3	SCREW-TAPTITE, PWH, +, B, M3, L6	6003-000264	4	
S4	SCREW-TAPTITE PWH,+,B,M3,L10	6003-000196	4	OK
S5	RING-C, ID3, OD7, T0.6	6044-000159	1	
S6	RING-C, ID5, OD11, T0.6	6044-000156	1	

8-9. Tray Unit Assembly

16

S3

16-2

16-1

16-3

16-4

16-5

16-6

S3

16-2

16-1

16-8

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16-7
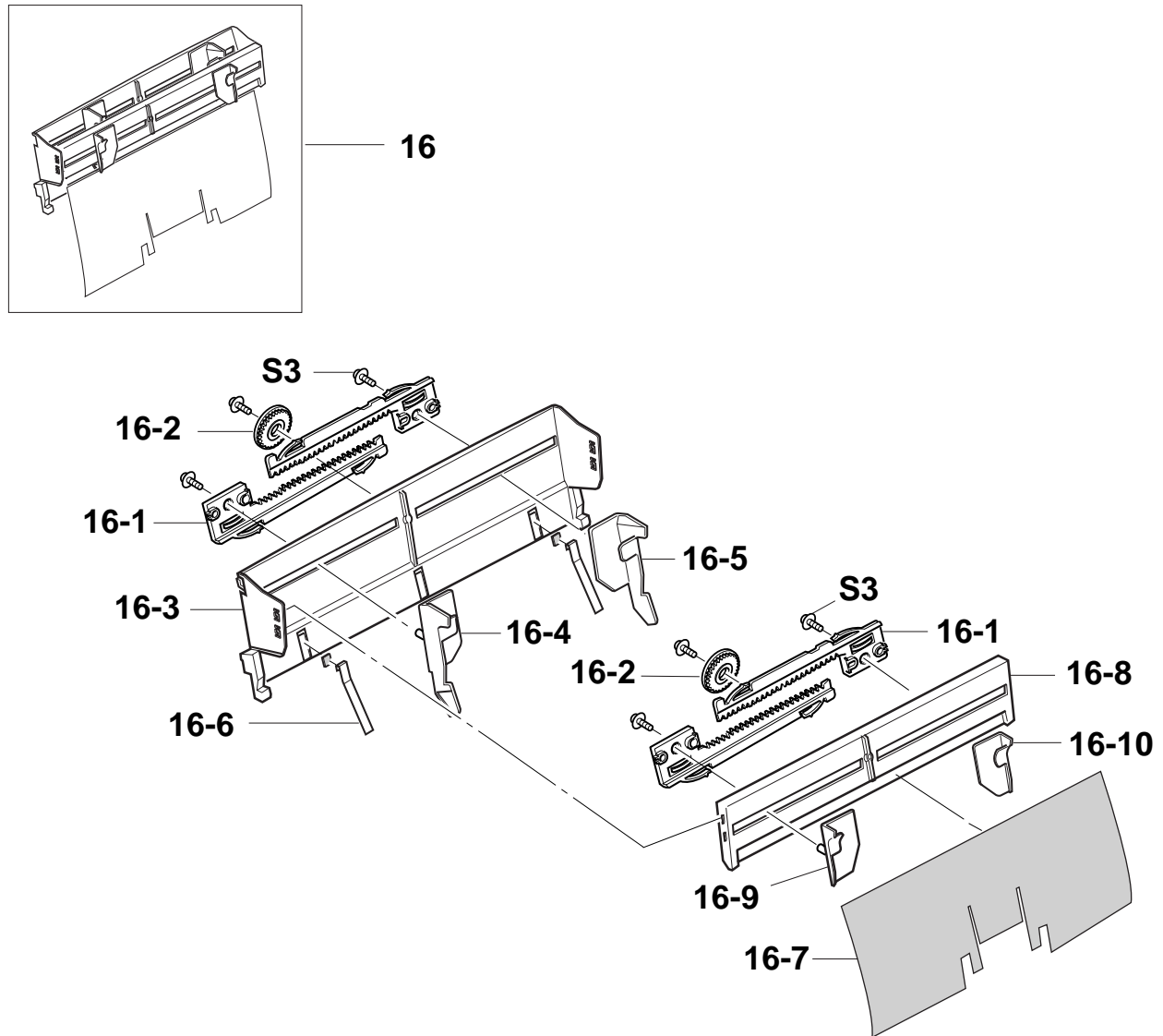
Tray Unit Assembly Parts Lists

Location No.	Description	SEC. Code	Q'ty	Remark
16	MEA-UNIT TRAY	JC97-01135E	1	
16-1	GEAR-ADJUST RACK	JC66-40934A	4	
16-2	GEAR-PINION	JG66-40003A	2	
16-3	PMO-TRAY AUTO PAPER	JC72-41150C	1	
16-4	PMO-ADJUST AUTO L	JC72-41148C	1	
16-5	PMO-ADJUST AUTO R	JC72-41149C	1	
16-6	RPR-FILM SUPPORT PAPER	JC73-00006A	2	
16-7	RPR-GUIDE FILM SHEET	JC73-10948A	1	
16-8	PMO-TRAY MANUAL PAPER	JC72-41168A	1	
16-9	PMO-ADJUST MANUAL L	JC72-41147C	1	
16-10	PMO-ADJUST MANUAL R	JC72-41146C	1	
S3	SCREW-TAPTITE, PWH, +, B, M3, L6	6003-000264	6	

9. Electrical Parts List

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
JC44-10504A	SMPS-ORION(110V);SF-5805P,AC/D	1	
JC59-10505A	UNIT-LSU;ML-5000,LSBL68DL6ARCD	1	
0609-001103	CONTACT IMAGE SENSOR;216mm,(DYNA)	1	
JG39-40145A	CBF HARNESS-;SF6000,-,UL1061,1	1	CIS-SCAN
3101-001146	MOTOR-STEP;7.5deg,24V,1200ppc,	1	
JC31-30502A	FAN-DC FAN MOTOR;ML-5000,24V,2	1	FAN
JC33-10004A	SOLENOID-UNIT;ML-5000A,ESD2430	1	SOLENOID
JC39-40548A	CBF HARNESS-24P;ML-5000A,FLAT,	1	ENGINE-MAIN
JC39-40564A	CBF HARNESS-20P;ML-5000A,FLAT,	1	ENGINE-JOINT
JC39-40566A	CBF HARNESS-5P/6P;ML-5000A,*,U	1	LSU
JC39-40572A	CBF HARNESS-RING_TER;ML-5000A,	1	LSU GND
JC39-40587A	CBF HARNESS-FG;SF-5805P,CBF,UL	1	SCAN-FG
JC39-40612A	CBF HARNESS-SCAN_20P;SF-5805P,	1	SCAN-MAIN(20P)
JC39-40591A	CBF HARNESS-LIU;SF-5805P,CBF,U	1	LIU
JC39-40592A	CBF HARNESS-JACK;SF-5805P,CBF,	1	MODULAR JACK
JC39-40607A	CBF HARNESS-SCAN,GND;SF-5805P,	1	MAIN-SCAN GND
JC39-40613A	CBF HARNESS-MAIN_20P;SF-5805P,	1	MAIN-SCAN(20P)
JC39-40611A	CBF HARNESS-OPE_GND;SF-5805P,C	1	OPE-SCAN-MAIN GND
JC39-30002A	CBF-INTERFACE;-,-,UL/CSA,1800M	1	
JF39-40692A	CBF-HARNESS;-,POWER CORD,-,2.5	1	
JF39-50094B	CBF LINE CORD-;MINI FAX,-,-,IV	1	

9-1 Main Part List

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
JC92-01036C	PBA MAIN CTRL-MAIN;SF-5800P,US	1	MAIN PBA
1203-000495	IC-RESET;7045,T0-92,3P,-,PLAST	1	U35
2801-003330	CRYSTAL-UNIT;38.00053MHz,15ppm	1	X2
2804-000349	OSCILLATOR-CLOCK;66MHz,100ppm,	1	OSC1
2804-001176	OSCILLATOR-CLOCK;28.6925MHz,10	1	OSC2
3301-000344	CORE-FERRITE BEAD;ZZ,3.5x6.5mm	1	BD2
3301-000344	CORE-FERRITE BEAD;ZZ,3.5x6.5mm	1	BD3
3702-000118	CONNECTOR-RIBBON;36P,FEMALE,AN	1	CN1
3711-000411	CONNECTOR-HEADER;3WALL,12P,1R,	1	CN4
3711-000443	CONNECTOR-HEADER;3WALL,2P,1R,2	1	CN5
3711-000452	CONNECTOR-HEADER;BOX,3P,1R,2mm	1	CN7
3711-000524	CONNECTOR-HEADER;3WALL,9P,1R,2	1	CN6
3711-002001	CONNECTOR-HEADER;-,20P,2R,2mm,	1	CN3
3711-003204	CONNECTOR-HEADER;BOX,24P,2R,2m	1	CN2
4301-000108	BATTERY-LI;3V,210mAH,BUTTON,20	1	BAT1
4302-001005	BATTERY-NIH(2ND);4.8V,60mAh,CY	1	BAT2
0401-000116	DIODE-SWITCHING;MMSD914T1,100V	1	D7
0401-000116	DIODE-SWITCHING;MMSD914T1,100V	1	D8
0401-000116	DIODE-SWITCHING;MMSD914T1,100V	1	D4
0404-000112	DIODE-SCHOTTKY;RB420D,25V,100m	1	D2
0404-000112	DIODE-SCHOTTKY;RB420D,25V,100m	1	D6
0404-000112	DIODE-SCHOTTKY;RB420D,25V,100m	1	D5
0404-000112	DIODE-SCHOTTKY;RB420D,25V,100m	1	D3
0501-000338	TR-SMALL SIGNAL;2SC2812,NPN,20	1	Q1
0501-000279	TR-SMALL SIGNAL;2SC2812,NPN,20	1	Q3
0801-000379	IC-CMOS LOGIC;74HC00,NAND GATE	1	U33
0801-001055	IC-CMOS LOGIC;74VHC08,AND GATE	1	U40
0801-001055	IC-CMOS LOGIC;74VHC08,AND GATE	1	U41
0803-000274	IC-TTL;74F32,OR GATE,SOP,14P,1	1	U32
0803-003058	IC-TTL;74F1071,ESD,SOP,20P,-,-	1	U34
0903-001126	IC-MICROCONTROLLER;32C6100,32B	1	U1
0909-000101	IC-REAL TIME CLOCK;4513,-,SOP,	1	U30
1001-000170	IC-ANALOG SWITCH;MC14051BD,SPD	1	U19
1001-000171	IC-ANALOG SWITCH;MC14053BD,SPD	1	U13
1105-000191	IC-DRAM;416C120,-,-,-,-,70nS,5	1	U22
1105-000191	IC-DRAM;416C120,-,-,-,-,70nS,5	1	U21
1105-000191	IC-DRAM;416C120,-,-,-,-,70nS,5	1	U20
1105-000191	IC-DRAM;416C120,-,-,-,-,70nS,5	1	U23
1106-000197	IC-SRAM;62256,32Kx8BIT,SOP,28P	1	U26
1106-001012	IC-SRAM;68257,32KX8BIT,SOJ,28P	1	U29
1107-001077	IC-FLASH MEMORY;29F800,512Kx16	1	U27

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
1107-001077	IC-FLASH MEMORY;29F800,512Kx16	1	U28
1201-000114	IC-AUDIO AMP;386,SOP,8P,150MIL	1	U18
1201-000167	IC-OP AMP;358,SOP,8P,150MIL,DU	1	U16
1201-000423	IC-OP AMP;4558,SOP,8P,150MIL,D	1	U12
1201-000423	IC-OP AMP;4558,SOP,8P,150MIL,D	1	U11
1201-000423	IC-OP AMP;4558,SOP,8P,150MIL,D	1	U10
1201-001052	IC-OP AMP;14577,SOP,8P,150,DUA	1	U5
1205-001134	IC-MODEM;KS16117Q,QFP,100P,-,P	1	U17
2007-000002	R-CHIP;75KOHM,5%,1/10W,DA,TP,2	1	R92
2007-000011	R-CHIP;200ohm,1%,1/10W,DA,TP,2	1	R75
2007-000029	R-CHIP;0OHM,5%,1/10W,DA,TP,201	1	R209
2007-000029	R-CHIP;0OHM,5%,1/10W,DA,TP,201	1	R45
2007-000029	R-CHIP;0OHM,5%,1/10W,DA,TP,201	1	R107
2007-000029	R-CHIP;0OHM,5%,1/10W,DA,TP,201	1	R226
2007-000029	R-CHIP;0OHM,5%,1/10W,DA,TP,201	1	R156
2007-000029	R-CHIP;0OHM,5%,1/10W,DA,TP,201	1	R177
2007-000029	R-CHIP;0OHM,5%,1/10W,DA,TP,201	1	R207
2007-000029	R-CHIP;0OHM,5%,1/10W,DA,TP,201	1	R44
2007-000241	R-CHIP;1.5KOHM,5%,1/10W,DA,TP,	1	R165
2007-000282	R-CHIP;100KOHM,5%,1/10W,DA,TP,	1	R105
2007-000282	R-CHIP;100KOHM,5%,1/10W,DA,TP,	1	R85
2007-000282	R-CHIP;100KOHM,5%,1/10W,DA,TP,	1	R91
2007-000282	R-CHIP;100KOHM,5%,1/10W,DA,TP,	1	R40
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2	1	R12
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2	1	R11
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2	1	R10
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2	1	R176
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2	1	R8
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2	1	R7
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2	1	R180
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2	1	R181
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2	1	R224
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2	1	R9
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2	1	R179
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2	1	R178
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R193
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R220
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R221
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R222
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R101
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R228
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R229

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R231
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R232
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R233
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R234
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R100
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R189
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R190
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R191
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R38
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R192
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R94
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R96
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R97
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R98
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R39
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R41
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R42
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R93
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R99
2007-000308	R-CHIP;10OHM,5%,1/10W,DA,TP,20	1	R174
2007-000308	R-CHIP;10OHM,5%,1/10W,DA,TP,20	1	R175
2007-000308	R-CHIP;10OHM,5%,1/10W,DA,TP,20	1	R24
2007-000308	R-CHIP;10OHM,5%,1/10W,DA,TP,20	1	R25
2007-000308	R-CHIP;10OHM,5%,1/10W,DA,TP,20	1	R170
2007-000308	R-CHIP;10OHM,5%,1/10W,DA,TP,20	1	R171
2007-000308	R-CHIP;10OHM,5%,1/10W,DA,TP,20	1	R155
2007-000308	R-CHIP;10OHM,5%,1/10W,DA,TP,20	1	R157
2007-000308	R-CHIP;10OHM,5%,1/10W,DA,TP,20	1	R167
2007-000308	R-CHIP;10OHM,5%,1/10W,DA,TP,20	1	R168
2007-000308	R-CHIP;10OHM,5%,1/10W,DA,TP,20	1	R169
2007-000325	R-CHIP;118KOHM,1%,1/10W,DA,TP,	1	R114
2007-000392	R-CHIP;150KOHM,1%,1/10W,DA,TP,	1	R103
2007-000395	R-CHIP;150KOHM,5%,1/10W,DA,TP,	1	R112
2007-000395	R-CHIP;150KOHM,5%,1/10W,DA,TP,	1	R84
2007-000401	R-CHIP;150OHM,5%,1/10W,DA,TP,2	1	R150
2007-000409	R-CHIP;15KOHM,5%,1/10W,DA,TP,2	1	R89
2007-000409	R-CHIP;15KOHM,5%,1/10W,DA,TP,2	1	R83
2007-000435	R-CHIP;17.4KOHM,1%,1/10W,DA,TP	1	R102
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R235
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R240
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R122
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R130

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R139
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R138
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R137
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R121
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R124
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R125
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R123
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R127
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R128
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R129
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R120
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R115
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R132
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R119
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R118
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R117
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R116
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R133
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R126
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R134
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R135
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R136
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R131
2007-000477	R-CHIP;1MOHM,5%,1/10W,DA,TP,20	1	R90
2007-000477	R-CHIP;1MOHM,5%,1/10W,DA,TP,20	1	R227
2007-000477	R-CHIP;1MOHM,5%,1/10W,DA,TP,20	1	R236
2007-000572	R-CHIP;220OHM,5%,1/10W,DA,TP,2	1	R69
2007-000572	R-CHIP;220OHM,5%,1/10W,DA,TP,2	1	R65
2007-000572	R-CHIP;220OHM,5%,1/10W,DA,TP,2	1	R217
2007-000572	R-CHIP;220OHM,5%,1/10W,DA,TP,2	1	R63
2007-000572	R-CHIP;220OHM,5%,1/10W,DA,TP,2	1	R64
2007-000572	R-CHIP;220OHM,5%,1/10W,DA,TP,2	1	R216
2007-000572	R-CHIP;220OHM,5%,1/10W,DA,TP,2	1	R68
2007-000586	R-CHIP;22KOHM,5%,1/10W,DA,TP,2	1	R109
2007-000603	R-CHIP;240KOHM,5%,1/10W,DA,TP,	1	R82
2007-000653	R-CHIP;27KOHM,5%,1/10W,DA,TP,2	1	R106
2007-000668	R-CHIP;2KOHM,1%,1/10W,DA,TP,20	1	R71
2007-000703	R-CHIP;3.6KOHM,5%,1/10W,DA,TP,	1	R162
2007-000728	R-CHIP;300OHM,5%,1/10W,DA,TP,2	1	R80
2007-000757	R-CHIP;330KOHM,5%,1/10W,DA,TP,	1	R81
2007-000774	R-CHIP;33KOHM,5%,1/10W,DA,TP,2	1	R108
2007-000774	R-CHIP;33KOHM,5%,1/10W,DA,TP,2	1	R86

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R147
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R148
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R152
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R153
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R154
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R158
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R159
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R187
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R160
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R151
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R149
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R140
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R141
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R142
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R143
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R144
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R145
2007-000781	R-CHIP;33OHM,5%,1/10W,DA,TP,20	1	R146
2007-000844	R-CHIP;3KOHM,5%,1/10W,DA,TP,20	1	R88
2007-000872	R-CHIP;4.7KOHM,5%,1/10W,DA,TP,	1	R70
2007-000872	R-CHIP;4.7KOHM,5%,1/10W,DA,TP,	1	R212
2007-000872	R-CHIP;4.7KOHM,5%,1/10W,DA,TP,	1	R237
2007-000872	R-CHIP;4.7KOHM,5%,1/10W,DA,TP,	1	R238
2007-000920	R-CHIP;47.5KOHM,1%,1/10W,DA,TP	1	R113
2007-000941	R-CHIP;47KOHM,5%,1/10W,DA,TP,2	1	R214
2007-000941	R-CHIP;47KOHM,5%,1/10W,DA,TP,2	1	R213
2007-000947	R-CHIP;47OHM,5%,1/10W,DA,TP,20	1	R197
2007-000947	R-CHIP;47OHM,5%,1/10W,DA,TP,20	1	R196
2007-000947	R-CHIP;47OHM,5%,1/10W,DA,TP,20	1	R195
2007-000947	R-CHIP;47OHM,5%,1/10W,DA,TP,20	1	R199
2007-000947	R-CHIP;47OHM,5%,1/10W,DA,TP,20	1	R200
2007-000947	R-CHIP;47OHM,5%,1/10W,DA,TP,20	1	R201
2007-000947	R-CHIP;47OHM,5%,1/10W,DA,TP,20	1	R202
2007-000947	R-CHIP;47OHM,5%,1/10W,DA,TP,20	1	R203
2007-000947	R-CHIP;47OHM,5%,1/10W,DA,TP,20	1	R194
2007-000947	R-CHIP;47OHM,5%,1/10W,DA,TP,20	1	R198
2007-000964	R-CHIP;5.1KOHM,5%,1/10W,DA,TP,	1	R185
2007-000964	R-CHIP;5.1KOHM,5%,1/10W,DA,TP,	1	R186
2007-000964	R-CHIP;5.1KOHM,5%,1/10W,DA,TP,	1	R225
2007-001039	R-CHIP;56KOHM,5%,1/10W,DA,TP,2	1	R87
2007-001092	R-CHIP;620OHM,5%,1/10W,DA,TP,2	1	R104
2007-001100	R-CHIP;62OHM,5%,1/10W,DA,TP,20	1	R67

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2007-001133	R-CHIP;68OHM,5%,1/10W,DA,TP,20	1	R183
2007-001133	R-CHIP;68OHM,5%,1/10W,DA,TP,20	1	R184
2007-001133	R-CHIP;68OHM,5%,1/10W,DA,TP,20	1	R29
2007-001201	R-CHIP;820OHM,5%,1/10W,DA,TP,2	1	R62
2007-001220	R-CHIP;86.6KOHM,1%,1/10W,DA,TP	1	R110
2007-001220	R-CHIP;86.6KOHM,1%,1/10W,DA,TP	1	R111
2007-001289	R-CHIP;20OHM,5%,1/4W,DA,TP,322	1	R79
2011-001094	R-NETWORK;39ohm,5%,1/16W,L,CHI	1	RA2
2011-001094	R-NETWORK;39ohm,5%,1/16W,L,CHI	1	RA3
2011-001094	R-NETWORK;39ohm,5%,1/16W,L,CHI	1	RA10
2011-001094	R-NETWORK;39ohm,5%,1/16W,L,CHI	1	RA11
2011-001094	R-NETWORK;39ohm,5%,1/16W,L,CHI	1	RA12
2011-001094	R-NETWORK;39ohm,5%,1/16W,L,CHI	1	RA13
2011-001094	R-NETWORK;39ohm,5%,1/16W,L,CHI	1	RA5
2011-001094	R-NETWORK;39ohm,5%,1/16W,L,CHI	1	RA4
2011-001094	R-NETWORK;39ohm,5%,1/16W,L,CHI	1	RA7
2011-001094	R-NETWORK;39ohm,5%,1/16W,L,CHI	1	RA1
2011-001094	R-NETWORK;39ohm,5%,1/16W,L,CHI	1	RA9
2011-001094	R-NETWORK;39ohm,5%,1/16W,L,CHI	1	RA8
2011-001094	R-NETWORK;39ohm,5%,1/16W,L,CHI	1	RA6
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C193
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C185
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C186
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C156
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C113
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C188
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C187
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C192
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C215
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C208
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C207
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C204
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C107
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C51
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C50
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C59
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C54
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C53
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C36
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C43
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C42
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C40

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C39
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C191
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C103
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C104
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C112
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C189
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C190
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C61
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C60
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C65
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C89
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C92
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C91
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C90
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C216
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C217
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C46
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C93
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C109
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C45
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C62
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C37
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C52
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C106
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C63
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C64
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C94
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C101
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C108
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C202
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C194
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C195
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C196
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C201
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C102
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C95
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C99
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C98
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C97
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C96
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C110
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C105

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2203-000192	C-CERAMIC,CHIP;100nF,+80-20%,5	1	C100
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C221
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C211
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C139
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C140
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C141
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C142
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C143
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C144
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C117
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C134
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C135
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C136
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C137
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C138
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C145
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C146
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C210
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C209
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C160
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C155
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C151
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C147
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C148
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C149
2203-000239	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C150
2203-000260	C-CERAMIC,CHIP;10nF,10%,50V,X7	1	C218
2203-000260	C-CERAMIC,CHIP;10nF,10%,50V,X7	1	C219
2203-000316	C-CERAMIC,CHIP;120pF,5%,50V,NP	1	C128
2203-000389	C-CERAMIC,CHIP;15pF,5%,50V,NPO	1	C121
2203-000389	C-CERAMIC,CHIP;15pF,5%,50V,NPO	1	C120
2203-000444	C-CERAMIC,CHIP;1nF,10%,50V,X7R	1	C71
2203-000444	C-CERAMIC,CHIP;1nF,10%,50V,X7R	1	C88
2203-000444	C-CERAMIC,CHIP;1nF,10%,50V,X7R	1	C87
2203-000444	C-CERAMIC,CHIP;1nF,10%,50V,X7R	1	C86
2203-000444	C-CERAMIC,CHIP;1nF,10%,50V,X7R	1	C85
2203-000444	C-CERAMIC,CHIP;1nF,10%,50V,X7R	1	C84
2203-000444	C-CERAMIC,CHIP;1nF,10%,50V,X7R	1	C83
2203-000444	C-CERAMIC,CHIP;1nF,10%,50V,X7R	1	C82
2203-000444	C-CERAMIC,CHIP;1nF,10%,50V,X7R	1	C78
2203-000444	C-CERAMIC,CHIP;1nF,10%,50V,X7R	1	C79
2203-000444	C-CERAMIC,CHIP;1nF,10%,50V,X7R	1	C80

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2007-000029	R-CHIP;0OHM,5%,1/10W,DA,TP,201	1	C72
2203-000444	C-CERAMIC,CHIP;1nF,10%,50V,X7R	1	C75
2203-000444	C-CERAMIC,CHIP;1nF,10%,50V,X7R	1	C76
2203-000444	C-CERAMIC,CHIP;1nF,10%,50V,X7R	1	C77
2203-000444	C-CERAMIC,CHIP;1nF,10%,50V,X7R	1	C81
2203-000634	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C174
2203-000634	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C180
2203-000634	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C179
2203-000634	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C173
2203-000634	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C172
2203-000634	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C181
2203-000634	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C15
2203-000634	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C178
2203-000634	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C184
2203-000634	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C175
2203-000634	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C16
2203-000634	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C182
2203-000858	C-CERAMIC,CHIP;39pF,5%,50V,NPO	1	C74
2203-000938	C-CERAMIC,CHIP;470pF,5%,50V,NP	1	C164
2203-000938	C-CERAMIC,CHIP;470pF,5%,50V,NP	1	C166
2203-000938	C-CERAMIC,CHIP;470pF,5%,50V,NP	1	C167
2203-000938	C-CERAMIC,CHIP;470pF,5%,50V,NP	1	C170
2203-000938	C-CERAMIC,CHIP;470pF,5%,50V,NP	1	C171
2203-000938	C-CERAMIC,CHIP;470pF,5%,50V,NP	1	C169
2203-000938	C-CERAMIC,CHIP;470pF,5%,50V,NP	1	C168
2203-000938	C-CERAMIC,CHIP;470pF,5%,50V,NP	1	C165
2203-000989	C-CERAMIC,CHIP;47nF,10%,50V,X7	1	C213
2203-000989	C-CERAMIC,CHIP;47nF,10%,50V,X7	1	C124
2203-001143	C-CERAMIC,CHIP;68nF,10%,50V,X7	1	C129
2203-001158	C-CERAMIC,CHIP;68pF,5%,50V,NPO	1	C214
2203-001158	C-CERAMIC,CHIP;68pF,5%,50V,NPO	1	C159
2203-001158	C-CERAMIC,CHIP;68pF,5%,50V,NPO	1	C158
2203-001158	C-CERAMIC,CHIP;68pF,5%,50V,NPO	1	C116
2402-000135	C-AL,SMD;22uF,20%,16V,GP,TP,5.	1	C123
2402-000168	C-AL,SMD;100uF,20%,16V,-,TP,8x	1	C205
2402-000168	C-AL,SMD;100uF,20%,16V,-,TP,8x	1	C67
2402-000168	C-AL,SMD;100uF,20%,16V,-,TP,8x	1	C125
2402-000170	C-AL,SMD;1uF,20%,50V,GP,TP,4.3	1	C203
2402-000172	C-AL,SMD;33uF,20%,35V,-,-,8.3x	1	C163
2402-000172	C-AL,SMD;33uF,20%,35V,-,-,8.3x	1	C157
2402-000173	C-AL,SMD;4.7uF,20%,35V,GP,TP,4	1	C126
2402-000176	C-AL,SMD;10uF,20%,16V,GP,TP,4.	1	C131

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2402-000176	C-AL,SMD;10uF,20%,16V,GP,TP,4.	1	C133
2402-000176	C-AL,SMD;10uF,20%,16V,GP,TP,4.	1	C162
2402-000176	C-AL,SMD;10uF,20%,16V,GP,TP,4.	1	C132
2402-000176	C-AL,SMD;10uF,20%,16V,GP,TP,4.	1	C130
2402-000176	C-AL,SMD;10uF,20%,16V,GP,TP,4.	1	C122
2404-000151	C-TA,CHIP;1uF,20%,16V,-,TP,321	1	C127
2404-000308	C-TA,CHIP;33uF,20%,10V,-,TP,73	1	C220
2703-000125	INDUCTOR-SMD;10uH,10%,1.25x2x1	1	L2
2804-001232	OSCILLATOR-CLOCK;30MHz,50ppm,1	1	OSC3
2901-000229	FILTER-EMI SMD;50V,300mA,-,22n	1	LF3
2901-000229	FILTER-EMI SMD;50V,300mA,-,22n	1	LF4
2901-000229	FILTER-EMI SMD;50V,300mA,-,22n	1	LF1
2901-000229	FILTER-EMI SMD;50V,300mA,-,22n	1	LF2
4701-001020	FREQ-ATTENUATOR;5-80MHz,15dB,-	1	U14
JC41-10546B	PCB-MAIN;SF-5805P,FR-4,4L,T1.6	1	MAIN PCB
JG13-10062A	IC ASIC-IMAGE CHIP;SF4400,STOA	1	U31

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SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
JC92-01037B	PBA MAIN-ENGINE;SF-5800P,USA,U	1	ENGINE PBA
0604-001033	PHOTO-INTERRUPTER;TR,-,150mW,D	1	OP1
0801-000528	IC-CMOS LOGIC;74HCT574,D FLIP-	1	U2
0801-000722	IC-CMOS LOGIC;74HC245,TRANSCEI	1	U1
0803-001039	IC-TTL;74LS14,SCHIMITT INVERTE	1	U4
0803-001097	IC-TTL;7407,BUFFER/DRIVER,DIP,	1	U3
0903-000219	IC-MICROCOMPUTER;88C4316,8BIT,	1	U6
1103-001045	IC-EEPROM;27E512,64Kx8BIT,DIP,28P,600	1	U5
1103-000178	IC-EEPROM;9346,1Kx1BIT,DIP,8P,	1	U8
1202-000103	IC-VOLTAGE COMP.;393,DIP,8P,30	1	U7
2801-000002	CRYSTAL-UNIT;6.94407MHz,50ppm,	1	X1
3704-000235	SOCKET-IC;28P,DIP,SN,2.54mm	1	U5(SOCKET)
3711-000428	CONNECTOR-HEADER;3WALL,15P,1R,	1	CN4
3711-000814	CONNECTOR-HEADER;BOX,2P,1R,2.5	1	CN2
3711-002001	CONNECTOR-HEADER;-,20P,2R,2mm,	1	CN5
3711-003204	CONNECTOR-HEADER;BOX,24P,2R,2m	1	CN1
3711-003204	CONNECTOR-HEADER;BOX,24P,2R,2m	1	CN6
3711-003205	CONNECTOR-HEADER;BOX,4P,1R,2.0	1	CN3
0401-000116	DIODE-SWITCHING;MMSD914T1,100V	1	D4
0401-000116	DIODE-SWITCHING;MMSD914T1,100V	1	D3
0401-000116	DIODE-SWITCHING;MMSD914T1,100V	1	D2
0401-000116	DIODE-SWITCHING;MMSD914T1,100V	1	D1
0401-000116	DIODE-SWITCHING;MMSD914T1,100V	1	D5
0501-000010	TR-SMALL SIGNAL;KSC1008,NPN,80	1	Q3
0501-000010	TR-SMALL SIGNAL;KSC1008,NPN,80	1	Q2
0501-000010	TR-SMALL SIGNAL;KSC1008,NPN,80	1	Q1
2001-000362	R-CARBON;150OHM,5%,1/8W,AA,TP,	1	R45
2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,-	1	R25
2001-000660	R-CARBON;33KOHM,5%,1/8W,AA,TP,	1	R5
2004-000699	R-METAL;3.3Kohm,1%,1/8W,AA,TP,	1	R27
2007-000223	R-CHIP;1.2KOHM,5%,1/8W,DA,TP,3	1	R3
2007-000293	R-CHIP;100OHM,5%,1/8W,DA,TP,32	1	R11
2007-000293	R-CHIP;100OHM,5%,1/8W,DA,TP,32	1	R18
2007-000293	R-CHIP;100OHM,5%,1/8W,DA,TP,32	1	R28
2007-000293	R-CHIP;100OHM,5%,1/8W,DA,TP,32	1	R34
2007-000293	R-CHIP;100OHM,5%,1/8W,DA,TP,32	1	R36
2007-000293	R-CHIP;100OHM,5%,1/8W,DA,TP,32	1	R43
2007-000359	R-CHIP;12KOHM,5%,1/8W,DA,TP,32	1	R33
2007-000359	R-CHIP;12KOHM,5%,1/8W,DA,TP,32	1	R16
2007-000412	R-CHIP;15KOHM,5%,1/8W,DA,TP,32	1	R44
2007-000412	R-CHIP;15KOHM,5%,1/8W,DA,TP,32	1	R40

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2007-000412	R-CHIP;15KOHM,5%,1/8W,DA,TP,32	1	R37
2007-000472	R-CHIP;1KOHM,5%,1/8W,DA,TP,321	1	R42
2007-000472	R-CHIP;1KOHM,5%,1/8W,DA,TP,321	1	R31
2007-000472	R-CHIP;1KOHM,5%,1/8W,DA,TP,321	1	R22
2007-000472	R-CHIP;1KOHM,5%,1/8W,DA,TP,321	1	R21
2007-000575	R-CHIP;220OHM,5%,1/8W,DA,TP,32	1	R41
2007-000656	R-CHIP;27KOHM,5%,1/8W,DA,TP,32	1	R39
2007-000768	R-CHIP;330OHM,5%,1/8W,DA,TP,32	1	R30
2007-000768	R-CHIP;330OHM,5%,1/8W,DA,TP,32	1	R12
2007-000768	R-CHIP;330OHM,5%,1/8W,DA,TP,32	1	R1
2007-000861	R-CHIP;4.3KOHM,5%,1/8W,DA,TP,3	1	R24
2007-000875	R-CHIP;4.7KOHM,5%,1/8W,DA,TP,3	1	R23
2007-000875	R-CHIP;4.7KOHM,5%,1/8W,DA,TP,3	1	R6
2007-000944	R-CHIP;47KOHM,5%,1/8W,DA,TP,32	1	R29
2007-000944	R-CHIP;47KOHM,5%,1/8W,DA,TP,32	1	R35
2007-000984	R-CHIP;5.6KOHM,5%,1/8W,DA,TP,3	1	R2
2007-000984	R-CHIP;5.6KOHM,5%,1/8W,DA,TP,3	1	R19
2007-000984	R-CHIP;5.6KOHM,5%,1/8W,DA,TP,3	1	R17
2007-000984	R-CHIP;5.6KOHM,5%,1/8W,DA,TP,3	1	R8
2007-000984	R-CHIP;5.6KOHM,5%,1/8W,DA,TP,3	1	R4
2007-000984	R-CHIP;5.6KOHM,5%,1/8W,DA,TP,3	1	R38
2007-000984	R-CHIP;5.6KOHM,5%,1/8W,DA,TP,3	1	R10
2007-000984	R-CHIP;5.6KOHM,5%,1/8W,DA,TP,3	1	R26
2007-000984	R-CHIP;5.6KOHM,5%,1/8W,DA,TP,3	1	R20
2007-000984	R-CHIP;5.6KOHM,5%,1/8W,DA,TP,3	1	R9
2007-000984	R-CHIP;5.6KOHM,5%,1/8W,DA,TP,3	1	R46
2007-000984	R-CHIP;5.6KOHM,5%,1/8W,DA,TP,3	1	R7
2007-000984	R-CHIP;5.6KOHM,5%,1/8W,DA,TP,3	1	R13
2007-000984	R-CHIP;5.6KOHM,5%,1/8W,DA,TP,3	1	R14
2007-000984	R-CHIP;5.6KOHM,5%,1/8W,DA,TP,3	1	R15
2007-001041	R-CHIP;56KOHM,5%,1/8W,DA,TP,32	1	R32
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C14
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C13
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C12
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C1
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C9
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C31
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C28
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C32
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C26
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C25
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C18

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C8
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C36
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C33
2203-000242	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C21
2203-000242	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C22
2203-000242	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C7
2203-000242	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C35
2203-000262	C-CERAMIC,CHIP;10nF,10%,50V,X7	1	C3
2203-000262	C-CERAMIC,CHIP;10nF,10%,50V,X7	1	C23
2203-000262	C-CERAMIC,CHIP;10nF,10%,50V,X7	1	C15
2203-000262	C-CERAMIC,CHIP;10nF,10%,50V,X7	1	C10
2203-000457	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C19
2203-000457	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C11
2203-000457	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C6
2203-000457	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C2
2203-000457	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C38
2203-000457	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C37
2203-000457	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C34
2203-000457	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C39
2203-000457	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C4
2203-000457	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C41
2203-000457	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C42
2203-000457	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C5
2203-000636	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C17
2203-000636	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C16
2401-001197	C-AL;33uF,20%,50V,GP,TP,6.3x7,	1	C24
2401-001476	C-AL;47uF,20%,10V,GP,TP,6.3x5m	1	C29
2401-001476	C-AL;47uF,20%,10V,GP,TP,6.3x5m	1	C40
2401-002075	C-AL;4.7uF,20%,50V,GP,TP,5x11,	1	C30
2401-002075	C-AL;4.7uF,20%,50V,GP,TP,5x11,	1	C27
3301-000344	CORE-FERRITE BEAD;ZZ,3.5x6.5mm	1	FB5
3301-000344	CORE-FERRITE BEAD;ZZ,3.5x6.5mm	1	FB4
3301-000344	CORE-FERRITE BEAD;ZZ,3.5x6.5mm	1	FB3
3301-000344	CORE-FERRITE BEAD;ZZ,3.5x6.5mm	1	FB2
3301-000344	CORE-FERRITE BEAD;ZZ,3.5x6.5mm	1	FB1
JC41-10548B	P.C.B-ENGINE;SF-5800P,FR-1,2L,	1	

9-3 LIU Part List

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
JC92-01040F	PBA MAIN-LIU	1	LIU PBA
0402-000339	DIODE-BRIDGE;W06G,600V,1.5A,-,	1	BD1
0502-000133	TR-POWER;2SA1156,PNP,1W,TO-126	1	Q2
0604-000118	PHOTO-COUPLER;TR,20-300%,200mW	1	U2
0604-000119	PHOTO-COUPLER;TR,200-400%,200m	1	U6
0604-000237	PHOTO-COUPLER;TR,50-600%,200mW	1	U4
0604-000237	PHOTO-COUPLER;TR,50-600%,200mW	1	U5
1405-000170	VARISTOR;82V,1200A,9x3.6mm,-	1	VAR1
1405-000226	VARISTOR;-,25A,5mm,TP	1	VAR4
2001-001004	R-CARBON;82ohm,5%,1/4W,AA,TP,2	1	R5
2305-000378	C-FILM,MPEF;4.7nF,10%,400V,BK,	1	C8
2305-000566	C-FILM,MPEF;1uF,10%,250V,BK,25	1	C3
2802-001029	RESONATOR-CERAMIC;3.58MHz,0.5%	1	X1
3501-001025	RELAY-MINIATURE;12Vdc,280mW,2A	1	CML1
3711-002806	CONNECTOR-HEADER;BOX,5P,1R,2mm	1	P3
3711-002813	CONNECTOR-HEADER;BOX,12P,1R,2m	1	P1
4715-000119	SURGE ABSORBER;400V,15%,500A,-	1	ARS1
4715-000119	SURGE ABSORBER;400V,15%,500A,-	1	ARS2
4715-000119	SURGE ABSORBER;400V,15%,500A,-	1	ARS4
0401-000005	DIODE-SWITCHING;1N4148,75V,200	1	D1
0401-000005	DIODE-SWITCHING;1N4148,75V,200	1	D8
0403-000139	DIODE-ZENER;1N4734A,5.6V,5%,1W	1	ZD8
0403-000155	DIODE-ZENER;1N4748A,22V,5%,1W,	1	ZD5
0403-000532	DIODE-ZENER;1N4740A,10V,5%,1W,	1	ZD7
0403-000537	DIODE-ZENER;1N4749A,24V,5%,1W,	1	ZD9
0403-000716	DIODE-ZENER;MTZJ4.7B,4.7V,4.55	1	ZD1
0403-000716	DIODE-ZENER;MTZJ4.7B,4.7V,4.55	1	ZD2
0501-000242	TR-SMALL SIGNAL;BC547B,NPN,500	1	Q5
0501-000500	TR-SMALL SIGNAL;KSP45,NPN,625m	1	Q1
0501-000550	TR-SMALL SIGNAL;BC327-16,PNP,6	1	Q6
0501-000550	TR-SMALL SIGNAL;BC327-16,PNP,6	1	Q7
0505-000123	FET-SILICON;BS170,N,60V,500mA,	1	Q4
2001-000065	R-CARBON;10KOHM,5%,1/4W,AA,TP,	1	R6
2001-000294	R-CARBON;10Mohm,5%,1/4W,AA,TP,	1	R7
2001-000626	R-CARBON;300ohm,5%,1/4W,AA,TP,	1	R49
2001-000637	R-CARBON;30OHM,5%,1/2W,AA,TP,-	1	R48
2001-000643	R-CARBON;330Kohm,5%,1/4W,AA,TP	1	R9
2001-001004	R-CARBON;82ohm,5%,1/4W,AA,TP,2	1	R4
2007-000002	R-CHIP;75KOHM,5%,1/10W,DA,TP,2	1	R1
2007-000029	R-CHIP;0OHM,5%,1/10W,DA,TP,201	1	R26
2007-000029	R-CHIP;0OHM,5%,1/10W,DA,TP,201	1	R27

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2007-000029	R-CHIP;0OHM,5%,1/10W,DA,TP,201	1	R43
2007-000029	R-CHIP;0OHM,5%,1/10W,DA,TP,201	1	R57
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	R35
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	R36
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	R50
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J26
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J27
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J28
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J29
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J30
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J31
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J20
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J21
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J22
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J23
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J24
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J25
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J14
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J32
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J33
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J15
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J16
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J17
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J18
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J19
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J3
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J4
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	JJ8
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J10
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J11
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J12
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J13
2007-000282	R-CHIP;100KOHM,5%,1/10W,DA,TP,	1	R3
2007-000282	R-CHIP;100KOHM,5%,1/10W,DA,TP,	1	R33
2007-000282	R-CHIP;100KOHM,5%,1/10W,DA,TP,	1	R101
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R12
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2	1	R38
2007-000355	R-CHIP;12KOHM,5%,1/10W,DA,TP,2	1	R47
2007-000409	R-CHIP;15KOHM,5%,1/10W,DA,TP,2	1	R30
2007-000465	R-CHIP;1KOHM,1%,1/10W,DA,TP,20	1	R11
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R13
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,20	1	R17

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2007-000493	R-CHIP;2.2KOHM,5%,1/10W,DA,TP,	1	R18
2007-000498	R-CHIP;2.2MOHM,5%,1/10W,DA,TP,	1	R22
2007-000498	R-CHIP;2.2MOHM,5%,1/10W,DA,TP,	1	R24
2007-000572	R-CHIP;220OHM,5%,1/10W,DA,TP,2	1	R45
2007-000572	R-CHIP;220OHM,5%,1/10W,DA,TP,2	1	R46
2007-000615	R-CHIP;24KOHM,5%,1/10W,DA,TP,2	1	R41
2007-000757	R-CHIP;330KOHM,5%,1/10W,DA,TP,	1	R10
2007-000757	R-CHIP;330KOHM,5%,1/10W,DA,TP,	1	R21
2007-000757	R-CHIP;330KOHM,5%,1/10W,DA,TP,	1	R23
2007-000774	R-CHIP;33KOHM,5%,1/10W,DA,TP,2	1	R40
2007-000931	R-CHIP;470OHM,5%,1/10W,DA,TP,2	1	R44
2007-000964	R-CHIP;5.1KOHM,5%,1/10W,DA,TP,	1	R32
2007-001001	R-CHIP;510OHM,5%,1/10W,DA,TP,2	1	R39
2007-001071	R-CHIP;6.8KOHM,5%,1/10W,DA,TP,	1	R2
2007-001141	R-CHIP;7.5KOHM,5%,1/10W,DA,TP,	1	R51
2203-000206	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C37
2203-000260	C-CERAMIC,CHIP;10nF,10%,50V,X7	1	C11
2203-000260	C-CERAMIC,CHIP;10nF,10%,50V,X7	1	C40
2203-000374	C-CERAMIC,CHIP;15nF,10%,50V,X7	1	C19
2203-000374	C-CERAMIC,CHIP;15nF,10%,50V,X7	1	C23
2203-000429	C-CERAMIC,CHIP;18pF,5%,50V,NPO	1	C27
2203-000455	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C1
2203-000455	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C6
2203-000455	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C12
2203-000455	C-CERAMIC,CHIP;1nF,5%,50V,NPO,	1	C22
2203-000595	C-CERAMIC,CHIP;220pF,5%,50V,NP	1	C13
2203-000595	C-CERAMIC,CHIP;220pF,5%,50V,NP	1	C14
2203-000595	C-CERAMIC,CHIP;220pF,5%,50V,NP	1	C15
2203-000595	C-CERAMIC,CHIP;220pF,5%,50V,NP	1	C16
2203-000595	C-CERAMIC,CHIP;220pF,5%,50V,NP	1	C17
2203-000595	C-CERAMIC,CHIP;220pF,5%,50V,NP	1	C20
2203-000595	C-CERAMIC,CHIP;220pF,5%,50V,NP	1	C21
2203-000802	C-CERAMIC,CHIP;33nF,10%,50V,X7	1	C46
2203-000891	C-CERAMIC,CHIP;4.7nF,10%,50V,X	1	C29
2203-001143	C-CERAMIC,CHIP;68nF,10%,50V,X7	1	C4
2203-001143	C-CERAMIC,CHIP;68nF,10%,50V,X7	1	C18
2401-000042	C-AL;100uF,20%,16V,GP,TP,6.3x7	1	C24
2401-000217	C-AL;100nF,20%,50V,GP,TP,4x7mm	1	C45
2401-000486	C-AL;10uF,20%,50V,GP,TP,6.3x7m	1	C25
2401-000486	C-AL;10uF,20%,50V,GP,TP,6.3x7m	1	C28
2401-000486	C-AL;10uF,20%,50V,GP,TP,6.3x7m	1	C38
2401-000597	C-AL;1uF,20%,50V,GP,TP,4x7mm,1	1	C34

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2401-000597	C-AL;1uF,20%,50V,GP,TP,4x7mm,1	1	C42
2401-000597	C-AL;1uF,20%,50V,GP,TP,4x7mm,1	1	C43
2401-000911	C-AL;22uF,20%,16V,GP,TP,5x7,5		1C44
2401-001363	C-AL;470uF,20%,16V,GP,TP,10x12	1	C32
2401-001509	C-AL;47uF,20%,16V,GP,TP,5x7,2.	1	C39
2401-001775	C-AL;470nF,20%,50V,GP,TP,4x7,5	1	C31
2403-000124	C-TA,DIPPED;10uF,20%,16V,WT,TP	1	C36
2404-000151	C-TA,CHIP;1uF,20%,16V,-,TP,321	1	C10
JB41-10508A	PCB-LIU;MJ-715S,FR-4,1L,T1.6mm	1	LIU PCB
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP11
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP13
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP14
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP15
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP16
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP4
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP6
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP7
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP8
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP9
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP10
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP1
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP2
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP3
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP5
JF13-10073A	IC ASIC-ILIU;SF2900M,STI9510,D	1	U3
JF27-60051A	COIL-FILTER;CF5400,60uH,50mOHM	1	FLT1
JF27-60051A	COIL-FILTER;CF5400,60uH,50mOHM	1	FLT2
JG26-50001A	TRANS MATCHING-;SF6000,-,600/6	1	T2
JG26-50001A	TRANS MATCHING-;SF6000,-,600/6	1	T3
JG26-50002A	TRANS-MATCHING;SF6000,500V,600	1	T1
JG39-41013A	CBF HARNESS-LIU GND;SF4400,WIR	1	LIU GND

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SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
JB92-00956B	PBA SUB I/F-XEROX(A);SF4500C,XEROX,EU(A),220V,-9/-1	-	-
0401-000005	DIODE-SWITCHING;1N4148,75V,200MA,DO-35,TP	2	D1,D8
0401-000116	DIODE-SWITCHING;MMSD914T1,100V,200mA,225mW,4nS	2	D6,D7
0402-000339	DIODE-BRIDGE;W06G,600V,1.5A,-,BK	1	BD1
0403-000139	DIODE-ZENER;1N4734A,5.6V,5%,1W,DO-41,TP	1	ZD8
0403-000142	DIODE-ZENER;1N4736A,6.8V,5%,1W,DO-41,TP	1	ZD2
0403-000153	DIODE-ZENER;1N4746A,18V,5%,1W,DO-41,TP	1	ZD1
0403-000532	DIODE-ZENER;1N4740A,10V,5%,1W,DO-41,TP	1	ZD7
0501-000242	TR-SMALL SIGNAL;BC547B,NPN,500mW,TO-92,TP,200-	1	Q10
0501-000500	TR-SMALL SIGNAL;KSP45,NPN,625mW,TO-92,TP,50-20	1	Q2
0501-000500	TR-SMALL SIGNAL;KSP45,NPN,625mW,TO-92,TP,50-20	1	Q9
0501-000550	TR-SMALL SIGNAL;BC327-16,PNP,625mW,TO-92,TP,10	2	Q3,Q7
0502-000133	TR-POWER;2SA1156,PNP,1W,TO-126,-,40-80	1	Q1
0502-000133	TR-POWER;2SA1156,PNP,1W,TO-126,-,40-80	1	Q8
0505-000123	FET-SILICON;BS170,N,60V,500mA,5ohm,350mW,T	1	Q11
0604-000119	PHOTO-COUPLER;TR,200-400%,200mW,DIL-4,ST	3	U2,U3,U4
1405-000108	VARISTOR;120V,1200A,9x4.5mm,TP	1	VAR2
1405-001008	VARISTOR;400V,500A,7.0x3.3mm,TP	1	ARS1
1405-001009	VARISTOR;600V,500A,7.0x3.3mm,TP	3	ARS2,ARS3,ARS4
2001-000027	R-CARBON;100OHM,5%,1/4W,AA,TP,-	1	R38
2001-000070	R-CARBON;15KOHM,5%,1/4W,AA,TP,-	1	R1
2001-000078	R-CARBON;56KOHM,5%,1/4W,AA,TP,-	1	R3
2001-000294	R-CARBON;10MOHM,5%,1/4W,AA,TP,-	1	R2
2001-000395	R-CARBON;180KOHM,5%,1/4W,AA,TP,-	1	R39
2001-000626	R-CARBON;300OHM,5%,1/4W,AA,TP,-	1	R7
2001-000637	R-CARBON;30OHM,5%,1/2W,AA,TP,-	1	R6
2001-000643	R-CARBON;330KOHM,5%,1/4W,AA,TP,-	1	R16
2003-000538	R-METAL OXIDE(S);1Kohm,5%,2W,AA,TP,4x12mm	1	R36
2004-001773	R-METAL;12ohm,1%,1/4W,AA,TP,2.4x7mm	1	R37
2007-000029	R-CHIP;0OHM,5%,1/10W,DA,TP,2012	3	R18,R19,R20
2007-000029	R-CHIP;0OHM,5%,1/10W,DA,TP,2012	1	R35
2007-000282	R-CHIP;100KOHM,5%,1/10W,DA,TP,2012	2	R8,R29
2007-000290	R-CHIP;100OHM,5%,1/10W,DA,TP,2012	2	R4,R5
2007-000300	R-CHIP;10KOHM,5%,1/10W,DA,TP,2012	3	R12,R21,R32
2007-000409	R-CHIP;15KOHM,5%,1/10W,DA,TP,2012	1	R13
2007-000468	R-CHIP;1KOHM,5%,1/10W,DA,TP,2012	1	R34
2007-000498	R-CHIP;2.2MOHM,5%,1/10W,DA,TP,2012	2	R14,R15
2007-000572	R-CHIP;220OHM,5%,1/10W,DA,TP,2012	1	R31
2007-000615	R-CHIP;24KOHM,5%,1/10W,DA,TP,2012	1	R25
2007-000757	R-CHIP;330KOHM,5%,1/10W,DA,TP,2012	2	R10,R17
2007-000798	R-CHIP;360OHM,5%,1/10W,DA,TP,2012	1	R27

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2007-000804	R-CHIP;36KOHM,5%,1/10W,DA,TP,2012	1	R26
2007-000844	R-CHIP;3KOHM,5%,1/10W,DA,TP,2012	1	R24
2007-000931	R-CHIP;470OHM,5%,1/10W,DA,TP,2012	1	R30
2007-001001	R-CHIP;510OHM,5%,1/10W,DA,TP,2012	1	R33
2007-001071	R-CHIP;6.8KOHM,5%,1/10W,DA,TP,2012	1	R9
2007-001141	R-CHIP;7.5KOHM,5%,1/10W,DA,TP,2012	1	R11
2203-000206	C-CERAMIC,CHIP;100nF,10%,50V,X7R,TP,2012,-	2	C21,C24
2203-000260	C-CERAMIC,CHIP;10nF,10%,50V,X7R,TP,2012,-	4	C5,C8,C12,C13
2203-000374	C-CERAMIC,CHIP;15nF,10%,50V,X7R,TP,2012,-	1	C15
2203-000429	C-CERAMIC,CHIP;18pF,5%,50V,NPO,TP,2012,-	1	C22
2203-000455	C-CERAMIC,CHIP;1nF,5%,50V,NPO,TP,2012,-	1	C11
2203-000495	C-CERAMIC,CHIP;2.2nF,10%,50V,X7R,TP,2012,-	1	C10
2203-000802	C-CERAMIC,CHIP;33nF,10%,50V,X7R,TP,2012,-	1	C7
2203-000891	C-CERAMIC,CHIP;4.7nF,10%,50V,X7R,TP,2012,-	1	C17
2203-001143	C-CERAMIC,CHIP;68nF,10%,50V,X7R,TP,2012,2mm	1	C14
2305-000583	C-FILM,MPEF;470nF,10%,250V,BK,20x7x14,17.5	1	C2
2305-001024	C-FILM,MPEF;33nF,10%,250V,BK,10.5x3.5x6.5,	1	C3
2401-000217	C-AL;100nF,20%,50V,GP,TP,4x7mm,1.5m	1	C25
2401-000486	C-AL;10uF,20%,50V,GP,TP,6.3x7mm,5	2	C20,C23
2401-000597	C-AL;1uF,20%,50V,GP,TP,4x7mm,1.5mm	1	C9
2401-000899	C-AL;22uF,20%,100V,GP,TP,8x11mm,5mm	1	C26
2401-001363	C-AL;470uF,20%,16V,GP,TP,10x12.5,5	1	C19
2401-001509	C-AL;47uF,20%,16V,GP,TP,6.3x7mm,2.5	1	C18
2403-000124	C-TA,DIPPED;10uF,20%,16V,WT,TP,5.5x8.9mm,2	1	C6
2404-000151	C-TA,CHIP;1uF,20%,16V,-,TP,3216,-	1	C16
2802-001029	RESONATOR-CERAMIC;3.58MHz,0.5%,BK,10x4.5x7.5mm	1	X1
3501-001025	RELAY-MINIATURE;12Vdc,280mW,2A,2FormC,5mS,3mS	1	CML1
3710-000104	CONNECTOR-SHUNT;2P,1R,2.54mm,STRAIGHT,AUF	3	P2-1,P4-1,P5-1
3711-001422	CONNECTOR-HEADER;NOWALL,2P,1R,2.54mm,STRAIGHT,S	1	P5
3711-001479	CONNECTOR-HEADER;NOWALL,3P,1R,2.54mm,STRAIGHT,S	2	P2,P4
3711-002809	CONNECTOR-HEADER;BOX,8P,1R,2mm,STRAIGHT,SN	1	P3
3711-002813	CONNECTOR-HEADER;BOX,12P,1R,2mm,STRAIGHT,SN	1	P1
JB41-10508C	PCB-XEROX;SF4500C,FR-4,2L,T1.6mm,110X90m	1	JB92-00956B(LIU)
JF13-10067A	IC HYB-;SF800,HFS113F017A1,DIP,7P,-	1	HYB1
JF13-10073A	IC ASIC-ILIU;SF2900M,STI9510,DIP,40P,600MIL	1	U1
JF27-30055A	COIL RF-;SF2900M,3mH,6OHM,-	2	L1,L2
JF27-60051A	COIL FILTER-;CF5400,60uH,50mOHM,18T	4	FLT1,FLT2,FLT3,FLT4
JG26-50001A	TRANS MATCHING-;SF6000,-,600/600	2	T2,T3
JG39-41013A	CBF HARNESS-LIU GND;SF4400,WIRE,UL1007,145mm,GRN/Y	1	F.GND

9-5 OPE Part List

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
JC92-01038B	PBA MAIN-OPE;SF-5800P,USA,USA,	1	OPE PBA
0604-000167	PHOTO-INTERRUPTER;TR,-,-,-,BK	1	S1
0604-001006	PHOTO-INTERRUPTER;TR,-,-,DIP-4	1	S2
JC39-40589A	CBF HARNESS-OPE;SF-5805P,CBF,U	1	OPE-SCAN
JG07-20001A	DISPLAY LCD-;SF4000,UC-162937-	1	
JG39-40012A	CBF HARNESS-LCD;SF4000,-,UL287	1	
0401-000116	DIODE-SWITCHING;MMSD914T1,100V	1	D1
0404-000112	DIODE-SCHOTTKY;RB420D,25V,100m	1	D5
0404-000112	DIODE-SCHOTTKY;RB420D,25V,100m	1	D4
0404-000112	DIODE-SCHOTTKY;RB420D,25V,100m	1	D2
0404-000112	DIODE-SCHOTTKY;RB420D,25V,100m	1	D3
0404-000112	DIODE-SCHOTTKY;RB420D,25V,100m	1	D6
0404-000112	DIODE-SCHOTTKY;RB420D,25V,100m	1	D7
0404-000112	DIODE-SCHOTTKY;RB420D,25V,100m	1	D8
0601-000570	LED;CHIP,GREEN,-,660nm	1	LED1
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J4
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J3
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J2
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J19
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J7
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J8
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J9
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	R10
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J5
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J13
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J6
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J12
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J11
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J10
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J1
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J18
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J17
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J16
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J15
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	J14
2007-000303	R-CHIP;10KOHM,5%,1/8W,DA,TP,32	1	R14
2007-000303	R-CHIP;10KOHM,5%,1/8W,DA,TP,32	1	R7
2007-000403	R-CHIP;150OHM,5%,1/8W,DA,TP,32	1	R6
2007-000403	R-CHIP;150OHM,5%,1/8W,DA,TP,32	1	R9
2007-000542	R-CHIP;200OHM,5%,1/8W,DA,TP,32	1	R15
2007-000542	R-CHIP;200OHM,5%,1/8W,DA,TP,32	1	R1

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2007-000542	R-CHIP;200OHM,5%,1/8W,DA,TP,32	1	R3
2007-000575	R-CHIP;220OHM,5%,1/8W,DA,TP,32	1	R5
2007-000589	R-CHIP;22KOHM,5%,1/8W,DA,TP,32	1	R17
2007-000589	R-CHIP;22KOHM,5%,1/8W,DA,TP,32	1	R16
2007-000589	R-CHIP;22KOHM,5%,1/8W,DA,TP,32	1	R18
2007-000589	R-CHIP;22KOHM,5%,1/8W,DA,TP,32	1	R19
2007-000589	R-CHIP;22KOHM,5%,1/8W,DA,TP,32	1	R2
2007-000589	R-CHIP;22KOHM,5%,1/8W,DA,TP,32	1	R23
2007-000589	R-CHIP;22KOHM,5%,1/8W,DA,TP,32	1	R22
2007-000589	R-CHIP;22KOHM,5%,1/8W,DA,TP,32	1	R21
2007-000589	R-CHIP;22KOHM,5%,1/8W,DA,TP,32	1	R20
2007-000824	R-CHIP;390OHM,5%,1/8W,DA,TP,32	1	R8
2007-000875	R-CHIP;4.7KOHM,5%,1/8W,DA,TP,3	1	R13
2007-000944	R-CHIP;47KOHM,5%,1/8W,DA,TP,32	1	R4
2007-000944	R-CHIP;47KOHM,5%,1/8W,DA,TP,32	1	R12
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C5
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C10
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C1
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C12
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C8
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C7
2203-000242	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C2
2203-000583	C-CERAMIC,CHIP;220pF,5%,50V,NP	1	C6
2203-000583	C-CERAMIC,CHIP;220pF,5%,50V,NP	1	C11
2203-000583	C-CERAMIC,CHIP;220pF,5%,50V,NP	1	C9
2203-001005	C-CERAMIC,CHIP;47pF,5%,50V,NPO	1	C4
2203-001005	C-CERAMIC,CHIP;47pF,5%,50V,NPO	1	C3
2402-000176	C-AL,SMD;10uF,20%,16V,GP,TP,4.	1	C13
2802-001069	RESONATOR-CERAMIC;7.37MHz,0.5%	1	OSC1
JC41-10544B	PCB-OPE;SF-5800P,FR-1,1L,1.6T,	1	
JG09-10050A	IC MICRO COMPUTER-;SF5500,Z086	1	U1

9-6 SCAN Part List

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
JC92-01039A	PBA MAIN-SCAN		1
0501-000385	TR-SMALL SIGNAL;KSC5019-MTA,NP	1	SCAN PBA
1003-000243	IC-MOTOR DRIVER;PBL3717A,DIP,1	1	Q1
1003-000243	IC-MOTOR DRIVER;PBL3717A,DIP,1	1	U2
2001-000202	R-CARBON;0.5ohm,5%,1/2W,AA,TP,	2	U1
2401-000032	C-AL;100uF,20%,50V,GP,TP,8x12,	1	R5,R10
2401-003420	C-AL;2200UF,20%,6.3V,-,TP,10X1	1	C25
3711-000398	CONNECTOR-HEADER;BOX,10P,1R,2m	1	C15
3711-000470	CONNECTOR-HEADER;3WALL,4P,1R,2	1	CN2
3711-000484	CONNECTOR-HEADER;3WALL,5P,1R,2	1	CN7
3711-002001	CONNECTOR-HEADER;-,20P,2R,2mm,	1	CN3
2007-000245	R-CHIP;1.5KOHM,5%,1/8W,DA,TP,3	1	R1
2007-000303	R-CHIP;10KOHM,5%,1/8W,DA,TP,32	1	R7
2007-000472	R-CHIP;1KOHM,5%,1/8W,DA,TP,321	1	R4
2007-000472	R-CHIP;1KOHM,5%,1/8W,DA,TP,321	1	R9
2007-000705	R-CHIP;3.6KOHM,5%,1/8W,DA,TP,3	1	R2
2007-001041	R-CHIP;56KOHM,5%,1/8W,DA,TP,32	1	R8
2007-001041	R-CHIP;56KOHM,5%,1/8W,DA,TP,32	1	R3
2007-001159	R-CHIP;750OHM,5%,1/8W,DA,TP,32	1	R6
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C5
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C1
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C2
2203-000208	C-CERAMIC,CHIP;100nF,10%,50V,X	1	C10
2007-000033	R-CHIP;0OHM,5%,1/8W,DA,TP,3216	1	C17
2203-000242	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C24
2203-000242	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C16
2203-000242	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C20
2203-000242	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C4
2203-000242	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C21
2203-000242	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C22
2203-000242	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C23
2203-000242	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C18
2203-000242	C-CERAMIC,CHIP;100pF,5%,50V,NP	1	C19
2203-000636	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C9
2203-000636	C-CERAMIC,CHIP;22pF,5%,50V,NPO	1	C14
2203-001501	C-CERAMIC,CHIP;820pF,5%,50V,NP	1	C11
2203-001501	C-CERAMIC,CHIP;820pF,5%,50V,NP	1	C13
2203-001501	C-CERAMIC,CHIP;820pF,5%,50V,NP	1	C6
2203-001501	C-CERAMIC,CHIP;820pF,5%,50V,NP	1	C8
3301-000325	CORE-FERRITE BEAD;AB,3.2x2.5x1	1	L1
JC41-10545A	PCB-SCAN;SF-5800P,FR-2,2L,T1.6	1	SCAN PCB

9-7 Joint Part List

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
JC92-01001B	PBA SUB-JOINT	1	JOINT
1003-001165	IC-MOTOR DRIVER;SMA7029M,ANGLE	1	U401
2003-000547	R-METAL OXIDE(S);1ohm,5%,3W,AA	1	R416
2003-000547	R-METAL OXIDE(S);1ohm,5%,3W,AA	1	R418
3711-000961	CONNECTOR-HEADER;BOX,4P,1R,2.5	1	CN401
3711-002001	CONNECTOR-HEADER;-,20P,2R,2mm,	1	CN406
3711-002807	CONNECTOR-HEADER;BOX,6P,1R,2mm	1	CN405
3711-003408	CONNECTOR-HEADER;BOX,2P,1R,2mm	1	CN402
3711-003408	CONNECTOR-HEADER;BOX,2P,1R,2mm	1	CN407
3711-003968	CONNECTOR-HEADER;BOX,3P,1R,2.5	1	CN403
3711-003968	CONNECTOR-HEADER;BOX,3P,1R,2.5	1	CN408
0401-000005	DIODE-SWITCHING;1N4148,75V,200	1	D403
0401-000005	DIODE-SWITCHING;1N4148,75V,200	1	D404
0402-000129	DIODE-RECTIFIER;1N4003,200V,1A	1	D401
0402-000129	DIODE-RECTIFIER;1N4003,200V,1A	1	D405
0501-000010	TR-SMALL SIGNAL;KSC1008,NPN,80	1	Q401
0501-000010	TR-SMALL SIGNAL;KSC1008,NPN,80	1	Q402
0501-000010	TR-SMALL SIGNAL;KSC1008,NPN,80	1	Q404
0501-000010	TR-SMALL SIGNAL;KSC1008,NPN,80	1	Q405
0501-000010	TR-SMALL SIGNAL;KSC1008,NPN,80	1	Q406
0501-000010	TR-SMALL SIGNAL;KSC1008,NPN,80	1	Q407
0501-000010	TR-SMALL SIGNAL;KSC1008,NPN,80	1	Q408
2001-000006	R-CARBON;2.4Kohm,5%,1/8W,AA,TP	1	R408
2001-000006	R-CARBON;2.4Kohm,5%,1/8W,AA,TP	1	R413
2001-000281	R-CARBON;100OHM,5%,1/8W,AA,TP,	1	R450
2001-000281	R-CARBON;100OHM,5%,1/8W,AA,TP,	1	R451
2001-000281	R-CARBON;100OHM,5%,1/8W,AA,TP,	1	R452
2001-000281	R-CARBON;100OHM,5%,1/8W,AA,TP,	1	R407
2001-000362	R-CARBON;150OHM,5%,1/8W,AA,TP,	1	R430
2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,-	1	R403
2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,-	1	R417
2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,-	1	R420
2001-000429	R-CARBON;1KOHM,5%,1/8W,AA,TP,-	1	R432
2001-000786	R-CARBON;47KOHM,5%,1/8W,AA,TP,	1	R414
2001-000786	R-CARBON;47KOHM,5%,1/8W,AA,TP,	1	R421
2001-000812	R-CARBON;5.6Kohm,5%,1/8W,AA,TP	1	R415
2001-000812	R-CARBON;5.6Kohm,5%,1/8W,AA,TP	1	R419
2001-000812	R-CARBON;5.6Kohm,5%,1/8W,AA,TP	1	R423
2001-000812	R-CARBON;5.6Kohm,5%,1/8W,AA,TP	1	R431
2001-000812	R-CARBON;5.6Kohm,5%,1/8W,AA,TP	1	R401
2001-000812	R-CARBON;5.6Kohm,5%,1/8W,AA,TP	1	R404

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
2001-000812	R-CARBON;5.6Kohm,5%,1/8W,AA,TP	1	R412
2001-000832	R-CARBON;510OHM,5%,1/8W,AA,TP,	1	R402
2001-000832	R-CARBON;510OHM,5%,1/8W,AA,TP,	1	R406
2201-000326	C-CERAMIC,DISC;2.2nF,10%,50V,Y	1	C408
2201-000326	C-CERAMIC,DISC;2.2nF,10%,50V,Y	1	C411
2201-000469	C-CERAMIC,DISC;330pF,10%,500V,	1	C405
2201-000469	C-CERAMIC,DISC;330pF,10%,500V,	1	C406
2201-000558	C-CERAMIC,DISC;470pF,10%,50V,Y	1	C409
2201-000558	C-CERAMIC,DISC;470pF,10%,50V,Y	1	C415
2202-000002	C-CERAMIC,MLC-AXIAL;10nF,0.05,	1	C412
2202-000002	C-CERAMIC,MLC-AXIAL;10nF,0.05,	1	C401
2202-000002	C-CERAMIC,MLC-AXIAL;10nF,0.05,	1	C403
2202-000002	C-CERAMIC,MLC-AXIAL;10nF,0.05,	1	C404
2202-000002	C-CERAMIC,MLC-AXIAL;10nF,0.05,	1	C410
2202-000630	C-CERAMIC,MLC-AXIAL;100nF,10%,	1	C402
2401-001476	C-AL;47uF,20%,10V,GP,TP,6.3x5m	1	C407
2401-001476	C-AL;47uF,20%,10V,GP,TP,6.3x5m	1	C413
2401-002300	C-AL;47uF,20%,50V,GP,TP,6.3x11	1	C416
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP434
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP435
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP436
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP417
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP418
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP419
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP420
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP421
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP422
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP444
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP445
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP446
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP438
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP439
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP440
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP441
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP442
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP449
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP450
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP429
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP430
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP424
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP426
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP427

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP407
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP408
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP411
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP412
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP413
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP414
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP415
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP416
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP401
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP402
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP403
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP404
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP405
JC39-40511A	CBF-HARNESS;ML-80,JUMPER,AWG22	1	JP406
JC41-10534A	PCB-ENG B'D(JOINT);ML-5000A,FR	1	JOINT PCB

9-8 ETC. Part List

SEC CODE	DESCRIPTION/SPECIFICATION	Q'TY	LOCATION NO.
JC96-01190A	ELA UNIT-PTL	1	
0601-001234	LED;ROUND,RED,3mm,660nm	6	
2001-000903	R-CARBON;620ohm,5%,1/4W,AA,TP,	2	PTL
JC39-40557A	CBF HARNESS-2P;ML-5000A,FLAT,U	1	
JC41-10535A	PCB-PTL;ML-5000A,FR-1,1L,T1.6m	1	
3405-000125	SWITCH-MICRO;125V,5A,50gf,SPDT	1	
JC39-40551A	CBF HARNESS-3P,2WIRE;ML-5000A,	1	
JC41-10539A	PCB-SWITCH_B'D;ML-5000A,*,*,T1	1	
JC96-01200A	ELA UNIT-MOTOR;ML5000,XR,USA,-	1	
3101-001130	MOTOR-STEP;7.5deg,24V,701pps,1	1	
JC92-01017A	PBA SUB-SENSOR	1	
0604-000165	PHOTO-INTERRUPTER;TR,-,-,-,BK		2
2001-000362	R-CARBON;150OHM,5%,1/8W,AA,TP,	2	R1,R3
JC39-40565A	CBF HARNESS-4P;ML-5000A,FLAT,U	1	
JC41-10540A	PCB-SENSOR_B'D;ML-5000A,*,*,T1	1	
JC92-01044A	PBA SUB OPTIC-PE	1	
0604-001033	PHOTO-INTERRUPTER;TR,-,150mW,D	1	OP3
JC39-40561A	CBF HARNESS-3P;ML-5000A,FLAT,U	1	
JC41-10547A	PCB-P-EMPTY;ML-5000A,*,*,T1.6m	1	
	FUSER ASS'Y		
JC96-00967A	ELA HOU-FUSER ASSY;SF-5805PI/X	1	
1404-001128	THERMISTOR-NTC;2.11Kohm,5%,410	1	
4712-000001	THERMOSTAT-150C;125/250V,15/7.	1	
4713-001081	LAMP-HALOGEN;115V,-,400W,YEL,-	1	
JC39-40600A	CBF HARNESS-3P,2WIRE;SF-5805P,	1	
	SPK ASS'Y		
JC96-01300A	ELA HOU-SPK ASS'Y	1	
3001-001044	SPEAKER;1W,8ohm,83dB,500Hz	1	
JC39-40590A	CBF HARNESS-SPK;SF-5805P,CBF,U	1	
JC92-01002B	PBA PWR-HVPS;MLE-5000,LEXMARK,	1	

Electrical Parts List

10. Block Diagram
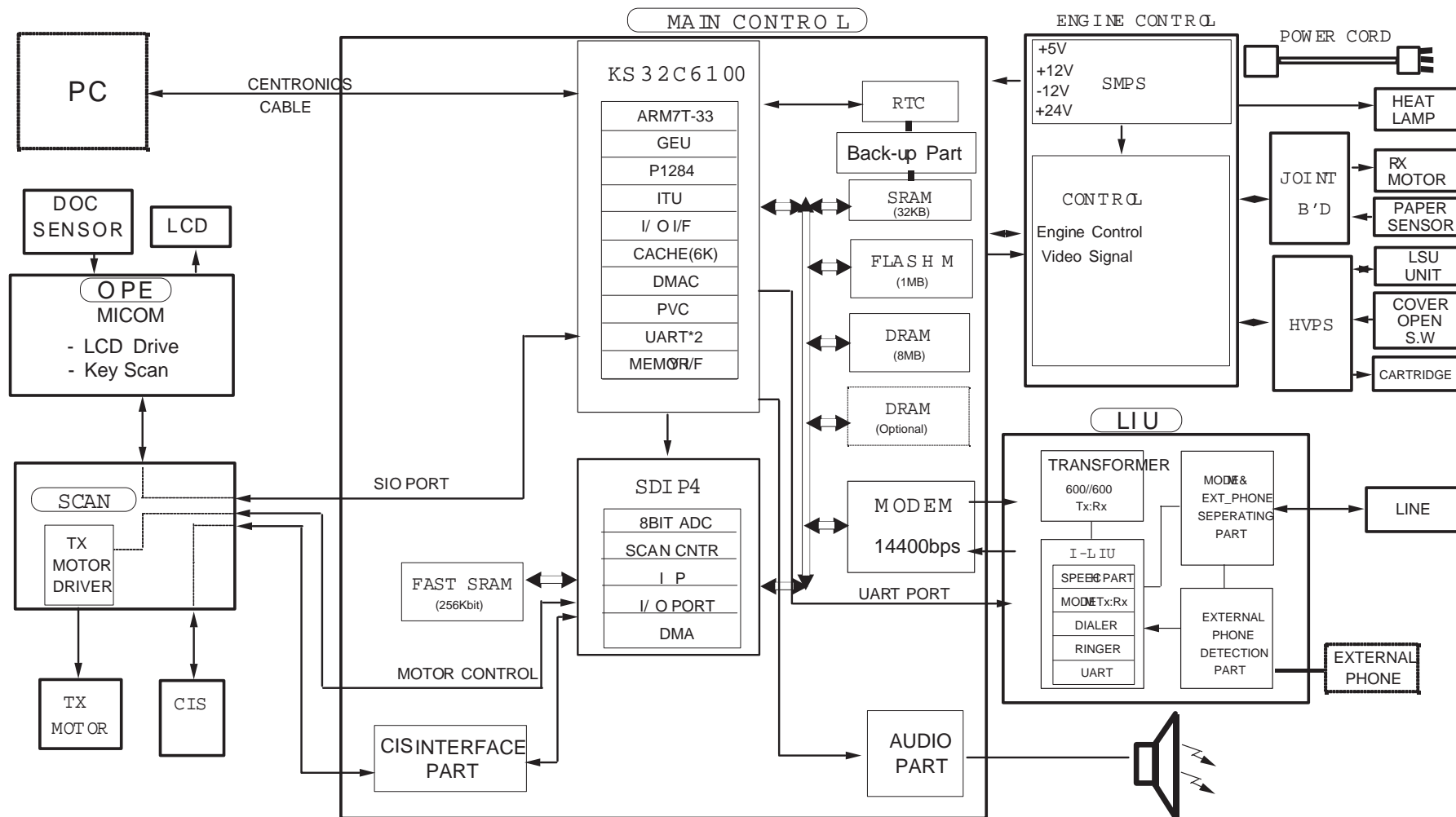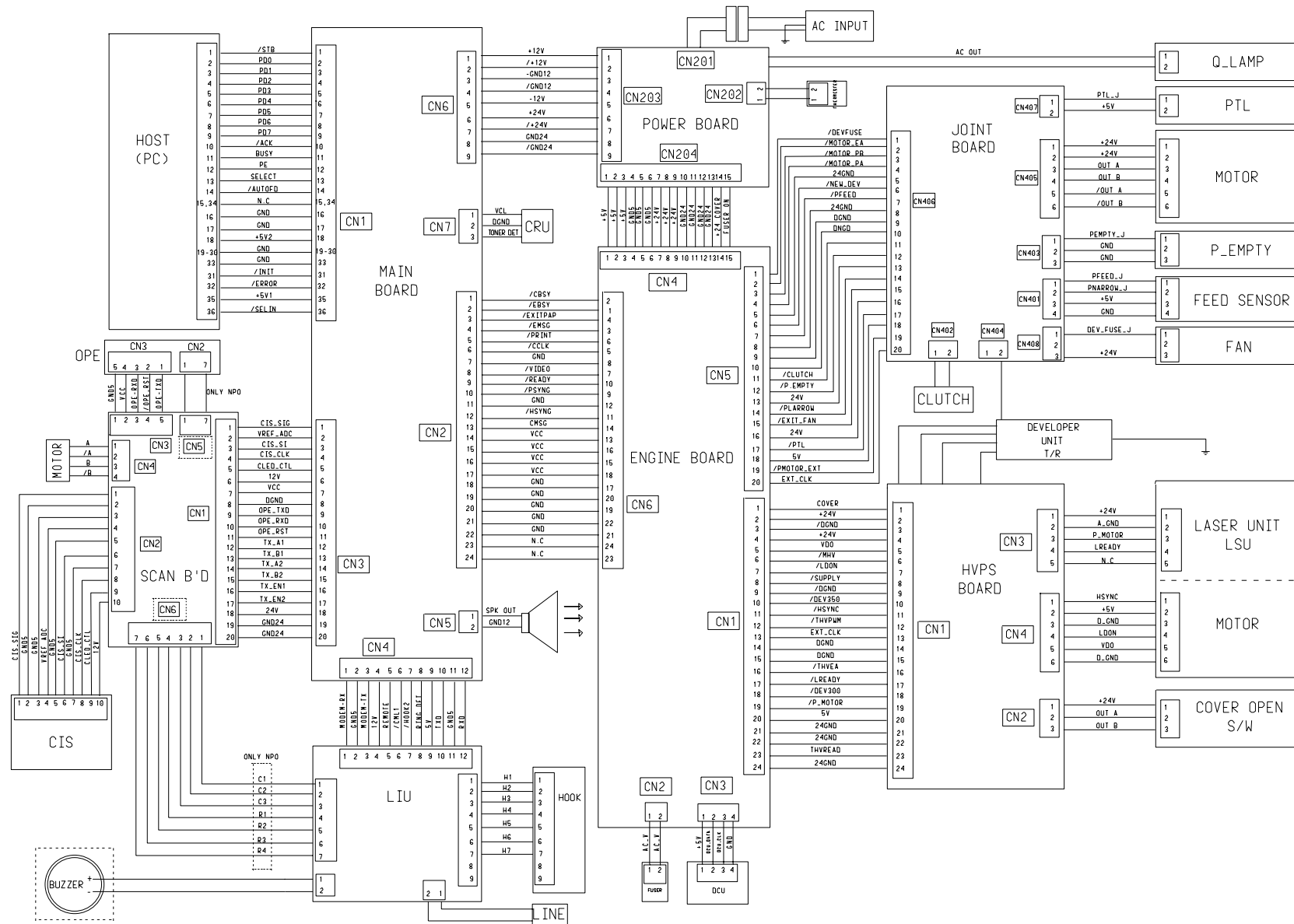
12-1 Main Circuit Diagram
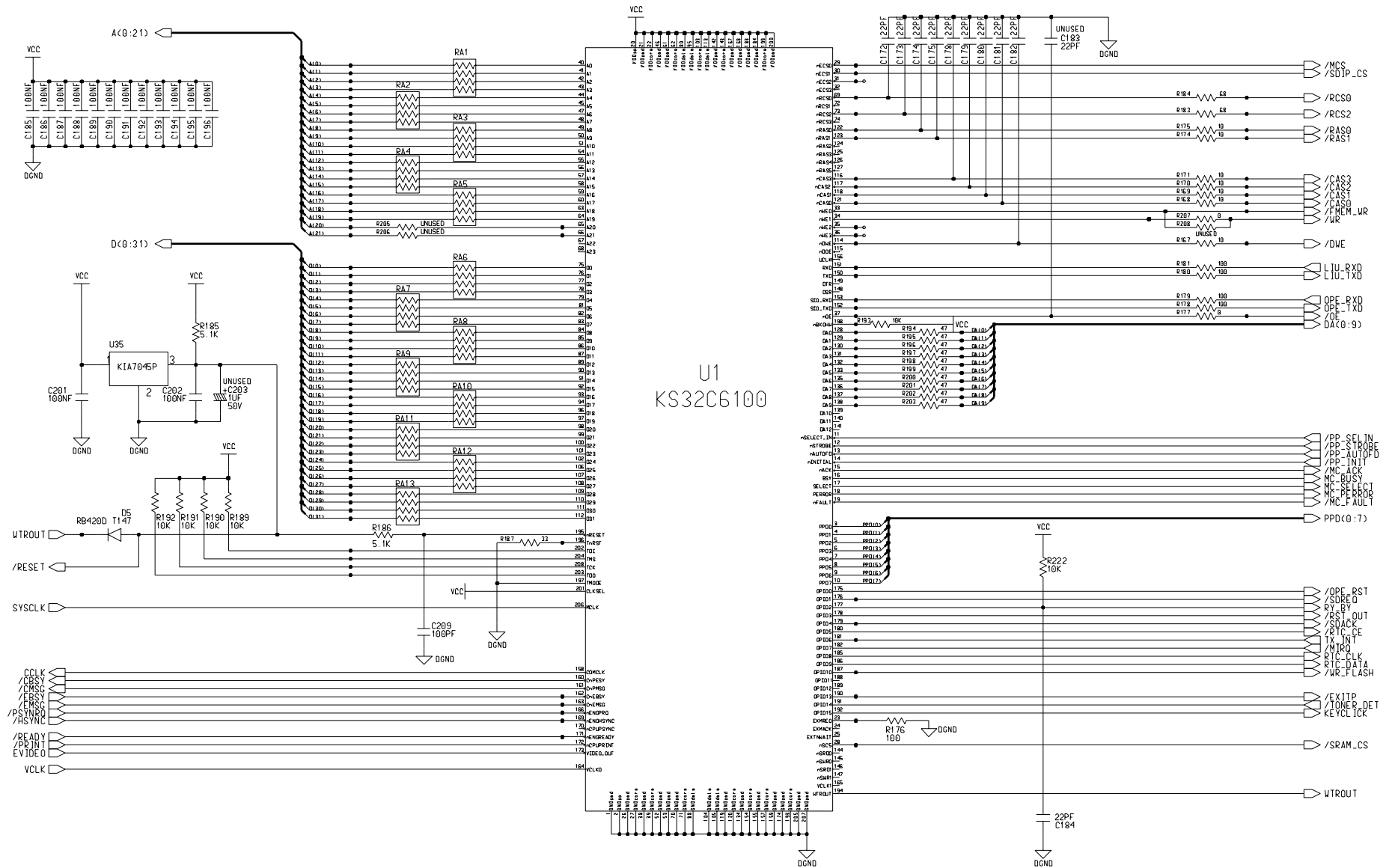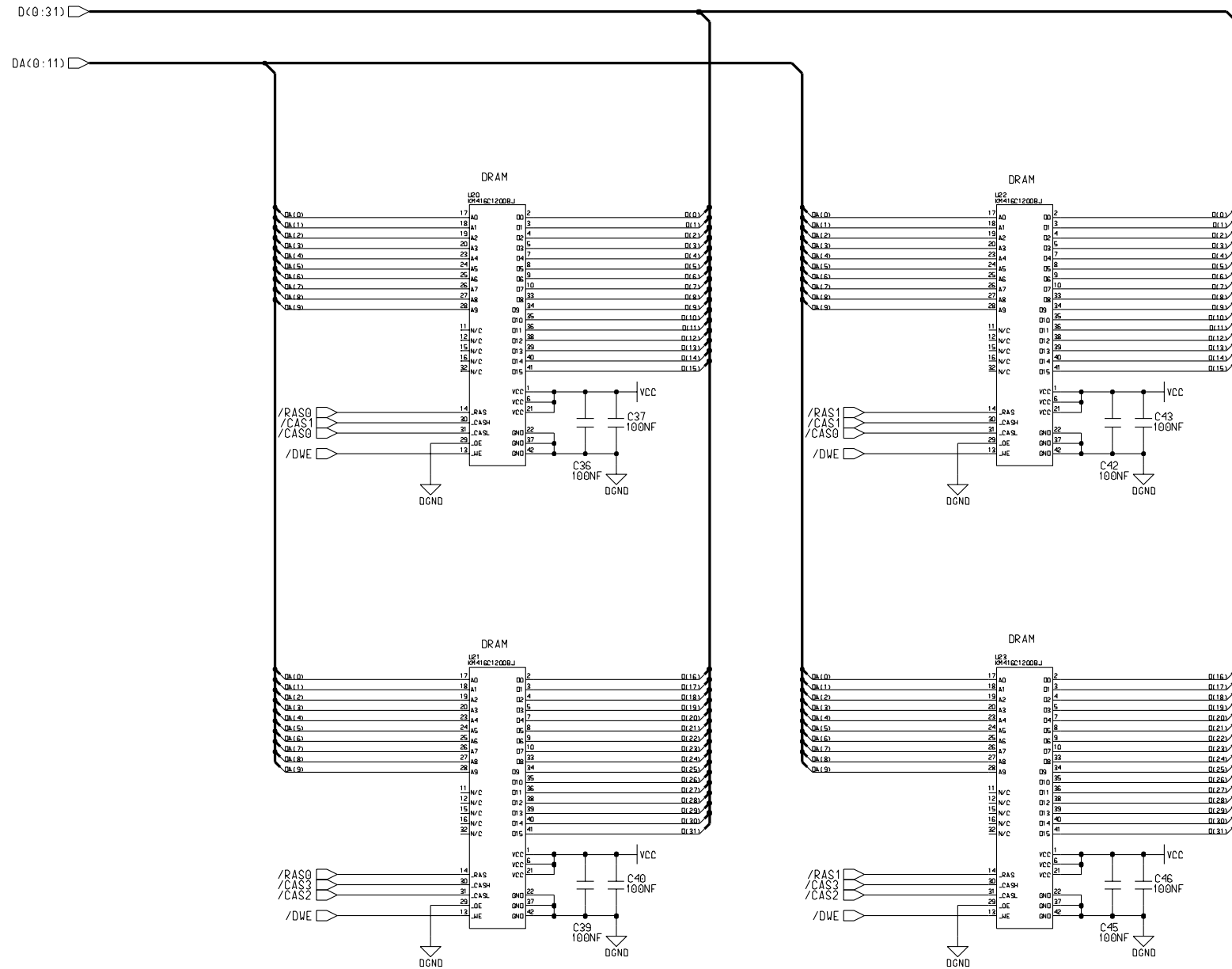
Main Circuit Diagram

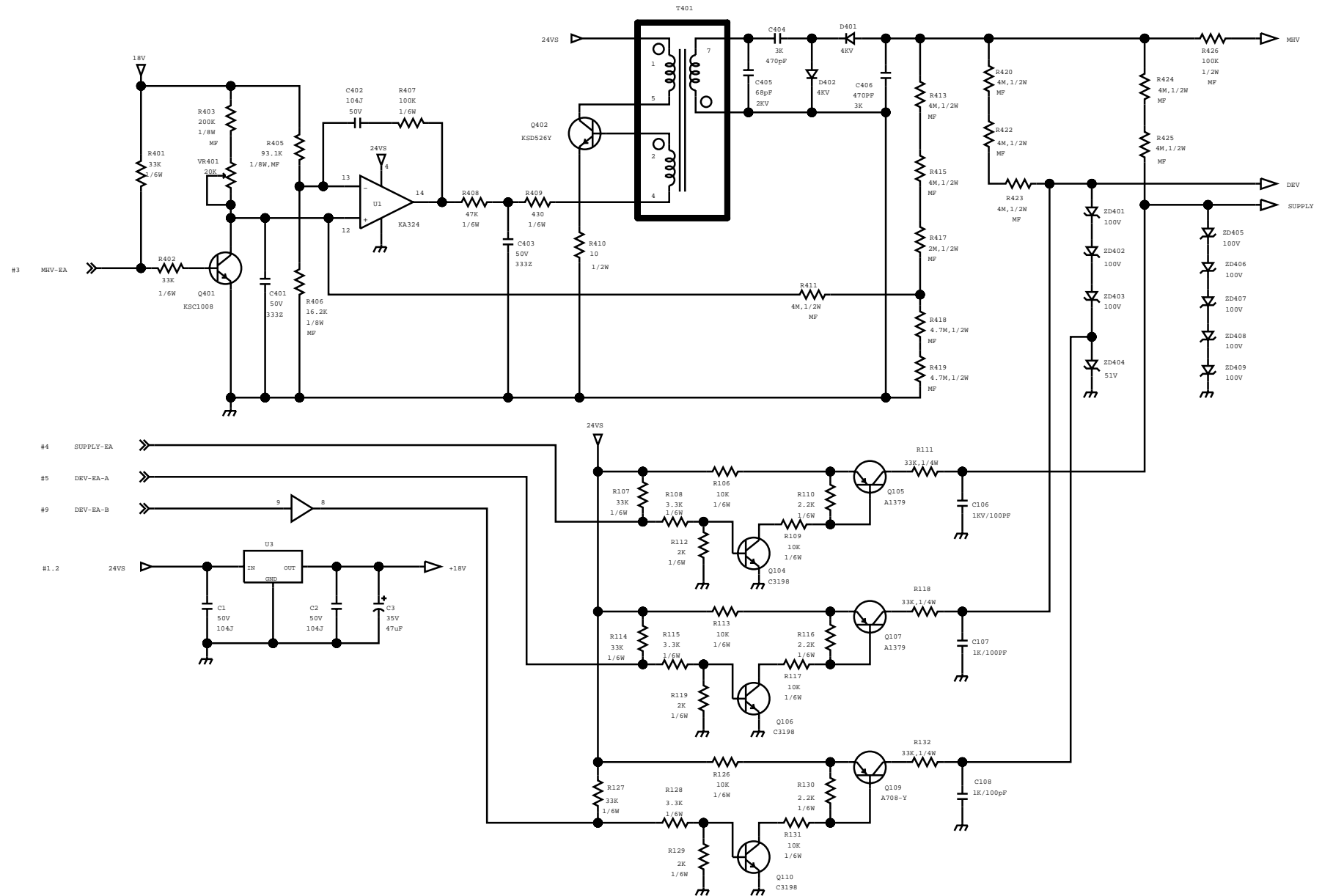# Main Circuit Diagram
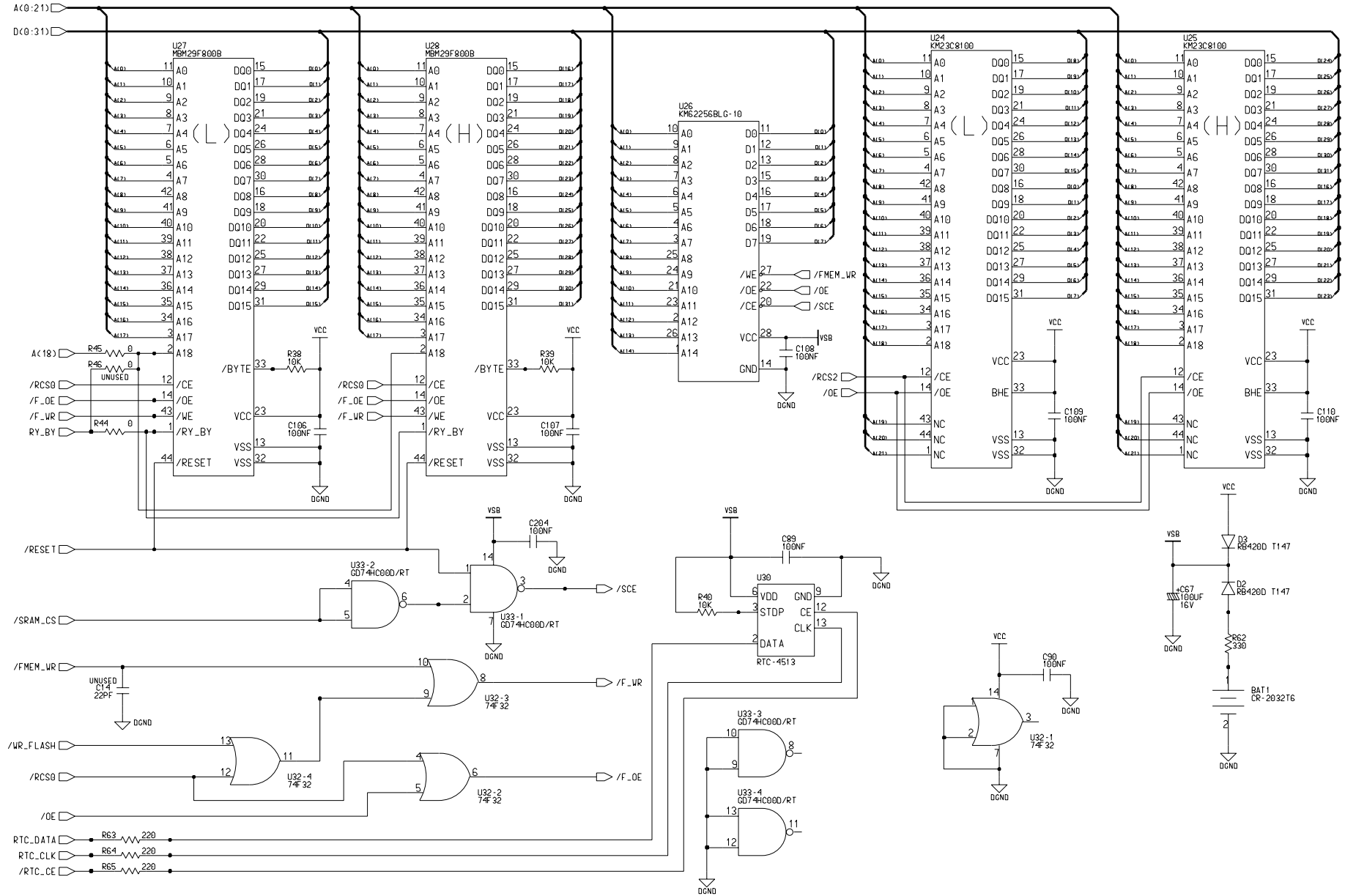
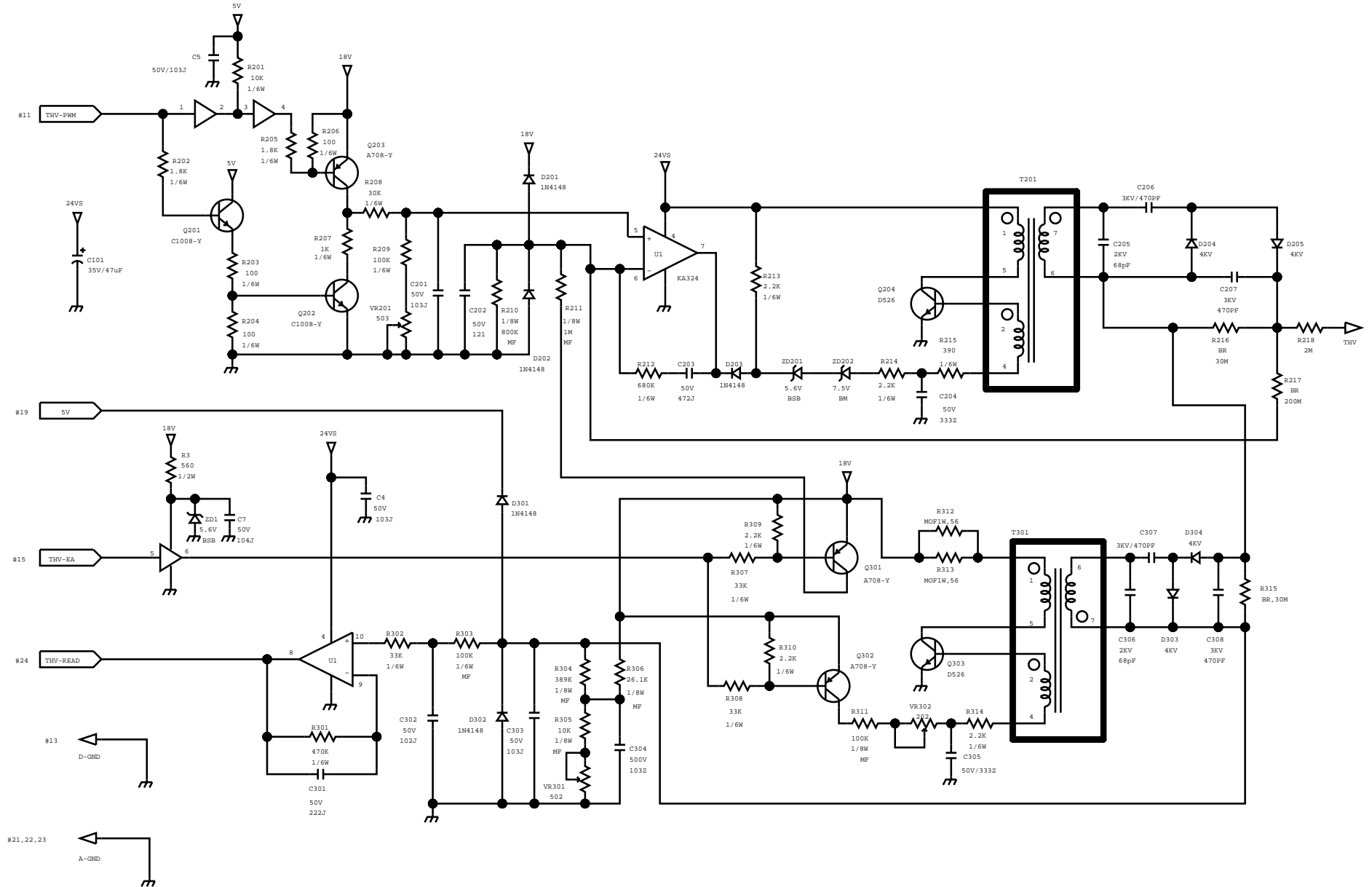## Main Circuit Diagram
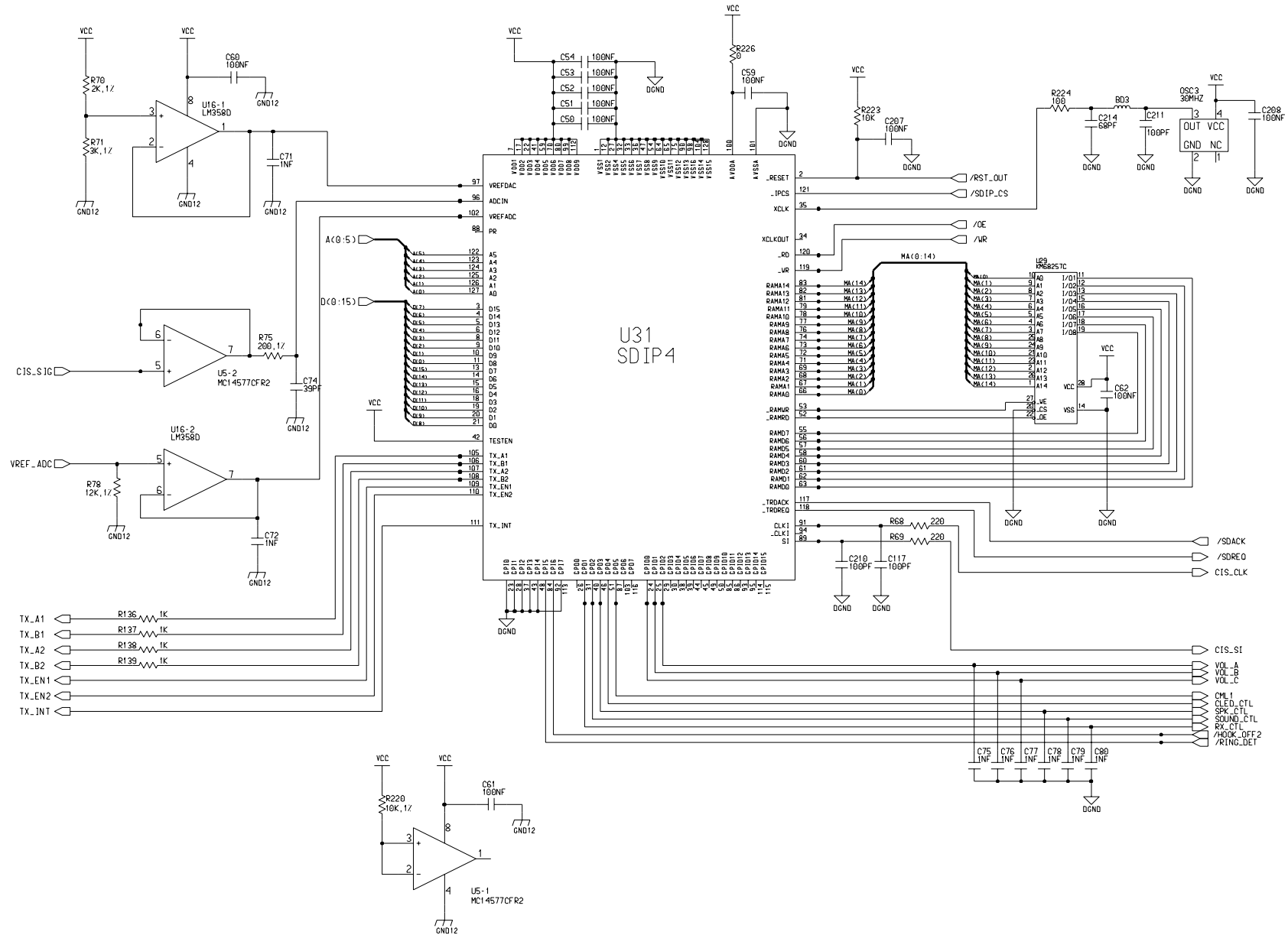
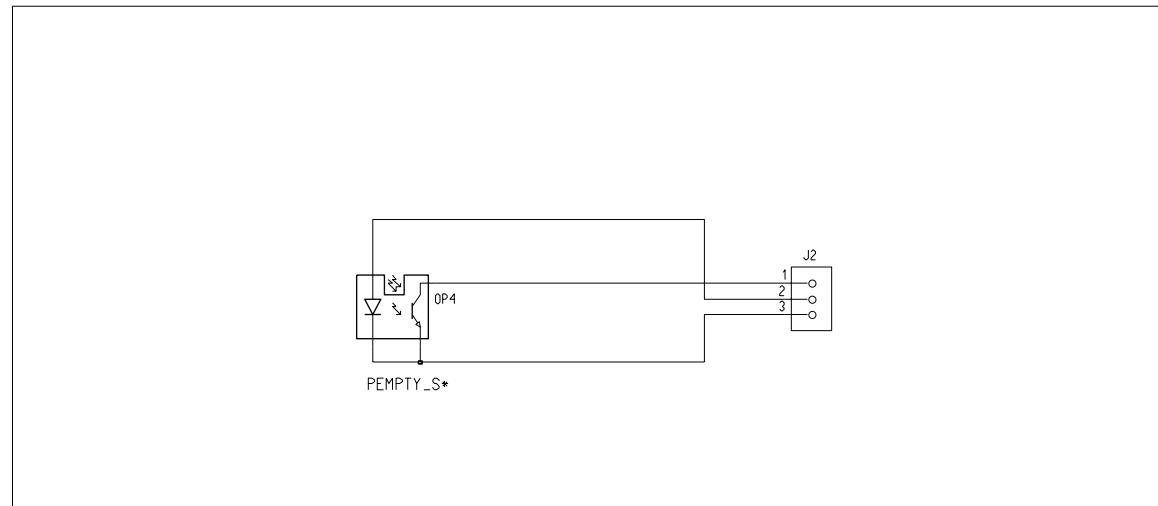# Main Circuit Diagram

Main Circuit Diagram

Main Circuit Diagram

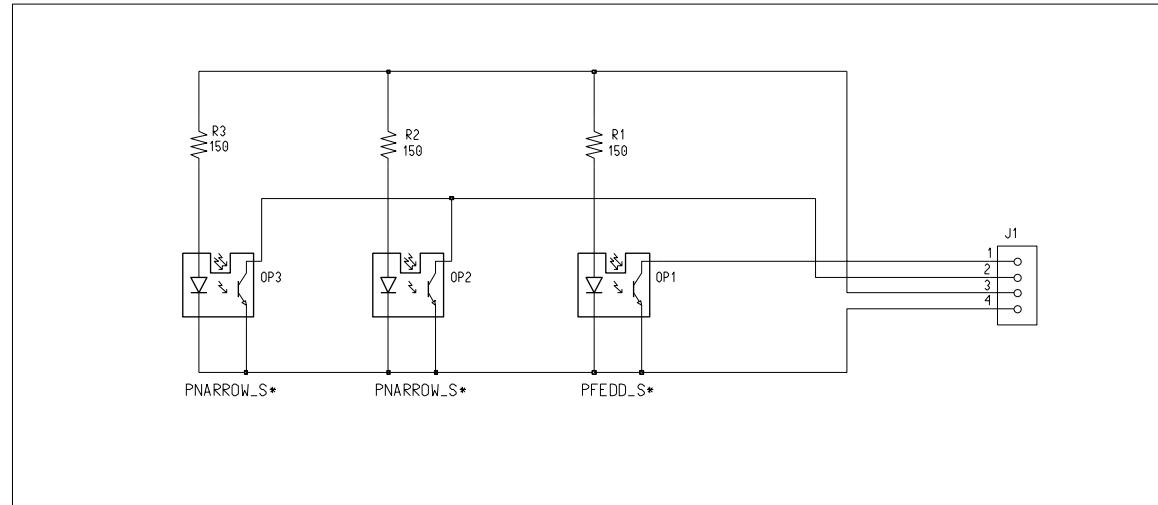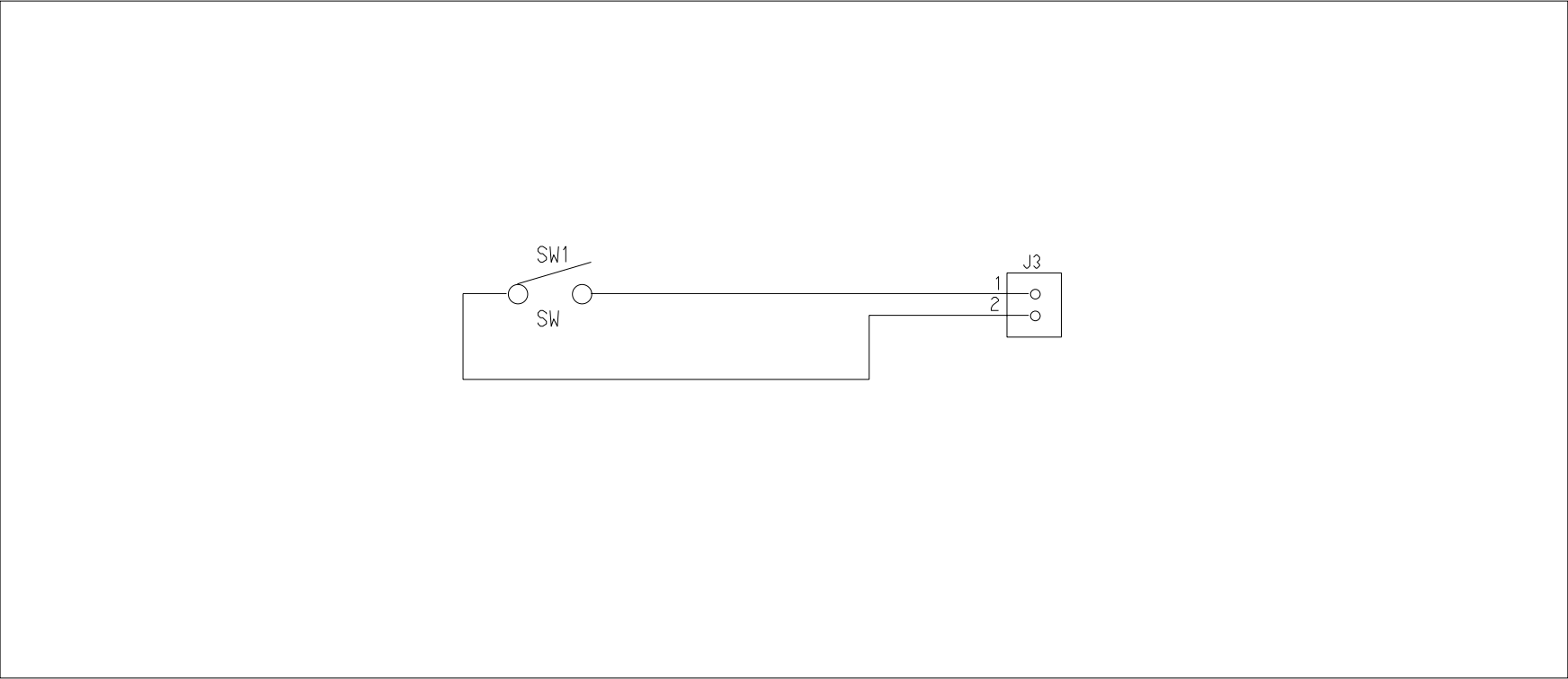## 12-2 HVPS Circuit Diagram
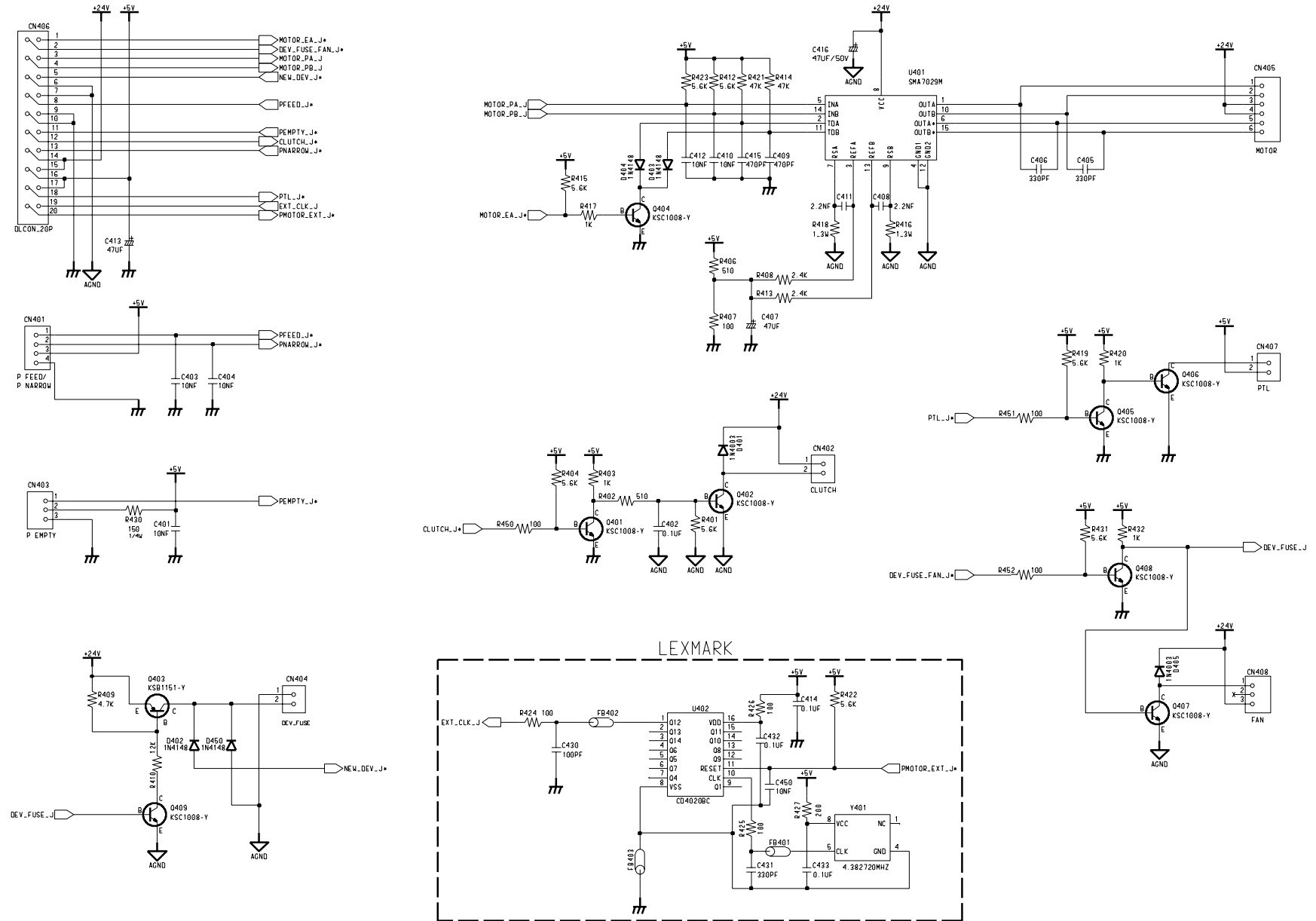
HVPS Circuit Diagram
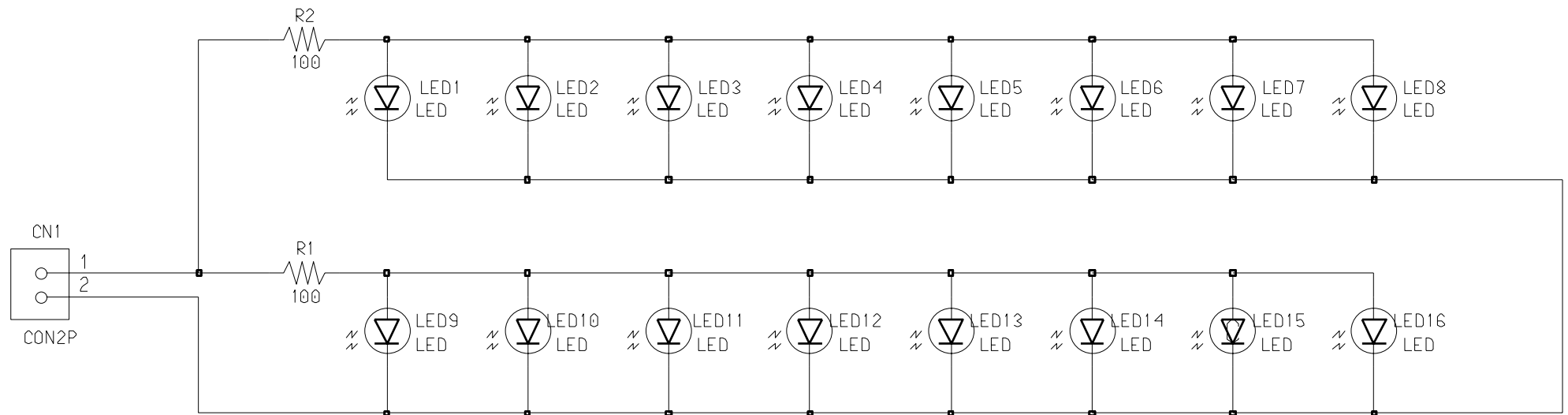
HVPS Circuit Diagram

12-3 Sensors Circuit Diagram
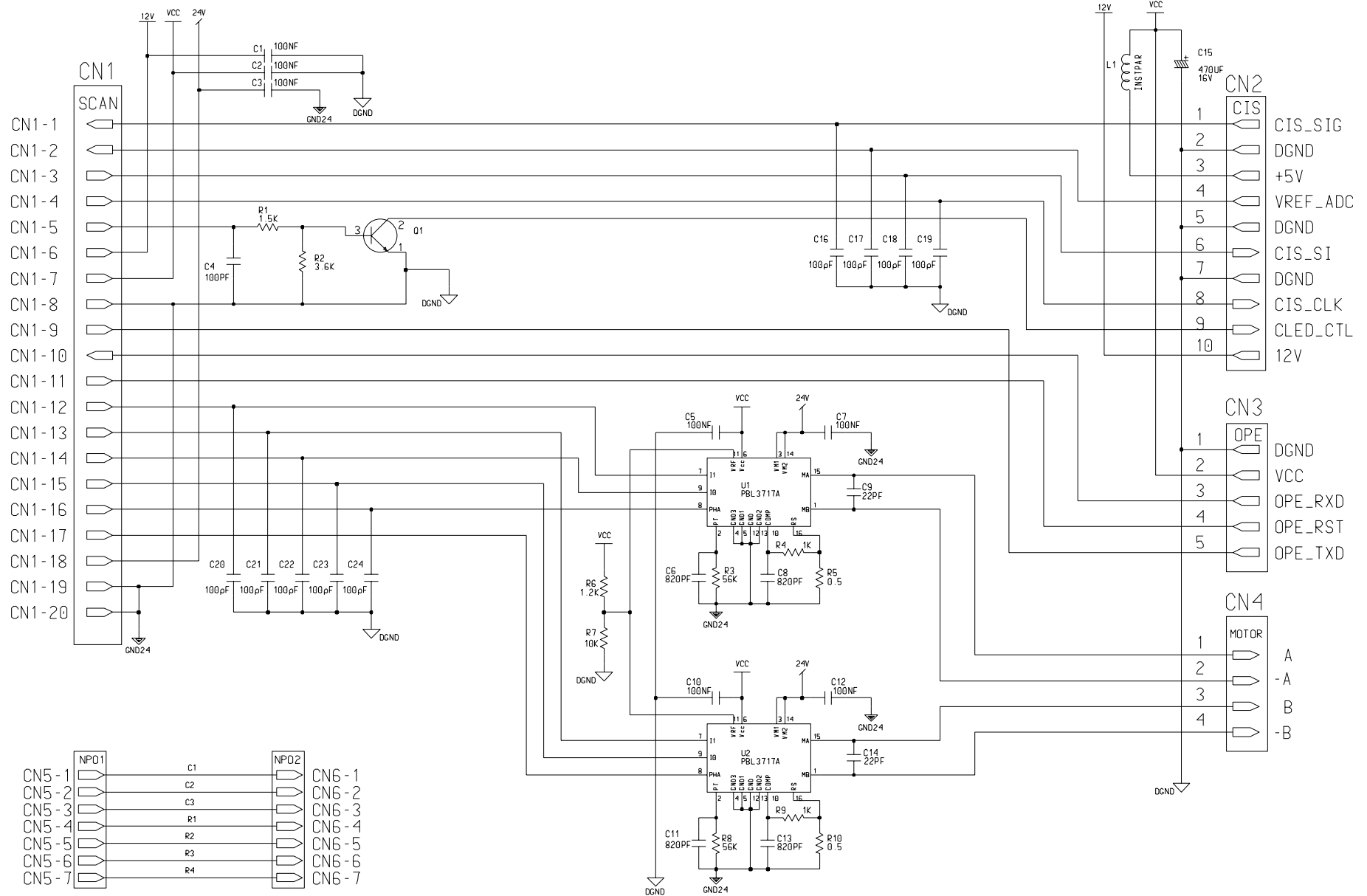
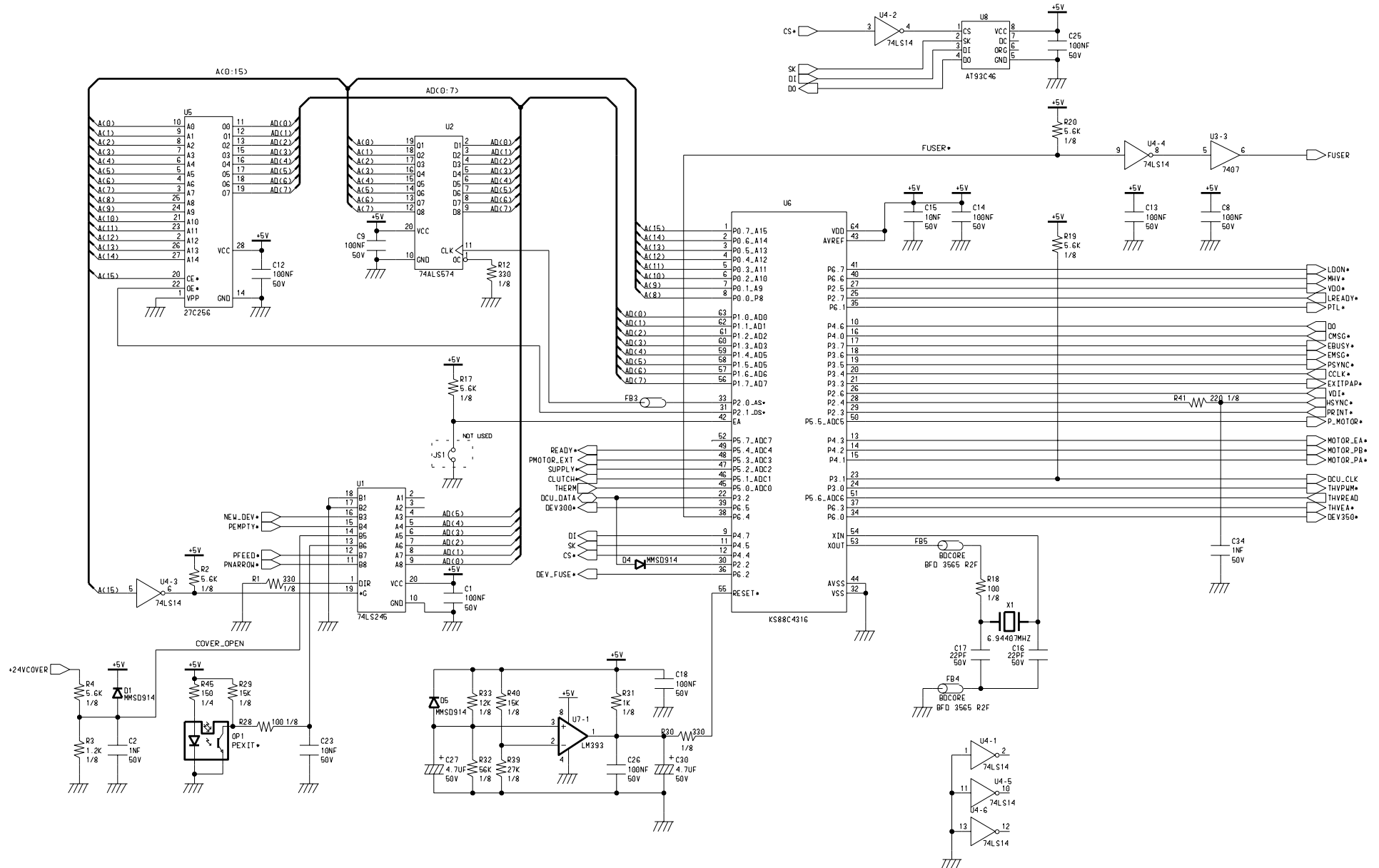## 12-4 Switch Circuit Diagram

12-5 Joint Circuit Diagram

12-6 OPE Circuit Diagram
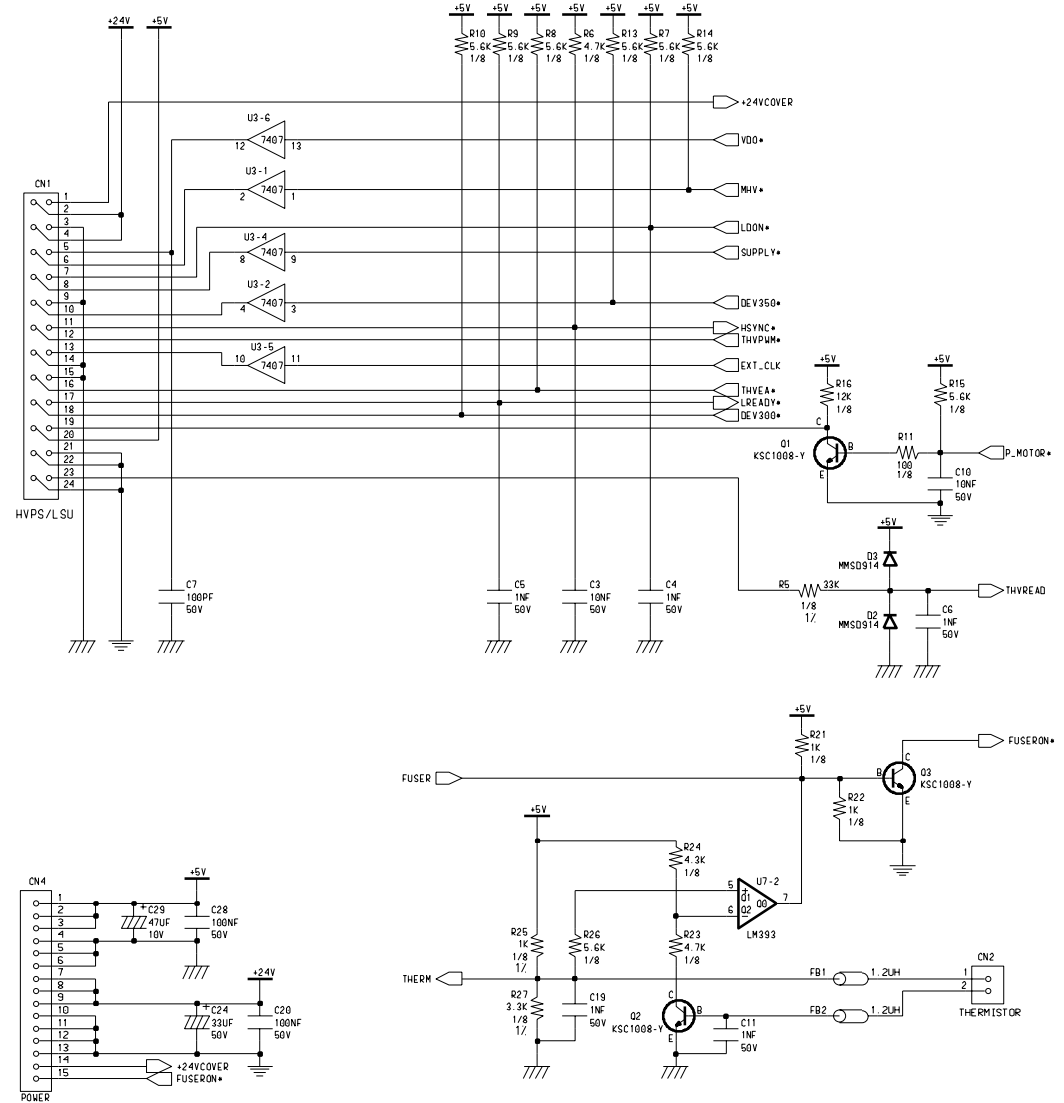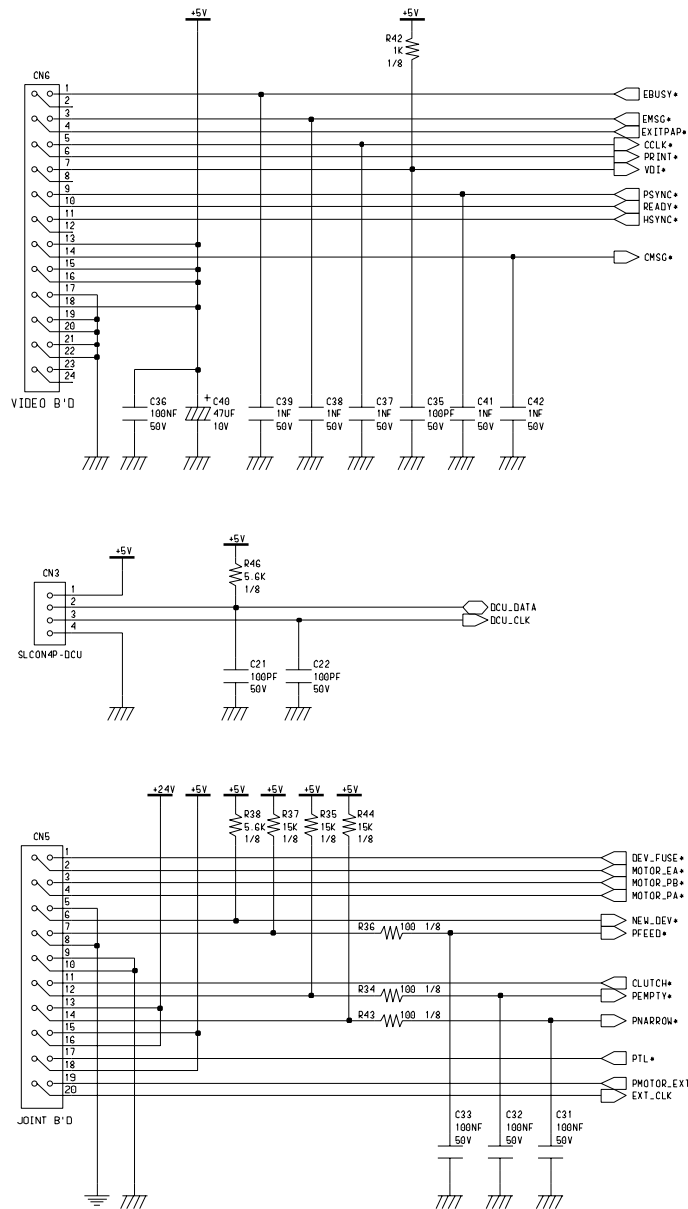
12-7 PTL Circuit Diagram
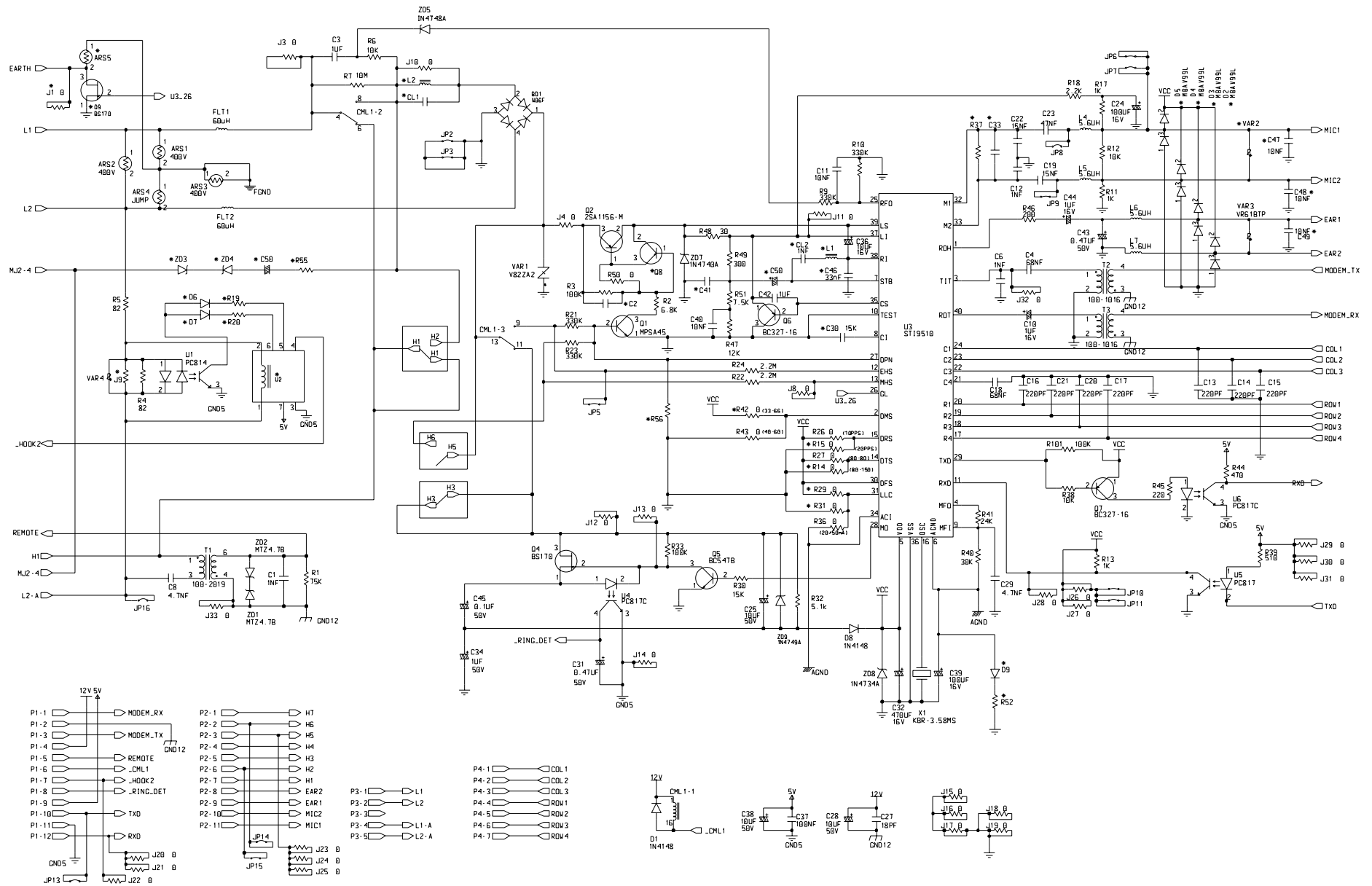
12-8 SCAN Circuit Diagram

12-9 Engin Circuit Diagram

Engin Circuit Diagram

12-10 LIU Circuit Diagram

12-11 LIU(EU) Circuit Diagram

(SUNT PIN CONNECTION)

1. CTR21 APPROVAL

1)DCR : P4(DCR<-->CTR21)
2)IMPEDANCE : P5(CTR21<-->IMP)

2. PTT APPROVAL

1) DCR : P4(DCR<-->OTHER)
2) IMPEDANCE : P5(OPEN)

3. DIAL PULSE MODE

1)DP 33/66 : P2(DP<-->33:66)
2)DP 40/60 : P2(DP<-->40:60)

SAMSUNG

ELECTRONICS