Model CM-C1
(Machine Code: B273-17/-21/-27)

Model CM-C1L
(Machine Code: G959-17/-21-27/B273-29)

SERVICE MANUAL

12th Sep. 2006
Subject to Change

PRECAUTIONS

The cautions in the below are items needed to keep in mind when maintaining and servicing.

Please read carefully and keep the contents in mind to prevent accidents while servicing and to prevent that the machine gets damage.

WARNING FOR SAFETY

1. **Request the service by qualified service person.**
   The service for this machine must be performed by a service person who took the additional education of this field. It is dangerous if unqualified service person or user tries to fix the machine.
2. **Do not rebuild it discretionary.**
   Do not attach or change parts discretionary. Do not disassemble, fix, and rebuilt it. If you do, the machine will not work and electric shock or a fire can occur.
3. **Laser Safety Statement**
   The machine is certified in the U.S. to conform to the requirements of DHHS 21 CFR, chapter 1 Subchapter J for Class 1(1) laser products, and elsewhere, it is certified as a Class I laser product conforming to the requirements of IEC 825. Class I laser products are not considered to be hazardous. The laser system and machine are designed so there is never any human access to laser radiation above a Class I level during nor-mal operation, user maintenance, or prescribed service condition**.**

NOTE: Never operate or service the machine with the protective cover removed from Laser/Scanner assembly. The reflected beam can damage your eyes. When using this product, these basic safety precautions should always be followed to reduce risk of fire, electric shock, and injury to persons.

⚠WARNING

CAUTION FOR SAFETY

PRECAUTION RELATED NOXIOUS MATERIAL

It is possible to get harmed from noxious material if you ignore the below information.

1. Do not touch the damaged LCD. This machine has LCD in control panel. Noxious liquid to human body exists in the LCD. If it is got into mouth, immediately see a doctor. If it is got into eyes or on skin, immediately wash off over 15 minutes with flowing water and see a doctor.
2. The toner in a machine cartridge contains a chemical material, which might harm human body if it is swallowed.

Please keep children out of the toner cartridge.

PRECAUTION RELATED ELECTRIC SHOCK OR FIRE

It is possible to get electric shock or burn by fire if you don't follow the instructions of the manual.

1. Use exact voltage. Please do use an exact voltage and wall socket. If not, a fire or an electric leakage can be caused.
2. Use authorized power code. Do use the power code supplied with machine. A fire can be occurred when over current flows in the power code.
3. Do not insert many cords into an outlet. If do, a fire can occur due to an over flow of current in an outlet.
4. Do not put water or extraneous matter in the machine. Please do not put water, other liquid, pin, clip, etc. It can cause a fire, electric shock, or malfunction. If it happens, turn off the power and remove the power plug from the outlet immediately.
5. Do not touch the power plug with a wet hand. When servicing, remove the power plug from the outlet and do not insert or remove it with a wet hand. Electric shock can occur.
6. Use caution when inserting or taking off the power plug. The power plug has to be inserted completely.
   If not, a fire will be caused due to poor contact. When taking off the power plug, grip the plug and remove it.
7. Management of power cord. Do not bend, twist, bind or place other materials on it. Do not use staples around machine. If the power code gets damage, a fire or electric shock can occur. A damaged power code must be replaced immediately. Do not repair the damaged part or reuse it. Repairing cord with plastic tape can cause a fire or electric shock. Do not spread chemicals on the power code. Do not spread insecticide on the power code. A fire or electric shock can occurred due to a thin(weak) cover on the power code.

8. Check whether the power outlet and the power plug are damaged, pressed or chopped. When such inferiorities are found, repair it immediately. Do not press or chop the cord when moving the machine.
9. Use caution during thunder or lightning storms. It may cause fire or electric shock. Take the power plug off under these conditions. Do not touch cable and device during thunder or lightening storms.
10. Avoid damp or dusty areas. Do not install the machine in dusty areas or around humidifiers. A fire can occurs. Clean plug well with dried fabric to remove dust. Fire can occur if water is dropped into the unit or if covered with dust.
11. Avoid direct sunlight. Do not install the machine near to a window where it directly contacts to the sun-light.
    If the machine contacts sunlight for a long time, the machine will not work properly, because the inner temperature of machine will get higher. A fire can occur.
12. Turn off the power and take off the plug when smoke, a strange smell, or sound from the machine is detected. A fire can occur if unit is used under these conditions.
13. Do not insert steel or metal pieces inside/outside of the machine. Do not put steel or metal piece into the ventilator. An electric shock can occur.

PRECAUTION RELATED TO HANDLING THE MACHINE

If you ignore this information, you could get harm and machine could be damaged.

1. Do not install unit on uneven surfaces or slanted floors.
   Please confirm unit is correctly balanced after installation. Machine may fall over when not balanced correctly.
2. Be careful not to insert a finger or catch your hair in the rotating unit.
   Be careful not to insert a finger or hair in the rotating unit (motor, fan, paper feeding part, etc) while the machine is operation.
3. Do not place any containers of water or chemical or small metals near the machine. If these objects get into the inner side a fire or electric shock can be occurred.
4. Do not install machine in areas where moisture or dust exists. For example, do not install machine near open windows, damage may be caused by these conditions.
5. Do not place candles, burning cigarettes, etc. on the machine. Do not install the machine near to a heater. A fire may occur.

PRECAUTIONS FOR WHEN ASSEMBLY/DISASSEMBLY

Replace parts very carefully. Do remember the location of each cable before replacing parts, in order to reconnect it afterwards. Please perform the below steps before replacing or disassembling any parts.

1. Check the contents stored in the memory. All the information will be erased after the main board is replaced. Write down and needed information.
2. Disconnect the power cord before servicing or replacing electrical parts.
3. Remove the machine cables and power cord.
4. Do use formal parts and same standardized goods when replacing parts. Must check the product name, part code, rated voltage, rated current, operating temperature, etc.
5. Do not use excessive force when loosening or tightening of plastic parts.
6. Be careful not to drop small parts or objects in the machine.

ESD PRECAUTIONS

Certain semiconductor devices can be easily damaged by static electricity. Such components are commonly called “Electro statically 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.

TABLE OF CONTENTS

1. INSTALLATION

Refer to the Operating Instructions for Installation procedures.

12 September 2006

2. PREVENTIVE MAINTENANCE

2.1 PM INTERVALS

The cycle period shown below is for maintenance.

Environmental conditions and use will change.

The cycle period shown is for reference only.

	Component	Replacement Cycle	Done by
Scanner	ADF Rubber Pad	20,000 Pages	Service
	ADF Pick-up Ass'y	80,000 Pages	Service
Mainframe	Pick-up Ass'y	150,000 pages	Service
	Transfer Roller	60,000 Pages	Service
	Fusing Unit	80,000 Pages	Service

12 September 2006

3. REPLACEMENT AND ADJUSTMENT

This manual uses the following symbols

☛ : See or refer to : Screw : Connector

3.1 GENERAL PRECAUTIONS

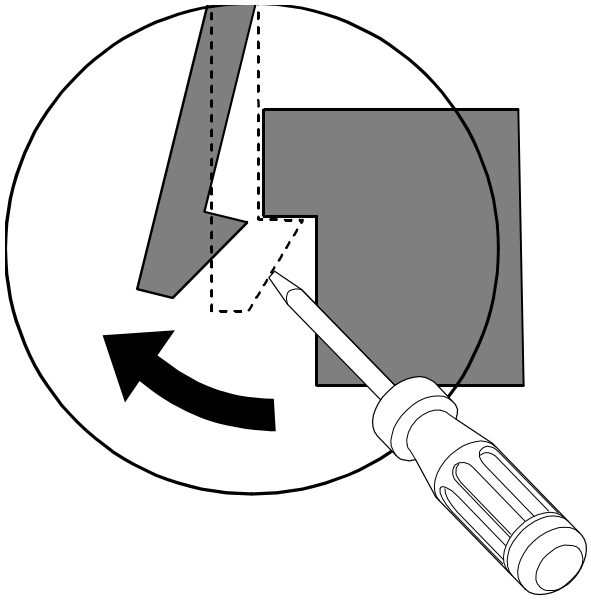
- Use high caution when you disassemble and reassemble components.
- Make sure all cables are correctly routed. Check the correct cable routing before you service the machine. Return all cables to their original position after you service the machine.

3.1.1 SERVICING THE MACHINE

1. Make sure there are not documents stored in memory before you service the machine.
2. Remove the toner cartridge before you disassemble parts.
3. Unplug the power cord before you service the machine.
4. Use a flat clean surface to service the machine.
5. Use only approved replacement parts. Machine function cannot be guaranteed of you use unauthorized replacement parts.
6. Do not force plastic components.
7. Make sure all components are in their correct positions.

3.1.2 RELEASING PLASTIC LATCHES

Many of the parts are held in place 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.



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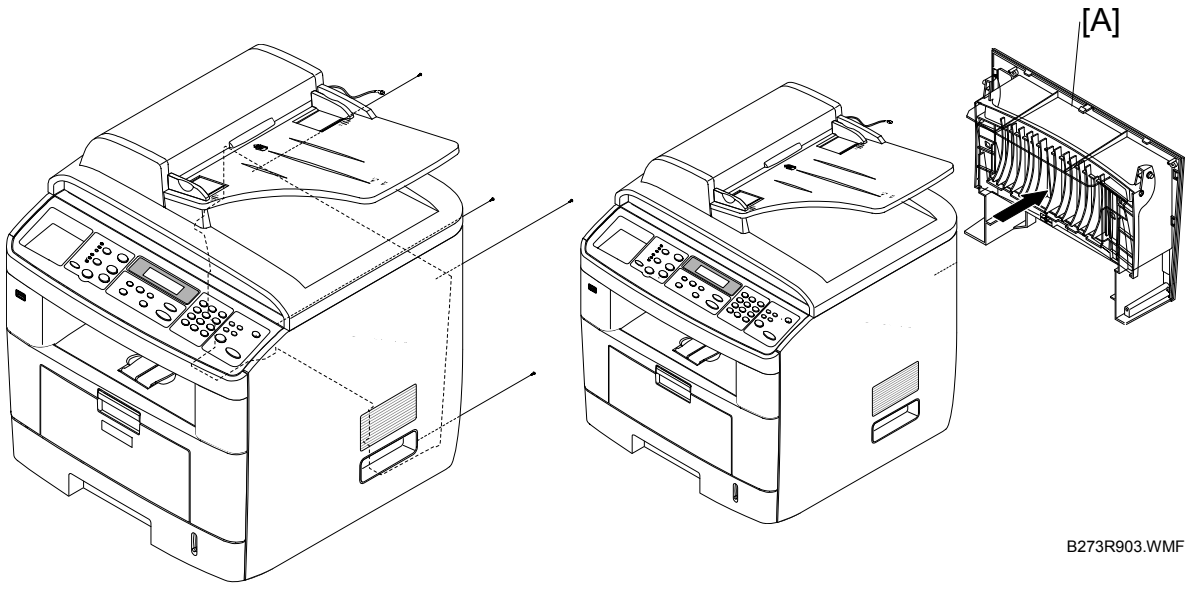
3.2 COVERS

3.2.1 REAR COVER



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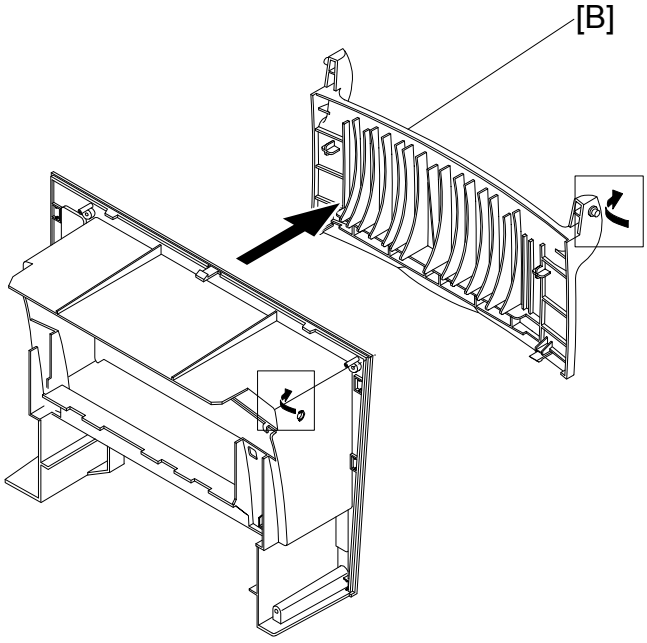
1. Remove 4 x securing the rear cover [A]. Then remove the rear cover from the frame assembly.



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2. Unhook the face cover [B] from the rear cover as shown above. Then lift the face cover out.

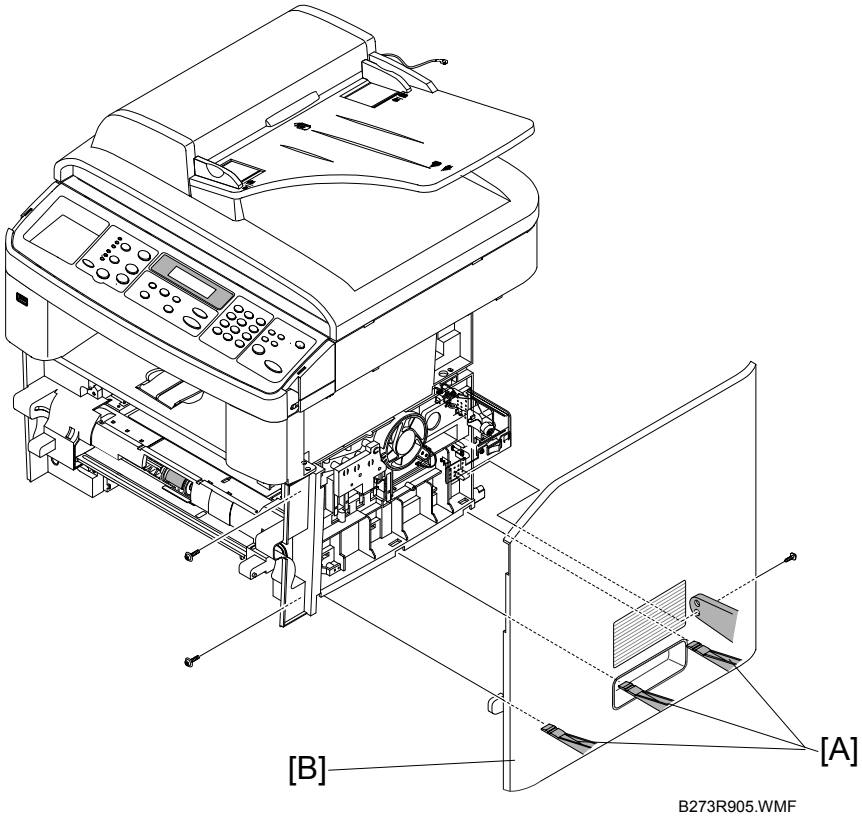
3.2.2 SIDE COVERS

Remove the following before you remove the side covers.

☛: Rear cover

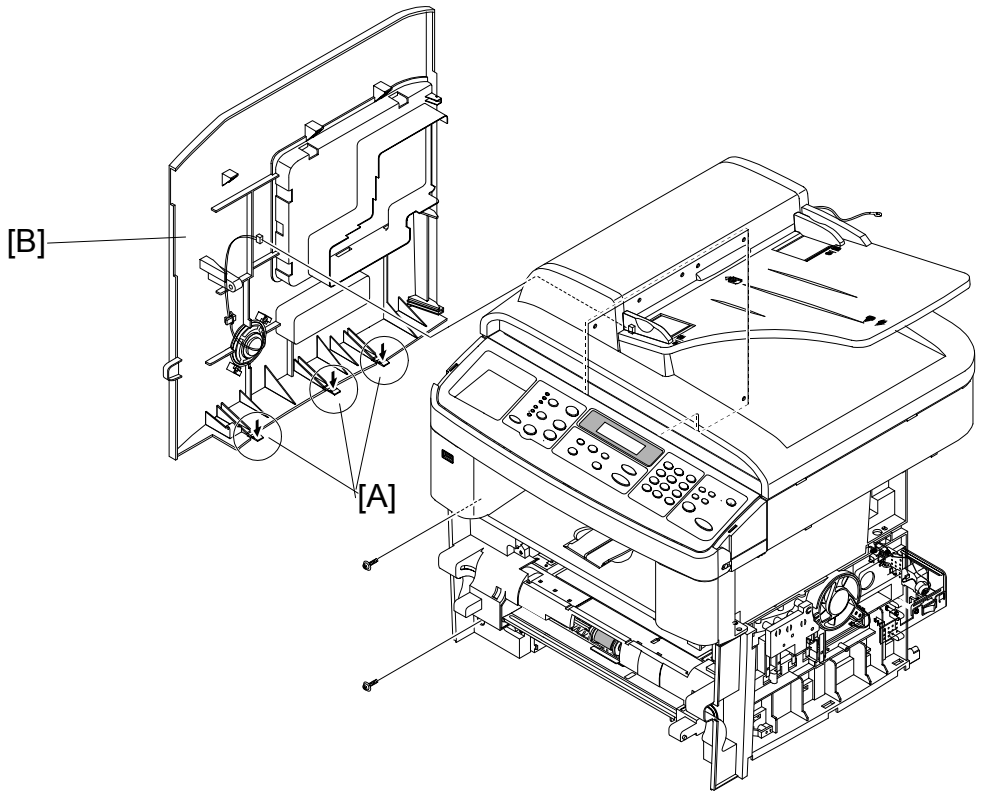
Remove the paper tray unit before you remove the side covers.

Right Cover



1. Open the front cover and remove 2 x ☞ on the front and 1 x ☞ on the back.
2. Release 3 x clips [A] underneath the cover.
3. Ease the rear screw bracket over its location pin and gently slide the right cover [B] to the right.
4. Remove the right cover from the frame.

Left Cover



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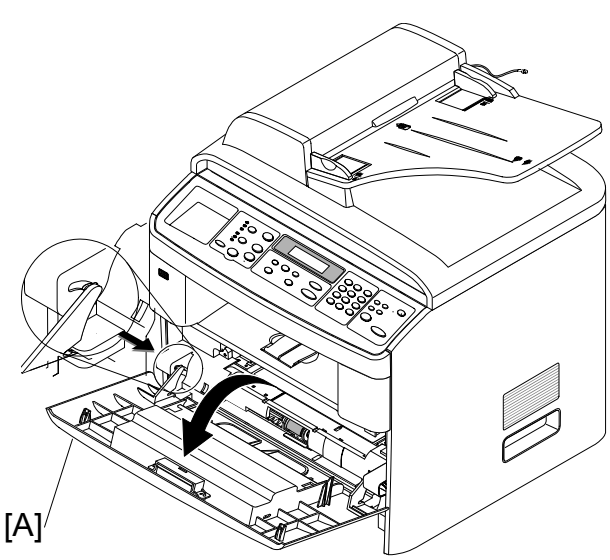
1. Release 3 x clips [A] underneath the cover.
2. Ease the rear screw bracket over its location pin and gently slide the left cover [B] to the right.
3. Remove the left cover from the frame.

3.2.3 FRONT COVER



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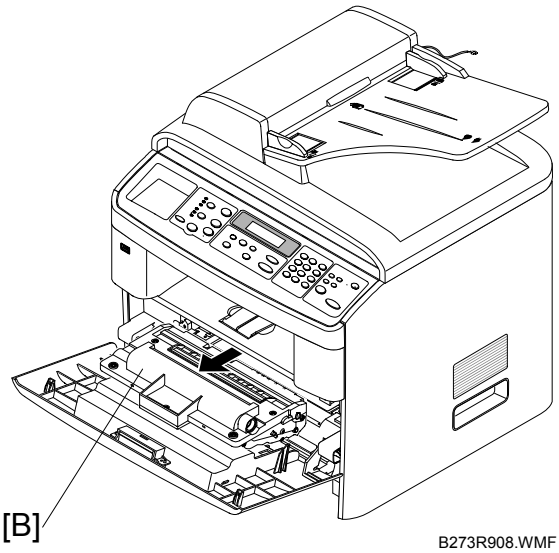

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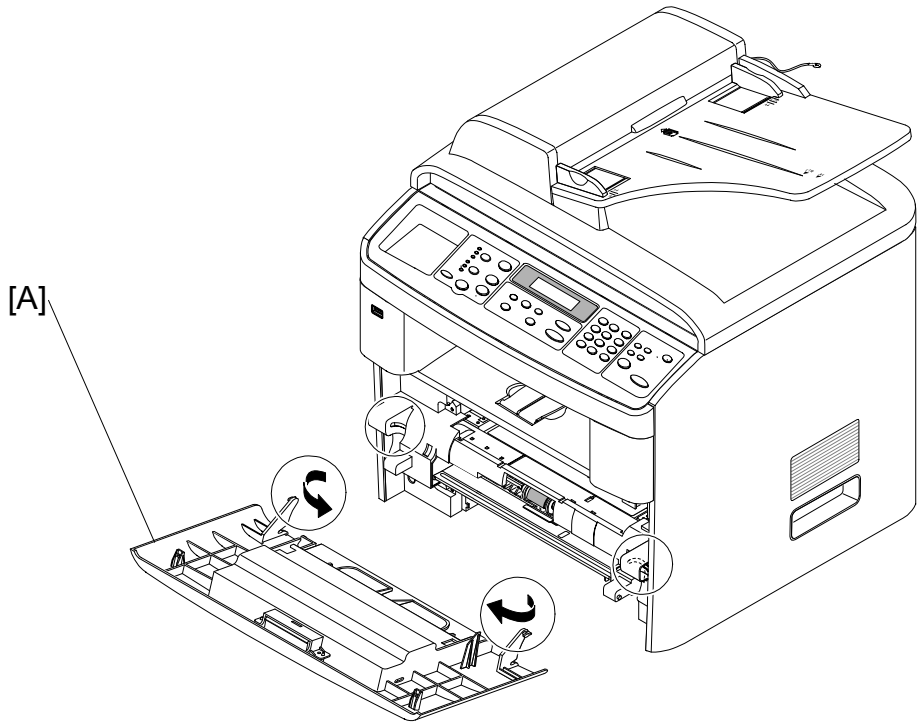
1. Open the front cover [A] and remove the toner cartridge [B].



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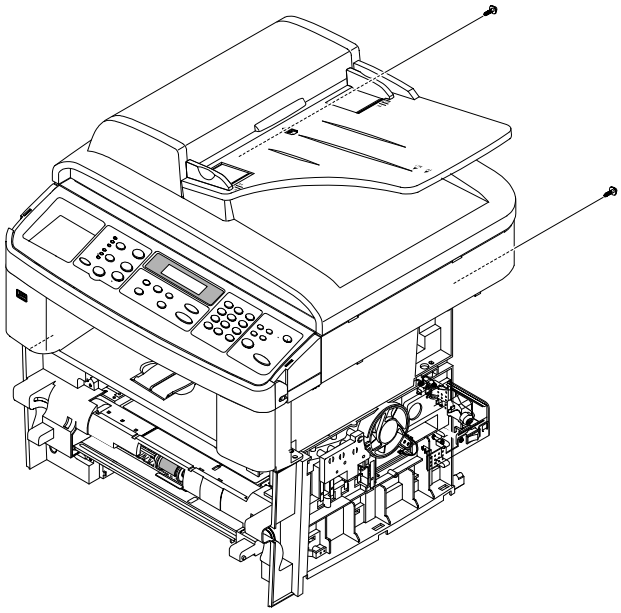
2. Unhook the front cover [A] from the frame assembly. Then remove the front cover as shown above.

3.3 SCANNER ASSEMBLY

Remove the following before you remove the ADF motor assembly
☛: Rear cover
☛: Side covers

1. Remove 2 x from the scanner assembly as shown.



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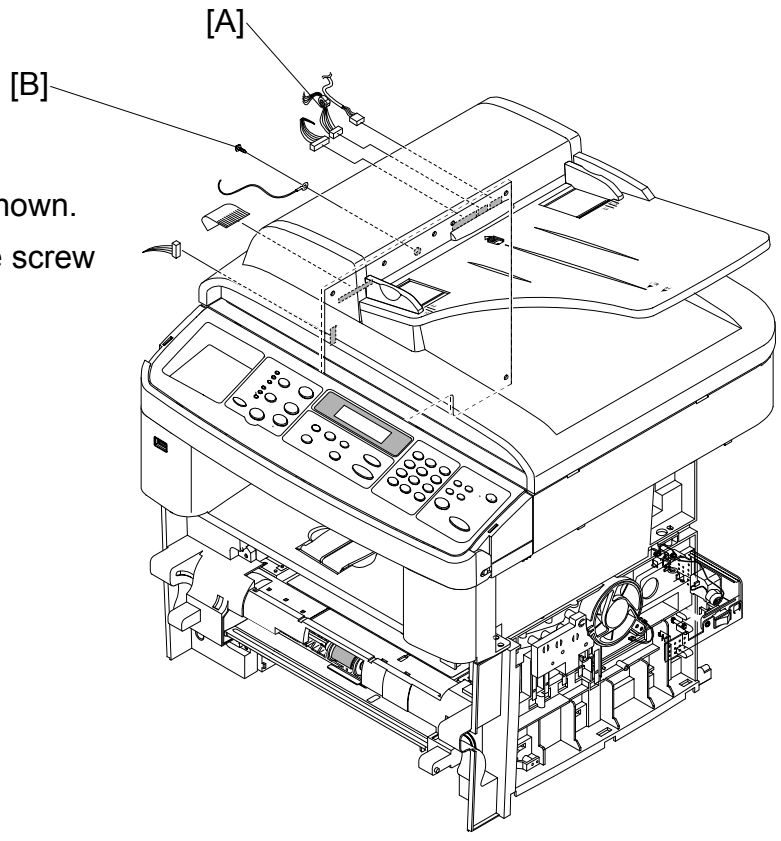

2. Remove 5 x [A] as shown.
3. Remove the ground wire screw [B].

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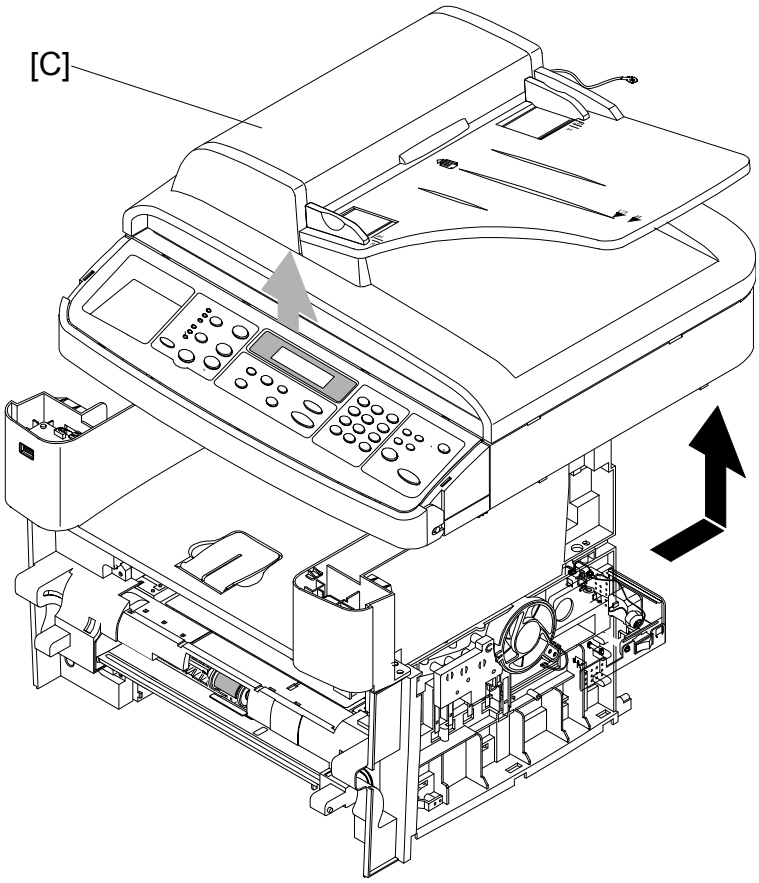

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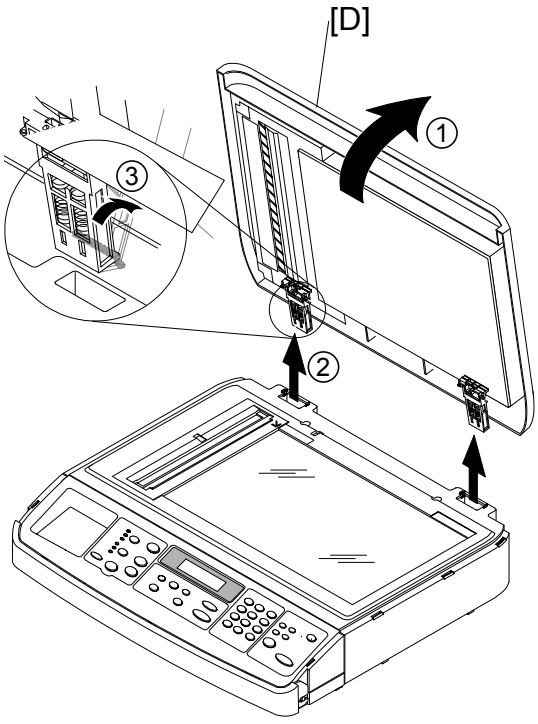
4. Lift up the scanner assembly as shown above.

5. Lift and remove the platen cover [D] as shown.



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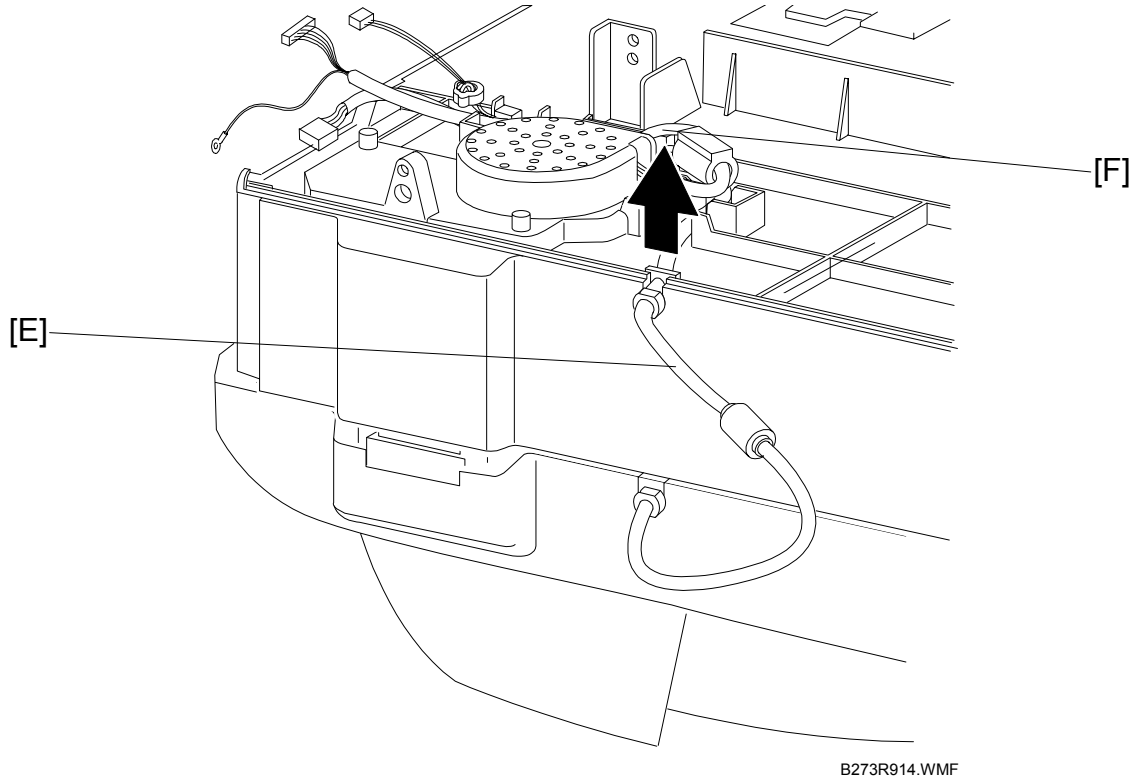
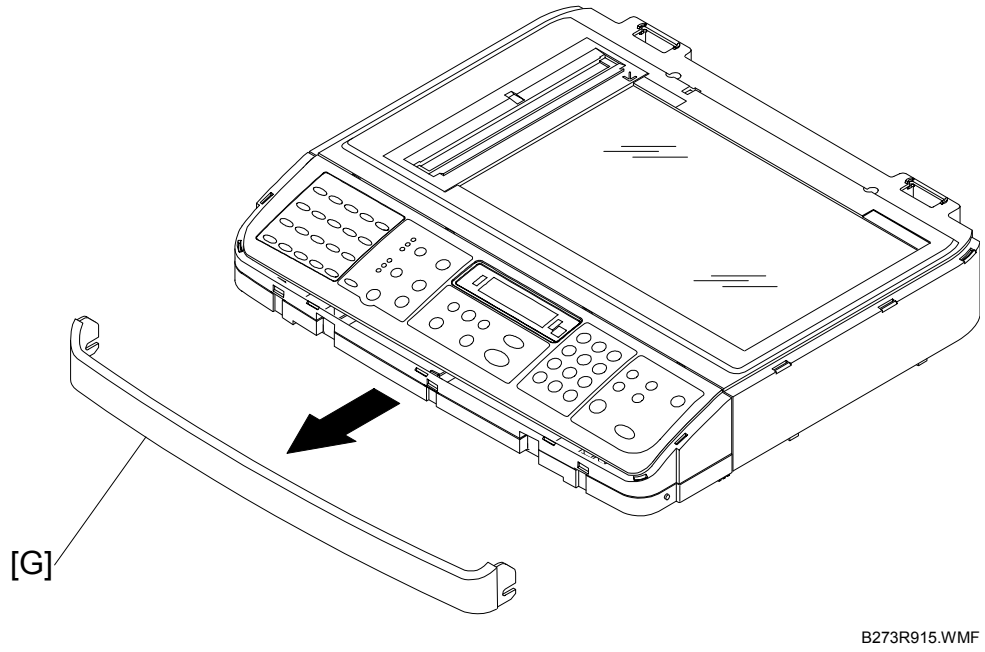
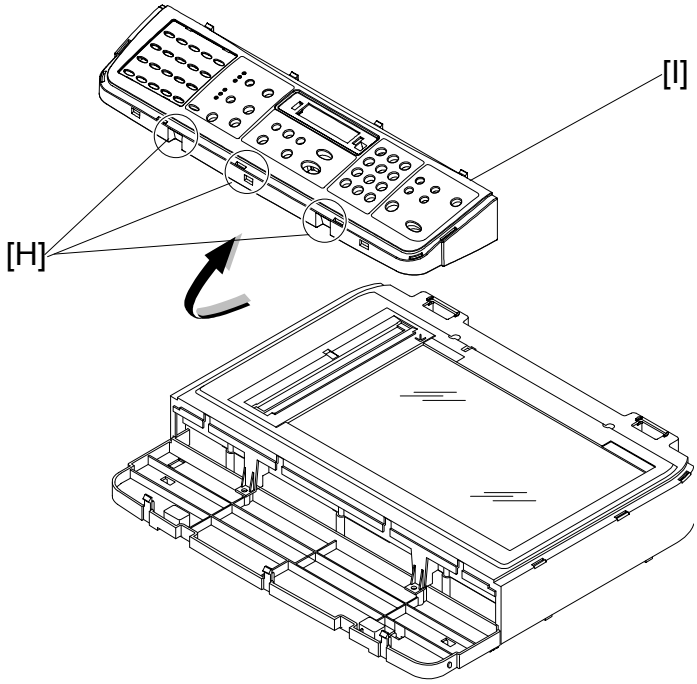


6. Free the scanner cable harness [E] from the clips [F] underneath the scanner. Then remove it from the frame.

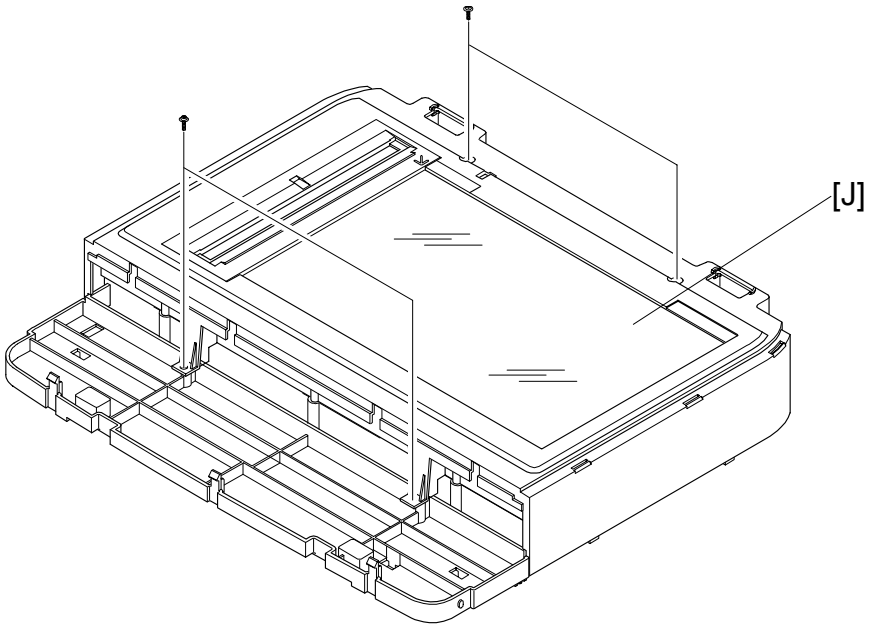


7. Lift the front part of the OPE front cover [G] to release it from the hooks connecting it to the scanning assembly. Then remove it.



B273R916.WMF

8. Release the 3 x clips [H] on the front of the OPE unit [I]. Then remove the OPE as shown.
   NOTE: 1) Make sure to thread the harness through the frame



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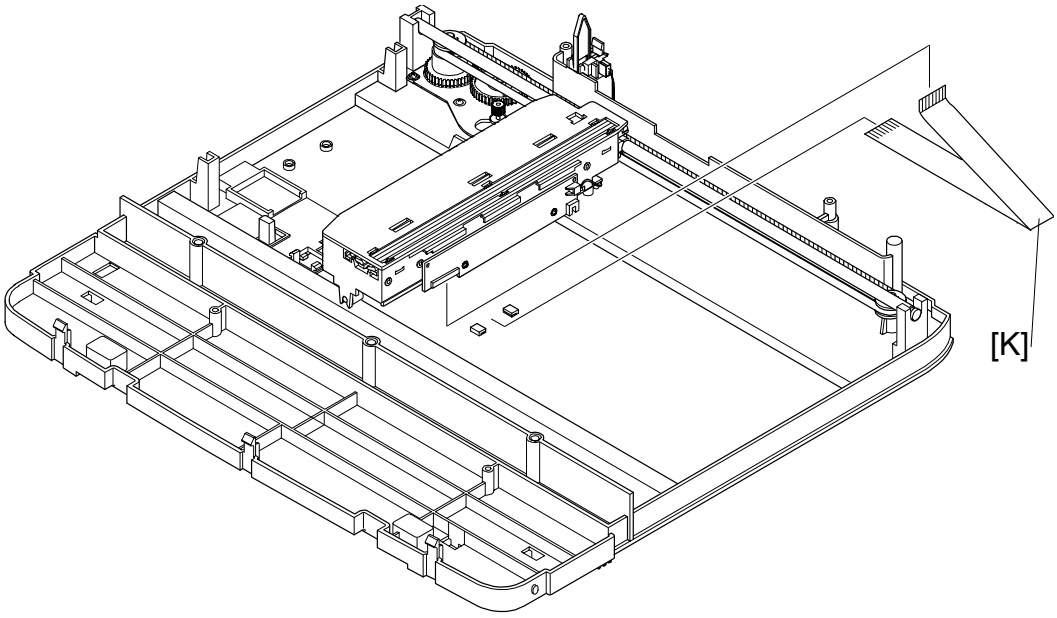
9. Remove 4 x ☞ securing the upper part [J] of the scanning unit
10. Unclip 2 x clip securing the upper part of the scanning unit from the scanner assembly. Then lift the upper part of the scanning unit upward and remove it.



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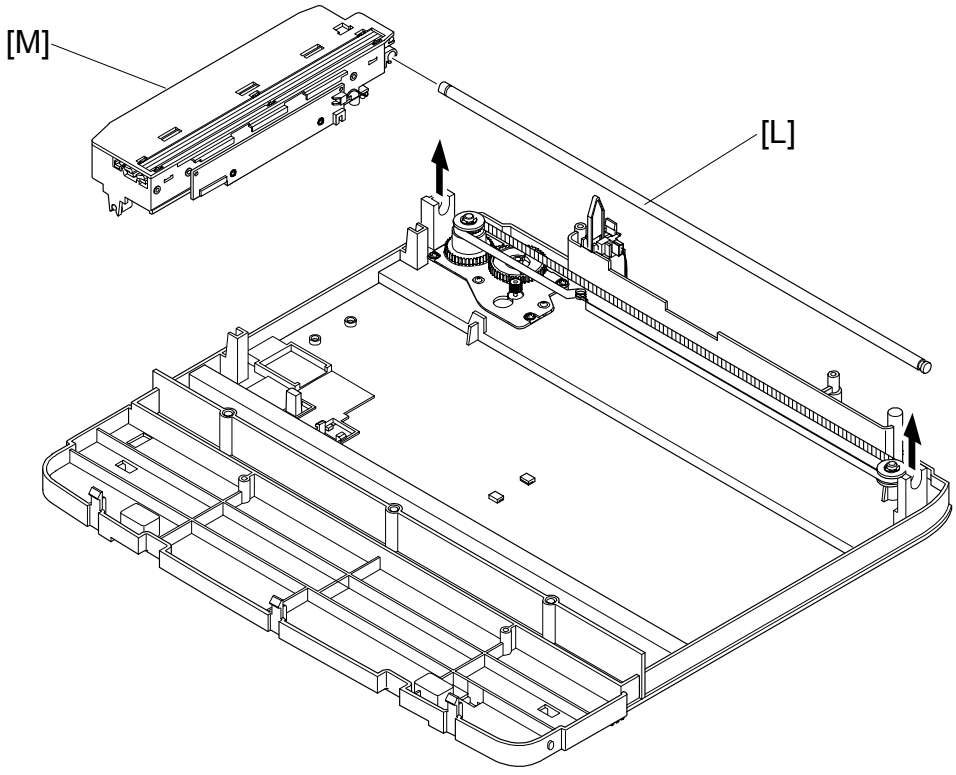
11. Remove the CCD cable [K] as shown above.



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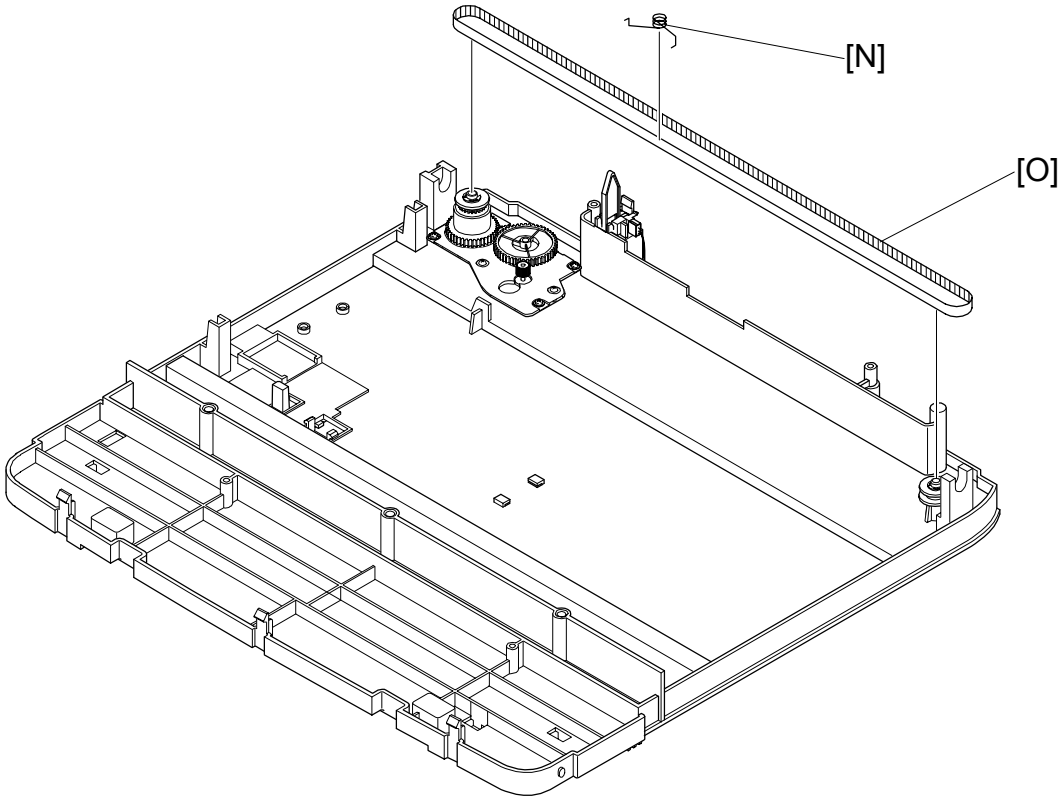
12. Pull up the CCD shaft [L]and remove the scanner module [M].



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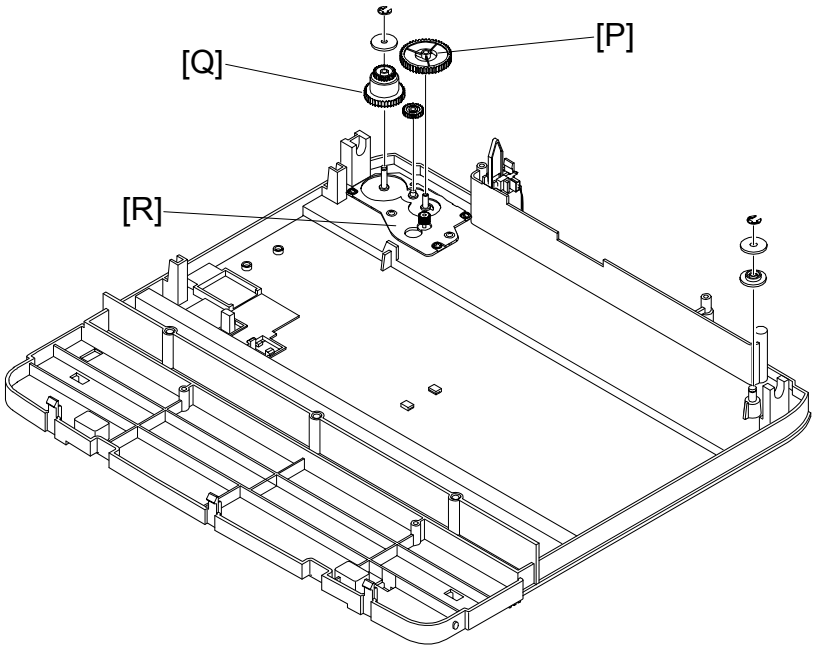
13. Squeeze the spring [N] to relieve tension in the belt [O]. Then lift the belt away form the pulleys as shown.



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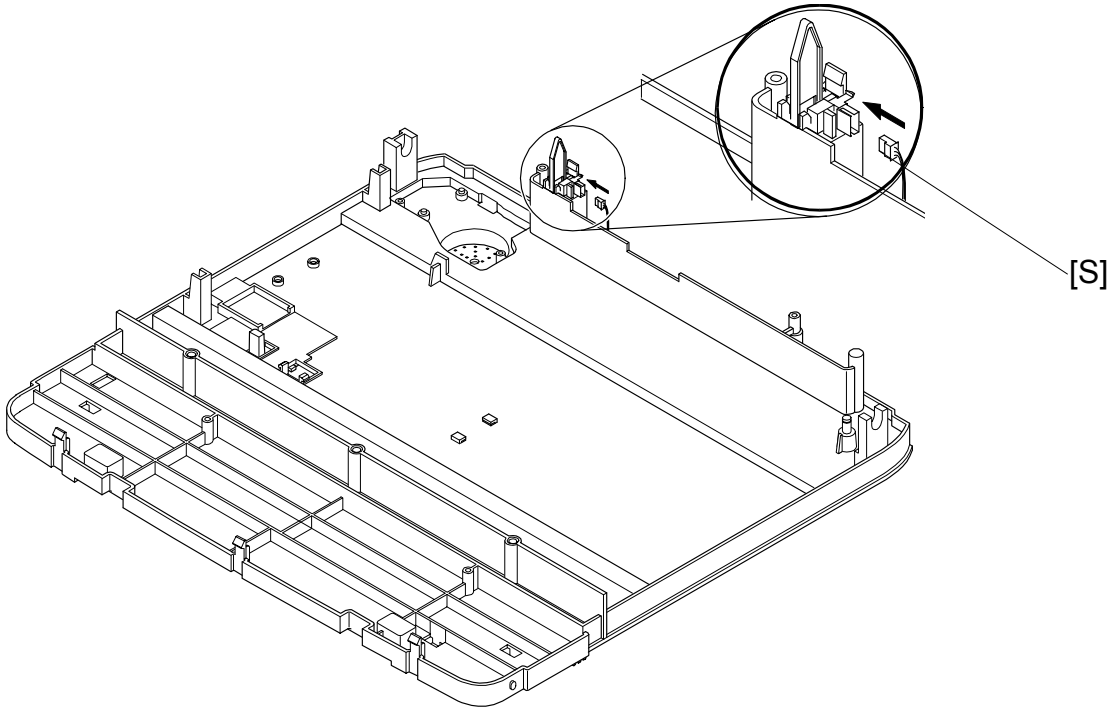
14. Remove the reduction gear [P] and idle gear [Q] As shown.
15. Remove 3 x ☞ and remove the motor bracket [R].



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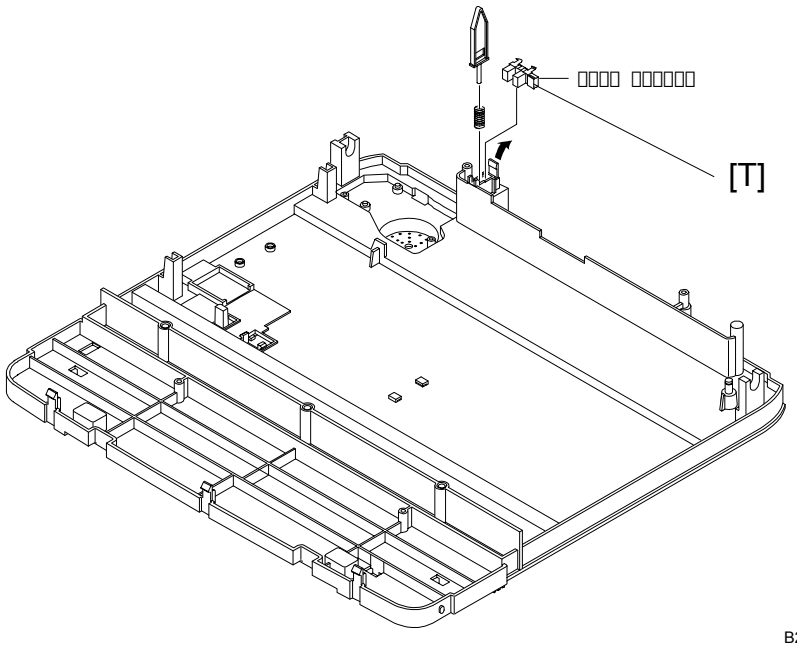
16. Unplug the connector from the open sensor assembly [S]



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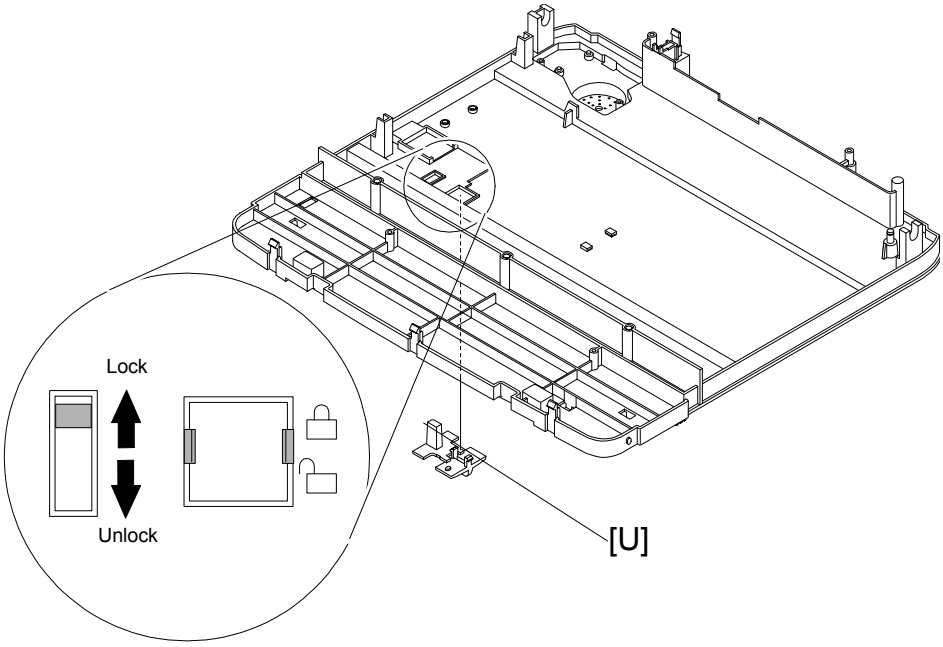
17. Unlatch the cover open sensor [T] and remove it.



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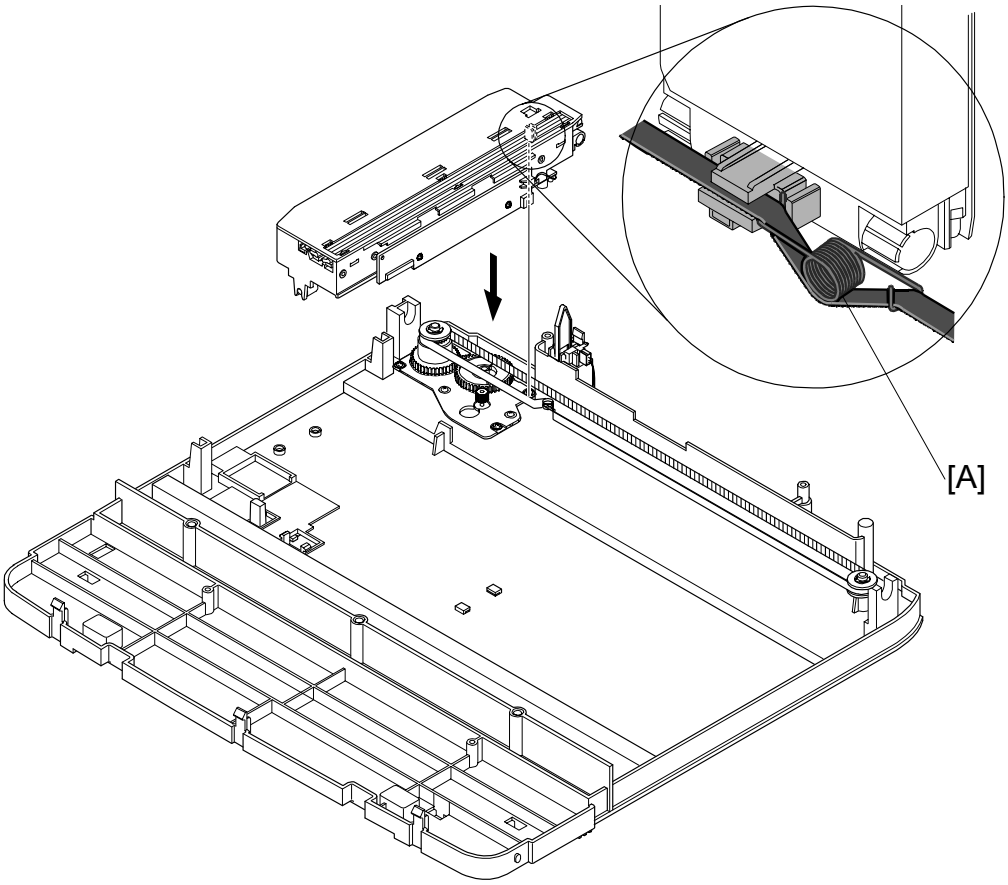
18. Remove the CCD lock [U].

3.3.1 WHEN YOU REASSEMBLE THE SCANNER ASSEMBLY



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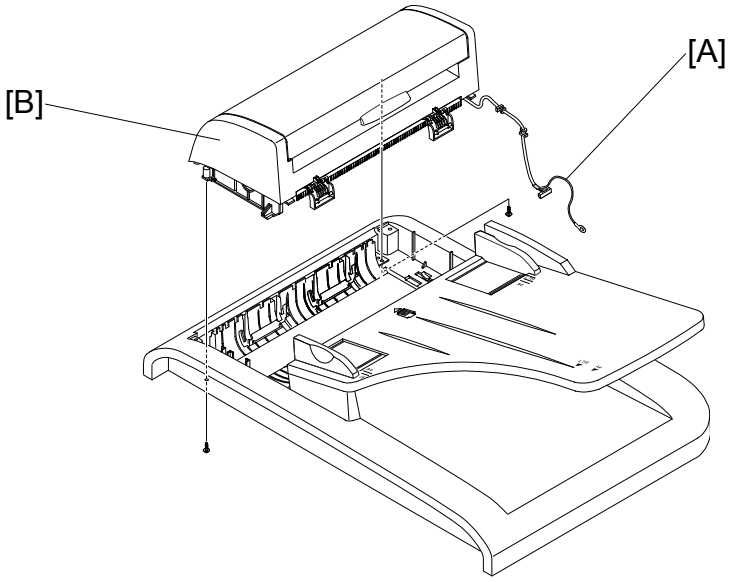
Make sure to put the tension spring [A] as close to the right hand side of the scanner assembly when you reassemble the scanner module, belt and belt spring.

3.4 ADF MOTOR ASSEMBLY

Remove the following before you remove the ADF motor assembly
☛: Rear cover
☛: Side covers
☛: Scanner assembly



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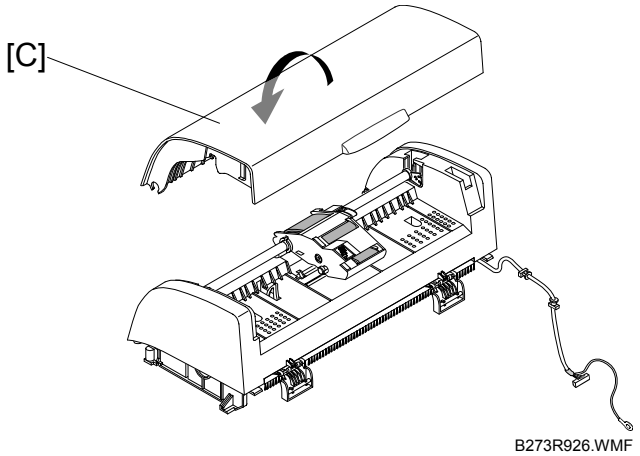
1. Unclip the harness [A] from the platen cover.
2. Remove the 2 x ☞ securing the ADF assembly and remove it. (Make sure to thread the harness through the frame).



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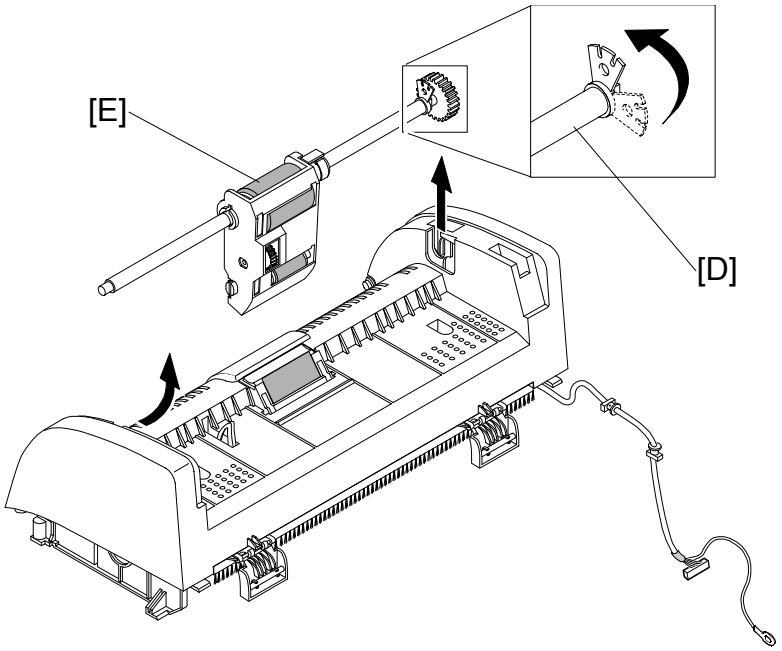
3. Remove the cover [C] as shown

NOTE: Make sure you do not contaminate the rubber rollers with grease when you disassemble the ADF motor assembly.



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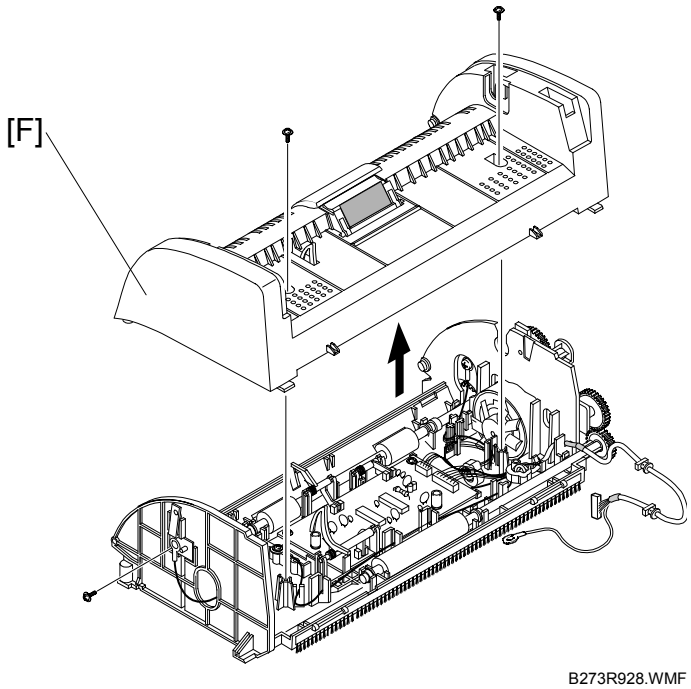
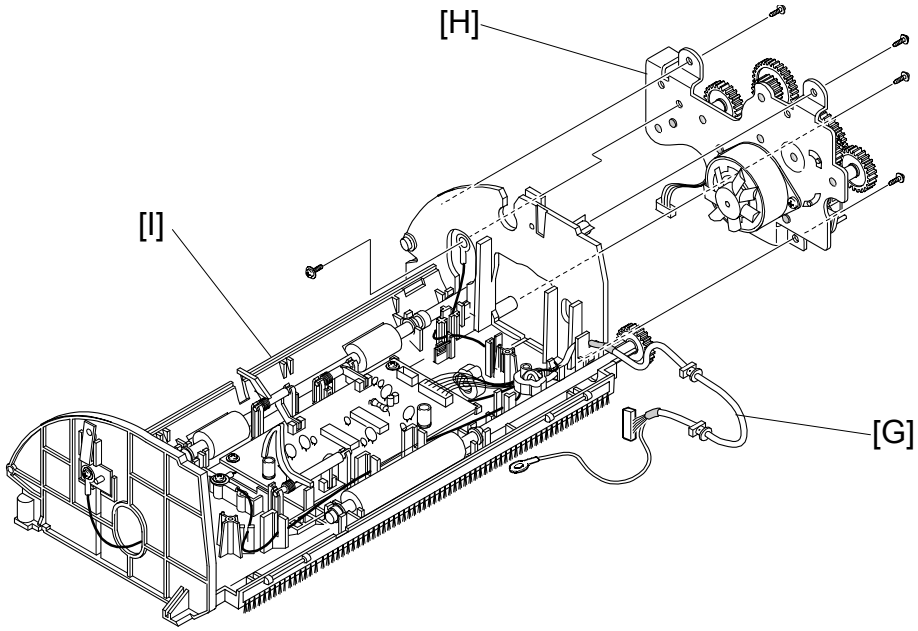
4. Release the bush [D] and rotate it until it gets to the slot as shown above.
5. Then remove the pick-up assembly [E].



B273R928.WMF

6. Remove the 2 x securing the upper cover [F] and remove it as shown above.

NOTE: Make sure you note the position of the ferrite core and motor harness routing before you remove the ADF motor assembly. Make sure you return these to their original positions when you reassemble the ADF assembly.



B273R929.WMF

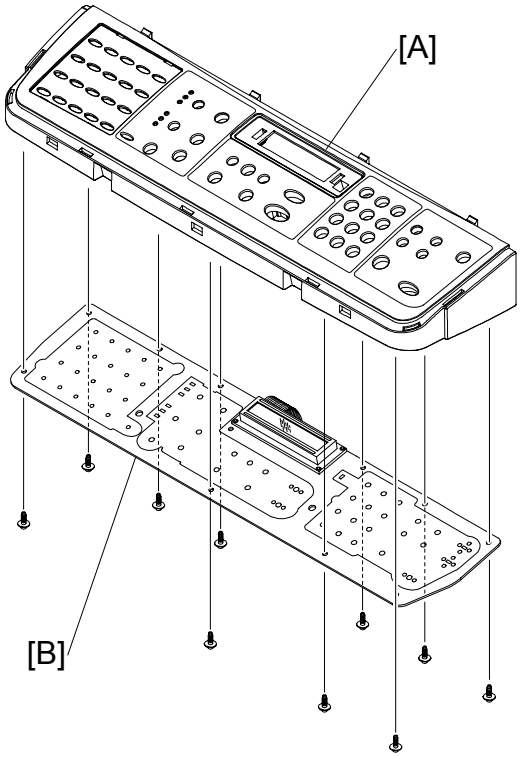
7. Unplug 1 x and 5 x securing the ADF assembly.
8. Then remove the ADF motor assembly [H] from the ADF lower assembly [I].

You do not need to disassemble the ADF unit if you only want to replace the separator pad. At this time do the following.

1) Open the ADF cover and remove the pick-up assembly.
2) Use a pair of tweezers or a small flat-bladed screwdriver and release the clips on both sides of the ADF separator pad assembly.
3) Then remove the ADF separator pad assembly from the machine.

3.5 OPERATION PANEL

Remove the following before you remove the operation panel.
☛: Rear cover
☛: Side covers
☛: Scanner assembly



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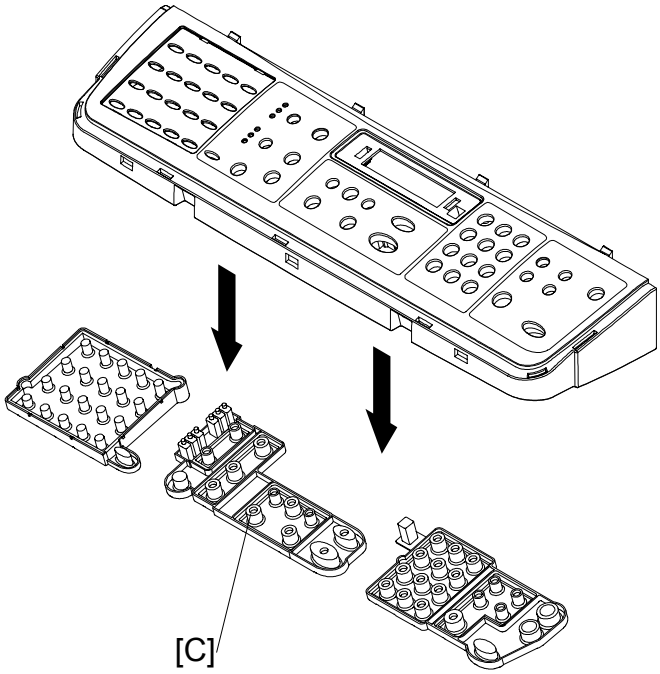

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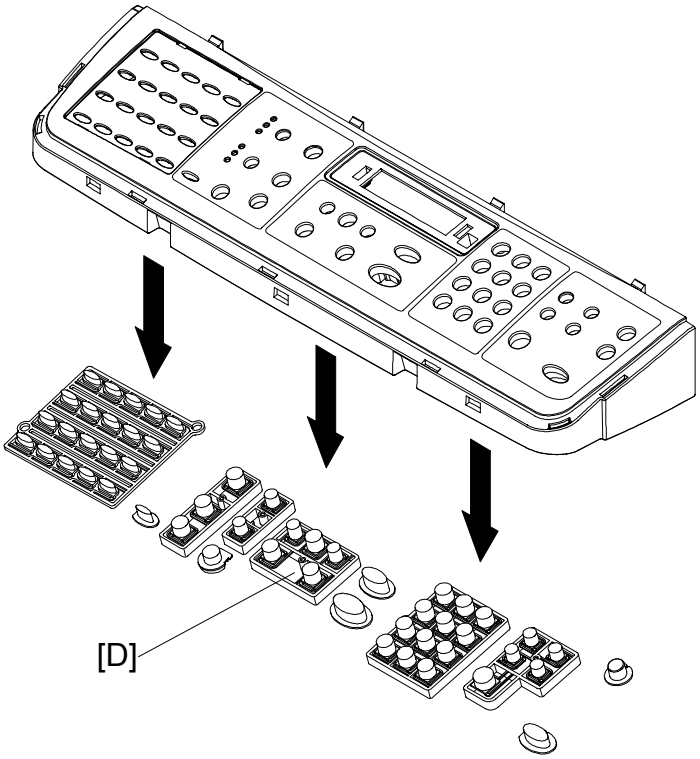
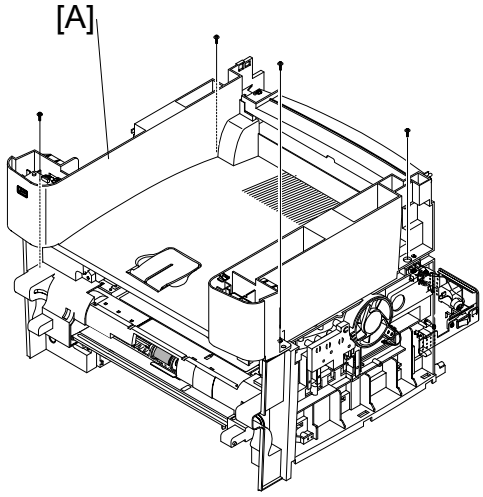
1. Remove 10 x 🔩 securing the operation board panel cover [A] from the operation board panel assembly [B].
2. Remove the contact rubber [C] from the operation board panel cover [A].



3. Remove the keypad [D] from the operation panel board cover.

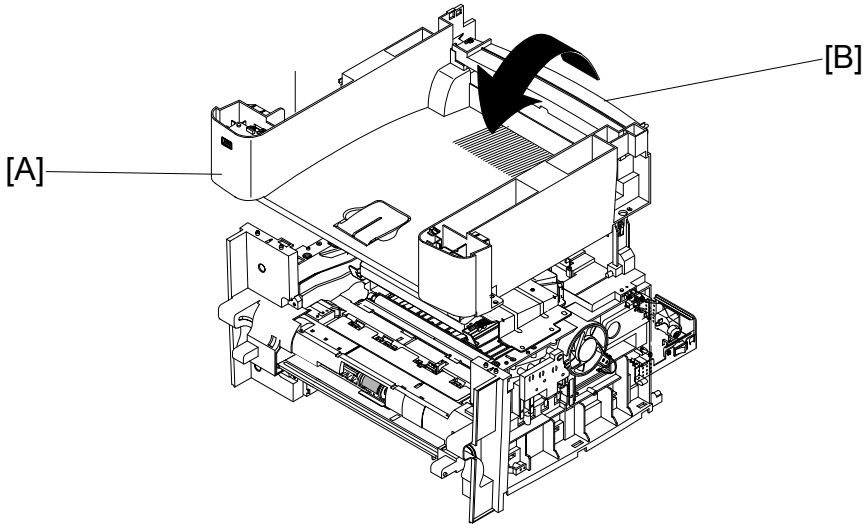
3.6 MIDDLE COVER AND EXIT ROLLER

Remove the following before you remove the middle cover and exit roller.
☛: Rear cover
☛: Side covers
☛: Scanner assembly



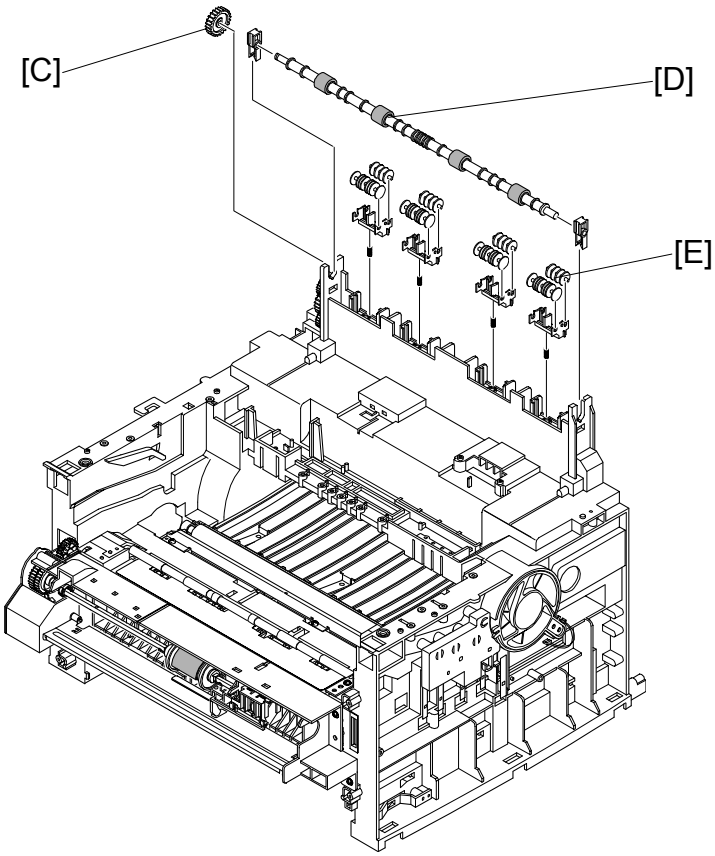
B273R933.WMF

1. Remove 4 x securing the middle cover [A]. Then remove it.



B273R934.WMF

2. Remove 2 x securing the controller shield assembly [B] to the middle cover.
3. Unhook the middle cover [A] from the frame assembly as shown above.
4. Use high caution when you remove the shield assembly locating pegs. Then lift the top cover out.

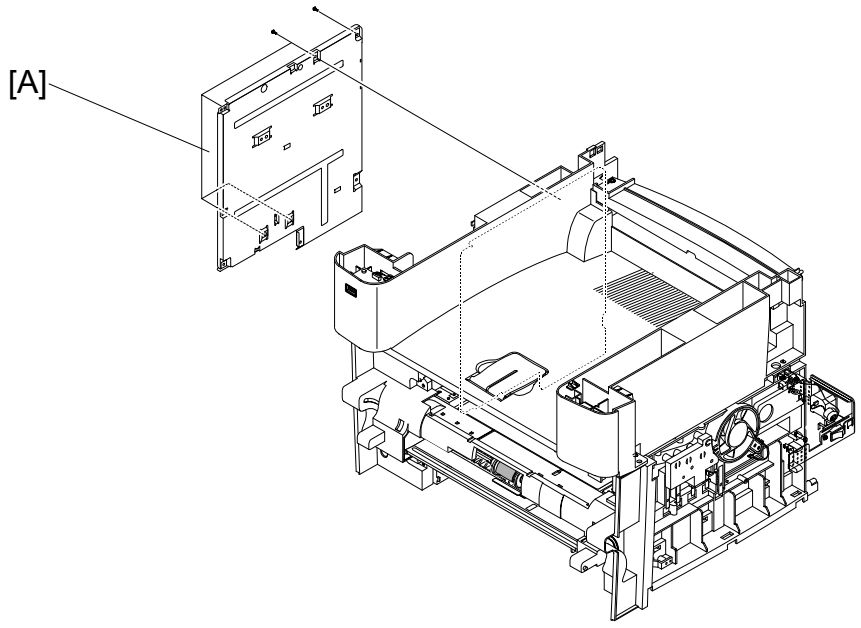


B273R935.WMF

5. Remove the exit gear [C], exit roller [D] and 4 x bushings [E] as shown above.

3.7 CONTROL SHIELD ASSEMBLY

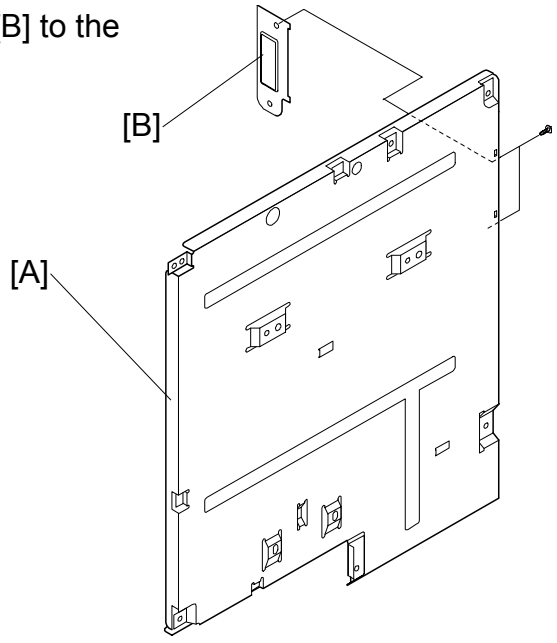
Remove the following before you remove the control shield assembly.
☛: Rear cover
☛: Side covers



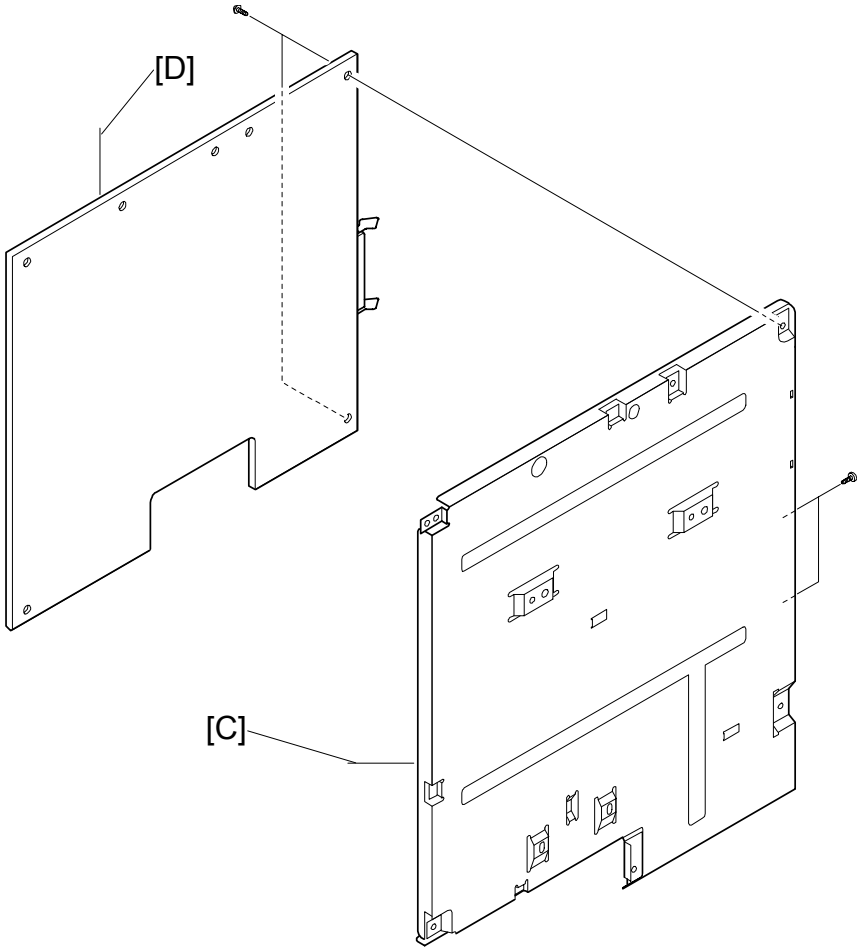
B273R936.WMF

1. Remove all connectors and 5 x 🔩 securing the controller shield assembly [A] to the middle cover and the frame. Then remove the assembly.

2. Remove 2 x 🔩 connecting the NIC card [B] to the controller board assembly.
3. Remove the NIC card [B].



B273R937.WMF

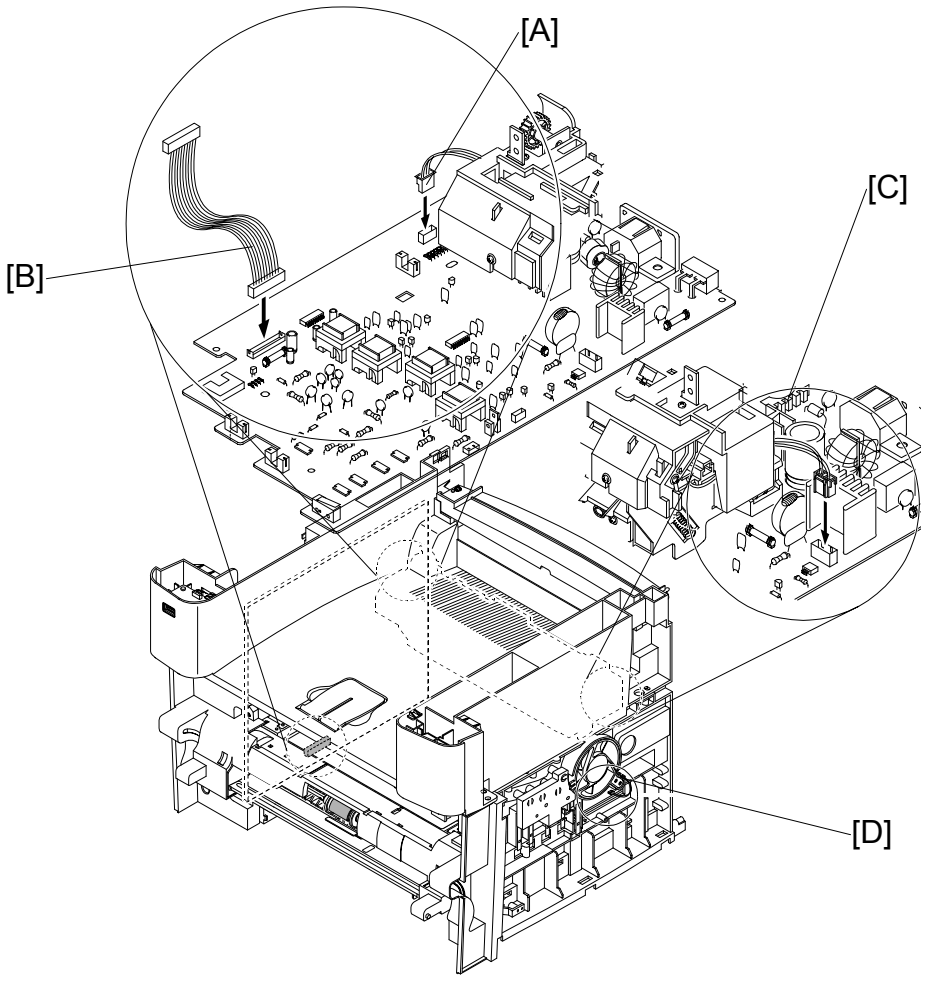


4. Remove the 5 x ☞ to remove the bracket [C] from the main board [D].

3.8 ENGINE SHIELD ASSEMBLY AND EXIT BOARD

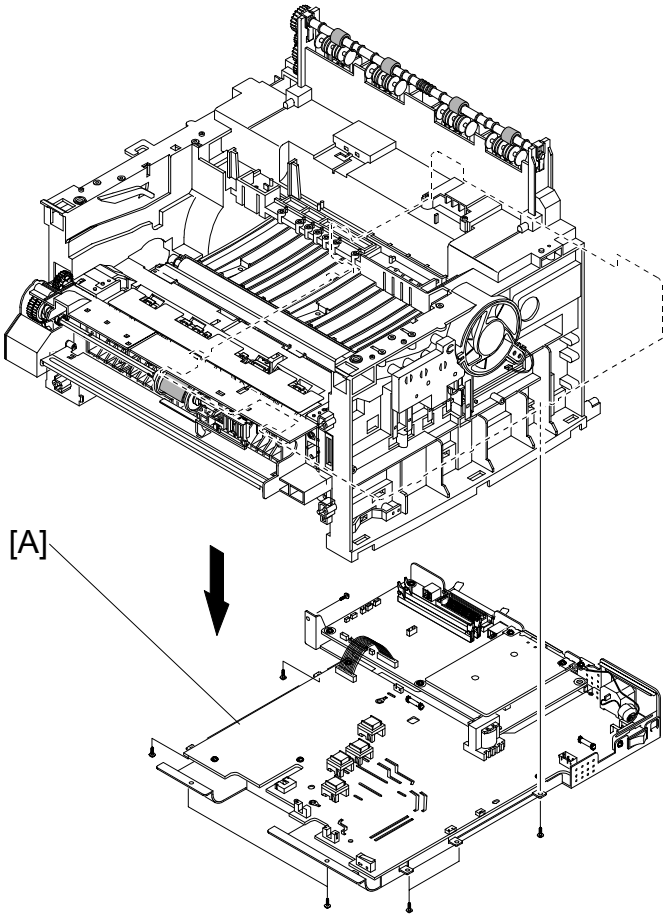
Remove the following before you remove the engine shield and exit board.
☛: Rear cover
☛: Side covers
☛: Scanner assembly

3.8.1 ENGINE SHIELD



B273R939.WMF

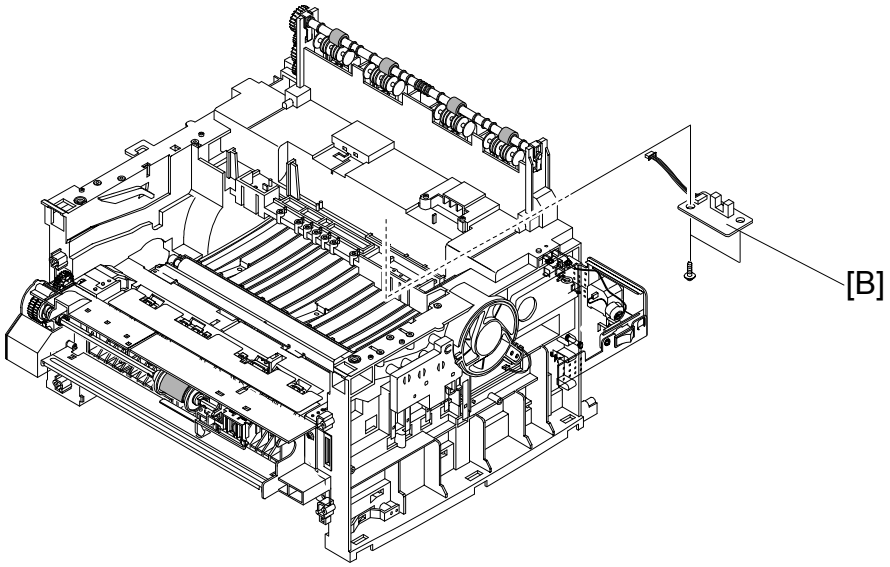
1. Unplug the following connectors
   1) Exit connector [A]
   2) Main connector [B]
   3) AC connector [C]
   4) Fan connector [D]
   5) LIU connector if connected (not shown)



B273R940.WMF

2. Remove the 11 x securing the engine shield assembly [A]. Tilt the assembly to one side. Then unplug all harnesses before you remove the assembly.

3.8.2 EXIT BOARD

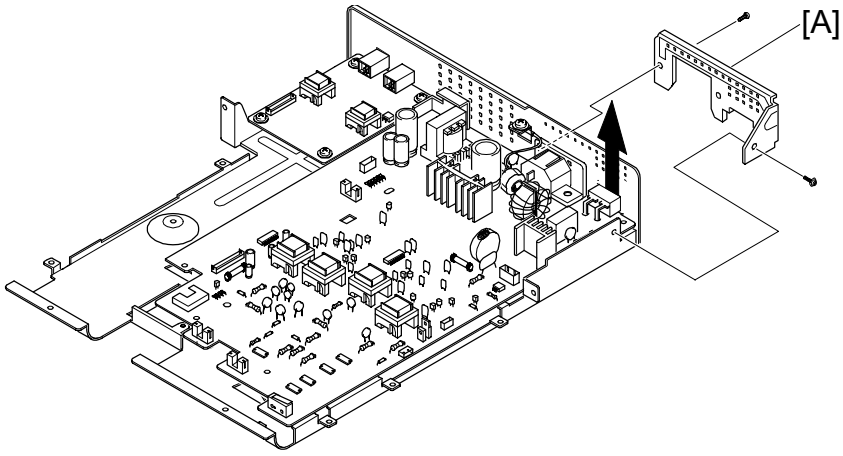


B273R941.WMF

3. Remove the 2 x exit board [B] and remove it.

3.9 SMPS AND LIU

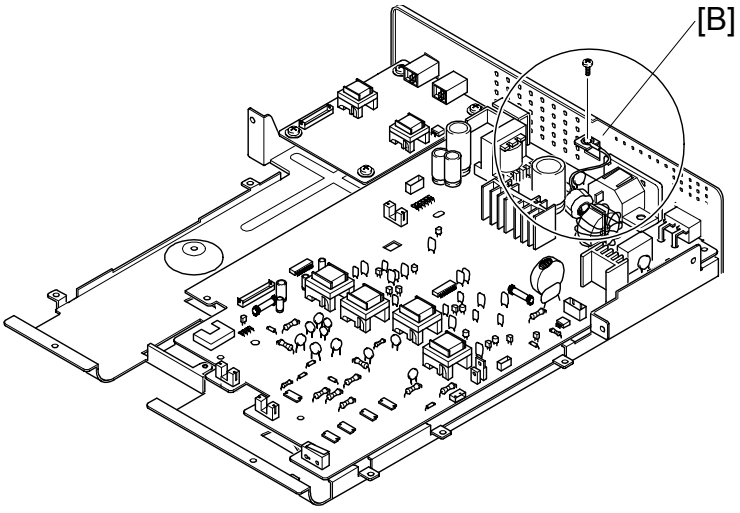
Remove the following before you remove the SMPS and LIU.
☛: Rear cover
☛: Side covers
☛: Scanner assembly
☛: Engine shield assembly



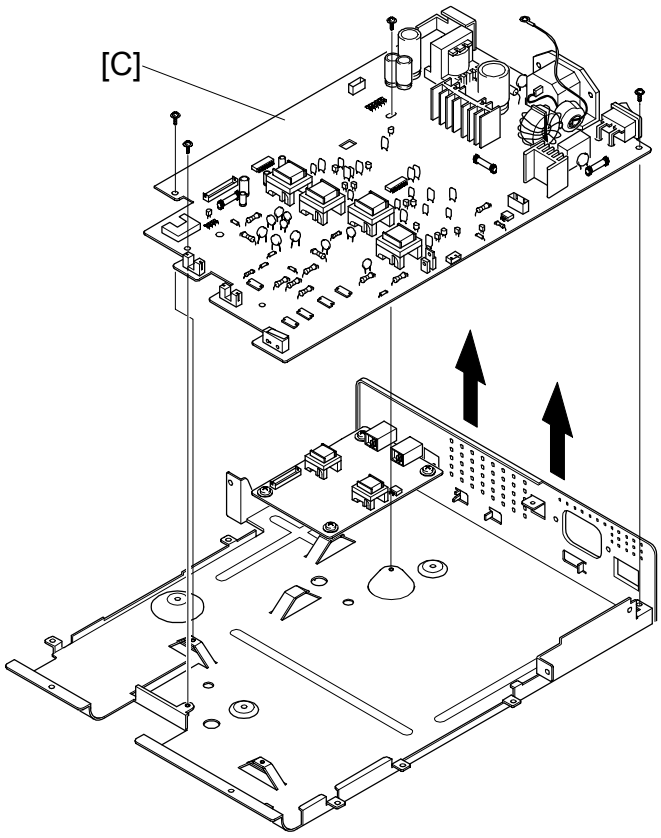
B273R942.WMF

1. Remove the 2 x securing the inlet bracket [A] and remove it.

2. Remove the 1 x securing the engine shield ground wire [B].



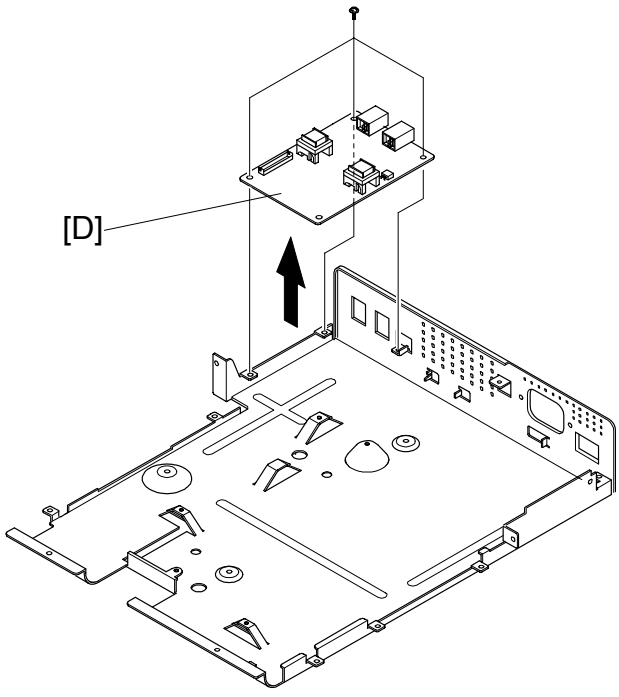
B273R943.WMF



B273R944.WMF

3. Remove the 3 x ☞ securing the SMPS [C]. Then lift it out as shown above.

4. Remove the 3 x ☞ securing the LIU. Then lift the LIU [D] out as shown in the illustration.



B273R945.WMF

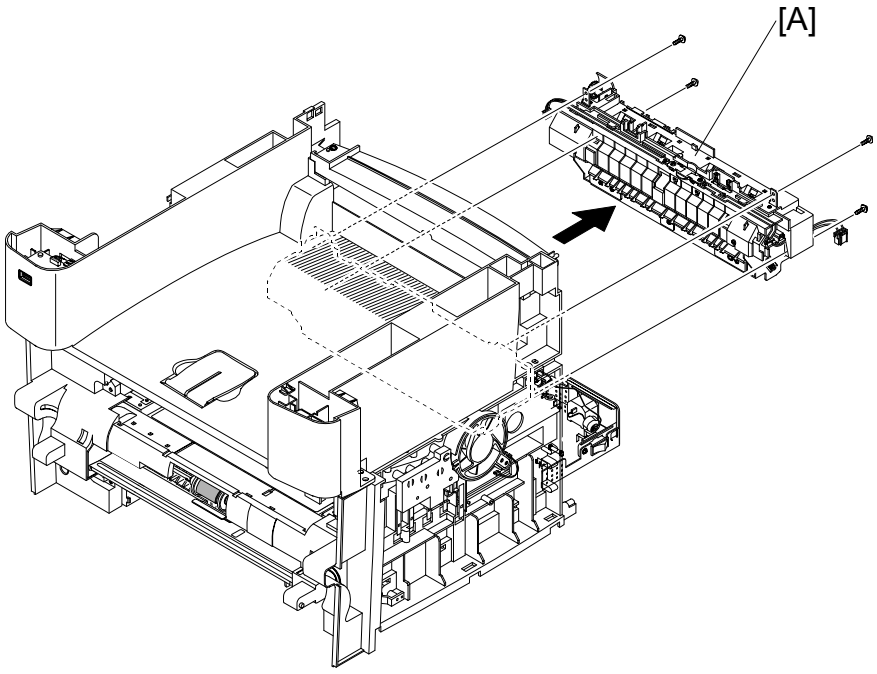
3.10 FUSING UNIT

Remove the following before you remove the fusing unit.

☛: Rear cover

NOTE: 1) Do procedure 3.10.1 if you only want to remove the entire fusing unit assembly.
2) Refer to the following sections if you want to remove components from the fusing unit. ☛ : 3.10.1, 3.10.2 and 3.10.3

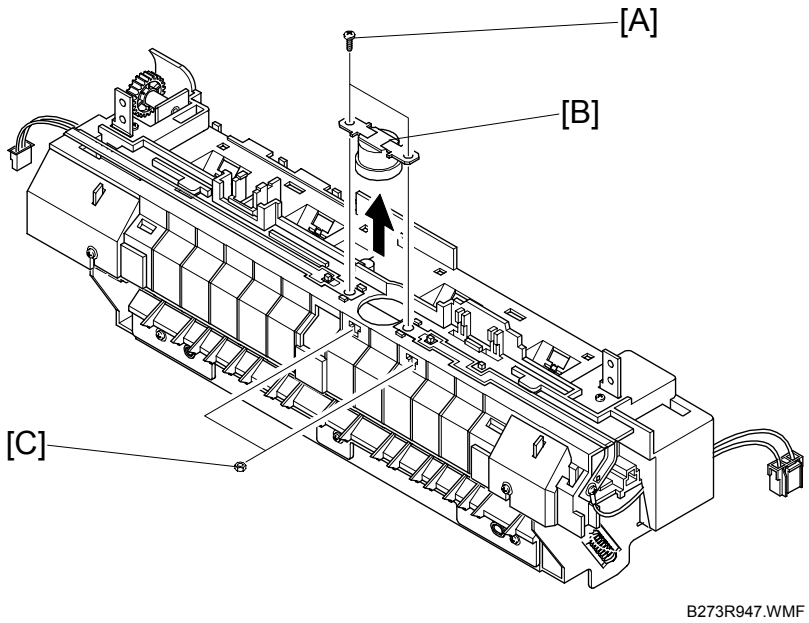
3.10.1 FUSING UNIT ASSEMBLY



B273R946.WMF

1. Unplug the 2 x from the main PBA and SMPS
2. Remove the 4 x securing the fusing assembly [A] and remove it.

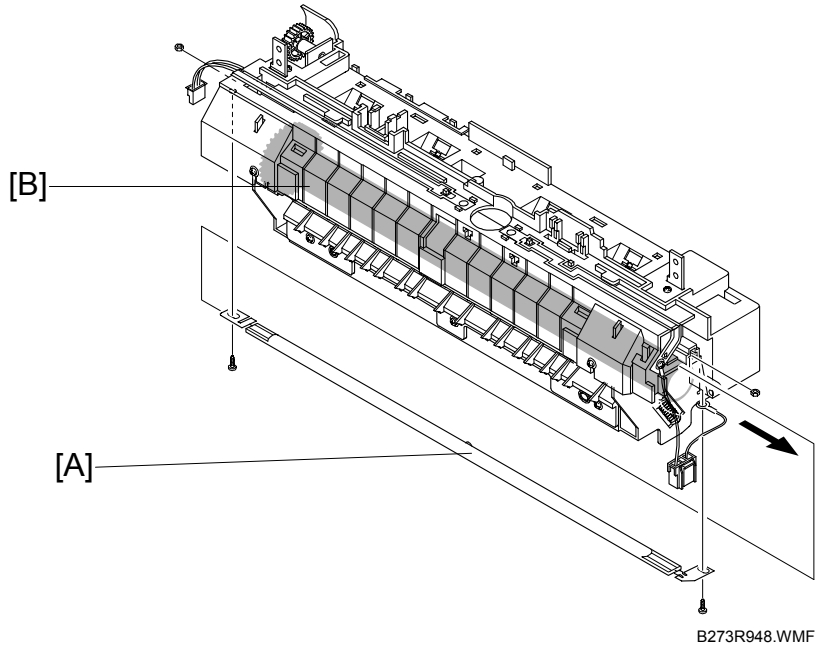
3.10.2 THERMOSTAT



B273R947.WMF

1. Remove the 4 x ☞ (bolts) [A] securing the thermostat [B].
2. Lift the thermostat [B] out. Make sure to keep the nuts [C] in a safe place.

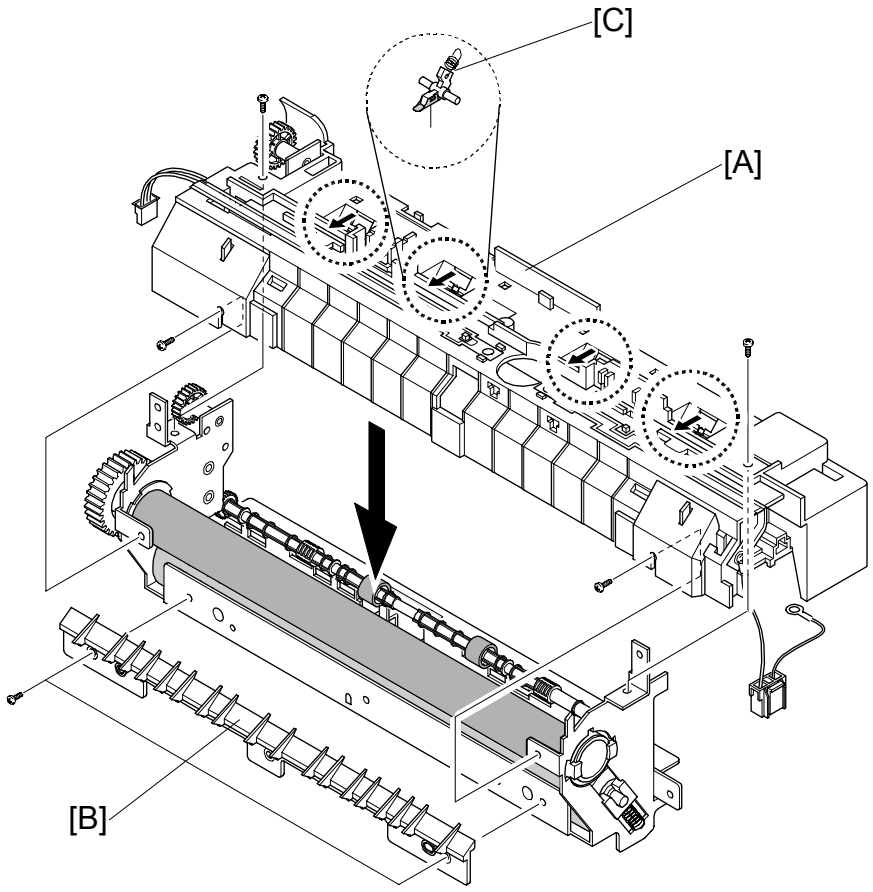
3.10.3 FUSING LAMP



B273R948.WMF

1. Remove the 2 x ☞ securing the fusing lamp [A].
2. Remove the fusing lamp [A] from the hot roller [B].

3.10.4 STRIPPER PAWLS



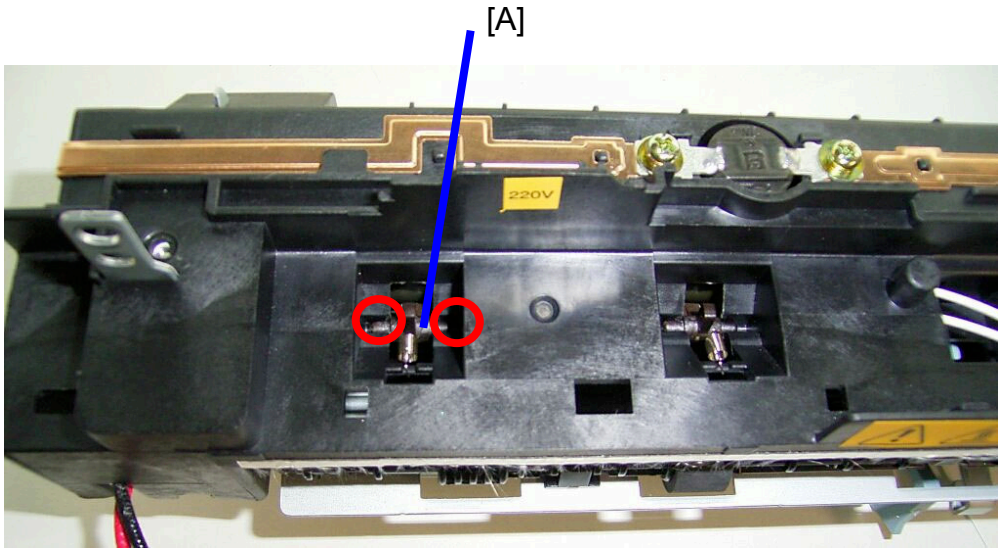
B273R949.WMF

1. Remove the 4 x ☞ securing the fusing unit cover [A].
2. Remove the 2 x ☞ securing the guide input [B].
3. Remove the stripper pawls [C] from the fusing unit cover [A].

When you Reassemble the Fusing Unit

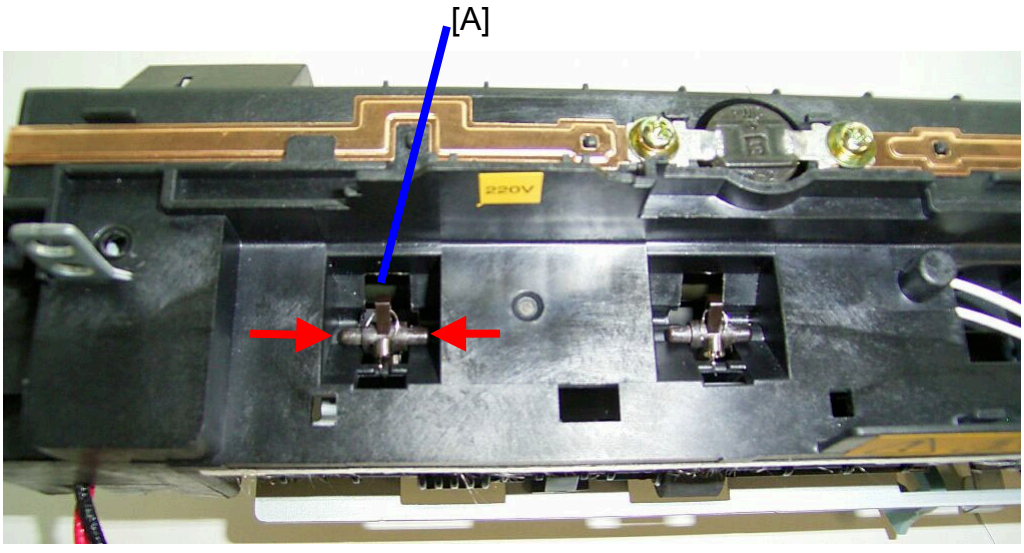
The 4 x stripper pawls must be put in the correct position before you can reassemble the fusing unit. Do the following procedure before you put the fusing unit back to the fusing unit assembly.

1. Snap the 4 x stripper pawls [A] out of the left and right side stripper pawl holder slots (shown in red circles below).



B273R950.TIF

2. Put the top part of the fusing unit onto the bottom part of the fusing unit.
3. Place the 4 x stripper pawls [A] back into the stripper pawl holder slots (shown with two red arrows in the illustration below).
4. Push the sides of the stripper pawls securely into the stripper pawl holder slots.
5. Reassemble the rest of the fusing unit and set is back into the machine again.

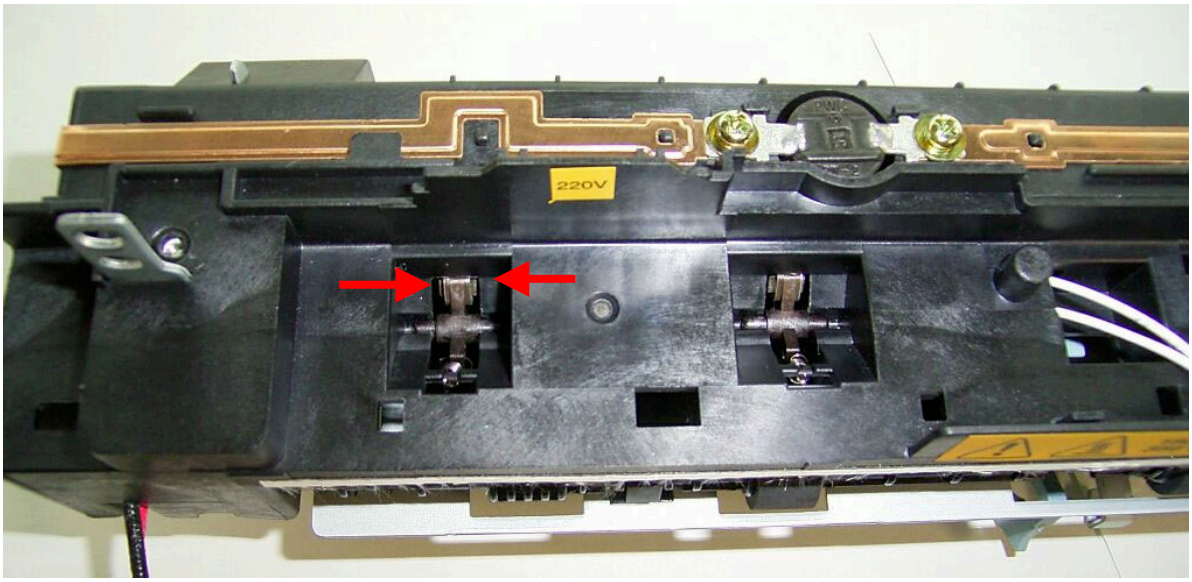


B273R951.TIF

Note.

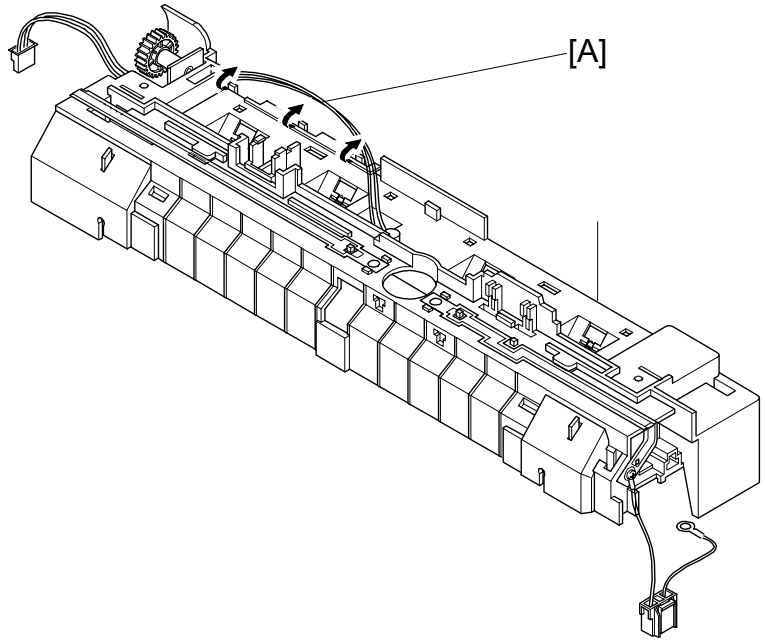
The illustration below shows the stripper pawls in the incorrect position.

Note that the stripper pawls are not correctly set into the stripper pawl holder slots. In this condition you cannot replace the fusing unit back to the machine.



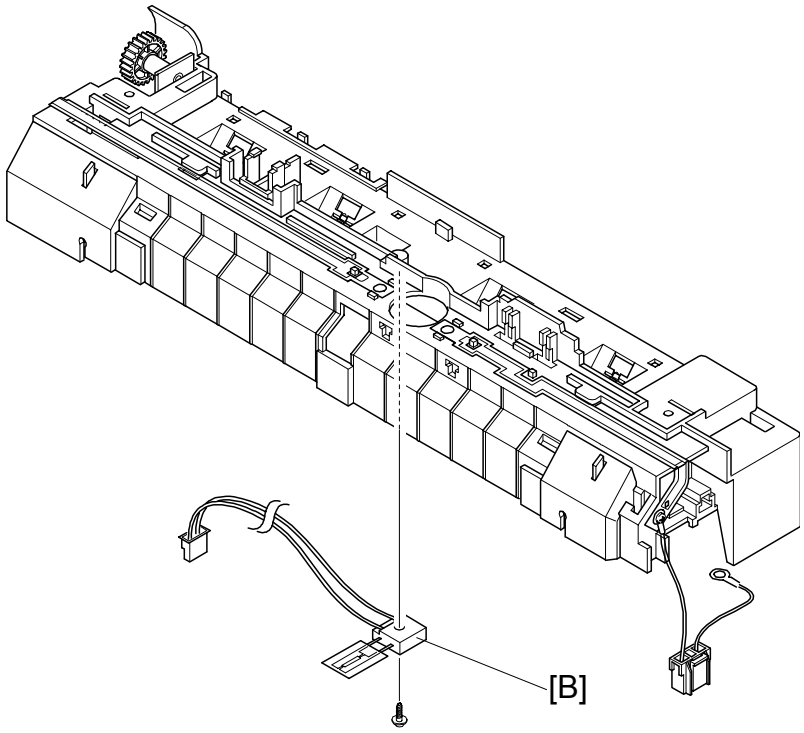
B273R952.TIF

3.10.5 THERMISTOR



B273R950.WMF

1. Unwrap the thermistor harness [A] as shown above

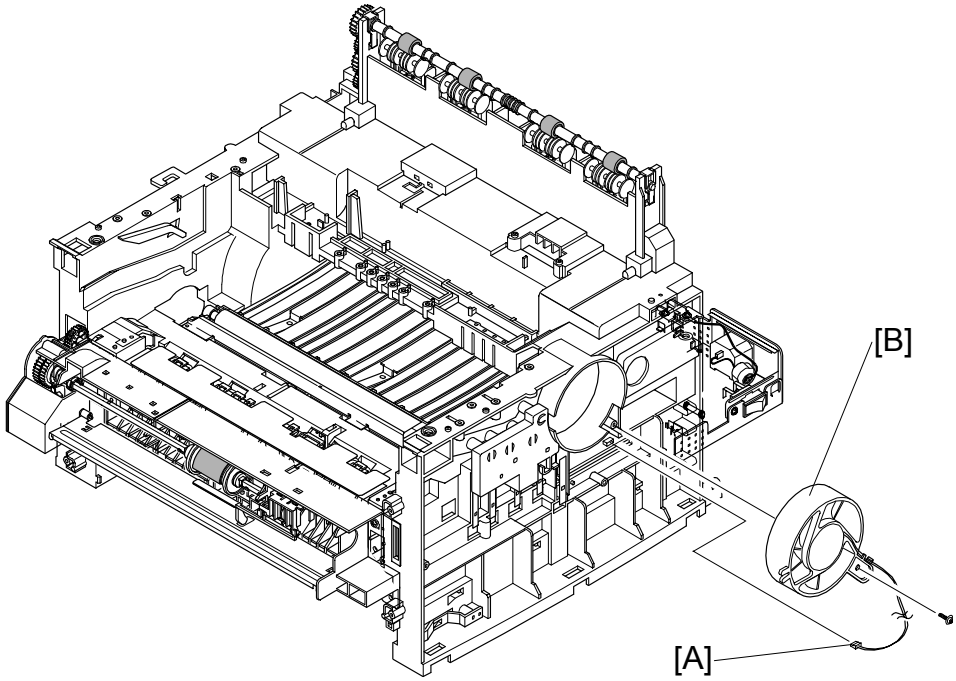


B273R951.WMF

2. Remove 1 x ☞ securing the thermistor [B] and remove it

3.11 FAN

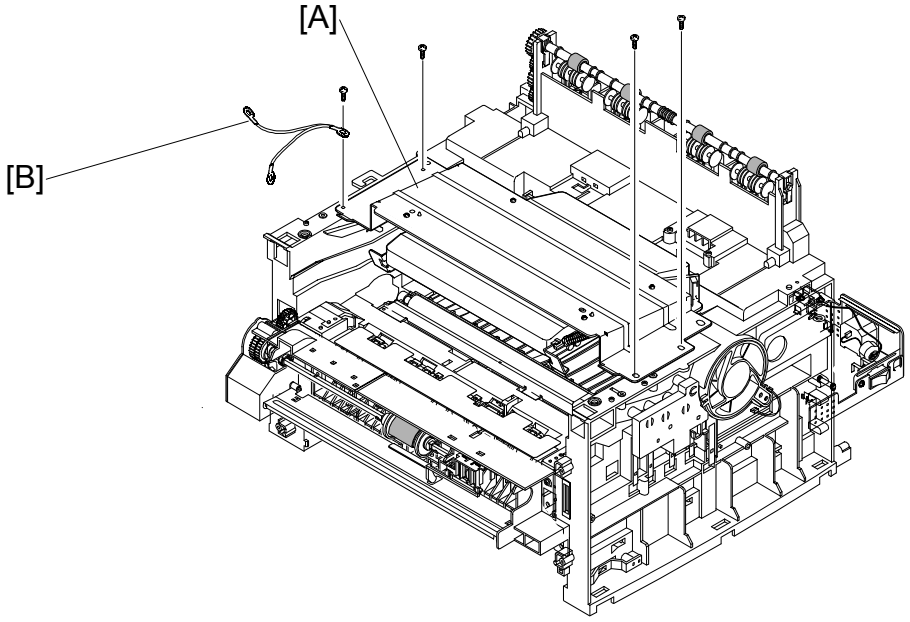
Remove the following before you remove the fan.
☛: Rear cover
☛: Side covers



1. Unplug the 1 x [A] from the SMPS.
2. Remove the 1 x securing
3. Remove the fan [B].

3.12 LSU

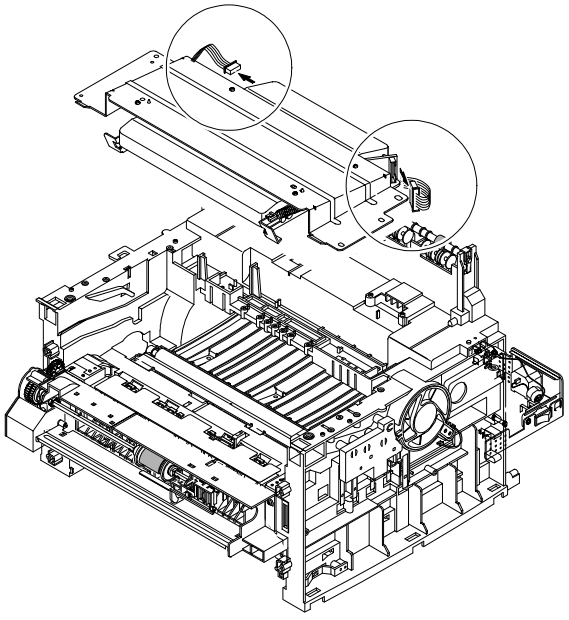
Remove the following before you remove the LSU.
☛: Rear cover
☛: Side covers
☛: Scanner assembly
☛: Front cover
☛: Middle cover



B273R953.WMF

1. Remove the 4 x securing the LSU [A] and remove it.
2. Make sure to keep the wire [B] in a safe place.

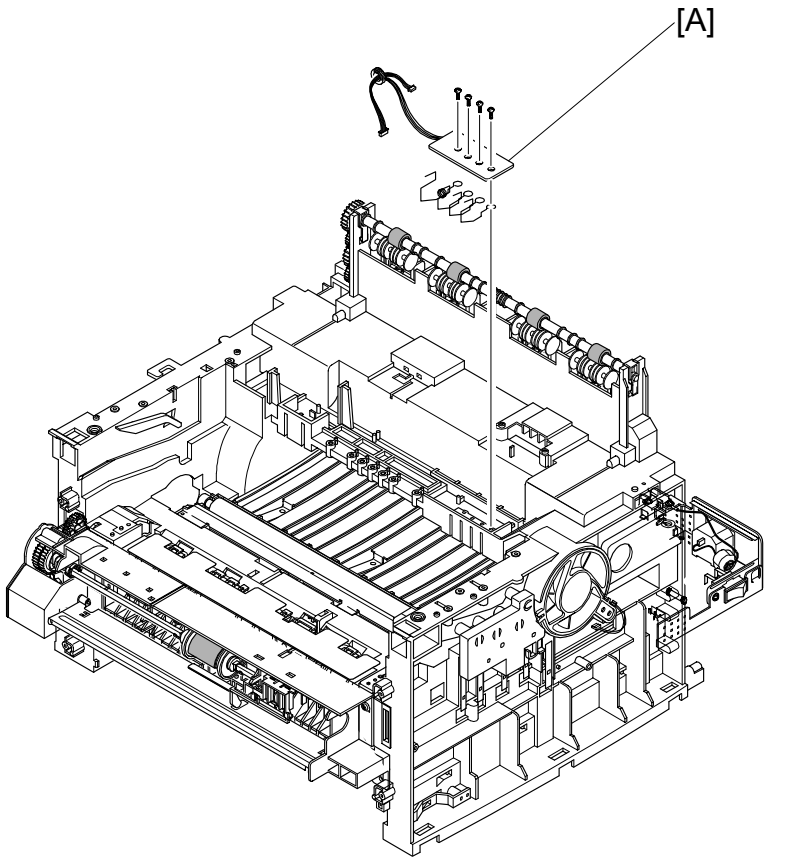
3. Unplug the 2 x as shown in the illustration.



B273R954.WMF

3.13 CRUM BOARD

Remove the following before you remove the CRUM board.
☛: Rear cover
☛: Side covers
☛: Scanner assembly
☛: Front cover
☛: Middle cover
☛: LSU

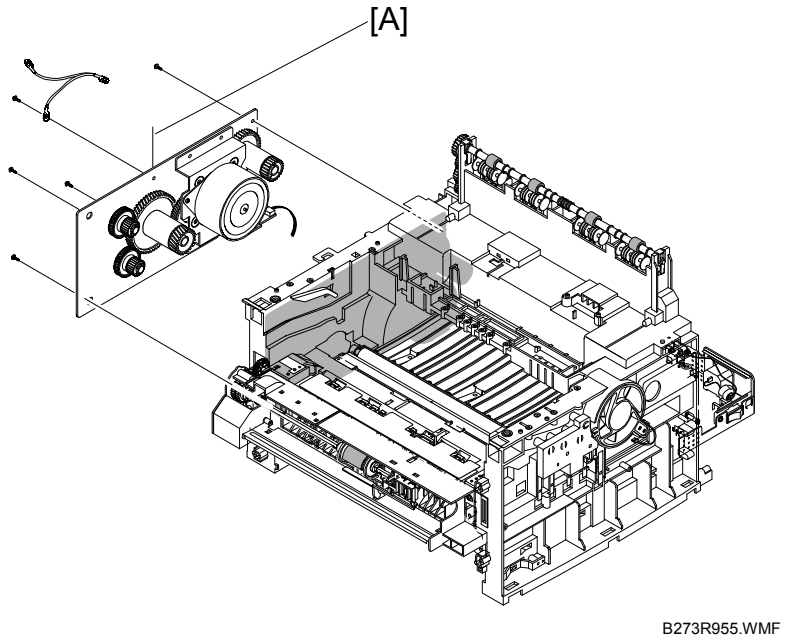


B273R956.WMF

1. Remove the 4 x ☞ to separate the CRUM board [A] from the main frame as shown above. Make sure to keep the springs in a safe place.

3.14 DRIVE ASSEMBLY

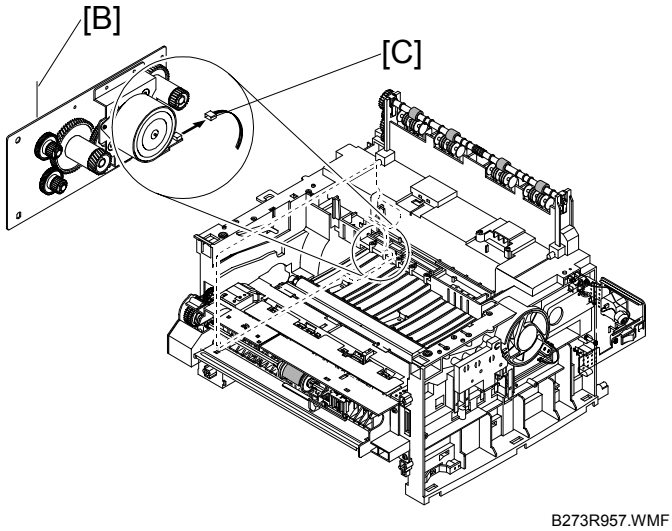
Remove the following before you remove the drive assembly.
☛: Rear cover
☛: Side covers
☛: Shield controller



B273R955.WMF

1. Remove the 5 x 🔩 securing the drive assembly.

2. Remove the drive assembly [B].
3. Unplug the 1 x 🔌 [C] from the motor PBA.

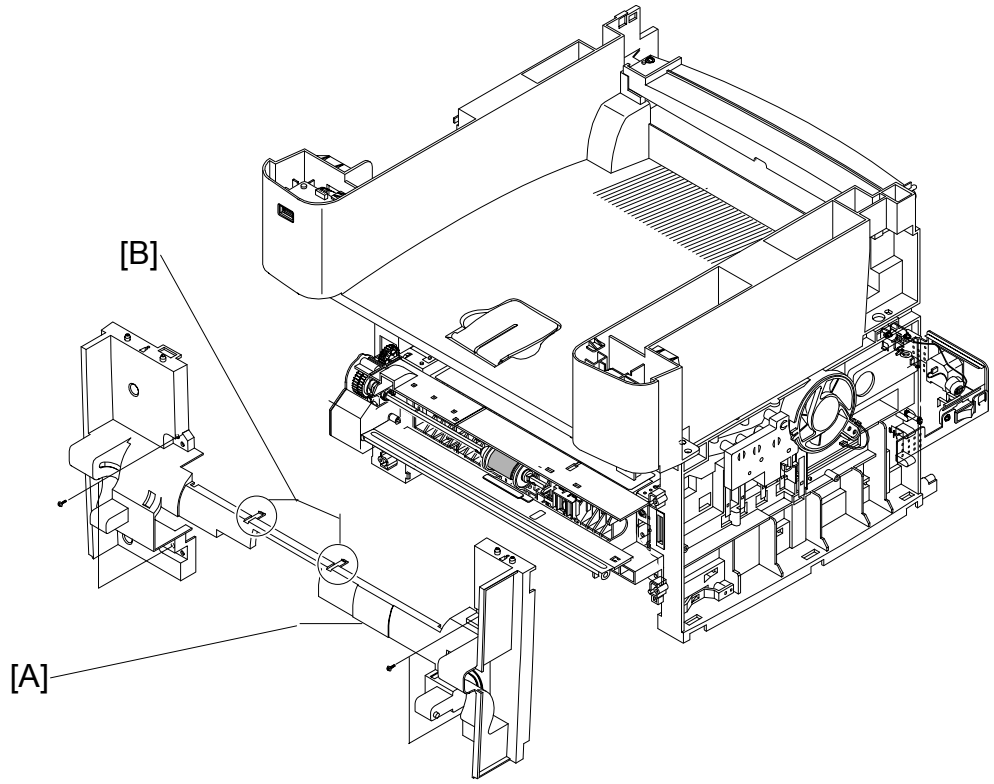


B273R957.WMF

NOTE: The six screws have numbers stamped on the drive assembly base plate. Tighten the screws in the order they show when you reassemble the drive assembly. You only need to consider screws one to five at the time you replace the drive assembly. Screw number six gets tightened when you replace the shield controller assembly.

3.15 COVER MID-FRONT

Remove the following before you remove the cover mid-front.
☛: Rear cover
☛: Side covers
☛: Middle cover



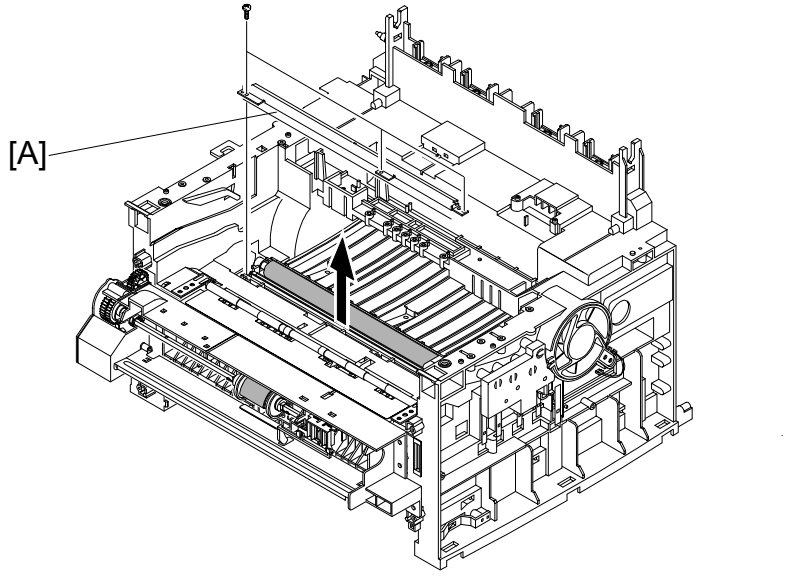
B273R958.WMF

1. Remove the 4 x ☞ securing the cover mid front [A].
2. Release the 2 clips [B] in the center.
3. Remove the cover mid front [A].

NOTE: The cover is very fragile. Use high caution when you remove it.

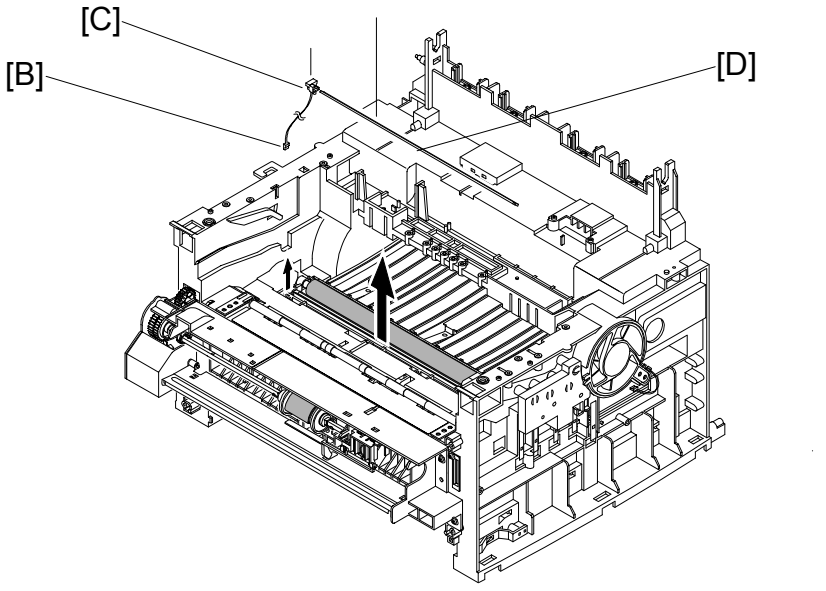
3.16 TRANSFER ASSEMBLY

Remove the following before you remove the transfer assembly.
☛: Rear cover
☛: Side covers
☛: Scanner assembly
☛: Front cover
☛: Middle cover
☛: LSU
☛: Cover front-mid



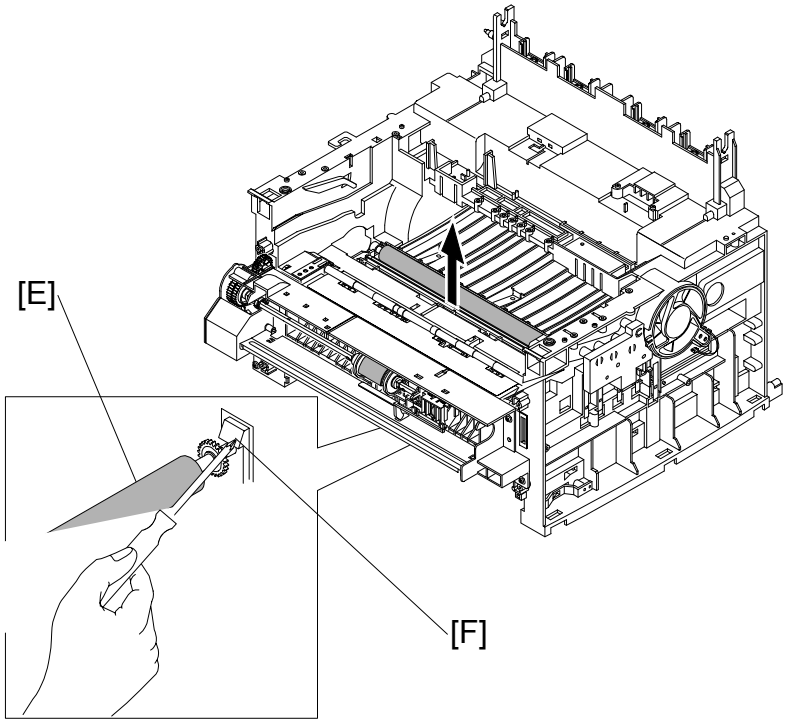
B273R959.WMF

1. Remove the 3 x ☞ securing the transfer earth [A] and remove it.



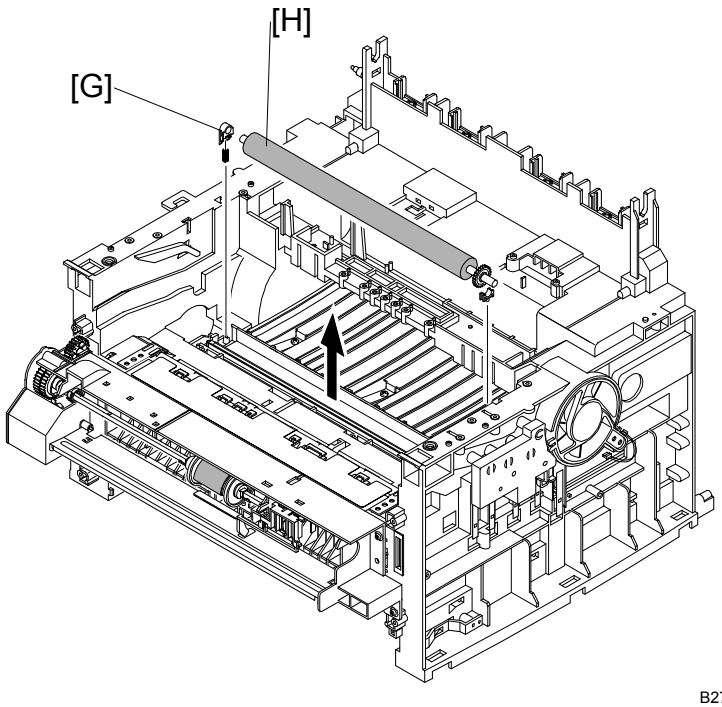
B273R960.WMF

2. Unplug the PTL holder connector [B] and remove the PTL [C].
3. Remove the PTL lens [D].



B273R961.WMF

4. Remove the transfer roller [E] by pressing the hook [F] securing the roller to the right.

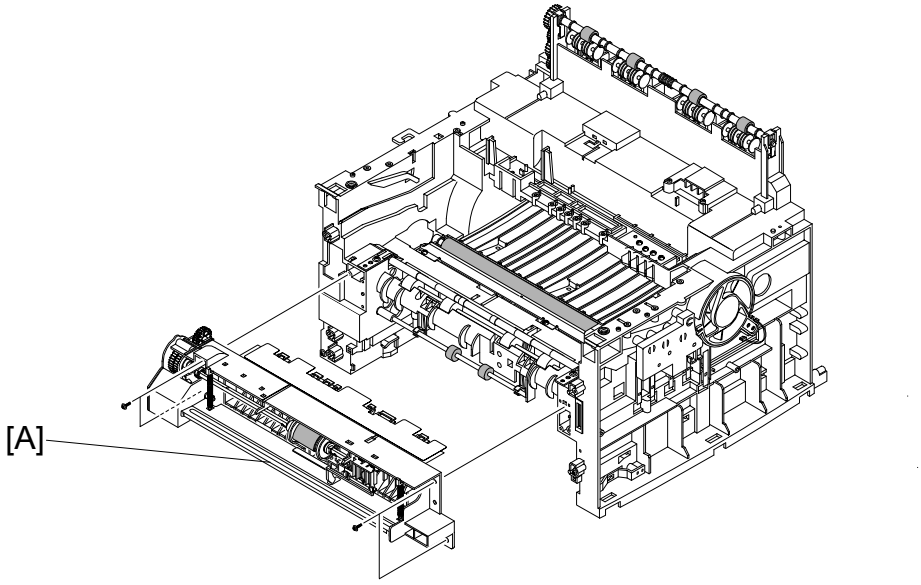


B273R962.WMF

5. Unlatch the bushing [G] and remove it.
6. Lift the transfer roller [H] out as shown above.

3.17 FEED ASSEMBLY

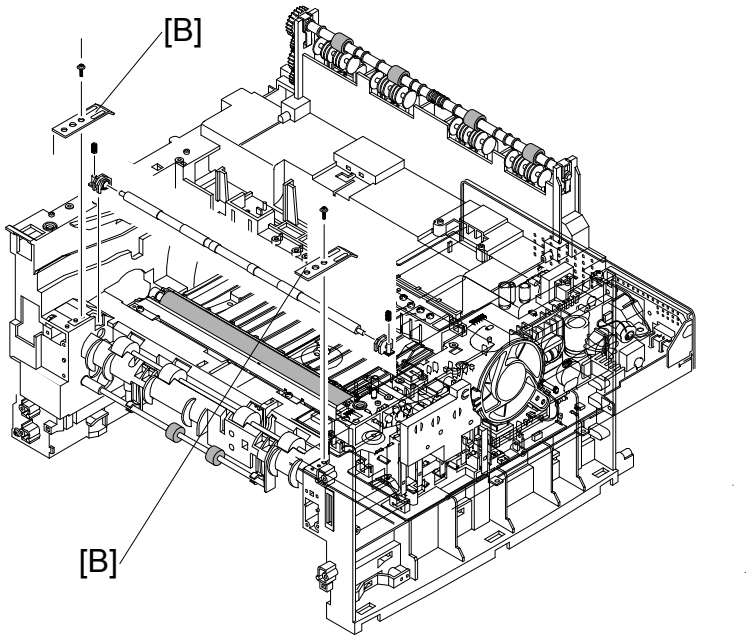
Remove the following before you remove the feed assembly.
☛: Rear cover
☛: Side covers
☛: Scanner assembly
☛: Front cover
☛: Middle cover
☛: Controller shield assembly
☛: Drive assembly



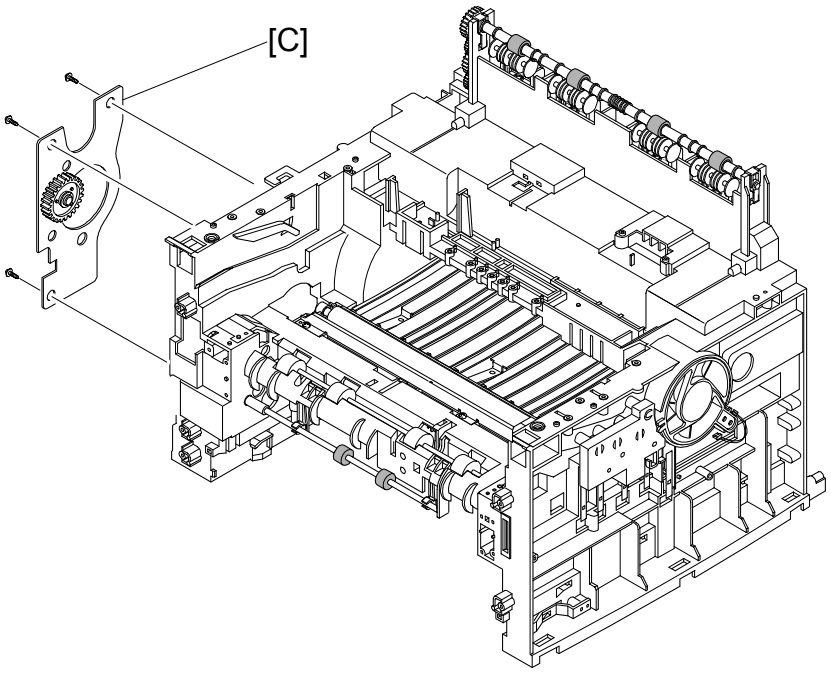
B273R963.WMF

1. Remove the 4 x 🔩 securing the guide paper front and remove it.

2. Remove the 2 x 🔩 on both sides of the guide paper to remove the two guides [B].
3. Remove two guides and the two springs as shown in the illustration.

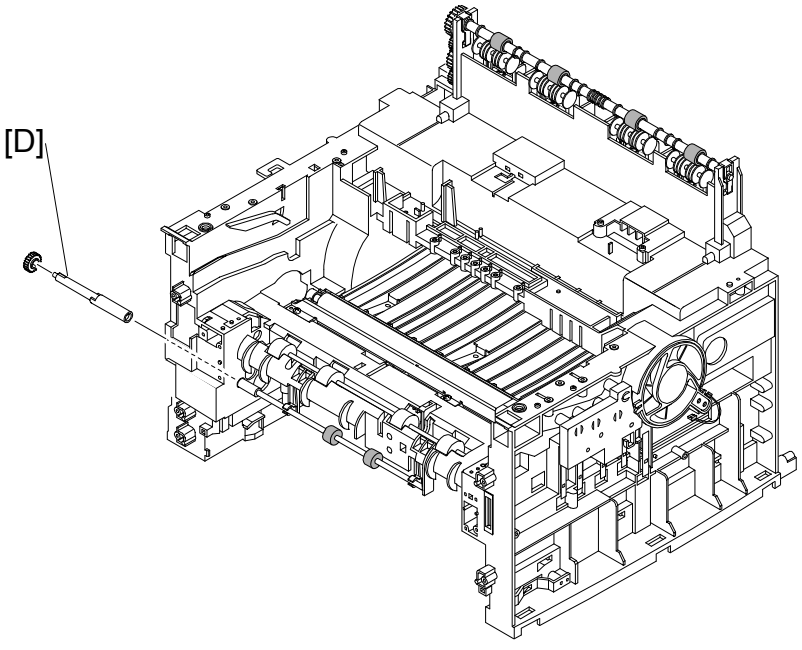


B273R964.WMF



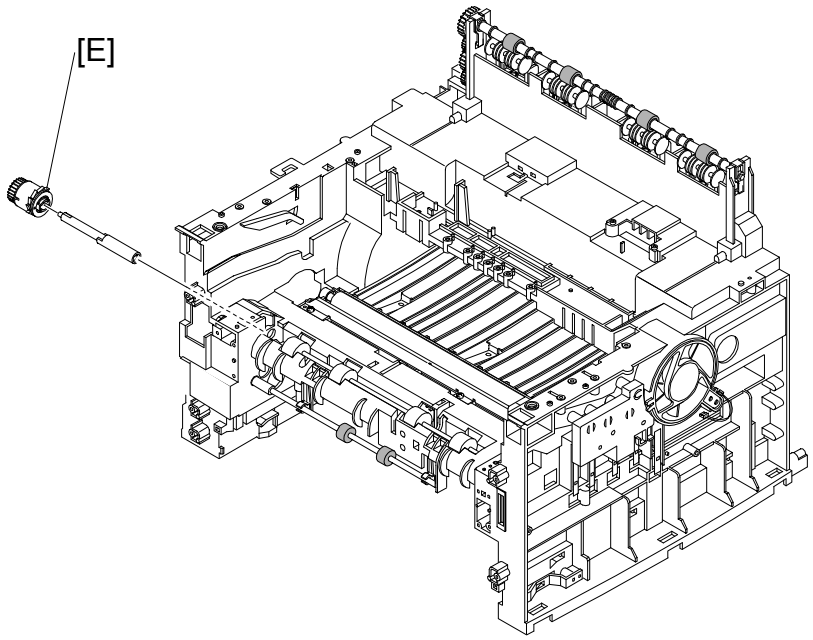
B273R965.WMF

4. Remove the 3 x securing the feed bracket [C] and remove it.



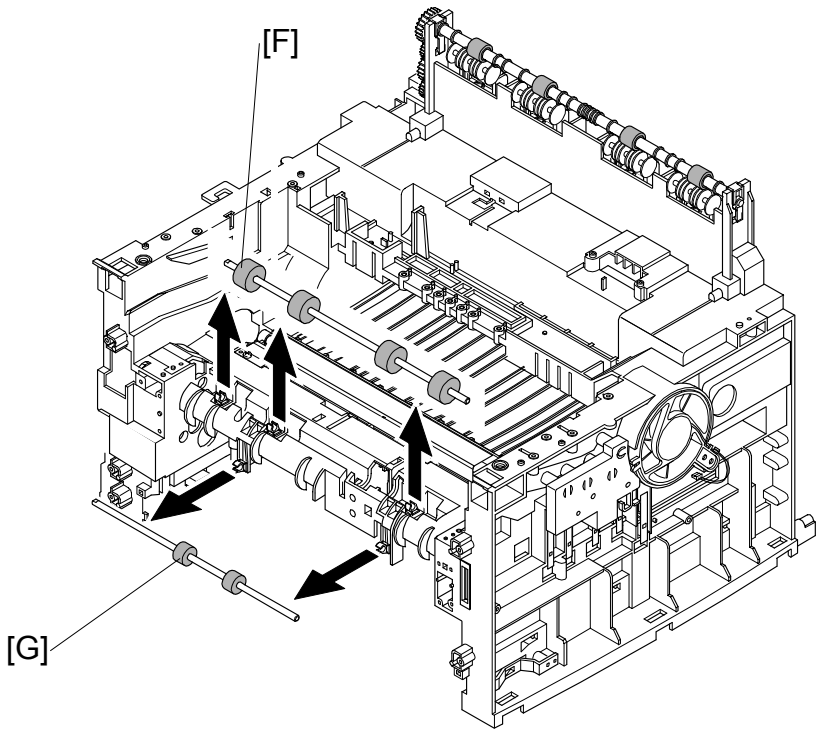
B273R967.WMF

5. Remove feed gear 2 [D].



B273R966.WMF

6. Remove feed gear 1 [E].



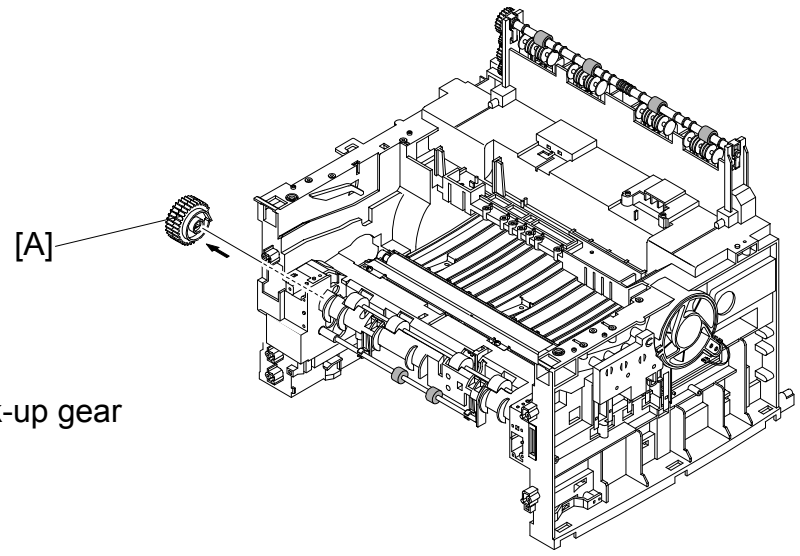
B273R968.WMF

7. Remove the feed roller [F].
8. Remove feed roller 1 [G] as shown above.

3.18 PICK-UP ASSEMBLY AND SOLENOID

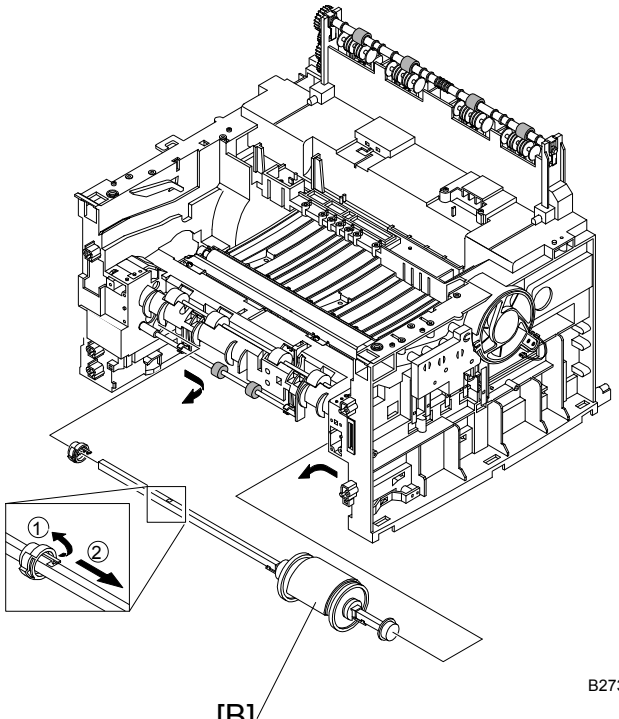
Remove the following before you remove the pick-up assembly and solenoid.
☛: Rear cover
☛: Side covers
☛: Scanner assembly
☛: Front cover
☛: Middle cover
☛: Controller shield assembly
☛: Drive assembly
☛: Engine shield assembly
☛: Feed assembly

3.18.1 PICK-UP ASSEMBLY



1. Remove the pick-up gear assembly [A]

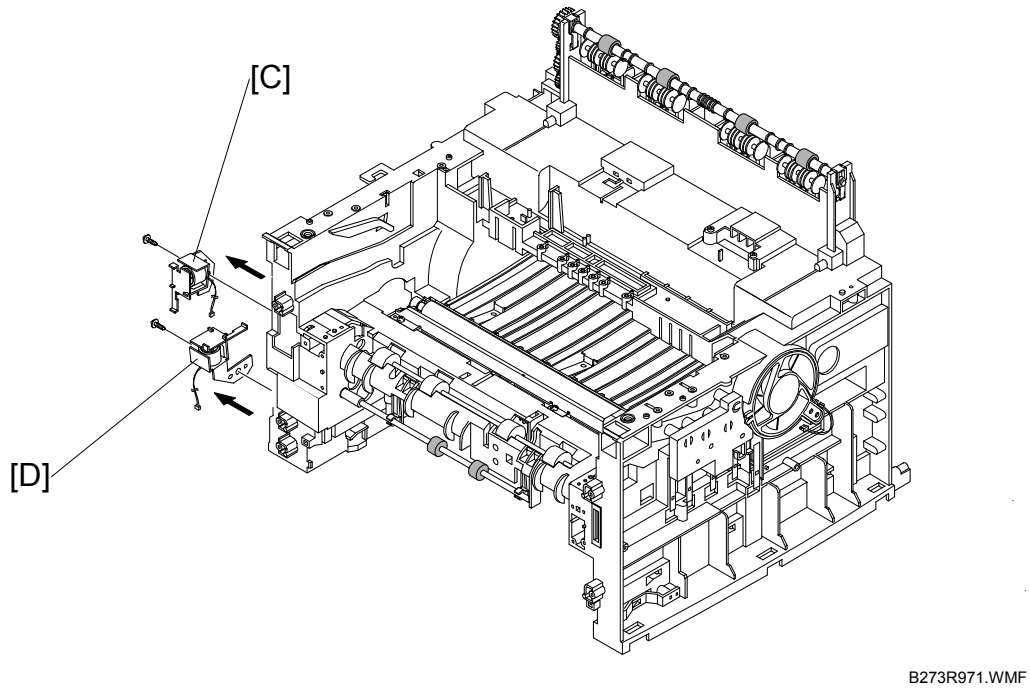
B273R969.WMF



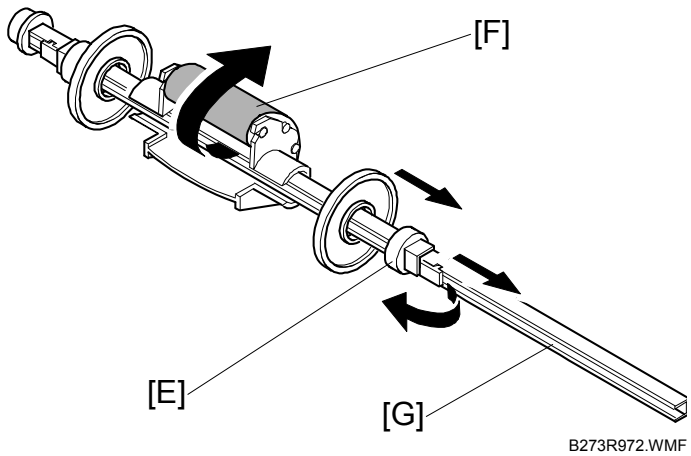
2. Remove the pick-up assembly as shown in the illustration.

B273R970.WMF

3.18.2 SOLENOID



3. Remove the 1 x 🔩 securing the pick-up solenoid [C] and remove it.
4. Remove the 1 x 🔩 securing the manual solenoid [D] and remove it.

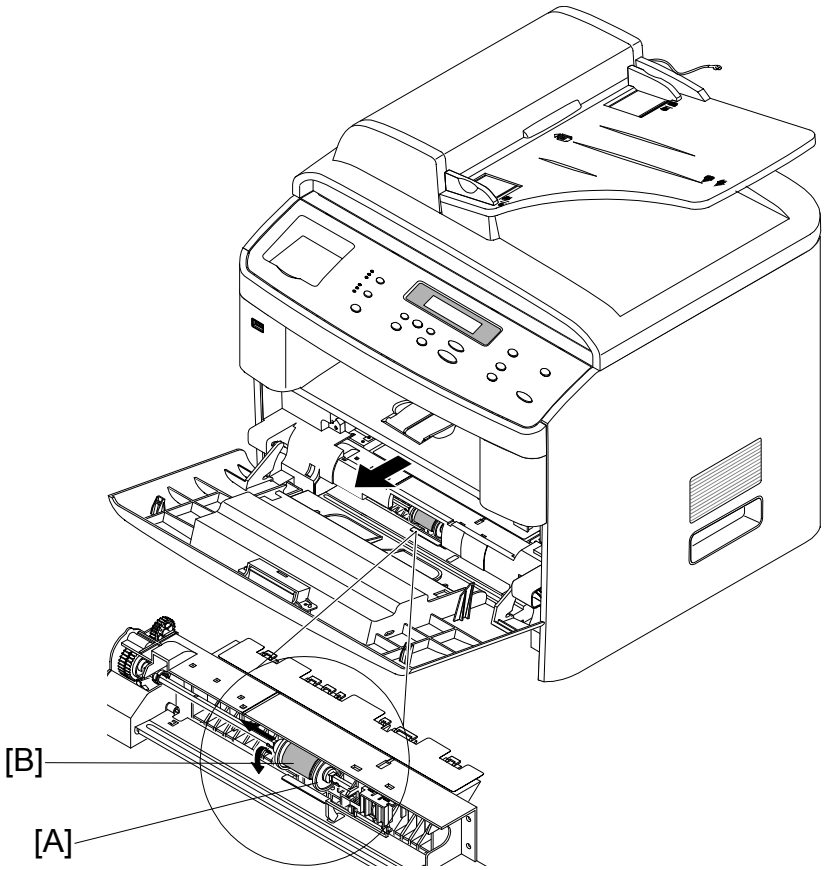


5. To replace the pick-up roller, move the stopper [E] securing the sponge roller [F] top the right. Then turn the sponge roller and remove it from the shaft [G]

3.18.3 BY-PASS PICK-UP ROLLER AND PAPER FEED UNIT PICK-UP ROLLER.

It is possible to replace the by-pass or paper feed unit pick-up rollers only. Do the following procedures if you only want to replace the by-pass pick-up roller or the paper feed unit pick-up roller.

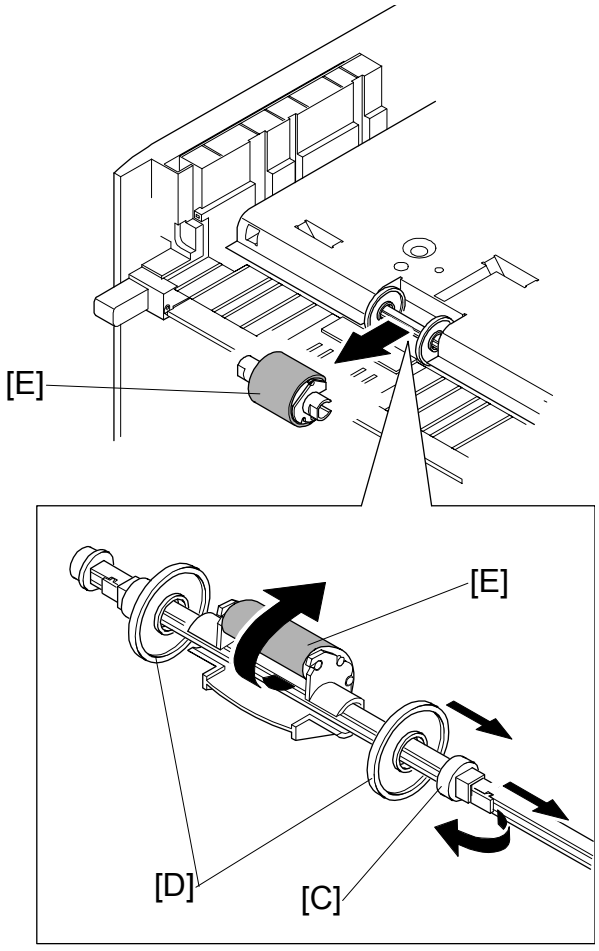
By-pass pick-up roller



B273R973.WMF

1. Release the white catch and slide the locking piece as far to the side as possible.
2. Slide the white collar [A] as far to the side as possible.
3. Slide the by-pass pick-up roller [B] as far as possible to the side until it gets free from the white collar.
4. Rotate the pick-up roller around the drive shaft until it can be removed.

Paper Feed Unit Pick-up Roller



B273R974.WMF

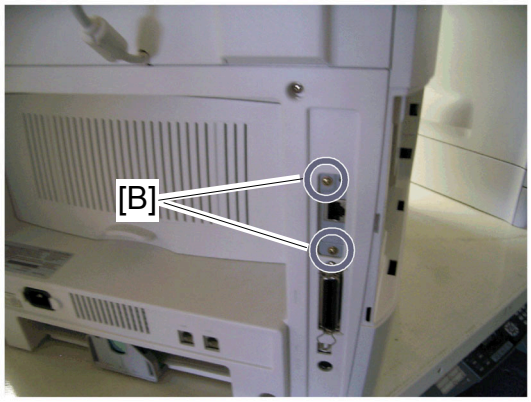
1. Turn the machine upside down.
2. Release the white catch [C]. Then slide the locking piece as far to the side as possible.
3. Slide the white collar [D] as far to the side as possible.
4. Slide the pick-up roller [E] to the side until it gets free from the white collar.
5. Rotate the pick-up roller around the drive until it can be removed.

3.19 NETWORK BOARD (FOR B273-17/-21/-27 ONLY)

1. Open the side cover (Cover-Memory) [A].

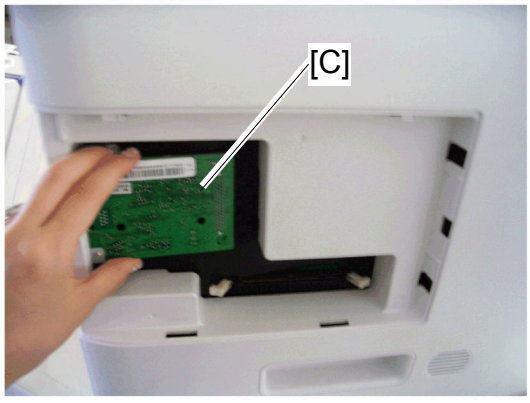
B273R953.PNG

2. Remove the two screws [B] (x 2).



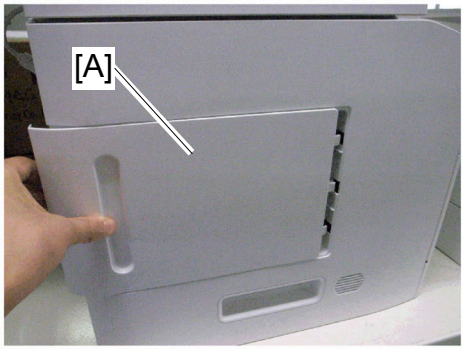
B273R954.PNG

3. Remove the network board [C].



B273R955.PNG

4. Close the side cover (Cover-Memory) [A].



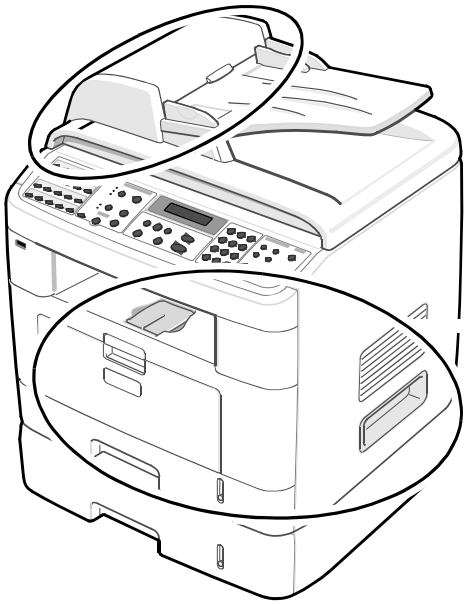
B273R956.PNG

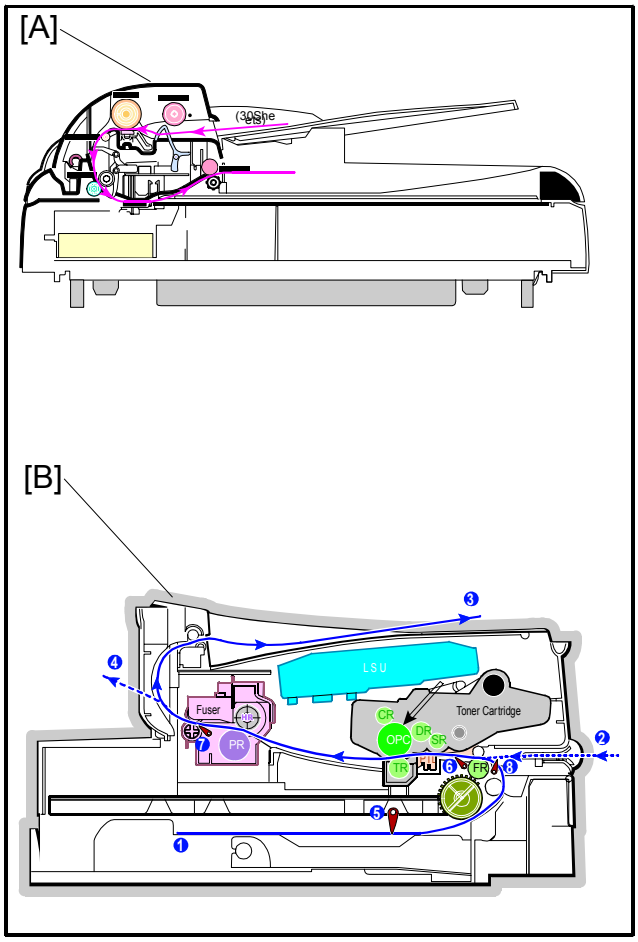
12 September 2006

4. TROUBLESHOOTING

4.1 PAPER PATH

The diagram below shows the paper path for the scanner part and engine part of the machine. Refer to the next two pages for more details.



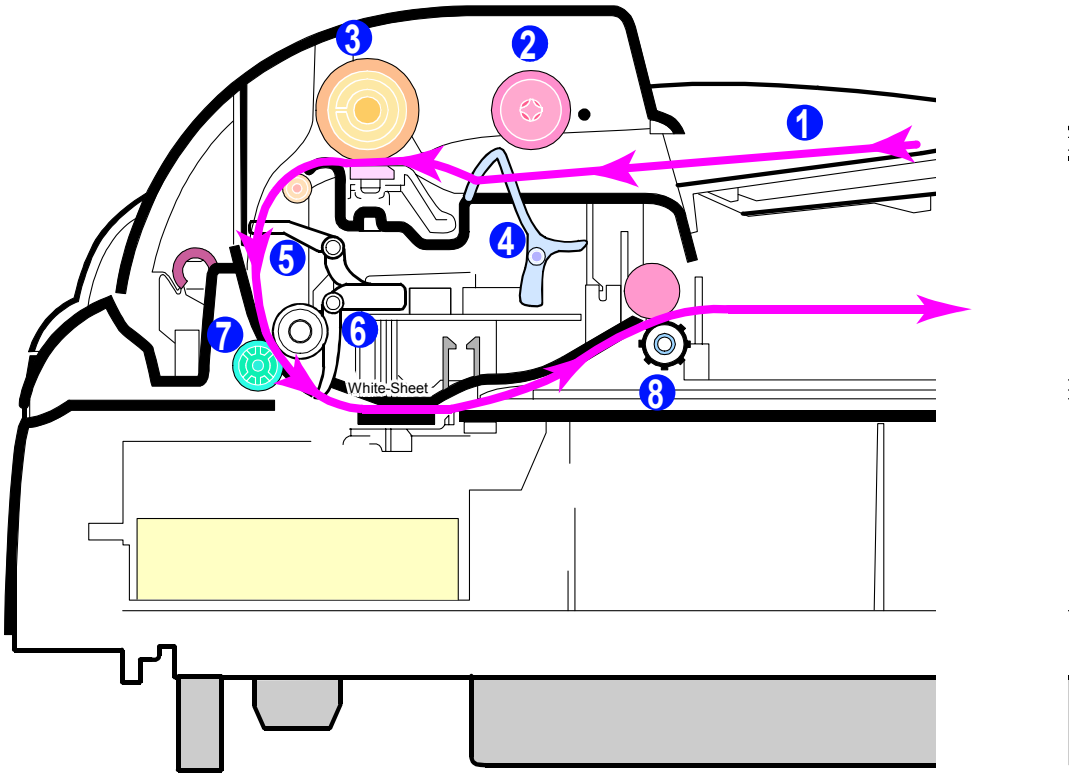


B273T04.WMF

[A]: Scanner part
[B]: Engine part

4.1.1 COPY/SCAN DOCUMENT PATH

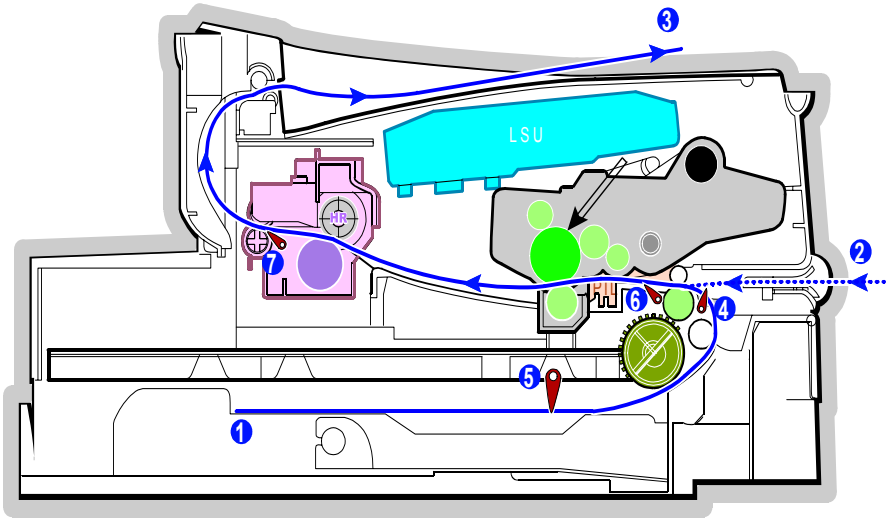
Scanner part



B273T05.WMF

1. Paper
2. Pick-up roller
3. ADF roller
4. Document sensor
5. Registration sensor
6. Scanning sensor
7. Feed roller
8. Exit roller

Engine Part



1. Paper feed unit
2. By-pass tray
3. Paper output area (face down)
4. Paper empty sensor (by-pass)
5. Paper empty sensor (paper feed unit)
6. Paper feed sensor
7. Paper exit sensor

4.1.2 PRINTER PAPER PATH

The machine feeds paper from the main cassette or by-pass tray when it gets a print command. The paper being fed passes the paper feed sensor.

1. Jam 0 occurs if the sensor is not operated within a certain time.
2. Jam 1 also occurs if the sensor is not operated within a certain time.
3. Jam 2 occurs if the trailing edge of the paper does not pass the exit sensor within a certain time after the leading edge of the paper activates the exit sensor.

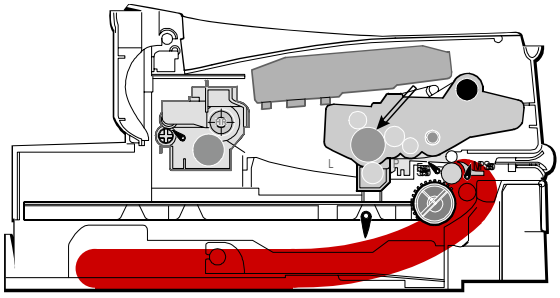
4.2 PAPER JAM CONDITIONS

The following show conditions when paper can get jammed during a print job.

- The tray is loaded incorrectly or overfilled.
- The tray has been pulled out during a print job.
- The front cover has been opened during a print job.
- Incorrect paper type was used.

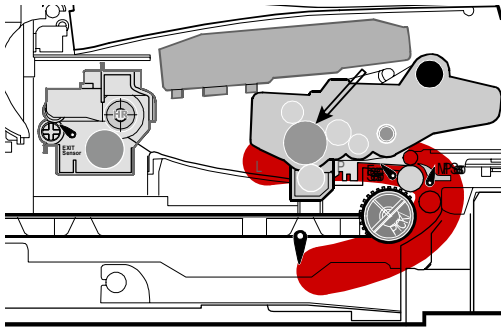
NOTE: 1) An error message shows on the LCD if a paper jam occurs. At this time find and remove the jammed paper. If you don't see the paper, open the covers. Do not use a tweezers, pincers or other metal tools to clear paper jams. This could damage the internal mechanism.

Jam0 (Paper Feed Area)



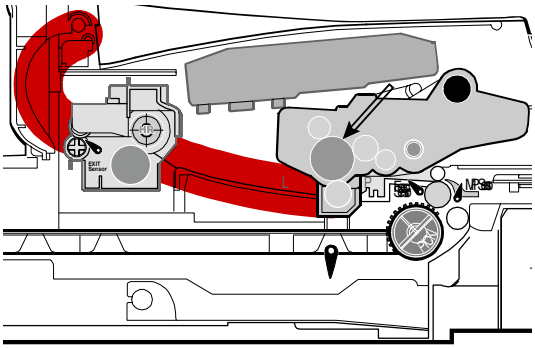
B273T07.WMF

Jam1 (Fusing/Toner Cartridge)



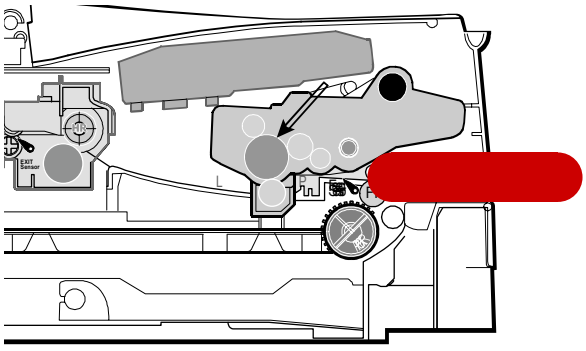
B273T08.WMF

Jam2 (Paper Exit Area)



B273T09.WMF

By-pass Jam (By-pass Tray)



B273T10.WMF

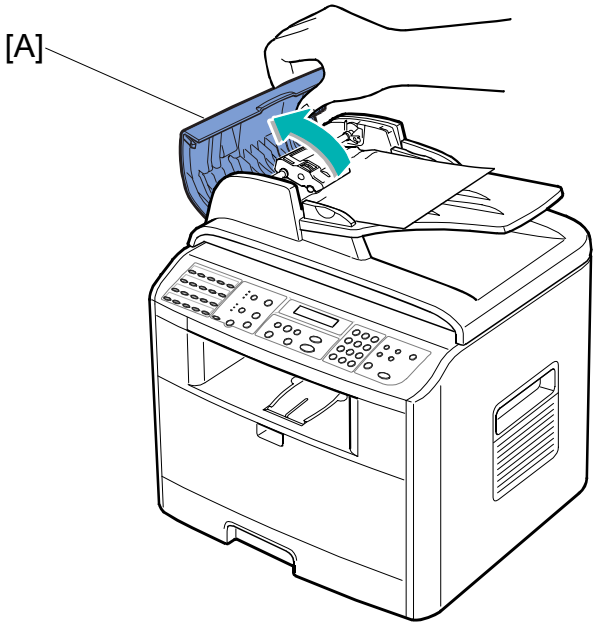
4.2.1 CLEARING DOCUMENT JAMS (ADF)

'DOCUMENT JAM' shows on the operation panel if a document jams when it gets fed through the ADF.

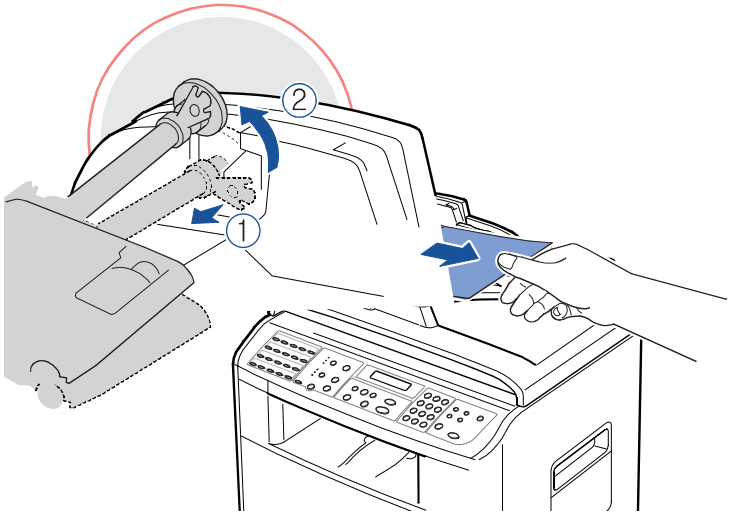
ADF Input Misfeed

Do the following to remove a jam of this type.

1. Open the top cover [A]



B273T11.WMF



B273T12.WMF

2. Pull the document gently to the right and out of the ADF
3. Close the top cover and load the documents to the ADF again

NOTE: 1) To prevent document jams, use the platen glass for the thick, thin or mixed documents instead of ADF.

ADF Exit Misfeed

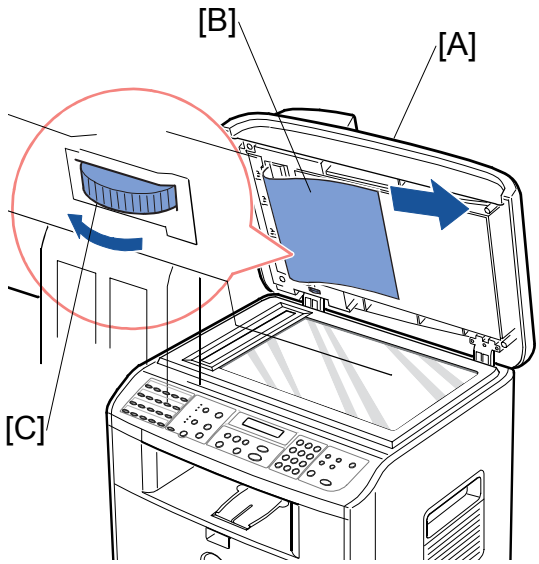
Do the following to remove a jam of this type.

1. Open the document cover and turn the release knob to remove the misfed documents from the exit area.
2. Close the document cover. Then load the documents to the ADF again.

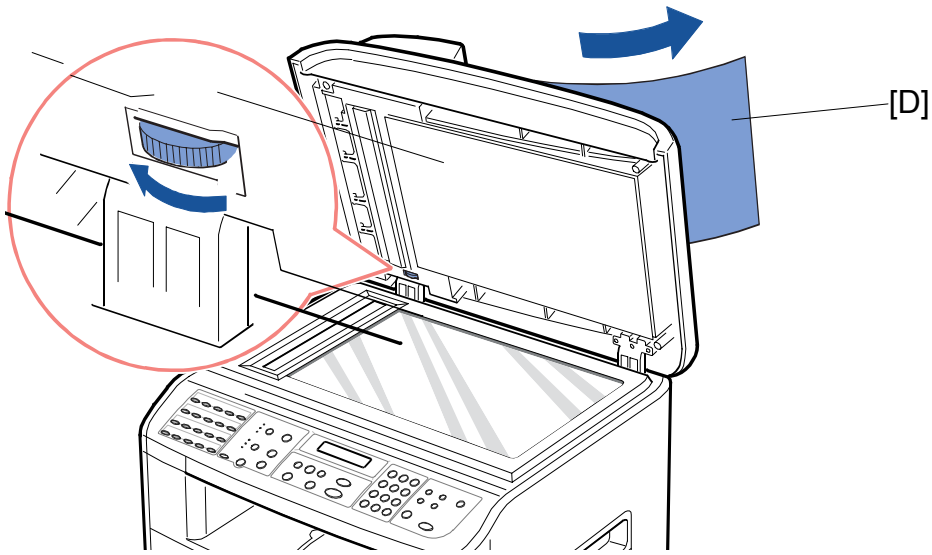
ADF Roller Misfeed

Do the following to remove a jam of this type.

1. Open the document cover [A]
2. Turn the release knob [C] to release the document [B].



B273T13.WMF



B273T14.WMF

3. Carefully pull the document [D] to the right with both hands.
4. Close the document cover. Then load the documents to the ADF again.

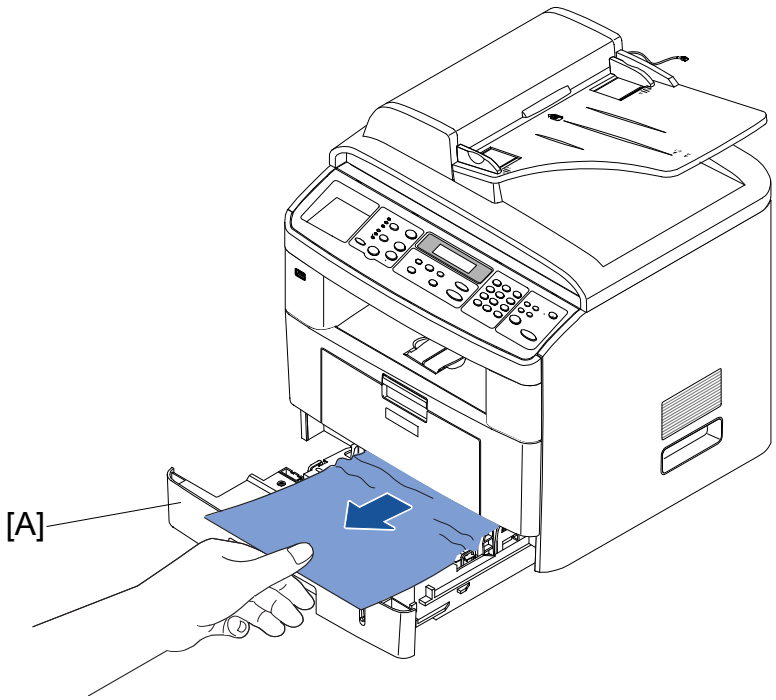
4.2.2 JAM0 (PAPER FEED AREA)

Do the following to remove a jam of this type.

1. Open and close the front cover. The jammed paper automatically exits the machine.

Go to the next step if the paper does not exit.

2. Pull the paper tray [A] open.



B273T16.WMF

3. Remove the jammed paper by gently pulling it straight out.
4. Push the paper tray back to the machine until it snaps into place.
5. Open and close the front cover to start printing again.

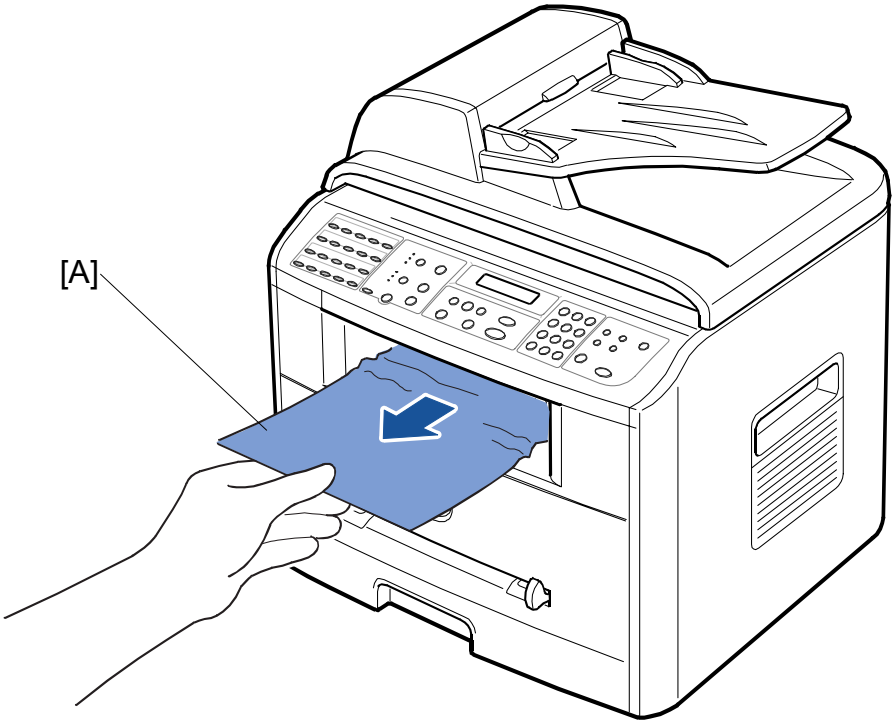
NOTE: If there is any resistance and the paper does not move when you pull or if you cannot see the paper in this area, skip to the fuser area around the toner cartridge.

4.2.3 JAM1 (FUSING AREA OR AROUND THE TONER CARTRIDGE AREA)

Do the following to remove a jam of this type.

NOTE: 1) The fusing area is hot. Use high caution when you remove paper from the machine.

1. Open the front cover and remove the toner cartridge.



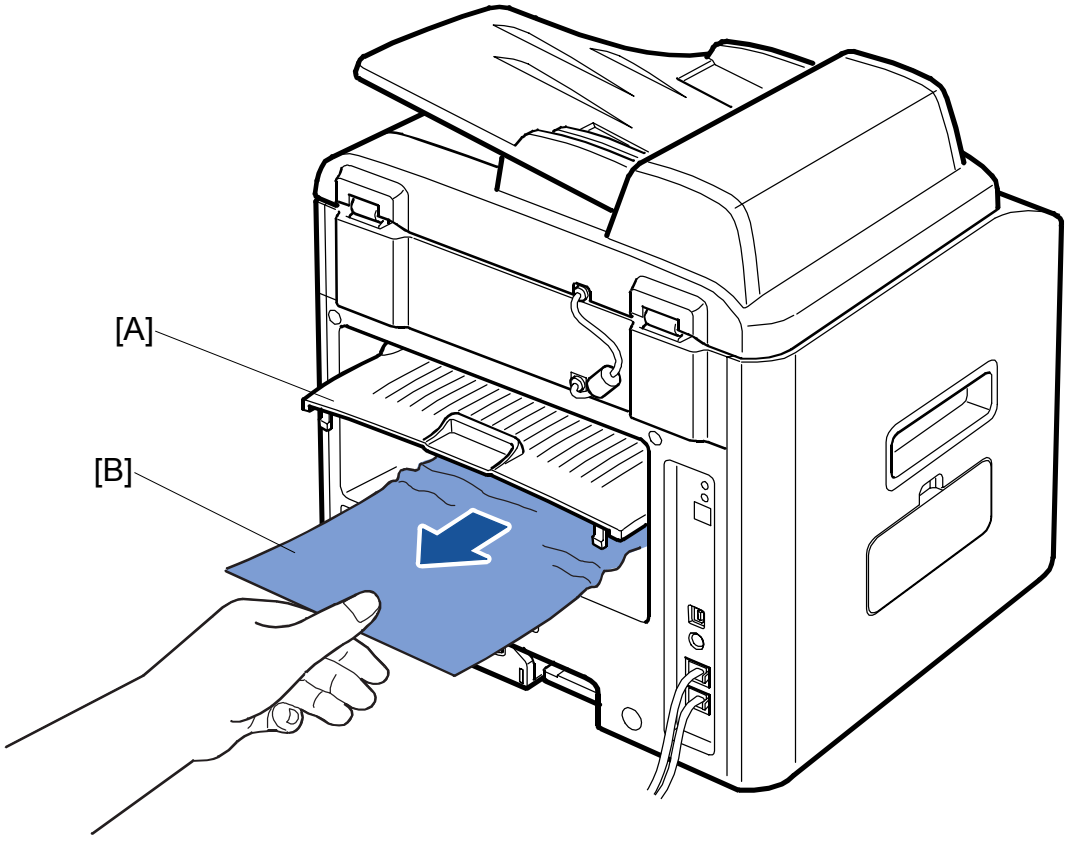
B273T17.WMF

2. Remove the jammed paper by gently pulling it straight out.
3. Replace the toner cartridge and close the front cover. Printing automatically starts again.

4.2.4 JAM2 (PAPER EXIT AREA)

Do the following to remove a jam of this type.

1. Open and close the front cover. The jammed paper automatically exits the machine. Go to step two if the paper does not exit from the machine.
2. Gently pull the paper out of the front output tray.



B273T19.WMF

3. Open the face-up door [A] if there is resistance on the paper when you try to pull it out of the front output tray.
4. Remove the paper [B] by gently pulling it straight out.
5. Close the rear cover.
6. Open the close the front cover to resume printing.

4.2.5 BY-PASS TRAY JAM

“MP Tray Jam” shows on the display when you try to print with the by-pass tray and the machine does not detect paper. This occurs due to no paper or improper paper loading. The error message may also occur when the paper is not properly fed into the machine through the manual feeder.

In this condition pull the paper out of the machine.

4.3 PAPER FEED PROBLEMS

4.3.1 INCORRECT PRINT POSITION

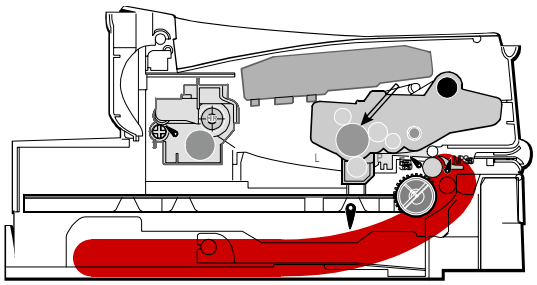
Description: The print job starts when the paper is not in the correct position

Cause	Solution
1. Defective feed sensor actuator	1. Replace the defective actuator

4.3.2 JAM 0

Description:

- Paper does not exit from the cassette
- Jam 0 shows when the paper feeds into the printer



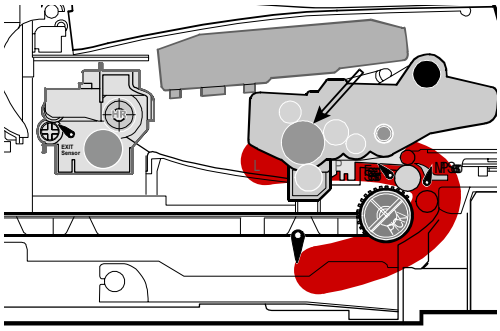
B273T07.WMF

Cause	Solution
1. Defective solenoid. Check the solenoid in Tech Mode. 2. Cassette/By-pass knock-up plate and springs. 3. Paper separator pad 4. Pick-up roller may be contaminated or not installed correctly. 5. The area between the pick-up roller and registration sensor may be contaminated. 6. Feed sensor may be defective. Check in Tech Mode.	1. Replace the solenoid 2. Repair/Replace as required 3. Clean with a soft cloth dampened with isopropyl alcohol or water. Replace if necessary. 4. Clean with a soft cloth dampened with isopropyl alcohol or water. Replace if necessary. 5. Make sure all rollers are clean. 6. Check the SMPS PBA, Main PBA and all connectors. Replace any faulty parts.

4.3.3 JAM 1

Description:

- Paper gets jammed in front of, or, inside the fusing unit.
- Paper gets stuck in the discharge roller and in the fusing unit after it passes through the actuator feed.



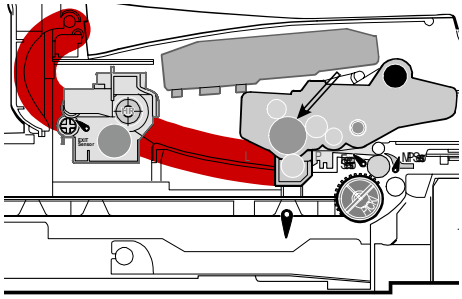
B273T08.WMF

Cause	Solution
1. Paper gets jammed in front of, or, inside the fusing unit. 2. Feed actuator may be defective.	1. Replace the SMPS 2. Disassemble and then reassemble the actuator feed and spring.

4.3.4 JAM 2

Description:

- Paper gets jammed in front of, or, inside the fusing unit.
- Paper gets stuck in the discharge roller and in the fusing unit after it passes through the actuator feed.

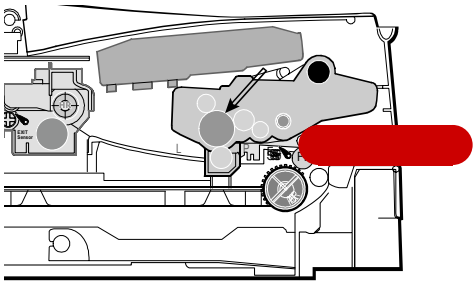


B273T09.WMF

Cause	Solution
1. Jam 2 can show even if the paper is completely fed out of the printer. The exit sensor may be defective. This sensor should go back to its original position to the shut the photo sensor. It may stay open due to debris. 2. Paper stays rolled in the fusing unit. The guide claw could be broken or damaged.	1. Check if the exit sensor or actuator exit is damaged. • Check if burrs show on the assembly part of the exit actuator. • Check if unwanted particles prevent correct operation of the actuator. 2. Disassemble the fusing unit and remove the jammed paper. Then clean the surface of the pressure roller with dry gauze. Check all ribs, claws and springs.

4.3.5 MULTI-FEEDING

Description: Multiple sheets of paper get fed at the same time.



B273T10.WMF

Cause	Solution
1. Paper size guides may not be set correctly (main paper tray unit and by-pass tray) 2. Solenoid does not operate correctly. 3. Friction pad is contaminated. 4. Paper has a rough surface edge.	1. Adjust the paper guides 2. Replace the solenoids or PBA 3. Clean the friction with a soft cloth dampened with isopropyl alcohol or water. 4. Use paper with a smoother surface

4.3.6 PAPER IN THE FUSING UNIT

Description: Paper stays rolled around the rollers in the fusing unit.

Cause	Solution
1. Pressure roller or hot roller may be contaminated 2. Ribs, claws or springs may be damaged or deformed.	1. Clean the roller surfaces and area between the hot roller and thermistor with isopropyl alcohol or water. 2. Check for damage. Replace if necessary.

4.3.7 PAPER STAYS IN THE OPC DRUM

Description: Paper stays rolled in the OPC drum

Cause	Solution
1. Paper is too thin 2. The face of the paper is curled	1. Use paper supported by the machine. 2. Make sure paper is stored correctly. To remove paper in the OPC 1) Remove the toner cartridge from the machine (do not touch the green surface with bare hands). 2) Rotate the gear wheel and remove the paper from the cassette. 3) Clean all fingerprints from the OPC with a soft tissue. Make sure to not scratch the surface.

4.3.8 DEFECTIVE ADF

Description: ADF does not operate correctly.

Cause	Solution
1. ADF rubber or holder may be damaged. 2. ADF assembly sensors (3) may not operate correctly.	1. Replace the damaged part 2. Replace the ADF assembly if you cannot visibly identify the problem.

4.4 MACHINE MALFUNCTIONS

4.4.1 LCD DISPLAY DEFECTIVE

Description: Strange characters show on the LCD panel, or, the operation panel buttons do not work.

Cause	Solution
1. The memory needs to be cleared 2. Operation panel harness is not connected correctly.	1. Clear the memory and try to use the machine again. 2. Check the harness connection. Replace the operation board assembly and main board if this does not solve the problem.

4.4.2 DEFECTIVE CONTROL PANEL

Description: Operation panel does not operate when keys are pressed

Cause	Solution
1. The memory needs to be cleared 2. No sounds is heard when the keys are pressed	1. Make sure the keypad is correctly assembled. Replace the keypad if necessary. 2. Replace the operation panel and main board.

4.4.3 FUSING GEAR MELTS (OVERHEATS)

Description:

- Paper constantly gets jammed in the fusing unit.
- Fusing unit rollers do not turn

Cause	Solution
1. Fusing lamp, thermostat or thermistor are damaged.	1. Check the fusing unit in engine diagnostic mode. • Replace the fusing unit • Replace the SMPS or main PBA if necessary.

4.4.4 PAPER EMPTY 1

Description: Paper empty shows on the LCD when paper is loaded in the cassette.

Cause	Solution
1. Paper sensor or paper sensor actuator is damaged. 2. SMPS or main PBA are defective. 3. Faulty cables or connectors.	1. Replace the defective sensor or actuator. 2. Replace the SMPS or main board 3. Check all connections.

4.4.5 PAPER EMPTY 2

Description: Paper empty does not show on the LCD when there is no paper loaded in the cassette.

Cause	Solution
1. Paper sensor or paper sensor actuator is damaged. 2. SMPS or main PBA are defective.	1. Replace the defective sensor or actuator. 2. Replace the SMPS or main board

4.4.6 COVER OPEN 1

Description: Cover open message shows on the LCD when the front cover is closed.

Cause	Solution
1. Open cover micro-switch is stuck or damaged. 2. Front cover tab is damaged or broken. 3. Faulty connection between the switch and the main PBA.	1. Do the cover sensor test in Tech Mode to check cover switch operation. Replace the switch if necessary. 2. Replace the front cover 3. Replace the main PBA or cover open switch if necessary.

4.4.7 COVER OPEN 2

Description: Cover open message does not show on the LCD when the front cover is open.

Cause	Solution
1. Open cover micro-switch is stuck or damaged. 2. Faulty connection between the switch and the main PBA.	1. Do the cover sensor test in Tech Mode to check cover switch operation. Replace the switch if necessary. 2. Replace the main control board or cover open switch if necessary.

4.4.8 DEFECTIVE MOTOR OPERATION

Description: Main motor does not operate and paper does not get fed into the machine. In this condition Jam 0 shows.

Cause	Solution
1. Main motor harness or motor PCB are faulty.	1. Check the motor harness and connectors. Replace if necessary. Replace the main PBA if the problem stays. • Use EDC mode to check motor operation.

4.4.9 NO POWER

Description: LCD panel does not come on when the machine power is turned on.

Cause	Solution
1. Power input and SMPS output are abnormal. 2. Normal start up sounds are hard but the LCD does not come on. 3. LCD does not come on and no sounds are heard after the SMPS is replaced.	1. Replace the power supply cord or SMPS. Replace fuses if necessary. 2. Replace the operation panel. 3. Replace the main PBA

4.4.10 PRINTED VERTICAL LINES BEND

Description: Vertical lines are not straight when the machine prints.

Cause	Solution
1. 24 V power supply to the LSU is faulty.	1. Replace the LSU if the 24 V power supply is stable 2. Replace the SMPS if the 24 V power supply is unstable. Replace the main PBA if the problem stays.

4.5 PRINTING QUALITY PROBLEMS

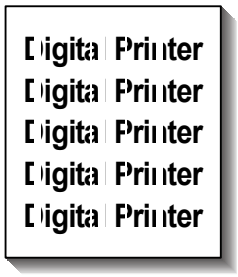
4.5.1 INCORRECT PRINT POSITION

Description: The print job starts when the paper is not in the correct position

Cause	Solution
1. Defective feed sensor actuator	1. Replace the defective actuator

4.5.2 VERTICAL WHITE LINE

Description. White vertical lines show. In this condition, parts of the image get blocked.

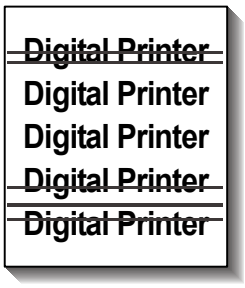


B273T914.WMF

Cause	Solution
1. Window or internal lenses of LSU mirror are contaminated. 2. Unwanted particles inside the toner cartridge or low toner. 3. Unwanted particles, contamination or burr on the edge of the toner cartridge window. 4. Fusing unit is defective if voids periodically show on the top of black images. 5. OPC drum is contaminated. 6. Depression or deformation on the surface of the transfer roller.	1. Clean the LSU window with isopropyl alcohol. Replace the LSU if there is unwanted particles inside. 2. Replace the toner cartridge. 3. Clean the exposure window. 4. Check the ribs of the fusing unit and remove unwanted particles if found. 5. Replace the toner cartridge. 6. Replace the transfer roller.

4.5.3 HORIZONTAL BLACK BANDS

Description: Dark or blurry horizontal stripes show periodically on the printout



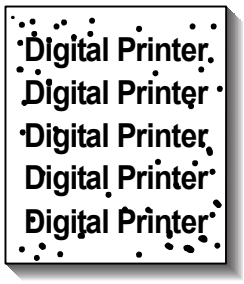
B273T915.WMF

Cause	Solution
1. Bad contacts on the toner cartridge high voltage terminals. 2. The following rollers are damaged • Charge roller in the toner cartridge • Supply roller in the toner cartridge • Development roller in the toner cartridge • Transfer roller	1. Clean all high voltage terminals on the toner cartridge and set frame. Remove toner and dust particles. 2. Clean the gear on the OPC. Replace the toner cartridge if the problem stays. 3. Clean the transfer roller gear. Replace the transfer roller if the problem stays.

Trouble-shooting

4.5.4 BLACK/WHITE SPOTS

Description: Dark, white or blurry spots show periodically on the printout.



B273T916.WMF

Cause	Solution
1. Developer is covered with unwanted matter or paper dust. 2. The OPC drum surface is damaged. 3. Transfer roller has reached the end of its life.	1. Print several OPC cleaning mode prints. Then run the self-test 2-3 times. 2. Examine the OPC drum surface and remove any unwanted particles with a soft lint free cloth. Replace the toner cartridge if the problem stays. 3. Replace the transfer roller if it is past the 60 K PM interval.

4.5.5 LIGHT IMAGE

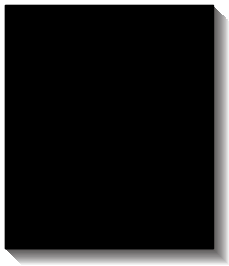
Description: Printed image to light (no ghost)

B273T917.WMF

Cause	Solution
1. Toner save mode is enabled. 2. Developer roller is contaminated or the toner cartridge is almost empty. 3. Ambient temperature is below 10 C. 4. Bad contact because of dirty terminals on the toner cartridge set. 5. Abnormal output from the HVPS	1. Turn the toner save more off. 2. Replace the toner cartridge. 3. Turn the machine off. Wait 30 minutes and turn the machine on again. Then try to print. 4. Clean dirt from the toner cartridge and cartridge set contacts. 5. Replace the HVPS.

4.5.6 DARK/BLACK IMAGE

Description: Printed image is dark



B273T919.WMF

Cause	Solution
1. No charge voltage in the engine board. 2. Charge voltage fault due to bad contact between toner cartridge and cartridge set 3. VD0 signal from main PBA is low	1. Check the connector that connects the HVPS and the engine board. 2. Clean the high voltage charge terminals. Replace the HVPS if the problem stays. 3. Replace the LSU or main PBA.

4.5.7 UNEVEN DENSITY

Description: Print density is uneven between left and right.

B273T920.WMF

Cause	Solution
1. Pressure force on the left and right springs of the transfer roller is not even, springs are damaged, transfer roller is not correctly installed, transfer roller bushings or holders are damaged. 2. Toner cartridge has reached the end of its life. 3. Toner inside the cartridge is not level due to damaged blade or low toner.	1. Replace both the left and right bush and spring assemblies. 2. Replace the toner cartridge. 3. Gently shake the toner cartridge side to side 5-6 times and try to print again. Replace the toner cartridge if the problem stays.

4.5.8 BACKGROUND

Description: Light dark background shows throughout the printout.

B273T921.WMF

Cause	Solution
1. The machine has not printed large quantities of low coverage pages, or, the machine has not been used for a long time. 2. A recycled toner cartridge is used. 3. The toner cartridge has reached the end of its life. 4. The up/down movement of the transfer roller is not smooth. 5. HVPS is abnormal.	1. The toner cartridge is deigned to print 3,000 sheets with 5% coverage. Background can show if the machine prints more than 3,600 pages with 2% coverage. 2. Machine operation is not guaranteed with recycled toner cartridges. Gently shake the toner cartridge side to side 5-6 times and try to print again. Replace the toner cartridge if the problem stays. 3. Replace the toner cartridge. 4. Clean the transfer roller bushes. 5. Clean the high voltage charge terminals. Replace the HVPS if the problem stays.

4.5.9 GHOST 1

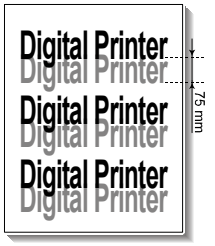
Description: Ghost shows at 75.5 mm intervals of the OPC drum in the printout.

B273T922.WMF

Cause	Solution
1. Bad contacts caused by unwanted toner particles between the high voltage terminal in the main body and the electrode of the toner cartridge. 2. Bad contacts caused by unwanted toner particles between the high voltage terminal in the main body and the in the HVPS board. 3. The toner cartridge has reached the end of its life. 4. Transfer roller has reached the end of its life. 5. Ambient temperature below 10 C. 6. Damaged cleaning blade in the toner cartridge.	1. Clean all HV contacts. Replace the HVPS if the problem stays. 2. Clean all HV contacts. Replace the HVPS if the problem stays. 3. Replace the toner cartridge. 4. Replace the transfer roller 5. Turn the machine off. Wait 30 minutes and turn the machine on again. Then try to print. 6. Replace the toner cartridge.

4.5.10 GHOST 2

Description: Ghost shows at 75 mm intervals of the OPC drum in the printout.

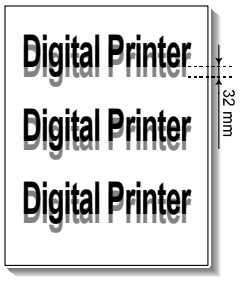


B273T923.WMF

Cause	Solution
1. Higher voltage required when printing on card stock, thick paper or OHP sheets.	1. Set the machine to print to print for these media types in the printer driver or application software.

4.5.11 GHOST 3

Description: Ghost shows at 66.3 or 75.5 mm intervals of the OPC drum in the printout.

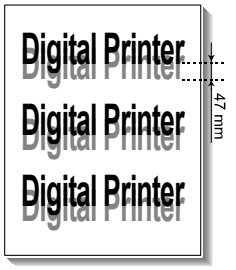


B273T924.WMF

Cause	Solution
1. Fusing unit is contaminated	1. Disassemble the fusing unit and remove unwanted matter from the rollers. Clean unwanted particles between the thermistor and the hot roller (Use high caution not to damage the rollers)

4.5.12 GHOST 4

Description: White ghost shows at 32 mm intervals of the OPC drum in the printout.



B273T925.WMF

Cause	Solution
1. Developer has reached the end of its life. 2. Abnormal output from the HVPS.	1. Replace the toner cartridge. 2. Check the HVPS supply voltage. Clean the HV terminals on the cartridge and cartridge set. Replace the HVPS if the problem stays.

4.5.13 STAINS ON FRONT OF PAGE

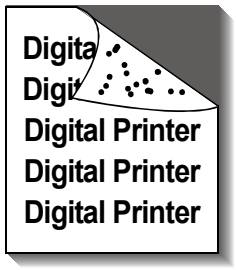
Description: Background on the face of the printout is stained.

B273T926.WMF

Cause	Solution
1. Toner leakage due to incorrectly sealed toner cartridge. 2. Transfer roller is contaminated.	1. Replace the toner cartridge. 2. Do the PC cleaning mode 2-3 times. Then do the self-test 2-3 times.

4.5.14 STAINS ON BACK OF PAGE

Description: The backside of the printout is stained at 47.1 or 75.4 mm intervals.

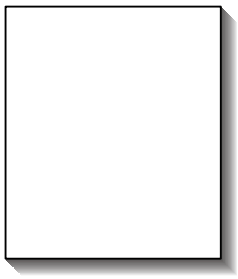


B273T927.WMF

Cause	Solution
1. Transfer roller is contaminated 2. Pressure roller is contaminated.	1. Do the PC cleaning mode 2-3 times. Then do the self-test 2-3 times. Replace the transfer roller if the problem stays. 2. Disassemble the fusing unit and clean the hot roller and the pressure roller. Clean the area between the hot roller and the thermistor. (Use high caution not to damage the rollers)

4.5.15 BLANK PAGE 1

Description: Blank page gets printed

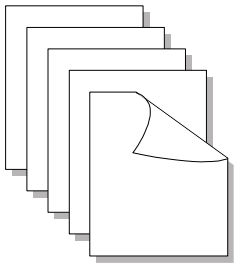


B273T928.WMF

Cause	Solution
1. Bad ground contacts in the OPC and/or toner cartridge.	1. Check if the ground OPC or the OPC ground Zener diode are defective. Clean the terminals on the toner cartridge and cartridge set.

4.5.16 BLANK PAGE 2

Description: Blank page or several blank page (s) get printed, or, several blank pages get printed when the machine is turned on.



B273T929.WMF

Cause	Solution
1. Abnormal solenoid	1. Do the engine self test mode in Tech Mode to check if the solenoid is normal. Replace the main PBA if the problem stays.

4.6 FAX AND PHONE PROBLEMS

4.6.1 NO DIAL TONE

Description: No dial tone when the 'On-Hook' button is pressed.

Cause	Solution
1. Telephone line cord is not securely connected to the TEL LINE. 2. No 'click sound' is heard when the OHD key is pressed. 3. Faulty harness connection between the LIU and the main board. 4. Speaker is not correctly connected.	1. Test the wall socket by plugging in a normal telephone. Replace the LIU board if the wall socket is okay. 2. Replace the operation panel assembly if you don't' hear the 'click sound'. 3. Examine the speaker connection harness between the LIU and the main power board. 4. Use Tech Mode/Modem Test to check if the speaker and amplifier work correctly. Replace the main board if the speaker and amplifier work correctly.

4.6.2 DEFECTIVE MF DIAL

Description: MF Dial does not function correctly.

Cause	Solution
1. Telephone line cord is not securely connected to the TEL LINE. 2. No 'click sound' is heard when the OHD key is pressed. 3. Faulty harness connection between the LIU and the main board. 4. Speaker is not correctly connected.	1. Test the wall socket by plugging in a normal telephone. Replace the LIU board if the wall socket is okay. 2. Replace the operation panel assembly if you don't' hear the 'click sound'. 3. Examine the speaker connection harness between the LIU and the main power board. 4. Use Tech Mode/Modem Test to check if the speaker and amplifier work correctly. Replace the LIU and main board in sequence if the speaker and amplifier work correctly.

4.6.3 DEFECTIVE FAX FORWARD/RECEIVE

Description: Fax Forward/Receive function does not work correctly.

Cause	Solution
1. No dial tone is heard when you press the on hook dial (OHD). 2. No receive toner is heard when you do the modem test in Tech Mode.	1. Replace the LIU is the modem test is normal and there is no dial tone. 2. Replace the main board if the modem test shows a fault.

4.6.4 DEFECTIVE FAX FORWARD

Description: Receive function works correctly. Forward function does not work correctly, or, received data is corrupt.

Cause	Solution
1. A strange noise is heard when you press 'On-Hook'. 2. Use the same socket (if possible) to see if the destination fax machine can receive forwarded faxes. 3. Cable between the machine and the wall socket is damaged.	1. Repair the telephone line. 2. Replace the LIU. 3. Replace the line cord.

4.6.5 DEFECTIVE FAX RECEIVE 1

Description: Forward function works correctly. Receive function does not work correctly, or, received data is corrupt.

Cause	Solution
1. A strange noise is heard when you press 'On-Hook'. 2. Use the same wall socket with a different fax to receive data from the same sender.	1. Repair the telephone line 2. Replace the LIU.

4.6.6 DEFECTIVE FAX RECEIVE 2

Description: Received data gets lengthened or cut in the printout.

Cause	Solution
1. A strange noise is heard when you press 'On-Hook'. 2. Use the same wall socket and ask the sender to send another fax to a different fax machine.	1. Repair the telephone line. 2. Replace the LIU or main PBA in sequence.

4.6.7 DEFECTIVE FAX RECEIVE 3

Description: The phone rings continuously but the call does not get answered.

Cause	Solution
1. Receive mode is not set to fax mode.	1. Replace the LIU or main PBA in sequence if the problem stays even if the machine is set to Receive mode.

4.6.8 DEFECTIVE FAX RECEIVE 4

Description: Received data gets reduced by more than 50% in the printout.

Cause	Solution
1. A problem exists with the sending fax machine.	1. Ask the sender to check the status of their machine.

4.6.9 DEFECTIVE AUTOMATIC RECEIVING

Description: The automatic receive function does not work correctly.

Cause	Solution
1. Receive mode is not set to Fax mode.	1. Set the Receive mode to Fax mode if it is currently set to TEL mode. Replace the LIU or main PBA in sequence if the problem stays.

4.7 COPY PROBLEMS

4.7.1 WHITE COPY

Description: Blank page gets printed out when copying.

Cause	Solution
1. Scanner cover is not closed	1. Close the scanner cover.
2. Shading profile is not correctly set.	2. Redo shading profile in Tech mode.
3. Faulty white/black reference voltage on main PBA.	3. Replace the main PBA.

4.7.2 BLACK COPY

Description: Black page gets printed out when copying.

Cause	Solution
1. CCD problem on the main PBA. 2. Shading profile is not correctly set.	1. Make sure the CCD harness is correctly connected. 2. Redo shading profile in Tech mode.

4.7.3 ABNORMAL NOISE

Description: A strange noise is heard from the ADF when copying.

Cause	Solution
1. Faulty scanner motor, gearbox or rollers. 2. Faulty motor driver on driver PBA.	1. Make sure the gears and motor are correctly assembled. Make sure that there is no unwanted material in the scanner path. Replace worn parts. 2. Replace the main PBA.

4.7.4 DEFECTIVE IMAGE QUALITY

Description: Copied image is very light or very dark.

Cause	Solution
1. Shading profile is not correctly set. 2. Abnormal gap between the original and the scanner glass. 3. Print quality trouble.	1. Redo shading profile in Tech mode. 2. Make sure the gap does not exceed 0.5 mm. Make sure the rollers are not defective. Replace if necessary. 3. See 'Print' troubleshooting section.

4.8 SCANNING PROBLEMS

4.8.1 PC SCANNING PROBLEMS

Description: Unable to scan with the PC

Cause	Solution
1. Cable (USB or Parallel) is not correctly connected. 2. Drive is not correctly installed. 3. Copy function does not operate normally.	1. Replace faulty cables. Make sure the parallel port is correctly configured in the BIOS. 2. Make sure the scanner driver is installed. 3. Replace the main PBA if the copy function does not work. Replace the CCD assembly if the problem stays.

4.8.2 POOR QUALITY OF SCANNED IMAGES

Description: Image scanned by the PC is either poor or not clear.

Cause	Solution
1. Waveform is abnormal. 2. Resolution is set too low in the PC scan options.	1. Do a shading test in Tech mode and examine the waveform printout. Replace the CCD if the waveform is abnormal. 2. Adjust the scanner resolution.

4.9 ERROR MESSAGES

Error	Description	Solution
By-pass tray jam (door open)	Paper is either jammed in the by-pass tray, or, paper is not fed correctly.	Clear the paper jam and load paper correctly.
Cancel? 1. Yes, 2. No	The memory becomes full when you try to store a document	Press the '1' button and select 'yes' to cancel the fax job. Press the '2' button and select 'no' to send the pages that are stored in memory. This will only send the pages that are stored. You can send the remaining pages at a later time when the memory frees up.
COMM error	A communication error occurred.	Ask the sender to try again.
Low/Open heat error	A problem in the fusing unit occurred.	Check the thermostat, thermistor contact point and heating lamp.
Overheat	The machine has overheated.	The machine automatically goes to stand-by mode. The machine starts again when it cools down to the normal operating temperature. Check the operation of the thermistor and thermostat if the problem stays.
Delayed function full	The delayed fax job list/memory space is full.	Cancel unnecessary fax jobs.
Document jam	A jam occurred in the ADF	Clear the document jam.
Door open	The front or rear cover is not securely latched.	Close the clover until it locks into place.
Enter again	Invalid item is entered	Enter the correct item
Function impossible	You have tried to use a combination of printer functions that cannot be used at the same time.	Reduce the number of selected functions, or use only one function at a time.
Group not available	You have tired to select a group location number where only a single location number can be used. This can occur when you try to add locations for a broadcasting operation.	Use a speed dial number, or dial the number manually with the number keypad.
LSU error	A problem occurred in the LSU	Use tech mode to test the LSU. Replace if necessary.
Invalid/No cartridge	A unauthorized cartridge has been used.	Use an approved cartridge.
Line error	The machine cannot connect with the remote machine, or has lost contact because of a problem with the phone line.	Try again. If the problem stays, wait an hour for the line to clear and then try again, or turn the ECM on.

Error	Description	Solution
Memory full	The memory is full	Delete unnecessary documents (delayed transmission, broadcast, polling etc.), or transmit the documents again when more memory becomes available. This can also occur when you send a large, several paged complex document. In this condition split the document into more than one job.
No answer	The remote fax machine does not answer after several attempts.	Try again. Make sure the receiving number is correct.
Number not assigned	The speed dial location has no number assigned to it.	Dial the number manually with the number keypad, or assign the number.
Number not available	You have tried to delay the number for a delayed fax job.	Check the number you want to delete and try again. Delete the number after the delayed fax job has finished.
No paper/Add paper	There is no paper in the paper tray unit	Load paper to the paper tray unit.
Operation not assigned	You are performing and Add/Cancel operation, but there are no jobs waiting.	Check the operation panel to see if there are any jobs waiting. The display shows scheduled jobs in stand-by more such as delayed fax.
[Paper jam0] Open/Close door	Paper is jammed in the feed area of the paper tray.	Clear the jam.
[Paper jam2] check inside	Paper is jammed in the paper exit area.	Clear the jam
Power failure	The power has been turned off and then on and the machines memory was not saved.	In this condition the memory has been lost. Start the job again.
Registered	The group dial location is already registered with another speed dial number.	Select another group dial location.
Retry redial	The machine is waiting for a specified time interval to pass before it attempts to dial a previously busy number again.	Press <Select> to immediately dial again, or press <Cancel> to cancel the redial operation.
Toner low	The toner is almost empty	Remove the toner cartridge and gently shake it. This will improve image quality temporarily Replace the toner cartridge to ensure print quality.
Priority fax function full	The priority fax job queue is full.	Cancel unnecessary priority

Error	Description	Solution
		fax jobs.
Incompatible	The remote machine does not have the requested feature such as sending a color fax. This message can also show if the remote machine does not have enough memory to complete the job.	Reconfirm the features of the remote machine.
Jam1 or No cartridge	Paper is jammed in the paper exit area, or the toner cartridge is not installed.	Clear the jam. Install the toner cartridge.
Line busy	The receiving party does not answer, or the line is busy.	Try again later.
Load document	You have attempted to set up a copy/fax job, but no document is loaded in the ADF.	Load the document in the ADF and try again.
Scanner locked	The scanner module is locked.	Unlock the scanner and press Stop/Clear
Stop pressed	The Stop/Copy button was pressed during a copy/fax job.	Try again
Toner empty replace toner	The toner cartridge has run out and the machine stops printing.	Replace the toner cartridge.
Retry redial	The machine is waiting for a specified timer interval to dial a previously busy station again.	Press <Enter> to immediately redial, or press Stop/Clear to cancel the redial operation.

4.10 TONER CARTRIDGE

Make sure you only use toner cartridges approved by the manufacturer. Machine operation is not guaranteed if you use toner cartridges not approved by the manufacturer.

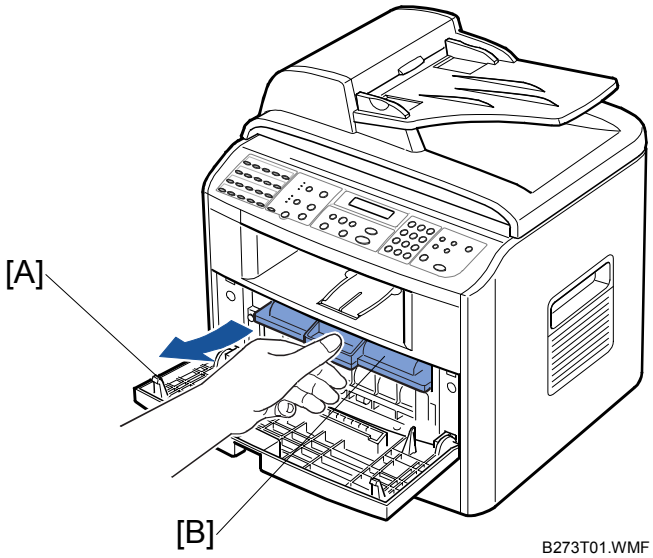
4.10.1 TONER CARTRIDGE PRECAUTIONS

Do no expose the toner cartridge to direct light for more than a few minutes.

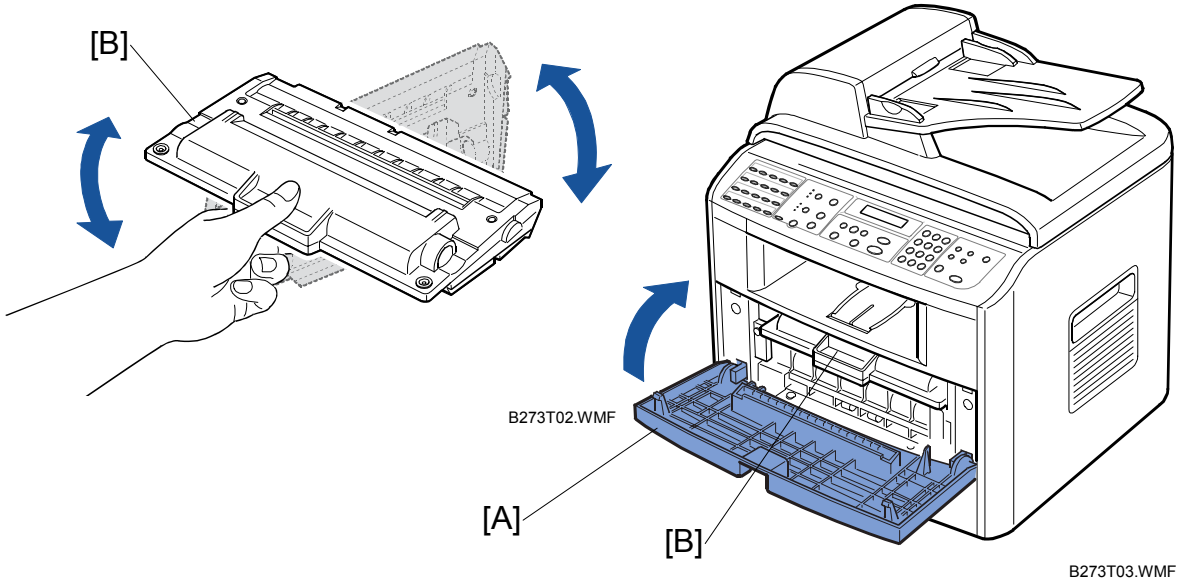
You can temporarily improve the print quality by redistributing the toner if the printed image is light due to low toner supply. In this condition, shake the toner cartridge side-to-side 5-6 times. However, you should replace the toner cartridge to ensure high quality printouts.

4.10.2 REDISTRIBUTING TONER

White streaks or light printouts show when the toner cartridge is near the end of its life. At this time the LCD displays shows the 'Toner Low' message. To temporarily solve this problem, you can redistribute the remaining toner in the cartridge.



1. Open the front cover [A]. Then gently push the toner cartridge [B] down and remove it from the machine.



2. Gently shake the toner cartridge [B] in the direction of the arrow as shown above. Then put the toner cartridge [B] back into the machine again and close the front cover [A].

4.10.3 TONER CARTRIDGE ERROR MESSAGES

The following table shows error message that show on the LCD. The messages are related to data stored in the EEPROM in the toner cartridge.

Error Message	Description	Solution
Toner Low	The amount of remaining toner is less than 10%	Replace the cartridge.
Toner Empty	The toner cartridge is empty.	Replace the cartridge.
Drum Warning	OPC drum is near the end of its life (14,000 pages).	Replace the cartridge even if there is still toner in it.
Replace Drum	Toner cartridge mechanical life has expired.	Replace the cartridge.

4.10.4 TONER CARTRIDE DETAILS

Description	Signs	Cause and Check and Solution
Light image/partially blank image (cartridge has reached the end of its life)	• Printed image is light, dirty or not clear. • Parts of the image are not printed. • A strange 'tick-tick' noise is periodically heard.	1. If the image is light, shake the toner cartridge and try to print again. If the problem stays, the cartridge has reached the end of its life. Replace the toner cartridge. 2. Shake the toner cartridge if some parts of the image do not get printed. If the problem stays, clean the LSU window and try to print again. If the problem still stays, the cartridge has reached the end of its life. 3. Measure the time between 'ticks' if you hear this sound. If the time interval of 'ticks' is about 2 seconds, the toner has almost reached the end of its life. Replace the toner cartridge. 4. Shake the toner cartridge if white vertical bands show and try to print again. If the problem still stays, the cartridge has reached the end of its life. Replace the toner cartridge.
Toner contamination	• Toner contamination shows at regular intervals on the printout. • Toner contamination shows at random intervals over the whole or parts of the printout.	1. Contamination at regular intervals • A). Check the distance between contamination marks. • B). Check both ends of the toner cartridge OPC drum. If both ends are contaminated with toner, the waste toner collector is full. 2. Random page contamination. • A). Make sure the terminal contact points of the toner cartridge are clean. Clean all HV contacts if they are dirty. Replace the toner cartridge if the problem stays. • B). Make sure the terminal contact points of the toner cartridge are not damaged. Replace the toner cartridge if there is damage to the contact terminals.

Description	Signs	Cause and Check and Solution
White/Black Spot	• Light or dark black dots show periodically on the image. • White spots show periodically on the image.	1. Toner cartridge rollers are contaminated with unwanted particles if light or dark black dots show periodically on the image. In this condition do the OPC clean mode print 4-5 times. Then check for unwanted matter on the OPC surface. Clean with isopropyl alcohol if necessary. 1) 38 mm interval: Charge roller 2) 95 mm interval: OPC cycle 2. The OPC drum is damaged or unwanted matter stays on the drum if white spots show at 95 mm intervals in a black image, or, if black spots show in areas where they should not show. Do the following if running the OPC clean mode print 4-5 times does not solve the problem. 1) 37.7 mm intervals: Replace the toner cartridge. 2) 75.5 mm intervals: Clean the OPC drum. 3. The transfer rollers life has expired if a black or white image is broken at irregular intervals. In this condition replace the transfer roller. Also, check the transfer voltage and readjust it if necessary.

Description	Signs	Cause and Check and Solution
Recycled Product	• Toner cartridge appears to be in poor condition. • Dirty or rough printouts. • Poor background in the image.	1. The toner cartridge is recycled if the following are true. 1) There is evidence that the toner cartridge has been disassembled. 2) Materials that are not approved by the manufacturer have been added or substituted to the toner cartridge. • Check the toner cartridge for the following. Replace the toner cartridge if necessary. 1) Check the toner cartridge for damage. 2) Check the appearance of following toner cartridge parts • Frame, hopper screws. 2. Check the following if the printouts are not clear or rough. 1) Make sure the terminal contact points are clean and the set is not damaged. Clean the terminal points if the problem stays. The above problems can happen if the toner cartridge is recycled 2 times or more.

Description	Signs	Cause and Check and Solution
Ghost image and other contamination	• Print out is too light or dark, or, partially contaminated. • Black image gets printed out. • Printout density is too dark and ghosting occurs.	1. Check the following if the printout is too light, too dark or partially contaminated. 1) Check if unwanted matter stays on terminal contact points of the cartridge set. 2) Make sure the terminal is correctly assembled. • Do the following if the above are true. 1) Clean the contacts on the toner cartridge. 2) Clean the contact points on the set. 3) Repair or replace the terminals if they are damaged. Replace the toner cartridge if the problem stays. 2. Check the following if a black image gets printout out. 1) Check if unwanted matter stays on terminal contact points of the cartridge set. 2) Check if the terminal and charge roller contacts are correctly assembled. • Do the following if the above are true. 1) Examine the charge roller contacts. Clean them if they appear dirty or contaminated. Replace the toner cartridge if the problem stays. 3. Check the following if the printout too dark and ghosting occurs 1) Check if unwanted matter stays on terminal contact points of the cartridge set. 2) Check if the terminal and developer roller contacts are correctly assembled. • Do the following if the above are true 1) Check developer bias voltage contact. Clean it if it appears dirty or contaminated. 2) Examine the charge roller contacts. Clean them if they appear dirty or contaminated.

4.11 SOFTWARE PROBLEMS

4.11.1 PRINTER DOES NOT OPERATE CORRECTLY 1

Description: The printer does not operate in printing mode when the power is turned on.

Description	Solution
Do the self-test mode. Use the menu buttons (menu, enter, enter) and print the test page.	There are no problems with the machine if the test print works correctly. The machine is faulty if the test print does not work correctly. In this condition the problem is not due to computer software or printer driver settings.
Make sure the PC and the printer are correctly connected. Make sure the toner cartridge is correctly installed.	Replace the printer cable. Check the amount of remaining toner if the problem stays. Replace the toner cartridge if necessary.
Printing does not work in Windows.	Check that the connection between PC and printer. Check the following if you use Windows. 1) Check that the printer driver in the controller is correctly set up 2) Make sure the correct port is selected and 'Use On-line' is selected in the driver. Print a test page from the driver properties if the printer driver is correctly set up. Check which program printing does not work. Open 'Memo Pad' and try to print. Adjust the setup within that program If the printer does not work in a certain program. Sometimes the printout is normal within Windows basic programs, but does not work in some programs. In this condition, uninstall and re-install the new driver. Check the following if the printer does not work in Windows basic programs, and you are using the parallel port. • Check the port setting in CMOS is on ECP and that the address is IRQ 7 and 378 (for parallel port 1). • Try using USB instead of parallel port or vice-versa.
Make sure the printer cable is directly connected to the printer.	Uninstall other devices that share the printer port and check if the printer works by itself. Connect directly to the back of the PC if you are using a USB hub.

4.11.2 PRINTER DOES NOT OPERATE CORRECTLY 2

Description: After receiving the print command there is either no response or the print speed is low. Incorrect machine set-up and not printer malfunction is the cause of this condition.

Description	Solution
Not enough free hard disk space to accommodate temporary work files created during printing.	'Insufficient Printer Memory' message means there is a hard disk space problem rather than a printer RAM problem. In this condition, provide more space on the hard disk with the disk utilities program.
Printer error occurs even if there is enough space in the hard disk.	Make sure the connection between the cable and printer port is correct. Make sure the port settings in CMOS are correct if you use the parallel port.
Parallel port related problems in the CMOS set-up.	Select ECP for the printer port. SPP and normal modes support 8-bit data transfer. ECP mode supports 12-bit data transfer.
System needs to reboot to print.	The cable of printer driver may be defective if regular fonts do not get printed. At this time turn off the PC and reboot the system. If the problem stays, double click the printer icon in my computer. Replace the cable if the regular fonts are still not printed.

4.11.3 ABNORMAL PRINTING

Description: The printer does not work even after you replace the cables, or, strange fonts get printed.

Description	Solution
Parallel port problem with CMOS set-up	Make sure ECP (recommended), or SPP is selected in the CMOS (BIOS) set-up.
Printer driver error	Make sure the correct driver is loaded. Use the driver supplied on the CD, or, download the correct driver from the Ricoh web site. DO NOT use the Microsoft driver supplied with the Windows operating system. If the printer is a GDI or SPL type printer, ensure that ALL OTHER GDI or SPL drivers are uninstalled as Windows only lets 1 of this type of driver to be loaded.
'Insufficient Memory' message shows. Print jobs may suddenly stop due to insufficient space on the hard disk.	Delete unnecessary files to free up space on the hard disk. Then try to print again.

4.11.4 SPOOL ERROR

Description: Jobs are processed and stored on the hark disk until the printer is ready to accept them

Description	Solution
Insufficient space on the hard disk in the directory assigned for the basic spool.	Delete unnecessary files to free up space for spool storage.
Previous printing errors were not solved.	Delete '.jnl' files. Then reboot Windows and try to print again.
There may be conflict with other drivers or programs.	Close all programs except the one you need.
An application program or printer driver are damaged.	Delete the printer driver completely. Then reinstall it.
OS related files are damaged or virus infected.	Reboot the computer. Then check for viruses. Restore damaged files and reinstall application programs that do not work correctly.
Not enough memory exists.	Add more memory to the PC.

How to Delete Data in the Spool Manager

The installed drivers and the list of the documents waiting to be printed show in the spool manager. Select the document you want to delete and check delete in the menu. If the job you want to delete is the current job, data that has already been transferred to the printer's memory will still be printed. The job may take a long time to delete as it must wait for a time out if there is a problem with the printer such as out of toner, offline, out of paper etc.

4.12 NETWORK PROBLEMS (FOR B273-17/-21/-27 ONLY)

This section only concerns B273-17/-21/-27 models. This section does not concern G959-17/-21/-27 and B273-29 models because these models do not have a network board.

4.12.1 GENERAL PROBLEMS

Description	Solution
Incorrect set-up can cause network errors	Parameters in the PortThru (network card) may be corrupt. Restart the printer and reset the printer network settings to the factory defaults with the front panel or with SyncThru on the PC.
SNMP Manager cannot access the printer	Try to ping the printer with the SNMP manager. • A problem exists with the network connectivity between the SNMP manager and PortThru if the ping is not successful. • Make sure community names entered in the PortThru settings are correct and have necessary permissions if the ping is successful.
Printer does not get an IP address from a BOOTP, RARAP or DHCP server	Make sure there are no VLAN, access control lists or other network settings that prevent communication if there is an IP address server on your network. Where no address server exists, use SyncThru , or the control panel and select 'Static IP Address Assignment Method'. Then set the IP address, subnet mask and default gateway in the printer with SyncThru, control panel or browser methods. (see Operating Instructions).
Print server does not use TCP/IP protocol	• Make sure the TCP/IP protocol is installed and correctly configured in your PC. • Make sure your PC is on the same network with the print server. IP addresses and subnet masks must be set correctly in the PC AND the printer.
Unable to print in a NetWare environment	Use SyncThru to see if PortThru shows if the queue is serviceable. If not, login permissions may have changed, or the configuration information for queue's printers and print servers may have changed. Verify with PCONSOLE and NWADMIN that the configuration is correct. Then check the job queue to see if the print job exists. Make sure the NetWare is enabled on PortThru.
Printer name does not show when a port is added. Printer does not operate	• Make sure the protocol settings on your computer are correct. • Assign an IP address to PortThru with the operation panel, SyncThru, or browser (see Operating Instructions).

4.12.2 WINDOWS PROBLEMS

Description	Solution
Print server name does not show under new print server in SyncThru after you install PortThru.	1. Make sure the power switch is turned on and the 'READY' message shows on the operation panel. 2. Make sure the LAN cable is plugged into the PortThru card. 3. There are 2 LEDs on the PortThru card. One should flash and the other should stay on. Make sure the network card is correctly installed and the PCB cable makes a good connection if this is not the case. If the problem stays, check the network cable/socket with a different cable or socket. Replace the network card if the problem still stays. 4. Make sure the print server and the PC that searches for the new print server are on the same LAN.
Print server name shows but the test page does not get printed.	Print the network configuration. Turn the printer off if the network menu does not show, or, if the configuration page does not get printed. Make sure the network card is correctly installed. Then turn the machine on again. Replace the network card if the problem stays.
SyncThru shows the firmware upgrade is complete. But the software version does not show the firmware upgrade when the network configuration is printed.	Use the ping command to make sure the printer and computer can communicate before you upgrade the machine firmware.
SyncThru is unable to automatically detect the printer.	1. Make sure the LAN cable is connected to the printer. Make sure the ping command can see the printer if an IP address is assigned to the computer and the printer. 2. Print the network configuration. Enable the TCP/IP or network protocols if they are disabled, or, make sure the DLC/LLC protocol is installed in the computer. 3. In SyncThru use the Settings/Protocol selection menu option to select either TCP/IP or IPX protocols. Then use the View/Refresh option to scan the network again. 4. Make sure the network cable and wall socket function correctly. 5. Make sure the SyncThru version is the same as or newer than the version sent with the printer. 6. Make sure there is no router between the printer and the computer.

Description	Solution
	SyncThru cannot work through a router. 7. Make sure there are no switch or router VLAN or access control lists the block communication between the printer and the computer. Windows XP does not support DLC/LLC protocols.
The printer does not print via a network connection.	1. Connect the printer with a parallel or USB cable. Make sure the printer drivers are correctly installed if the machine will still not print. 2. Check the printer properties /ports and make sure a TCP/IP port has been allocated to the printer if the machine only prints via a local connection.

4.12.3 SYNCTHRU INSTALLATION PROBLEMS

Description	Solution
'File transfer' error shows during the installation process.	1. Uninstall any previous versions of SyncThru. Then restart the computer. 2. Do the following if the problem stays • In Windows 95/98 boot into MS/DOS mode and delete the "sammon.dll" file in the windows\system directory. • In Windows NT stop the spooler service with 'services' in the control panel and delete the "sammon.dll" file in the windows\system32 directory. Then restart the spooler service and reinstall SyncThru.

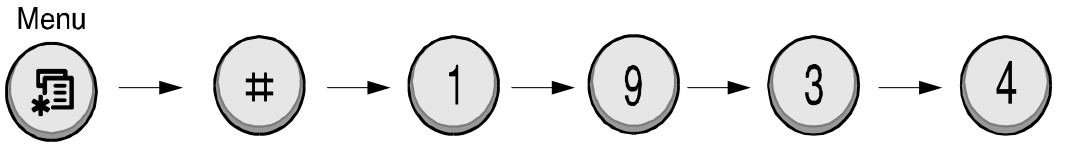
5. SERVICE PROGRAM MODE

5.1 TECH MODE

Tech mode lets you check the machine and do various tests to solve problems. The machine can still operate normally when you are in tech mode.

5.1.1 HOW TO ENTER TECH MODE

Do the following to enter tech mode.



B273S01.WMFMF

The LED briefly shows 'Tech' when the machine enters tech mode.

What you can do in Tech Mode

Function	Item	Contents	
Data Setup	Send Level	9-15 dBm	
	Dial Mode	Tone/Pulse	
	Modem Speed	33.6 / 28.8 / 14.4 / 12.0 / 9.6 / 4.8 (K bps)	
	Error Rate	5% / 10%	
	Notify Toner	Customer No.	
		Customer Name	
		Service No.	
		Serial No.	
	Clear All Memory	Select Country (☛ 5.5)	
	Clear Count	Enter Password (1934 enter)	Total Page CNT
			FLT Scan CNT
			ADF Scan CNT
			Used Toner CNT
	Flash Upgrade	Local / Remote	
	Silence Time	12 Sec / Unlimit / Off	
	Ignore Toner	On /Off	
Machine Test	Switch Test		
	Modem Test		
	Dram Test	OK / NG	
	Rom Test	Flash / Engine versions	
	Pattern Test	☛ 5.1.3	
	Shading Test		
Report	Protocol	Protocol List	
	System Data	System Data List	

Service Tables

5.1.2 DATA SET-UP

Send Level

This lets you set the level of the transmission signal. The Tx level should normally be under -12 dBm.
The send fax level is set to the best condition during manufacture. These should not be changed in the field.

Dial Mode

Select the dialing mode according to the user's line status.

- TONE: Electrical type of dial
- PULSE: Mechanical type of dial

Modem Speed

This lets you set the maximum modem speed. The value of the maximum modem speed is checked for both transmitter and receiver when the fax makes communication with a remote set. The lowest value is used. It is best set at 33.6Kbps (default).

Error Rate

The Baud rate automatically adjusts to 2400 bps when the error rate goes past the set value. This ensures that the error rate stays below the set value.

You can select the rate between 5% and 10%.

Notify Toner

With this feature enabled, when the toner becomes low, the toner low information will be sent to a specified contact point, for example, the service company. After you access this menu, select ON, and when the LCD-prompts, enter the name and the number of the contact point, the customer's fax number, the model name, and the serial number.

CLEAR ALL MEMORY

Use this function to reset the system to the default set at the factory.

This function resets the system to the initial value when the machine does not work correctly. Values are set to the default values. The machine will not keep data set by the user. This procedure does not clear the counter data values.

<Procedure>

1. Set the [MEMORY CLEAR] in tech mode.
2. Push the ENTER button.
3. The country name will show. You can see all available countries when you scroll by pressing "◄" or "►"
   - EU default (UK)
   - North America default (USA/Canada)
   - Asia default (Singapore)
   - China default (China)

   Note: You cannot change the default country values.
4. Push the ENTER button. This clears the memory. Then it changes it to the country code that you set.

Note: Do this procedure after you replace the main board. If you do not do this procedure, the system will not operate correctly.

Flash Upgrade

The firmware upgrade has these functions:

- Local and remote.

Examine the firmware upgrade section (☛ 5.2).

Silence Time

In ANS/FAX mode, after a call is picked up by the answering machine, the machine monitors the line. If a period of silence is detected on the line at any time, the call will be treated as a fax message and the machine begins receiving. Silence detection time is selectable between limited (about 12 seconds) and unlimited time.

When "12 sec" is selected, the machine switches to receiving mode as soon as it detects a period of silence. When "unlimited" is selected, the machine waits until the answering operation is concluded even though a period of silence is detected. After the answering operation is concluded, the machine switches to receiving mode.

5.1.3 MACHINE TESTS

Switch Test

This lets you test the keys on the operation panel. The result shows on the LCD window when you press a key.

Modem Test

This lets you hear various transmission signals to the telephone line from the modem and to check the modem, amplifier and speaker. The modem part of the main board, amplifier, speaker or speaker harness is faulty if no transmission signal sound is heard.

DRAM Test

This lets you test the machine's DRAM. The LCD shows ‘OK’ if the memory operates correctly.

ROM Test

This lets you test the machine's ROM. The result and the software version show on the LCD display.

- FLASH VER : 1.00 V
- ENGINE VER :1.00V

Pattern Test

The pattern printout lets you make sure that the printer mechanism operates correctly. This function is for factory manufacturing use only.

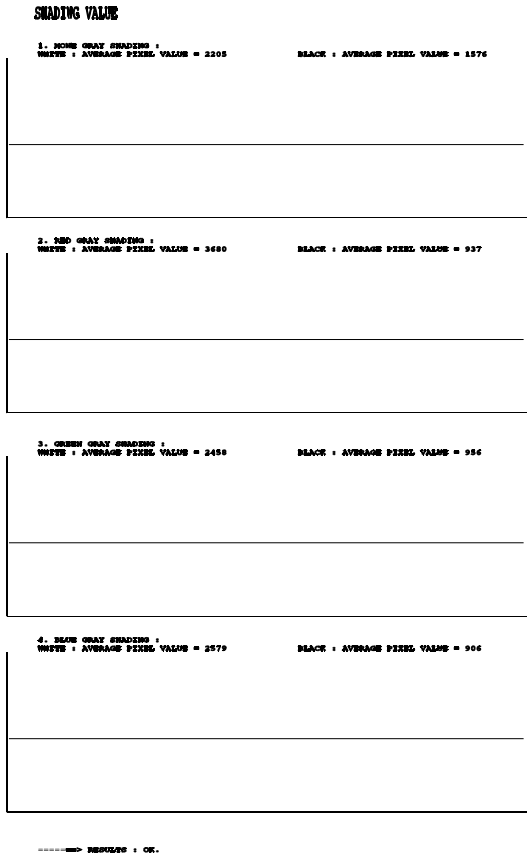
Shading Test

The lets you set the optimum scan quality determined by the specific characteristics of the CCD (Charge Coupled Device). Do the following procedure to check the condition of the CCD unit if copy image quality is poor.

Procedure

1) Select the [Shading Test] in tech mode (Menu, #, 1934).
2) Push the ENTER button and an image will be scanned.
3) CCD shading profile gets printed after the image gets scanned.
4) The CCD is defective if the printed image is not the same as the sample image shown

NOTE: Make sure the cover is closed when you test the CCD.



B273S08.WMF

5.1.4 REPORTS

Protocol List

This shows the sequence of the CCITT group 3 T.30 protocol for the most recent sending or receiving operation. This list lets you check for send and receive errors.

System Data

This shows a list of the user system data settings and tech mode settings.

5.2 USER MODE

The table below shows functions available to the user. Refer to the Operating Instructions for further details.

Function	Item		Contents
1. Paper Setting	Copy Tray		Auto tray / MP tray
	Fax Tray		Auto tray / MP tray
	Paper Size	Tray Paper	A4 / A5 / B5 / A6 / LTR / LGL / Executive / Folio
		MP Paper	A4 / A5 / B5 / A6 / LTR / LGL / Executive / Folio
Machine Set-up	Machine ID		Fax / ID
	Date & Time		DMY
	Clock Mode		12 / 24 hour
	Language		16 languages
	Power Save		On / Off
	Scan PWR Save		0.5 / 1 / 4 / 8 / 12
	Ignore Toner		On / Off
	Import Setting		Phone book / All setting
	Export Setting		Phone book / All setting
	Scan Time Out		
3. Copy Setup	Default Change	Darkness	Lighten / Normal / Darken
		Original type	Text / Photo
			Photo
			Text
		Reduce / Enlarge	Original / LGL->LTR
		Number Of Copies	1-99
	Timeout		15 / 30 / 60 / 180 / off
4. Fax Setup	Receive Mode		Fax / Tel / Ans /Fax
	Ring to Answer		1-7
	Darkness		Lighten / Normal / Darken
	Redial Term		1-15
	Redials		0-13
	MSG Confirm.		On / Off / On-Err
	Auto Report		On / Off
	Auto Reduction		On / Off
	Discard Size		0-30 MM
	RCV Start Code		0-9
	DRPD Mode		Set (On / Off)
5. Fax Feature	Delay Fax		Enter number
	Priority Fax		Enter number
	Add Page		
6. Advanced Fax	Send Forward		On / Off
	RCV Forward		On / Off
	Junk Fax Setup		On / Off
	Secure Receive		On / Off / Print
	Prefix Dial		Enter number
	Stamp RCV Name		On / Off
	ECM Mode		On / Off

Function	Item	Contents
7. Reports	Phone Book	Phone Book List
	Sent Report	Transmission Journal
	RCV Report	Reception Journal
	System Data	System Data List
	Scheduled Jobs	Schedule Information List
	MSG Confirm	Message Confirmation Report
	Junk Fax List	Junk Fax List
	Scan Journal	
8. Network Setup (for B273-17/-21-27 models only)	Reset Network	Yes/No
	Config Network	TCP/IP
	Set to Default	Yes/No
	Print net CFG	Yes/No
9. Sound / Volume	Speaker	On / Off / Comm.
	Ringer	Off / Low / Med / High
	Key Sound	On / Off
	Alarm Sound	On / Off
0. Maintenance	Clean Drum	Yes/No
	Auto Cleaning	On / Off
	Notify Toner	On / Off
	Clear Settings	All/Paper/Copy/Fax/Fax features/Advanced fax/Send report/RCV report/Phonebook/Scan journal
	Network Scan (for B273-17/-21-27 models only)	Enable / Disable

5.3 FIRMWARE DOWNLOAD

You can use the “Printer Setting Utility” by connecting the machine to a PC through parallel or USB cable for all models and “Web image Monitor Type103” through Network to upgrade the machine firmware for B273-17/-21-27 models only.

5.3.1 DOWNLOAD PROCEDURE

Printer Setting Utility mode

This procedure is used when the machine is connected with a parallel port or USB port to a PC. The machine uses the Printer setting Utility software to upgrade the firmware.

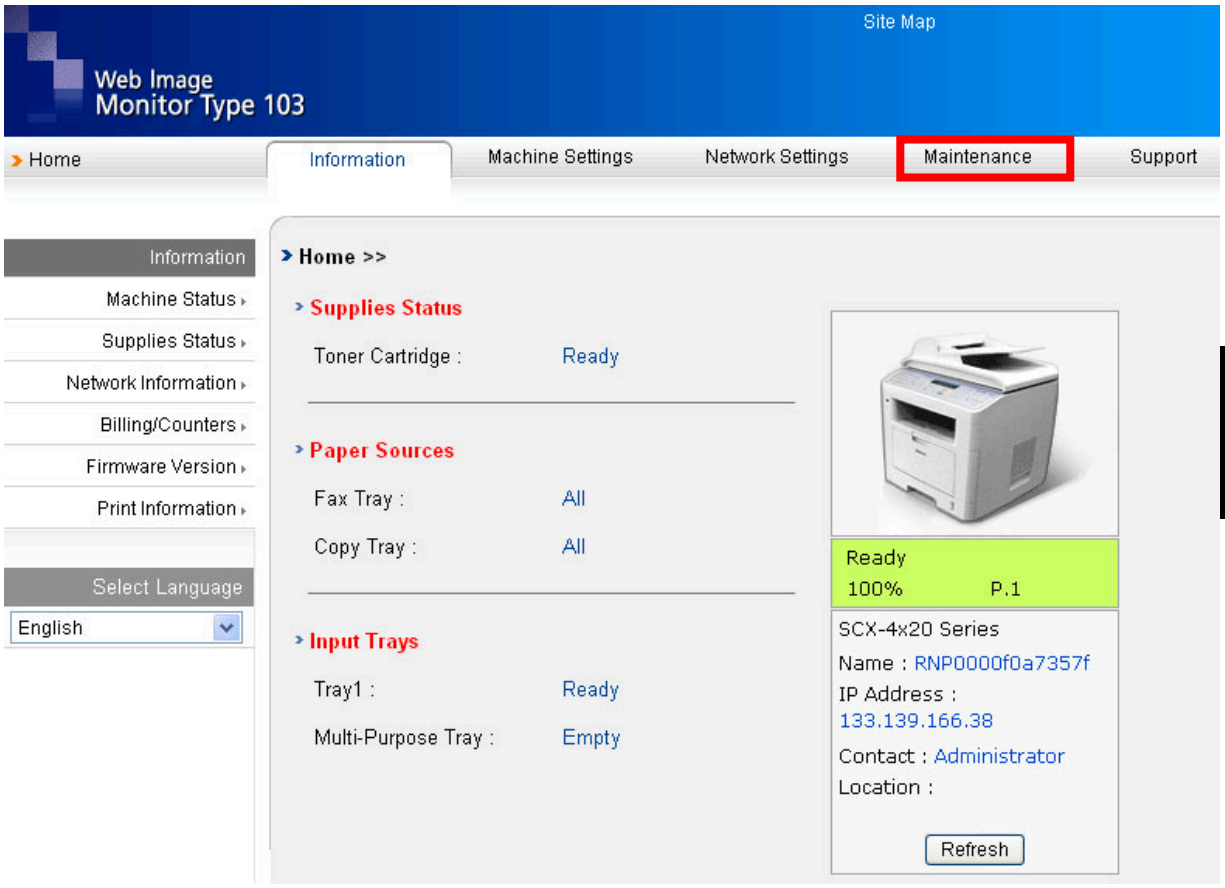
1. Print out the System data list for back up the data and setting.
2. Connect PC and printer with parallel cable or USB cable.
3. Do Printer Setting Utility and set the Firmware update tab. Current firmware version and emulation version are shown.
4. Keep the firmware file on the PC, in a path near to the root of C:, ie C:\TEMP. Use the “Browse” button to get the firmware file to update the machine.
5. Push the update button. The firmware file automatically goes to the printer. The printer is initialized when the update is finished. Make sure that these show on the LCD display when you download the new firmware:
   1) DATA RECEIVING (USB) / COPY/B FILE LPT1 (PARALELL)
   2) PC TO DRAM IS OK
   3) FLASH IS ERASING
   4) FLASH PROGRAMMING
   5) CHECKSUMMING
   6) DOWNLOAD OK
   7) Warming up Please wait…
6. Push the refresh icon. Then make sure that the version number shown agrees with the new firmware.

Note: The country code will not change after you download the new firmware.

Web Image Monitor Type103 mode (for B273-17/-21-27 models only)

1. Print out the System data list for back up the data and setting.
2. Download the Firmware on the PC.
   NOTE: 1) Make sure to download both the 'Printer Firmware' and 'Network Firmware' if you want to upgrade both.

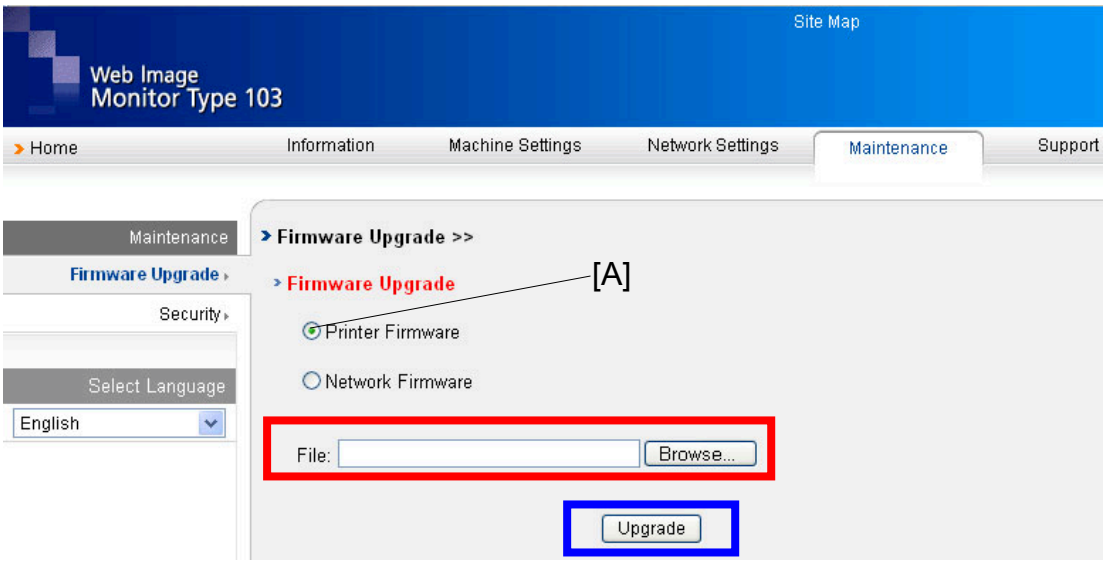
3. Access the 'Web image Monitor Type 103' with the correct IP address.
4. Select 'Maintenance' as shown below



B273S03.TIF

Service Tables

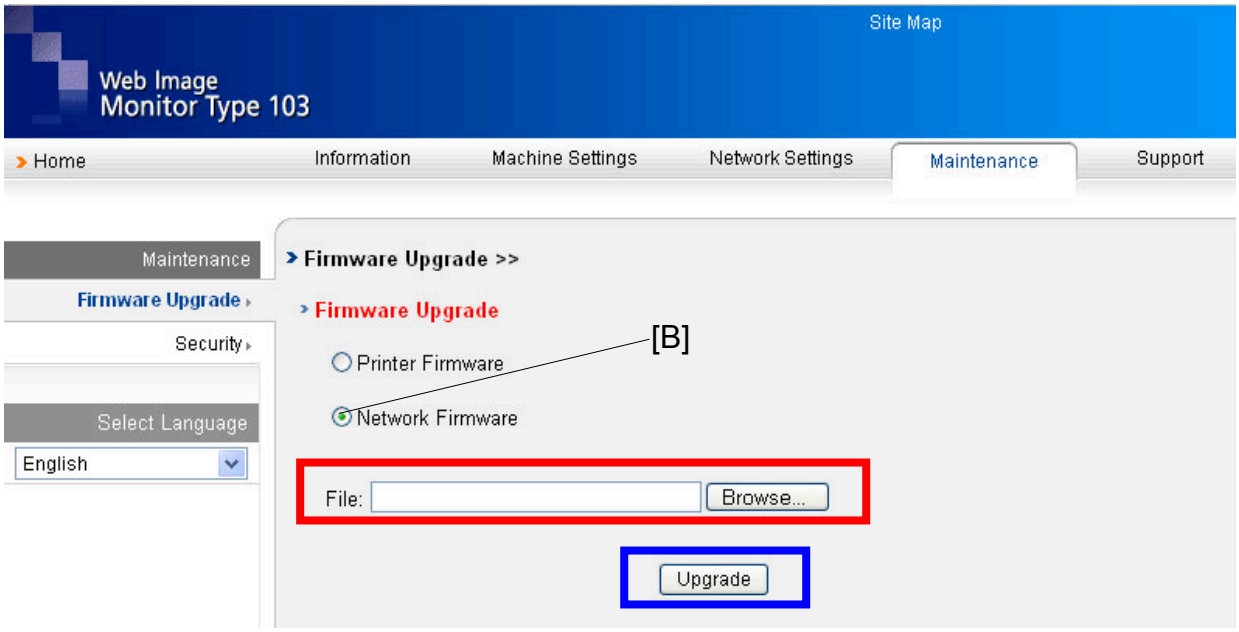
5. Make sure 'Printer Firmware' [A] is selected as shown below. If not, select it.
   NOTE: 1) Go to step 9 if you only want to upgrade the 'Network Firmware'.



B273S04.TIF

6. Click the browse button and select the Printer Firmware file you saved in the PC.
7. Click the 'Upgrade' button
8. Make sure the firmware was completely updated.
   NOTE: Do not turn off the power of the machine while updating the FW.

9. Make sure 'Network Firmware' [B] is selected as shown below. If not, select it.



B273S05.TIF

10. Click the browse button and select the Network Firmware file you saved in the PC.
11. Click the 'Upgrade' button
12. Make sure the firmware was completely updated.

NOTE: Do not turn off the power of the machine while updating the FW.

Service Tables

5.3.2 FIRMWARE RECOVERY PROCEDURE

The machine will not operate if the update procedure did not work correctly. At this time, do these steps:

1. Set the power off and then on.
2. Do the steps in the above download procedure.

The machine will start the upgrade procedure again.

5.4 ENGINE TEST MODE

The engine test mode lets you check the condition of the print engine. It tests the condition of each device and shows the result of the test on the LCD. The engine test mode is divided into 5 functions (0~4).

5.4.1 HOW TO ENTER ENGINE TEST MODE

The technician can examine the machine and do different tests in service (tech) mode. This will help show the cause of a malfunction.

The machine operates correctly in Tech mode.

Do this procedure to go into the Tech mode:

Press Menu → # → 1 →9 → 3 → 1 in sequence. The LCD shows 'TECH'. Then the machine goes into service (tech) mode.

Do this procedure to go back to user mode:

Menu → # → 1 → 9 → 3 → 1

5.4.2 DIAGNOSTIC

Test Number	Sub Number	Engine test	Remark
0	1	Motor test	1: On, 2: Off. Next test selected
	2	Pick-up test	1: On, 2: Off. Next test selected
	3	Fan test	1: On, 2: Off. Next test selected
	4	Manual CLT test	1: On, 2: Off. Next test selected
	5	PTL test	1: On, 2: Off. Next test selected
1	1	LSU motor test	1: On, 2: Off. Next test selected
	2	LSU Hsync test	1: On, 2: Off. Next test selected
	3	LD test	1: On, 2: Off. Next test selected
2	1	Feed sensor test	1. Check: Read the sensor
			2. Next: Next sensor test
	2	Exit sensor test	1. Check: Read the sensor
			2. Next: Next sensor test
	3	Cover sensor test	1. Check: Read the sensor
			2. Next: Next sensor test
	4	Empty sensor test	1. Check: Read the sensor
			2. Next: Next sensor test
	5	Manual sensor test	1. Check: Read the sensor
			2. Next: Next sensor test
3	1	Therm ADC 180	1: On, 2: Off. (maintain the fusing temperature 80 C)
	2	Therm ADC 140	1: On, 2: Off. (maintain the fusing temperature 135 C)
	3	Therm ADC 120	1: On, 2: Off. (maintain the fusing temperature 160 C)
	4	Therm ADC 100	1: On, 2: Off. (maintain the fusing temperature 191 C)
4	1	MHV test	1: On, 2: Off. (-1550 ±50V)
	2	Dev bias test	1: On, 2: Off. (-430 ±20V)
	3	THV EN/NEG test	1: On, 2: Off. (-1200 +300/-150V)
	4	THV ON 1300 V	1: On, 2: Off. (+1300±20V)
	5	THV ADC 1300 V	1: On, 2: Off. (ADC value 101±5V)
	6	THV ADC 600-3500 V	1: On, 2: Off. (Compare ADC value)

Detailed description (engine test mode)

Function name	Description	Display
01. Motor test	The motor starts when you press the execution key and stops when you press the stop key.	Main motor on/off
02. Pick-up test	Automatically stops when you select execution.	Tray 1,2 solenoid on/off
03. Fan test	The fan starts when you press the execution key and stops when you press the stop key.	Fan on/off
04. Manual clutch test	Tray 2,3 clutch stays on for 1 second and then automatically turns off when you select execution. The main motor runs 2 seconds earlier to check the clutch condition.	Tray 2,3 clutch on/off
05. PTL (pre-transfer lamp) test	The PTL lights when you press the execution key and stops when you press the stop key.	PTL on/off
11. LSU motor	The laser motor starts when you press the execution key and stops when you press the stop key.	Laser motor on/off
12. LSU Hsync test	The LSU motor starts and 'Laser Ready' shows if the motor spins at the correct speed. Otherwise 'laser Error' shows.	Laser ready on/off
13. LD test	'Diode On' shows when the laser diode in on. Otherwise 'Diode off; shows.	Diode on/off
21. Feed sen test	These show the current state of the sensor.	Sensor 'off' or sensor 'on'
22. Exit sen test		
23. Cover sen test	This shows the current state of the cover sensor. Touch the sensor to confirm that the message changes from 'Cover Open' to 'Cover Close'.	Cover 'open' or cover 'close'
24. Empty sen test	These show the current state of the sensor.	Sensor 'off' or sensor 'on'
25. Manual sen test		
31. Therm ADC 180	'Current Value' shows on the upper line of the LCD. 'Target Value' shows on the bottom line. Target value is limited between 80-191 C.	Target temperature and output temperature from thermistor and ADC,
32. Therm ADC 140		
33. Therm ADC 120		
34. Therm ADC 100		
41. MHV test	These functions make sure the HVPS operates correctly	MHV on/off
42. Dev bias test		Dev bias on/off
43. THV EN/NEG test		THV EN/NEG on/off
44. THV ON (1300V)		THV on/off
45. THV ADC (1300V)		ADC value shows
46. THV ON 600-3500V		ADC value shows

5.4.3 STATUS PRINT

When the function is enabled a group of parameters are printed at the bottom of each page. This shows the print engine condition. This is not necessary for service use.

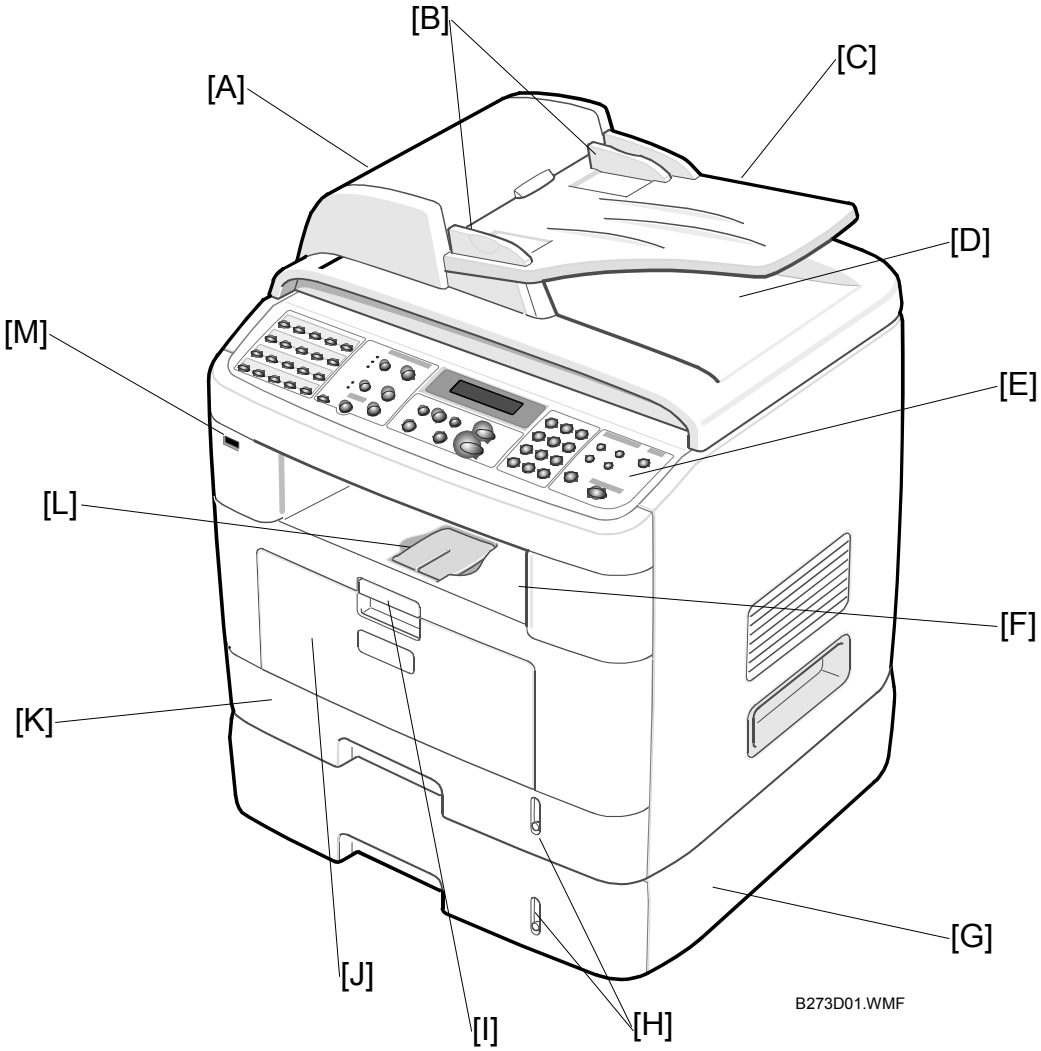
This setting stays on when you get out of Engine Mode. Make sure to set it off.

12 September 2006

6. DETAILED DESCRIPTIONS

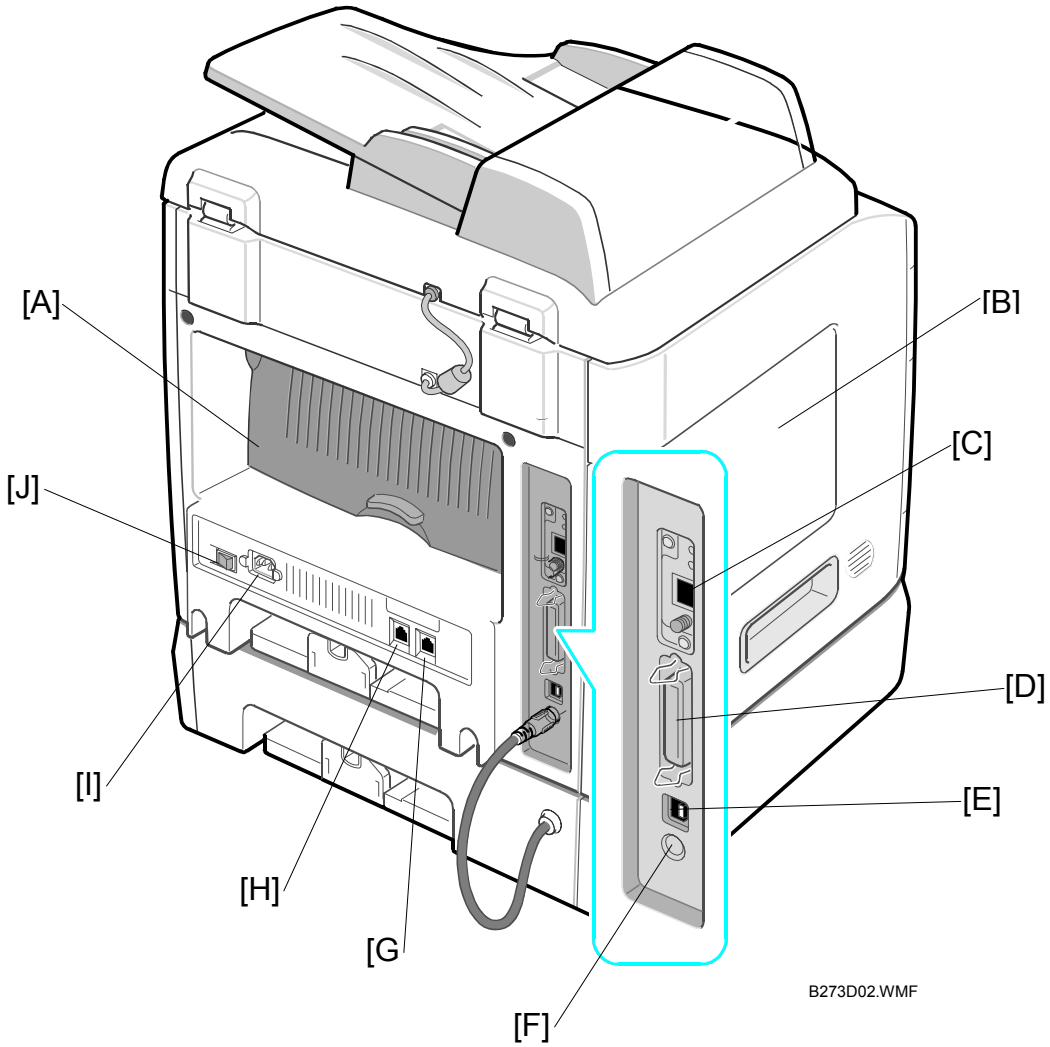
6.1 PRINTER COMPONENT LAYOUT

6.1.1 FRONT VIEW



[A]: ADF
[B]: Document guides
[C]: Input tray
[D]: Output tray
[E]: Operation panel
[F]: Front output tray (face down)
[G]: Optional paper tray unit
[H]: Paper level indicator
[I]: Front door
[J]: By-pass tray
[K]: Standard paper tray unit
[L]: Paper output extension
[M]: USB flash drive port

6.1.2 REAR VIEW



[A]: Face-up door
[B]: Control board cover
[C]: Network port*1
[D]: Parallel connector
[E]: USB connector
[F]: Optional paper feed tray connector
[G]: External jack
[H]: Line jack
[I]: AC power connector cord
[J]: Power switch

*1: Only B273-17/-21-27 models have this network port.

NOTE: You may not be able to use the external jack if your country has a different telephone system

6.2 SYSTEM LAYOUT

6.2.1 PAPER FEED

The paper tray unit and the manual by-pass unit automatically feed paper to the machine. A friction pad separates the paper and makes sure that paper is fed one sheet at a time.
A sensor checks when the paper tray is empty. At this time a message shows on the operation panel. There is no paper near end sensor in this machine.

- Feeding Method: Universal Cassette Type
- Feeding Standard: Center Loading
- Feeding Capacity: Cassette-250 sheets (75g/m2, 20lb paper standard)
- Manual: 1 sheet (paper, OHP, envelop, etc.)
- Paper detecting sensor: Photo sensor
- Paper size sensor: None

6.2.2 TRANSFER ASSEMBLY

The transfer assembly consists of the PTL (pre-transfer lamp) and the transfer roller. The PTL sends light to the OPC drum. This lowers the charge on the drum's surface and improves transfer efficiency. The transfer roller moves toner from the OPC drum surface to the paper.

6.2.3 DRIVE ASSEMBLY

The drive assembly is a gear driven power unit. The motor supplies power to the following.

- Paper feed unit
- Fusing unit
- Toner cartridge.

6.2.4 FUSING ASSEMBLY

The fusing unit consists of the following.

- Fusing lamp
- Hot roller
- Pressure roller
- Thermistor and thermostat.

The fusing unit uses pressure and heat to melt toner to the paper.

Thermostat

The thermostat cuts off the power to the fusing lamp to not let the machine overheat. Power gets cut when the thermostat temperature gets to 160 C.

Thermistor

The thermistor detects the surface temperature of the hot roller. This information goes to the main processor, which uses this information to regulate the temperature of the hot roller.

Hot Roller

The fusing lamp heats the surface of the hot roller. Toner gets melted and stays on the surface of the paper when the paper passes between the hot roller and pressure roller. The surface of the hot roller is coated with Teflon to ensure that toner does not stay on the roller surface.

Pressure Roller

The pressure roller is mounted under the hot roller. It is made of a silicon resin, and the surface of the roller is coated with Teflon. This ensures that toner does not stay on the roller surface.

Safety Features

The machine has the following countermeasures to prevent overheating.

1. 1st protection device: Hardware cuts off when the machine temperature gets to 207 C
2. 2nd protection device: Software cuts off when the machine temperature gets to 220 C for 3 seconds
3. 3rd protection device: Thermostat measures the temperature of the hot roller and cuts off main power to the fusing lamp when the temperature gets to a pre-determined level.

Safety Devices

1. Fusing power gets cut off when the front cover is opened.
2. LSU power gets cut off when the front cover is opened.
3. The temperature of the fusing units cover surface stays at less than 80ºC. This protects the user. A caution label is attached where the customer can see it easily when the rear cover is opened

6.2.5 SCANNING UNIT

The image gets read using a photosensitive sensor. The scanning unit consists of the following.

- CCD module
- Connection board
- ADF board
- AFE (Analog Front End)
- Image Processor (located in CPU)
- Platen glass and ADF mechanism.

CCD Module Specifications

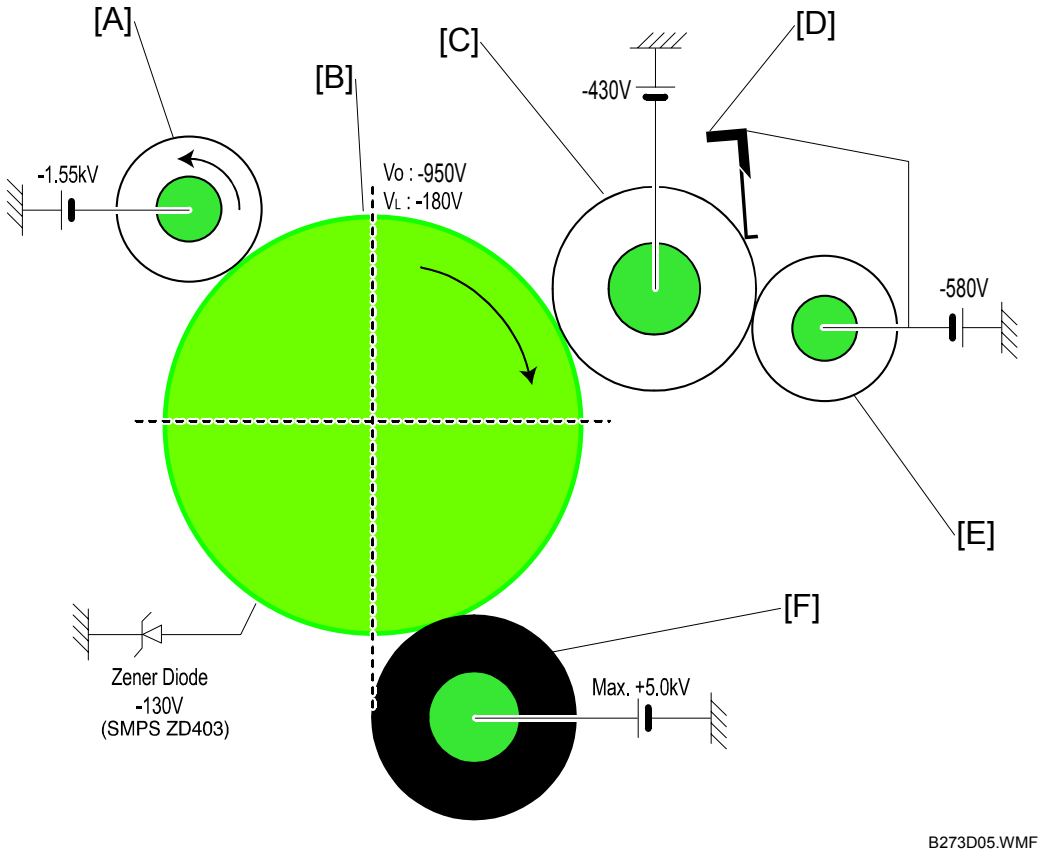
- Resolution: 600dpi/A4
- Maximum scan width: 8.5”
- Color filter: Red, Green, Blue
- Output channel: 3 channels (R, G, B)
- Effective pixel: 5,400 pixels
- Voltage: 24V & 5V
- Pre-heating time: Maximum 30 seconds (70% of light output reached)
- Life span of the lamp: 30,000 hours (25 C)

6.2.6 LASER SCANNING UNIT (LSU)

The laser-scanning unit converts the video data received from the computer into an electrostatic latent image on the surface of the OPC drum. This is achieved by controlling the laser beam and exposing the surface of the OPC drum to the laser light.

The polygon mirror reflects the laser light onto the OPC. Each side of the mirror is one scan line. The OPC drum turns as the paper feeds to scan the image down the page.

6.2.7 TONER CARTRIDGE



[A]: Charging roller	[D]: Doctor blade
[B]: OPC drum	[E]: Supply roller
[C]: Developing roller	[F]: Transfer roller

The toner cartridge contains the OPC unit and toner unit. The OPC unit consists of the OPC drum and charging roller. The toner cartridge unit consists of the toner, supply roller, developing roller, and doctor blade.

There is no toner near end sensor in the machine. But the machine has a toner remaining amount sensor.

A cleaning blade is used to collect used toner.

- Developing method: Non magnetic 1 element contacting method
- Toner: non magnetic 1 element shatter type toner
- Toner life span: 5,000 sheets (IDC Pattern/A4 standard)
- OPC cleaning: Electrostatic process

6.2.8 NEW AIO DETECTION

A new supply AIO cartridge has a ID chip. The machine knows a new cartridge has been installed when the chip gets detected.

When the new cartridge is installed in the machine, the machine automatically detects by the chip that the cartridge is brand-new. Then the machine resets the total dot counter (TOTAL TONER COUNT) and CRU print counter (Cru Prints). and increments the counter for counting the number of CRU replaced (Replaced Toner Counts). Only the case when the “Replaced Toner Counts” was 0, the CRU currently installed is regarded as starter CRU. In this condition, threshold to detect toner end is shorter than that for supply CRU.

6.2.9 TONER END DETECTION

The machine does not have a toner end sensor. The machine checks the amount of toner with software. The machine counts and adds up black dots as toner consumption. For example, the following occurs when the machine prints 5% of black rate chart

- Starter cartridge: Approx. 4, 750, 000, 000 dots will be added.
- Supply cartridge: Approx. 7, 500, 000, 000 dots will be added.

When the total number of dots gets to a pre-programmed figure (as for toner near-end), the machine shows “TONER LOW”. After another period of dots has been counted up, the machine finally shows “TONER EMPTY” (as for toner end), and the machine stops printing.

You can check the total dot counts from the current cartridge in the System Data List in TECH mode.

6.3 CONTROLLER

6.3.1 MAIN PBA

The main PBA consists of the following components.

1	Image processor	11	Motor driver	21	Line transceiver
2	Processor ASIC	12	Motor driver	22	VEDIC X-TAL
3	Flash memory-Code high	13	USB	23	CPU X-TAL
4	Flash memory-Code low	14	CMOS-logic	24	Modem X-TAL
5	Flash memory-PCL6 high	15	CMOS-logic	25	USB host X-TAL
6	Flash memory-PCL6 low	16	Panasonic	26	PS3 DIMM
7	SDRAM	17	Varta	27	RAM DIMM
8	SDRAM	18	FPGA	28	Jack USB
9	Modem	19	A/D convertible	29	Jack DIN
10	SRAM	20	USB host		

The engine board and controller board are both on a single PBA and consist of the following.

- CPU
- Printer scanner
- Line control functions.

The CPU functions as the bus controller, I/O handler, motor driver and PC interface. The main board sends the current image video data to the LSU and manages the Electrophotographic printing process.

Circuits on the PBA drive include the following.

- Main motor (paper feed, cartridge, fusing)
- Clutch driver
- Pre-transfer lamp driver,
- Fusing lamp driver
- CCD driver
- Scan motor driver
- Modem
- Fan driver.

The signals from the paper feed jam sensor and paper empty sensor are inputted to the main board from the power supply PBA.

6.3.2 ASIC

A 32Bit RISC processor executes printer and fax functions.

Main Function Block

- Fully integrated system for embedded applications
- LSU interface module to interface with the PVC or HPVC
- 2 channel general purpose DMA controller for high speed I/O
- Dual memory bus architecture
- Operation frequency: AHB bus: 60MHz. Internal system Bus: 120MHz
- Operation voltage: 3.3V
- Power on reset time: Less than 5.6 ms

6.3.3 MEMORY

The machine has Flash ROM and DRAM memory units. There are 2 SODIMM sockets to let you add DRAM or Flash ROM (Postscript Option).

- Capacity :16 MB
- Access Time : 100nsec

6.3.4 FLASH MEMORY

- Record/download system program from the PC Interface.
- Fax for journal list
- Memory for one touch dial
- Speed dial list.
  - Size : 4M Byte
  - Access Time :70 nsec

6.3.5 SDRAM

SDRAM is used for the following.

- Swath buffer in printing
- Scan buffer in scanning,
- ECM buffer in fax receiving
- System working memory area
  - Size: 32MB
  - Max Frequency: 133MHz

6.3.6 BATTERY BACKUP

Backup power is provided by a 3.6V rechargeable lithium battery. It provides power to the SDRAM to keep faxes in memory when main power is cut. The backup power will last up to 43 hours. The battery requires 48 hours to charge.

6.3.7 SENSOR INPUT CIRCUIT

Paper Empty Sensor

The paper empty sensor (photo interrupter) is monitored by the CPU signal (nP_EMPTY). The machine shows a message on the LCD when the cassette is empty.

By-pass Tray Sensor

Paper in the by-pass tray is detected by operation of the by-pass sensor (photo interrupter). The CPU monitors signal (MP_EMPTY) to recognize paper in the by-pass tray. Paper gets fed from the by-pass tray if there is paper present.

Paper Feed Sensor

When paper passes the actuator on the feed sensor, it is detected by the photo interrupter signal (nP_FEED). The signal is monitored by the CPU and starts the process of creating the image after certain delay time. Jam0 shows on the operation panel if the feed sensor is not detected within 1 sec. after paper is fed. The toner cartridge also operates the paper feed sensor when it is inserted it. A message shows on the operation panel if no cartridge is detected.

Paper Exit Sensor

An exit sensor on the engine board and actuator on the frame detects when the paper exits cleanly from the machine. The sensor checks the signal (P_EXIT) and detects the on/off time of the exit sensor. Jam2 shows on the operation panel if jam status is detected.

Cover Open Sensor

The cover open sensor actuator is located on the front cover and the senor is in the main frame. Power (+24V) gets cut to the following when the front cover is opened.

- DC fan
- Solenoid
- Main motor
- Polygon motor part of LSU.

The CPU monitors signal (COVER_OPEN) to recognize when the cover is opened.

DC Fan/Solenoid Driving

These are driven by a transistor and controlled by the signal (FAN (SMPS, CON2-23)) bit of the CPU. The fan is activated by turning the transfer roller when the signal is high. The fan is deactivated when sleep mode is selected.

There are two solenoids and both are driven by the paper pick-up and MP signals. The drive time is 300ms. A diode protects the driving TR from the back-EMF pulse which is generated when the solenoid is de-energized.

Motor Driving

The motor driving circuit is activated when the driver IC is enabled. You can change the resistance value of sensing and the voltage value of the V reference with the motor driving voltage value.

6.4 SMPS AND HVPS

The SMPS (switching mode power supply) and HVPS (high voltage power supply) are on the same board. The SMPS supplies either 110V or 220V DC power to the system, and outputs +5V, +12V and +24V supplies to the main and other PBAs.

The HVPS creates the high voltage of THV/MHV/Supply/Dev and supplies it to the toner cartridge. The CPU modifies some of these voltage settings to provide the ideal voltages to create the image. The HVPS part uses the 24V, and outputs the high voltage for THV/MHV/BIAS.

Outputted high voltage is supplied to the following.

- Toner
- OPC cartridge
- Transfer roller.

6.4.1 HVPS

The HVPS supplies the following voltages to the machine.

Transfer High Voltage (THV+)

This voltage transfers toner from the OPC drum to the paper.

- Output voltage: +1300V DC ±20V
- Error: Low-density printing occurs due to toner on the OPC drum not transferred to the paper if THV (+) is not present. If this condition stays, waste toner over-flow can occur. Ghost images may show which repeat at 76mm intervals.

Charge Voltage (MHV)

This voltage charges the surface of the OPC from –900V to –1000V.

- Output voltage: –1550V DC ± 50V
- Error: Toner particles get transferred to the whole OPC drum surface if MHV is not present because the OPC drum surface has no charge. In this condition a black page gets printed out.

Cleaning Voltage (THV-)

This voltage removes toner contamination from the rear side of the paper by sending negative polarity to the transfer roller. This forces toner to transfer back to the to OPC drum.

- Output Voltage: –1200V, +300V/–150V
- Error: Smudges and toner contamination show on the reverse side of the printed page.

Developing Voltage (DEV)

This voltage develops the toner on the section of the OPC drum surface exposed by the LSU.

At the time of printing, the exposed voltage on the OPC is –180V. Unexposed voltage is –900 to –1000V. The exposing voltage on the DEV is –430V. Therefore toner with negative polarity gets developed onto an exposed section of the OPC.

- Output voltage –430V DC ± 20V
- Error:
  - Print density gets extremely low if DEV is GND.
  - Print density gets extremely high when DEV is floating due to poor connection between the frame and cartridge contacts etc.

Supply Voltage (SUP)

This voltage supplies toner to the developing roller.

- Output voltage: –580V DC ± 50V (Use ZENER, DEV Gear)
- Error:
  - Print density gets extremely low when SUP is GND.
  - Print density gets extremely low if SUP is floating due to poor connection between the frame and cartridge contacts etc. In this condition prints are hard to see.

OPC Ground ZENER Voltage

This voltage prevents image contamination under low temperature and low humidity environment conditions. The ZENER diode is connected to OPC ground when a set prints without an output voltage of –130V. DC ± 15V is maintained.

- Error type:
  - There is no serious image problem in the general environment when the ZENER diode is –0V. However contamination can occur on the entire image in low temperature and low humidity environments.
  - A blank page gets printed out when the ZENER diode is disconnected.

6.4.2 SMPS(SWITCHING MODE POWER SUPPLY)

This is the power source for the whole system. It is mounted at the bottom of the set and consists of the SMPS section, which supplies DC power to drive the system. It also supplies power to the AC heater control part, which supplies the power to the fusing unit. The SMPS has four output channels (+5V, +24V and 24VS).

The machine supplies the following power types.

- North America: 120V
- Europe: 220V
- China (nations with unstable power supply): 220V

1. AC Input

- Input rated voltage : AC 220V ~ 240V AC 120V / AC 220V
- Input voltage fluctuating range : AC 198V ~ 264V AC 90V ~ 135V / AC 198V ~ 264V
- Rated frequency : 50/60 Hz
- Frequency fluctuating range : 47 ~ 63 Hz
- Input current : Under 5.0A/2.5A (When the fusing lamp is off and input/output voltages are in range)

2. Rated Output Power

No	Item	CH2	CH3	Remark
1	Channel Name	+5V	+24V	
2	Connector pin	Con 23 5V pin: 3, 4 GND pin 5-7	Con 23 24V pin: 11-13 GND pin 9, 10,18	
3	Rated output	+5V and 5% (4.75 to 5.25V)	+24V and 10% (21.6 to 26.4V)	
4	Maximum output current	0.14A	2.0A	
5	Peak loading current	0.14A	2.5A	1ms
6	Ripple noise voltage	100mV	Under 500Mv	
7	Maximum output power	0.35W	48W	
8	Peak output power	0.7W	60W	1ms

3. Power Consumption

No	Item	CH2 (+5V)	CH3 (+24V)	Remark
1	Stand-by	0.07A	0.4A	Ave. 55W
2	Printing	0.14A	2.0A	Ave. 350W
3	Energy saver mode	0.01A	0.4A	Ave. 20W

4. Length of Power cord

- 1830 ±50mm

5. Power Switch:

- Fitted

6. Feature

- Insulation resistance : over 50M Ω(at DC500V)
- Insulating retest pressure : No problem within 1min. (at 1500Vzc, 10mA)
- Leakage current : under 3.5mA
- Operating current : under 40A peak (at 25°c, cold start) Under 60A peak (in other conditions)
- Rise Time : Within 2Sec
- Fall Time : Over 20ms
- Surge : Ring Wave 6KV-500A (Normal, Common)

7. Environment Condition

- Operating temperature range : 0°C ~ 40°C
- Storage temperature range : -25°C ~ 85°C
- Storage humidity range : 30% ~ 90% RH
- Operating atmospheric pressure range : 1

8. EMI Requirement

- CISPR ,FCC, CE, MIC, C-Tick

9. Safety Requirement

- IEC950, C-UL, TUV, Semko, iK, CB, CCC, EPA,

6.4.3 FUSING UNIT AC POWER CONTROL

The fusing lamp is heated with AC power and is controlled by a triac (THY1). 'On/Off control' is achieved when the gate of the triac is turned on/off by a phototriac (PC1). The Phototriac also acts as an insulating part.

The fusing heat lamp is turned on/off when it gets a signal from the engine control section. The phototriac LED flashes when the 'HEATER ON' signal is activated by the engine. The flashing light causes the triac to switch and supplies a voltage to the gate of triac. As a result AC current gets supplied to the fusing lamp, and heat is produced.

On the other hand, when the signal is off, the phototriac is off. At this time the voltage is cut off at the gate of triac. In this condition the triac is off and no heat gets supplied to the fusing lamp.

- Triac (THY1): 12A, 600V SWITCHING
- Phototriac Coupler (PC3): 15mA ~ 50mA(Design: 16mA)

6.5 ENGINE

6.5.1 PAPER FEED

Jam0 (feed area)

Jam0 occurs at the following times.

- Paper does not enter the unit due to a paper misfeed after a page was picked up.
- Paper entered, but did not get to the feed sensor in a certain time due to slip, etc after a page was picked up.
- A page was picked up, but the feed sensor is not on. Jam0 shows if the feed sensor is still not on after a certain time after the feed sensors tries again. This means that the leading edge of the paper doesn't pass the feed sensor within a certain time.
- The feed sensor does not turn on even though the paper reaches the feed sensor. This means that the leading edge of the paper already passed the feed sensor or that the sensor is faulty.

Jam1 (inside the machine)

Jam1 occurs at the following times.

- The trailing edge of the paper does not pass the feed sensor within certain time after the leading edge of the paper passes the feed sensor. (During this time the feed sensor cannot be Off)
- The paper does not reach the exit sensor within certain time after the leading edge of the paper passes the feed sensor. (The exit sensor cannot be On during this time)
- There is already paper between the feed sensor and the exit sensor.

Jam2 (exit area)

Jam1 occurs at the following times.

- The trailing edge of the paper does not pass the exit sensor within certain time after the trailing edge of the paper passes the feed sensor.

6.5.2 DRIVE

The main motor drives the following.

- Paper feed unit
- Developing unit
- Fusing unit

Software drives the main motor and controls the motor acceleration, motor speed and motor deceleration. The motor is managed with an A3977 driver IC and is controlled by signals from the CPU.

6.5.3 TRANSFER

The charging voltage, developing voltage and the transfer voltage are controlled by PWM (Pulse Width Modulation). Each output voltage is changeable according to the PWM duty cycle. The transfer voltage used when the paper passes the transfer roller is decided by environment recognition. The resistance value of the transfer roller changes due to the surrounding environment in the room or within the set, this change in resistance in turn changes the value of the voltage due to loading. This voltage is fed back into the set through the A/D converter. Based on this fed back value the PWM cycle is changed to maintain the required transfer voltage

6.5.4 FUSING

The temperature of the heat roller's surface gets detected from the resistance value of the thermistor. The thermistor resistance is measured with the A/D converter. This lets the CPU determine the temperature of the heat roller.

The AC power is controlled by comparing the target temperature to the value from the thermistor. An error shows if the value from the thermistor is out of the controlling range during the fusing process. The table below shows the error conditions.

Error	Description
Open heat error	The temperature stays lower than 68 C for more than 25 seconds during warm-up.
Low heat error	Standby: The temperature stays lower than 100 C for more than 25 seconds. Printing: 1. The temperature stays lower than 145 C for more than 5 seconds for 2 consecutive pages 2. The temperature stays 40 C lower than the fixed fusing temperature for more than 4seconds for 3 consecutive pages.
Over heat error	The temperature stays higher than 220 C for more than 3seconds.

6.5.5 LASER SCANNING UNIT

The LSU consists of the LD (Laser Diode) and the polygon motor control. When the printing signal occurs, the LD is turned on and the polygon motor is enabled. When the light sensor detects the beam, Hsync occurs. When the polygon motor speed becomes a normal, LReady occurs. If these two conditions are satisfied, the status bit of the LSU controller register becomes 1 ant the LSU is judged to be ready.

6.6 OPERATION PANEL (OPE)

The OPE consists of various function keys and an LCD to show machine status and messages.

A MICOM (HOLTEC HT48R50) drives the LEDs and LCD. Communication between the OPE and the CPU on the main board is serial (related signals are /Reset, TXD, and RXD).

6.7 USB HOST

The USB host PBA provides power to the USB connector. This enables the USB memory drive to use the following functions.

- Direct printing
- Scan to USB functions.

6.8 FAX SECTION

6.8.1 MODEM

- Group3 facsimile modem
- External handset support (not supported on this machine)
- Requires Discrete Line Interface Unit (LIU)
- V.34 Half-Duplex Mode (modulation method used at Fax transmission)
- V.90 PCM/V.34 Duplex Data Modes (data modem only)

6.8.2 LIU PBA

The LIU board is the line interface unit and consists of the following.

- Tel_line
- Interface circuit
- Telephone circuit.

The Tel_Line circuit consists of the following.

- A matching transfer to conform to the impedance of the receiving telephone line.
- A circuit to isolate the fax machine from the PSTN
- A surge absorber to protect against lighting strike surges on the incoming line.

The Telephone circuit is consists of ring detection circuit, speech circuit, external hook detection circuit, and recall circuit.

SPECIFICATIONS

1. GENERAL SPECIFICATIONS

Configuration	Desktop	
Paper capacity	Main tray	250 sheets
	By-pass tray	50 sheets
	Optional paper feed unit	250 sheets
	Output tray	Face down: 150 sheets
		Face up: 1 sheet
Paper size	Main tray	A4, Letter, Legal, Folio, Executive, B5
	By-pass tray	Envelope 63/4, 73/4, #9, #10, DL, C5, B5
Paper weight	Main tray	60-90 g/m^2 (16-24 lb.)
	By-pass tray	60-163 g/m^2 (16-43 lb.)
Paper size	Maximum	216 x 356mm (8.5 x 14 inch)
	Minimum	76 x 127mm (3.5 inch)
ADF	Paper weight	47-105 g/m^2 (12.5-28 lb).
	Capacity	50 sheets
	Width	142 x 216mm (5.6x 8.5 inch)
	Length	148 x 356mm (5.8 x 14 inch)
Network (for B273-17/-21-27 models only)	Protocol	SPX/IPX, TCP/IP, Ethertalk, SNMP, HTTP 1.1, DLC/LLC
Machine size (W*D*H)	450 x 423 x 456 mm (17.7 x 16.7 x 18 inch)	
Weight	With toner cartridge	15.6 Kg (34.3 lb)
	Without toner cartridge	14.8 Kg (32.6 lb)
Operation panel	16 x 2 characters	
Interface option	USB 2.0	
Total Counter	Electric Counter	
Environmental Standard	US version: Energy Star Tier 1	
	EU version: BAM specifications	
Energy Saver Mode	Selectable 5/**15**/30/45 minutes	

2. PHYSICAL SPECIFICATIONS

Power consumption	Printing operation	370 W
	Energy saver mode	30 W (energy start compliant)
	Power switch	Supported
Power supply	Low voltage	110-127 V
	High voltage	220-240 V
	Input frequency	50/60 (± 3Hz)
Noise	Printing	54 dB
	Copy	55 dB
	Standby	33 dB
Warm up time (from energy saver mode)	Less than 42 seconds	

3. PRINT SPECIFICATIONS

Print speed	22 ppm LT	
	20 ppm A4 (600 dpi)	
Printer drivers	PCL6	
Auto emulation sensing	Supported	
Font	45 Scalable, 1 Bitmap	
Energy Save Mode	**5**/10/15/30/45 min	
Resolution	Normal	600 x 600 dpi
	RET	1200 x 1200 dpi
Toner save mode	Supported	
Memory	16 MB	
First print time	From standby	Less than 10 seconds
	From energy saver mode	Less than 50 seconds
Duplex print	Not supported	
Printable area	208 x 273 mm (Letter)	
Halftone grayscales	128 levels	

4. SCAN SPECIFICATIONS

Scan method	Color CCD	
Scan speed through ADF	Linearity	Approximately 75 seconds (USB 1.1)
	Gray	Approximately 75 seconds (USB 1.1)
	Color	Approximately 150 seconds (USB 1.1)
Scan speed through platen	Linearity	Approximately 75 seconds (USB 1.1)
	Gray	Approximately 75 seconds (USB 1.1)
	Color	Approximately 150 seconds (USB 1.1)
Resolution	Optical	600 x 1200 dpi
	Enhanced	4800 x 4800 dpi
Halftone	256 levels	
Scan area	Maximum document width	216 mm (8.5 inch)
	Effective scan width	208 mm (8.2 inch)
Scan to	E-mail, Image, OCR, Fax, Web,	
Scan depth	Color: 24 bit	
	Monochrome: 1 bit for line art, 8 bit for grayscale	

5. COPY SPECIFICATIONS

Copy resolution	Text	600 x 300 dpi
	Text/Photo	600 x 300 dpi
	Photo	600 x 600 dpi for platen
	Other	Not supported
First copy time	From stanby	10 seconds: Platen
		15 seconds: ADF
	From energy saver mode	50 seconds
Copy speed (letter)	SDMC (all modes)	Letter: 22 cpm
		A4: 20 ccm
	MDMC (text 600 x 300 dpi)	14 cpm
	MDMC (photo 600 x 600 dpi)	8 cpm
Original alignment	Platen	Rear left
	ADF	Center
Resolution	Scan	600 x 300 dpi, 600 x 600 dpi
	Print	600 x 600 dpi
Zoom	Platen	25%-400%
	ADF	25%-100%
Multi-copy	1-99	
Copy mode	Text, Mixed, Photo (all supported)	
Preset	Supported	
Darkness control	3 levels (LED)	
Collation copy	Supported: 600 x 300 dpi	
Auto return to default mode	Supported: (off/15/30/60/180 seconds)	
Changeable default mode	Contrast, image, reduce/enlarge, number of copies	
Special copy	N-up	2-up, 4-up
	Collation copy	Supported: (ADF only)
	Auto fit copy	Supported: (Platen only)
	2-side copy	Supported: (Platen only)
	Clone	Supported: (Platen only)
	Poster	Supported: (Platen only)
Environmental Standard	US version: Energy Star Tier 1	
	EU version: BAM specifications	
Energy Saver Mode	Default 15 minutes	
	Selectable 1/5/15/30/45/60 minutes	

6. TELEPHONE SPECIFICATIONS

Handset	No
On hook dial	Supported
Search	Supported (phone book)
1 touch dial	40EA (20 x shift). 20 x 2 dedicated keys
Speed dial	200 locations (00-199)
Telephone answering device I/F	Supported
Tone/Pulse	Supported (selected in Tech Mode)
Pause	Supported
Auto redial	Supporterd
Last number redialed	Supported
Distinctive ring	Supported
Caller ID	Supported
External phone interface	Supported
Report and list print out	Tx/Rx Journal: Supported
	Confirmation: Suppoprted
	Auto dial list: Suppoprted
	System data list: Suppoprted
Sound control	Ring volume (Off, Low, Medium, High)
	Key volume (On, Off)
	Alarm volume: (On, Off)
	Speaker (On, Off, Comm)

7. FAX SPECIFICATIONS

Compatibility	ITU-T, G3		
Communication system	PSTN/PABX		
Modem speed	33.6 Kbps		
Compression	MH/MR/MMR/JPEG		
Color fax	Supported (send only)		
Error correction mode	Supported		
Resolution	Standard	203 x 98 dpi	
	Fine	203 x 196 dpi	
	Super fine	300 x 300 dpi	
Scan speed	Standard		2.5 seconds/LT
	ADF (fine/super fine)		5 seconds/LT
Duplex fax print out	Not supporterd		
Multiple page scan	14 ppm/LT		
Receive mode	Fax, TEL, Ans/Fax, DRPD		
Memory	Capacity	4 MB (optional memory not supported)	
	Max locaations to store 1 group dial	199 locations	
	Fax forward	Supported (On, Off)	
	Broadcasting	Supported (up to 209 locations)	
	Cover page	Supported	
	Delayed fax	Supported	
	Memory RX	Supported	
Functions	Vioce request	Not supported	
	TTI	Supported	
	RTI	Supported	
	Polling	Not supported	
	Flash	Not supported	
	Auto reduction	Supported	
	F/W remote upgrade	Supported	
Junk fax barrier	Supported		
Secure receive	Supported		
Memory back-up	Supported (Maximum 43 hours)		

8. SOFTWARE SPECIFICATIONS

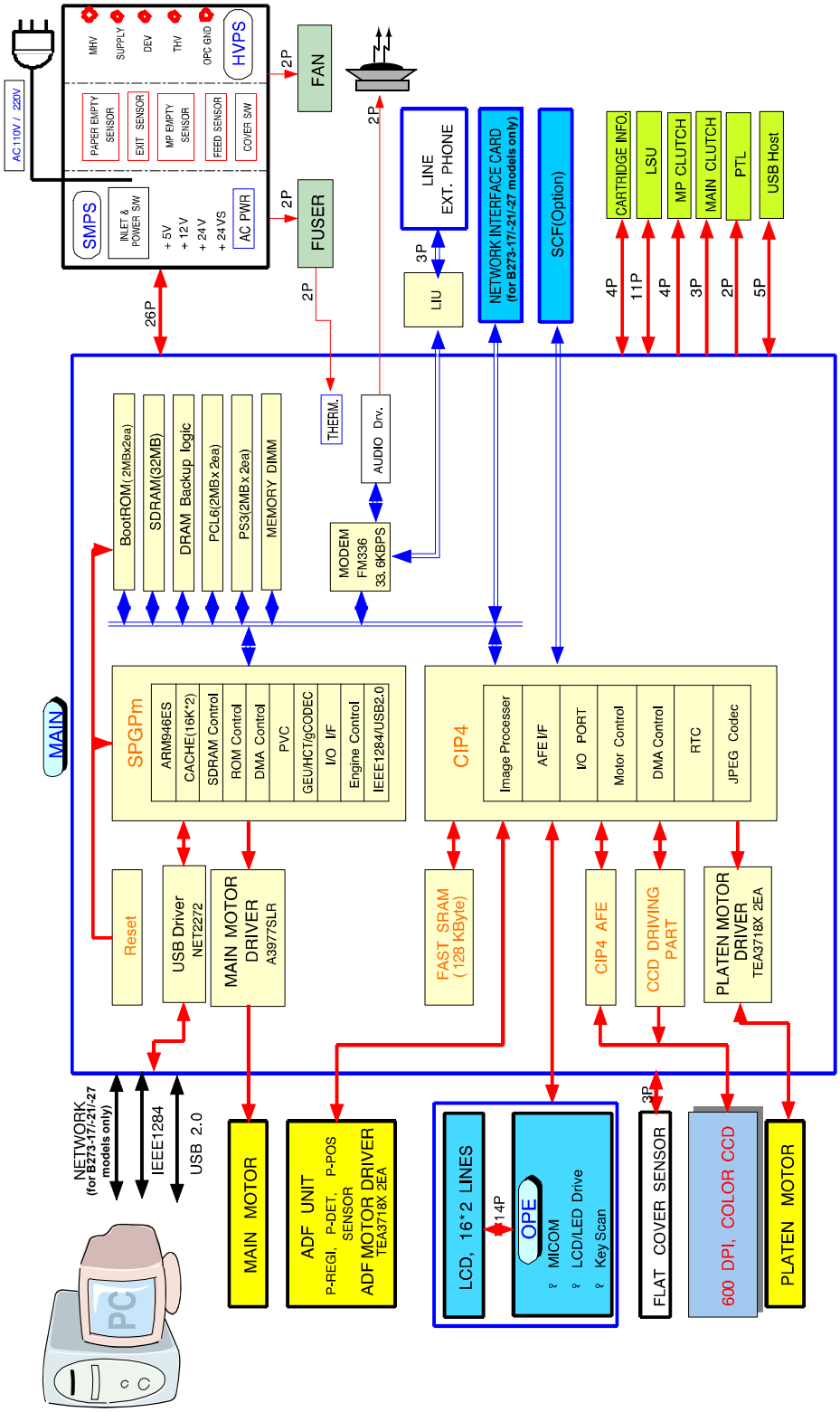
Operating sytems	Supported	Windows 95/ME/NT 4.0/2000/XP Mac: English only web version
	Not supported	DOS Windows 3.x/95 Linux
WHQL	MFP: Supported: Windows 2000/XP	
Drivers	Printer	PCL6
	TWAIN	Supported
	WIA	Supported
	RCP	Supported
	PC-Fax	Supported (through PC modem and fax S/W)

9. PAPER SIZES/WEIGHTS

Paper Tray	Supported Paper Sizes	Remarks
Standard Paper tray	A6, A5, A4, B5, 81/2" x 11", 81/2" x 13", 81/2" x 14"	Plain paper
By-pass tray	A6, A5, A4, B5, 71/4" x 101/2, 81/2" x 11", 81/2" x 13", 81/2" x 14"	Plain paper, Envelope, Transparency, Label, Card, Post card
	Irregular size: 76-216 x 127-356 mm (3.0" - 8.5" x 5.0" - 14.0")	
Paper Tray	**Paper Weights**	
Standard Paper tray	60-90 g/m^2 (16-24 lb.)	
By-pass tray	60-163 g/m^2 (16-43 lb.)	

APPENDIX

BLOCK DIAGRAM



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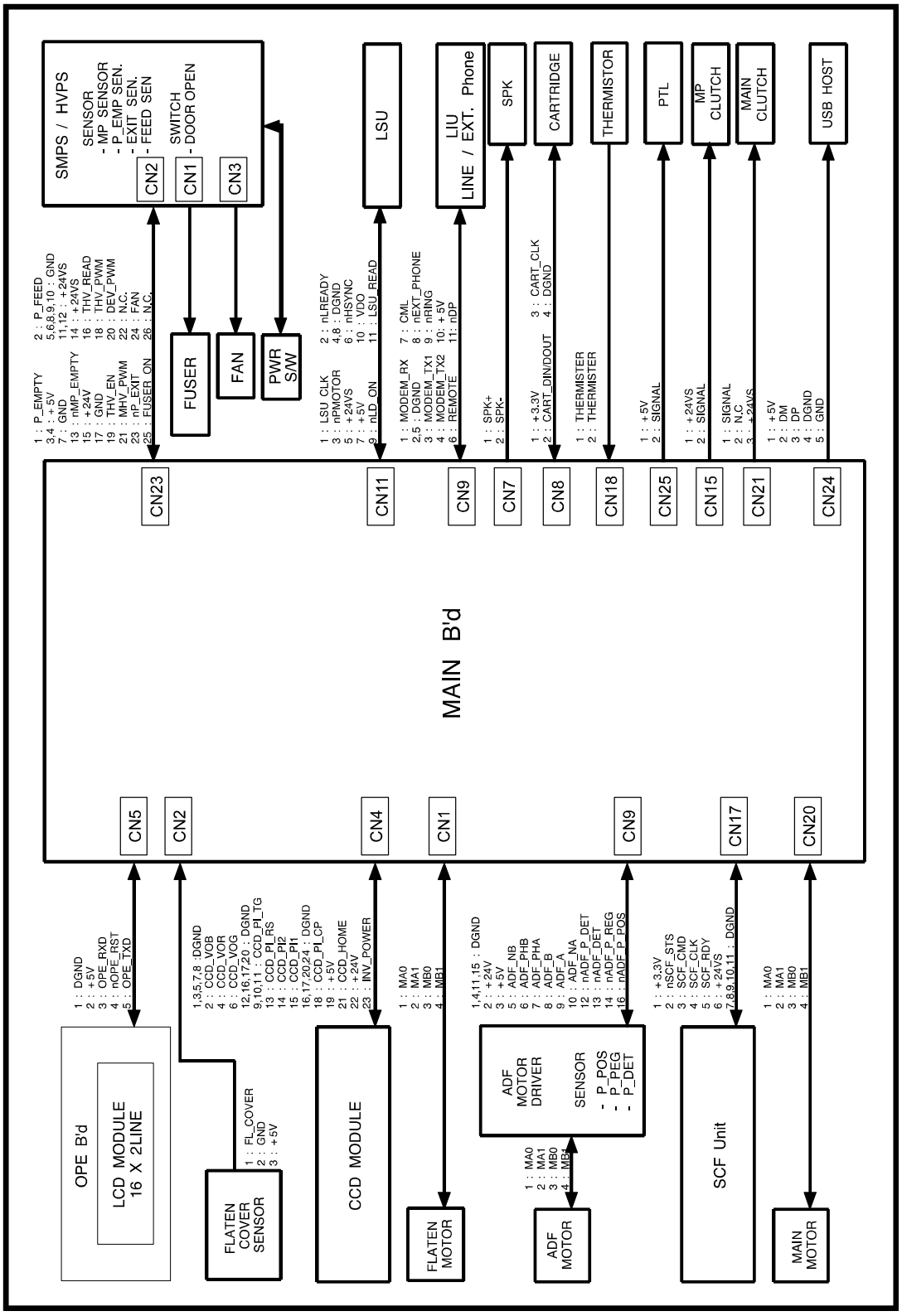
CONNECTION DIAGRAM



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