Model L2A/L2B/L2C
(Machine Code: H914/H915/H916)

SERVICE MANUAL

16 April 2004
Subject to Change

PRECAUTIONS

Read these safety notes carefully before you service the machine.

WARNING FOR SAFETY

1. **Only an approved service engineer can service this machine.**
   High voltages and lasers in this machine are dangerous. The user must not service this machine.F
2. There are no user serviceable parts in the machine. Do not make changes or add things to the machine. These could cause the machine to malfunction and cause electrical shocks or fire hazards.
3. **Laser Safety**
   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. It is certified as a Class I laser product for the requirements of IEC 825 in other places. Class I laser materials are not hazardous. The laser system does not let you get access to laser radiation at these times:
   - Above a class I level at the time of normal operation
   - User maintenance
   - Approved service condition.

⚠WARNING

Do not operate or service the machine with the protective cover removed from the laser/scanner assembly. The reflected beam, although invisible, can damage your eyes. You must follow the basic safety pre-cautions to decrease the risk of fire, electrical shock, and injury.

CAUTION.WMF

CAUTION FOR SAFETY

POISONOUS MATERIAL

This machine contains poisonous materials that can make you sick if you swallow them.

1. It is possible for the liquid inside to come out if the LCD control panel is damaged. This liquid is poisonous. Contact with the skin must be prevented. Clean splashes from your eyes or skin immediately. Then contact your doctor. Go to a doctor immediately if the liquid gets in your mouth
2. Keep toner cartridges away from children. The toner powder in the toner cartridge can be dangerous. Contact a doctor if you swallow the toner.

ELECTRICAL SHOCK AND FIRE SAFETY PRECAUTIONS

Do these to prevent electrical shock or to prevent a fire.

1. Use only the correct voltage. Failure to do these could damage the machine and cause a fire cause or an electrical shock.
2. Use only the power cable supplied with the machine. Use of an incorrectly specified cable could cause the cable to get too hot and cause a fire.
3. Do not overload the power socket. This can let the cables in the wall overheat and could start a fire.
4. Do not let water or other liquids go into the machine. This can cause electrical shock. Do not let paper clips, pins or other unwanted objects go into the machine. These could cause a short circuit and can make an electrical shock or fire hazard.
5. Do not touch the plugs on the two ends of the power cable with wet hands. This can cause electrical shock. Disconnect the power plug from the wall socket before you service the machine.
6. Use high caution when you put in or disconnect the power plug. The power plug must be correctly put in. If not, a fire will be caused because of unsatisfactory contact. Hold the plug tightly when you disconnect the power plug.
7. Examine the power cable. Do not let it get twisted, bent around corners or damaged. Do not put objects on top of the power cable. The power cable can get too hot and cause a fire if it gets damaged. Damaged cables can cause an electrical shock. Replace a damaged power cable immediately. Do not repair or use the damaged cable again. Some chemicals can damage the layer on the power cable.
8. Make sure that the power sockets and plugs are not open or broken. You must repair defects immediately. Make sure that you do not cut or damage the power cable or plugs when you move the machine.

9. Use high caution during thunder or lightening storms. Disconnect the machine from the power source at these times. Do not touch the machine or the power cord if it is connected to the wall socket in these weather conditions.
10. Stay away from damp or dusty areas. Install the machine in a location with good airflow. Do not put the machine near a humidifier.
11. Do not put the machine in direct sunlight. This will cause the temperature inside the machine to increase and not let the machine operate correctly.
12. Do not put metal objects into the machine through the ventilator fan or other part of the casing. This could make contact with a high voltage conductor inside the machine and cause an electrical shock.

HANDLING PRECAUTIONS

Examine these instructions for your safety.

1. Install the machine on a level surface that can hold its weight.
2. The machine has many rollers, gears and fans. Use high caution to not let these occur:
   - Make sure to not let your fingers get caught in the parts.
   - Do not let hair or unwanted things go in the rotating devices.
3. Do not put small metal objects, containers of water, chemicals or other liquids near the machine. These can damage the machine.
4. Do not install the machine in these areas:
   1) Areas with high dust or moisture levels.
   2) Adjacent to an open window.
   3) Close to a humidifier or heater.
5. Do not put candles, cigarettes, etc on the machine. These can start a fire.

ASSEMBLY / DISASSEMBLY PRECAUTIONS

Replace parts carefully. Use recommended parts only. Make sure that you check the correct location of parts and cable routing before you service the machine. Make sure that all parts and cables are correctly replaced. Do these procedures before you service the machine:

1. Check the contents of the machine memory. Then make a note of any user settings. You cannot keep these if you replace the main board or network card.
2. Make sure that you disconnect the power before you service or replace electrical parts.
3. Disconnect interface cables and power cables.
4. Only use approved spare parts. Make sure that these things are correct:
   - Part number
   - Product name
   - Voltage
   - Current
5. Do not use high force when you remove or replace parts.
6. Do not let small parts go into the machine.
7. Toner cartridge

   NOTE: 1) The OPC drum can get damaged if it is exposed to light. Make sure to not let the OPC drum get exposed to direct sunlight or to fluorescent or incandescent lighting. Exposure for 5 minutes or less can damage the surface's photoconductive properties. Use high caution when you service the machine. Remove the OPC drum and keep it in a black bag or other lightproof container. Use high caution when you work with the covers (especially the top cover) open. Light can get to the OPC area and can damage the OPC drum.

   2) Make sure not to scratch the green surface of OPC drum unit. Print quality will decrease if the green surface of the drum cartridge is scratched or touched.

READ THIS WARNING CAREFULLY TO PREVENT INJURY

1. **Use high caution with the high-temperature part.**
   The fuser unit operates at a high-temperature. Use caution when you service the machine. Let the fuser to cool down before disassemble it.
2. **Do not put finger or hair into the rotating parts.**
   Use high caution when you use the machine. It contains many parts that turn. Make sure that fingers, hair and unwanted things do not get caught in the mechanism.
3. **When you move the machine.**
   This machine weighs 10kg (with toner cartridge and cassette). Use safe procedures to lift and move the machine. Use the lifting handles located on each side of the machine. Back injury could be caused if you do not lift the machine correctly.

SAFTY.WMF

4. **Make sure that the machine is installed safely.**
   The machine weighs 10Kg. Install the machine on a level surface that can hold its weight.
5. Do not install the machine on a slope or surface that is not stable. Make sure that the machine is stable after you install it.

ESD PRECAUTIONS

Static electricity can damage semiconductor devices. These components are called “Electrostatically Sensitive (ES) Devices”, or ESDs.

These are examples of ESDs:

1) Integrated circuits
2) Some field effect transistors
3) Semiconductor “chip” components.

Do the procedures shown below to not let these components get damaged by static electricity.

⚠CAUTION

Make sure that no power goes to the chassis or circuit. Then do these safety precautions.

1. Remove electrostatic charge from your body before you touch a semiconductor component.
2. Put an electrical assembly with ESDs on a conductive surface, such as aluminum or copper foil after you remove it.
3. Use only a grounded tip soldering iron to solder or de-solder ESDs.
4. Use an “anti-static” solder removal device. Some solder removal devices not classified as “anti-static” can give electrical charges sufficient to damage ESDs.
5. Do not use Freon propelled chemicals. These can give electrical charges sufficient to damage ESDs.
6. Do not remove a replacement ESD from its package until the time you will install it. Most replacement ESDs come with all leads shorted together by conductive foam, aluminum foil, or a comparable conductive material.
7. Put the protective material to the chassis or circuit assembly into which the device will be installed before you remove the protective shorting material from the leads of a replacement ESD.
8. Keep continuous electrical contact between the ESD and the assembly into which it will be installed, until completely plugged or soldered into the circuit.
9. Use minimum body movements when you touch a replacement ESD. Body movements can make static electricity sufficient to damage an ESD.

TABLE OF CONTENTS

SPECIFICATIONS

APPENDIX

PARTS CATALOG

1. INSTALLATION

Examine the operating instructions for installation instructions.

2. PREVENTIVE MAINTENANCE

The replacement cycle interval shown below is for maintenance.

Environmental conditions and differences in how the machine is used will change this interval.

The cycle period shown is for reference only.

[H914/H915]

	Component	Replacement Cycle	Done by
Scanner	ADF Rubber	10,000 Pages	Service
	ADF Roller	60,000 Pages	Service
Printer	Friction Pad	60,000 pages	Service
	Paper Feed Roller	60,000 Pages	Service
	Transfer Roller	60,000 Pages	Service
	Fuser	60,000 Pages	Service

[H916]

	Component	Replacement Cycle	Done by
Scanner	ADF Rubber	20,000 Pages	Service
	ADF Roller	60,000 Pages	Service
	ADF Pick-up Roller	60,000 Pages	Service
Printer	Friction Pad	60,000 pages	Service
	Paper Feed Roller	60,000 Pages	Service
	Transfer Roller	60,000 Pages	Service
	Fuser	60,000 Pages	Service

3. REPLACEMENT AND ADJUSTMENT

3.1 GENERAL PRECAUTIONS ON DISASSEMBLY

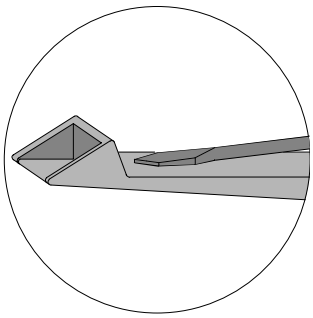
Use high caution when you disassemble and reassemble components. Make sure that you put all cables in the correct position, after you replace a part.

You must do these before you service the machine:

1. Make sure that no documents are in the memory.
2. Disconnect the power cord.
3. Remove the toner and drum cartridges before you disassemble parts.
4. Use a flat and clean surface.
5. Replace only with necessary components.
6. Do not use high force when you push plastic-material components.
7. Make sure that all components are in their correct position.

Releasing Plastic Latches

Many parts are set in their positions with plastic latches. The latches break easily. Release them carefully. Push the hook end of the latch away from the part to which it is latched to remove these parts.



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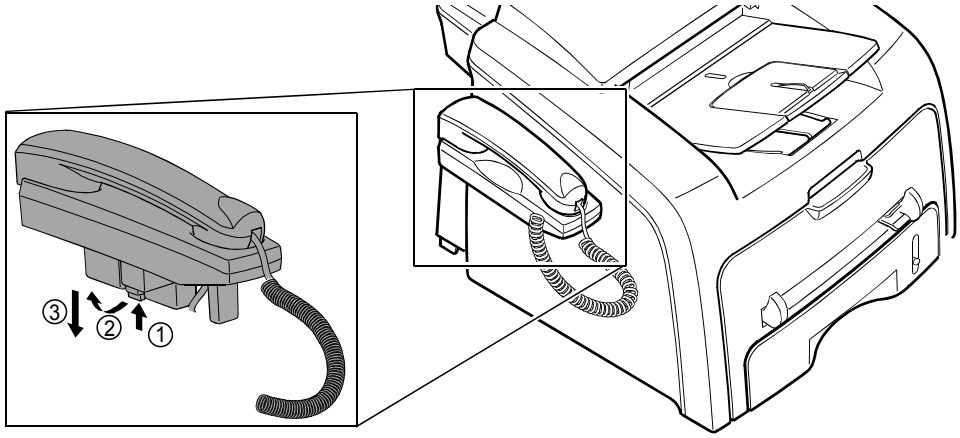
3.2 REPLACEMENT AND ADJUSTMENT (H914 / H915)

3.2.1 HANDSET CRADLE

1. Push the lever and remove the cradle as shown below.



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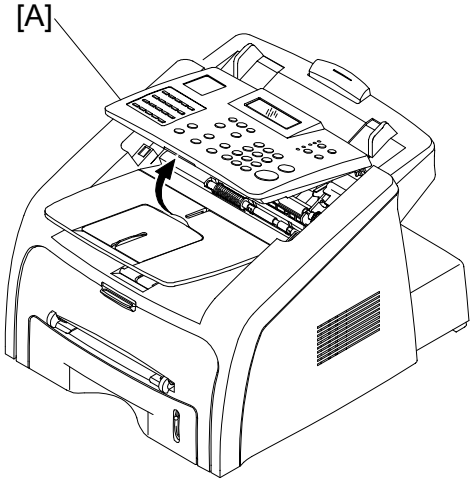
3.2.2 WHITE ROLLER ASS'Y

1. Open the OPE unit. (OPE-Port) [A]



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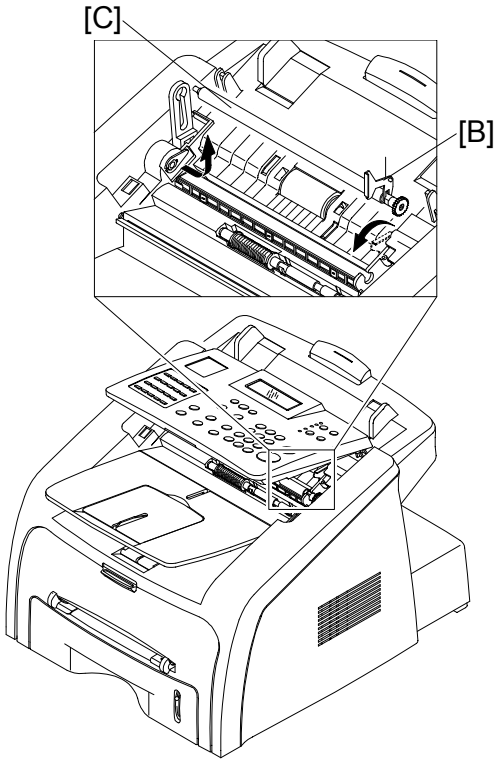
2. Push the bushing [B] on right side end of the white roller [C] slightly inward. Then rotate it until it reaches the slot. Then lift the white roller out.



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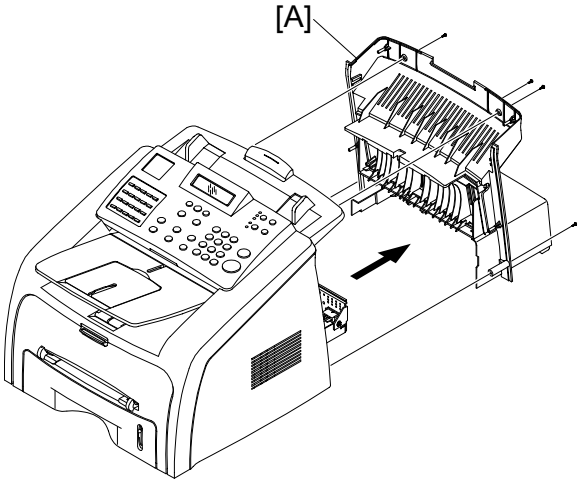
NOTE: Check the white roller for dirt. Clean with a soft cloth dampened with water. If the white roller is heavily worn replace it with a new one.

3.2.3 REAR COVER

1. Remove the four screws from the rear cover [A]. Then remove it.



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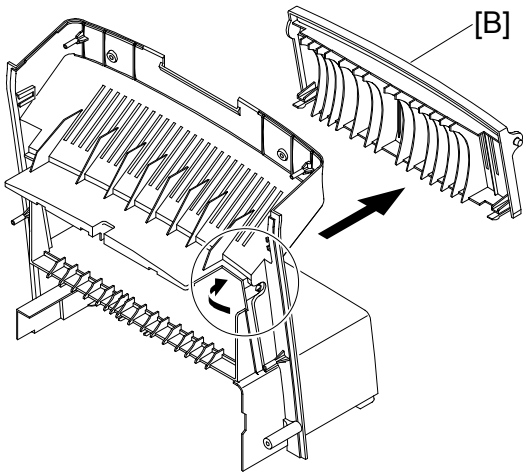
2. Unlatch the face up cover [B] from the rear cover. Then remove the face up cover.



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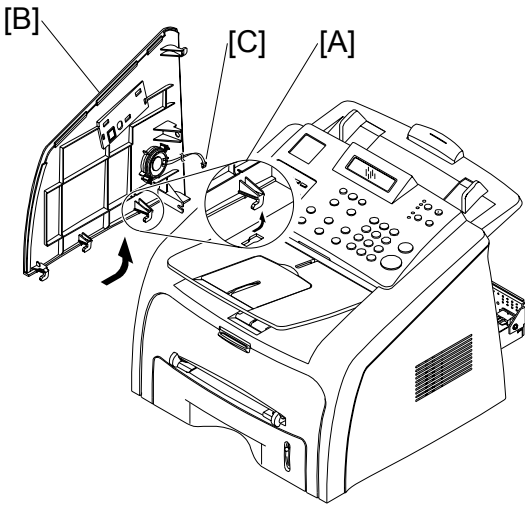
3.2.4 LEFT COVER

1. Remove these before you remove the Left cover:
   - Handset Cradle (☛ 3.2.1)
   - Rear Cover (☛ 3.2.3)

2. Release the latches [A] of the left cover [B] from the frame ass'y in the direction of the arrow. Use high caution not to disconnect the speaker harness [C].



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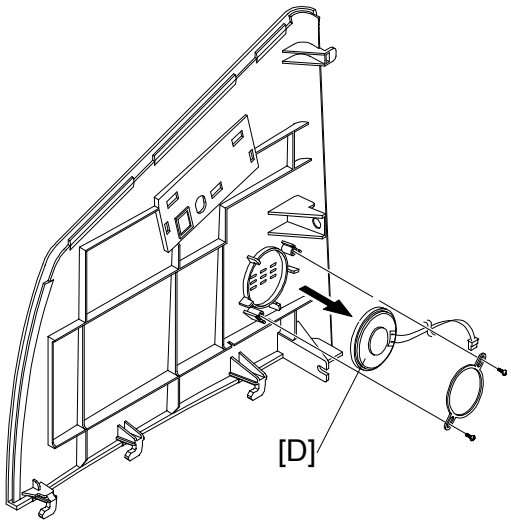
3. If necessary, remove the two screws from the left cover. Then remove the monitor speaker [D].



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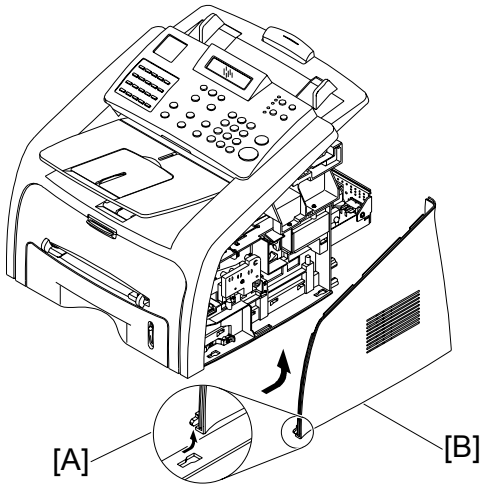
3.2.5 RIGHT COVER

1. Remove this before you remove the Right cover:
   - Rear Cover (☛ 3.2.3)

2. Release the latches [A] of the right cover [B] from the frame ass'y in the direction of the arrow.



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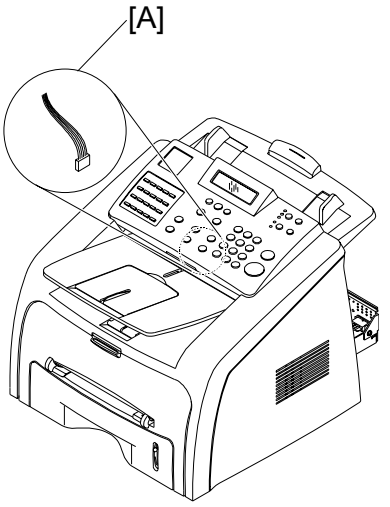
3.2.6 OPE UNIT (ALSO KNOWN AS OP-PORT)

1. Remove these before you remove the OPE unit:
   - Rear Cover (☛ 3.2.3)
   - Left cover (☛ 3.2.4)

2. Disconnect the OPE connector [A] from the scan motor harness. Then remove the two screws from the ground cable and remove it. Check the position of the bronze earth plate.



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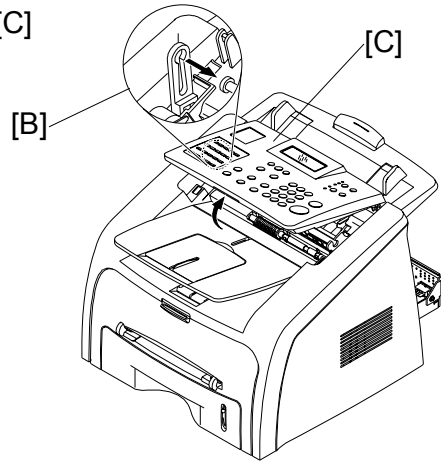
3. Open the OPE unit [B] Then release the latch [C] from holder.



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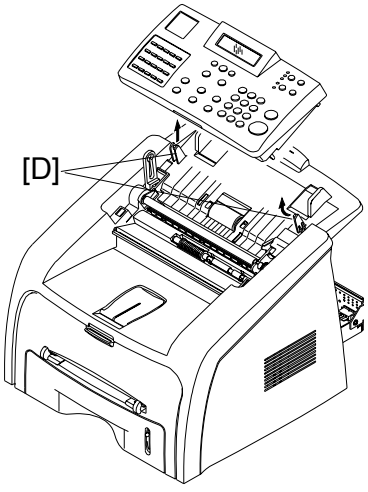
4. Carefully release the latches [D] from the top cover in the direction of the arrow.



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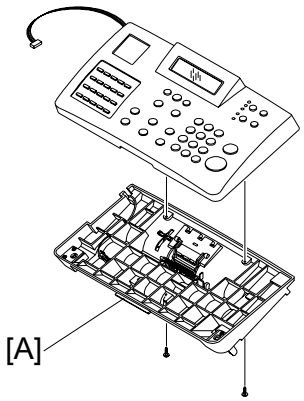
5. Remove the two screws from the upper scanner [A]. Then remove it.



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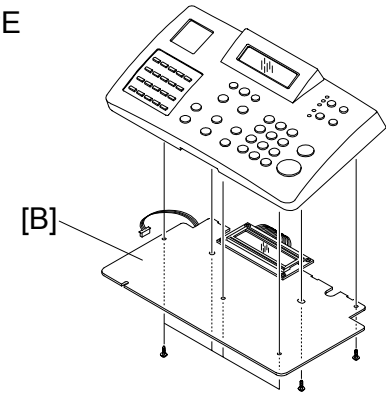
6. Remove the seven screws from the OPE PBA (OPE Board) [B]. Then remove it.



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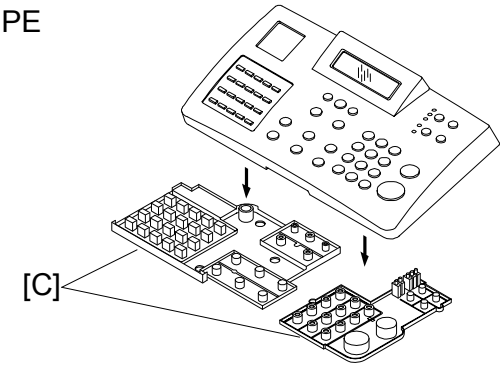
7. Remove the contact rubber [C] from the OPE cover.



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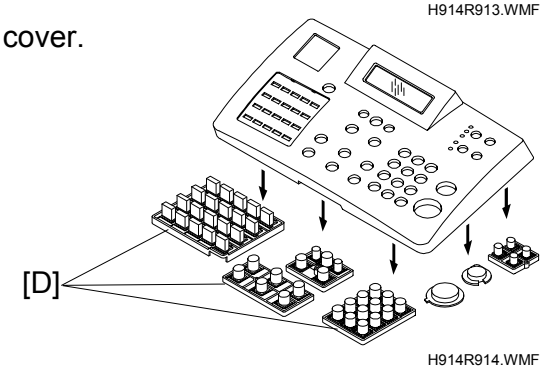
8. Remove the key pad [D] from the OPE cover.



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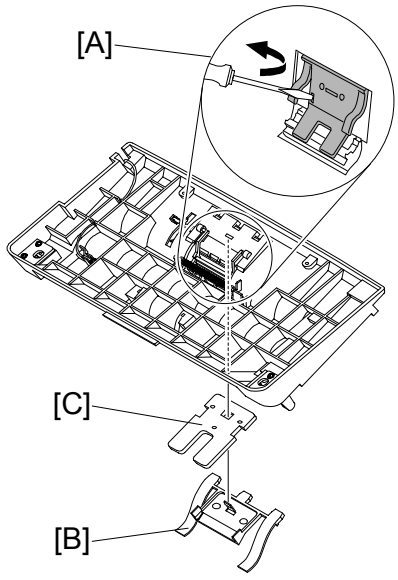
3.2.7 ADF RUBBER PAD

1. Remove these before you remove the ADF rubber pad:
   - Rear Cover (☛ 3.2.3)
   - OPE Unit (☛ 3.2.6)

2. Put a flat-blade screwdriver into the slot [A]. Then release the latches.
3. Remove the rubber holder [B] and the rubber pad [C].



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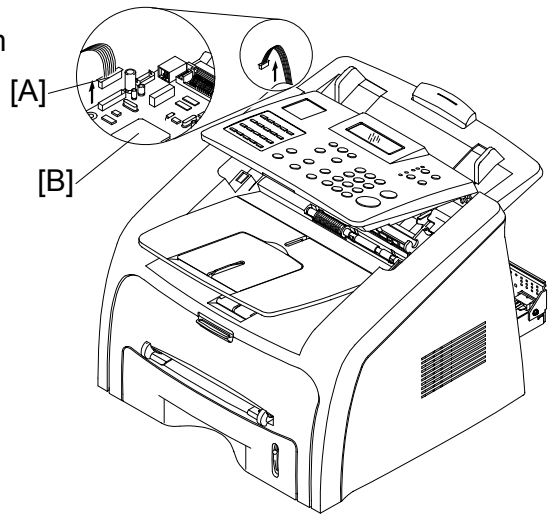
NOTE: 1) Check these when you reassemble the rubber pad:
- Make sure that the rubber pad and holder fit into the guide correctly.
- Make sure the holder latches fit into the correct holes.
- Push firmly until the part clicks.

2) Clean the surface of the rubber pad with ethyl alcohol. Then wipe it, dry. Check the rubber for wear. Replace it if the wear gets to 1/2 of its original thickness.

3.2.8 CIS

1. Remove these before you remove the CIS:
   - White Roller Ass'y (☛3.2.2)
   - Rear Cover (☛ 3.2.3)

2. Disconnect the CIS connector [A] from the main board. (CN14)



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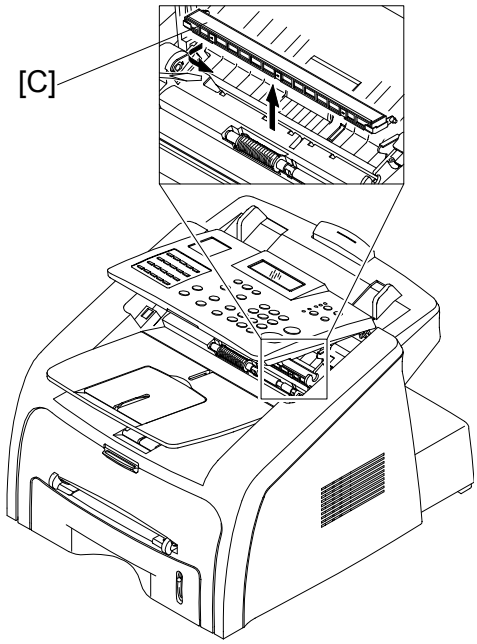
3. Disconnect the CIS [B] with a flat-blade screwdriver. Then release it. Disconnect the harness from CIS unit.



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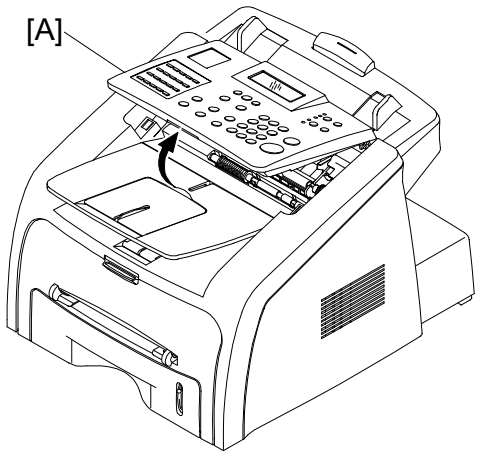
3.2.9 EXIT ROLLER

1. Open the OPE unit [A].



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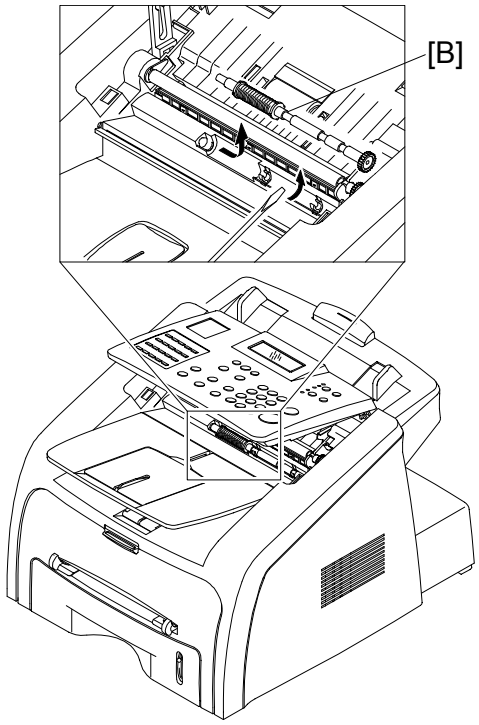
2. Pull up the exit roller [B] with a flat-blade screwdriver. Then remove it.



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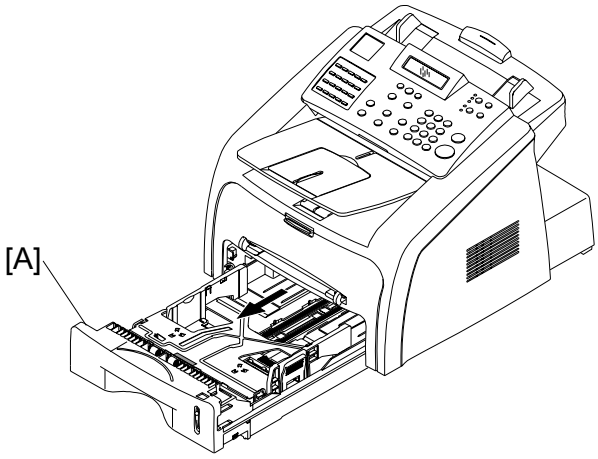
3.2.10 FRONT COVER

1. Remove the cassette [A].



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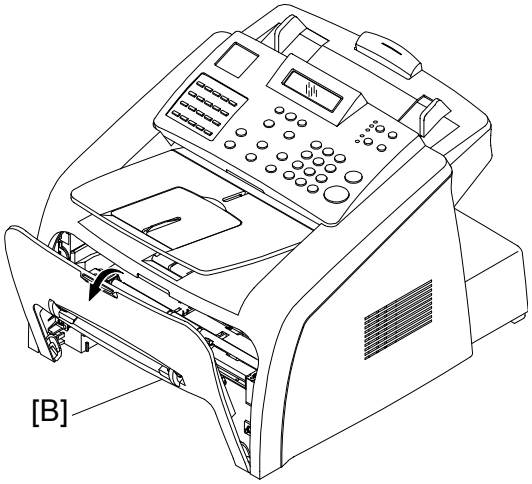
2. Open the front cover [B].



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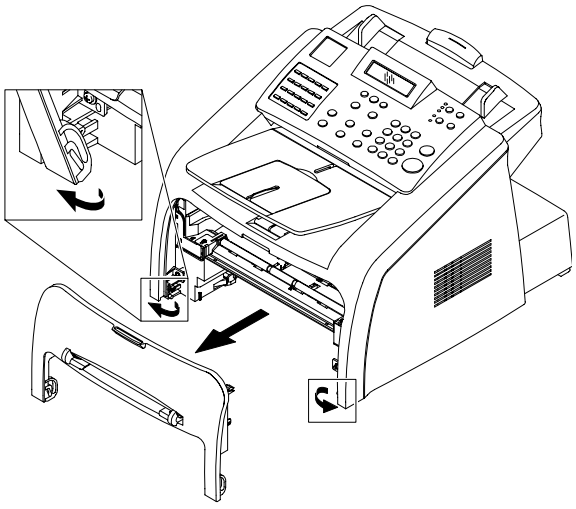
9. Disconnect the front cover from the frame ass'y. Then remove the front cover in the direction of the arrow.



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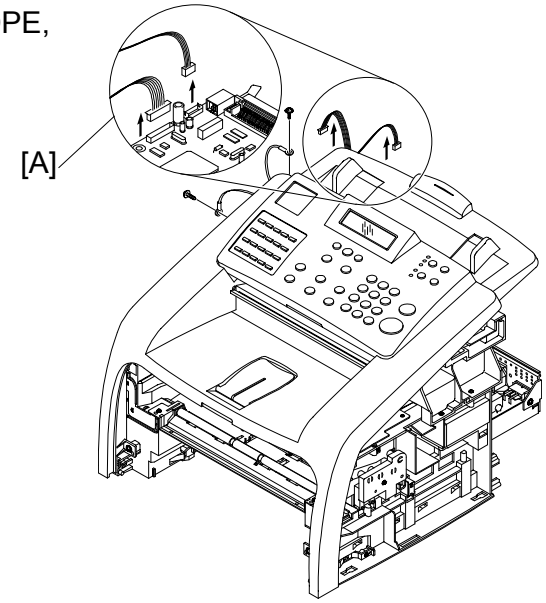
3.2.11 SCAN ASS'Y

1. Remove these before you remove the scan ass'y:
   - Rear Cover (☛ 3.2.3)
   - Left cover (☛ 3.2.4)
   - Front Cover (☛ 3.2.10)

2. Disconnect the three connectors [A] (OPE, CIS, scan motor) from the main board. Then remove the two ground cables.



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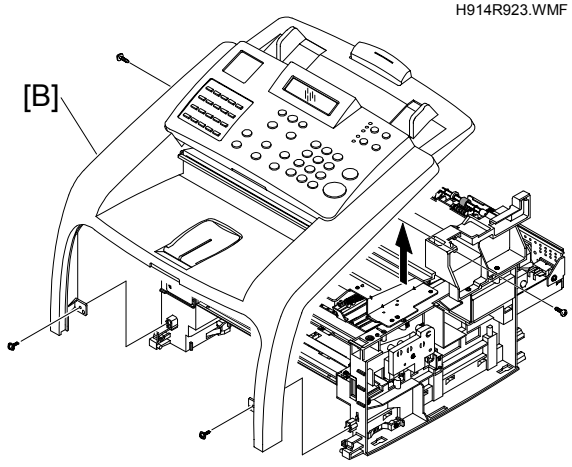
3. Remove the four screws from the scan ass'y [B]. Then remove it.



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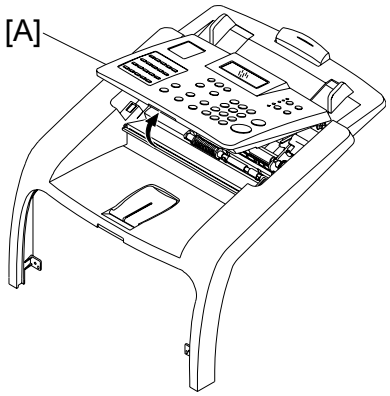
3.2.12 SCAN MOTOR ASS'Y

1. Remove these before you remove the scan motor ass'y:
   - Rear Cover (☛ 3.2.3)
   - Right Cover (☛ 3.2.5)
   - OPE Unit (☛ 3.2.6)
   - Scan Ass'y (☛ 3.2.11)

2. Open the OPE unit [A].



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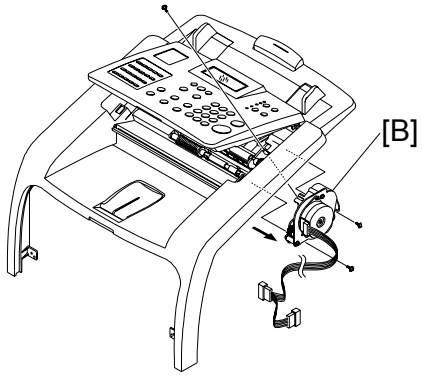
3. Remove the three silver screws from the scan motor ass'y [B]. Then remove it.



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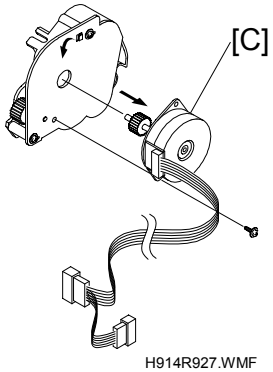
4. If necessary, remove the one screw from the scan motor [C]. Then release the latches from motor bracket in the direction of the arrow.

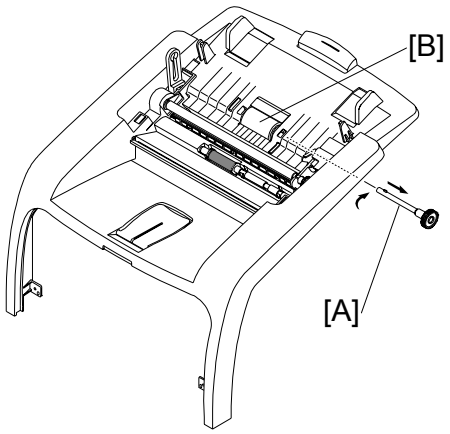


H914R927.WMF

3.2.13 ADF ROLLER

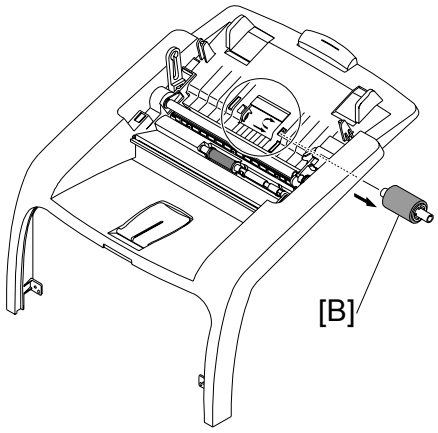
1. Remove these before you remove the ADF roller:
   - Rear Cover (☛ 3.2.3)
   - Right Cover (☛ 3.2.5)
   - Front Cover (☛ 3.2.10)
   - Scan Ass'y (☛ 3.2.11)
   - Scan Motor Ass'y (☛ 3.2.12)

2. Carefully release the ADF gear [A] from the ADF roller [B].



H914R928.WMF

3. Carefully release the ADF roller [B] from the top cover in the direction of the arrow.

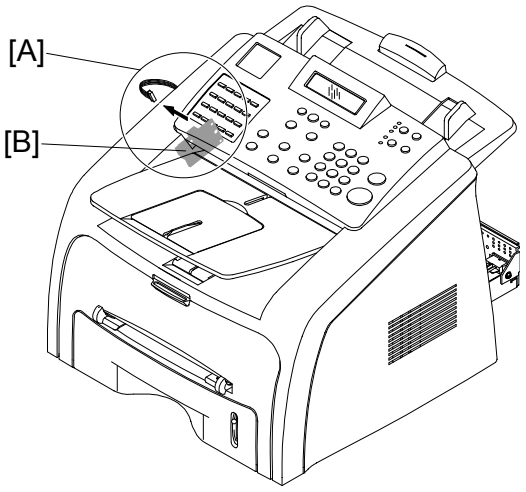


H914R929.WMF

3.2.14 HOOK SWITCH BOARD

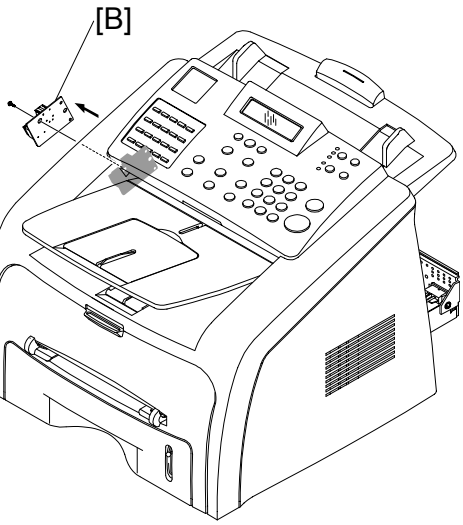
1. Remove this before you remove the hook switch board:
   - Rear Cover (☛ 3.2.3)

2. Disconnect one connector [A] from the hook switch board [B].



H914R930.WMF

3. Remove one screw from the hook switch board [B]. Then remove it.



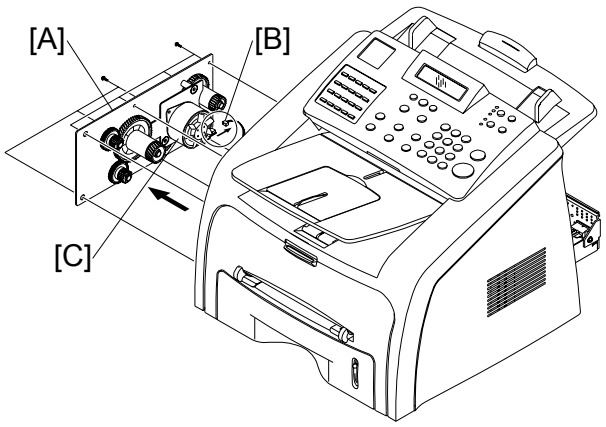
H914R931.WMF

3.2.15 DRIVE ASS'Y

1. Remove these before you remove the drive ass'y:
   - Rear Cover (☛ 3.2.3)
   - Left cover (☛ 3.2.4)

   NOTE: Note: Make sure you tighten the screws in the order that they are numbered on the base plate when you refit the drive ass'y.

2. Remove the six screws from the drive ass'y [A]. Then remove it.
3. Disconnect the one connector [B] from the drive motor [C].

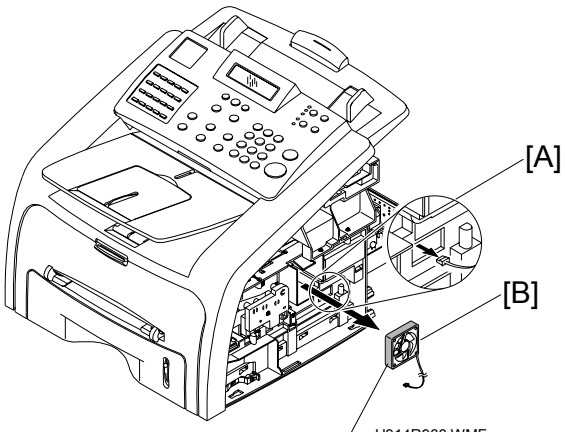


H914R932.WMF

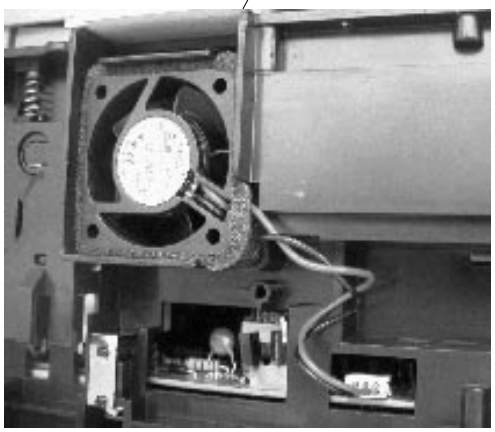
3.2.16 FAN

1. Remove these before you remove the fan:
   - Rear Cover (☛ 3.2.3)
   - Right Cover (☛ 3.2.5)

2. Disconnect the one connector [A] from the SMPS. Then remove the fan [B].



H914R933.WMF

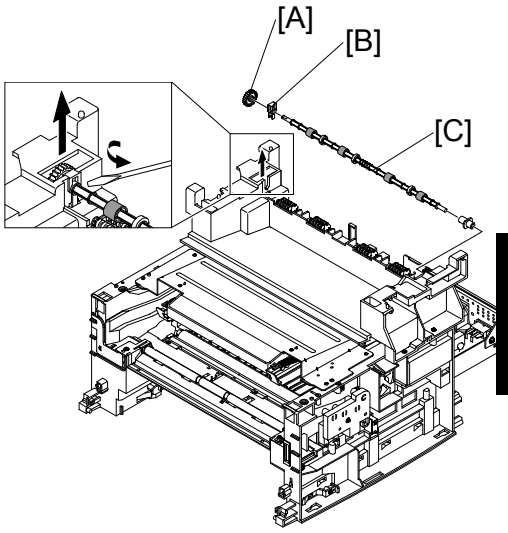


CAUTION: Make sure to set the fan in the correct position. The label on the fan must face outward.

3.2.17 EXIT COVER ASS'Y

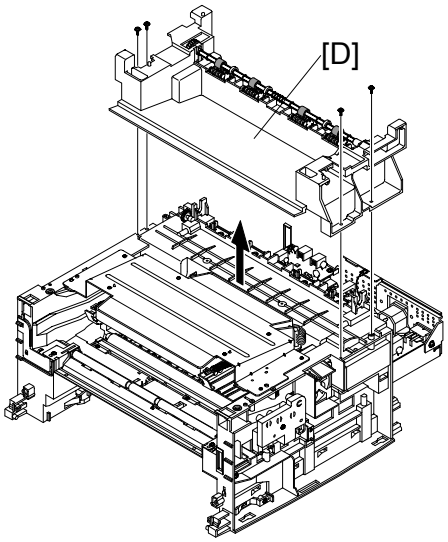
1. Remove these before you remove the exit cover ass'y:
   - Scan Ass'y (☛ 3.2.11)
   - Hook Switch Board (☛ 3.2.14)

2. Remove the exit gear [A] and bearing [B] with a flat-blade screwdriver. Then remove the exit roller [C].



H914R935.WMF

3. Remove the four screws from the exit cover ass'y [D]. Then remove it.

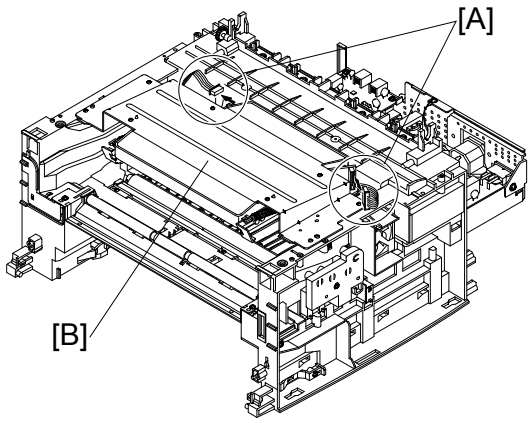


H914R934.WMF

3.2.18 LSU (LASER SCANNING UNIT)

1. Remove these before you remove the LSU:
   - Scan Ass'y (☛ 3.2.11)
   - Exit Cover Ass'y (☛ 3.2.17)

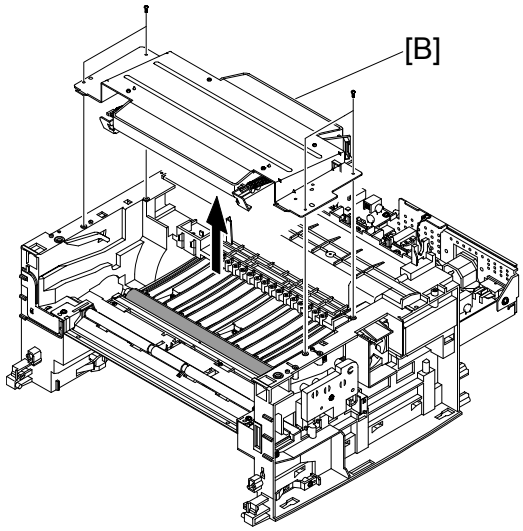
2. Disconnect the two connectors [A] from the LSU [B].



H914R936.WMF

3. Remove the four screws from the LSU [B]. Then remove it.

   NOTE: Note: Tighten the screws in the order that they are numbered on the base plate when you refit the drive ass'y

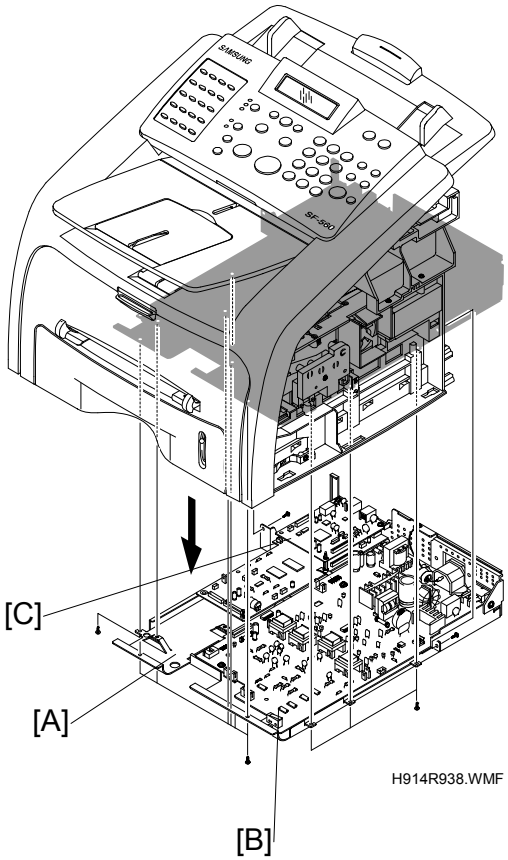


H914R937.WMF

3.2.19 SHIELD PLATE – MAIN BOARD

1. Remove these before you remove the Shield Plate-Main Board:
   - Rear Cover (☛ 3.2.3)
   - Left cover (☛ 3.2.4)
   - Right Cover (☛ 3.2.5)

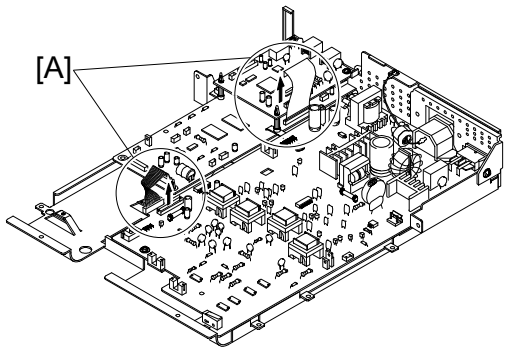
2. Remove the twelve screws securing the shield plate-main board [A] and remove it. Then disconnect all connectors from the SMPS [B] and main board [C], HVPS.



3.2.20 LIU PBA (ALSO KNOWN AS NCU)

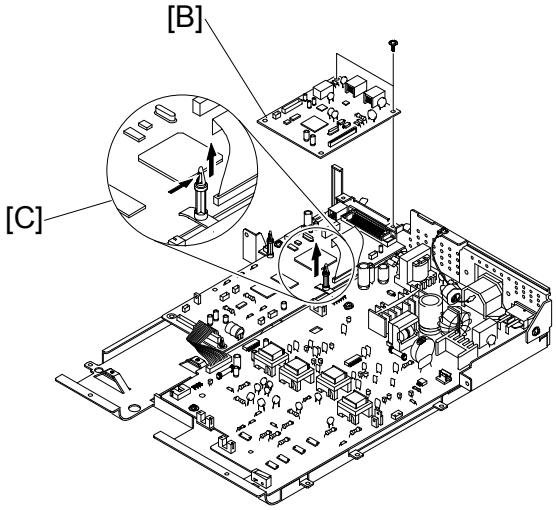
1. Remove this before you remove the LIU PBA:
   - Shield Plate – Main Board (☛ 3.2.19)

2. Disconnect the flat cable and one connector [A].



H914R939.WMF

3. Remove the two screws from the LIU board [B].
4. Carefully release the latches from the supporter [C]. Then remove it.



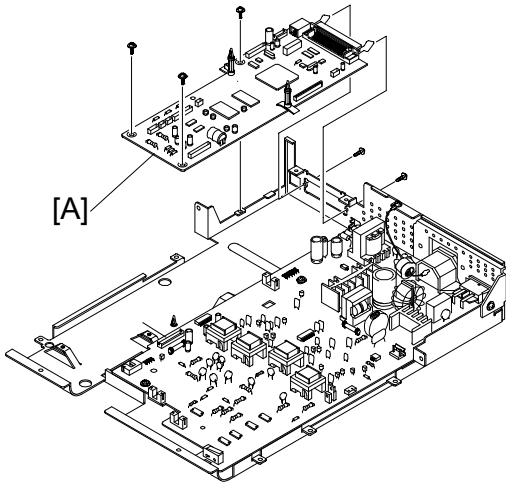
H914R940.WMF

3.2.21 MAIN PBA (MAIN BOARD)

NOTE: 1) Print out the system data list in Tech mode to keep programmed data before you do the replacement procedure.
2) Do the “Clear All Memory” in Tech mode (☛ 5.2.3) after you finish the replacement procedure.

1. Remove these before you remove the main board:
   - Shield Plate – Main Board (☛ 3.2.19)
   - LIB PBA (☛ 3.2.20)

2. Remove the five screws from the main PBA [A]. Then remove it. Use high caution when you release the latches from the supporter.

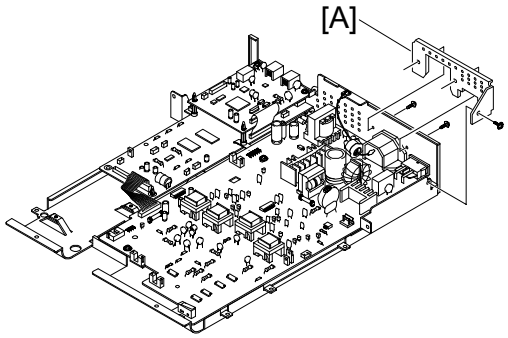


H914R941.WMF

3.2.22 SMPS (ALSO KNOWN AS POWER SUPPLY UNIT)

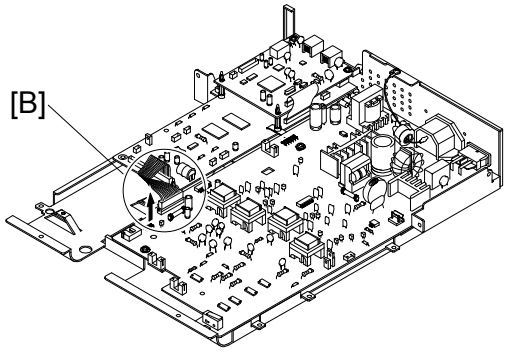
1. Remove this before you remove the SMPS:
   - Shield Plate – Main Board (☛ 3.2.19)

2. Remove the three screws from the inlet bracket [A]. Then remove it.



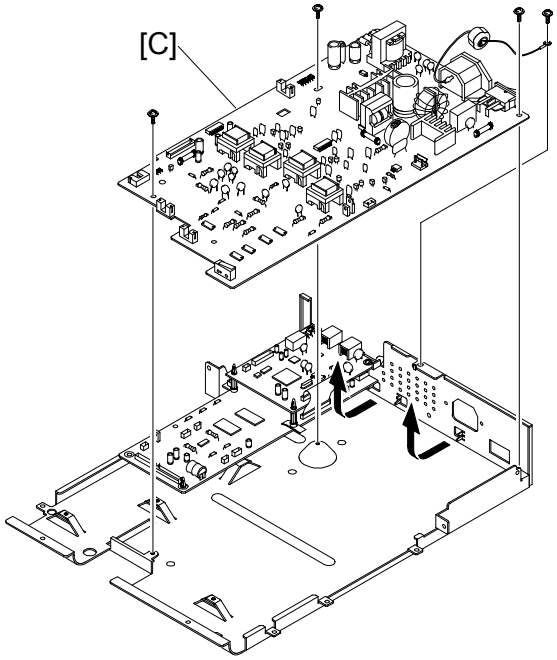
H914R942.WMF

3. Disconnect one connector [B].



H914R943.WMF

4. Remove the four screws from the SMPS [C]. Then remove it.



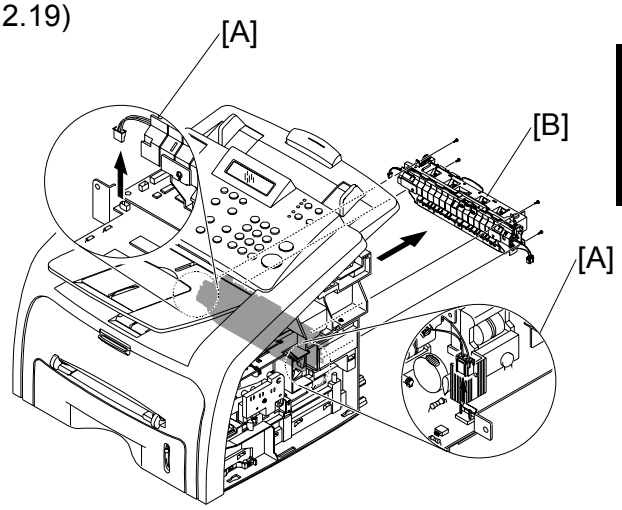
H914R944.WMF

3.2.23 FUSER ASS'Y (ALSO KNOWN AS FUSING UNIT)

⚠CAUTION
The fusing unit has tapping screws. Assembly/disassembly should be kept to a minimum. Adjustments again and again can cause failure. To avoid hazardous situations, do not replace any components inside the fusing unit such as thermistor, hot roller, stripper pawls, fusing lamp, etc.

1. Remove this before you remove the Fuser ass'y:
   - Shield Plate – Main Board (☛ 3.2.19)

2. Disconnect the two connectors [A] from the main board and SMPS. Then remove the four screws from the fuser ass'y [B]. Then remove it.

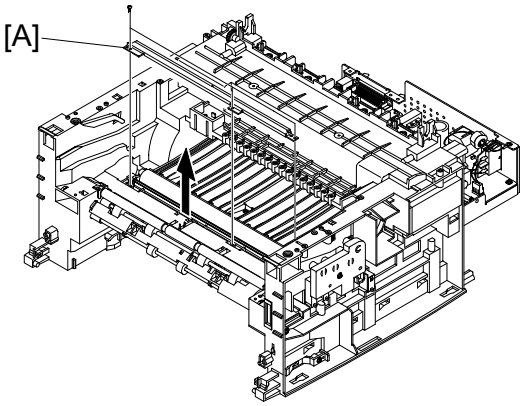


H914R945.WMF

3.2.24 TRANSFER ASS'Y

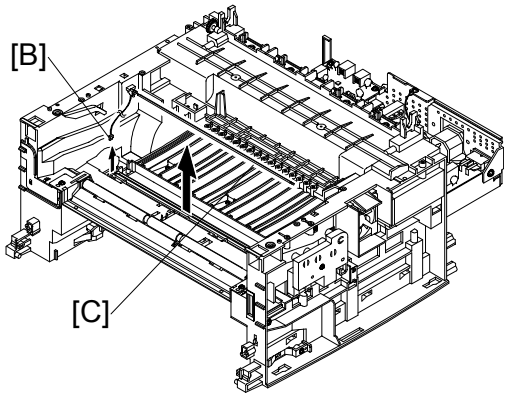
1. Remove this before you remove the Transfer ass'y:
   - LSU (☛ 3.2.18)

2. Remove the three screws from the transfer earth.[A] Then remove it.



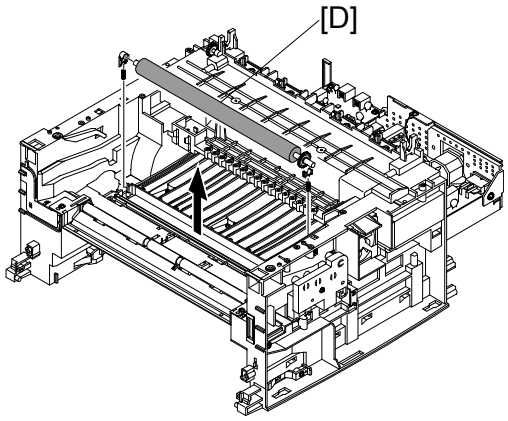
H914R952.WMF

3. Disconnect the lens holder connector [B]. Then remove the lens holder and lens-quenching unit [C].



H914R953.WMF

4. Release the frame latch on the right cover of the transfer roller [D]. Then remove the transfer roller. Release the latch on each bush. Then remove it.

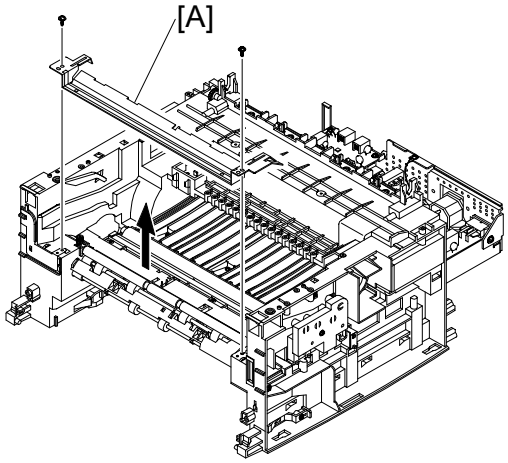


H914R954.WMF

3.2.25 FEED ASS'Y

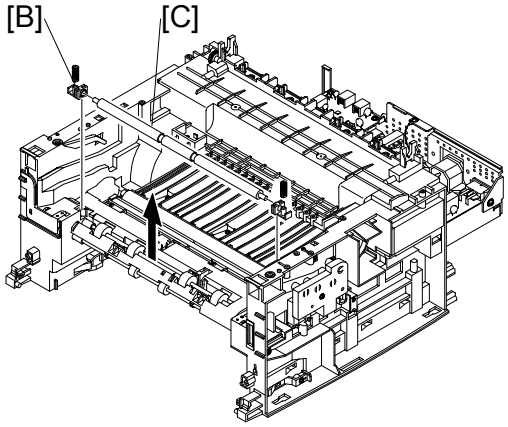
1. Remove these before you remove the feed ass'y:
   - Scan Ass'y (☛ 3.2.11)
   - Drive Ass'y (☛ 3.2.15)
   - LSU (☛ 3.2.18)

2. Remove the two screws from the paper guide [A]. Then remove it.



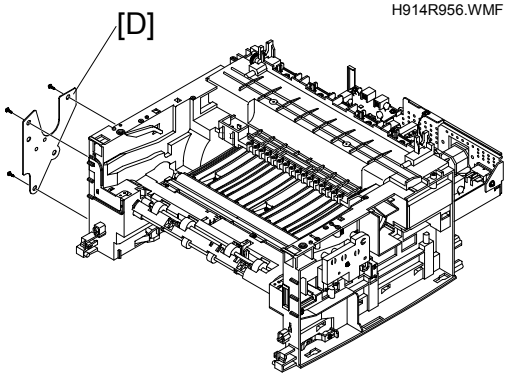
H914R955.WMF

3. Pull up the feed idle bushing [B]. Then pull up the idle shaft-feed [C].



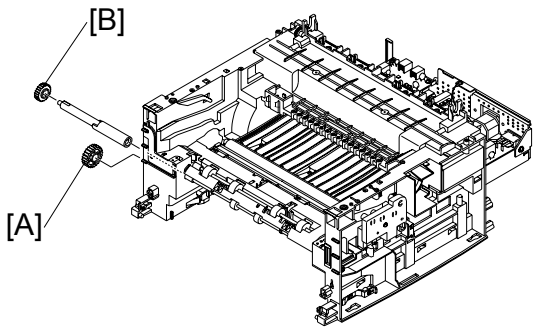
H914R956.WMF

4. Remove the three screws from the feed bracket [D]. Then remove it.



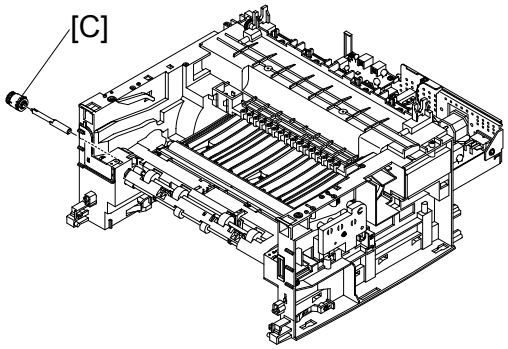
H914R957.WMF

5. Remove the idle gear [A] and feed gear 2 [B].



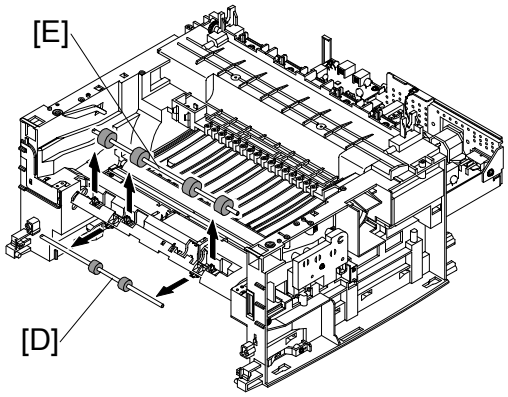
H914R958.WMF

6. Remove the feed gear 1 assembly [C].



H914R959.WMF

7. Pull up the feed roller [D] and feed roller 1 [E].

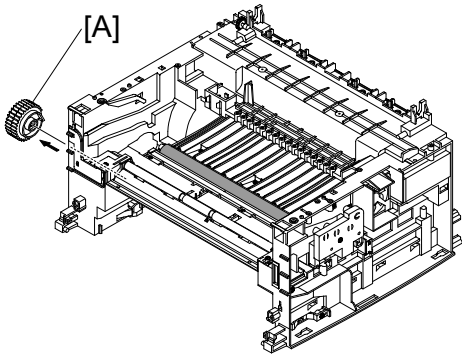


H914R960.WMF

3.2.26 PICK UP ASS'Y AND SOLENOID

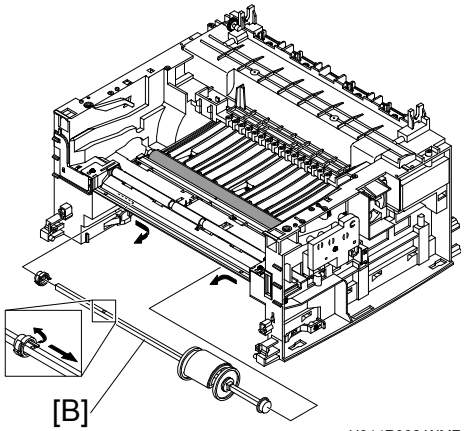
1. Remove these before you remove the pick up ass'y:
   - Scan Ass'y (☛ 3.2.11)
   - Drive Ass'y (☛ 3.2.15)
   - LSU (☛ 3.2.18)
   - Shield Plate – Main Board (☛ 3.2.19)

2. Remove the pick up gear assembly [A].



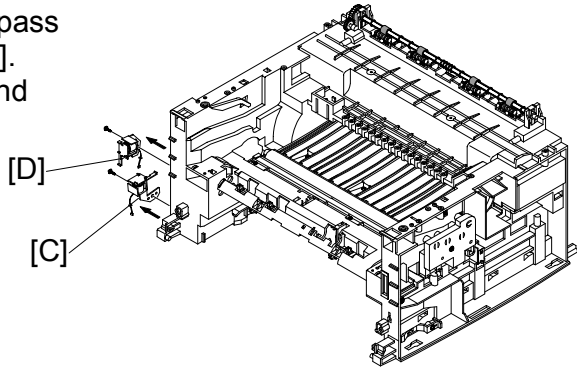
H914R961.WMF

3. Remove the pick-up ass'y [B].



H914R962.WMF

4. Remove the two screws from the bypass solenoid [C] and pick-up solenoid [D]. Then remove the bypass solenoid and pick-up solenoid.

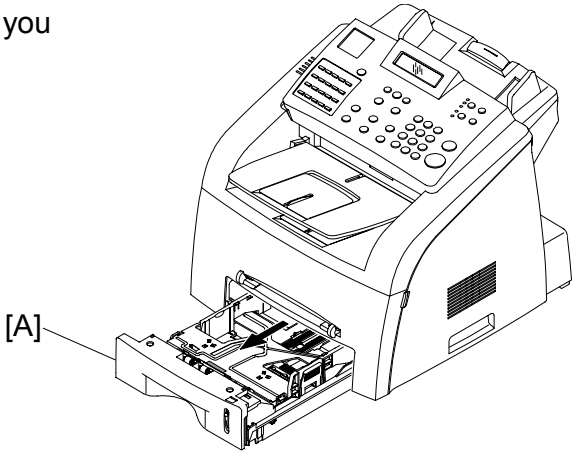


H914R964.WMF

3.3 REPLACEMENT AND ADJUSTMENT (H916)

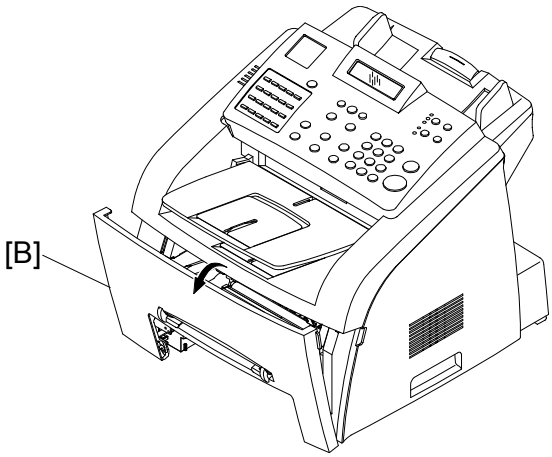
3.3.1 FRONT COVER ASS'Y

1. Remove the front cover ass'y before you remove the cassette unit [A].



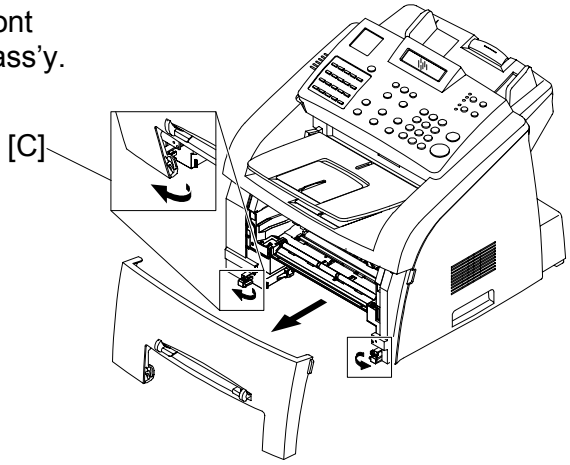
H916R901.WMF

2. Open the front cover ass'y [B].



H916R902.WMF

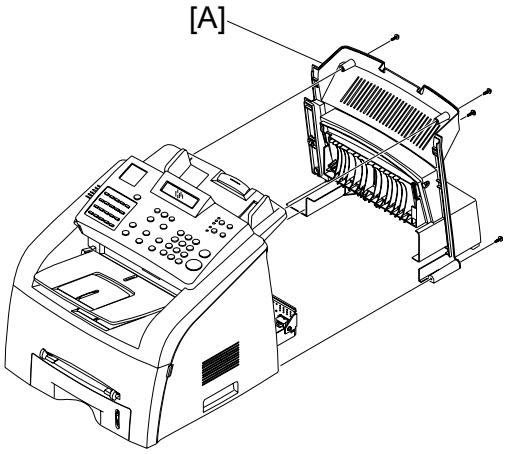
3. Disconnect the plastic [C] from the front cover ass'y. Then lift the front cover ass'y.



H916R903.WMF

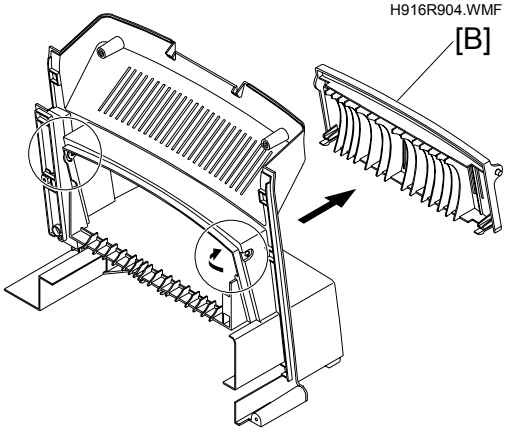
3.3.2 REAR COVER

1. Remove the four screws from the rear cover [A]. Then remove it.



H916R904.WMF

2. Unlatch the face up cover [B] from the rear cover. Then remove it.

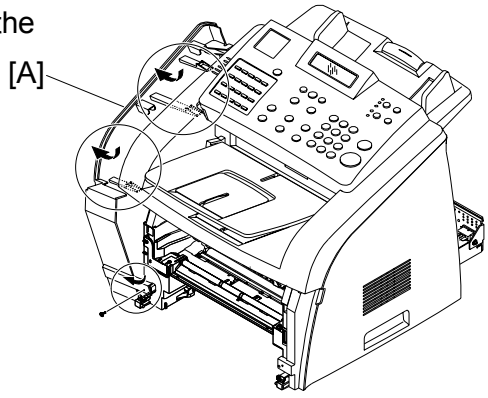


H916R905.WMF

3.3.3 LEFT COVER

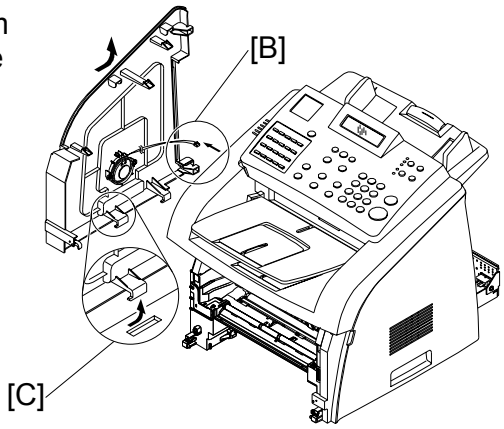
1. Remove these before you remove the Left cover:
   - Front Cover Ass'y (☛ 3.3.1)
   - Rear Cover (☛ 3.3.2)

1. Remove the one screw from the bottom of the left cover [A].



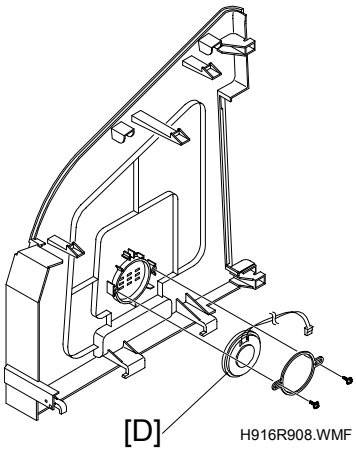
H916R906.WMF

2. Disconnect the speaker connector [B] from the main board. Then carefully release the latches [C] from frame ass'y in the direction of the arrow.



H916R907.WMF

3. If necessary, remove the two screws from the left cover. Then remove the monitor speaker [D].

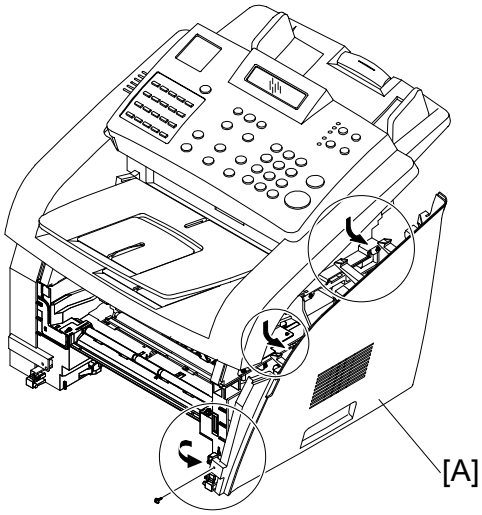


H916R908.WMF

3.3.4 RIGHT COVER

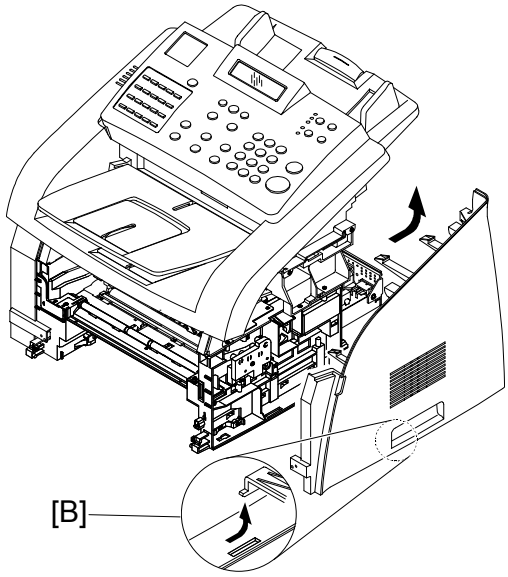
1. Remove this before you remove the Right cover:
   - Rear Cover (☛ 3.3.2)

2. Remove the one screw from the bottom of the right cover [A].



H916R921.WMF

3. Release the latches [B] from the right cover in the direction of the arrow.



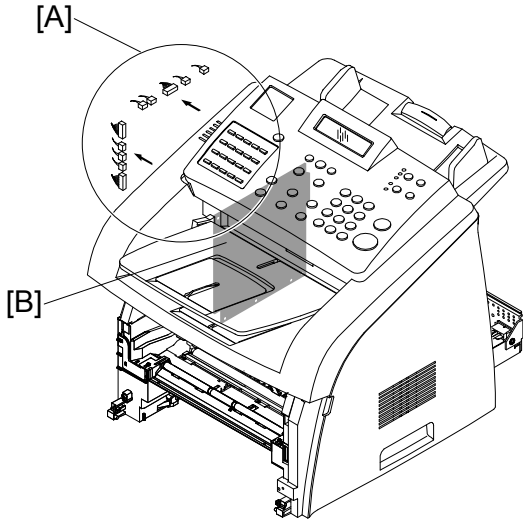
H916R922.WMF

3.3.5 MAIN PBA (MAIN BOARD)

NOTE: 1) Print out the system data list in Tech mode to keep programmed data before you do the replacement procedure.
2) Do the “Clear All Memory” in Tech mode (☛ 5.2.3) after you finish the replacement procedure.

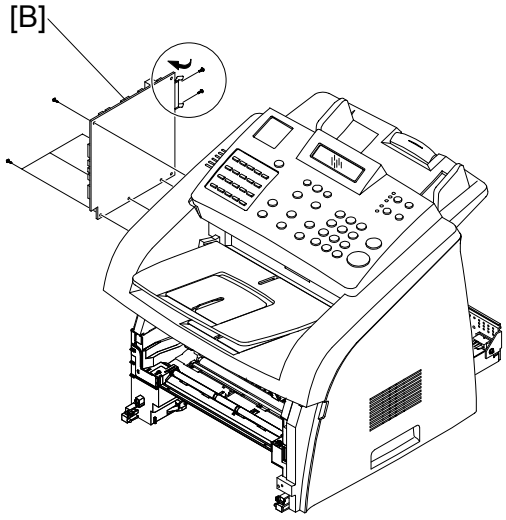
1. Remove these before you remove the main PBA. :
   - Rear Cover (☛ 3.3.2)
   - Left Cover (☛ 3.3.3)

2. Disconnect the harness cable and all connectors [A] from the main board [B].



H916R909.WMF

3. Remove the six screws from the main board bracket. Then remove it. Then carefully release the main board.

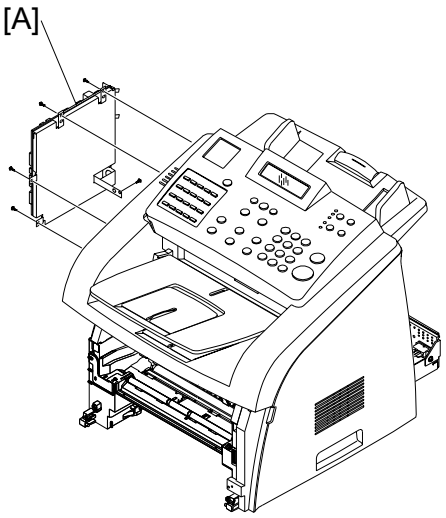


H916R910.WMF

3.3.6 DRIVE ASS'Y

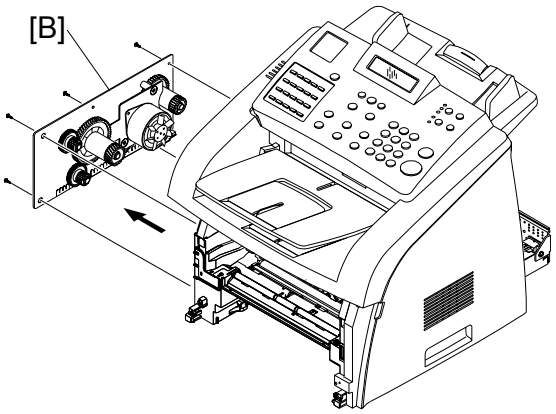
1. Remove these before you remove the Drive ass'y. :
   - Rear Cover (☛ 3.3.2)
   - Left Cover (☛ 3.3.3)
   - Main PBA (MAIN BOARD) (☛ 3.3.5)

2. Remove the five screws from the main board bracket [A]. Then remove it. Then carefully release the main board bracket.



H916R912.WMF

3. Remove the four screws from the drive ass'y [B]. Then remove it. Then disconnect the one connector from the drive motor.

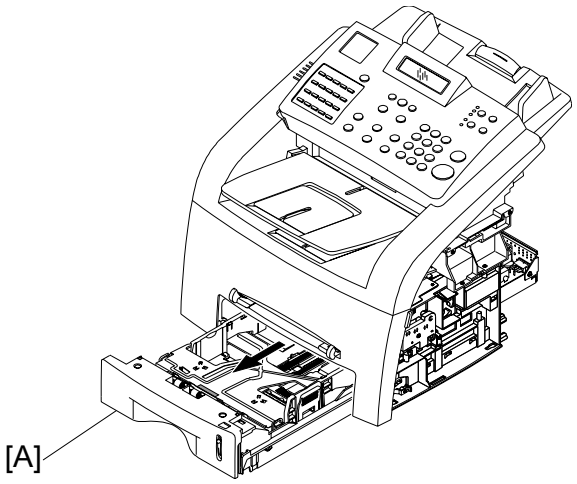


H916R913.WMF

3.3.7 ENGINE SHIELD ASS'Y

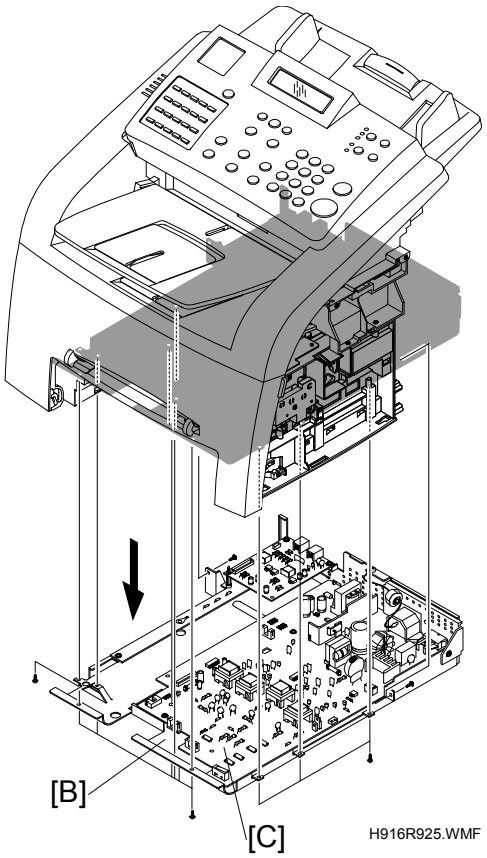
1. Remove these before you remove the Engine shield ass'y:
   - Front Cover Ass'y (☛ 3.3.1)
   - Rear Cover (☛ 3.3.2)
   - Right Cover (☛ 3.3.4)

2. Remove the cassette [A].



H916R924.WMF

3. Remove the twelve screws from the engine shield ass'y [B]. Then remove it. Then disconnect the three connectors (LIU, Fan, Power) from the SMPS [C] and main board and HVPS.

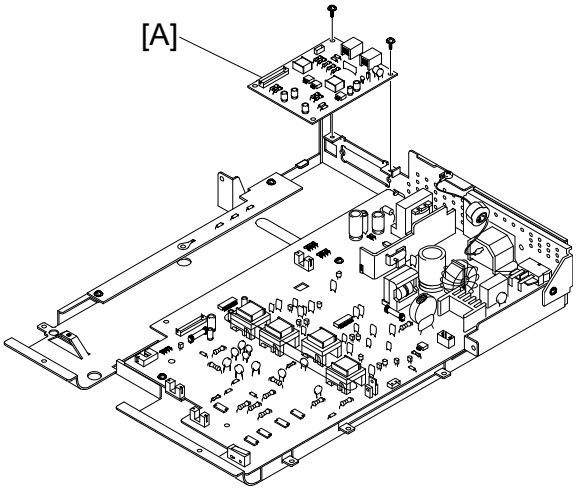


H916R925.WMF

3.3.8 LIU PBA (ALSO KNOWN AS NCU)

1. Remove this before you remove the LIU PBA:
   - Engine Shield Ass'y (☛ 3.3.7)

2. Remove the two screws from the LIU PBA [A]. Then remove the it

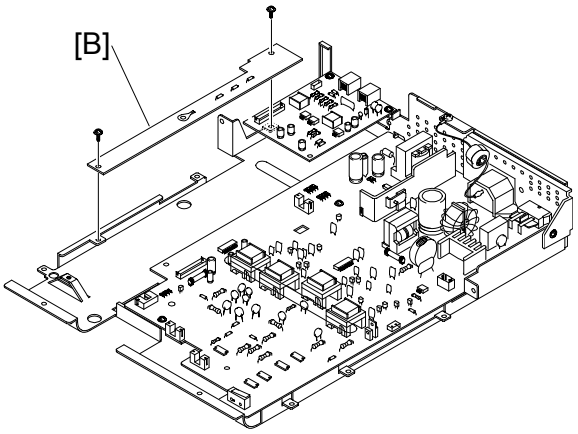


H916R926.WMF

3.3.9 SUB PBA

1. Remove this before you remove the Sub PBA:
   - Engine Shield Ass'y (☛ 3.3.7)

2. Remove the Sub board [B].

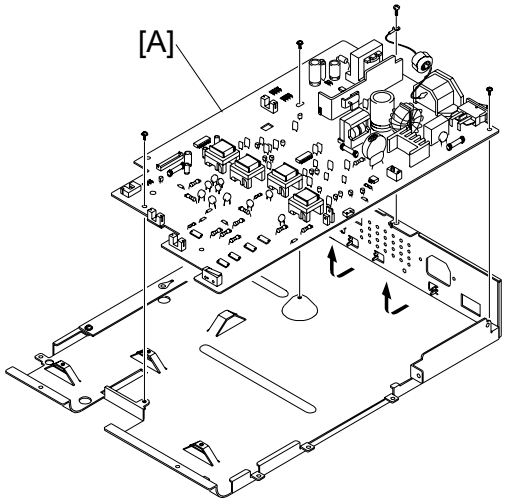


H916R927.WMF

3.3.10 SMPS (ALSO KNOWN AS POWER SUPPLY UNIT)

1. Remove these before you remove the SMPS:
   - Engine Shield Ass'y (☛ 3.3.7)
   - LIU PBA (☛ 3.3.8)

2. Remove the four screws (tree screw: SMPS, one screw: ground cable) from the SMPS. Then lift the SMPS [A] out.



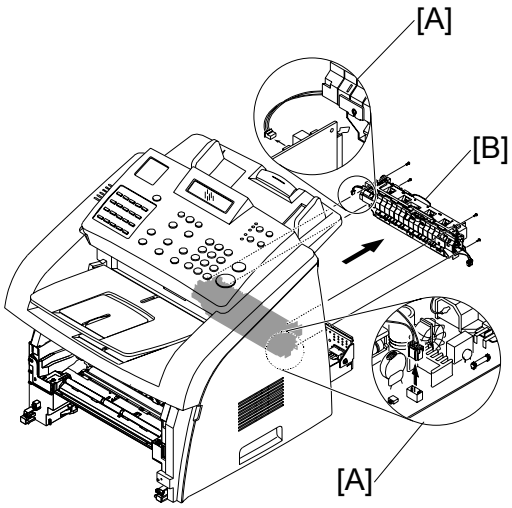
H916R929.WMF

3.3.11 FUSER ASS'Y (ALSO KNOWN AS FUSING UNIT)

⚠CAUTION
The fusing unit has tapping screws. Assembly/disassembly should be kept to a minimum. Adjustments again and again can cause failure. To avoid hazardous situations, do not replace any components inside the fusing unit such as thermistor, hot roller, stripper pawls, fusing lamp, etc..

1. Remove these before you remove the Fuser ass'y:
   - Rear Cover (☛ 3.3.2)
   - Left Cover (☛ 3.3.3)
   - Engine Shield Ass'y (☛ 3.3.7)

2. Disconnect the two connectors [A] from the main board and SMPS. Then remove the four screws from the fuser ass'y [B]. Then remove it.

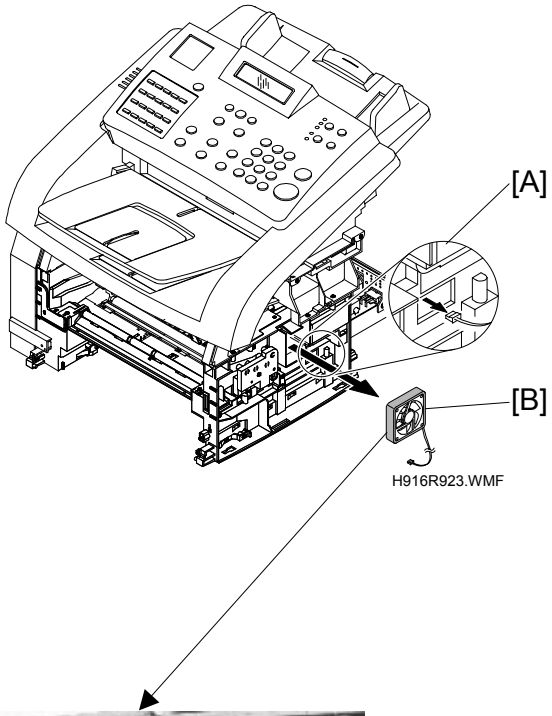


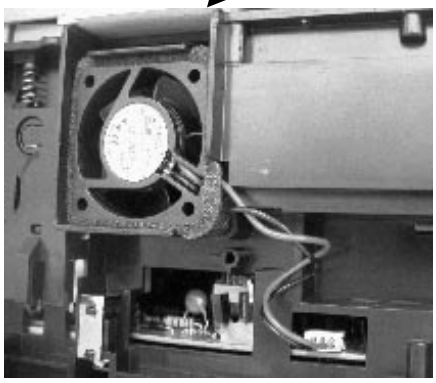
H916R914.WMF

3.3.12 FAN

1. Remove these before you remove the Fan:
   - Front Cover Ass'y (☛ 3.3.1)
   - Rear Cover (☛ 3.3.2)
   - Right Cover (☛ 3.3.4)

2. Disconnect the one connector [A] from the SMPS. Then remove the fan [B].



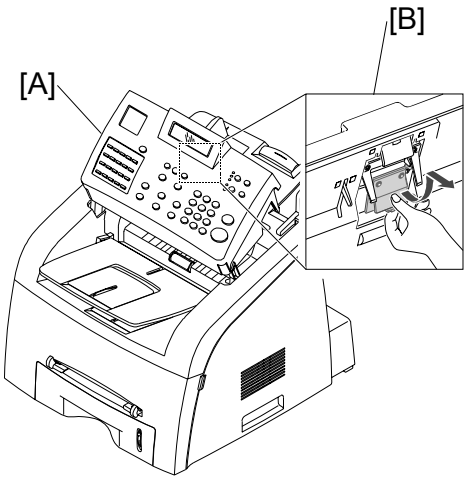


CAUTION: Make sure to set the fan in the correct position. The label on the fan must face outward.

3.3.13 ADF RUBBER

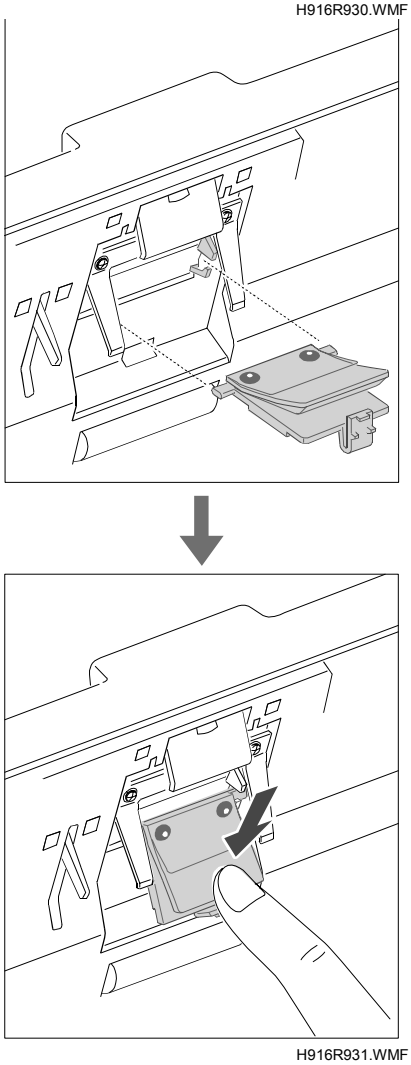
1. Open the OPE unit [A].

2. Squeeze the tab at the bottom of the ADF rubber ass'y [B]. Then pull it out.



H916R930.WMF

3. Insert the tabs at the top of the new ADF rubber ass'y into the slots. Then push it down until it locks into place.

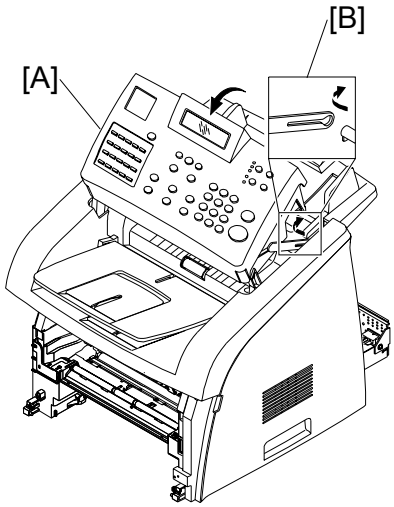


H916R931.WMF

3.3.14 OPE UNIT (ALSO KNOWN AS OP-PORT)

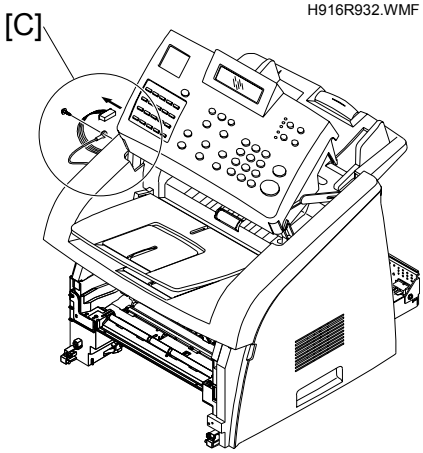
1. Remove these before you remove the OPE unit:
   - Front Cover Ass'y (☛ 3.3.1)
   - Rear Cover (☛ 3.3.2)
   - Left Cover (☛ 3.3.3)

2. Open the OPE unit [A]. Then remove the holder [B] from the top cover.



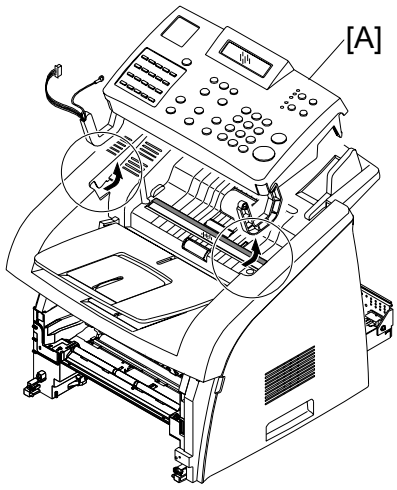
H916R932.WMF

3. Disconnect the OPE connector [C] from the main board. Then remove the one screw from the ground cable. Then remove it.



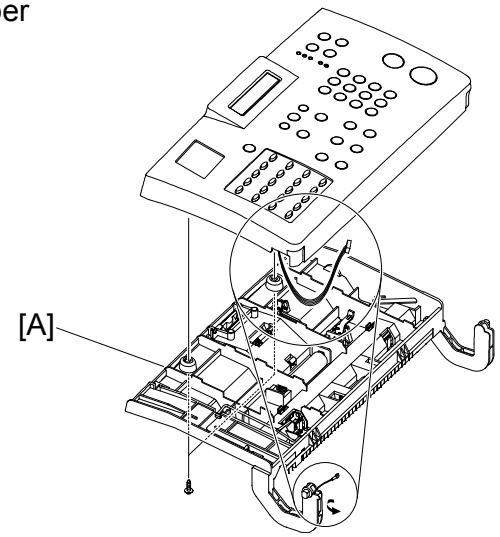
H916R933.WMF

4. Carefully release the OPE unit from top cover in the direction of the arrow.



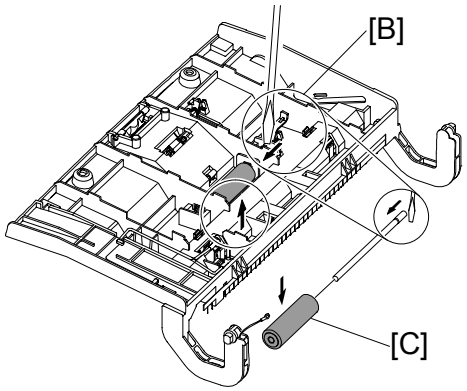
H916R934.WMF

5. Remove the two screws from the scan upper ass'y [A]. Then remove it.



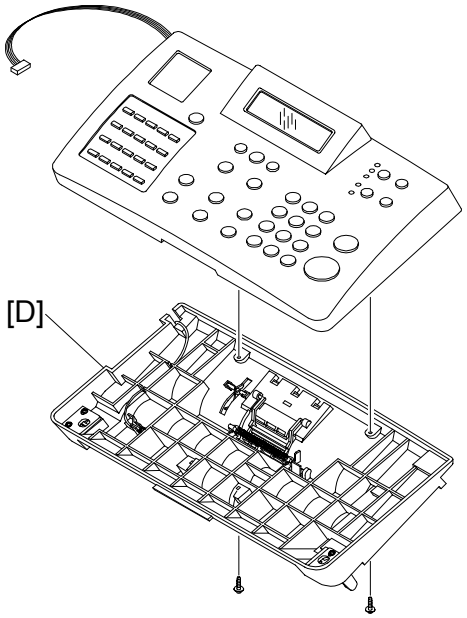
H916R935.WMF

6. If necessary, put a flat-blade screwdriver into the shaft [B]. Then remove the idle roller [C].



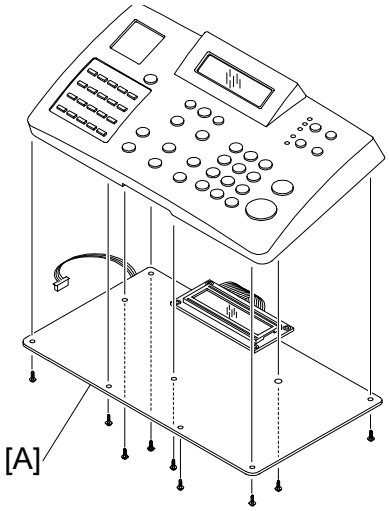
H916R936.WMF

7. Remove the two screws from the lower scanner ass'y [D]. Then remove it.



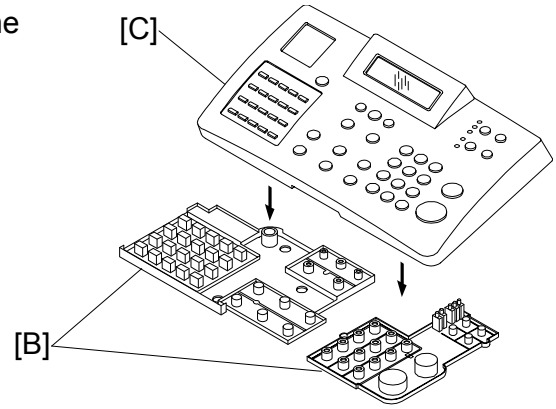
H916R937.WMF

8. Remove the nine screws from the OPE board [A]. Then remove it.



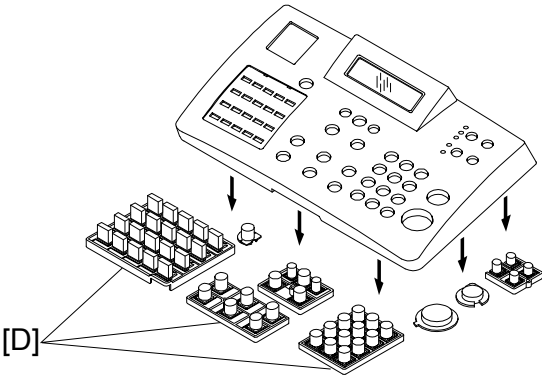
H916R938.WMF

9. Remove the contact rubber [B] from the OPE cover [C].



H916R939.WMF

10. Remove the key pad [D] from the OPE cover.

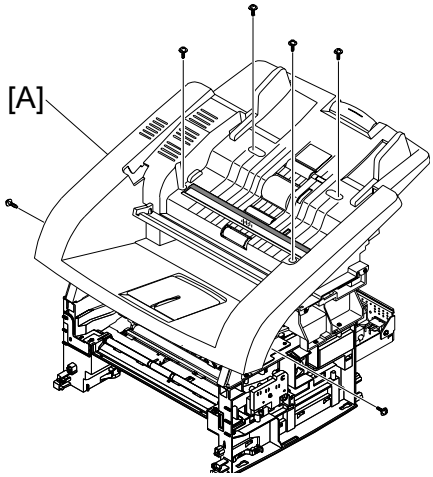


H916R940.WMF

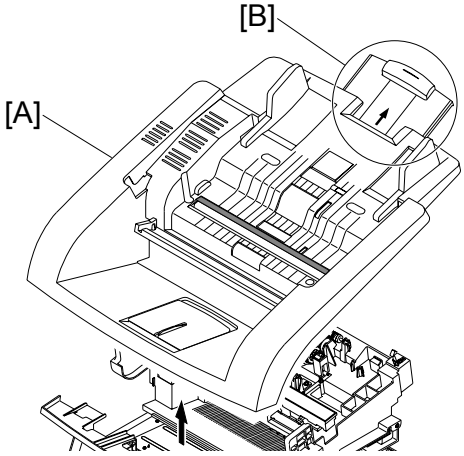
3.3.15 TOP COVER ASS'Y

1. Remove these before you remove the Top cover ass'y:
   - Front Cover Ass'y (☛ 3.3.1)
   - Rear Cover (☛ 3.3.2)
   - Left Cover (☛ 3.3.3)
   - Right Cover(☛ 3.3.4)
   - OPE Unit (☛ 3.3.14)

2. Remove the six screws from the top cover [A].

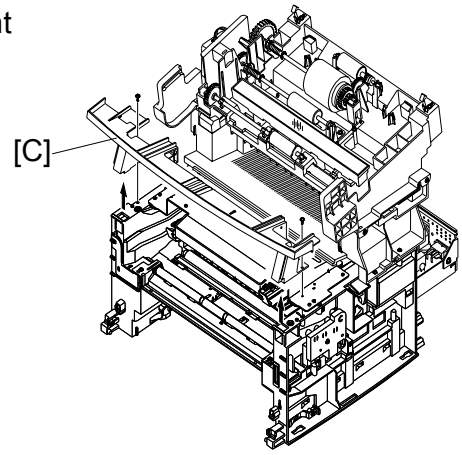


3. Unlatch the document input support [B] from the top cover ass'y. Then lift the top cover ass'y out.



H916R942.WMF

4. Remove the two screws from the dummy front cover [C]. Then remove it.

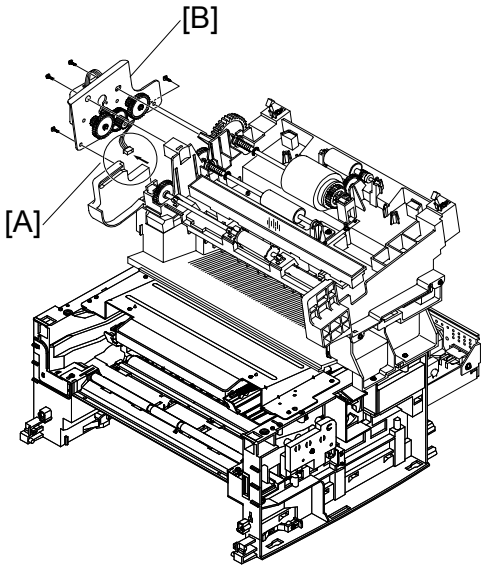


H916R943.WMF

3.3.16 SCAN MOTOR ASS'Y

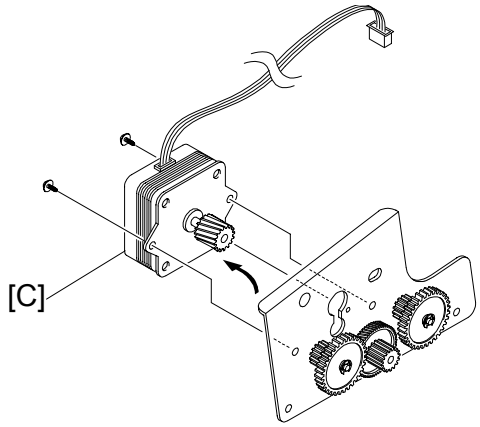
1. Remove these before you remove the Scan motor ass'y:
   - Front Cover Ass'y (☛ 3.3.1)
   - Rear Cover (☛ 3.3.2)
   - Left Cover (☛ 3.3.3)
   - Right Cover(☛ 3.3.4)
   - OPE Unit (☛ 3.3.14)
   - Top Cover Ass'y (☛ 3.3.15)

2. Disconnect the scan motor connector [A] from the main board.
   Then remove the four screws from the scan motor ass'y [B]. Then remove it.



H916R944.WMF

3. If necessary, remove the two screws from the scan motor [C]. Then release the latches from motor bracket in the direction of the arrow.

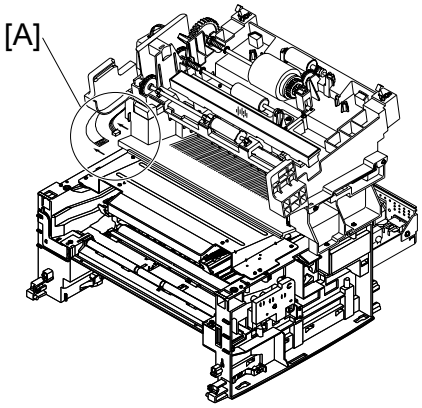


H916R945.WMF

3.3.17 LOWER SCANNER

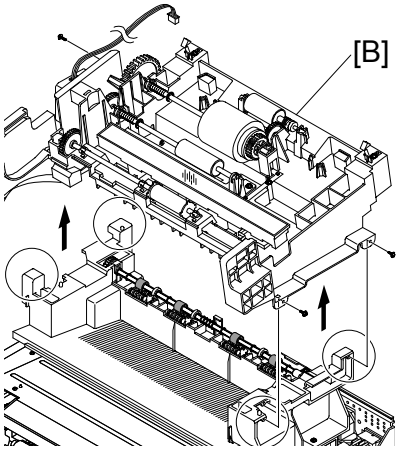
1. Remove these before you remove the Lower scanner:
   - Front Cover Ass'y (☛ 3.3.1)
   - Rear Cover (☛ 3.3.2)
   - Left Cover (☛ 3.3.3)
   - Right Cover(☛ 3.3.4)
   - OPE Unit (☛ 3.3.14)
   - Top Cover Ass'y (☛ 3.3.15)

2. Disconnect the scan motor connector and the CIS cable connector [A] from the main board.



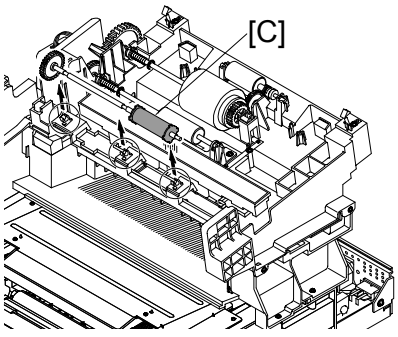
H916R946.WMF

3. Remove the four screws from the lower scanner ass'y [B]. Then remove it.



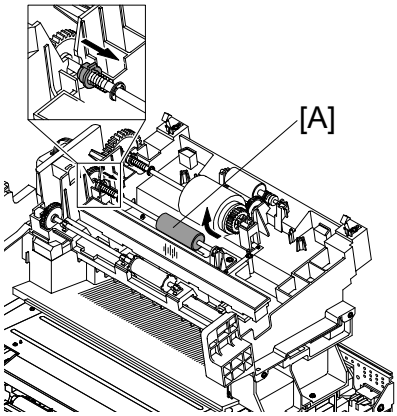
H916R947.WMF

4. Unlatch the ADF exit roller [C] from the lower scanner cover ass'y. Then lift the ADF exit roller out.



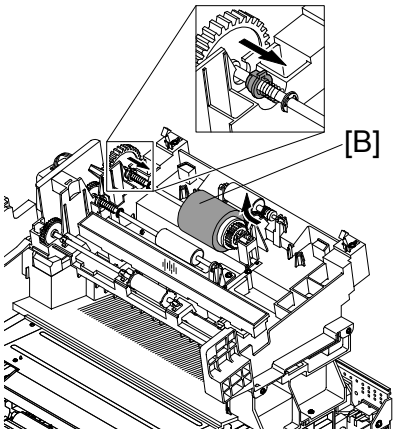
H916R948.WMF

5. Carefully release the ADF feed roller [A] from the lower scanner ass'y in the direction of the arrow.



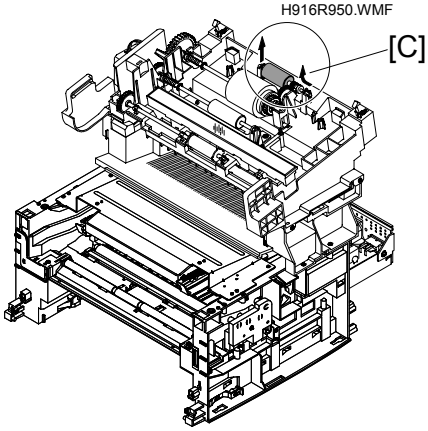
H916R949.WMF

6. Carefully release the ADF roller [B].



H916R950.WMF

7. Carefully release the pick-up roller ass'y [C] from the lower scanner ass'y in the direction of the arrow.

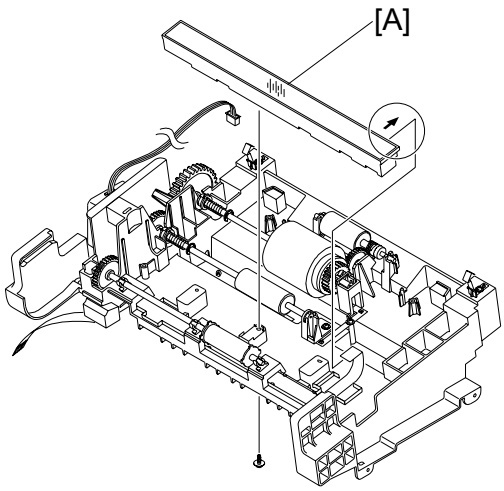


H916R951.WMF

3.3.18 CIS

1. Remove these before you remove the CIS:
   - Front Cover Ass'y (☛ 3.3.1)
   - Rear Cover (☛ 3.3.2)
   - Left Cover (☛ 3.3.3)
   - Right Cover(☛ 3.3.4)
   - OPE Unit (☛ 3.3.14)
   - Top Cover Ass'y (☛ 3.3.15)
   - Lower Scanner(☛ 3.3.17)

2. Remove the one screw. Then unlatch the CIS [A] with a flat-blade screwdriver. Then release it. Disconnect the harness from the CIS unit.

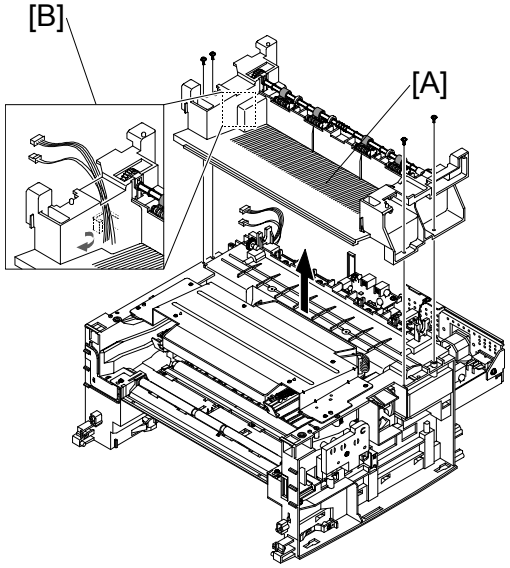


H916R952.WMF

3.3.19 EXIT COVER ASS'Y

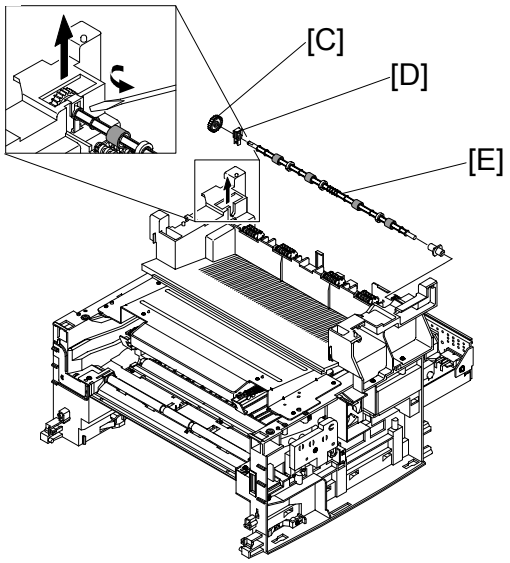
1. Remove these before you remove the Exit cover ass'y:
   - Front Cover Ass'y (☛ 3.3.1)
   - Rear Cover (☛ 3.3.2)
   - Left Cover (☛ 3.3.3)
   - Right Cover(☛ 3.3.4)
   - OPE Unit (☛ 3.3.14)
   - Top Cover Ass'y (☛ 3.3.15)
   - Lower Scanner(☛ 3.3.17)

2. Remove the four screws from the exit cover ass'y [A]. Then disconnect the two connectors [B] (fuser harness, LIU harness) from the exit cover ass'y. Then remove it.



H916R953.WMF

3. Remove the exit gear [C] and bearing [D] with a flat-blade screwdriver. Then remove the exit roller [E].

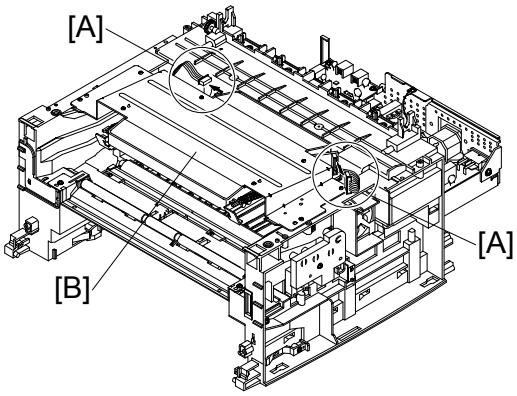


H916R954.WMF

3.3.20 LSU (LASER SCANNING UNIT)

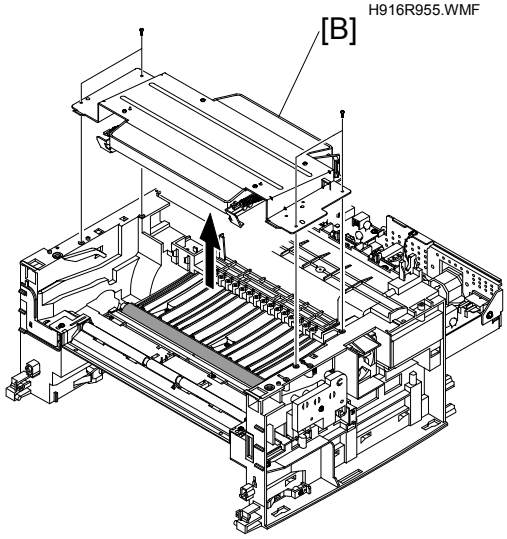
1. Remove these before you remove the LSU:
   - Front Cover Ass'y (☛ 3.3.1)
   - Rear Cover (☛ 3.3.2)
   - Left Cover (☛ 3.3.3)
   - Right Cover(☛ 3.3.4)
   - OPE Unit (☛ 3.3.14)
   - Top Cover Ass'y (☛ 3.3.15)
   - Lower Scanner(☛ 3.3.17)
   - Exit Cover Ass'y (☛ 3.3.19)

2. Disconnect the two connectors [A] from the LSU [B].



H916R955.WMF

3. Remove the four screws from the LSU. Then remove it.

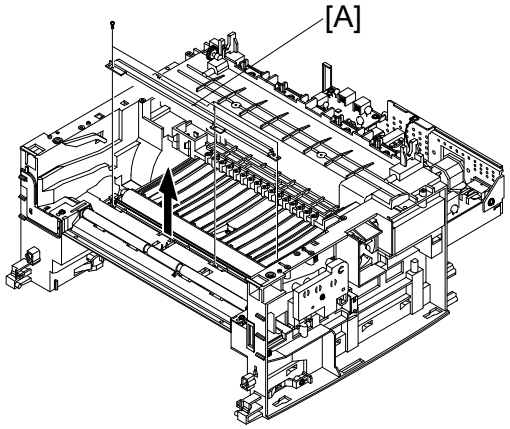


H916R956.WMF

3.3.21 TRANSFER ASS'Y

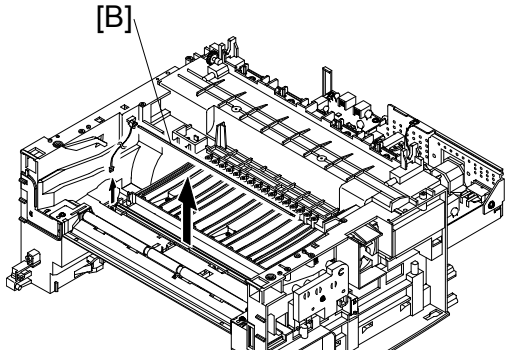
1. Remove these before you remove the Transfer ass'y:
   - Front Cover Ass'y (☛ 3.3.1)
   - Rear Cover (☛ 3.3.2)
   - Left Cover (☛ 3.3.3)
   - Right Cover(☛ 3.3.4)
   - OPE Unit (☛ 3.3.14)
   - Top Cover Ass'y (☛ 3.3.15)
   - Lower Scanner(☛ 3.3.17)
   - Exit Cover Ass'y (☛ 3.3.19)
   - LSU (☛ 3.3.20)

2. Remove the three screws from the transfer earth [A]. Then remove it.



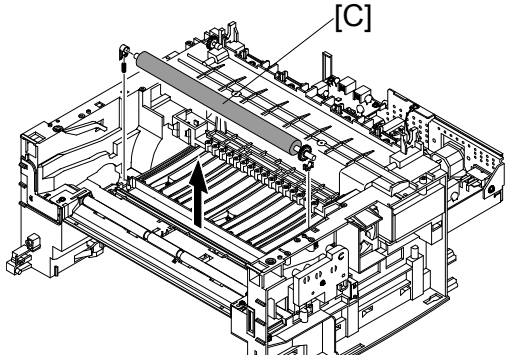
H916R957.WMF

3. Disconnect the PTL holder connector. Then remove the PTL holder and PTL lens [B].



H916R958.WMF

4. Release the frame latch on the right cover of the transfer roller [C]. Then lift the roller out. Release the latch on each bush. Then lift them out.

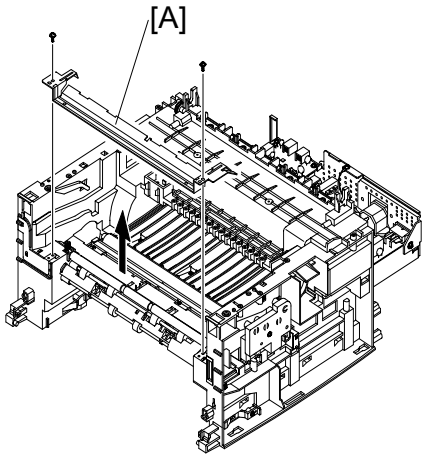


H916R959.WMF

3.3.22 FEED ASS'Y

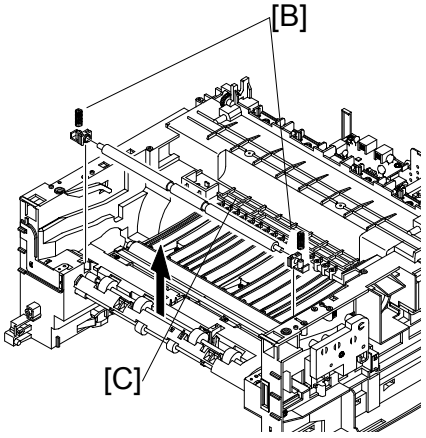
1. Remove these before you remove the Feed ass'y:
   - Drive Ass'y (☛ 3.3.6)
   - Engine Shield Ass'y (☛ 3.3.7)
   - OPE Unit (☛ 3.3.14)
   - Top Cover Ass'y (☛ 3.3.15)
   - LSU (☛ 3.3.20)

2. Remove the two screws from the Paper guide [A]. Then remove it.



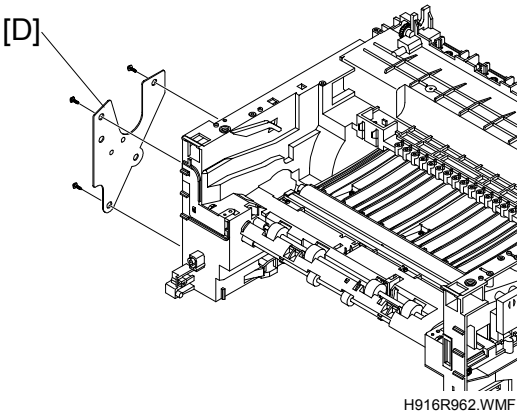
H916R960.WMF

3. Pull up the feed idle bush [B] and feed idle shaft [C].



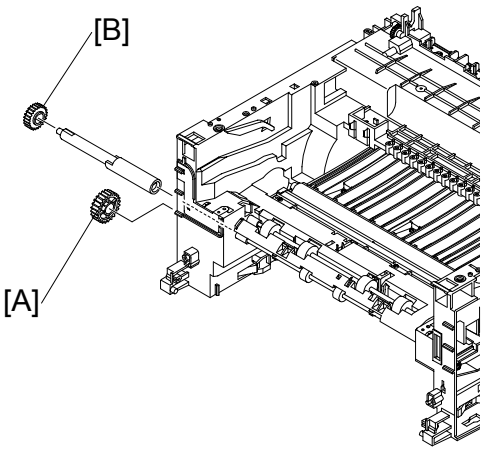
H916R961.WMF

4. Remove the three screws from the feed bracket [D]. Then remove it.



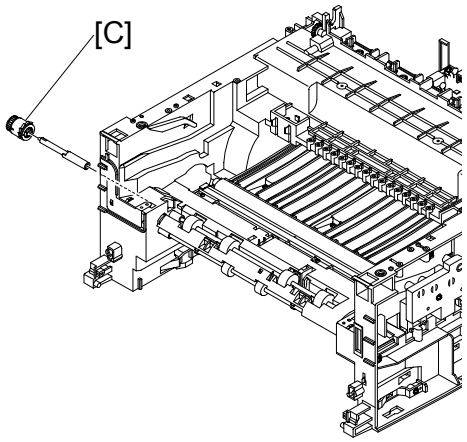
H916R962.WMF

5. Remove the idle gear [A] and feed gear2 [B].



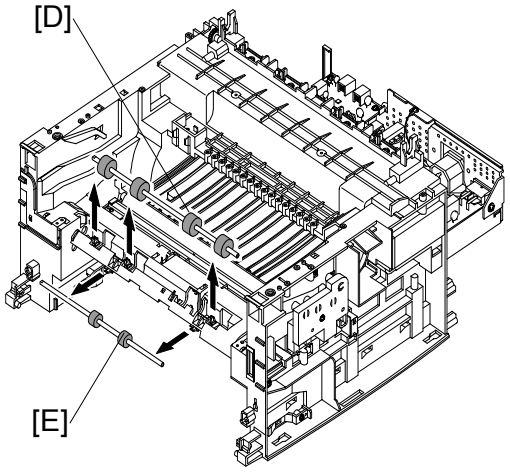
H916R963.WMF

6. Remove the feed gear1 ass'y [C].



H916R964.WMF

7. Pull up the feed roller [D] and feed roller1 [E].

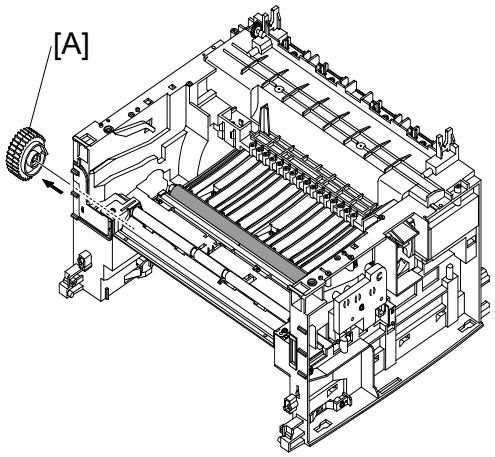


H916R965.WMF

3.3.23 PICK UP ASS'Y

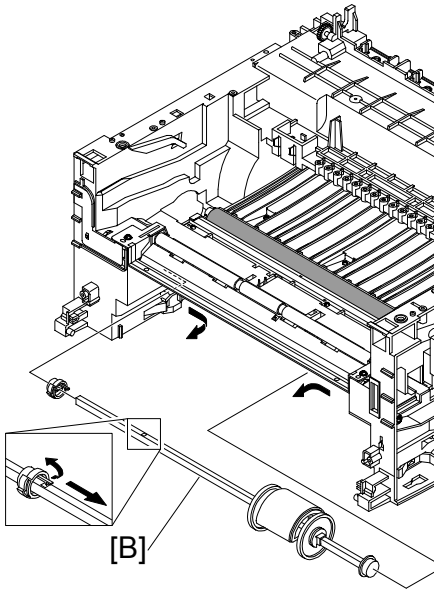
1. Remove these before you remove the Pick up ass'y:
   - Drive Ass'y (☛ 3.3.6)
   - Engine Shield Ass'y (☛ 3.3.7)
   - OPE Unit (☛ 3.3.14)
   - Top Cover Ass'y (☛ 3.3.15)
   - LSU (☛ 3.3.20)

2. Remove the pick up gear ass'y [A].



H916R966.WMF

3. Remove the pick up ass'y [B].

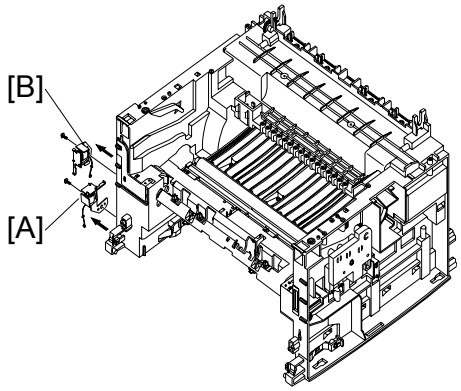


H916R967.WMF

3.3.24 BYPASS SOLENOID AND PICK-UP SOLENOID

1. Remove these before you remove the Solenoid:
   - Drive Ass'y (☛ 3.3.6)
   - Engine Shield Ass'y (☛ 3.3.7)
   - Top Cover Ass'y (☛ 3.3.15)
   - LSU (☛ 3.3.20)
   - Feed Ass'y (☛ 3.3.22)
   - Pick up Ass'y (☛ 3.3.23)

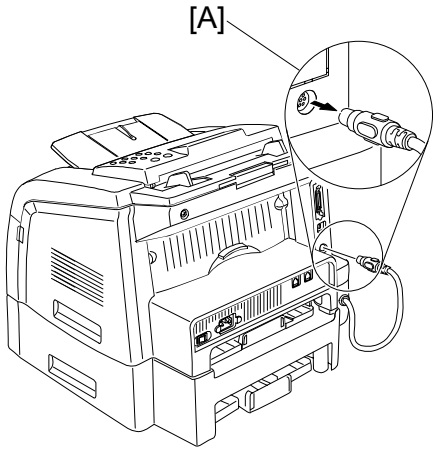
2. Remove the two screws from the Bypass solenoid [A] and Pick-up solenoid [B]. Then remove these.



H916R968.WMF

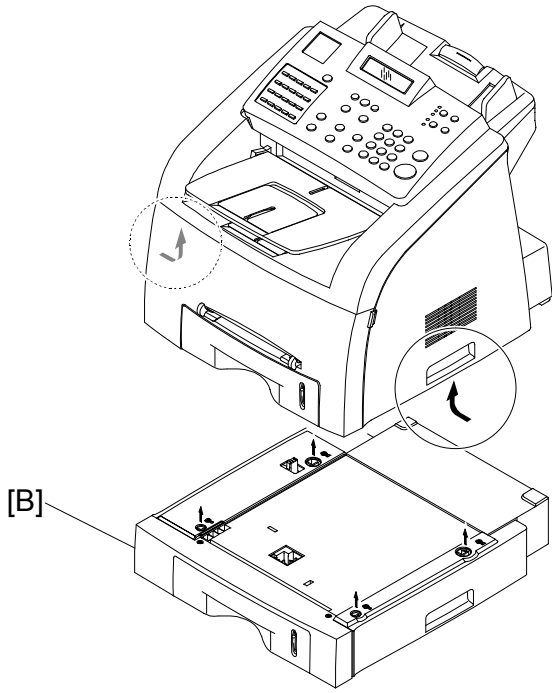
3.3.25 OPTIONAL PAPER FEED UNIT

1. Disconnect the SCF cable connector [A] from the bottom of the frame body.



H916R969.WMF

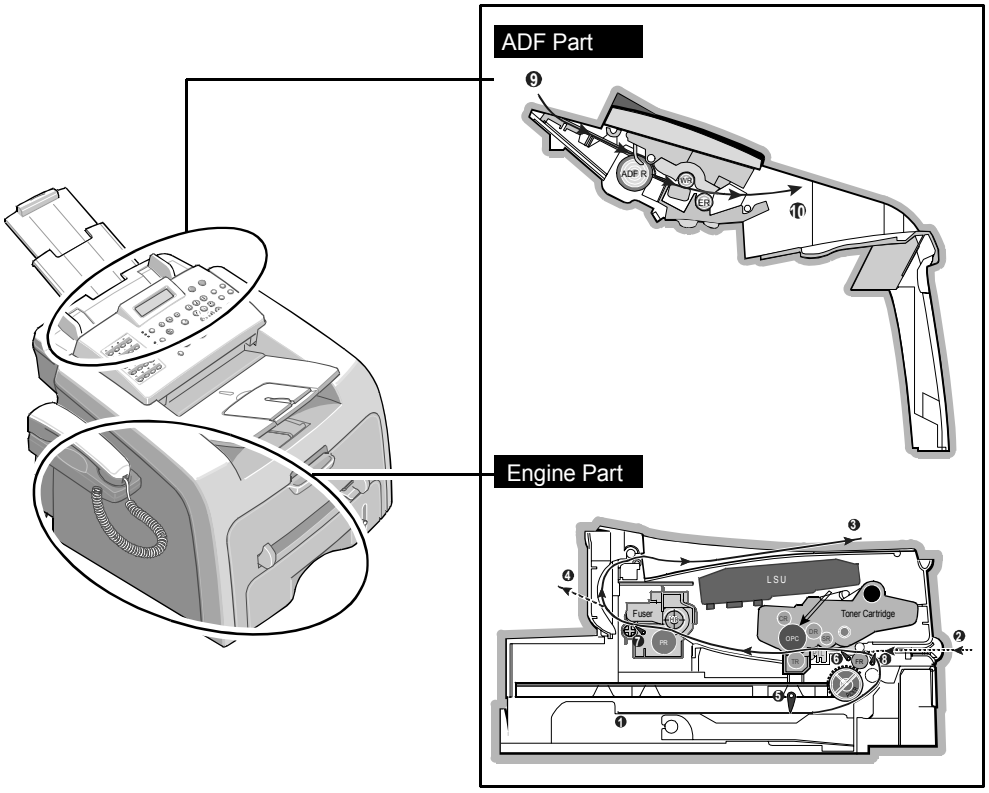
2. Remove the Paper feed unit [B].



H916R970.WMF

4. TROUBLESHOOTING

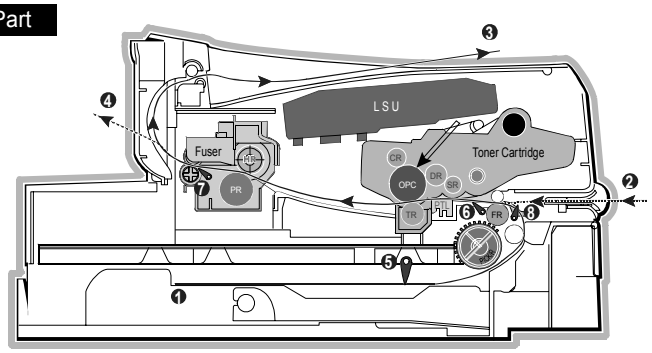
4.1 PAPER PATH (H914/H915)



H914T900.WMF

Printer Paper Path

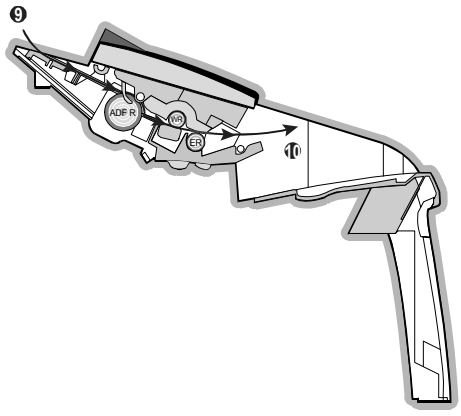
Engine Part



H916T902.WMF

Copy & Scan Document Path

ADF Part

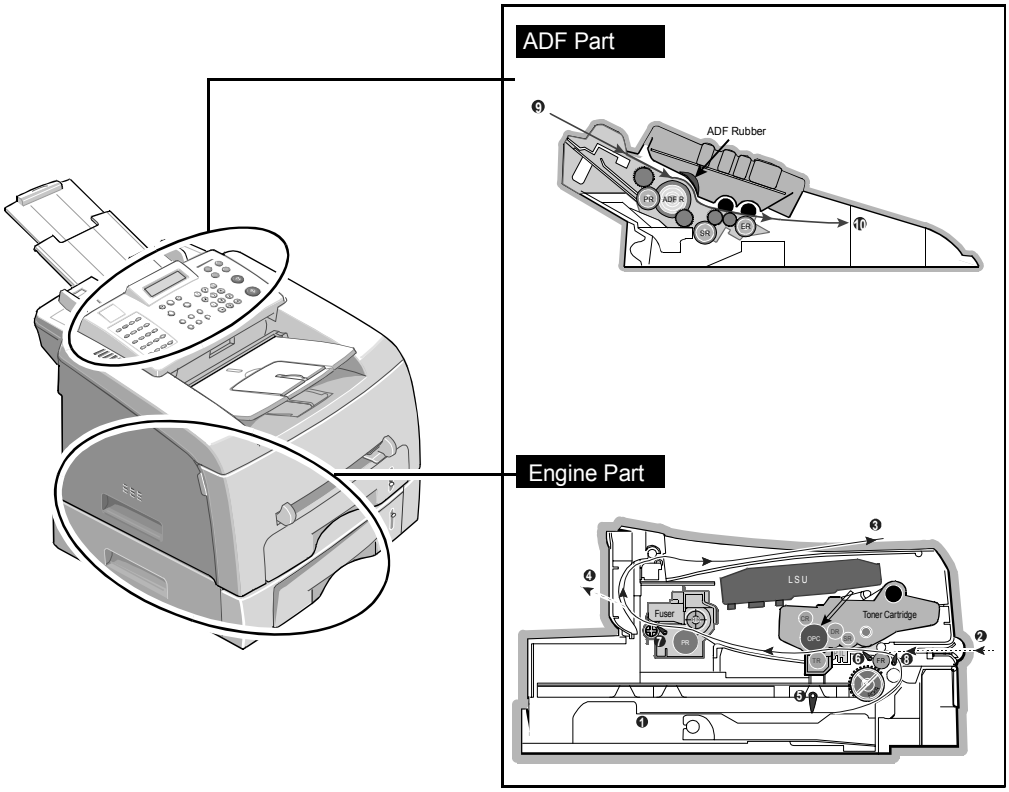


H914T901.WMF

❶ Paper Input (Cassette)
❷ Paper Input (Manual Feeder)
❸ Paper Out (Face Down)
❹ Paper Out (Face Up)
❺ Paper Empty Sensor (Cassette)
❻ Paper Feeding Sensor
❼ Paper Exit Sensor
❽ Paper Empty Sensor (Manual)
❾ Paper Input (ADF)
❿ Paper Output (ADF)

1. After receiving print job, the printer feeds the printing paper from the cassette or manual feeder.
2. The fed paper passes the paper feeding sensor. (Jam 0 occurs if the sensor is not operated after certain time passes)
3. The paper passed the paper feeding sensor moves to the paper exit sensor via printing process. (Jam 1 occurs if the sensor is not operated after certain time passes)
4. The paper passed the paper exit sensor moves out from the set. (Jam 2 occurs sometime after if the tailing edge of the paper has not exited out from the set after the leading edge of paper passes the paper exit sensor.)

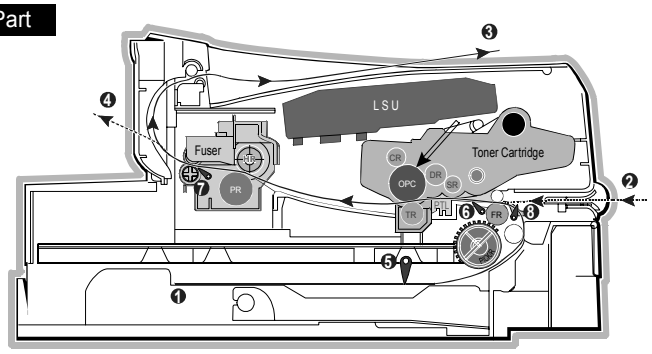
4.2 PAPER PATH (H916)



H916T900.WMF

Printer Paper Path

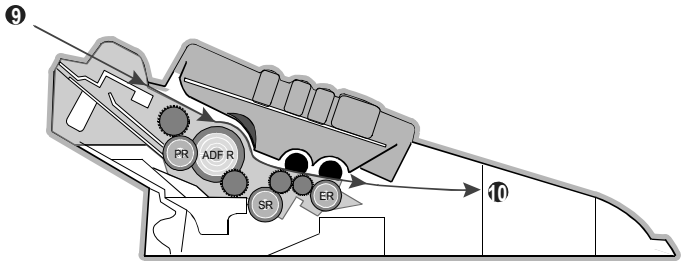
Engine Part



H916T902.WMF

Copy & Scan Document Path

ADF Part



H916T901.WMF

❶ Paper Input (Cassette)
❷ Paper Input (Manual Feeder)
❸ Paper Out (Face Down)
❹ Paper Out (Face Up)
❺ Paper Empty Sensor (Cassette)
❻ Paper Feeding Sensor
❼ Paper Exit Sensor
❽ Paper Empty Sensor (Manual)
❾ Paper Input (ADF)
❿ Paper Output (Face Down)

1. After receiving print job, the printer feeds the printing paper from the cassette or manual feeder.
2. The fed paper passes the paper feeding sensor. (Jam 0 occurs if the sensor is not operated after certain time passes)
3. The paper passed the paper feeding sensor moves to the paper exit sensor via printing process. (Jam 1 occurs if the sensor is not operated after certain time passes)
4. The paper passed the paper exit sensor moves out from the set. (Jam 2 occurs sometime after if the tailing edge of the paper has not exited out from the set after the leading edge of paper passes the paper exit sensor.)

4.3 CLEARING JAMS

Occasionally, paper can be jammed during a print job. Some of the causes include:

- The tray is loaded improperly or overfilled.
- The tray has been pulled out during a print job.
- The front cover has been opened during a print job.
- Paper was used that does not meet paper specifications.
- Paper that is outside of the supported size range was used.

If a paper jam occurs, the On Line/Error LED on the control panel shows red. Find and remove the jammed paper. If you don't see the paper, open the covers.

Do not use a pinset or a sharp metal tool to remove a jam.

The covering of a metal part can be removed which can cause an electric leakage.

4.3.1 CLEARING PAPER JAMS

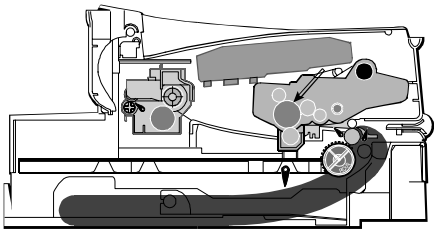
If paper jams occur, " PAPER JAM " appears on the display. Refer to the table below to locate and clear the paper jam.

PAPER JAM 0: In the paper feed area

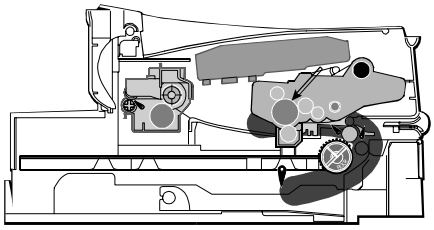
PAPER JAM 1: In the paper exit area

PAPER JAM 2: In the fuser area or around the toner cartridge

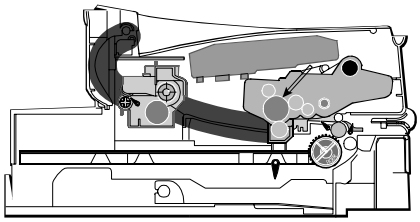
BYPASS JAM: In the Bypass tray



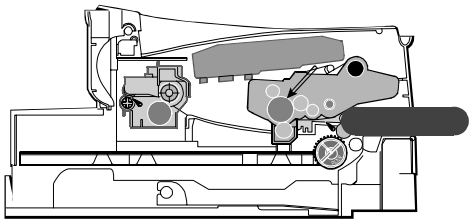
Paper Jam0 H914T903.WMF



Paper Jam1 H914T904.WMF



Paper Jam2 H914T905.WMF



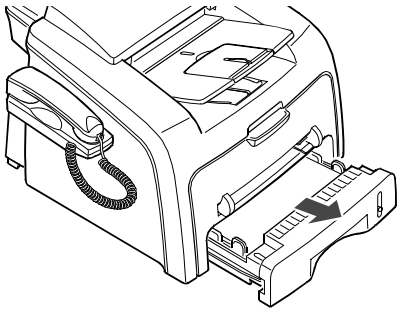
Bypass Jam H914T906.WMF

Remove the jammed paper carefully. Do the steps on the next page to clear a jam. Remove the paper carefully to not let the paper tear.

JAM0 (In the Paper Feed Area)

1. Open and close the front cover. The jammed paper automatically exits the machine. If the paper does not exit, continue to Step 2.

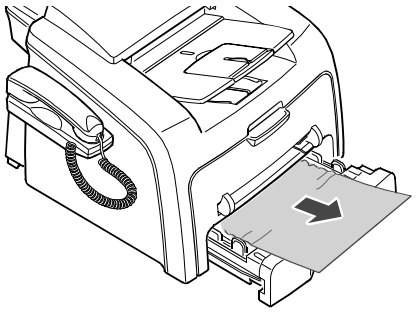
1. Pull the paper cassette open.



H914T910.WMF

3. Remove the jammed paper by gently pulling it straight out.

   NOTE: If there is any resistance when you pull the paper or the paper is not seen in this area, go to the fuser area around the toner cartridge

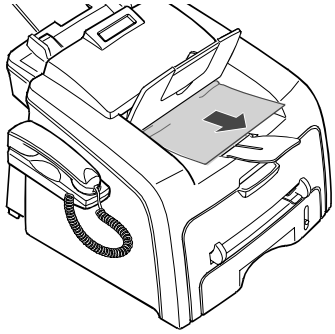


H914T911.WMF

4. Insert the paper tray into the machine until it snaps into place.
5. Open and close the front cover to resume printing.

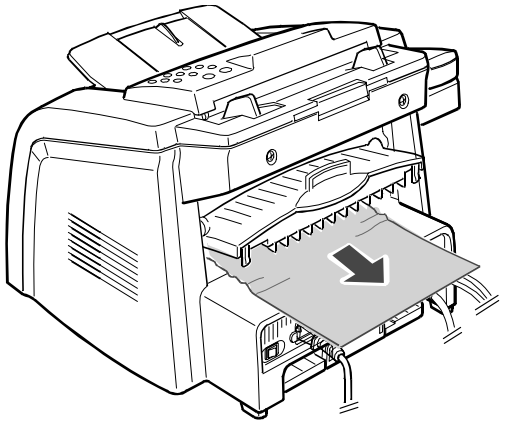
JAM2 (In the Paper Exit Area)

1. Open and close the front cover. The jammed paper automatically exits the machine. If the paper does not exit, continue to Step 2.
2. Gently pull the paper out of the front output tray.



H914T912.WMF

3. If there is any resistance when you pull the paper or the paper is not seen in the front output tray, open the rear cover.
4. Remove the jammed paper by gently pulling it straight out.



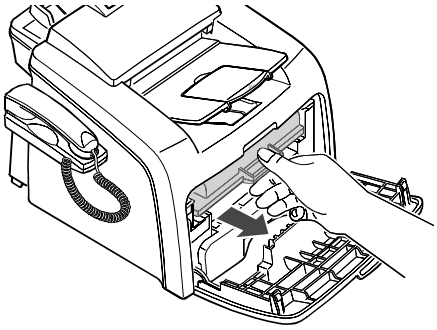
H914T913.WMF

5. Close the rear cover.
6. Open and close the front cover to resume printing.

JAM1 (In the Fuser Area of Around the Toner Cartridge Area)

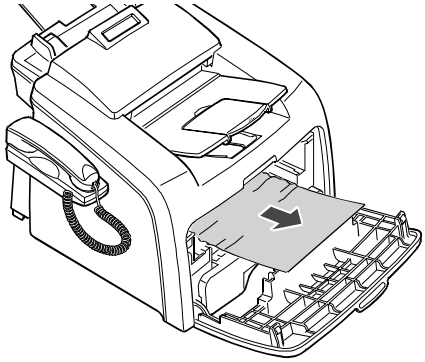
NOTE: The fuser area is hot. Be careful when removing paper from the machine.

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



H914T914.WMF

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

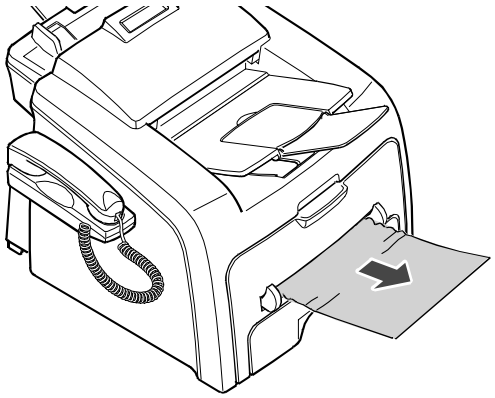


H914T915.WMF

BYPASS JAM (In the Bypass Tray)

“BYPASS JAM ” appears on the display when the machine does not detect paper in the Bypass tray due to no paper or improper paper loading when you try to print using the Bypass tray.

“BYPASS JAM ” also may occur when the paper is not properly fed into the machine through the Bypass tray. In that case, pull the paper out of the machine.



H914T940.WMF

Tips for Avoiding Paper Jams

By selecting the correct paper types, most paper jams can be avoided. If a paper jam occurs, follow the steps outlined in “Clearing Paper Jams ”

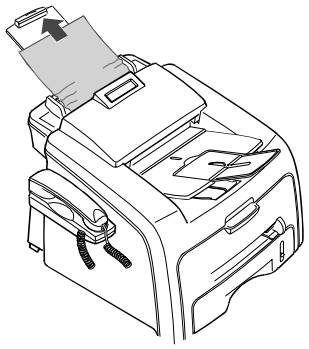
- Follow the procedures in “Loading Paper ” Ensure that the adjustable guides are positioned correctly.
- Do not overload the paper tray. Ensure that the paper is below the paper capacity mark on the inside wall of the paper tray.
- Do not remove the paper from the tray while printing.
- Flex, fan and straighten the paper before loading.
- Do not use creased, damp or highly curled paper.
- Do not mix paper types in the paper tray..
- Use only recommended print materials. See “Paper Specifications ”
- Ensure that the recommended print side is facing down when loading paper in the paper tray and facing up in the Bypass tray.

4.3.2 CLEARING DOCUMENT JAMS

If a document jams while it is feeding through the ADF (Automatic Document Feeder),“DOCUMENT JAM ” appears on the display.

Input Misfeed

1. Open the ADF top cover.
2. Pull the document gently to the right and out of the ADF.



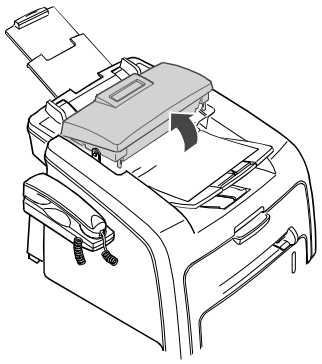
H914T907.WMF

3. Close the ADF top cover. Then load the documents back into the ADF.

NOTE: To prevent document jams, use the document glass for the thick, thin or mixed documents.

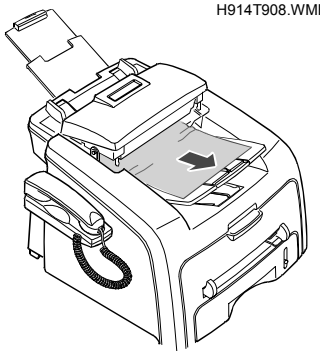
Exit Misfeed

1. Remove all documents from the ADF.
2. Open the control panel by gripping its lower front edge and lifting gently.



H914T908.WMF

3. Gently remove the document from the ADF.

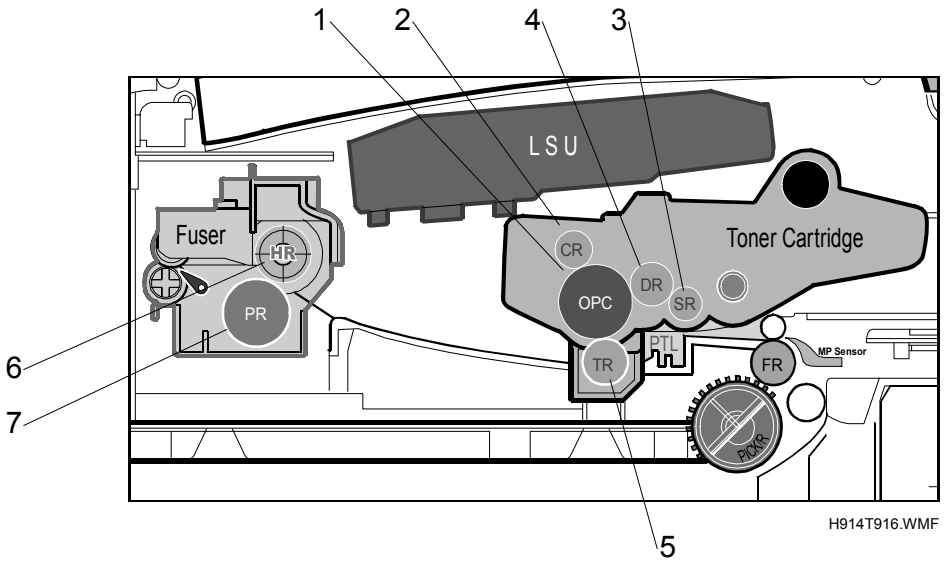


4. Close the control panel. Then put the documents back into the ADF.

H914T909.WMF

4.4 ABNORMAL IMAGE PRINTING AND DEFECTIVE ROLLER

If abnormal image prints periodically, check the parts shown below.



No	Roller	Abnormal Image Period	Kind of Abnormal Image
1	OPC Drum	75.5 mm	White spot, Black spot
2	Charge Roller	37.7 mm	Black spot
3	Supply Roller	37.0 mm	Horizontal density band
4	Develop Roller	35.2 mm	Horizontal density band
5	Transfer Roller	45.3 mm	Back side contamination/transfer fault
6	Hot Roller	66.3 mm	Black spot and fuser ghost
7	Pressure Roller	75.5 mm	Back side contamination

4.5 PAPER FEEDING PROBLEMS

4.5.1 WRONG PRINT POSITION

Description

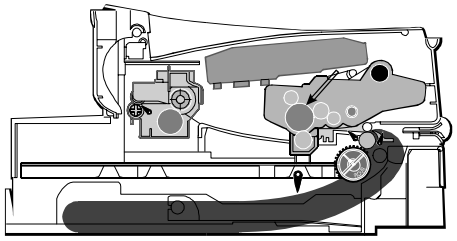
Printing begins when the paper is in the wrong position.

Check and Cause	Solution
A defective feed sensor actuator can cause incorrect timing.	Replace the defective actuator.

4.5.2 JAM 0

Description

1. Paper does not exit from the cassette.
2. Jam-0 occurs when the paper goes into the printer.



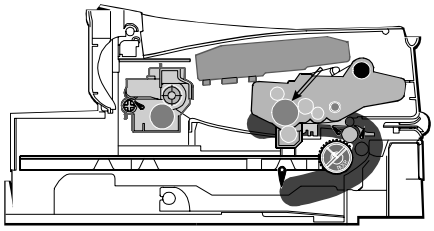
H914T933.WMF

Check and Cause	Solution
Check the solenoid by using Engine Test Mode: Diagnostic Mode 0.	Replace the solenoid.
Check if the pad is loose due to bad sealing of the side-pad.	Replace the side-pad or assembly L or R if necessary.
Check the surface of the roller-pick-up for foreign matter.	Clean with a soft cloth dampened with IPA (Isopropyl Alcohol) or water.
If continuous clusters occur, check whether the assembly slot between shaft-pickup and housing-pickup become open or is broken away.	Replace the house pick-up unit and/or shaft pick-up.
If the paper feeds into the printer and Jam 0 occurs, perform Engine Test Mode to check feed-sensor of the engine board.	

4.5.3 JAM 1

Description

1. Recording paper is jammed in front of or inside the fuser.
2. Recording paper is stuck in the discharge roller and in the fuser just after passing through the Actuator-Feed..



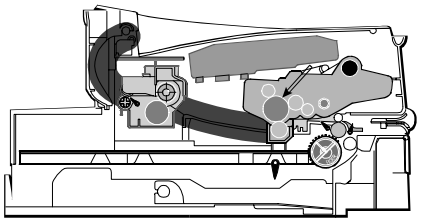
H914T934.WMF

Check and Cause	Solution
If the recording paper is jammed in front of or inside the fuser.	Replace the SMPS.
The actuator may be defective if the recording paper stays in the discharge roller and the fuser after it passes through the actuator-feed.	Reassemble the Actuator-Feed and Spring-Actuator if the return is bad.

4.5.4 JAM 2

Description

1. Recording paper is jammed in front of or inside the fuser.
2. Recording paper is stuck in the discharge roller and in the fuser just after passing through the Actuator-Feed..



H914T935.WMF

Check and Cause	Solution
Exit sensor is defective if the paper is completely fed out of the printer, but Jam 2 occurs. • After the paper is completely discharged, actuator exit should return to the original position to shut off the photo-sensor. Sometimes it takes longer than it should and does not return.	Check if the exit sensor actuator is defective. • Check if the actuator exit is deformed (Check if the lever part is deformed in shape). • Check if burrs occur in the assembly part of the actuator exit or not. Check if the actuator is smoothly operated. • Check if unwanted matters and wire get caught in the actuator exit's operation.
If the paper is rolled in the fuser roller: • This occurs when a guide claw breaks away or transforms. • It occurs when the guide spring breaks away or transforms. • It occurs when the heat-roller or pressure-roller gets too much toner powder.	If the paper is stuck in the fuser, disassemble the fuser and remove the jammed paper. Then clean the surface of the pressure roller with dry gauze.
Paper is accordion and jams in fuser.	Remove the jammed paper after you disassemble the fuser: Clean the surface of the pressure roller with dry gauze. • Remove the toner particles stained on the rib. • Check the assemblage and performance of the exit.

4.5.5 MULTI-FEEDING

Description

Multiple sheets of paper are fed at once.

Check and Cause	Solution
Solenoid malfunction (the solenoid does not work properly): Perform Engine Test Mode: Diagnostic Mode code 0.	Replace the solenoid if necessary.
Friction-Pad is contaminated with foreign matter (oil).	Clean the friction-pad with soft cloth dampened with IPA (Isopropyl Alcohol).
The front and back side of the paper is mixed.	Use smooth paper.

4.5.6 PAPER ROLLED IN THE FUSER

Description

If contaminated at intervals of 57 mm on the back of a paper.

Check and Cause	Solution
Contamination of the pressure roller. (Background, Hot off set)	Disassemble the fuser, clean the area between the Heat-roller and Thermistor and remove the foreign matter off of the pressure roller. **NOTE:** Assembly/disassembly of the fuser unit should be kept to a minimum, in order to avoid hazardous situations. (a/b: ☛3.2.23, c: ☛3.3.10)
	If background appears badly in the printing, fix it by referring to the Solutions for background. (☛ 4.7.8)

4.5.7 PAPER ROLLED IN THE OPC

Description

Paper stays in the OPC.

Check and Cause	Solution
Paper is too thin.	Recommend to use normal paper thickness.
The face of paper is curled.	How to remove the rolled paper in the OPC. • Remove the paper while turning the OPC against the ongoing direction. • Clean fingerprints on the OPC softly with soft cloth dampened with IPA (Isopropyl Alcohol) or tissue.

4.6 PRINTING PROBLEMS

4.6.1 DEFECTIVE OPERATION (LCD WINDOW) DISPLAY

Description

Strange characters are displayed on the OPE Panel or buttons do not operated.

Check and Cause	Solution
Clear the memory. (☛ 5.2.3)	Then try again after clearing the memory.
Check if OPE harness is connected to the Connection Board correctly.	After confirming that OPE HARNESS is connected to the Main Board correctly though the connector board, if it is so, then replace the OPE assembly, Connector Board and Main Board in sequence.

4.6.2 DEFECTIVE LCD OPERATION

Description

Defective LCD Operation

Check and Cause	Solution
Clear the memory. (☛ 5.2.3)	The key is wrong itself or wrongly assembled.
Confirm to catch a click sound, while a key on the OPE panel is pressed on.	Even after the key has been replaced, it is still wrong, try to replace the OPE Ass'y and the Main Board in sequence.

4.6.3 NOT FUNCTIONING OF THE FUSER GEAR DUE TO MELTING AWAY

Description

The motor breaks away from its place due to gear melting away.

Check and Cause	Solution
Check the Fusing Lamp.	Replace the Fuser.
	Replace the Main Board.
	Replace the SMPS.

4.6.4 PAPER EMPTY

Description

The paper lamp on the operator panel is on even when paper is loaded in the cassette.

Check and Cause	Solution
Bending or deformation of the actuator of the paper sensor.	Replace the defective actuator.
The function of the Main Control board is defective Perform Engine Test Mode: diagnostic code 2.	Replace the Main Board.

4.6.5 PAPER EMPTY WITHOUT INDICATION

Description

The paper lamp on the operator panel does not come on when the paper cassette is empty.

Check and Cause	Solution
Bending or deformation of the actuator of the paper sensor.	Replace the defective actuator.
The function of the Main Control board is defective Perform Engine Test Mode: diagnostic code 2.	Replace the Main Board.

4.6.6 COVER OPEN

Description

The ERROR lamp is on even when the front door is closed.

Check and Cause	Solution
The hook lever in the Front Cover may be defective.	Replace the hook lever, if defective.
Check the connector (CN1) and circuit of the cover switch department in the Main Board.	Check the insertion of the Cover Open S/W Connecter.
	Replace the Main Board or Cover Open S/W.

4.6.7 NO LAMP ON WHEN THE COVER IS OPEN

Description

The ERROR lamp does not come on even when the front door is open

Check and Cause	Solution
Check the connector (CN1) and circuit of the cover switch department in the Main Board.	Check the insertion of the Cover Open S/W Connecter.
	Replace the Main Board or Cover Open S/W.

4.6.8 DEFECTIVE MOTOR OPERATION

Description

Main motor is not driving when printing, and paper does not feed into the printer, resulting “Jam 0”.

Check and Cause	Solution
Motor harness or Main Board may be defective.	Check the motor harness, replace it, if defective.
Perform Engine Test Mode diagnostic code 0 and Check the Motor operation.	Replace the SMPS, if necessary.

4.6.9 NO POWER

Description

When system power is turned on, all lamps on the operator panel do not come on.

Check and Cause	Solution
Check if the power input and SMPS output are normal.	Replace the power supply cord or SMPS.
Check for defective of LED-Panel on the OPE if the LED of panel does not appear after normal warming-up.	Replace the OPE ass’y.

4.6.10 VERTICAL LINE GETTING CURVED

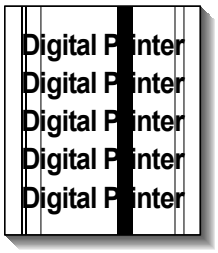
Description

When printing, vertical line gets curved.

Check and Cause	Solution
If the supply of +24v is unstable in the Main Board linking with LSU, check drive by Engine Test Mode: Diagnostic Code Check -1- LSU Motor on.	Replace LSU.
	Replace the Main Board.

4.7 PRINTING QUALITY PROBLEMS

4.7.1 VERTICAL BLACK LINES AND BANDS



H914T917.WMF

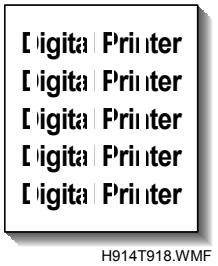
Description

1. Straight thin black vertical line occurs in the printing
2. Dark black vertical band occur when the machine prints.

Check and Cause	Solution
1. Damaged develop roller in the developer. Damaged doctor-blade or cleaning-blade.	If causes 1 and 2 occur in the developer cartridge, replace the AIO and try to print out.
2. Scratched surface of the discharge roller in the developer.	Replace the transfer roller if occurred as No. 3.
3. Partial depressions or deformation on the surface of the transfer roller.	

Trouble-shooting

4.7.2 VERTICAL WHITE LINE



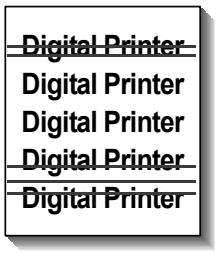
H914T918.WMF

Description

White vertical line shows in the image.

Check and Cause	Solution
Foreign matter stuck onto the window of internal lenses of LSU mirror.	Foreign matter stuck onto the window: Clean the LSU window with recommended cleaner(IPA) Clean the window with a clean cotton swab.
Foreign matter or toner particles between the developer roller and blade. (In case the life of the developer has been expired, white lines or light image occur in front of the image.)	Foreign matter in the LSU: Open the cover of LSU and clean with a cotton swab on the surface of the reflex mirror.
It may occur when a Burr and foreign substances are on the window of the developer frame.	Remove the foreign matter and burr of the exposure window. (Developer cartridge)
If the fuser is defective, voids occur periodically at the top of a black image.	Open the front cover and check ribs that corresponds to the position of the voids. Remove if found.
	If the problems are not solved, replace the AIO.

4.7.3 HORIZONTAL BLACK BANDS



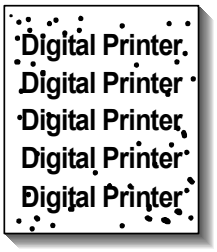
H914T919.WMF

Description

Dark or blurry horizontal stripes occur in the prints printing periodically. (They may not occur periodically.)

Check and Cause	Solution
Bad contacts of the voltage terminals to developer.	Clean each voltage terminal of the Charge, Supply, Develop and Transfer roller. (remove the toner particles and paper particles)
The rollers of developer may be stained. Charge roller = 37.7 mm Supply roller = 37 mm Develop roller = 35.3 mm Transfer roller = 45.3 mm	Clean the right gear that has a relatively small gap in the OPC.
	If the malfunction persists, replace the AIO.

4.7.4 BLACK/WHITE SPOT



H914T920.WMF

Description

1. Dark or blurry black spots occur periodically in the printing.
2. White spots occur periodically in the printing.

Check and Cause	Solution
If dark or blurry black spots occur periodically, the rollers in the developer may be contaminated with unwanted matter or paper particles. (Charge roller : 37.7 mm interval OPC drum : 75.5 mm interval)	Run OPC cleaning mode. Then print and run the Self-test 2 or 3 times.
If faded areas or voids occur in a black image at intervals of 75.5 mm, or black spots occur elsewhere, the OPC drum surface is damaged.	In case of 75.5 mm interval irremovable in 1, cleanly remove foreign substances stuck on the OPC location equivalent to black spots and white spots with a dry duster.
If a black image is partially broken, the transfer voltage is abnormal or the transfer roller's life has expired.	The transfer roller guarantees 60,000 sheets printing. If the roller's life is expired, replace it.
	In case of 37.7 mm interval irremovable in 1, take measures as to replace the AIO and try to print out.
	Clean the inside of the set against the paper particles and foreign matter in order not to cause the trouble.

4.7.5 LIGHT IMAGE

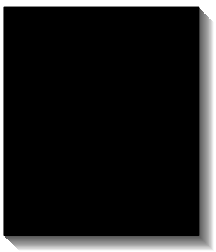
H914T921.WMF

Description

The printed image is light, with no ghost.

Check and Cause	Solution
Developer roller is stained when the toner of developer cartridge is almost consumed.	Check if the toner save mode is off.
	Replace the AIO. Then try to print.
Ambient temperature is below than 10°C.	Wait 30 minutes after the printer is powered on before you start to print.
Defective contact caused by the toner stains between the high voltage terminal in the HVPS and the one in the set.	Clean the contaminated area.
Abnormal output from the HVPS. (Run self-test and check the solution)	Replace the HVPS (SMPS) if the problems are not solved by the above four directions.

4.7.6 DARK IMAGE OR A BLACK



H914T922.WMF

Description

The printed image is dark.

Check and Cause	
No charge voltage in the Main Board. (Perform Engine Test Mode diagnostic code 4 HVPS check.)	Clean the high voltage charge terminal.
Charge voltage is not turned on due to the bad contacts between power supply in the side of the Developer and charge terminal of HVPS.	Check the connector, which connects the main board and HVPS.
	If steps 1 and 2 above did not correct the problem, replace the HVPS (SMPS).

4.7.7 UNEVEN DENSITY

Description

Print density is uneven between left and right.

H914T923.WMF

Check and Cause	Solution
The pressure force on the left and right springs of the transfer roller is not even, the springs are damaged, the transfer roller is improperly installed, or the transfer roller bushing or holder is damaged.	Replace both the left and right spring holders.
The life of the developer has expired.	Problem with the toner cartridge, replace the AIO and try to print out.
The toner level is not even on the developer roller due to a bad blade.	

4.7.8 BACKGROUND

Description

Light dark background appears in whole area of the printing.

H914T924.WMF

Check and Cause	Solution
Recycled recording paper has been used.	Quality is not guaranteed with recycled paper.
The life of the developer has expired.	Replace the AIO.
The up-to-down movement of the transfer roller is swift?	Clean the bushings on the transfer roller.
The HVPS is normal? (Perform Engine Test Mode diagnostic code 4)	Replace the HVPS (SMPS).

4.7.9 GHOST (1)

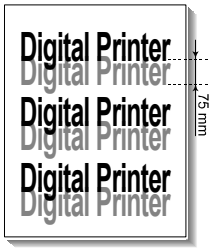
H914T925.WMF

Description

Ghost occurs at 75.5 mm intervals of the OPC drum in all print areas.

Check and Cause	Solution
Bad contacts caused by contamination from toner particles between high voltage terminal in the main body and the electrode of the Developer.	Clean the contaminated terminals.
Bad contacts caused by contamination from toner particles between high voltage terminal in the main body and the one in the HVPS board.	Replace the AIO. Then try to print out.
The life of developer is expired.	Replace the main board if not solved by the above two directions.
Transfer roller lifetime (60,000 sheets) has expired.	If not solved by the above direction, check the transfer roller lifetime and replace it.
Abnormal low temperature (below 10°C).	Wait about 1 hour after power on before you use the printer.
Damaged cleaning blade in the developer.	Problem in the toner cartridge, replace the AIO and try to print out.

4.7.10 GHOST (2)



H914T926.WMF

Description

Ghost occurs at 75 mm intervals of the OPC drum in the whole printing.

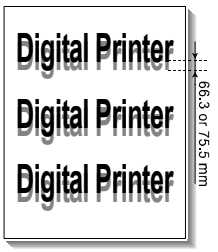
(When printing on card stock or transparencies using manual feeder)

Check and Cause	Solution
When printing on card stock thicker than normal paper or transparencies such as OHP, higher transfer voltage is required.	Select “Thick Mode” on paper type menu from the software application. Then go back to the original mode.

4.7.11 GHOST (3)

Description

Ghost occurs at 66.3 or 75.5 mm intervals.



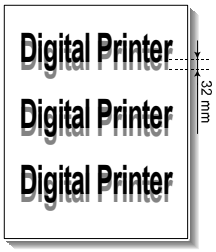
H914T927.WMF

Check and Cause	Solution
Fuser contamination.	Disassemble the fuser. Then remove contamination on the rollers. Clean contamination between the thermistor and the heat roller. Make sure not to damage the rollers.

4.7.12 GHOST (4)

Description

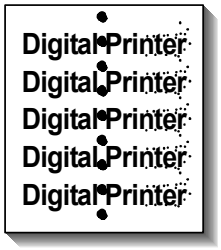
White ghost occurs in a black image printing at 32 mm intervals.



H914T928.WMF

Check and Cause	Solution
The life of the developer may be expired.	Replace the toner cartridge. Then try to print again.
The abnormal voltage and bad contact of the terminal of the supply roller.	Check the approved voltage of the supply roller and contact of the terminal and adjust if necessary.

4.7.13 STAINS ON THE FACE OF THE PAGE



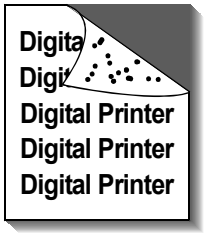
H914T929.WMF

Description

The background on the face of the printed page is stained.

Check and Cause	Solution
Toner leakage due to incorrectly sealed developer.	Replace the AIO.
If the transfer roller is contaminated, stains on the face of page will occur.	If the transfer roller is contaminated, run PC Cleaning Mode Print 2 or 3 times. Then do the Self-Test 2 or 3 times to remove contamination.

4.7.14 STAINS ON BACK OF PAGE



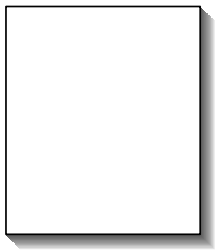
H914T930.WMF

Description

The back of the page is stained at 56.1 mm intervals.

Check and Cause	Solution
Transfer roller is contaminated.	Perform the OPC Cleaning Mode Print 2 or 3 times. Run Self-Test to remove the contamination of the transfer roller.
Pressure roller is contaminated.	Replace the transfer roller if contaminated severely.
	Replace the fuser.

4.7.15 BLANK PAGE PRINT OUT (1)



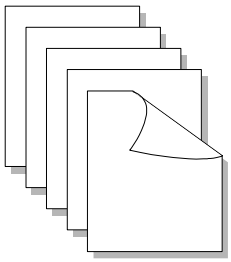
H914T931.WMF

Description

Blank page is printed.

Check and Cause	Solution
Bad ground contacts in OPC and/or developer.	Remove contamination of the terminals of the AIO and the printer.

4.7.16 BLANK PAGE PRINT OUT (2)



H914T932.WMF

Description

1. Blank page is printed.
2. One or several blank pages are printed.
3. When the printer turns on, several blank pages print.

Check and Cause	
Bad ground contacts in OPC and/or developer.	Remove contamination from the terminals of the AIO.
Abnormal solenoid.	Perform the engine self test with the Engine Test Mode diagnostic code 0 to check if the solenoid operates correctly.
	If not solved by the above two directions, replace the main board.
	Turn the power off. Then clear the print job on the computer. Then try to print again.

4.8 FAX & PHONE PROBLEMS

4.8.1 NO DIAL TONE

Description

While on-hook button is pressed, there is no dial tone.

Check and Cause	Solution
Check if the telephone line cord is connected to “LINE” correctly.	If the telephone cord is normal but there is no dial tone, then try to replace the LIU Board.
Check if it makes CLICK sound while on hook dial key is pressed.	If you cannot hear the CLICK sound of the on hook dial key, the OPE Ass’y may be defective. Replace the OPE assembly.
Check the connection of HARNESS between the LIU and the main board.	Check the speaker connection. Replace it if necessary.
Check if the SPEAKER is connected correctly.	Lastly, try to replace the Main Board.

4.8.2 DEFECTIVE TONE DIAL

Description

The tone dial does not operate correctly.

Check and Cause	Solution
Check if the telephone line is connected correctly.	If you cannot hear the CLICK sound of the on hook dial key, the OPE Ass’y may be defective. Replace the OPE assembly.
Wile the ten key pad is pressed, check to catch a CLICK sound.	If you can catch a CLICK sound, after checking the connection of HARNESS between the LIU and the main board, try to replace the HARNESS.
Check the connection of HARNESS between the LIU and the Main Board.	The problem still persists, then replace the LIU and the Main Board in sequence. **Notes:** Product supports the Tone Dial type only.

4.8.3 DEFECTIVE FAX FORWARD/RECEIVE

Description

The FAX FORWARD/RECEIVE does not operate correctly.

Check and Cause	Solution
Check if you can hear a dial tone by pressing on hook dial key.	☛ 4.8.2
Check if you can hear a RECEIVE tone while MODEM testing in the TECH mode.	If the MODEM testing is normal and there is no dial tone, then replace the LIU board.
	If the MODEM testing is abnormal, replace the main board.

4.8.4 DEFECTIVE FAX FORWARD

Description

RECEIVE is functioning, but FORWARD does not operate correctly.

Check and Cause	Solution
Check if there is NOISE when you press on-hook dial.	If it makes NOISE while using on-hook dial, replace or repair the telephone line.
Check the RECEIVE condition by trying to forward a FAX to another fax machine from the forwarding side FAX.	
Check if the telephone line connected to the product is damaged	

4.8.5 DEFECTIVE FAX RECEIVE (1)

Description

FORWARD is functioning, but RECEIVE is not functioning or the received data are broken.

Check and Cause	Solution
Check if there is NOISE when you press on-hook dial.	If it makes NOISE while on hooking, replace or repair the telephone line.
Check the RECEIVE condition by trying to receive a FAX at another fax machine.	

4.8.6 DEFECTIVE FAX RECEIVE (2)

Description

The received data are lengthened or cut in the printing.

Check and Cause	Solution
Check if there is NOISE when you press on-hook dial.	If it makes NOISE, rearrange the telephone line. (☛ 4.8.4)
Ask to the forwarding side, check the image quality of another machine receiving a FAX additionally sent to.	Check if the FAX status of the forwarding side is also normal.

4.8.7 DEFECTIVE FAX RECEIVE (3)

Description

The phone is ringing continuously, but it cannot receive.

Check and Cause	Solution
Check if the RECEIVE mode is TEL MODE or FAX MODE.	Replace the LIU and the main board in sequence when the RECEIVE mode is changed to FAX MODE.

4.8.8 DEFECTIVE FAX RECEIVE (4)

Description

The received data is reduced by more than 50% in the printing.

Check and Cause	Solution
Check the FAX status of the forwarding side.	After checking the data of the forwarding side, correct the FAX of the forwarding side.

4.8.9 DEFECTIVE AUTOMATIC RECEIVING

Description

The automatic receiving function is not working.

Check and Cause	Solution
Check if the RECEIVE mode is TEL MODE or FAX MODE.	If the RECEIVE mode is set to the TEL MODE, reset it to the FAX MODE.
	Even after the RECEIVE mode is changed to the FAX mode, it cannot receive, then try to replace the LIU and the Main Board in sequence.

4.9 COPY PROBLEMS

4.9.1 WHITE COPY

Description

Blank page is printed out when copy.

Check and Cause	Solution
Check the Scan-Cover open.	Room light can transit a thin original.
Check shading profile.	Remake a shading profile in the tech mode.
Check white/black reference voltage in the Main Board.	Replace the Main Board if it is defective.

4.9.2 BLACK COPY

Description

Black page is printed out when Copy..

Check and Cause	Solution
Check for CIS problem on the Main board.	Check the CIS harness is properly connected.
Check shading profile.	Read shading profile in the Tech mode.

4.9.3 ABNORMAL NOISE

Description

There is noise from the ADF when machine copies.

Check and Cause	Solution
Check the Scanner Motor and any mechanical disturbance.	Check the right position of the Scanner Motor, and check any mechanical disturbance in the Scanner psth.
Check the Motor Driver in the Main Board.	If any driver is defective, replace the Main Board. • Connection PBA U4-1, 19 or U5-1, 19=0V to 24V swing signal when operating.

4.9.4 DEFECTIVE IMAGE QUALITY

Description

There is noise when copy.

Check and Cause	Solution
Check shading profile.	Remake shading profile in the tech mode. .
Check the gap between original and scanner glass.	The gap above 0.5 mm can cause a blurred image.
Check printing quality.	☛ 4.7

4.10 ERROR MESSAGES

The display on the front panel shows the messages to indicate the printer 's status or errors. Refer to the tables below to understand the message 's meaning and clear the problem if necessary. Message details are shown in alphabetical order with numbered messages.

BYPASS JAM

Description: The machine detects non-feed from bypass tray.

Solution: Open the side cover. Then clear the jam.

COMM. ERROR

Description: Facsimile communication problem.

Solution: Try again.

DOCUMENT JAM

Description: Document jams in the feeder when document jam occurs at ADF

Solution: Clear the document jam.

DOOR OPEN

Description: Side cover is not correctly closed.

Solution: Close the cover correctly.

GROUP NOT AVAILABLE

Description: You have tried to set a group location when you can only set a single location number. This can occur when you try to add locations for multi-dial operation.

Solution: Try again. Check group location.

HEATING ERROR

Description: Temperature does not go up at the time of operation.

Solution: Check thermistor contact point and heating lamp.

LINE BUSY

Description: Remote fax did not answer

Solution: Try again.

LINE ERROR

Description: The machine cannot connect with the remote machine, or has lost contact because of a problem on the phone line.

Solution: Try again. Wait an hour for the line to clear. Then try again if you still have problems.

LOAD DOCUMENT

Description: You have attempted to set up a sending operation with no document loaded. Load a document and try again.

Solution: Try again. Make sure the remote machine is OK.

MEMORY FULL

Description: The memory has become full.

Solution: Either delete unnecessary documents, or retransmit after more memory becomes available, or split the transmission into more than one operation.

NO ANSWER

Description: The remote machine did not answer after all the redial attempts.

Solution: Try again. Make sure the remote machine is OK.

NO CARTRIDGE

Description: When the machine detected the toner cartridge has not been installed.

Solution: Install the Cartridge.

NO. NOT ASSIGNED

Description: The speed dial location you tried to use has no number assigned to it.

Solution: Dial the number manually with the keypad, or assign the number.

NO PAPER [ADD PAPER]

Description: The recording paper has run out. The printer system stops.

Solution: Load the recording paper in the paper feeder.

OPEN HEAT ERROR

Description: Thermistor not connected to main board or contact point is not coupled tightly in power on.

Solution: Check thermistor contact point, Heating Camp & Thermostat.

OVERHEAT

Description: The printer part has overheated.

Solution: Your unit will automatically return to the standby mode when it cools down to normal operating temperature. If failure persists, call service.

PAPER JAM 0 OPEN/CLOSE DOOR

Description: Recording paper has jammed in paper feeding area. Recording paper is jammed in pick-up unit

Solution: Press STOP and clear the jam.

PAPER JAM 1/2 OPEN/CLOSE DOOR

Description: Recording paper has jammed inside the unit. Recording paper has jammed in paper exit unit.

Solution: Clear the jam.

RETRY REDIAL?

Description: The machine is waiting for the programmed interval to automatically redial.

Solution: You can press START to immediately redial, or STOP to cancel the redial operation.

TONER EMPTY

Description: When the machine has encountered the Toner Empty.

Solution: Replace the Toner Cartridge.

TONER LOW

Description: Toner may be low

Solution: Toner may be unevenly distributed. Remove the toner cartridge and shake it gently to evenly distribute the toner. Then replace the toner cartridge.

4.11 TONER CARTRIDGE (AIO) SERVICE

Use only the recommended toner cartridge. Machine operation cannot be guaranteed if you do not use the recommended toner cartridge.

4.11.1 PRECAUTIONS ON SAFE-KEEPING THE TONER CARTRIDGE

Do not put the toner cartridge in direct light for more than a few minutes. This can damage the cartridge.

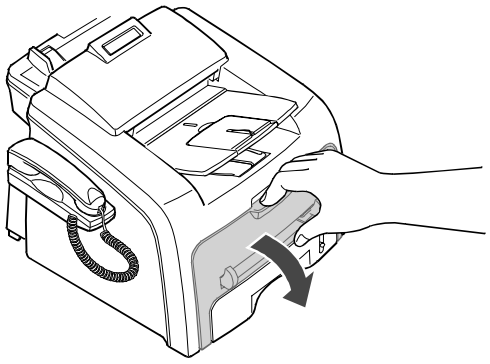
4.11.2 SERVICE FOR THE LIFE OF TONER CARTRIDGE

You can temporarily improve the print quality by redistributing the toner if the printed image is light due to the life of the toner. (Shake the toner cartridge). This will temporarily solve the problem, however you should replace the toner cartridge.

Redistributing Toner

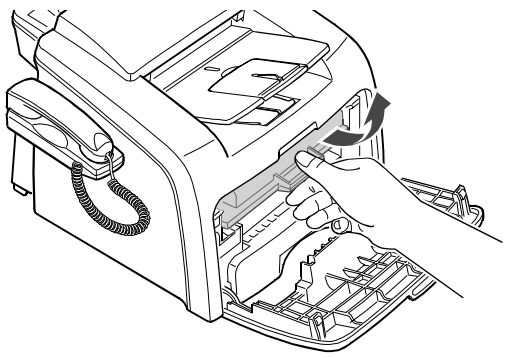
White streaks or light print occurs when the toner cartridge gets near the end of its life. The LCD shows the warning message, “Toner Low.” You can temporarily make the print quality better by redistributing the remaining toner in the cartridge.

1. Open the front cover.



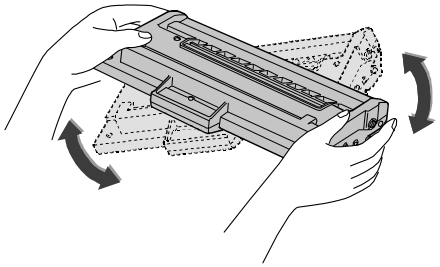
H914T936.WMF

2. Gently push the used cartridge down. Then pull it out.
   NOTE: Recycle the used toner cartridge. Examine the recycling brochure packed with the toner cartridge for details



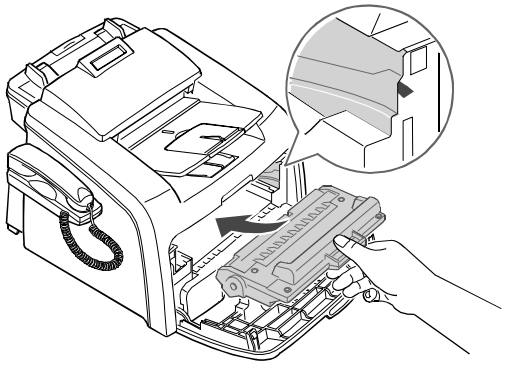
H914T937.WMF

3. Unpack the new toner cartridge. Then gently shake it horizontally four or five times. This distributes the toner evenly inside the cartridge.



H914T938.WMF

4. Keep the box and the cover for shipping. Put the new toner cartridge in the machine until it locks into place.



H914T939.WMF

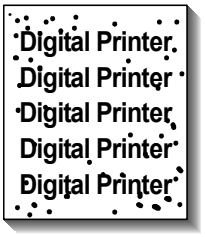
4.11.3 SERVICE GUARANTEE

Please refer to the operating Instructions for details on service guarantee.

4.11.4 SIGNS AND MEASURES AT POOR TONER CARTRIDGE

Fault	Signs	Cause & Check	Solution
Light image and partially blank image (Cartridge life is ended.)  H914T921.WMF	• The printed image is light or dirty.	1. Shake the toner cartridge if the image is light or dirty. Then check the image again. If the problem stays, the cartridge is at the end of its life.	1. Image quality improves when you shake or replace the toner cartridge. 100 pages remain before toner ends.
	• Parts of the image are not printed.	2. Parts of the image does not print. Shake the toner cartridge. Then check the image again. 1) NG: clean the LSU window with a cotton swab. 2) OK: Lack of toner. The toner life is near the end.	2. For item 2- If image quality improves after you clean the LSU window, then the toner cartridge is normal. (Contamination on the LSU window has caused image quality problems.)
	• A "tick tick" noise occurs.	3. A noise like "tick tick" occurs. Measure the time between ticks. 4. White vertical stripes show on parts of the page. Shake the toner cartridge. Then check the image again. OK: Lack of toner. The toner life is near the end.	3. For item 3- If the time between ticks is about 2 seconds, the toner inside the toner cartridge is almost empty. (Replace the toner cartridge. 200 pages remain before the toner ends) 4. For item 3- This is caused by lack of toner. Replace the toner cartridge.

Fault	Signs	Cause & Check	Solution
Toner Contamination	• Toner contamination of the printed page at regular intervals down the page.	1. Contamination at regular intervals. (a)Check the distance between contamination marks. (b)Check the appearance at the two ends of the toner cartridge OPC drum.	1. (a) Refer to section 6.5 1. (b) If the ends of the OPC drum are contaminated with toner: Check the number of pages printed with this cartridge. Waste toner collector could be full.
	• Random toner contamination over large parts of the paper surface.	2. Random page contamination. (a) Maker sure the terminals (contact points) of the toner cartridge are clean. (b) Make sure the terminals (contact points) of the toner cartridge are not damaged.	2. Clean all HV contacts. Replace the cartridge if the problem stays.

Fault	Signs	Cause & Check	Solution
White Black spot  H914T920.WMF	• Light or dark black dots on the image occur.	1. If light or dark black dots occur at regular intervals this is because the toner cartridge rollers are contaminated with unwanted substance or paper particles. 1) 38mm interval: Charge roller 2) 95mm interval: OPC cycle	1. For item 1 -Do OPC cleaning mode print 4-5 times to remove excess toner. Check for unwanted substances on the OPC surface. Clean with a clean gauze with IPA (Isopropyl Alcohol). Use high caution not to damage the OPC surface. Never use other alcohol.
	• White spots occur in the image.	2. If white spots occur in a black image at intervals of 95mm, or black spots occur elsewhere, the OPC drum is damaged or unwanted substance stays on the surface. 3. If a black and white or graphic image is partially broken at irregular intervals, the transfer roller's life has ended or the transfer voltage is not correct.	2. For Item 2 -If OPC cleaning mode print 4-5 times does not resolve the problem at intervals of 37.7mm - place the toner cartridge at intervals of 75.5mm – clean OPC drum. 3. For item 3 - Replace the transfer roller. (Check the transfer voltage and readjust if necessary.)

Fault	Signs	Cause & Check	Solution
Recycled product	• Poor appearance of the toner cartridge.	1. Poor appearance of the toner cartridge. (a) Check for damage (b) Check the appearance of parts of the toner cartridge, such as frame, hopper, screws	1. For Item 1 the cartridge is a recycled product - (a) If there is any evidence of disassembling the toner cartridge. (b) If materials other than normal parts of the toner cartridge are added or substituted.
	• Dirty or rough printouts. • Bad background in the image.	• Not clean and rough printouts. (a) Make sure the terminals (contact point) of the toner cartridge are clean. (b) Make sure the terminals (contact point) of the toner cartridge are not damaged.	2. Clean all HV contacts. Replace the cartridge if the problem stays. **NOTE:** Note If the cartridge is recycled then these types of problems can occur when the toner cartridge is recycled over 2 times. If 'near empty' cartridges are collected for re-use this is also recycling the toner cartridge.

Fault	Signs	Cause & Check	Solution
Ghost & Image Contamination	• The printed image is too light or dark, or partially contaminated black.	1. The printed image is too light or dark, or partially contaminated black. (a) Check if unwanted substances or toner stay on the terminals (point of contact) of the toner cartridge. (b) Check if the terminal assembly is correct.	1. Items 1, 2, 3 (a) Clean the contacts on the toner cartridge. (b) Clean the contact points on the set. (c) If the terminal assembly is damaged repair or replace the terminals, or, replace the cartridge
	• Totally contaminated black. (Black image printed out)	2. Totally contaminated black. (Black image printed out) (a) Check if unwanted substances stay on the terminal (point of contact) of the toner cartridge. (b) Check if the terminal assembly is correct.	2. Item 2 This is related to problems with the charge roller contact. Check the charge roller contacts.
	• The density of printouts is too dark and ghost occurs.	3. The printed image is dark and ghost occurs. (a) Check if unwanted substances stay on the terminal (point of contact) of the toner cartridge. (b) Check if the terminal assembly is correct.	3. Item 3 This is related to problems with the developer bias voltage contact. Check the charge roller contacts.

4.12 SOFTWARE PROBLEMS (CAUSES AND SOLUTIONS)

4.12.1 THE PRINTER IS NOT WORKING (1)

Description

The printer does not operate in the printing mode when the power is set on.

Check and Cause	Solution
1. Do the self-test mode with the menu buttons. Then print the test page. (Menu, Enter, Enter) 2. Check that the PC and the printer are correctly connected. Make sure the toner cartridge is installed correctly. 3. The machine does not print in Windows. 4. Maker sure the printer cable is directly connected to the printer.	1. If the test print works then there are no problems in the printer. If the test print does not work then the printer is defective. The problem is not due to computer software or driver settings. 2. Replace the printer cable. If the problem is not solved even after the cable is replaced, check the amount of the remaining toner. (refer to Toner Cartridge Service 7-6, Page 7-25) 3. Check that the connection between PC and printer port are correct. If you use windows, check that the printer driver in the controller is set up correctly. Make sure the correct port is selected and 'Use On-line' is selected in the driver. If the printer driver is correctly set up, try to print a test page from the driver. Examine which program does not work. Try opening 'Memo Pad' and printing. If the printer does not work in a certain program, adjust the setup in that program. At times, the printout is normal in the Windows basic programs, but it's not working in a particular program. In this case, uninstall and re-install the new driver. If the printer does not work in the Windows basic programs and you are print with 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). Use USB instead of parallel – or vice versa. 4. If you have other devices that need to share the printer port, temporarily disconnecting these devices. Uninstall the drivers. Then check if the printer works by alone. If you use a USB hub try to connect directly to the back of the PC.

4.12.2 THE PRINTER IS NOT WORKING (2)

Description

There is no response or print speed is low when the machine gets a print command. This is due to incorrect setup and not a problem with the printer.

Check and Cause	Solution
1. Make sure you have enough free hard disk space for the temporary work files. 2. Print error occurs even if there is enough space in the hard disk. 3. Check the parallel-port-related items in the CMOS Setup. 4. Reboot the system to print.	1. Not enough printer memory means there is a hard disk space problem and not a printer RAM problem. In this case, make more space on the hard disk. Get more space with the disk utilities program. 2. The connection of the cable and printer port is not correct. Check that the cable is properly connected. Make sure the port settings in CMOS are correct f you use the parallel port 3. For the printer port, Select ECP. SPP and normal modes support 8-bit data transfer, while ECP Mode supports 12-bit data transfer. 4. If the regular font is not printing, the cable or the printer driver may be defective. Turn the PC and printer off, and reboot the system to print again. If not solved, double-click the printer in my computer If the regular fonts are not printed this time again. the cable must be defective so replace the cable with new one.

4.12.3 ABNORMAL PRINTING

Description

Printing does not work after you replace the cable. Printer does not operate or strange fonts are printed,

Check and Cause	Solution
1. Set up the parallel port with CMOS SETUP. 2. Printer driver error. 3. Error message “insufficient memory”. (The printing job stops because of insufficient virtual memory. This is caused by insufficient space on the hard disk.)	1. Ensure that ECP (best) or SPP is set in the CMOS (BIOS). 2. Make sure that the correct driver is loaded. Use the driver supplied on the CD or downloaded from the web site. DO NOT use the Microsoft driver supplied with the Windows operating system. If the printer is a GDI or SPL type printer make sure that ALL OTHER GDI or SPL drivers are uninstalled. Windows lets you load only 1 of this type of driver. 3. Delete unnecessary files to make enough space on the hard disk. Then start the print job again.

4.12.4 SPOOL ERROR

Description

SPOOL (simultaneous peripheral operations online) is the process Windows uses to manage print jobs. Jobs are processed and then stored on the hard disk until the printer is ready to get them

Check and Cause	Solution
1. Not enough space on the hard disk in the directory for the basic spool.	1. Delete unnecessary files to make more space for spool storage.
2. If previous printing errors were not solved.	2. There may be files from previous failed print jobs on the hard disk with the name in the form '*.jnl'. Delete these files and Reboot Windows to start the printer again.
3. There may be problems with other drivers or programs.	3. Close all other programs except the current one, if possible.
4. When an application program or the printer driver is damaged.	4. Delete the printer driver completely. Then install it again.
5. When some files related to the OS are damaged or virus infected.	5. Check for viruses, and restore the damaged files after you reboot the computer. Then install the application program again.
6. Memory is less than the minimum.	6. Put more memory to the PC.

CAUTION: How to delete the data in the spool manager.

The installed drivers and the list of the documents you want to print are shown in the spool manager

Select the document to be deleted. Then check delete in the menu.

The current job will still print when you delete the job data that has already been transferred to the printer's memory. The job may take a long time to delete if there is a problem with the printer (out of toner, offline, out of paper etc.).

5. SERVICE TABLES

5.1 USER MODE

Function	Item		Contents
1. Paper Setting	Paper Type		Plain Paper / Bond / Transparency / Card Stock / Labels / Preprinted / Colored / Envelope / Thick / Thin
	Paper Size	Tray Paper	A4 / LTR / LGL
		Manual Feed	A4 / LTR / LGL
2. Copy Setup	Default Change	Darkness	Light / Normal / Dark
		Original Type	Text / Photo
		Reduce / Enlarge	Custom 50–200 % / Original (100%) / LGL-LTR (78%) / LGL-A4 (83%) / A4-LTR (94%) / EXE-LTR (104%) / 50% / 150% / (200% only for Model L2C)
		No. of Copies	1-99
	Timeout		15 / 30 / 60 / 180 / off
	Copy Collated		On / Off
3. Fax Setup	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
	Receive Code		0-9
	DRPD Mode		Set
	Defalt change		Resolution
4. Fax Feature	Delay Fax		Enter number
	Priority Fax		Enter number
	Add Page		Enter number
	Cancel Job		Enter number
	Delay RX Poll		Enter number
5. 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
6. 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
7. Sound / Volume	Speaker	On / Off / Comm.
	Ringer	Off / Low / Med / High
	Key Sound	On / Off
	Alarm sound	On / Off
8. Machine Setup	Machine ID	Enter number
	Date & Time	Set date and time
	Clock Mode	12 Hour / 24 Hour
	Dial Mode*	Tone / Pulse
	Language	English / French / Spanish / Portuguese / German / Italian / Dutch / Danish / Swedish / Finnish / Norwegian / Russian / Polish / Hungarian / Czech
	Power Save	On / Off
	Ignore Toner	On / Off
	USB Mode	Full Speed / High Speed
9. Maintenance	Clean Drum	Yes / No
	Notify toner	On / Off
	Clear Memory	Clear All Memory / Paper Setting / Copy Set Up / Fax Set Up / Fax Feature / Advanced Fax / Sound/Volume / Machine Set Up / Sent Report / RCV Report / Phone Book
	Remote Test	On / Off
	Adjust Shading	On / Off

*: This item can show only in some country code settings.

The table shows functions the user can set. Examine the user manual for instructions.

The service manual shows things that the user can set.

5.2 TECH MODE

5.2.1 HOW TO GO INTO TECH MODE

The technician can examine the machine and do different tests in service (tech) mode. Tech mode shows the cause of a malfunction.

You can still use the machine normally when you are in tech mode.

Do this procedure to go into the Tech mode:

Press Menu → # → 1 →9 → 3 → 4 in sequence. The LCD shows 'TECH'. Then the machine goes into tech mode.

Do this procedure to go back to user mode:

Menu → # → 1 → 9 → 3 → 4

5.2.2 SETTING-UP SYSTEM IN TECH MODE

Function	Item	Contents	
Data Setup	Send Level	9-15	
	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 code	
	Clear Count	Enter Password (1934 enter)	Total Page CNT
			CRU Print CNT
			FLT Scan CNT
			ADF Scan CNT
			Used Toner CNT
			Edit Toner Dot
	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	Pattern 1-7, all	
	Shading Test		
Report	Protocol	Protocol List	
	System Data	System Data List	
New Cartridge		Yes / No	

5.2.3 DATA SET-UP

SEND LEVEL

You can set the level of the transmission signal. The Tx level must be less than -12 dBm.

CAUTION: The send fax level is set at the factory. Do not change this in the field.

DIAL MODE

Examine the users line status. Then set the correct dialing mode.

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

MODEM SPEED

You can set the maximum modem speed.

Communication is automatic when the modem speed is set at a lower speed. Keep the default at 33.6 Kbps.

ERROR RATE

The baud rate automatically goes to 2400 bps when the error rate is not the same as the set value. This keeps the error rate below the set value.

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

NOTIFY TONER

When this feature is enabled, (and when the toner becomes low), toner low information is sent to a specified contact point. The contact point can be the service company etc. Access this menu and select ON. Enter the name and the number of the contact point, the customer's fax number, the model name, and the serial number when the LCD prompts.

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

CLEAR COUNT

This function erases the counters stored in system memory. Type password "1934" to enter the menu

FLASH UPGRADE

The firmware upgrade has these functions:

- Local and remote.

Examine the firmware upgrade section (☛ 5.4.4).

SILENCE TIME

The machine monitors the line after a call is picked up by the answering machine in ANS/FAX mode. 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 goes to receiving mode when it detects a period of silence. When "unlimited" is selected, the machine waits until the answering operation ends. Then the machine goes to receiving mode.

5.2.4 MACHINE TEST

SWITCH TEST

Use this to test all keys on the operation control panel. The LCD shows the result when you push a key.

MODEM TEST

Use this to hear different transmission signals to the telephone line from the modem and to check the modem. The modem part of the main board does not operate correctly if you cannot hear a transmission signal.

DRAM TEST

Use this to examine the machine's DRAM. The LCD shows the result.

The LCD shows << O K >> if the memory works correctly.

ROM TEST

Use this to examine the machine's ROM. The LCD shows the result and the software version.

Example:

- FLASH VER: 6.04 V
- ENGINE VER:1.08 V

PATTERN TEST

Use this to make sure the printer mechanism operates correctly.

These patterns are printed;

- Pattern-1 ~ Pattern-7

QA Pattern-1 ~ QA Pattern-4

SHADING TEST

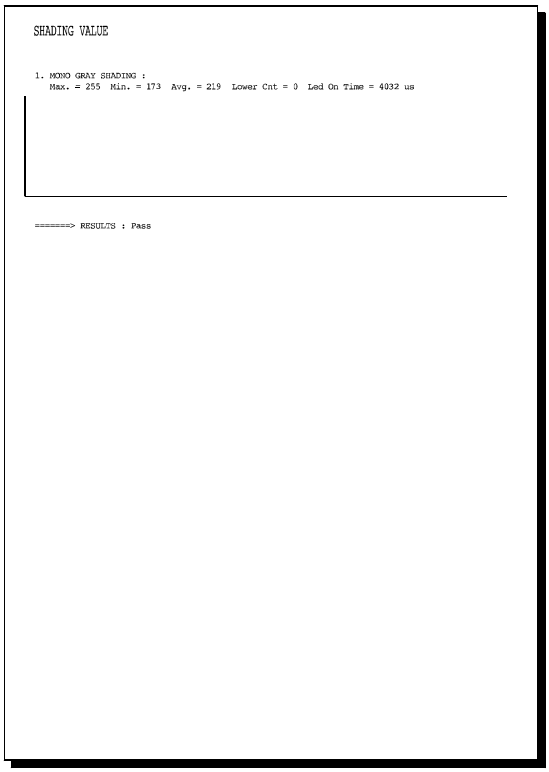
The function sets the best scan quality from information it gets from the CIS (Contact Image Sensor). This function checks the condition of the CIS unit if copy image quality is poor.

< Procedure >

1. TECH MODE
   (MENU, #, 1934)
   ↓
   Machine TEST
   ↓
   Shading TEST
   ↓
   Add white document in ADF
   ↓
2. After scanning the CIS SHADING PROFILE will print out.
3. If the printed image not the same as the sample image shown, then the CIS is defective.

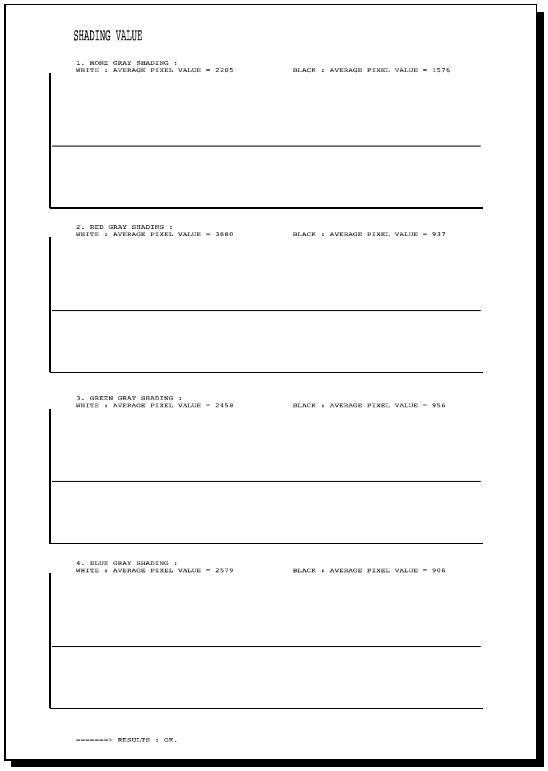
NOTE: Make sure that the cover is closed when you test the CIS.

[H914/H915]



H914S900.WMF

[H916]



H914S900.WMF

5.2.5 REPORT

PROTOCOL LIST

Use this list to examine for send and receive errors. The protocol list automatically prints if a communication error occurs when the machine is in tech mode.

SYSTEM DATA

- This gives a list of the system data set by the user and those in tech mode.

5.2.6 NEW CARTRIDGE

The machine usually detects when a new AIO (CRU) cartridge has been put in. However there may be the case when the machine does not detect the new AIO automatically. In cases like this you can manually let the machine detect a new AIO. The manual procedure and the automatic detect procedure have the same effect on the machine when the AIO is replaced. (New AIO Detection: ☛ 6.3.1).

If this is set to “Yes”, the machine will clear “TOTAL TONER COUNT” and “Cru Prints”. Then the machine increments the counter “Replaced Toner Counts”.

5.3 DATE OF SALE

This function shows the date that the customer used the machine for the first time.

When the customer first operates the machine, the machine starts a scan and page count.

NOTE:

- The machine will keep the time of first operation.
- The machine will keep this data even if you erase the memory (Clear All Memory).

Procedure

Press MENU, #, 1, 9, 3, # in sequence. Firmware version shows on the LCD.

Press 1 (in the number keypad): The LCD display shows "Firmware Updated date"

Press 2 (in the number keypad): The LCD display shows "product first use date"

5.4 FIRMWARE DOWNLOAD

You can use the remote control panel to upgrade the machine firmware. Connect the machine to a PC through parallel or USB cable before you do the firmware upgrade procedure.

It is very rare to lose data and settings after the program has downloaded. However you should print out the system data list in tech mode before you start the download procedure. This will let you re-program settings that may get lost.

5.4.1 DOWNLOAD PROCEDURE

RCP (Remote Control Panel) mode

This procedure is used when the machine is connected with a parallel port or USB port to a PC. The machine uses the RCP (Remote Control Panel) software to upgrade the firmware.

1. Connect PC and printer with parallel cable or USB cable.
2. Do RCP and set the Firmware update tab. Current firmware version and emulation version are shown.
3. 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.
4. 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…
5. Push the refresh icon. Then make sure that the version number shown agrees with the new firmware.

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

To get the system data list

Use this procedure to make sure that the firmware was correctly upgraded.

1. Go into TECH mode. Then get the system data list.
2. Make sure that the correct firmware version is shown on the system data list.
   - Example: Firmware/Engine/Emulation Version: 6.04 V1.0.8

5.4.2 RECOVERY PROCEDURE

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

1. Set the power off and then on.
2. Do the steps in the download procedure from step 4 again.

The machine will start the upgrade procedure again.

5.4.3 REMOTE MACHINE UPDATE

This function uses one fax machine installed with the most recent firmware. It upgrades one or more other remote machines of the same type with the telephone network.

How to update firmware by remote fax

1. Use a fax machine with the most recent firmware.
2. Select “Remote” in the flash upgrade of data setup menu in tech mode.
   Tech Mode → Data Setup → Flash Upgrade (☛ 5.2.3)
3. Put in the telephone number of the fax machine to upgrade. (You can upgrade several faxes at the same time). Put in the telephone number for each machine if you want to upgrade more than one machine.
4. Then push the enter button. This will send the firmware file to each fax machines. (It takes 10 or 15 minutes to send the file to each machine.)

CAUTION: 1) The sending and receiving fax machines must be the same model.
2) A sending fax must be set up in ECM mode. The receiving machine memory must be set to 100%.

5.5 ENGINE TEST MODE

The engine test mode lets you examine the engine condition. It examines the condition of each device and shows the result of the test on the LCD.

You can examine these in engine test mode:

- Diagnostic – Diagnose engine and mechanical components
- Engine test - Print out test patterns
- Status print - Print engine status condition on each output

5.5.1 TO ENTER THE ENGINE TEST MODE

Press MENU, #, 1, 9, 3, 1 in sequence. The LCD shows 'Engine Test'. Then the machine goes into engine test mode.
Press "0", "1", "2", "3" or "4" to select the Test No. (see list below – left hand column)

NOTE: You can damage the machine if you do tests for long periods of time.

5.5.2 DIAGNOSTIC

[H914/H915]

No.	Test Name	Engine Test	Remarks
0	MTR FAN SOLETC	Motor Test	1: On, 2: Off – next test selected
		Pick-Up Test	1: On, 2: Off – next test selected
		FAN Test	1: On, 2: Off – next test selected
		Manual CLT Test	1: On, 2: Off – next test selected
		PTL Test	1: On, 2: Off – next test selected
1	LSU TEST	LSU Motor Test	1: On, 2: Off – next test selected
		LSU Hsync Test	1: On, 2: Off – next test selected
		LD Test	1: On, 2: Off – next test selected
2	SENSOR TEST	Feed Sensor Test	1. Check: read the sensor
			2. Next: Next Sensor test
		Exit Sensor Test	1. Check: read the sensor
			2. Next: Next Sensor test
		Cover Sensor Test	1. Check: read the sensor
			2. Next: Next Sensor test
		Empty Senor Test	1. Check: read the sensor
			2. Next: Next Sensor test
		Manual Sensor Test	1. Check: read the sensor
			2. Next: Next Sensor test
3	HEAT TEST	Therm ADC (130 – 220)	1: On, 2: Off Next Sensor test
		Therm ADC (125 – 85)	1: On, 2: Off Next Sensor test

Service Tables

No.	Test Name	Engine Test	Remarks
4	HVPS TEST	MHV Test	1: On, 2: Off (-1550V ± 50V)
		Dev Biast Test	1: On, 2: Off (-430V ± 20V)
		THV EN/NEG Test	1: On, 2: Off (+1300V ± 20V)
		THV On Test (1300V)	1: On, 2: Off - next test selected
		THV ADC 600 V~3550 V	1: On, 2: Off (Compare each ADC Value)
5	Heat Error Num		1:Check, 2: Next
	Low Heat Num		1:Check, 2: Next
	Heat Buffer (1 - 10)		1:Check, 2: Next

[H916]

No.	Test Name	Engine Test	Remarks
0	MTR FAN SOLETC	Motor Test	1: On, 2: Off – next test selected
		SCF Motor Test	1: On, 2: Off – next test selected
		Pick-Up Test	1: On, 2: Off – next test selected
		SCF Pick-Up Test	1: On, 2: Off – next test selected
		FAN Test	1: On, 2: Off – next test selected
		Manual CLT Test	1: On, 2: Off – next test selected
		PTL Test	1: On, 2: Off – next test selected
1	LSU TEST	LSU Error Test	1: On, 2: Off – next test selected
		LD Test	1: On, 2: Off – next test selected
2	SENSOR TEST	Feed Sensor Test	1. Check: read the sensor
			2. Next: Next Sensor test
		Exit Sensor Test	1. Check: read the sensor
			2. Next: Next Sensor test
		Cover Sensor Test	1. Check: read the sensor
			2. Next: Next Sensor test
		Empty Senor Test	1. Check: read the sensor
			2. Next: Next Sensor test
		Manual Sensor Test	1. Check: read the sensor
			2. Next: Next Sensor test
		Scf Empty	1. Check: read the sensor
			2. Next: Next Sensor test
3	HEAT TEST	Therm ADC (130 – 220)	1: On, 2: Off Next Sensor test
		Therm ADC (125 – 85)	1: On, 2: Off Next Sensor test
4	HVPS TEST	MHV Test (1500 V)	1: On, 2: Off (-1550V ± 50V)
		BIAS Test (430 V)	1: On, 2: Off (-430V ± 20V)
		THV Test (1300 V)	1: On, 2: Off (+1300V ± 20V)
		THV Test (-)	1: On, 2: Off - next test selected
		THV ADC 600 V~3550 V	1: On, 2: Off (Compare each ADC Value)
5	Which self test?		1:Check, 2: Next
	Which low heat?		1:Check, 2: Next
	Fuser temp (1 - 60)		1:Check, 2: Next

ENGINE TEST (ONLY H916)

No.	Test Name	Engine Test
1	STRIPE PATTERN	Pattern Test 0
		Pattern Test 1
		Pattern Test 2
2	B / W PATTERN	Black Test
		White Test

5.5.3 STATUS PRINT

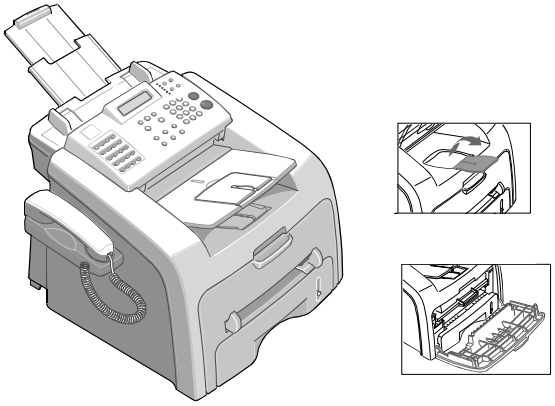
A group of parameters are printed at the bottom of each page when this function is enabled. This shows the print engine condition.

This function is not for service use. This setting stays on when you go out of engine mode. Make sure to set this function off before you go out of engine mode.

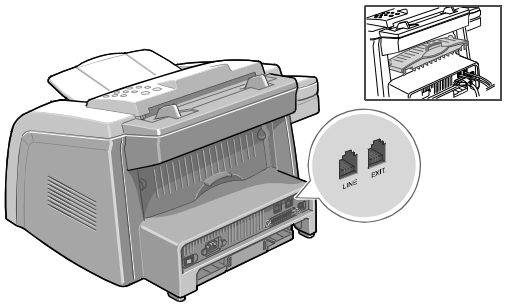
6. DETAILED DESCRIPTIONS

6.1 PRINTER COMPONENTS

6.1.1 FRONT VIEW / REAR VIEW (H914/H915)

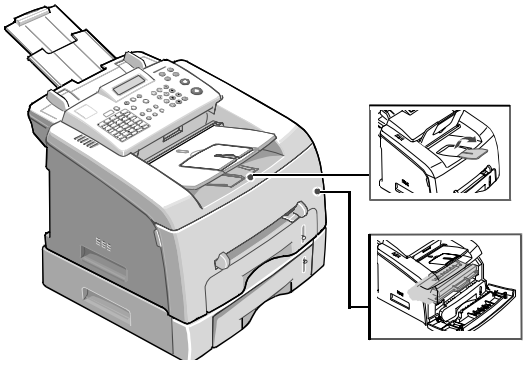


H914D901.WMF

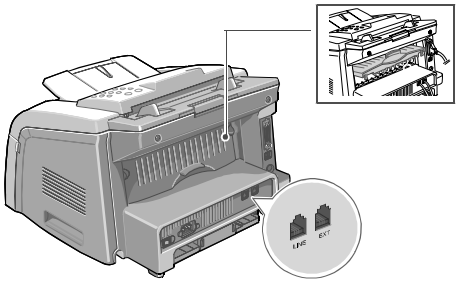


H914D902.WMF

6.1.2 FRONT VIEW / REAR VIEW (H916)



H916D901.WMF



H916D902.WMF

6.2 SYSTEM LAYOUT

6.2.1 FEEDING SECTION

The cassette automatically gets paper and feeds it one sheet at a time. The cassette has a friction pad. The friction pad separates paper to make sure that paper is fed one sheet at a time. A sensor checks when the paper tray is empty.

- Feeding method: Universal cassette type
- Feeding standard: Center loading
- Feeding capacity:
  - Cassette-250 sheets (75g/m^2, 20lb paper standard)
  - Manual 1 sheet (Paper, OHP, Envelop, etc.)
- Paper detecting sensor: Photo sensor
- Paper size sensor: None

6.2.2 TRANSFER ASS'Y

The transfer ass'y has a PTL and transfer roller. The PTL sends light to the OPC drum. This decreases 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 DRIVER ASS'Y

The driver ass'y is a gear driven power unit. The motor gives power to the paper feed unit, the fuser unit, and the toner cartridge.

6.2.4 FUSING

The fusing unit has these:

- Heat Lamp
- Heat Roller
- Pressure Roller
- Thermistor, and Thermostat.

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

Thermostat

The thermostat is a temperature-sensing device. It cuts power to the heat lamp when the heat lamp or heat roller gets too hot.

Thermistor

The thermistor checks the surface temperature of the heat roller. Then it sends this data to the main processor. The main processor uses this data to control the temperature of the heat roller.

Heat Roller

The heat lamp heats the surface of the heat roller. Toner melts and stays on the paper when the paper goes between the heat and pressure rollers. The surface of the roller is coated with teflon. The teflon makes sure that toner does not stay on the roller surface.

Pressure roller

The pressure roller is below the heat roller. It is made of a silicon resin, and the surface of the roller is coated with teflon. The teflon makes sure that toner does not stay on the roller surface.

Safety Features

- These are used to not let the machine get too hot:
  - 1st protection device: Hardware cuts off when the machine gets too hot.
  - 2nd protection device: Software cuts off when the machine gets too hot.
  - 3rd protection device: Thermostat cuts power to the lamp.

Safety device

- The machine uses these safety devices:
  - Fuser power is cut off when the front cover is opened.
  - LSU power is cut off when the front cover is opened.
  - The machine keeps the temperature of the fuser cover's surface at less than 80ºC. To protect the user, a caution label is put where the customer can see it easily when the rear cover is opened.

6.2.5 SCANNER

The scanner reads an image with a photosensitive sensor.

Hardware:

- CCD module, connection board, ADF board, AFE (Analog Front End), and image processor (Located in CPU).

Mechanical:

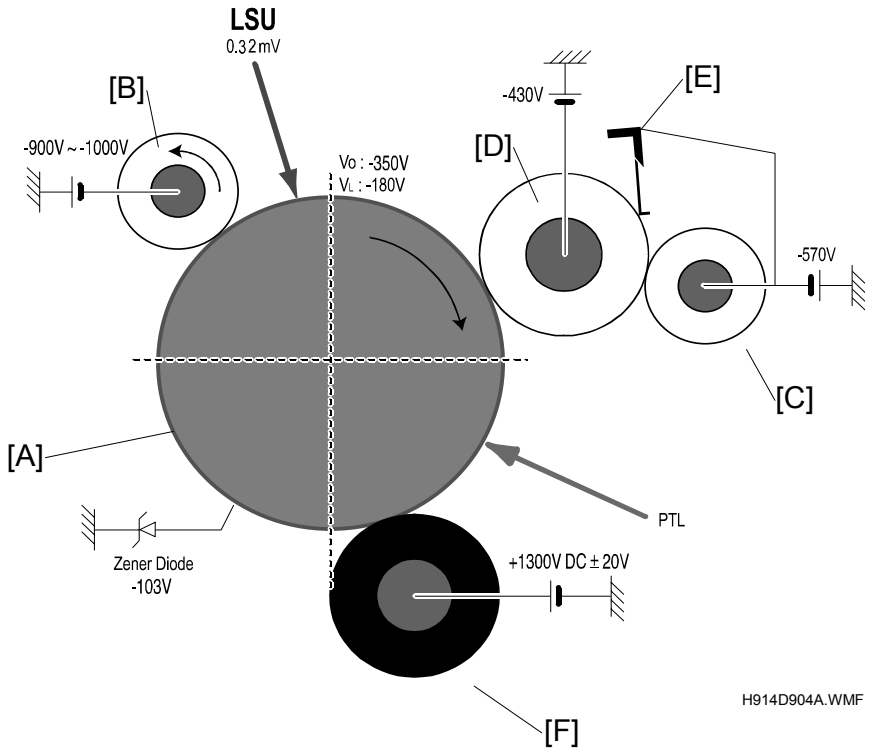
- ADF (Automatic Document Feeder)

6.2.6 LSU (LASER SCANNER UNIT)

The video controller controls the LSU unit. It scans the video data it gets from the video controller with a laser beam. It uses the rotation principal of the polygon mirror to put the latent image on the OPC drum.

One face of the polygon mirror is for one line scanning.

6.2.7 CRU (ALSO KNOWN AS AIO)



[A]: OPC Drum [D]: Developing Roller

[B]: Charge Roller [E]: Doctor Blade

[C]: Supply Roller [F]: Transfer Roller

A visual image is made with the electronic photo procedure.

The OPC unit and developer unit are in the same cartridge.

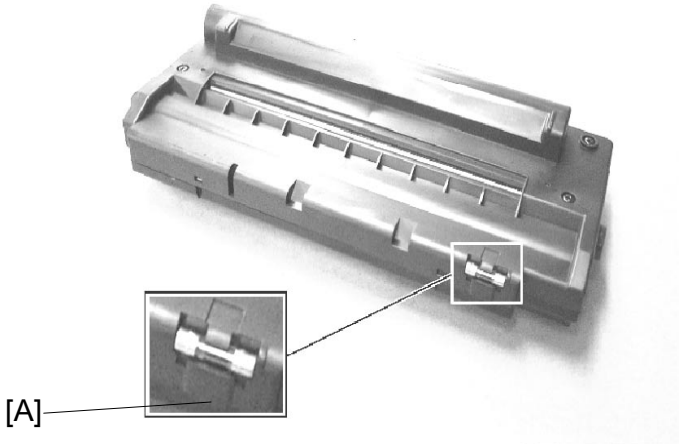
The OPC unit has the OPC drum [A] and charging roller [B].
The developer unit has toner, toner cartridge, supply roller, developing roller, and doctor blade.

- Developing procedure: Non magnetic 1 element contact procedure
- Toner: Non magnetic 1 element shatter type toner
- Toner near end sensor: None
- OPC cleaning: Electric static + FILM OPC gets the toner.
- Toner waste: Electrical static gets the toner.
- OPC drum protect shutter: None

6.2.8 NEW CRU (AIO) DETECTION

A new supply CRU cartridge has a fuse [A]. The machine knows a new cartridge has been installed when the fuse gets detected. The starter CRU does not have fuse.

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



B173D999.tif

The fuse will blow. This opens the circuit when you install the 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, when the machine prints 5% of black rate chart, approx. 1,165,000 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 shows “TONER EMPTY” (toner end). At this time, the machine stops printing.

You can check the total dot counts from the current AIO in the system data list in TECH mode.

6.3 MAIN BOARD

The engine board and controller board have been integrated into a single PBA. This board has the CPU, printer scanner and line control functions. The CPU operates as the bus controller, I/O handler, motor driver and PC interface. The main board sends the current image video data to the LSU. Then it monitors the electro photographic print procedure.

These circuits are on the PBA:

- Main motor (paper feed, cartridge, fuser)
- Clutch driver
- Pre-transfer lamp driver
- Heat-lamp driver
- CIS 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.

6.3.1 ASIC (CHORUS2)

The 16/32-bit RISC micro controller is a cost-effective, low power, small size and high performance micro-controller.

Main function block

- 1.8V internal, 3.3V external (I/O boundary) microprocessor with 4KByte cache
- Image processor
- On-chip clock generator with PLL
- Memory & external bank control
- DMA control (5-channel)
- Interrupt control
- 2-port USB host /1- port USB device (ver 1.1) interface control
- Parallel port interface control
- UART (2 Channel)
- Synchronous serial interface control
- Timer (4 Channel)
- Watch dog timer
- Power control: Normal, slow, idle, stop and SL_IDLE mode
- A/D converter (10-bit, 2 channel)
- General I/O port control
- Print head control
- Carrier motor control
- Paper motor control
- Tone generator
- RTC with calendar function
- S/W assistant function (Rotator)

6.3.2 FLASH MEMORY

This keeps the system program. Firmware upgrade occurs when you download from the new image with the PC interface.

- Capacity:
  a) H914/H915: 0.5 MB
  b) H916: 2.0 MB
- Access Time: 70 nsec

6.3.3 SDRAM

Used as a buffer, system memory area at the time the machine prints.

6.3.4 SENSOR INPUT CIRCUIT

Paper Empty Sensor:

The paper empty sensor (Photo Interrupter) on the engine board lets CPU know if the tray has paper. It uses the actuator to do this.
It shows a paper empty condition when it reads the D0 Bit of CPU. Then it sets the second LED (yellow) on the panel LEDs.

MP Sensing:

The MP sensor (Photo Interrupter) on the SMPS/HVPS PBA checks if paper is in the MP tray. The CPU monitors signal (MP_EMPTY, CN3-Pin 13) to check if paper is in the MP. Paper is fed from the MP if paper is available.

Paper Feed and Toner Cartridge Sensor:

Photo interrupter signal (nP_FEED, CN3-Pin 2) detects when paper passes the actuator on the feed sensor. The CPU monitors this. This signal starts the process of image creation after a certain delay time. If the feed sensor is not detected within 1 second after paper is fed, a paper Jam0 occurs. (Shown on the LCD panel).

The paper feed sensor operates when a toner cartridge is put in. A message is shown on the LCD if no cartridge is detected.

Paper Exit Sensor:

Checks if a paper gets out from the machine. The exit sensor on the engine board and actuator on the frame are used for this process. Paper detects the on/off time of exit sensor. Then correct operation or jam information is sent to the CPU.

Cover Open Sensor:

The cover open sensor actuator is located on the front cover. The sensor is in the main frame. The +24VS to the DC fan, solenoid, main motor, polygon motor part of LSU and HVPS are cut off when the front cover is opened. The CPU monitors signals (COVER_OPEN) to check when the cover is opened.

DC FAN / SOLENOID Driving:

Driven by transistor and controlled by D6 bit of CPU.
When it is set high, the TR goes on and drives the fan. It goes off when sleep mode is set.
There are two solenoids, driven by the paper pick-up and MP signal. The drive time is 300 ms. A diode prevents the TR from the noise pulse given when the solenoid is de-energizing.

Motor Drive:

The motor driving circuit starts when the driver IC is set on. An A3977 (motor driver IC) is used. You can change the resistance values of the sensing and the voltage values of the V reference with the motor driving voltage value.

6.4 SMPS & HVPS (ALSO KNOWN AS PSU AND POWER PACK)

The SMPS and HVPS are on the same board.
The SMPS gives DC power to the system.
It gets 110V (NA model) / 220V (EU, AS and China models) and outputs the 5 V, 12 V and 24 V. Then it gives power to the main board and ADF board.

The HVPS makes high voltage of THV/MHV/Supply/Dev and gives it to the developer part. The HVPS gets 24V and outputs the high voltage for THV/MHV/BIAS. The output high voltage goes to the toner, OPC cartridge, and transfer roller.

6.4.1 HVPS (HIGH VOLTAGE POWER SUPPLY)

1. **Transfer High Voltage (THV+)**
   - Function: This voltage moves toner from the OPC drum to the paper.
   - Output voltage: +1300V DC±20V
   - Error: If THV (+) is not present, then low-density printing occurs. This is because toner on the OPC drum does not get transferred to the paper. Waste toner over-flow can occur if this condition stays. Ghost images can show and occur again at 76mm intervals.
2. **Charge Voltage (MHV)**
   - Function: This voltage charges the surface of the OPC to -900V ~ -1000V.
   - Output voltage: -1550 V DC ± 50 V
   - Error: If MHV is not present, then toner with no charge goes to the full OPC surface. At this time a black page is printed out.
3. **Cleaning Voltage (THV-)**
   - Function: This removes toner contamination from the rear side of the paper. A negative (-) polarity is sent to the transfer roller. This forces the toner to go back to the to OPC drum.
   - Output Voltage: +300V/-150V
   - Error: Smudges and toner contamination show on the reverse side of the printed page.
4. **Developing Voltage (DEV)**
   - Function: This voltage develops toner on the OPC drum surface when it is exposed by the LSU (Laser Scanning Unit).
     - The exposed voltage on the OPC is -180V when the machine prints.
     - Unexposed is -900~-1000V
     - Exposing voltage on the DEV is –430 V.
   - Toner with (-) polarity is developed. Then it is put to an exposed section of the OPC.
   - Output voltage: -430 V DC ± 20 V
   - Error:
     a) If DEV is GND, print density gets very low.
     b) Print density gets very high when DEV floats because of a defective connection between the frame and cartridge contacts etc.

5. Supply Voltage (SUP)

- Function: This voltage gives toner to the developing roller.
- Output voltage: -630 V DC ± 50 V (Use ZENER, DEV Gear)
- Error:
  a) When SUP is GND, print density gets very low.
  b) Density gets very low and toner does not show if SUP floats because of defective connection between the frame and cartridge contacts etc.

6. OPC Ground ZENER Voltage

- Function: This voltage stops image contamination for low temperature and low humidity conditions.
- -130V DC ± 15V is maintained on OPC ground. (-103V ZENER diode is connected to OPC ground) when a set prints without an output voltage.
- Error type:
  a) There is no image problem when the ZENER diode is - 0V. Contamination can occur on the full image in low temperature and low humidity environments
  b) A blank page is printed out when the ZENER diode is disconnected. (It is the same when a ZENER diode is disconnected from OPC ground.)

6.4.2 SMPS (SWITCHING MODE POWER SUPPLY)

This is the power source for the full system. It is an independent module so that it is possible to use it for common use. It is attached at the bottom of the set.

The SMPS gives DC power to drive the system. The AC heater control gives power to the fuser. The SMPS has four output channels (+5 V, -5 V, +24 Vs).

The SMPS has these power sources:

- 120V (North America)
- 220 V (Europe, Asia, China).

AC Input

- Inputting rated voltage: AC 220V ~ 240V AC 100~127V
- Inputting voltage fluctuating range: AC 198V ~ 264V AC 90V ~ 135V
- Rated frequency: 50/60 Hz
- Frequency fluctuating range: 47 ~ 63 Hz
- Inputting current: under 4.5Arms/2.5Arms

Length of Power Cord: 1830 ± 50mm

Power Switch: Use

6.5 ENGINE F/W

6.5.1 FEEDING

Pickup roller drive is controlled by the pick-up solenoid when paper is fed from the cassette.

The general output port or the external output port control the on/off of the solenoid. The operation of the manual sensor decides if paper will be fed from the manual feeder. Paper gets fed by driving the main motor.

Paper jams occur at these times:

Jam 0

- Paper does not move after pick-up.
- Paper does not get to the feed sensor in time after pick-up.
- The machine will get the paper again if the feed sensor is not set on. When the machines tries to get the paper a second time and the feed sensor is not set on for some time, Jam 0 shows.
- Leading edge of the paper does not get to the feed sensor.
- Feed sensor does not go on when the paper gets to the feed sensor. This will show after the paper goes past the feed sensor.

Jam 1

- The trailing edge of the paper does not go past the feed sensor after some time (The feed sensor cannot be set off)
- The paper cannot get to the exit sensor after the leading edge of the paper goes past the feed sensor. (The exit sensor cannot be set on) The paper is between the feed sensor and the exit sensor.

Jam 2

- The paper does not pass the exit sensor after the trailing edge of the paper goes past the feed sensor.

6.5.2 DRIVE

The main motor drives the paper feed unit, developing unit and the fuser

Software controls these:

- Acceleration
- Constant speed
- Deceleration profiles.

6.5.3 TRANSFER

PWM (Pulse Width Modulation) controls these:

- Charging voltage
- Developing voltage
- Transfer voltage

6.5.4 FUSING

The resistance of the thermistor varies inversely with the temperature of the hot roller. The control circuit monitors the temperature through the thermistor and turns the fusing lamp on and off. This keeps the hot roller at the operating temperature.

Error Type

Error	Description
Open heat error	Stays less than 68 °C for more than 25 seconds at the time of warm-up.
Lower heat error	Standby: • Stays less than 100°C for more than 25 seconds Printing: • Stays less than 145°C for more than 5 seconds for 2 pages one after the other. • Stays 40°C less than the set fusing temperature for more than 4 seconds for 3 pages one after the other.
Over heat error	Stays higher than 220°C for more than 3 seconds

6.5.5 LSU

The LSU has the LD (Laser Diode) and the polygon motor control. The LD goes on and the polygon motor is enabled when they get a signal to print. Hsync occurs when the light sensor detects the beam.

LReady occurs when the polygon motor speed becomes normal.

The status bit of the LSU controller register goes to '1' if these two conditions are okay. Then the LSU is ready. The errors shown in the table occur if these two conditions occur.

Error Type

Error	Description
Polygon motor error	When the polygon motor's speed is not correct.
Hsync error	The polygon motor speed is correct, but the Hsync signal is not correct

6.6 LIU BOARD

LIU board is a line interface unit, and circuit to interface with a telephone line.

There is a ring-detect circuit to detect a ring signal from a switchboard. There is also a surge absorber to prevent it from a thunderbolt located on a line input unit.

6.7 OPE BOARD

OPE board has different function keys and LCD to show key operations.

SPECIFICATIONS

1. GENERAL SPECIFICATIONS

Item		H914	H915	H916
Size (W x D x H) w/o handset		363.0 x 398.0 x 308.3 mm (14.3" x 15.7"x 12.1")		388 x 417 x 335 mm (15.3" x 16.4"x 13.2")
Weight With Toner Cartridge		9.5 kg (21.1 lb) w/o handset 9.7 kg (21.5 lb) with handset		11 kg (24.4 lb) w/o handset
LCD		16 character x 2 lines		
Standard Interface		USB 1.1		USB 2.0
Power Switch		Yes		
Input Voltage		NA model: AC 100 ~ 127V, 50/60 Hz EU/AS/CHN model: 220V ~ 240V, 50/60 Hz		
Noise	Operating	52dBA		
	Standby	39dBA		40dBA
EMI Approval		Class B		

2. PC PRINT SPECIFICATION

Item		H914	H915	H916
Energy Save Mode		Yes (5/10/15/30/45 min./off)		
Print Method		Laser		
Speed		A4 - 16 ppm, Letter - 17 ppm (5%, Character Pattern)		
Resolution	Normal	600 x 600 dpi		
	RET	No		
Print Language		GDI		
Toner Save		Yes		
FPOT	Stand by	Approx. 12 seconds		
	Power Save	Less than 42 seconds		
Printable Area		A4 : 202 mm (7.9") / Letter : 208 mm (8.2")		
Duplex Print		No		

3. SCAN SPECIFICATION

Item		H914	H915	H916
Halftone		-	256 level	
Scan Method		-	Mono CIS	Color CIS
Scan Speed (Letter, 300 dpi, USB)	Gray scale	-	72 sec/scan	
	Color	-	-	120 sec/scan
	Black & White	-	25 sec/scan	
Resolution (Optical)		-	200 x 200 dpi	600 x 300 dpi
Scan Width	Max	-	216 mm (8.5")	
	Effective	-	208 mm (8.2")	
Scan Length	Max	-	356 mm (14.0")	

4. COPY SPECIFICATION

Item		H914	H915	H916
Speed		A4 - 16 ppm, Letter - 17 ppm (5%, Character Pattern)		
Resolution		200 x 300 dpi		600x300 dpi
Halftone		256 level		
Original mode	Text Photo	300 x 300 dpi		600 x 300 dpi
FCOT (Note)	Power Save	Approx 47 sec		Approx 40 sec
	Stand by	Approx 30 sec		Approx 20 sec
Copy Speed (Note)	SDMP	17 ppm (Letter)		
	MDSP	3 ppm (Letter)		8 ppm (Letter)
Zoom Range		50-150%		50-200%
Multi Copy		1~99		

NOTE: FCOT: First Copy Output Time
SDMP: Single Document Multiple Printout
MDSP: Multiple Document Single Printout

5. TELEPHONE SPECIFICATION

Item	H914	H915	H916
Speed Dial	80 Locations		150 Locations
1 – Touch	20 Locations		40 Locations
Handset	China: Yes EU, Asia: No	China. NA: Yes EU: No	No
On – hook Dial	Yes		
Last Number Redial	Yes		
Automatic Redial	Yes		
Pause	Yes		
Ringer Volume	Off / Low / Medium / High		

6. FAX SPECIFICATION

Item		H914	H915	H916
Compatibility		ITU-T G3		
Communication System		PSTN / PABX		
Modem Speed		33.6Kbps		
TX Speed		Approx. 3 sec		
Compression		MH / MR / MMR		MH / MR / MMR / JBIG
ECM		Yes		
Resolution	Std	203 x 98dpi		
	Fine	203 x 196dpi		
	Super Fine	203 x 392 dpi		300 x 300 dpi
Halftone		256level		
Memory	Capacity	2MB		5MB
	Optional Memory	No		
	Broadcasting	109 Locations		
	Delay TX	Yes		
	Memory RX	Yes		
Functions	TTI	Yes		
	RTI	No		
	CSI	Yes		
	Polling	Rx Polling		
	Security Receive	Yes		
	Flash	2 MB		
	Auto Reduction	Yes		
	F/W Upgrade from Remote	Yes		
Memory Back Up		Yes (96 Hour)		Yes (72 Hour)

7. PAPER HANDLING

Item		H914	H915	H916
Cassette	Type	Cassette		
	Input	250Sheets/75g/m^2 (20 lb.)		
	Optional Cassette	No		Yes (250 sheets)
	Output	Max. 150 sheets/75g/m^2 (20 lb.)		
	Output Control	Face down, (Face up with using rear output slot)		
	Bypass	1 sheet		
	Media Size for Main Tray	For Fax and Copy: A4, Letter, Legal For PC Print: A4, Letter, Legal, Folio, Executive, B5		
	Media Size for Bypass	A4, Letter, Legal, Folio, Executive, A5, B5, A6, Monarch, COM10, C5, DL, Custom		
	Media Weight	Tray: 60 ~ 90g/m^2 (16 ~ 24 lb) Bypass: 60 ~ 161g/m^2 (16 ~ 43 lb)		
ADF	Input Capacity	20 Sheets/75g/m^2 (20 lb.)		50 Sheets/ 75g/m^2 (20 lb.)
	Media Weight	50 ~ 105g/m^2 (12.5 ~ 28 lb)		

8. SOFTWARE

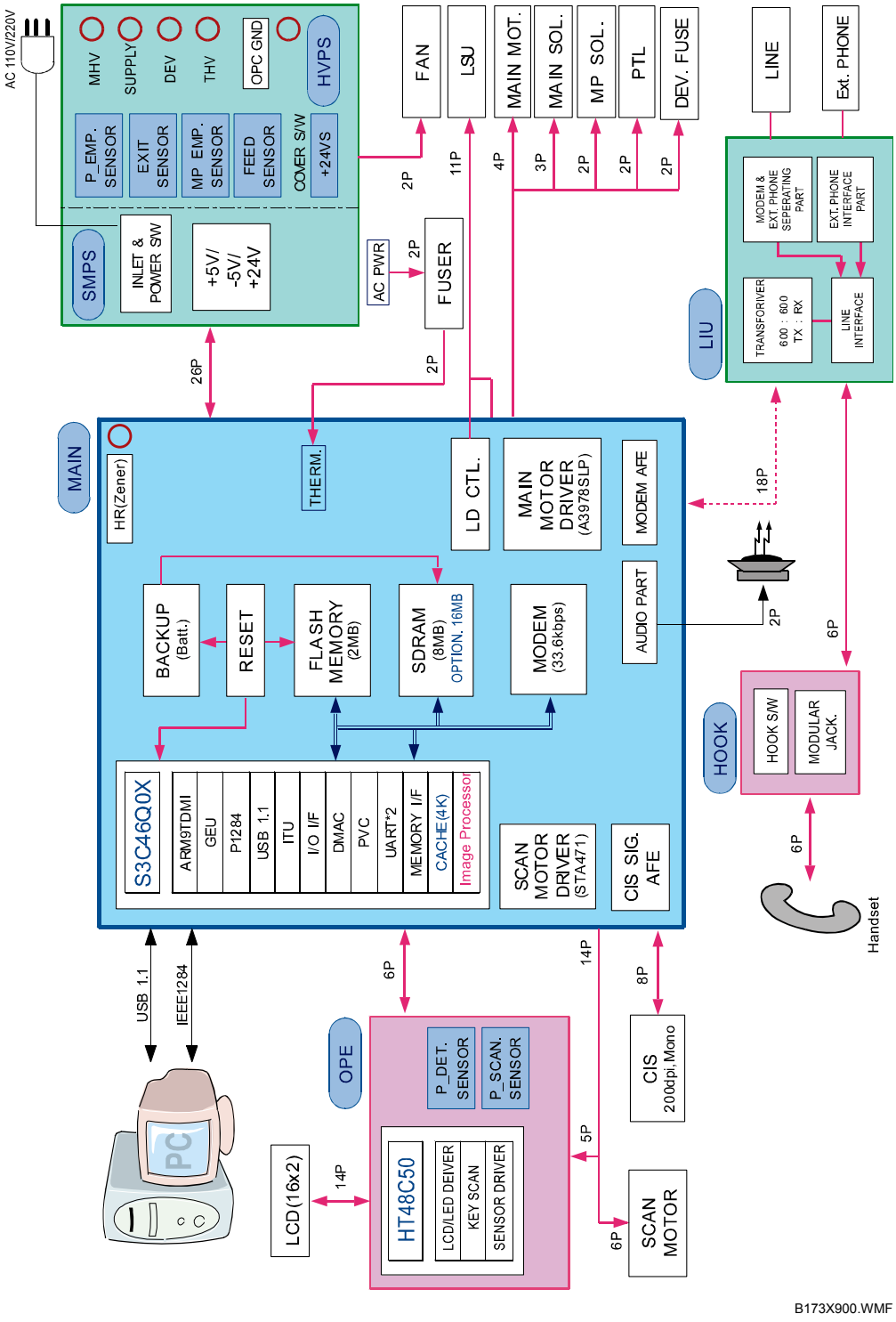
Item		H914	H915	H916
Operating System (Scan/Print)		-	Win95/98/Win-Me/NT4.0/2000/XP	
Driver	Printer	-	GDI	
	TWAIN	-	Yes	
	RCP (Windows only)	Yes (For firmware update only)	Yes	
	Mac	-	Yes (Printer only)	
	Linux	-	No	
	PC-FAX	-	No (PC-Fax is only available through PC modem.)	

9. CONSUMABLES

Item		H914	H915	H916
Type:		Single cartridge (All-in-one)		
How to install		Front door open and front loading		
Toner	Level sensor	No		
Toner Dot Count		Yes		

APPENDIX

BLOCK DIAGRAM



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APPENDIX

CONNECTION DIAGRAM