

RICOH

**D115/D116
Service Training**

Product Overview

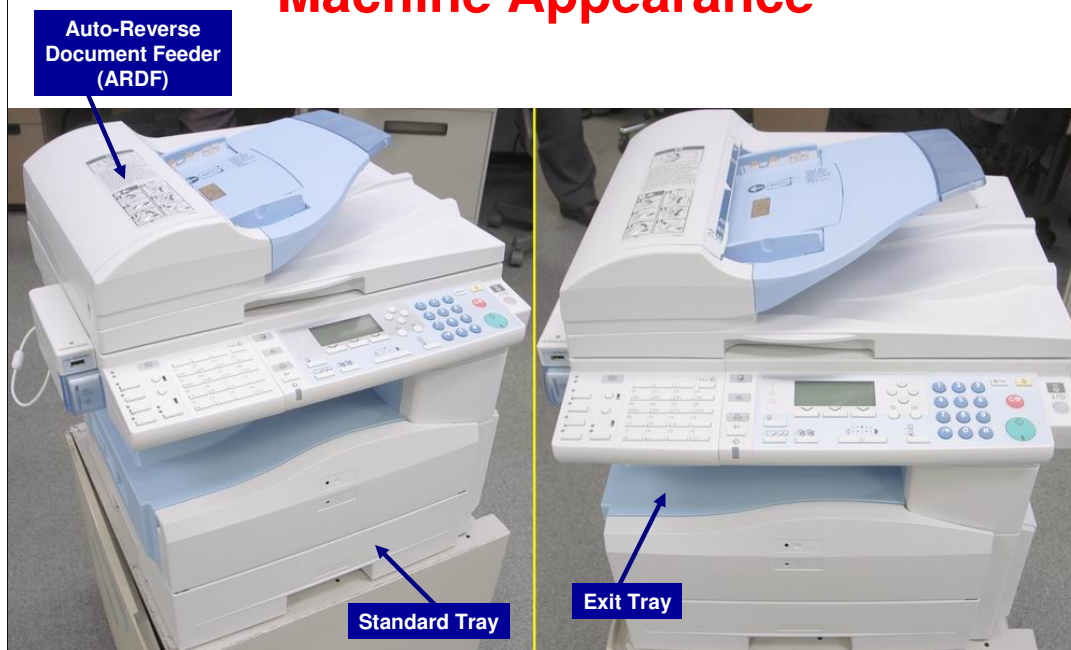
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Slide 1

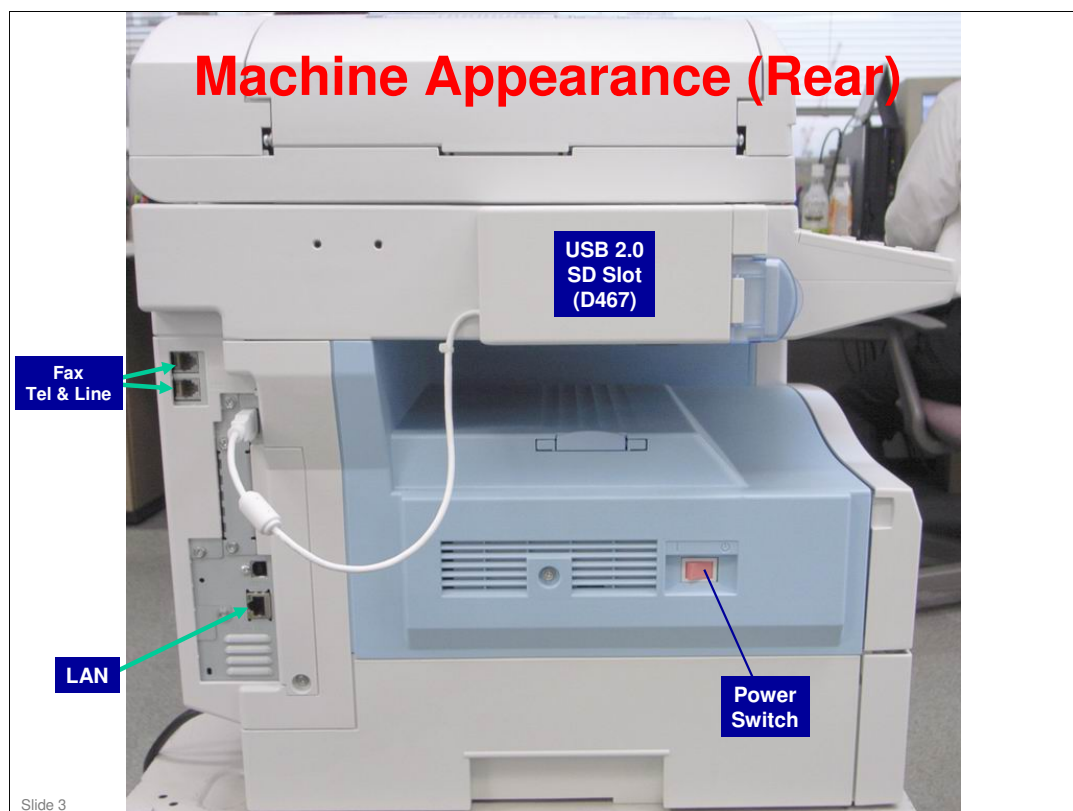
Draft started: 19 November 2010

First draft completed: 22 November 2010

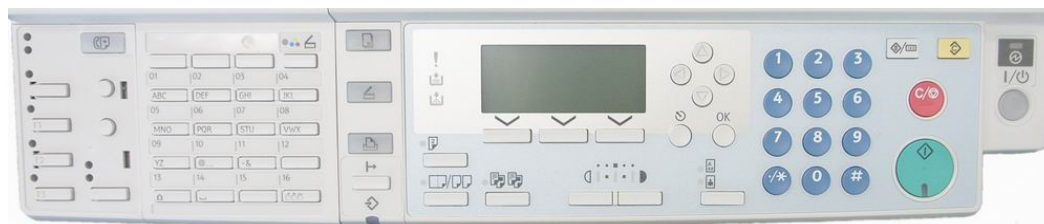
Machine Appearance



Slide 2



Operation Panel



- ☐ FAX functions on left side of panel above are standard on D115 and D116 models.
- ☐ Note that unlabeled section on left is labeled with relevant language for region in which machine is to be used.

Slide 4

New for this Model

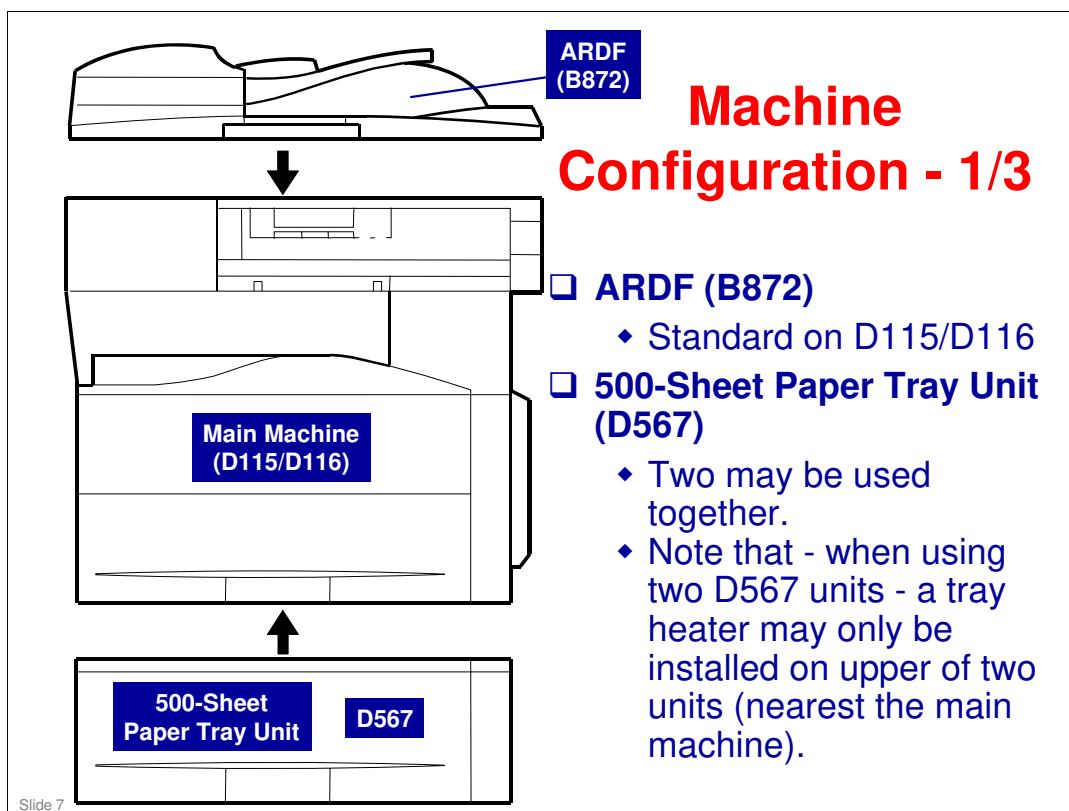
- ❑ **The major technical enhancement for the D115/D116 is Increased copy speed**
 - ◆ 17 cpm → 20 cpm

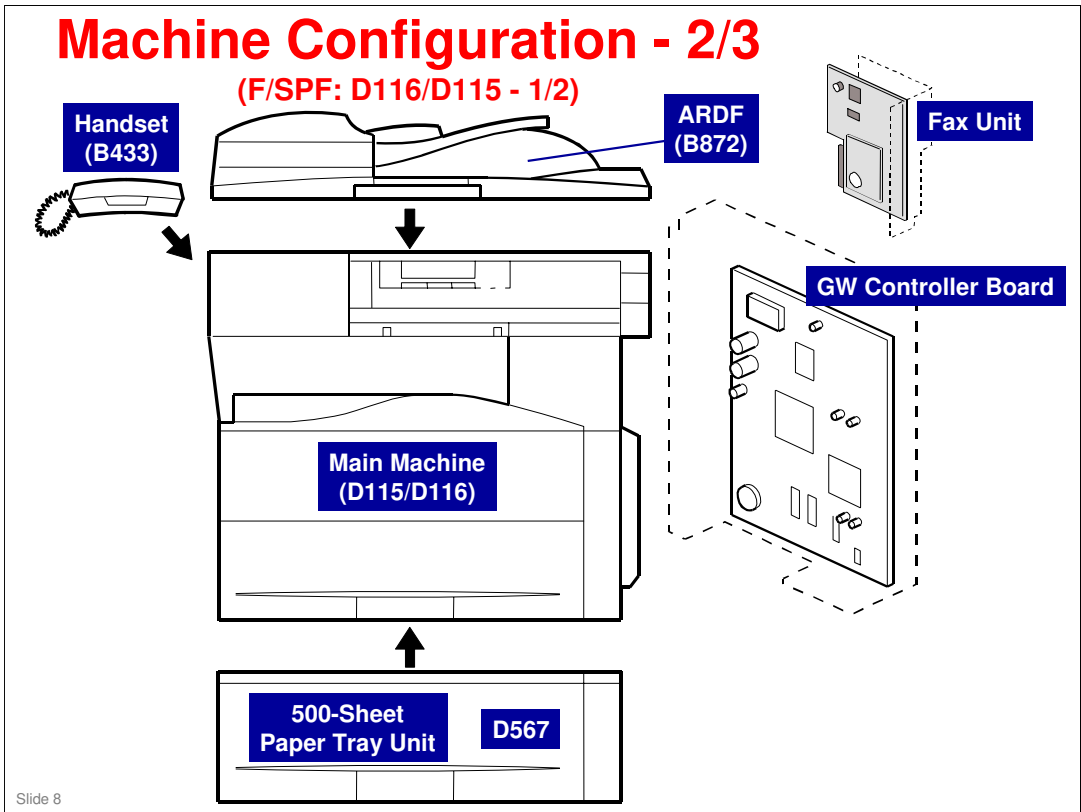
Slide 5

Who Will Use This Model

- ☐ **Small office users (3-10 people) or individuals (as a personal business machine).**
- ☐ **Mid to large sized offices (10-50 people) as a work group division printer/scanner.**
- ☐ **Mid to large sized offices as a business personal machine.**
- ☐ **This machine has these benefits:**
 - ◆ Compact size
 - ◆ Quick warm up time
 - ◆ Color scan to E-mail feature
 - ◆ Standard duplex printing (both scan and print)
 - ◆ Copier/printer/color scanner

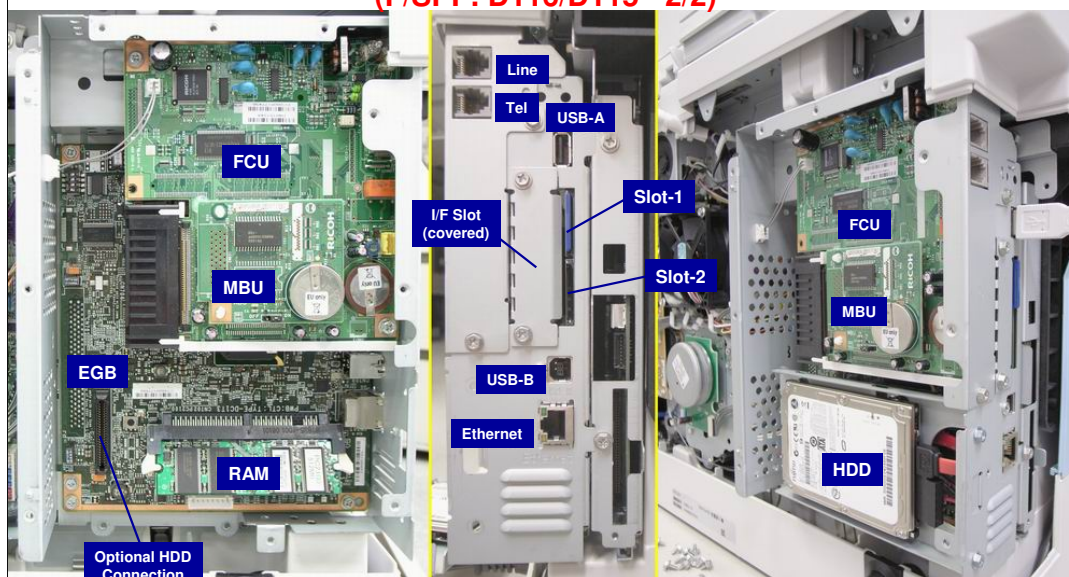
Slide 6





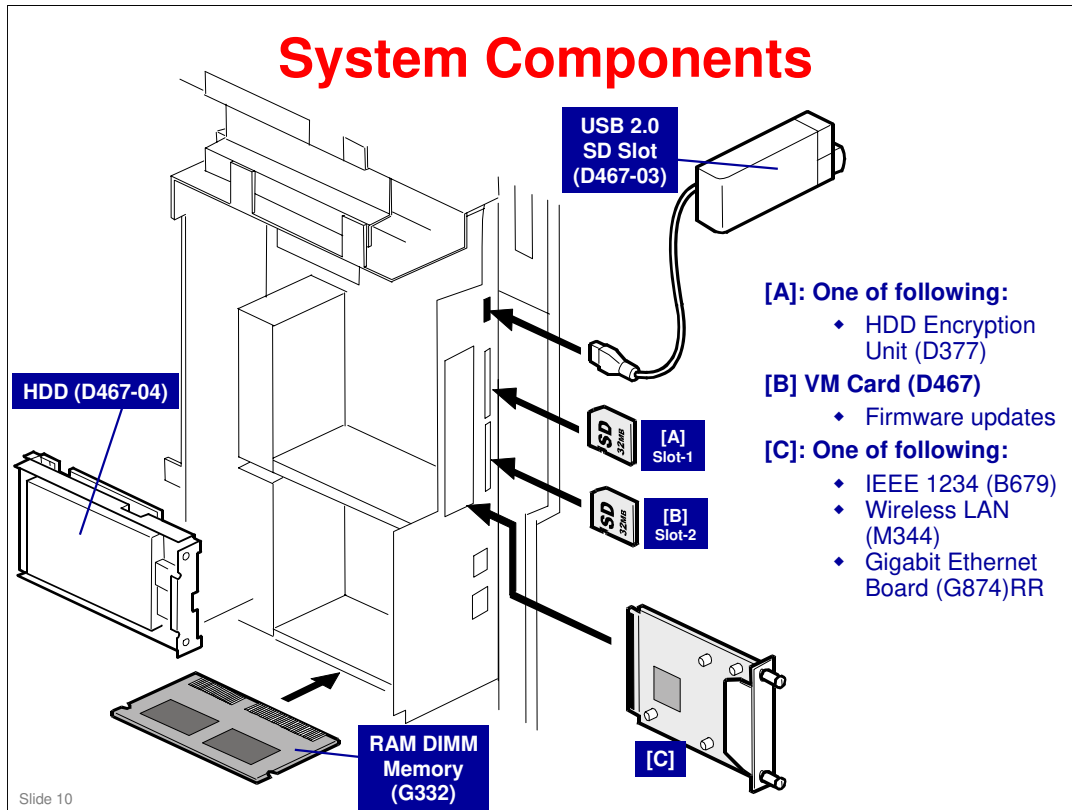
Machine Configuration - 3/3

(F/SPF: D116/D115 - 2/2)



- ☐ MBU - Memory Board Unit / FCU - Fax Control Unit / EGB - Main Engine Board
- ☐ HDD - Hard Disk Drive / RAM - Random Access Memory
- ☐ Be sure to remove all thirteen cover screws to access the EGB, MBU, FCU, & RAM boards.

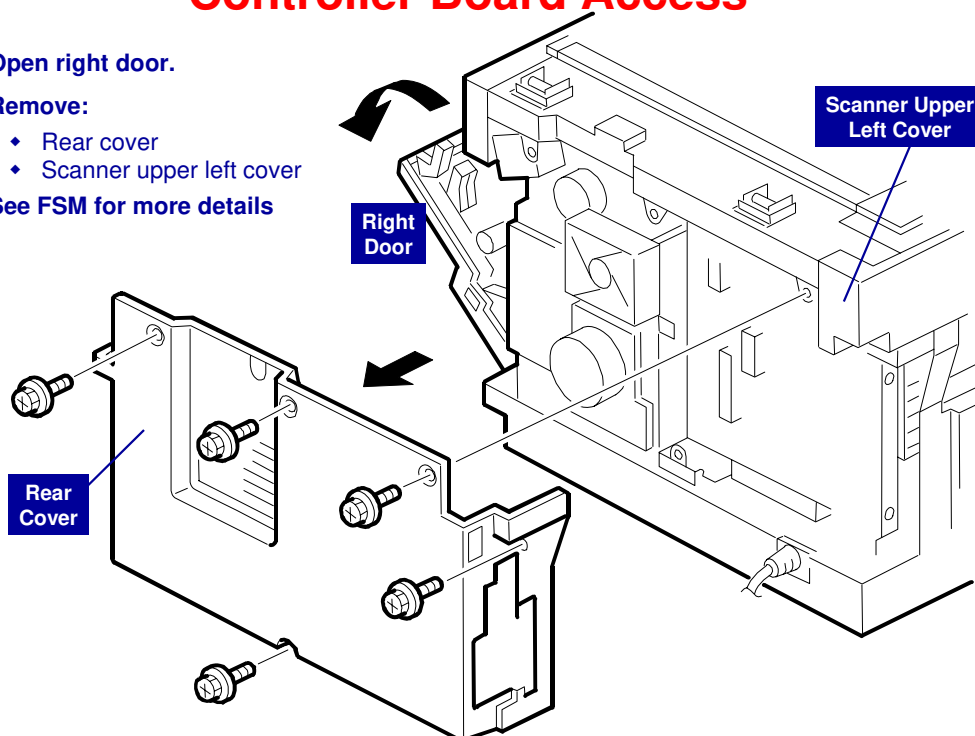
Slide 9



RAM DIMM memory distributed with the printer.

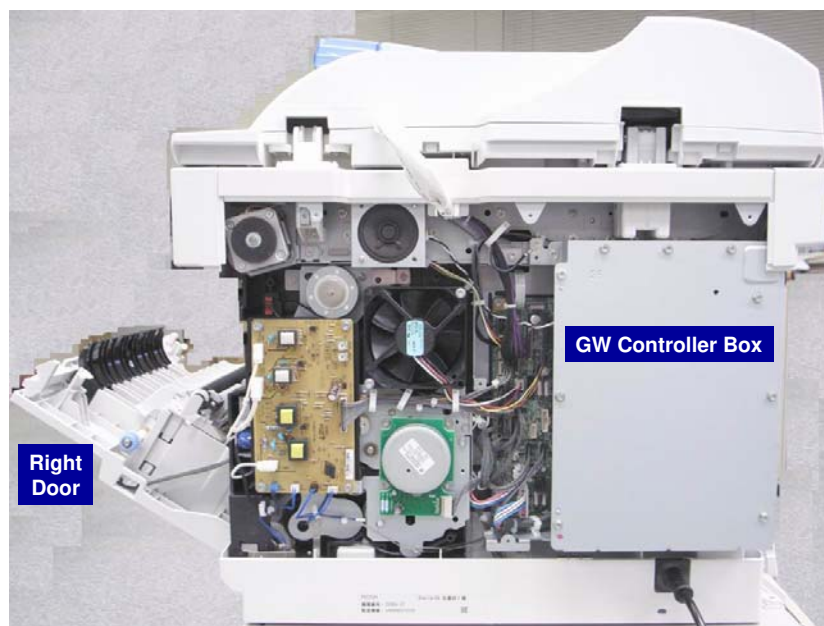
Controller Board Access

- Open right door.
- Remove:
 - ♦ Rear cover
 - ♦ Scanner upper left cover
- See FSM for more details



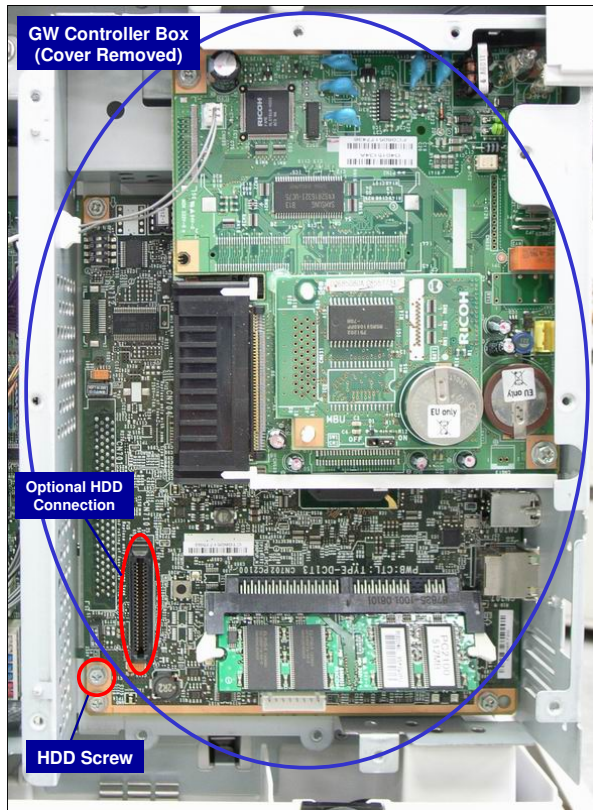
Slide 11

Optional HDD - 1/3



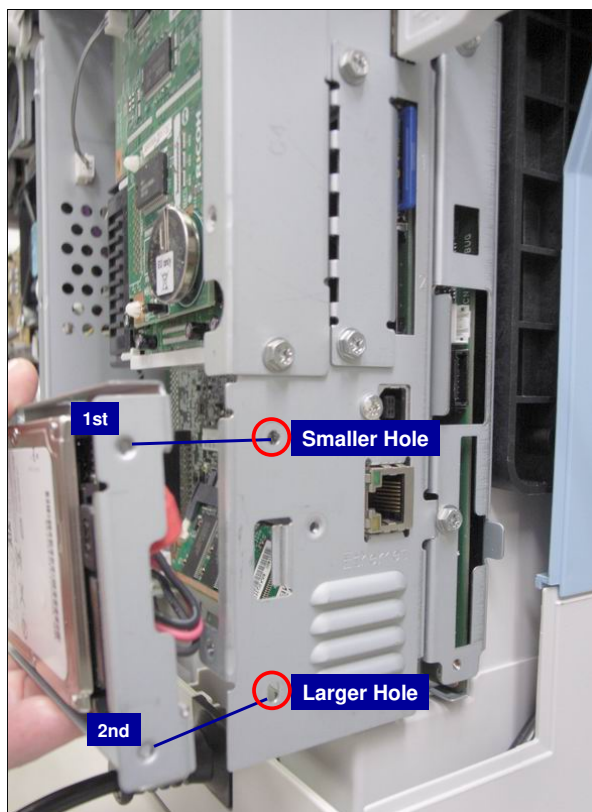
- ❑ To install the HDD Unit (Hard Disk Drive), first remove the rear cover of the machine, and then the GW Controller Box cover (thirteen screws).

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Optional HDD - 2/3

- ❑ **Note:** Before plugging in the optional HDD unit, the screw indicated at left must first be removed.
- ❑ After removing the indicated screw, plug in the HDD unit and then reattach the screw (which holds the HDD unit against the Main Engine Board), as well as the other two HDD screws (see next slide).



Optional HDD - 3/3

- When attaching the two HDD Unit screws from the end of the GW controller box, attach the screw into the smaller hole first, and the larger hole secondly.
 - ◆ This allows for adjustment and easier attachment.

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Specifications

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General Specifications

- ❑ **Configuration: Desktop**
- ❑ **Copy Process: Laser scanning & electrophotographic printing**
- ❑ **Copy speed: 20 ppm**
 - ◆ A4 / 8½" x 11"; 100% (printing from memory)
- ❑ **Warm up: (basic) 10 seconds / (other) approximately 30 seconds**
- ❑ **First copy time: 7.5 seconds or less**
- ❑ **Copy paper capacity:**
 - ◆ Paper tray: 250 sheets
 - ◆ Optional paper tray: 500 sheets x 2
 - ◆ Bypass: 100 sheets
- ❑ **Toner Yield: 7,000 copies per toner bottle**

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More Specifications

- For a more detailed description of machine's specifications, refer to specifications section of FSM (Field Service Manual), noting in particular the following:
 - ◆ Copy paper size
 - ◆ Copy paper weight
 - ◆ Power consumption and machine dimensions
 - ◆ Copy paper capacity
 - ◆ Original paper size
 - ◆ Paper feed

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Machine Configuration - 1/2

- ❑ **There are two machines in this series – D115 and D116. Machine configuration varies depending on version.**
- ❑ **Examine machine configurations in specifications section of FSM for more details, briefly:**
 - ♦ D116 - Fax Model (F)
 - ♦ D115 - Printer/Scanner and Fax Model (SPF)
- ❑ **Other connectivity options are also available (depending on machine version).**

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Machine Configuration - 2/2

- ☐ **B872 - ARDF**
- ☐ **D567 - Paper Tray Unit**
- ☐ **D467-03 - USB-2.0/SD Slot - Type B (only for D069)**
- ☐ **D577 - HDD Option, Type 201**
- ☐ **B446-83 - PCU (Photo Conductor Unit), Type 1515**
- ☐ **D461 - Accessibility Handle, Type C**
- ☐ **G874-01 - 1000 base-T**

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Installation

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Before You Start

- ☐ **Read Installation chapter of FSM before installing machine, noting:**
 - ◆ Environment (ventilation, temperature range, etc.)
 - ◆ Space and power requirements.
 - ◆ Accessory check (for model you will install).
- ☐ **Before installing optional units, be sure to:**
 - ◆ Switch machine off and remove power cord and network cable.
- ☐ **Keep system parameter report. You will need it for any future troubleshooting of machine.**

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Installation

- ☐ Install machine. See "Installation" of FSM.
- ☐ Install optional paper tray unit and optional paper tray unit heater.
- ☐ Be sure to keep in mind the following when you install machine and paper tray unit:
 - ◆ You do not need to pull toner bottle holder completely out of machine.
 - ◆ Do not remove inner cap of toner bottle.
 - ◆ Do not use force to turn toner bottle after you have set it in toner bottle holder. Machine will turn bottle.
 - ◆ Remove all tape from machine.

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Service Program Mode

- ❑ **Standard maintenance work requires utilization of SP modes. There are two kinds of SP modes for this machine:**
 - ◆ SP Mode (Service Program mode)
 - ◆ SSP Mode (Special Service Program mode)
 - » SP & SSP modes are for service technician only. Do not let users access SP & SSP modes.
- ❑ **Read the Service Program section of FSM. Then try entering some of the SP and SSP modes (after you have finished installing the machine).**

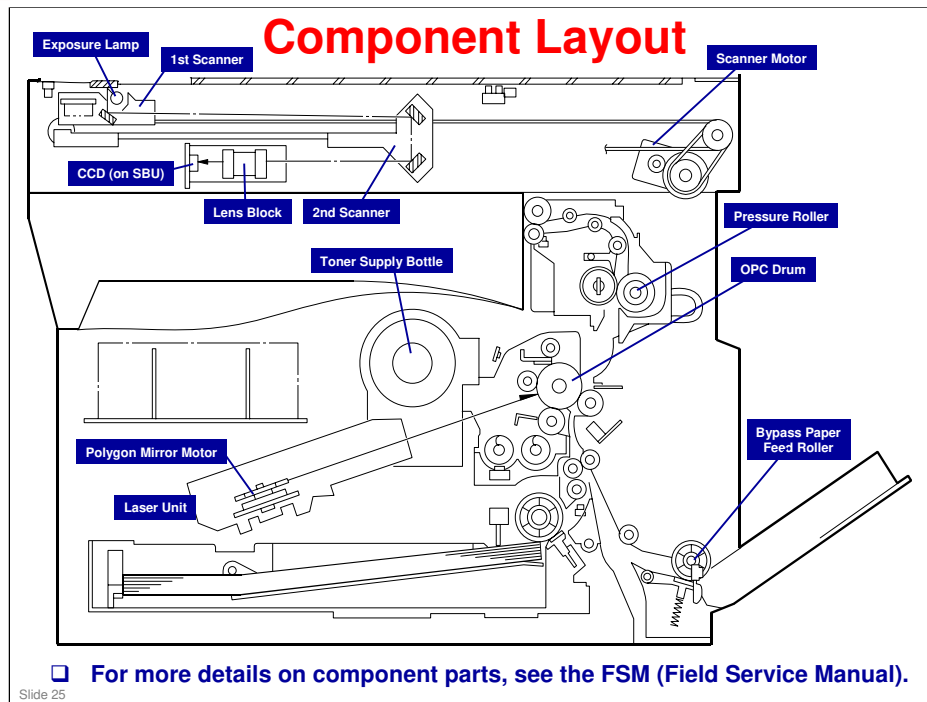
Slide 23

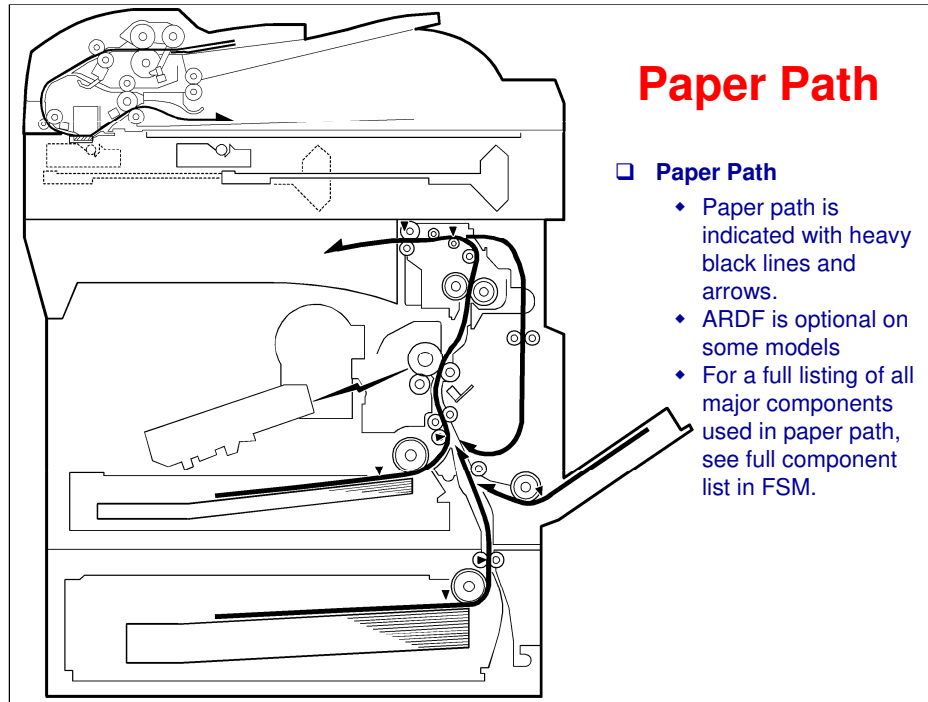
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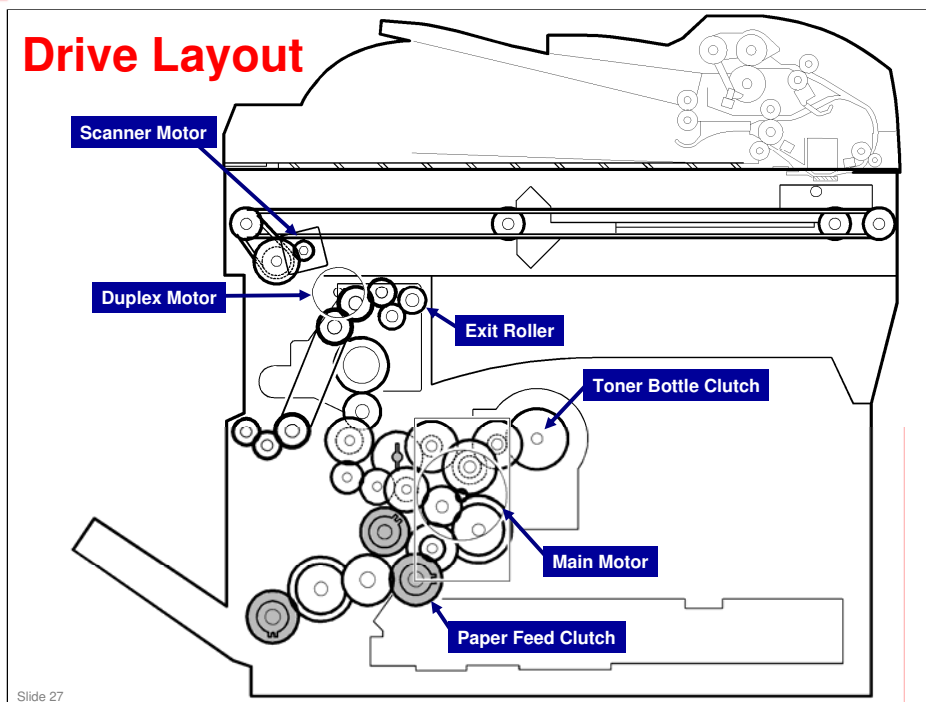
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Machine Overview and Machine Operation

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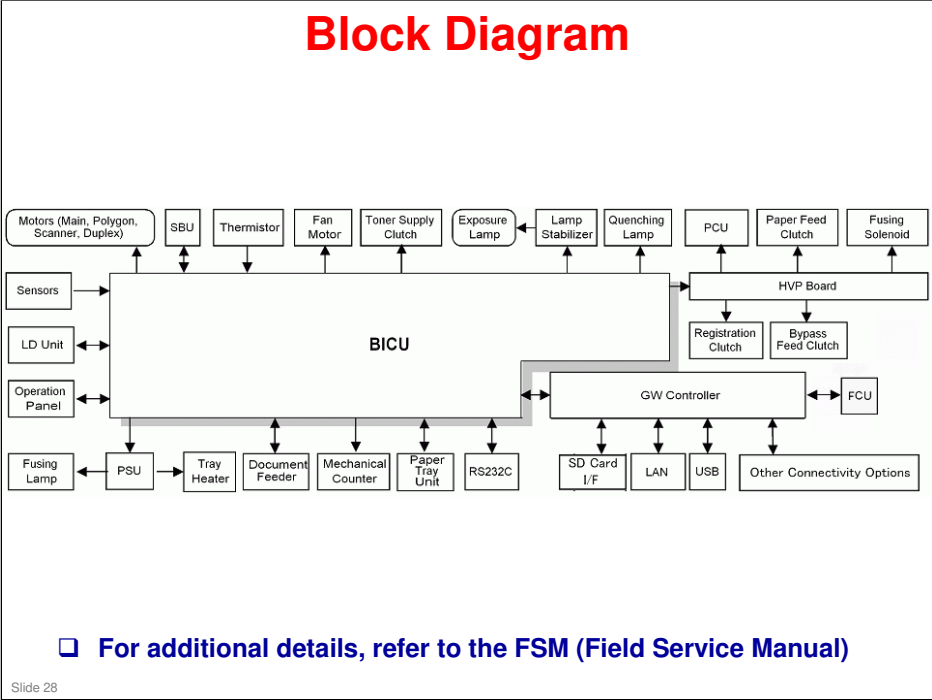




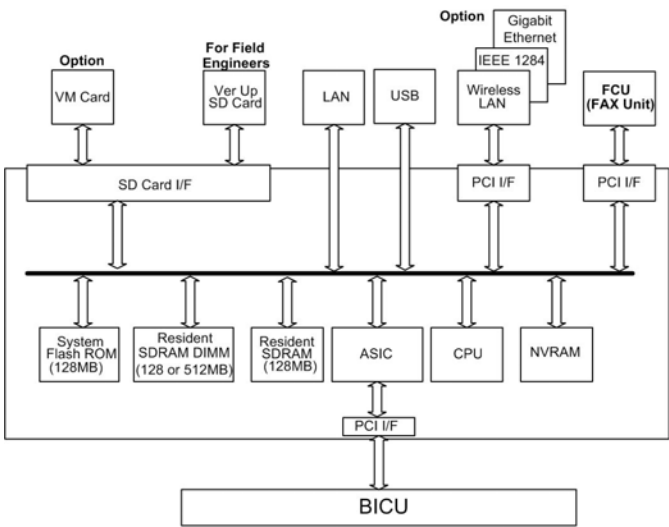


Drive Layout

- ❑ The slide shows some of the drive components. For more details and information, refer to the FSM.



Block Diagram (for GW Controller)



□ For additional details, refer to the FSM.

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NVRAM Upload/Download

- ❑ **This section depends on which model you have. There are two different procedures.**
 - ◆ SP5-824-1 (NVRAM Upload) - From the BICU to a flash memory card
 - ◆ SP5-825-1 (NVRAM Download) - From a flash memory card to the BICU
- ❑ **Practice as outlined in NVRAM Data Upload/Download (SP5-824/825) section of Service Tables.**

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Adjusting Copy Image

- ❑ **Adjust copy image area at these times:**
 - ◆ After clearing engine data (SP-5801-2).
 - ◆ If you replace any of these: First scanner or second scanner, lens block, scanner motor, polygon mirror motor, paper tray.
- ❑ **Do adjustments as outlined in "Adjusting Copy Image Area" in the Replacement and Adjustment section of FSM**

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Operating Instructions

- ❑ While these are user operations, service technicians should also be generally familiar with them.
- ❑ Read these if you're not already familiar with them:
 - ◆ User Tools: General settings
 - ◆ Placing originals and copying

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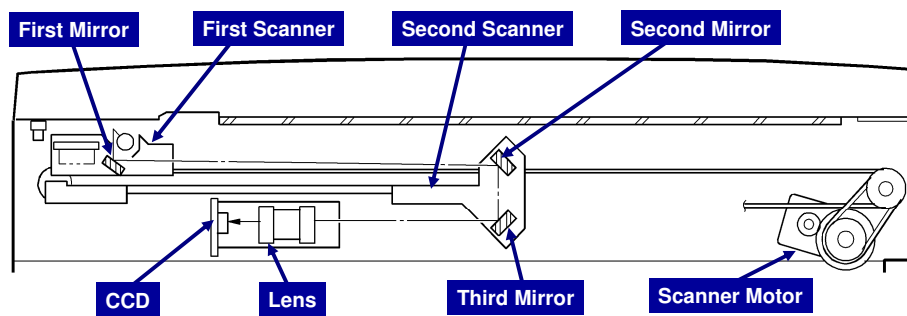
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Scanning and Image Processing

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Scanning - Overview

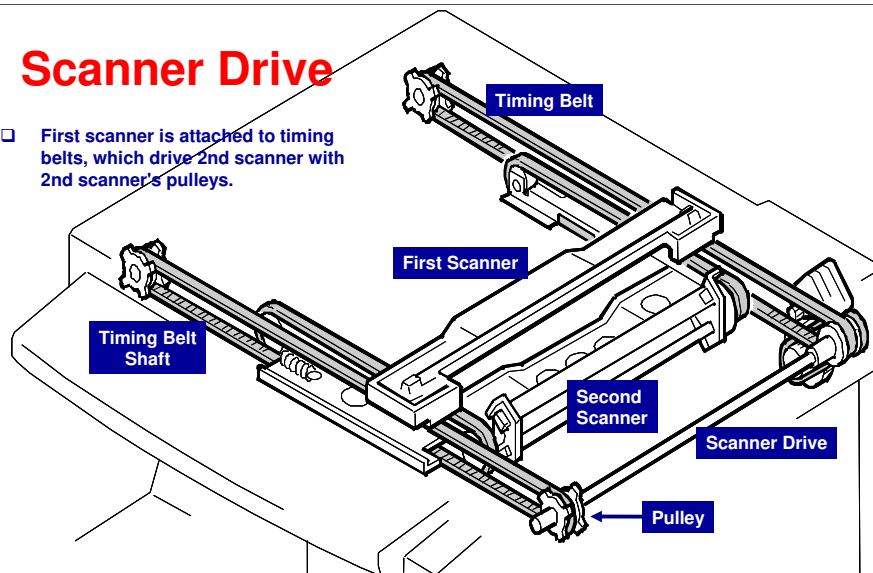


- ☐ HP sensor makes sure scanner is at home position.
- ☐ To copy, original is illuminated by xenon exposure lamp. Then 1st, 2nd, and 3rd mirrors move reflected light to lens block. After this, lens transmits it to CCD.
- ☐ 1st scanner has a reflector. This helps to not let shadows get on pasted originals.

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Scanner Drive

- First scanner is attached to timing belts, which drive 2nd scanner with 2nd scanner's pulleys.



- When scanning in book mode, 2nd scanner moves at half speed of 1st scanner. (Scanner speed is faster for reduction printing, and slower for enlargement printing.)
- Magnification can be adjusted in sub-scan direction.

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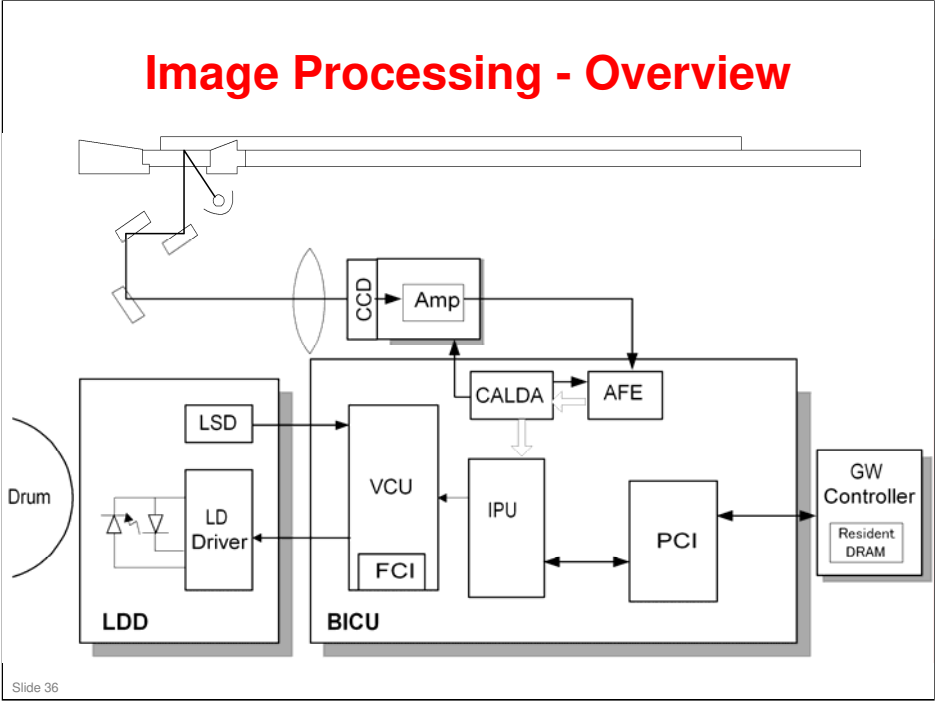


Image Processing - Overview

- ❑ **Changing Modes:**
 - ◆ You cannot switch modes at these times:
 - » When accessing user tools.
 - » When scanning an original
- ❑ **Practice switching modes and getting multi-access.
(Refer to Operating Instructions, General Settings Guide)**
- ❑ **To learn more about image processing, refer to the
Core Technology Manual**

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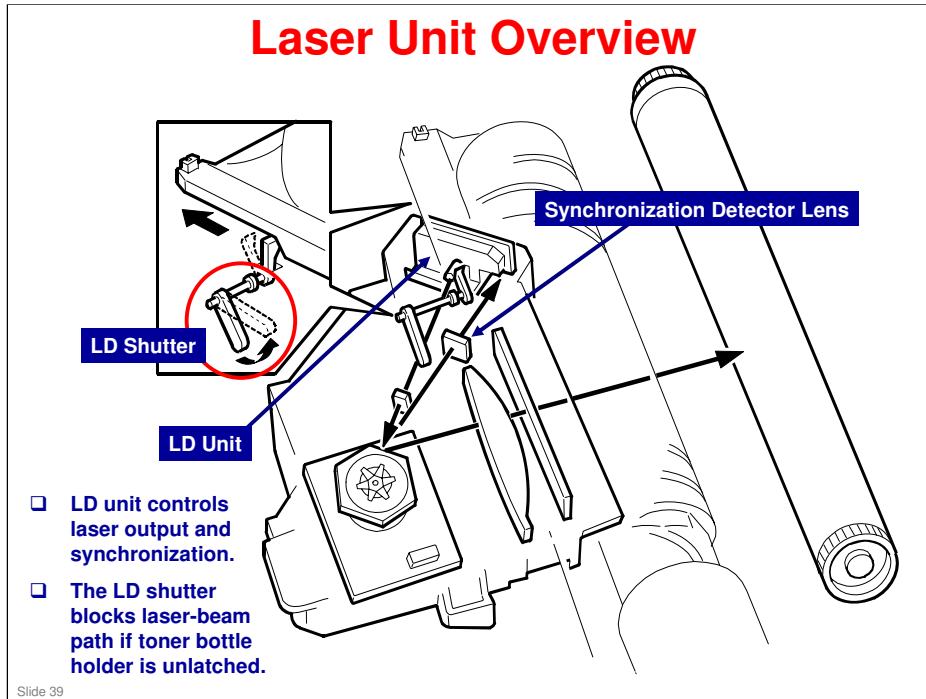
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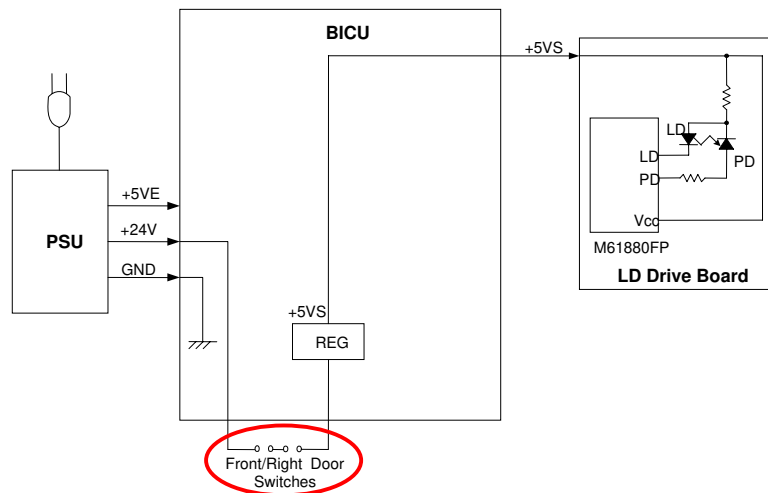
Laser Exposure and PCU

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Laser Unit Overview



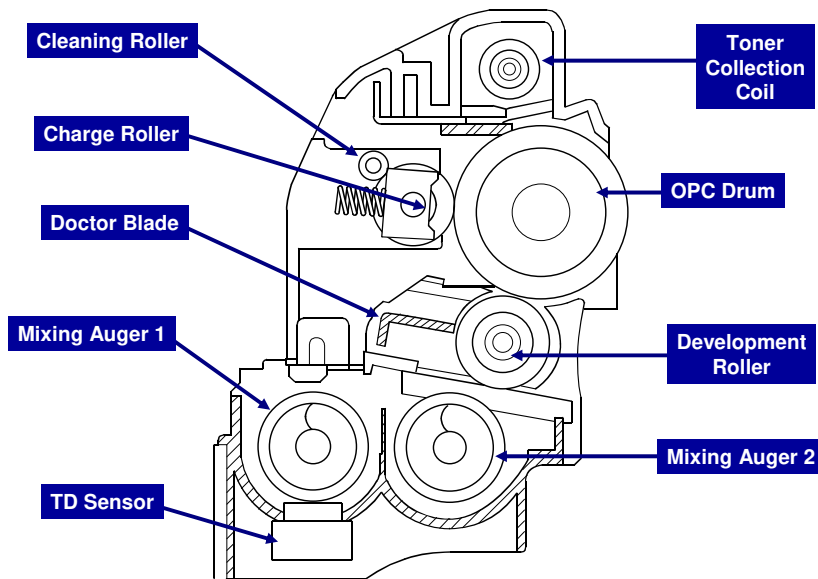
LD Safety Switches



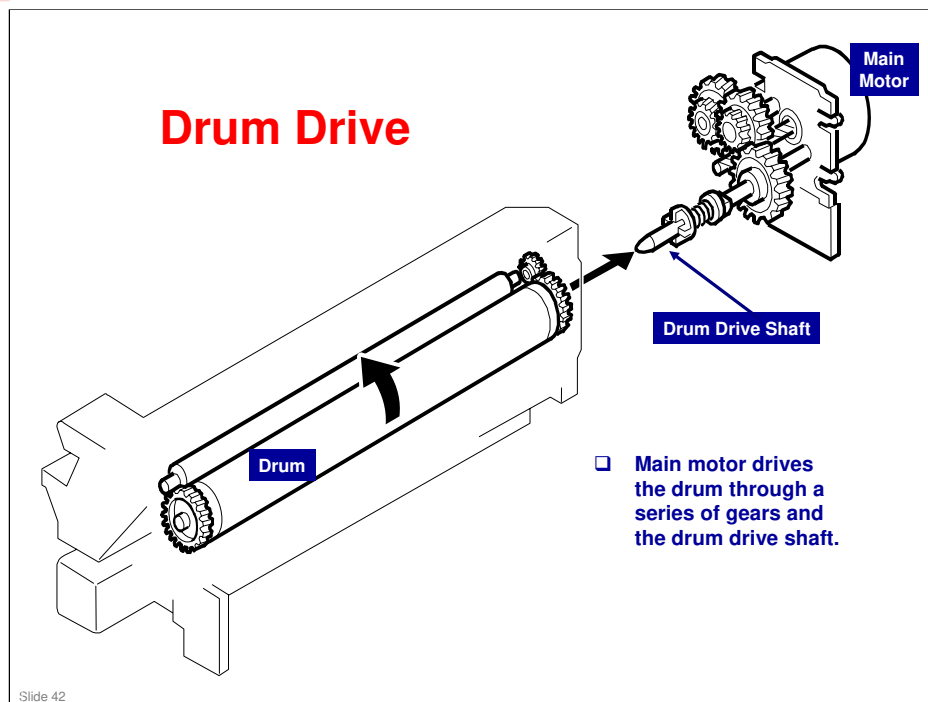
- Safety switches are installed at front and right doors. Machine will cut power to LD drive board if either door is opened. Corresponding switch cuts power supply (+5VS) to laser diode.

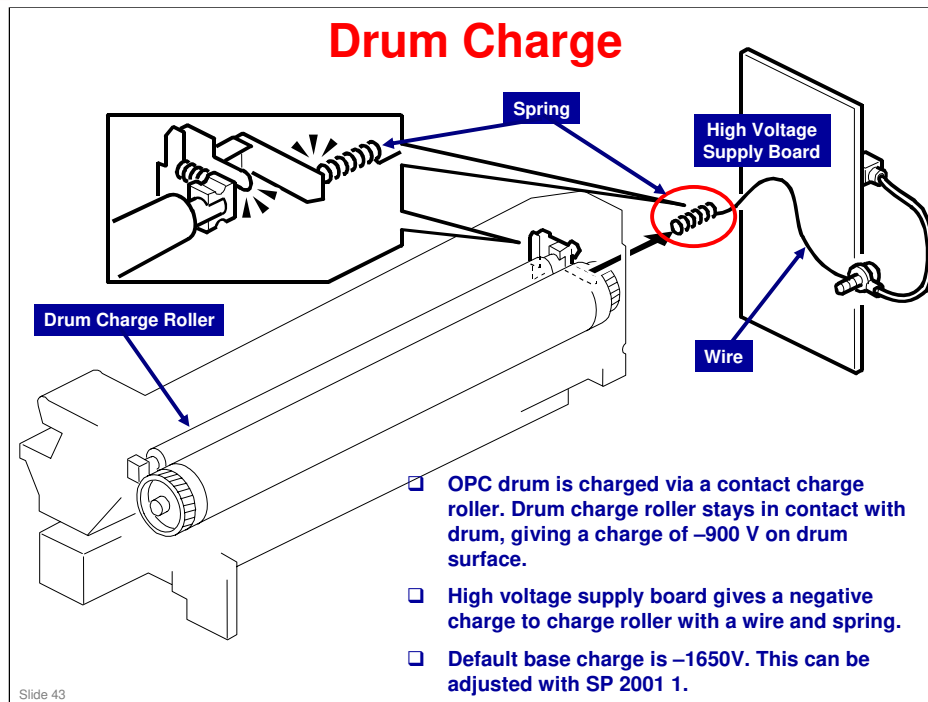
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Photoconductor Unit (PCU) -Overview

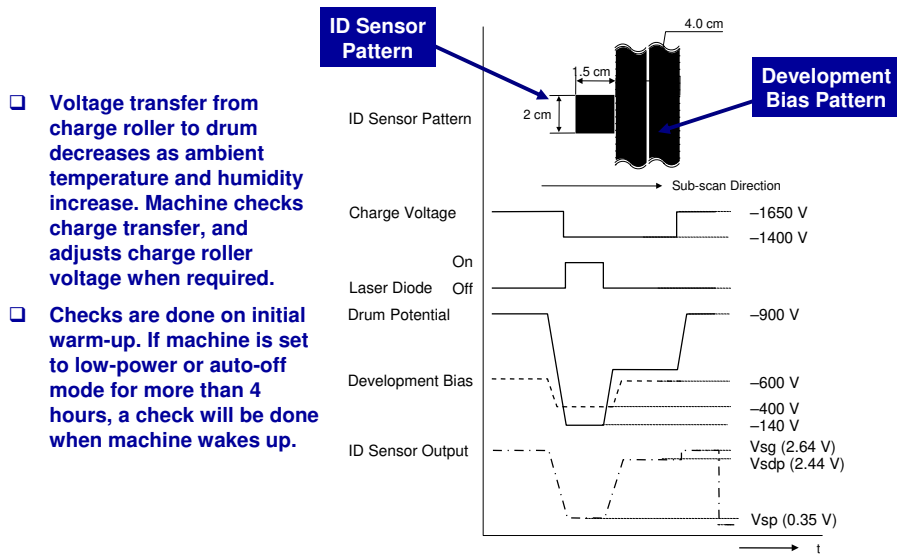


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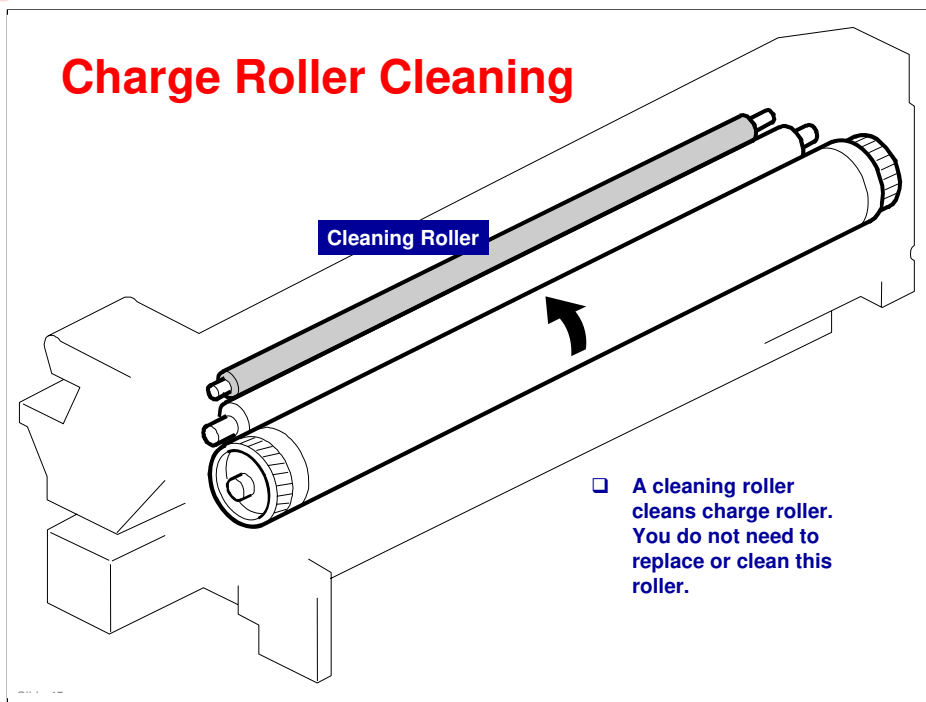
Charge Roller Voltage Correction

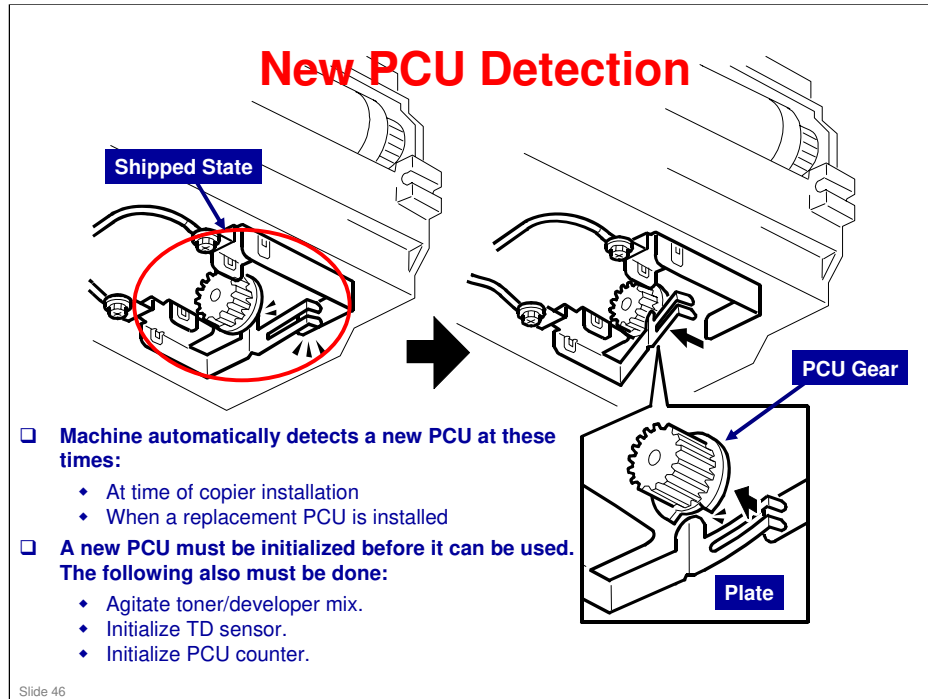


Procedure:

- ❑ Right after the machine creates the ID sensor pattern for toner density control, the development bias pattern is created. The development bias is decreased to -400 V.
- ❑ The ID sensor measures the development bias pattern's density (Vsdp) and the bare drum's voltage (Vsg).
- ❑ The FCU compares the results and adjusts the roller voltage accordingly.
 - ❑ $V_{dsp}/V_{sg} > 0.95$: Decreases the negative charge on the charge roller by +50 V.
 - ❑ $V_{dsp}/V_{sg} < 0.90$: Increases the negative charge on the charge roller by -50 V.
- ❑ Use SP 2221 to see the current ID sensor values.

Charge Roller Cleaning





- The machine automatically detects a new PCU and performs initialization. In the shipped state, the connection plates are pressed together and make a complete circuit. This tells the CPU that the PCU is new and must be initialized. When the PCU gear rotates, the top connection plate gets free and breaks the circuit.

- Pre-installed PCUs do not use this mechanism. A factory-set flag tells a new machine to initialize the PCU when the machine is switched on for the first time.

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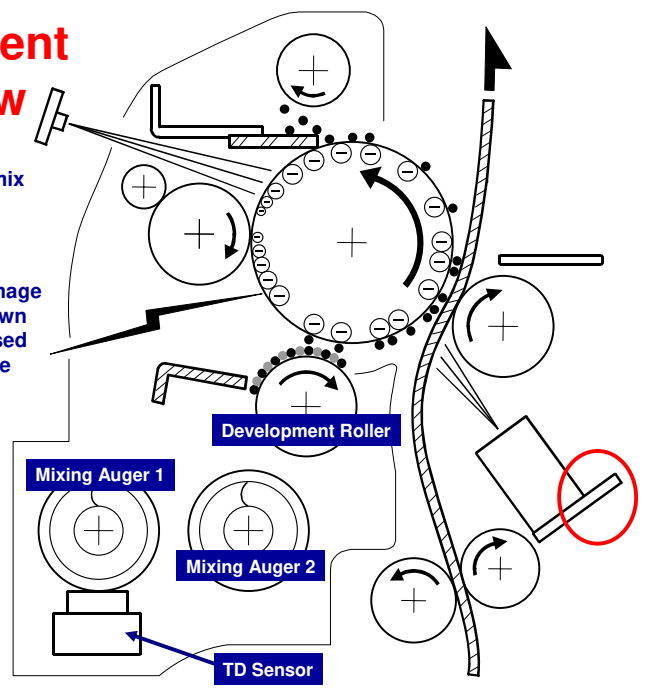
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Development

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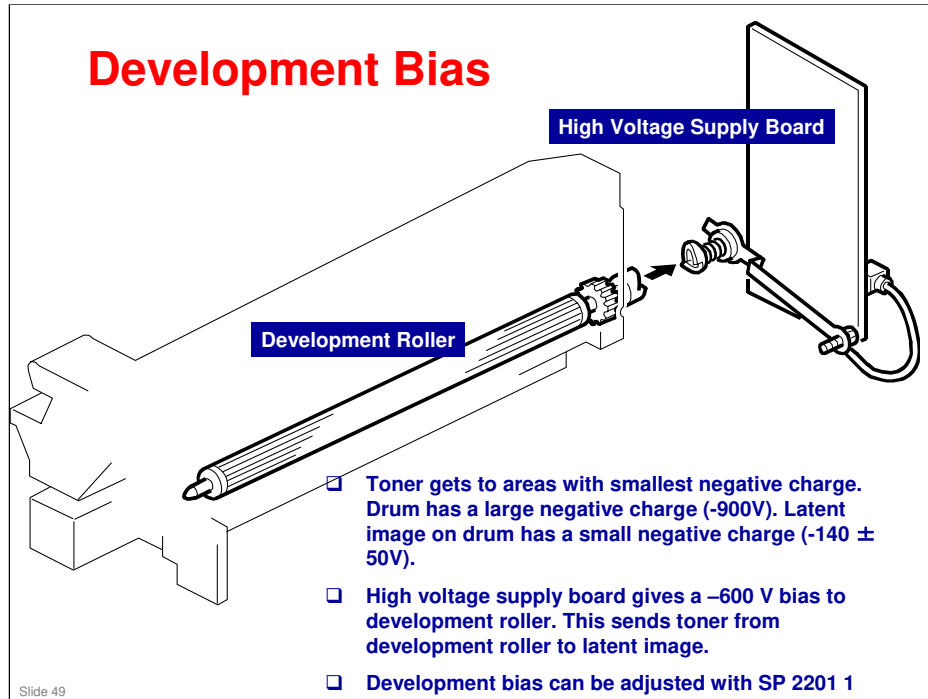
Development Overview

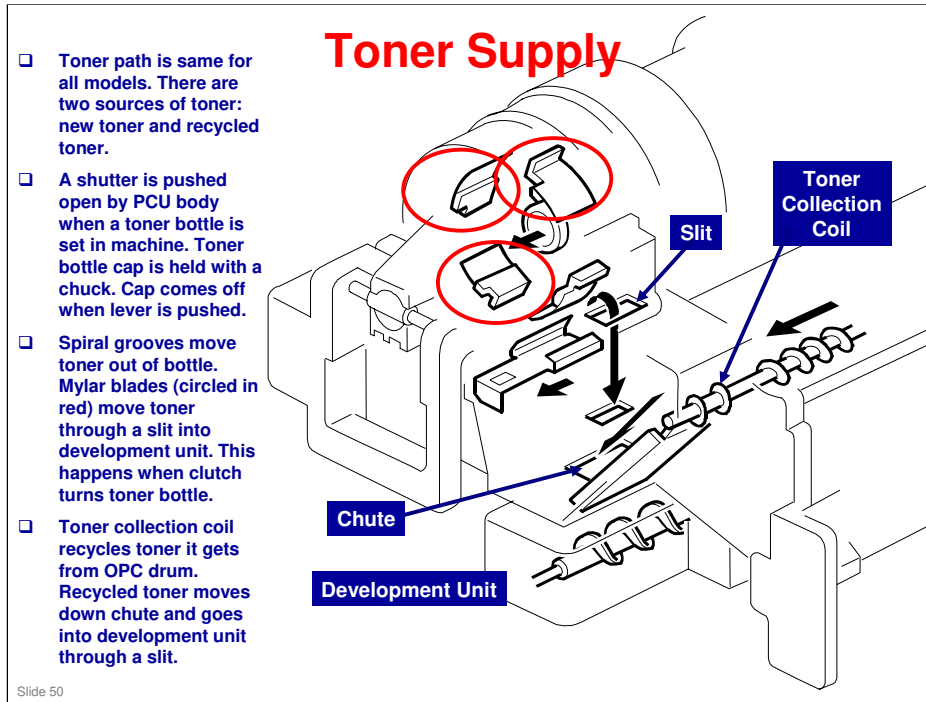
- Two mixing augers mix the developer (carrier/toner mix).
- TD (toner density) sensor and the ID (image density) sensor (shown in a red circle) are used to control copy image density.

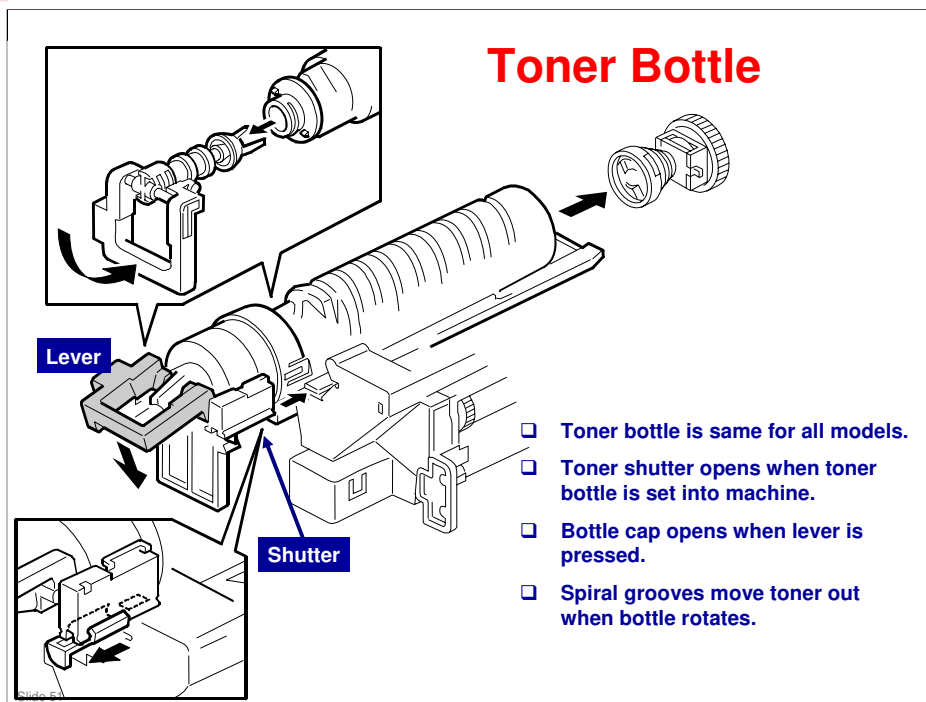


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Development Bias







Toner Density Control

- ❑ **Toner concentration in developer is controlled with these values:**
 - ♦ Vts: TD sensor initial set of 1.25V. (Used as reference voltage when Vref is not available).
 - ♦ Vref: Toner supply reference voltage (calculated value; periodically updated).
 - ♦ Vt: Actual output from TD sensor.
 - ♦ Vsg/Vsp: Values from ID sensor, where Vsp is voltage of a test pattern ("ID sensor pattern"), and Vsg is voltage of bare drum.
- ❑ **Toner is given to development unit if Vt is more than reference voltage**

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Toner Density Control

Reference Voltage

- ❑ Vts is used as the reference if the PCU has just been installed, or if ID sensor correction is set "off" with SP 2927. Vref is used as the reference at all other times.

Toner Density Sensor Initial Setting

- ❑ The Vts for this machine is 1.25 V. The machine adjusts the sensor so that it reads out 1.25V for TD sensor initialization when a new PCU is installed.

Toner Concentration Measurement

- ❑ The machine checks concentration every copy cycle, comparing Vt against the reference voltage to do this.

Vsp/Vsg Detection

- ❑ An ID sensor pattern is made on the drum by the charge roller and laser diode. The ID sensor detects the pattern density (Vsp) and the density of the bare drum (Vsg). Detection is done at the same time as (and immediately before) charge-roller voltage detection.
- ❑ You can set ID sensor control "off" with SP 2927.

Calculation of Vref

- ❑ Vref is calculated based on the ID sensor output (Vsp/Vsg) and the present reference voltage (Vref or Vts) – Vt.

Toner Supply Determination

- ❑ The machine gives toner if Vt gets to more than the reference voltage. You can see current Vt and reference voltage values with SP 2220.
- ❑ You can see other ID sensor values with SP 2221.

Toner Errors

- ❑ **Sensor errors occur at these times:**
- ❑ **ID Sensor:**
 - ◆ $V_{sg} \leq 2.5$ (when V_{sg} is read)
 - ◆ $V_{sg} < 3.5$ (at maximum power)
 - ◆ $V_{sp} \geq 2.5$
 - ◆ $V_t \geq 2.64$ or $V_t < 0.20$
- ❑ **You can see current readings with SP 2221**
- ❑ **TD Sensor**
 - ◆ $TD < 0.20 \text{ V}$
 - ◆ $TD > 2.64 \text{ V}$
- ❑ **If machine gets error readings 10 times in succession, SC 390 will be shown. You can see current value with SP 2220**

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Toner Near End/End Detection

❑ Machine will show toner near end at these times:

- ♦ Vt is at Level-6 five times in succession.
- ♦ Vt > 1.85 five times in succession.

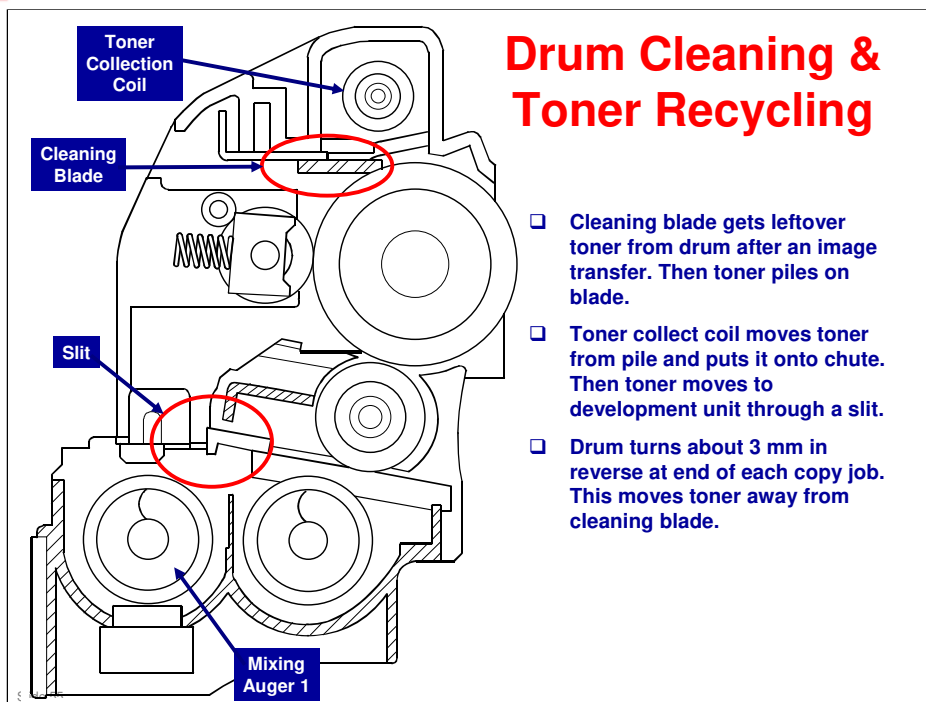
❑ Machine will show toner end at these times:

- ♦ VT is >= Level-6 or VT > 1.85 n times in a row.
- ♦ VT is at Level-7 or VT > 2.00 three times in a row

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Toner Near End/End Detection

- n is the number of sheets that can be printed before toner near end gets to toner end. n is set to 50 by default.
- You can change the value of n to 20 with SP 2213.



SP Modes

- ☐ **SP 2214: Developer initialization.**
- ☐ **SP 2802: Forced developer churning.**
- ☐ **SP 2908: Forced toner supply.**
- ☐ **SP 2921: Toner supply mode.**
- ☐ **SP 2926: Standard Vt.**
- ☐ **SP 2928: Toner end clear**

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Replacement and Adjustment

❑ Do this removal procedure:

- ◆ See “Toner Supply Clutch” in the FSM

❑ Preventive Maintenance.

- ◆ You must clean toner bottle holder after you replace the PCU.

❑ Learn more:

Core Technology Manual

- ◆ Development process
- ◆ Development bias
- ◆ Toner supply

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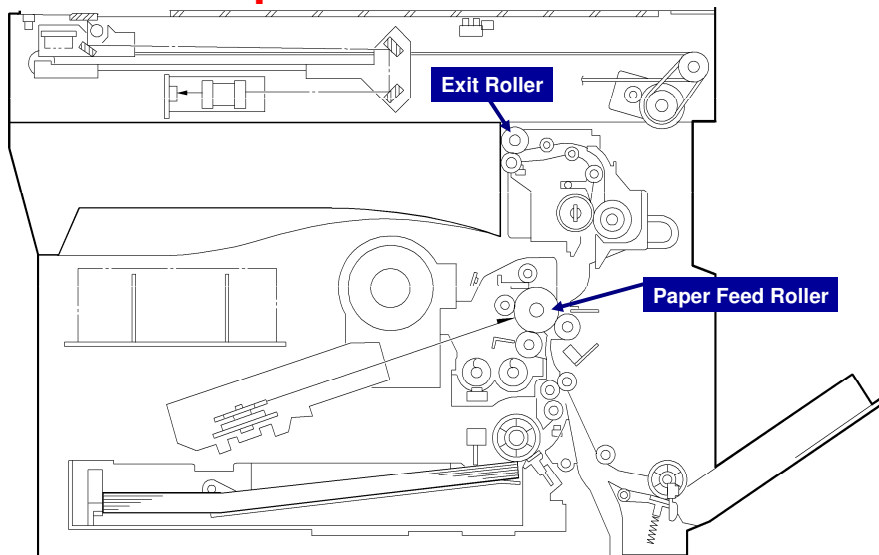
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Paper Feed

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Paper Feed - Overview

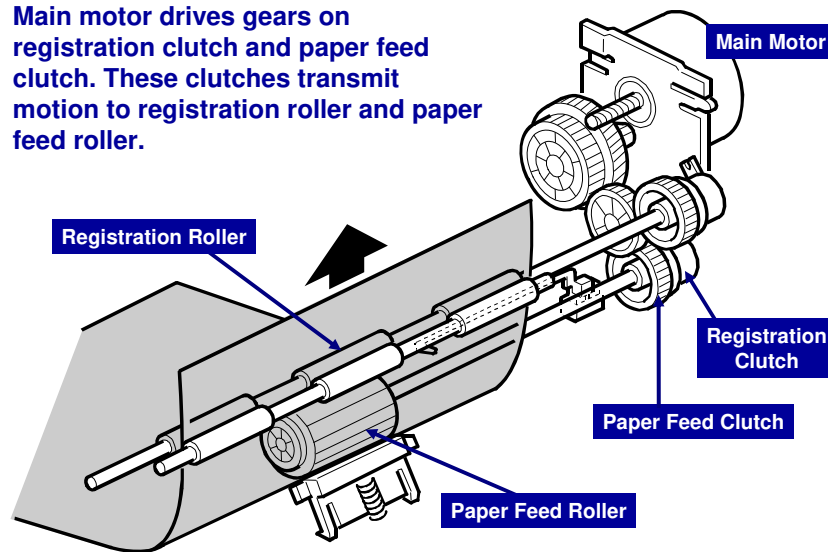


□ See the FSM for a more complete list of components.

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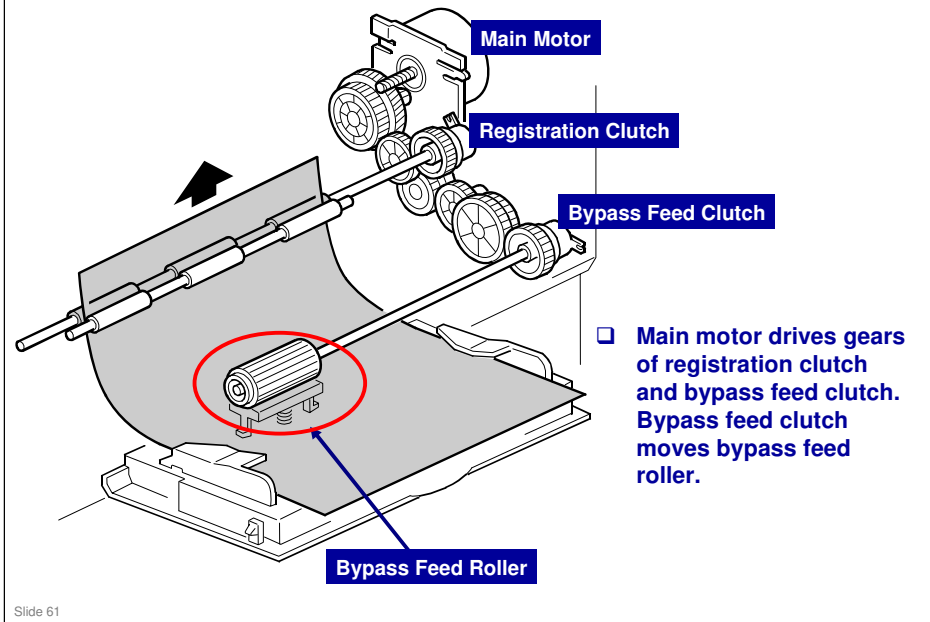
Drive Mechanism - From Paper Tray

- Main motor drives gears on registration clutch and paper feed clutch. These clutches transmit motion to registration roller and paper feed roller.

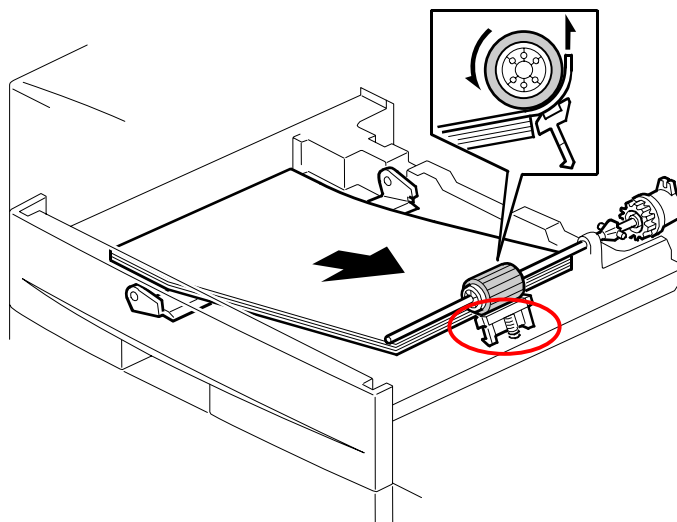


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Drive Mechanism - Bypass Tray

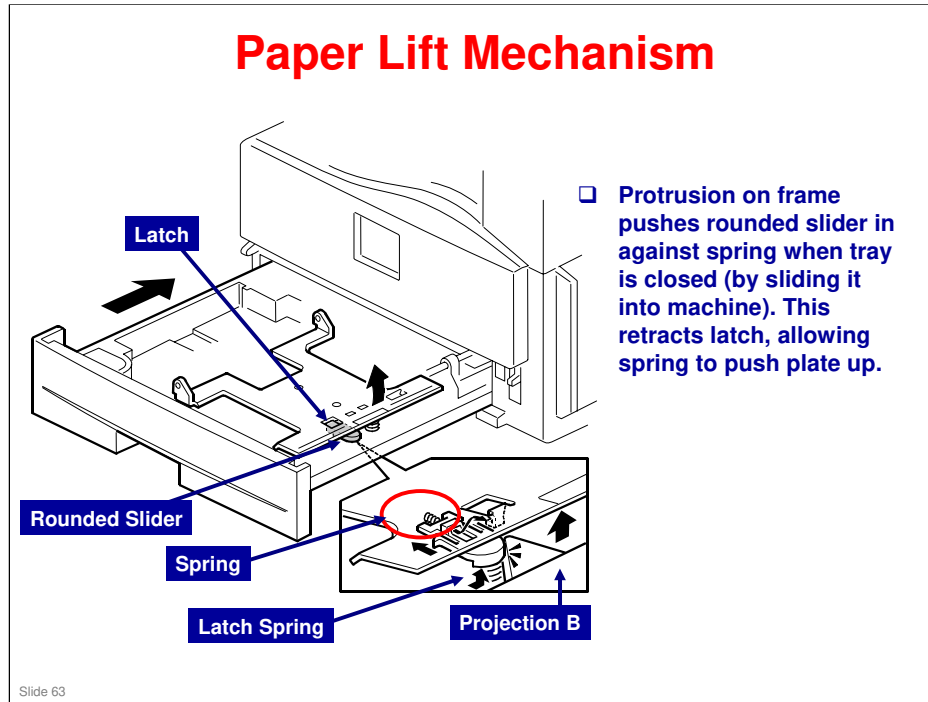


Paper Feed And Separation

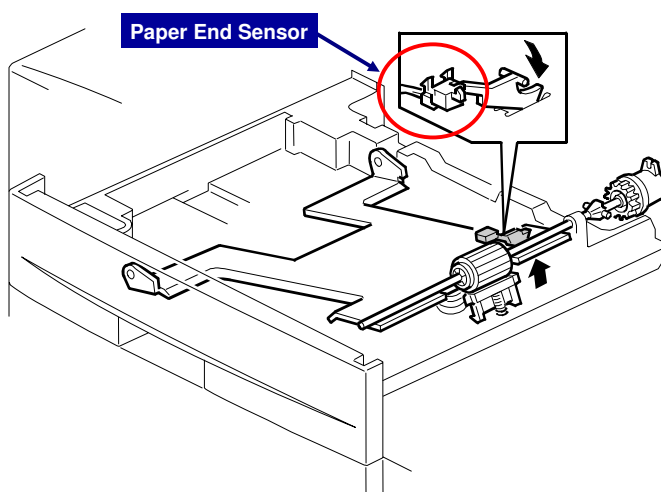


- ❑ Machine uses a friction-pad feed system, with friction pad located inside paper tray.

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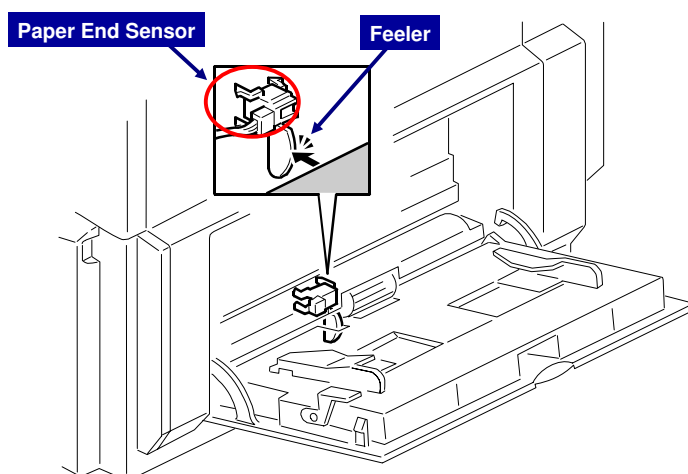
Paper End Detection-Main Tray



- Feeler goes into cutout when paper runs out, activating paper end sensor.

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Paper End Detection - Bypass Tray



- Feeler goes into cutout when paper runs out, activating paper end sensor.

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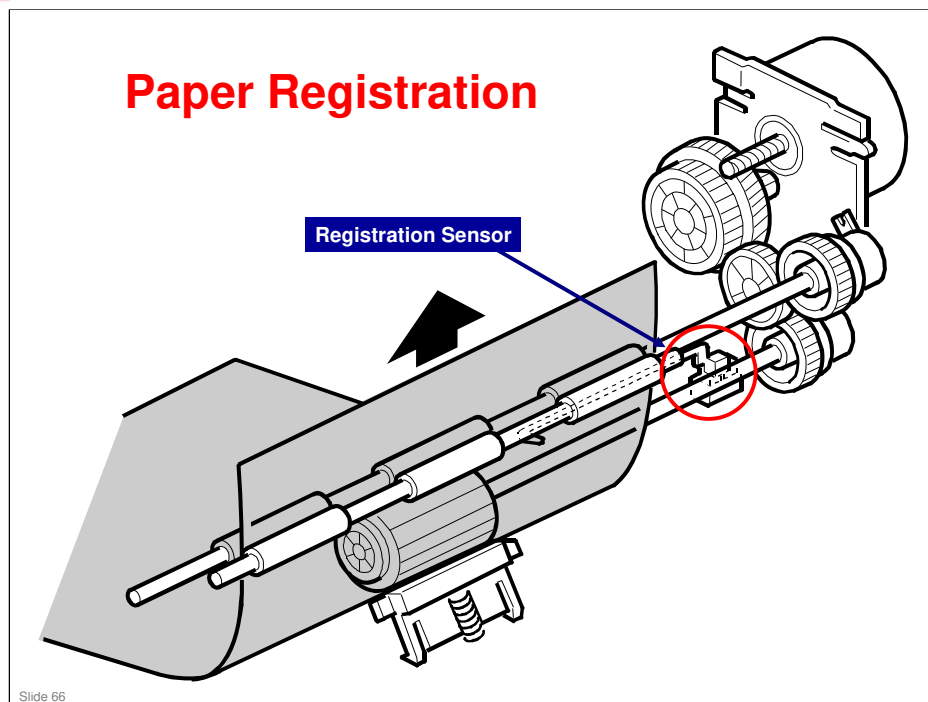




Image Transfer and Paper Separation

- ☐ Image transfer and paper separation will be covered.

In this section you will do these things:

- ☐ Examine how paper is fed through the machine.
- ☐ Examine transfer current.

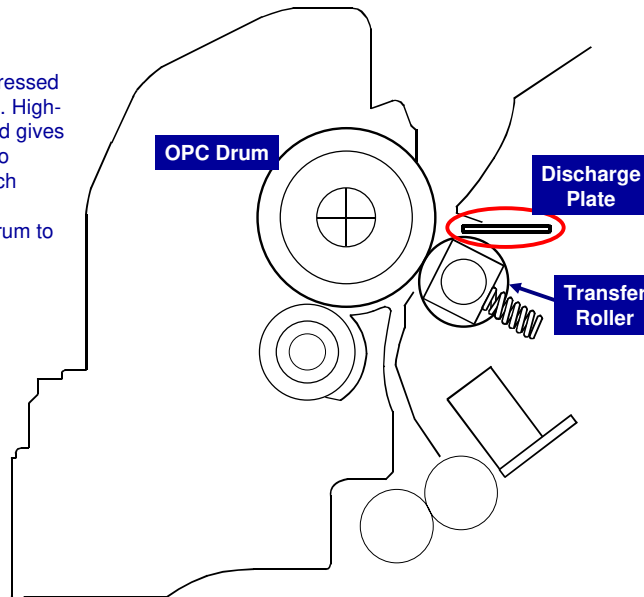
When you finish this section, you should know the answers to these questions:

- ☐ How is paper fed through the machine?
- ☐ How is the transfer roller cleaned?

Overview

□ Overview

- ♦ Transfer roller is pressed against OPC drum. High-power supply board gives a positive charge to transfer roller, which causes toner to be transferred from drum to paper.
- ♦ Machine uses following two paper separation techniques:
 - » Drum's curvature helps separate paper.
 - » Discharge plate removes paper's charge.



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Transfer Current Timing

- ❑ **Machine has two transfer current levels: Low and High.**
 - ◆ Low level: High voltage supply board supplies 10μA to transfer roller before image transfer starts. This prevents transfer roller from getting positively charged toner on drum surface.
 - ◆ High level: High voltage supply board supplies high level of current to transfer roller at time of image transfer. This allows transfer roller to move toner to paper.
 - ◆ High voltage supply board does not supply current when trailing edge of paper has passed transfer roller. High voltage supply board supplies low level current if machine prints more pages.
- ❑ **Transfer Current Timing**
 - ◆ Transfer current level can be adjusted with SP 2301.
 - ◆ Examine default current settings. If transfer current level is not adjusted correctly, the following may happen:
 - » Parts of page being printed may have ghost images.
 - » OPC drum could be damaged.

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Transfer Roller Cleaning

- ❑ **Toner can get onto transfer roller at these times:**
 - ◆ If you print on paper that is smaller than image size
 - ◆ During paper jams.
- ❑ **You must clean roller so toner will not get onto back of other prints.**
- ❑ **High voltage supply unit gives a negative charge to transfer roller. Toner with negative charge moves back to drum. Then high voltage unit provides a positive current. Toner with a positive charge moves back to drum.**
- ❑ **Roller is cleaned at these times:**
 - ◆ When power is switched on.
 - ◆ After you clear a paper jam.
 - ◆ At the end of a job, if at least 10 print jobs have been made since last clean cycle.
- ❑ **You can change current for cleaning procedure with SP 2301-4.**

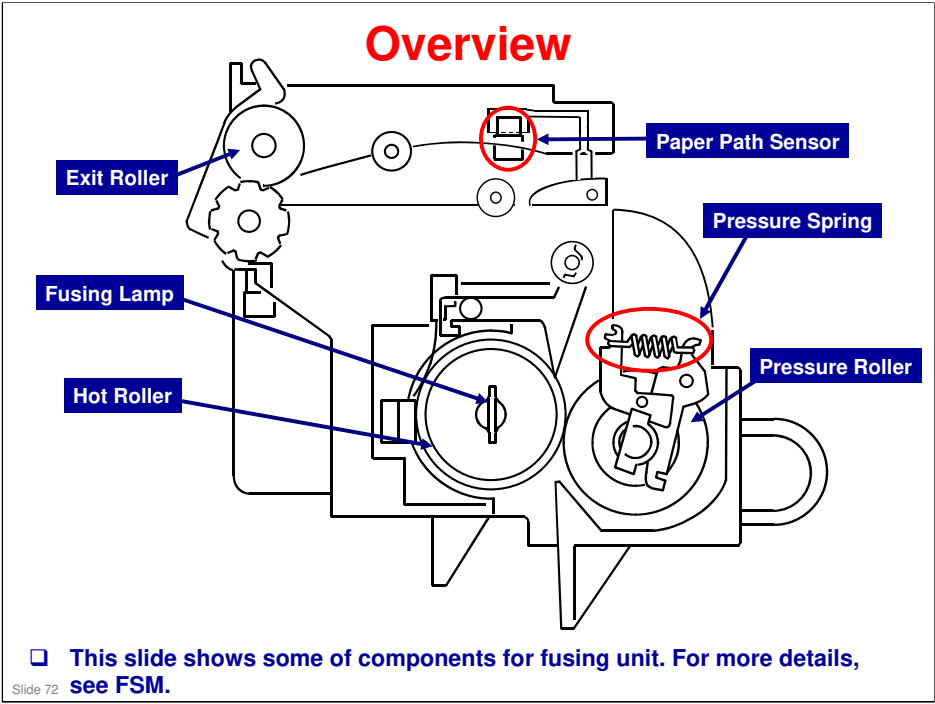
Slide 70

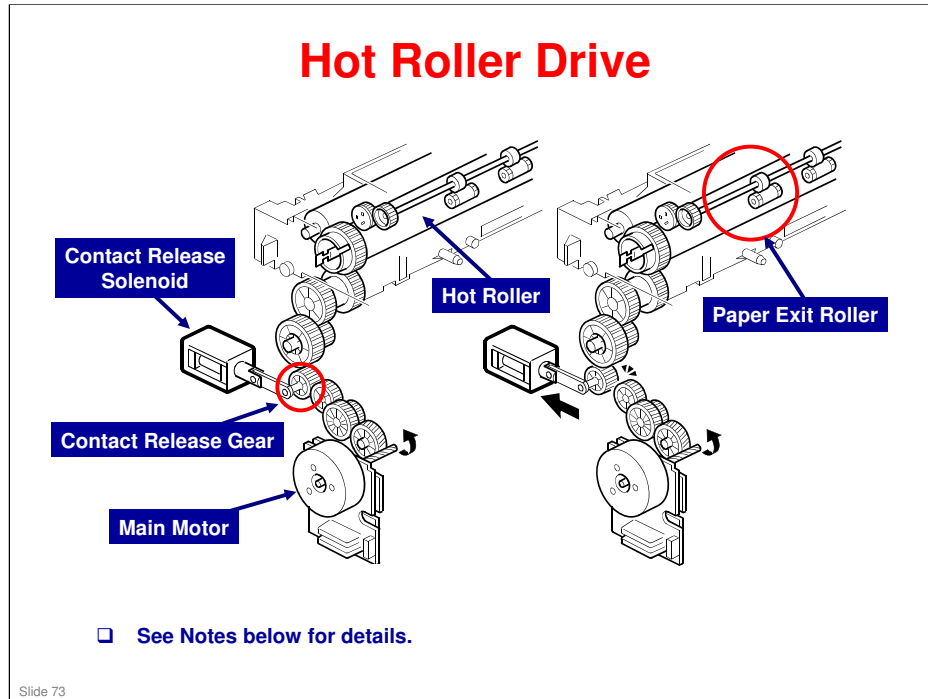
RICOH

**D115/D116
Service Training**

Fusing and Paper Exit

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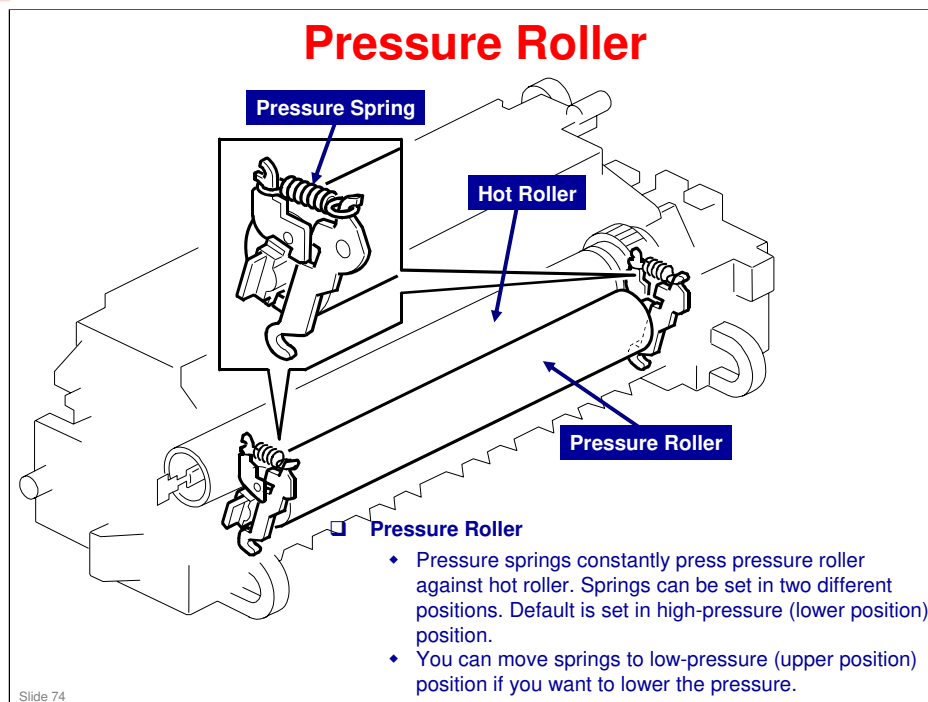


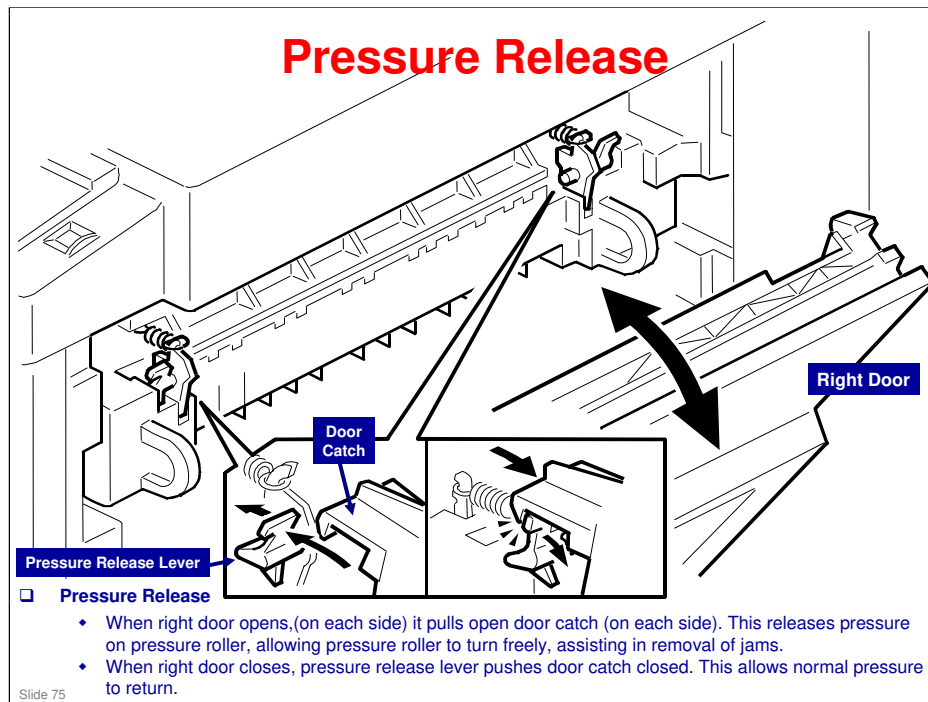
Hot Roller Drive Mechanism

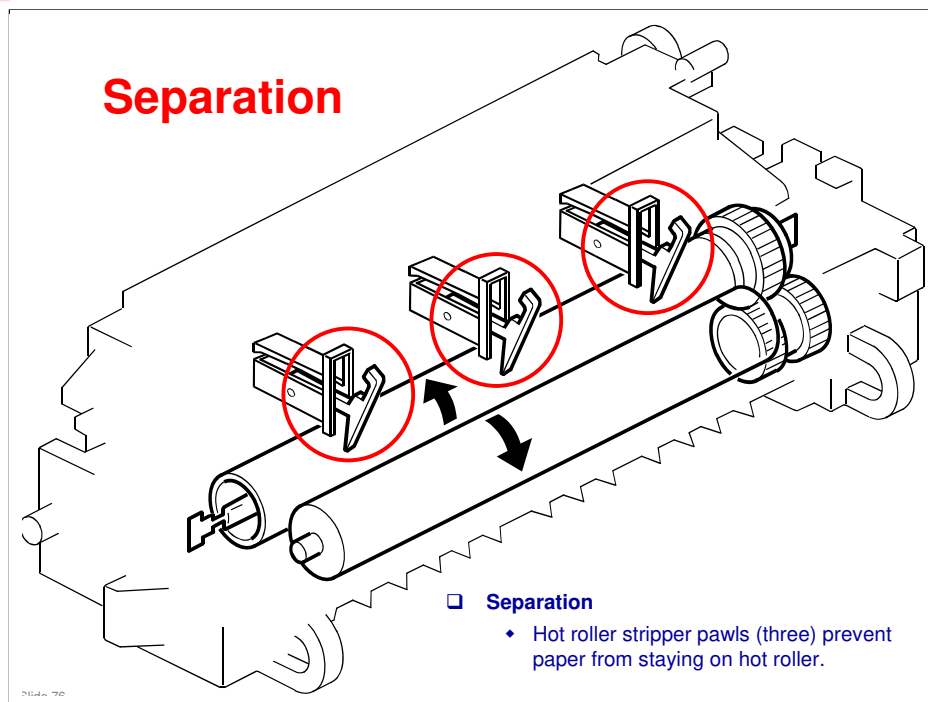
- The main motor drives the hot roller through a gear train. One of the gears in the gear train is the contact-release gear. This gear is linked to the contact-release solenoid. When the contact-release solenoid is activated, it separates the contact-release gear from another gear in the gear train.
- Drive power of the main motor is not transmitted to the hot roller.
- Drive power of the main motor is not transmitted to the paper exit roller. This roller is driven by the exit motor.

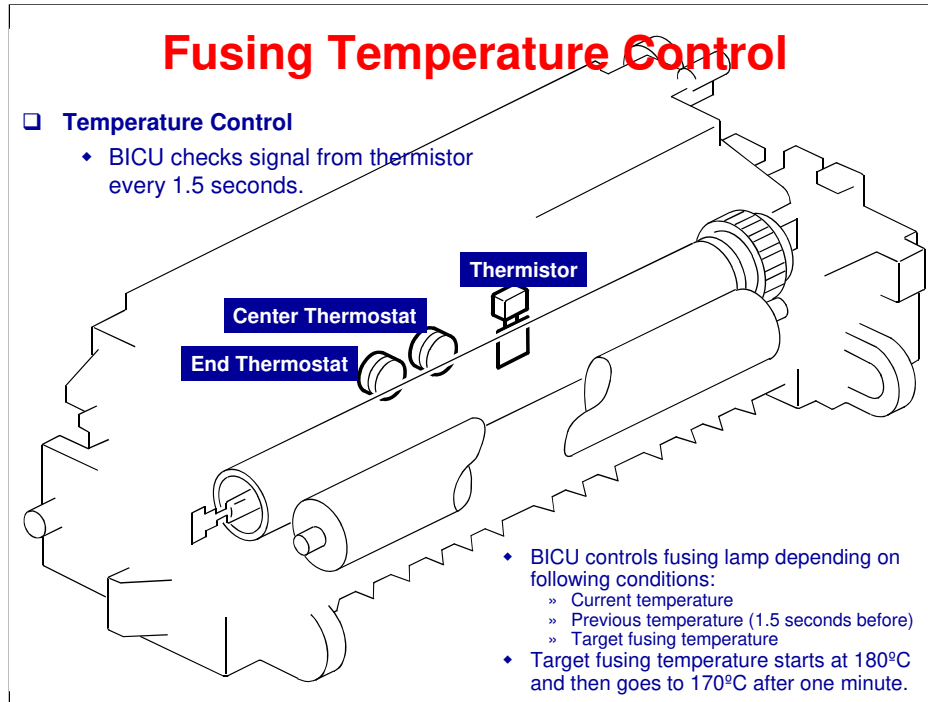
Contact/Release Control

- The contact-release solenoid comes on at these times:
 - When the copier warms the hot roller.
 - When the hot roller temperature is 18°C or higher.
 - Fusing idling (SP 1103 1) is set to "No."
- Control is based on these:
 - The copier takes a shorter time to heat the hot roller when the roller isn't turning.
 - The temperature of the hot roller surface may get uneven when the hot roller temperature is low and the roller does not turn.









Overheat Protection

- ❑ **BICU checks fusing temperature through thermistor. Copier has five features to safeguard machine from overheating.**
- ❑ **Feature 1**
 - ◆ BICU switches fusing lamp off when fusing temperature gets too high.
- ❑ **Feature 2**
 - ◆ BICU (Base engine & Image Control Unit) stops machine when thermistor detects an abnormal condition. Then machine will show one of these SC codes:
 - » SC 543, SC 544, SC 545, SC 546
- ❑ **Feature 3**
 - ◆ BICU stops machine if thermistor does not work correctly, and then shows SC 541
- ❑ **Feature 4**
 - ◆ Thermostat near center cuts power to fusing lamp at 160°C. Thermo-switch near end cuts power to fusing lamp at 170°C. These thermo-switches are on same circuit as fusing lamp.
- ❑ **Feature 5**
 - ◆ BICU stops machine if exhaust fan does not work correctly. Then machine shows SC 590.
 - ◆ A defective exhaust fan could cause machine to overheat.

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Energy Saver Modes

- ❑ **All models have these energy saver modes:**
 - ◆ Low power mode
 - ◆ Night/off mode
- ❑ **All models exit energy saver mode at these times:**
 - ◆ When power switch is switched on.
 - ◆ When originals are set on document feeder.
 - ◆ When platen cover is opened.
- ❑ **Timers**
 - ◆ Engine controller activates energy saver when in low power mode. (Timers are user-settable.)
 - ◆ Energy saver timer and auto off timer start at same time when machine ends all jobs, or when user ends all manual operations.
 - » Auto off timer does not wait for energy saver timer.

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Replacement and Adjustments

- ❑ **Do these removal procedures: (Reference fusing unit in FSM)**
 - ◆ Fusing unit.
 - ◆ Exit sensor.
 - ◆ Hot roller stripper pawls.
 - ◆ Hot roller and fusing lamp.
 - ◆ Thermoswitch and thermistor.
 - ◆ Pressure roller.
 - ◆ Nip band adjustment.
 - ◆ Contact release solenoid.
- ❑ **All parts for fusing unit have same PM intervals. You must replace or clean these components at PM 90 K.**

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Replacement and Adjustments

- ❑ All parts for the fusing unit have the same PM intervals. You must replace or clean these components at PM 90 K.



Duplex Unit

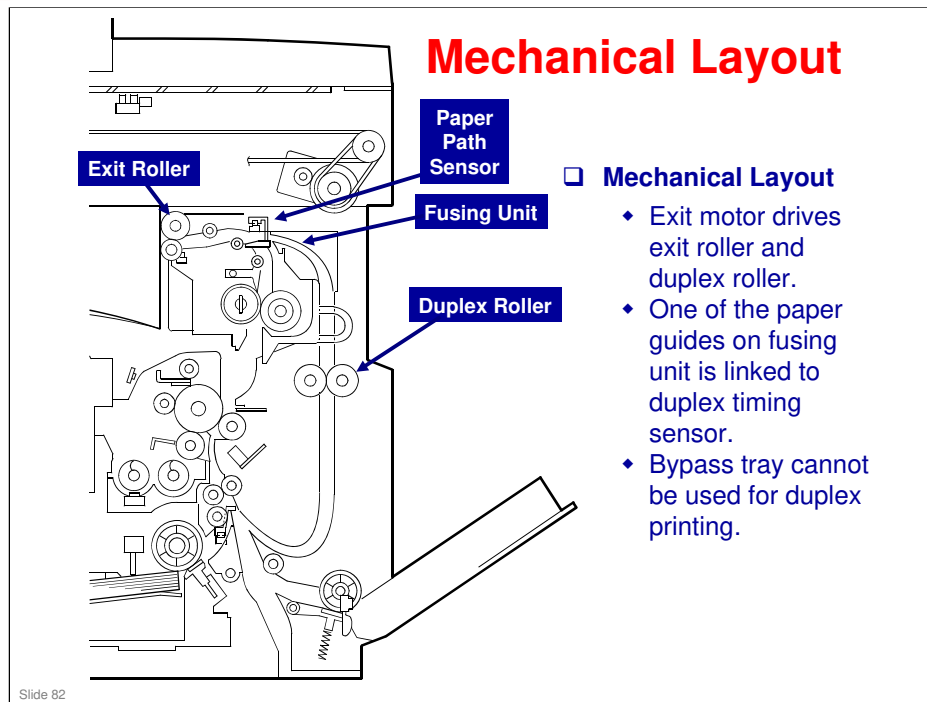
- ☐ The duplex unit will be covered.

In this section you will do these things:

- ☐ Examine the duplex print procedure.
- ☐ Examine the adjustments for the duplex unit.
- ☐ Learn the SP modes used in the duplex unit.

When you finish this section, you should know the answers to these questions:

- ☐ How is duplex printing done with this machine?
- ☐ What do I need to replace or adjust in the duplex unit?



Duplex Printing Process

- ❑ Read about duplex printing process in Duplex Unit of FSM.
- ❑ Examine function of following in duplex print process:
 - ◆ Main motor and exit motor
 - ◆ Hot roller and pressure roller
 - ◆ Duplex timing sensor
 - ◆ Exit roller
 - ◆ Duplex roller
 - ◆ Registration sensor
 - ◆ OPC drum

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Adjustment/SP Modes

□ SP Modes: Examine these SP modes in the FSM:

- ◆ SP 1001: Leading edge registration
- ◆ SP 1002: Side to side registration
- ◆ SP 1003: Paper feed timing
- ◆ SP 2301: Transfer current timing
- ◆ SP 7504 60: Registration duplex: Off
- ◆ SP 7504 123: Duplex inverter: Off
- ◆ SP 7504 125: Duplex inverter: On

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RICOH

**D115/D116
Service Training****ARDF (B872)**

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In this section you will do these things:

- ☐ Examine the mechanical layout for the ARDF.
- ☐ Examine the feed process.
- ☐ Review the replacement and adjustment procedures.

When you finish this section, you should know the answers to these questions:

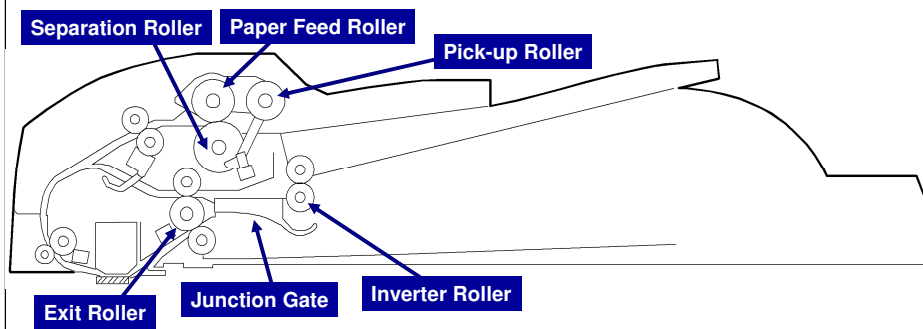
- ☐ Are the optics fixed or do they move for original scanning?
- ☐ What paper sizes can the ARDF handle?

Specifications

- ☐ **Paper sizes:**
 - ◆ A4 SEF, A5 SEF
 - ◆ 8½" x 5½" SEF, 8½" x 14" SEF
- ☐ **Paper weight: 52-105 g/m² (14-28 lb)**
- ☐ **Tray Capacity: 50 sheets (80 g/m², 21 lb)**
- ☐ **Transport: Roller transport**
- ☐ **Feed order: Top first**
- ☐ **Separation: FRR (Feed and Reverse Roller)**
- ☐ **Original transport: Roller transport**
- ☐ **Reproduction range: 50-200%**
- ☐ **Power source: 24 and 5 Vdc from the copier**

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Mechanical Layout

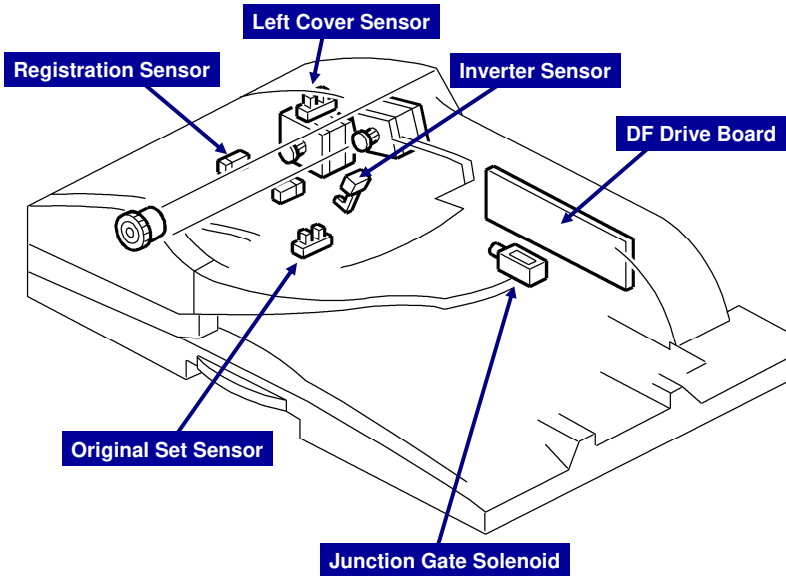


□ Mechanical Layout

- ◆ This slide shows some of components for ARDF.

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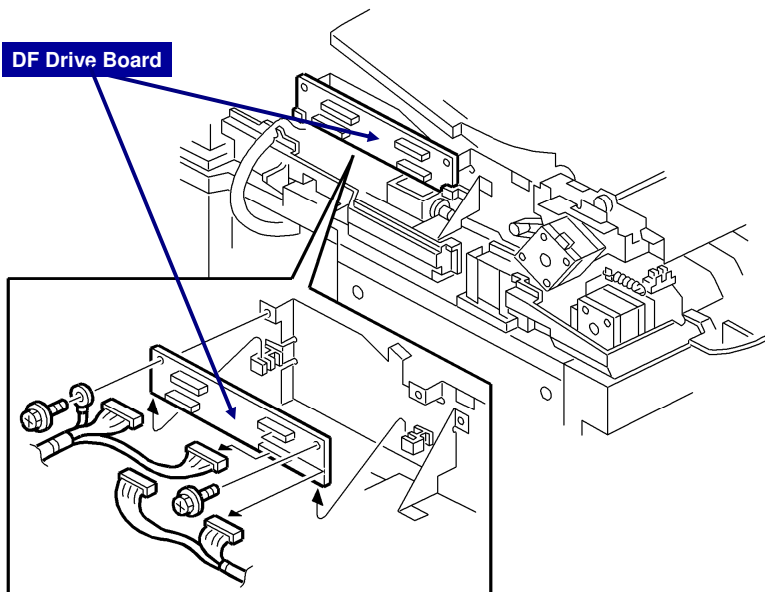
Electrical Component Layout - 1



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Electrical Component Layout-2

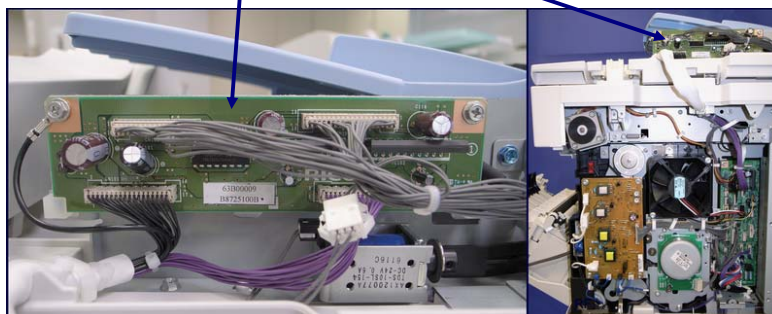
DF Drive Board



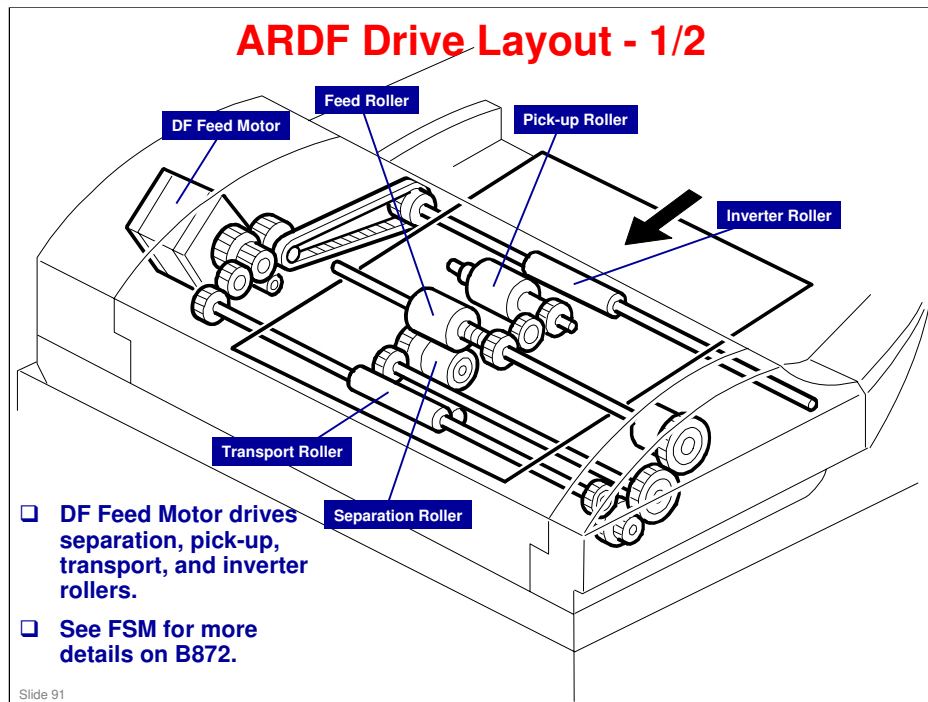
Slide 89

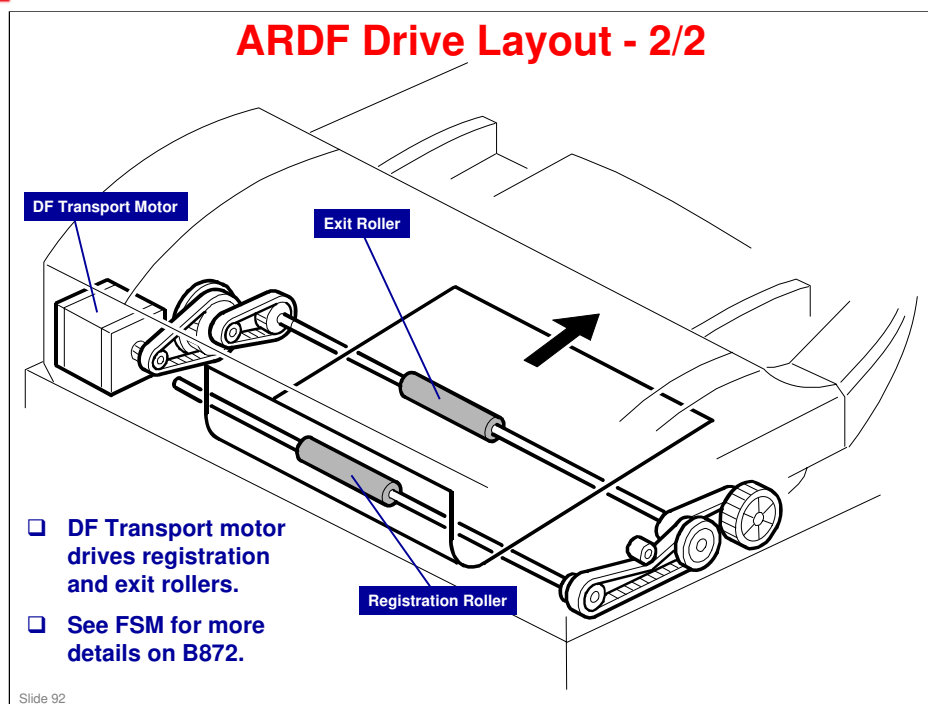
Electrical Component Layout - 3

DF Drive Board

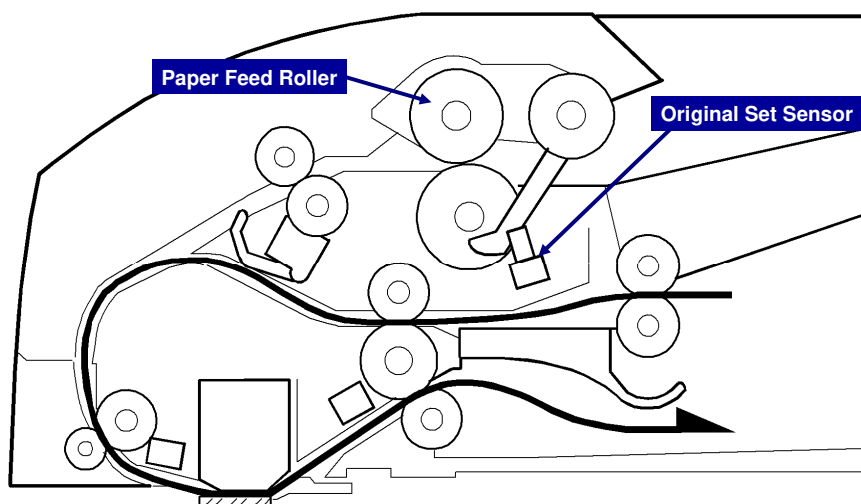


Slide 90





Paper Transport - Pick up and Feed



□ Original Size Detection

- ◆ Original pushes down feeler of original set sensor when original is placed on feeder table.
- ◆ ARDF does not detect paper sizes.

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Paper Transport Pickup and Separation

❑ Separation:

- ◆ ARDF uses FRR (feed & reverse roller) system.
- ◆ DF-Feed Motor drives DF pickup roller, DF feed roller, DF separation roller, and transport roller.
- ◆ Pickup roller drives top sheet(s) between feed and separation roller, where top sheet is separated and fed to transport rollers.

❑ Clutch Operation:

- ◆ DF feed clutch stops feeding when original is fed to inverter tray in double-sided mode. If DF feed clutch didn't stop pick-up, feed, and separation rollers in double-sided mode, next original would be fed while first original was at inverter tray and an original jam would occur.

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Paper Transport - Two-sided Originals

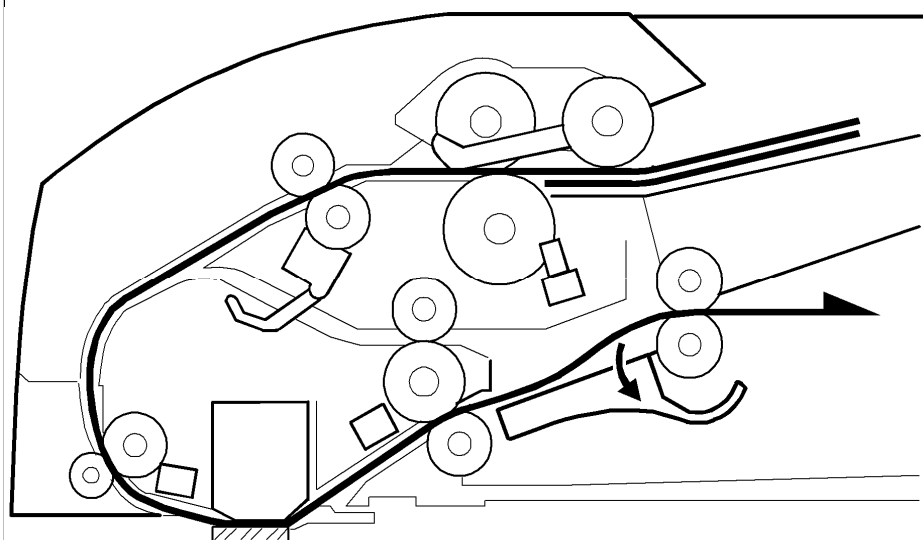
□ Two-sided Transport Details

- ◆ After original has been fed to registration sensor by transport roller, DF feed motor briefly stops.
- ◆ After scanner moves to DF scan position, front side of original is scanned.
- ◆ When exit sensor detects leading edge of original, junction gate solenoid is activated, opening junction gate.
- ◆ Original is then transported towards inverter table.
- ◆ After trailing edge of original passes exit sensor, junction gate solenoid switches off and junction gate is closed.
- ◆ Following feeding of original onto inverter table, feed and transport motors stop.
- ◆ Feed motor rotates in reverse and original is fed to exit roller by inverter roller.
- ◆ Feed motor stops briefly to adjust original skew. After adjusting, original is fed again by exit roller and registration roller to the scanning area (where reverse side will be scanned).
- ◆ Original is then sent to inverter table again to be turned over, enabling duplex output to be properly stacked front side down in exit tray.

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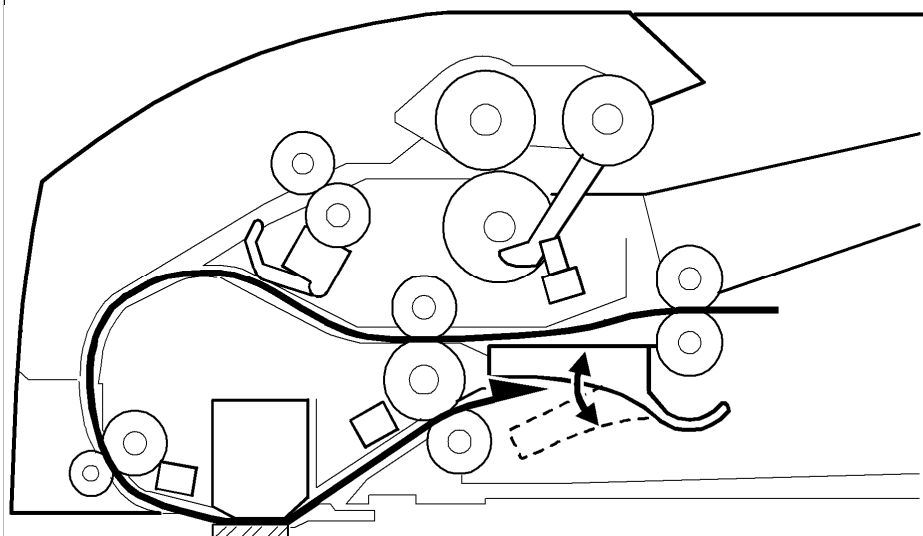
See ARDF illustrations on following pages.

Paper Transport - Two-sided Originals - 1/3

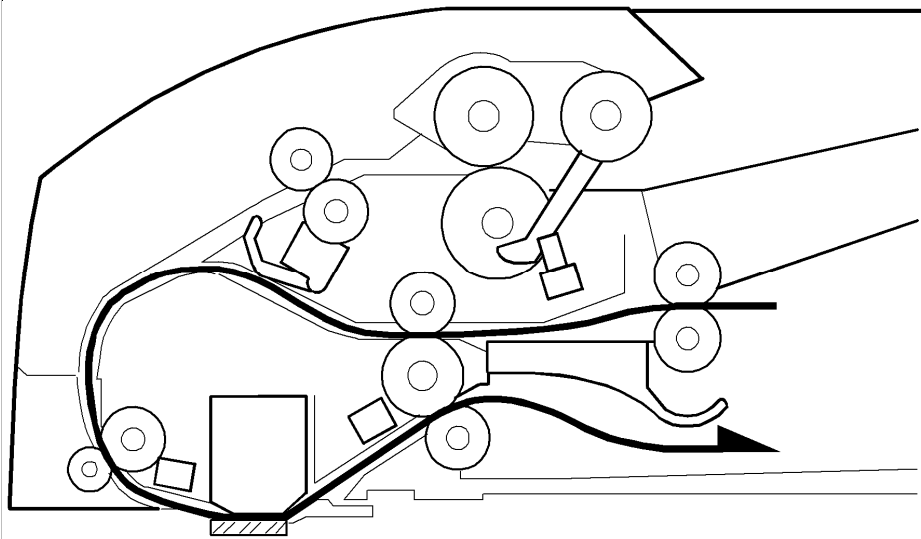


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Paper Transport - Two-sided Originals - 2/3



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Paper Transport - Two-sided Originals - 3/3

Slide 98

Replacement and Adjustment

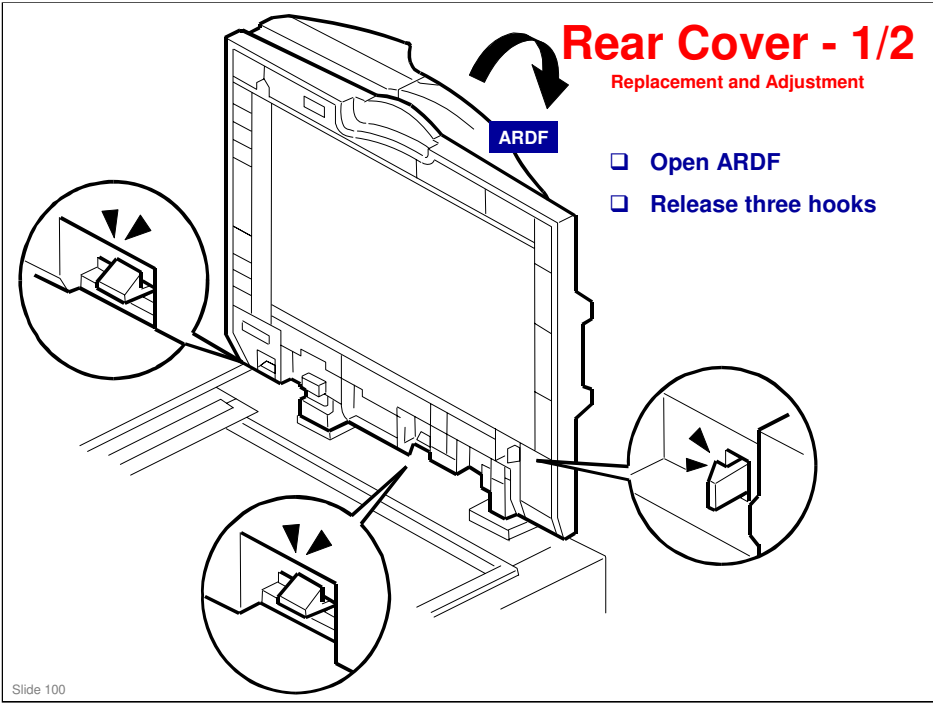
❑ Before you start:

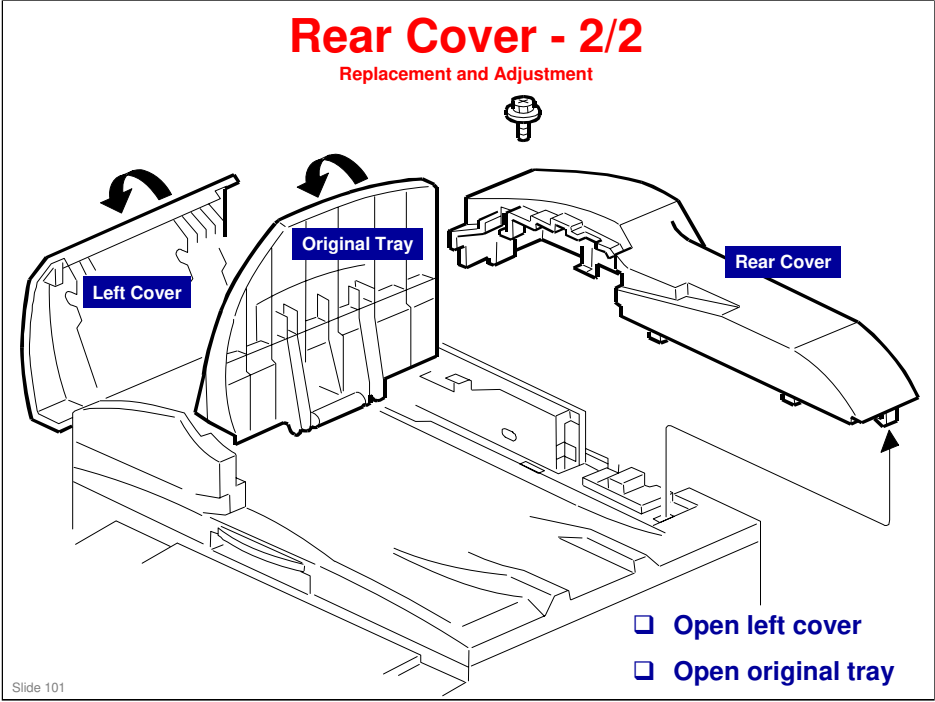
- ◆ Remove exterior cover and original table. (See Replacement and Adjustment section of ARDF (B872) FSM)

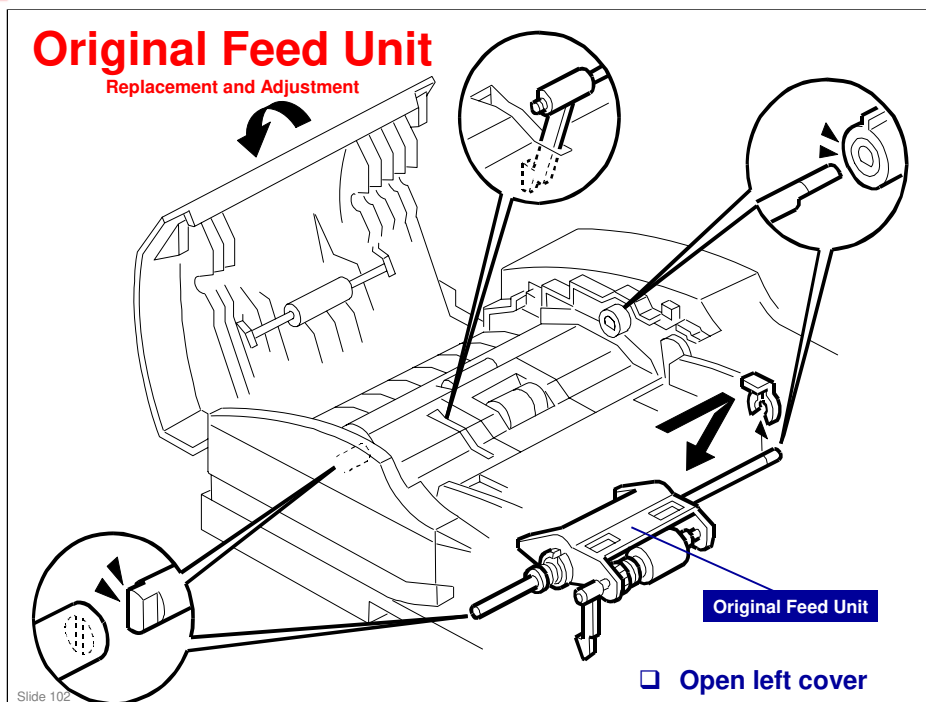
❑ Practice removal procedures for the following as outlined in FSM

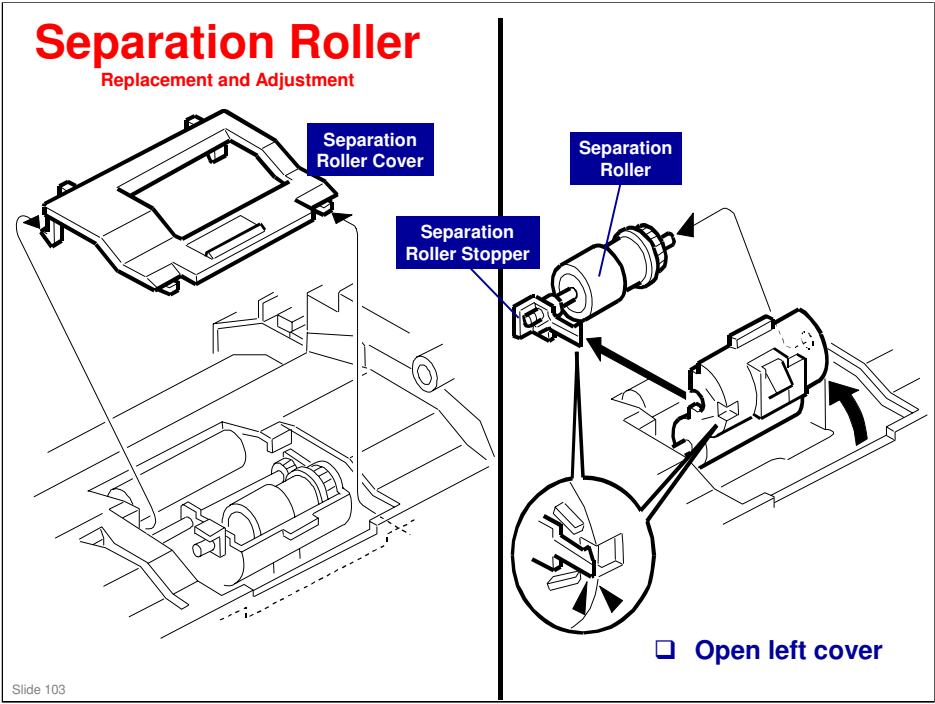
- ◆ Pick-up roller
- ◆ Paper feed roller
- ◆ Separation roller
- ◆ DF feed motor
- ◆ DF feed clutch
- ◆ Sensors
- ◆ DF drive board

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SP Modes and SC Codes

- ❑ **These SP modes are used for the ARDF:**
 - ◆ SP 6006 1: Side to side/front registration
 - ◆ SP 6006 2: Leading registration
 - ◆ SP 6006 3: Trailing erase
 - ◆ SP 6006 5: Sub-scan magnification
 - ◆ SP 6009 1: ARDF free run in duplex mode
 - ◆ SP 6009 3: ARDF free run in simplex mode
 - ◆ SP 6910 1: ARDF shading time
- ❑ **These SC codes are for the ARDF. They are all level “B” error codes:**
 - ◆ SC 760: DF gate error 1
 - ◆ SC 761: DF gate abnormal 2
 - ◆ SC 762: DF gate abnormal 3
- ❑ **Do the above SP modes if you are unfamiliar with them.**

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Preventive Maintenance

- ☐ **These need to be replaced at PM interval 90K:**
 - ◆ Separation roller
 - ◆ Pick-up roller
 - ◆ Feed roller
- ☐ **Clean remaining parts when necessary.**

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Paper Tray Unit (D567)

- ☐ The optional paper tray unit will be discussed.

In this section you will do these things:

- ☐ Examine the mechanical layout for the paper tray unit.
- ☐ Examine drive and paper lift.
- ☐ Learn how the paper tray unit detects the paper end.
- ☐ Replace the friction pad and feed roller.

When you finish this section, you should know the answers to these questions:

- ☐ What feed mechanism does the paper tray unit use?
- ☐ How is the paper end detected?
- ☐ Which components will I need to replace?

Overview

- ❑ Paper tray unit is an option for this machine.
- ❑ Paper tray unit uses standard mechanisms for these:
 - ◆ Paper feed (friction pad method)
 - ◆ Paper lift (springs)
 - ◆ Paper end detection (feeler method)
- ❑ Paper tray unit does not have any mechanism to detect paper size. If you want to change paper size, you must set new paper size in machine memory with a user tool. This will prevent timing jams.

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Specifications

☐ **Paper sizes:**

- ◆ A4 SEF
- ◆ 8½" x 11" SEF
- ◆ 8½" x 13" SEF
- ◆ 8½" x 14" SEF

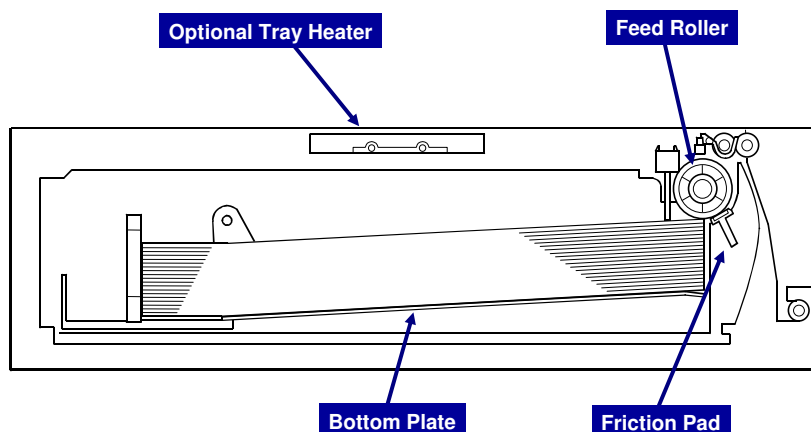
☐ **Paper weight: 60-90 g/m² (16-24 lb)**

☐ **Tray Capacity: 500 sheets**

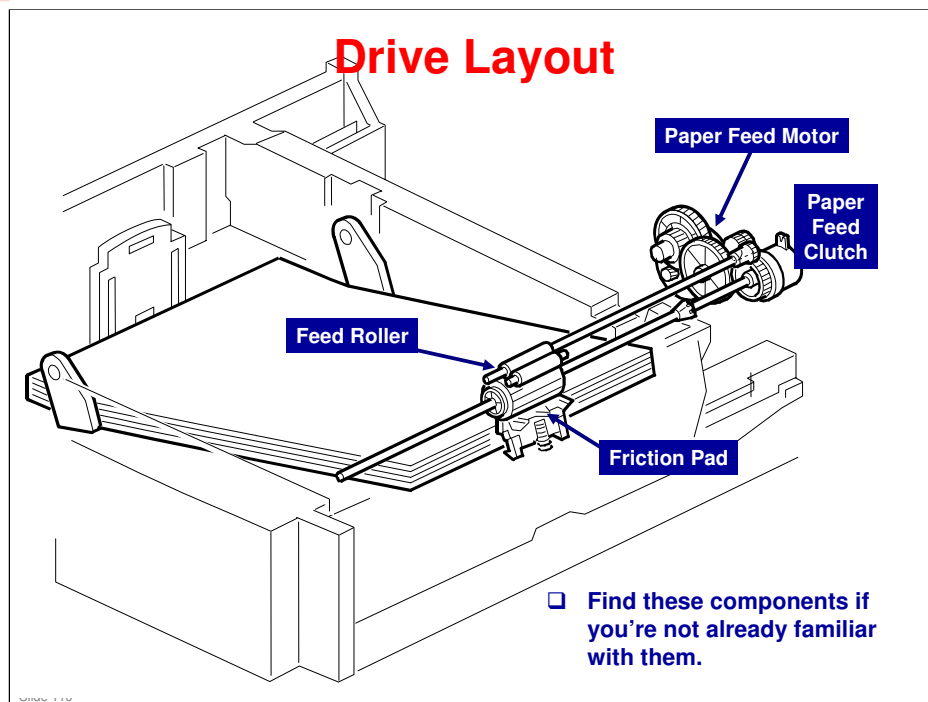
☐ **Paper feed system: Feed roller and friction pad**

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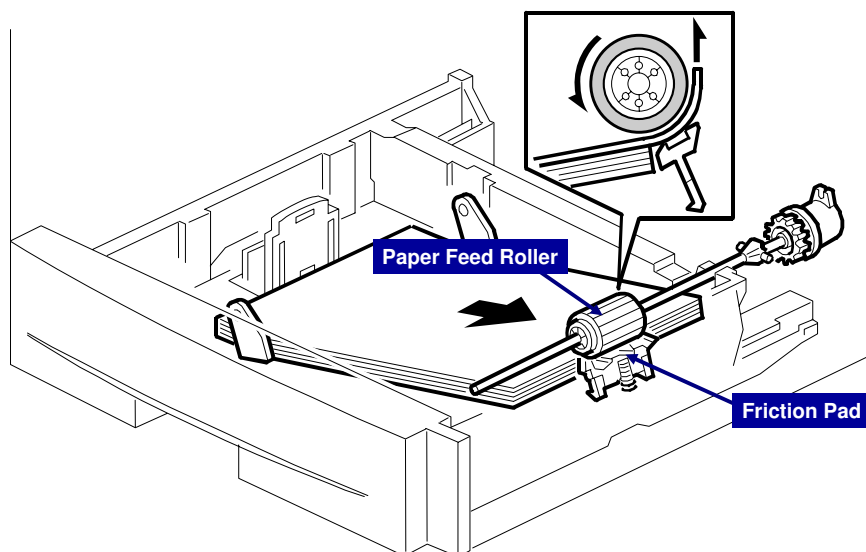
Mechanical Component Layout



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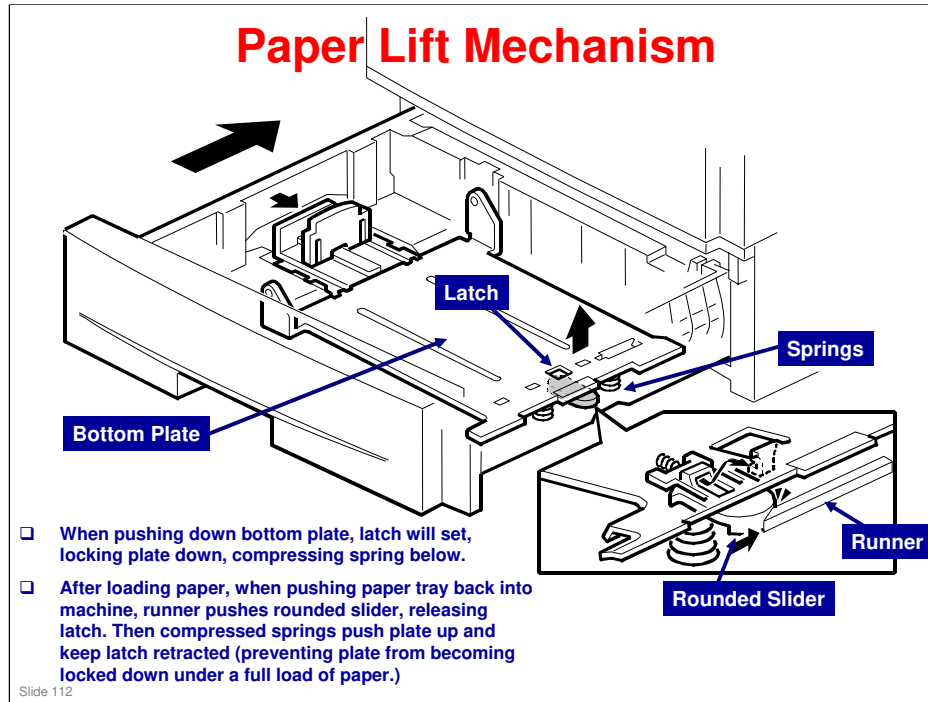


Paper Feed and Separation

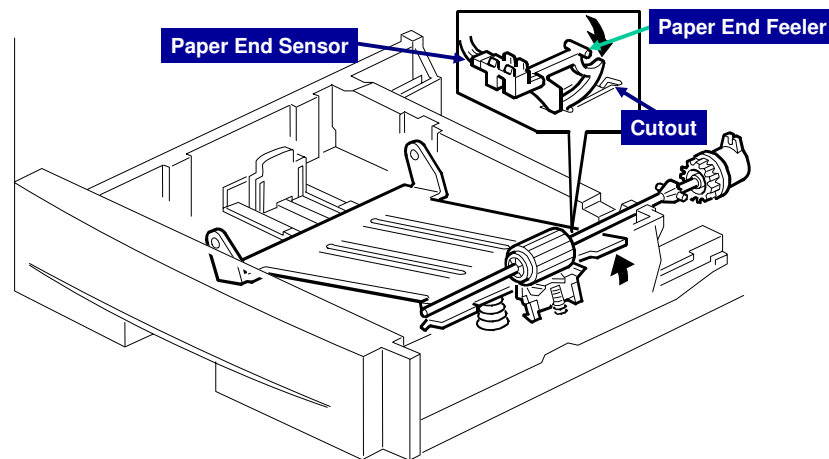


- Find these components if you're not already familiar with them.

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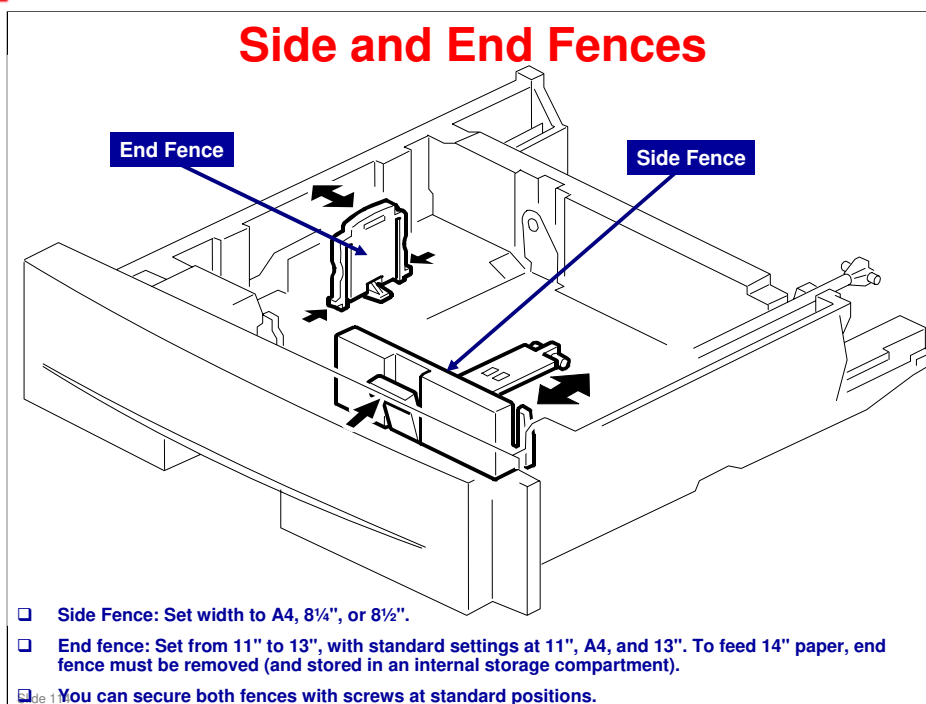
Paper End Detection



- ❑ If there is paper in tray, feeler will push up and sense this. If there is no paper in tray, feeler drops in the cutout and activates sensor.
- ❑ Feeler is rounded and moves when tray is pushed in or out, preventing feeler from getting caught in tray.

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Side and End Fences



Replacement and Adjustment

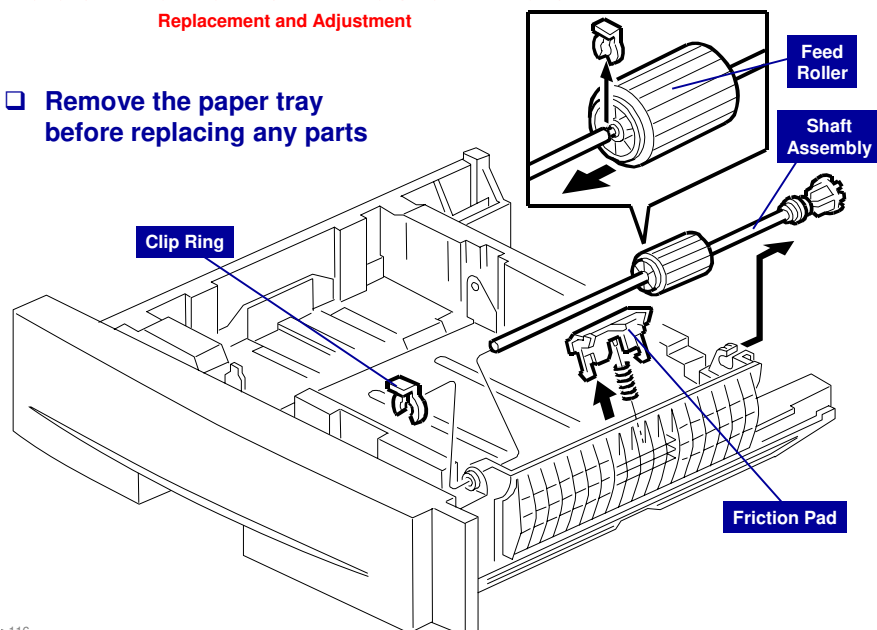
- ❑ **Examine how to remove paper tray unit from machine before you do replacement procedures. (Read Paper Tray Unit section of FSM.)**
- ❑ **You will usually have to replace these (PM interval every 120K) in the field due to normal wear and tear. Practice these removal procedures:**
 - ◆ Feed roller and friction pad
 - ◆ Sensors
 - ◆ Drive block
 - ◆ Paper feed motor
 - ◆ Paper feed clutch
 - ◆ Tray main board
 - ◆ Clean the bottom plate when necessary

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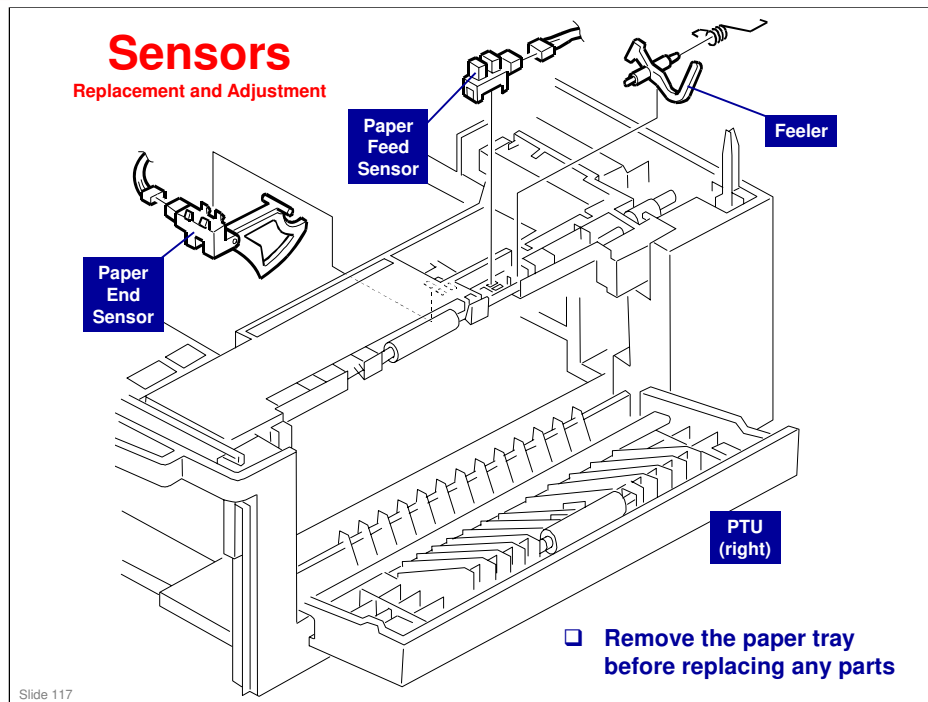
Feed Roller & Friction Pad

Replacement and Adjustment

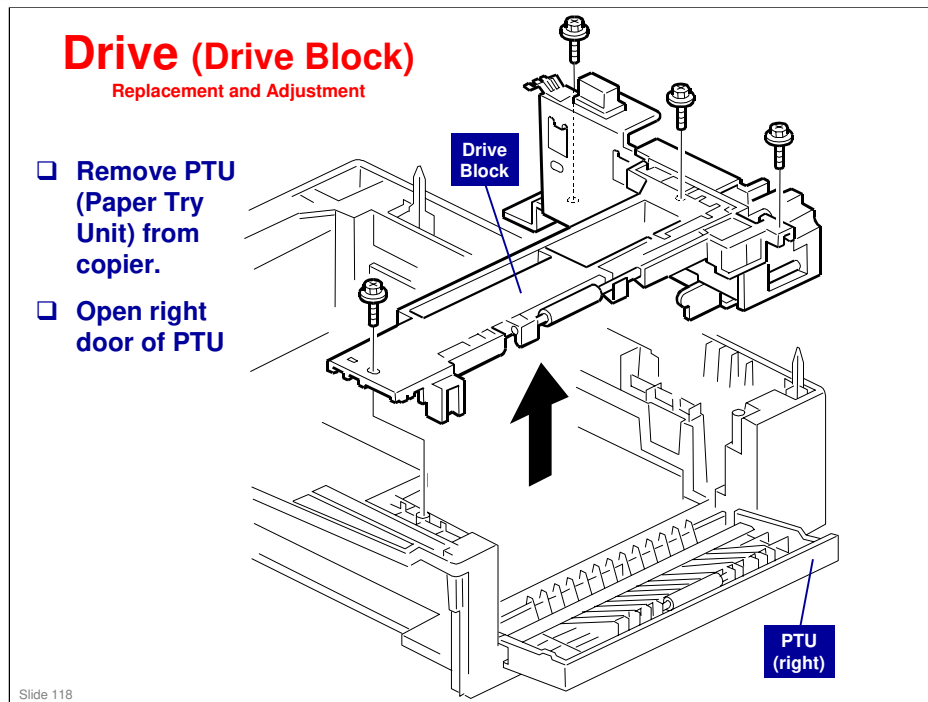
- ❑ Remove the paper tray before replacing any parts



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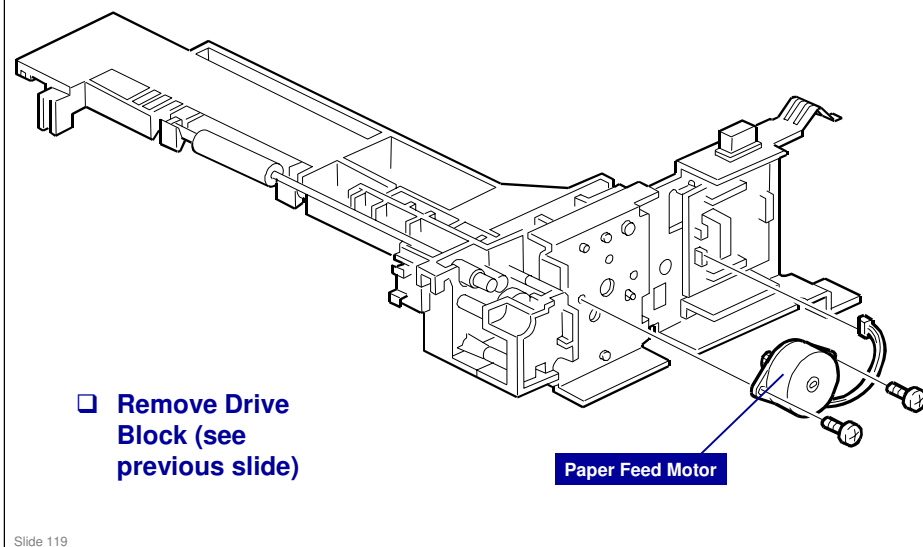
PTU - Paper Tray Unit

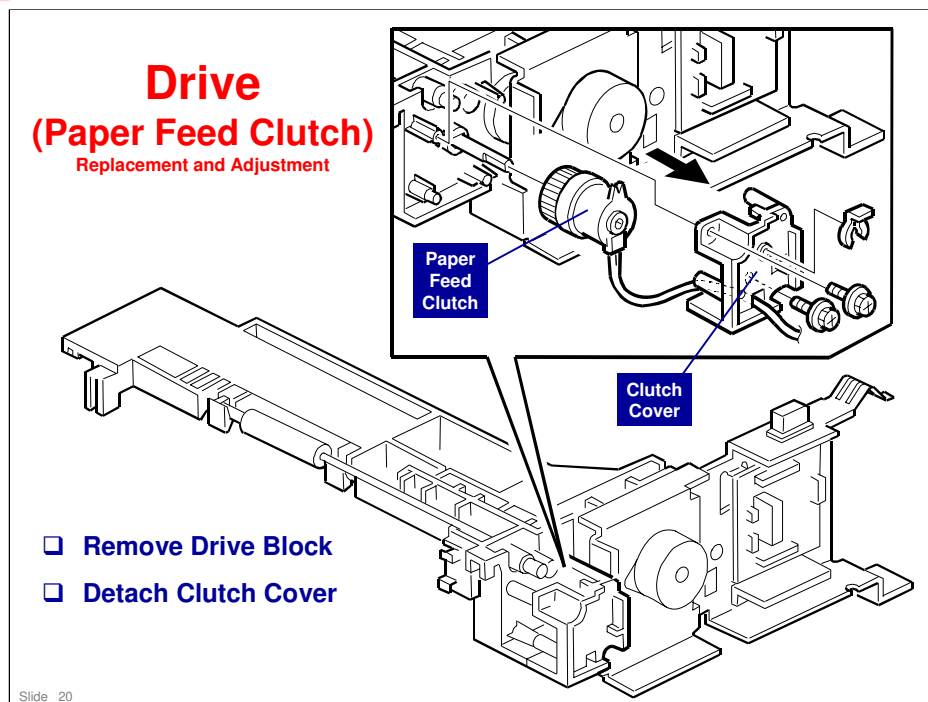


PTU - Paper Tray Unit

Drive (Paper Feed Motor)

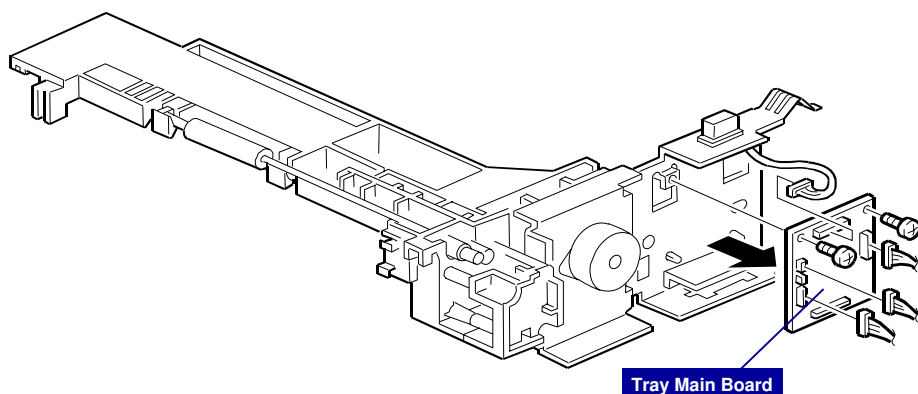
Replacement and Adjustment





Drive (Tray Main Board)

Replacement and Adjustment



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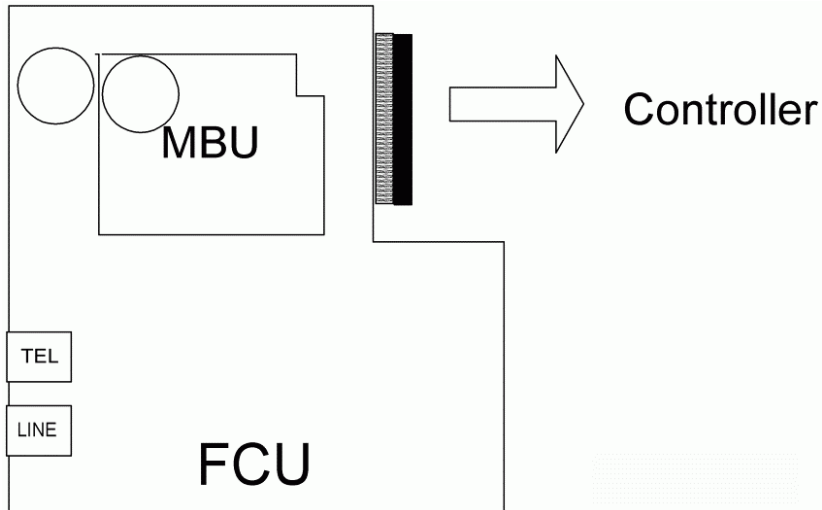
RICOH

**D115/D116
Service Training**

Fax Unit

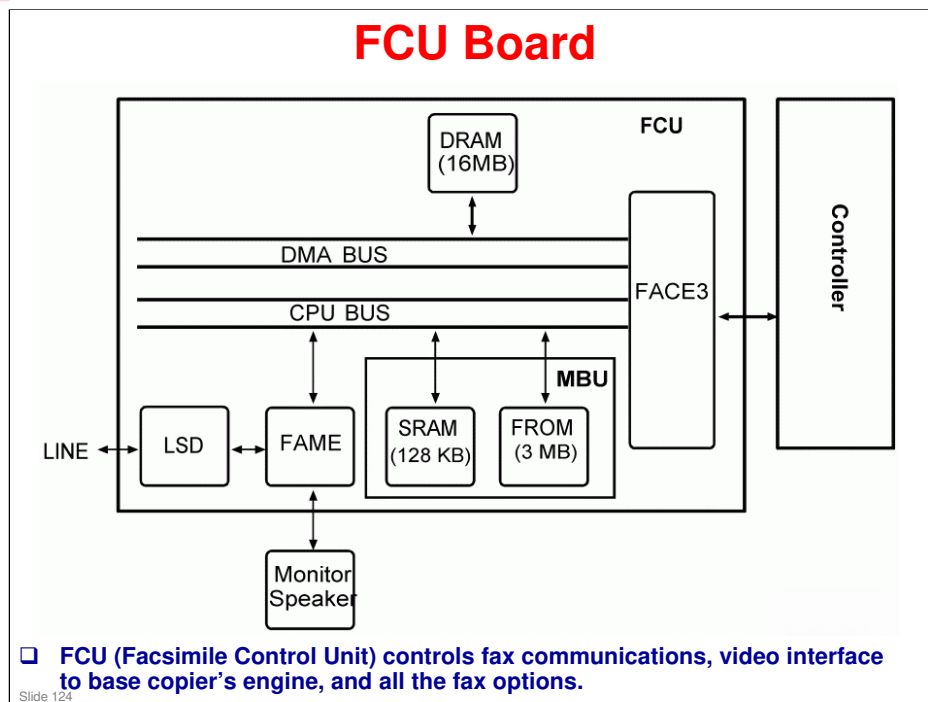
Slide 122

Fax Unit - Overview



- ❑ Basic fax unit consists of two PCBs: one FCU and one MBU.
- ❑ FCU controls all fax communications and fax features (together with controller board). MBU contains ROM and SRAM. Also, FCU has an NCU circuit.

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FCU Details - 1/2

- ❑ **FCU (Facsimile Control Unit)** controls fax communications, video interface to base copier's engine, and all fax options.
- ❑ **FACE3 (Fax Application Control Engine)**
 - ◆ CPU
 - ◆ (DCR) Data Compression and Reconstruction
 - ◆ DMA control
 - ◆ Clock generation
 - ◆ DRAM backup control
- ❑ **Modem (FAME)**
 - ◆ V.34, V33, V17, V.29, V.27ter, V.21, and V.8
- ❑ **DRAM**
 - ◆ 16 MB of DRAM is shared as follows.
 - » SAF memory: 4MB
 - » Working memory: 4MB
 - » Page memory: 8MB
 - ◆ SAF memory is backed up by a rechargeable battery.
- ❑ **Memory Back-up**
 - ◆ Rechargeable battery backs up SAF memory (DRAM) for 12 hours.

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FCU Details - 2/2

- ❑ **MBU**
 - ◆ Flash ROM on this board contains FCU firmware, and SRAM contains system data and user parameters. Even if FCU is changed, system data and user parameters are kept on MBU board.
- ❑ **ROM**
 - ◆ 3MB flash ROMs for system software storage
- ❑ **SRAM (Static Random Access Memory)**
 - ◆ 128 KB SRAM for system and user parameter storage is backed up by lithium battery.
- ❑ **Memory Back-up**
 - ◆ Lithium battery backs up system parameters and programmed items in SRAM, in case base copier's main switch is turned off.
- ❑ **Switches**
 - ◆ SW1
 - » Switches SRAM backup battery on/off.

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Specifications - Fax

- ☐ **Type: Desktop type transceiver**
- ☐ **Circuit: PSTN, PBX**
- Original size:**
 - ☐ **Book (face down)**
 - ♦ Maximum length: 297 mm (11.7 inch)
 - ♦ Maximum width: 216 mm (8.5 inch)
 - ☐ **ADF (face up)**
 - ♦ Length: 128-1200 mm (5.0-47.2 inch)
 - ♦ Width: 105-297 mm (4.1-11.7 inch)
- ☐ **Transmission time: G3, 3 seconds at 28.8K bps**
- ☐ **Look in specifications section of fax manual pages for more details.**

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Specifications:

- ☐ The fax unit can scan at these resolutions:
 - 200 x 100 dpi (standard)
 - 200 x 200 dpi (detail)
 - 200 x 400 dpi (fine)

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**D115/D116
Service Training**

Preventive Maintenance

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Before You Start

- ☐ Make sure you understand all warnings and precautions before you service machine.
- ☐ Most parts have a PM interval of 90 K (PCU has a PM interval of 45 K).
- ☐ Some parts require cleaning only. You do not need to replace these parts.
- ☐ You must clear PM counter with SP 7804 after you do a PM schedule.
- ☐ Refer to:
 - ◆ Preventative maintenance section of FSM
 - ◆ How to clear the PM counter (SP 7804-1)

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Copy Image Adjustments - Overview

- ❑ **Copy image adjustments need to be done after doing the following:**
 - ◆ Memory all clear
 - ◆ Replacement of first or second scanner
 - ◆ Replacement of lens block
 - ◆ Replacement of polygon mirror
 - ◆ Replacement of paper tray

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Printing Adjustments

- ☐ **Leading edge registration:** Check this for each paper tray. Use SP 1001 and make sure registration is set to correct tolerance levels.
- ☐ **Side to side registration:** Use SP 1002 and make sure registration is set to correct tolerance levels.
- ☐ **Blank margin:** Adjust leading edge and left edge margins only if you could not correctly adjust registration.
- ☐ **Use SP 5902 to print test pattern to check adjustments.**
- ☐ **Blank margin**
- ☐ **Adjust margins in this order**
 - ◆ Trailing edge
 - ◆ Right edge
 - ◆ Leading edge
 - ◆ Left edge

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Scanning Adjustments

- ☐ Leading edge registration: Use SP 4010 for this adjustment.
- ☐ Sub-scan magnification: Use SP 4008 for this adjustment.
- ☐ Main scan magnification: Use SP 4009 for this adjustment.
- ☐ Scan Auto Adjustment - See Scan Auto Adjustment in the Preventive Maintenance chapter of the FSM.

- ☐ Do registration and blank margin adjustments for printing before scanner is adjusted. Use A4 test chart to perform all adjustments.

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**D115/D116
Service Training**

Troubleshooting

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Overview

- ❑ SC codes refer to hardware or firmware malfunctions of copy/print engine. SC codes are shown on LCD screen of operation panel.
- ❑ This machine has four levels of service call conditions. Make sure you note which codes can be cleared by user and which codes cannot be cleared by user.
- ❑ Examine these before you replace any component in the machine:
- ❑ If the problem is with circuit boards: Disconnect and then reconnect all connectors before you replace a circuit board.

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Sensor/Switch Open Errors

- ☐ **Examine Service Call Conditions in Troubleshooting Unit. This table explains symptoms machine will exhibit when a sensor or switched circuit is in an open condition.**
- ☐ **Open front or right door. Make sure "Close Front/Right Cover" message is indicated on screen.**
- ☐ **Do some open sensor examples from Troubleshooting unit. Use caution not to damage any connectors.**

Slide 135

Blown Fuse Conditions

- ☐ Read Blow Fuse Conditions section of Troubleshooting Unit of FSM. It shows what happens if a power supply board fuse burns out.
- ☐ Pull copy tray out and simulate a blown fuse condition.

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Machine Functions

□ **Do these practical assignments to learn more about how to troubleshoot machine:**

- ♦ Test patterns: Print several different test patterns indicated in the "Test Pattern Print (SP 5902-1)" section of Service Tables unit in FSM.
- ♦ Output check: Use output check mode to test operation of polygon motor, main motor, and fan motor.
- ♦ Free run
 - » Scanner, SP 4013
 - » Machine, SP 5802
 - » Printer, SP 5901
 - » ARDF, SP 6009

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Sensors and Switches

□ Practice these to learn how to troubleshoot sensors and switches:

- ◆ Input check: This lets you check condition of most sensors and switches in machine.
- ◆ ID sensor analysis (SP 2221) lets you check these:
 - » Vsg (displayed as Vg)
 - » Vsp (displayed as Vp)
 - » Power (displayed as PW. This is the power for the light source.)
 - » Vsdp (displayed as Vg-Vp. This value does not have any error conditions.)
 - » Vt

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End of Course

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