RICOH

RICOH

D067/D072/D068/D069
Service Training

Product Overview

S-C4

Slide 1

New slide about added features (slide #5) added 2009/01/20

Repaired broken links on "Fax Unit - Overview" and "FCU Board" slides. - December 2nd, 2008

New slides (#11, #12, & #13) added 2008/12/02

New slide (#8) added 2008/12/01

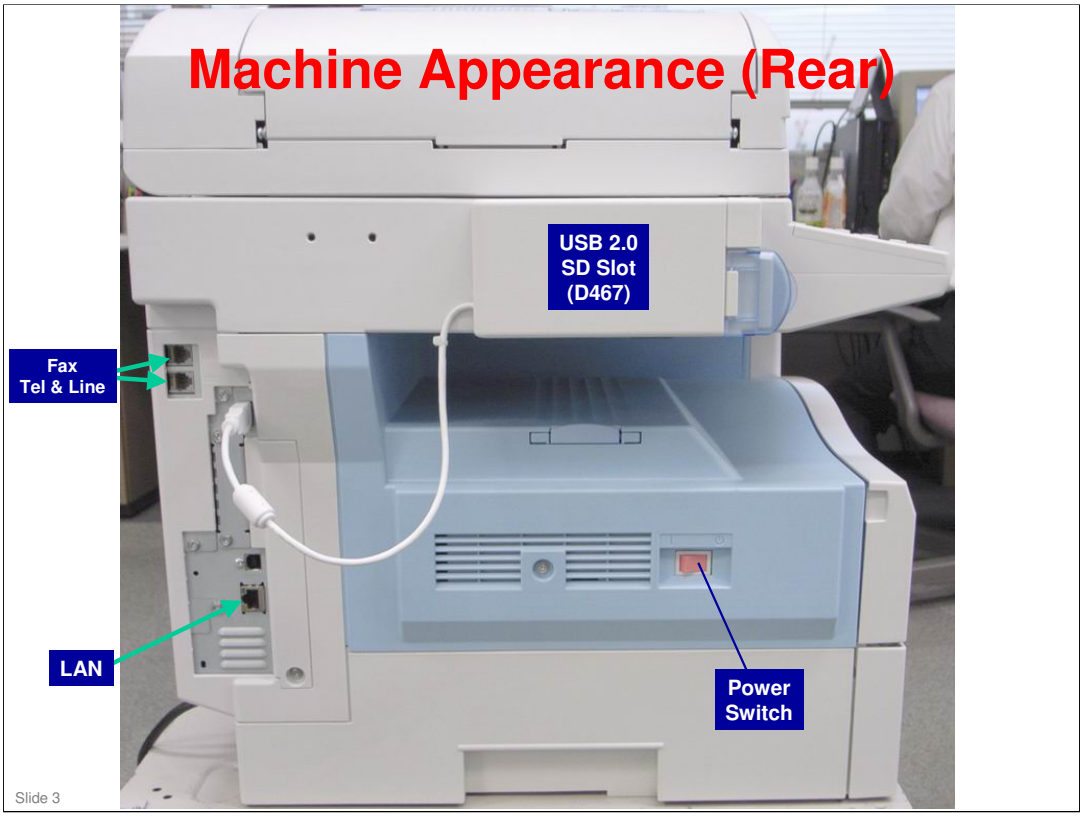
Final Version uploaded on November 28th, 2008

Presentation edited/compiled by:
Ron Faxon
ron.faxon@nts.ricoh.co.jp

Machine Appearance

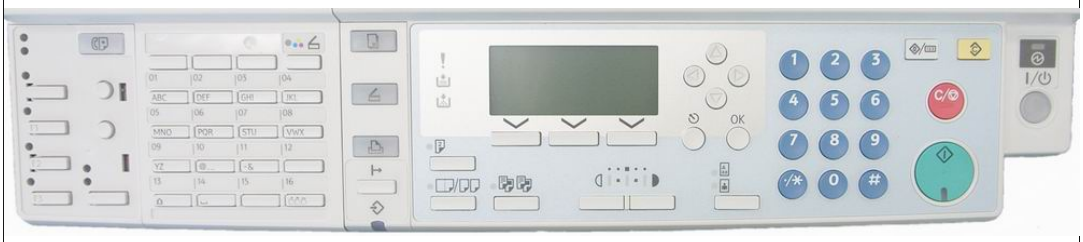
Slide 2

.


Machine Appearance (Rear)
USB 2.0
SD Slot
(D467)
Fax
Tel & Line
LAN
Power
Switch
Slide 3

.

Operation Panel



- FAX functions on left side of panel above are standard on D068 and D069 models.
- Printer/Scanner Option (D468) can be optionally added to other 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

- **Major technical enhancements**
  - Increased copy speed
    - » 16 to 17 cpm (printing from memory)
  - New design element
    - » Blue output tray
  - New options
    - » Accessibility Handle (for paper tray)
    - » Scan to SD/USB
    - » VM card
    - » HDD

Slide 5

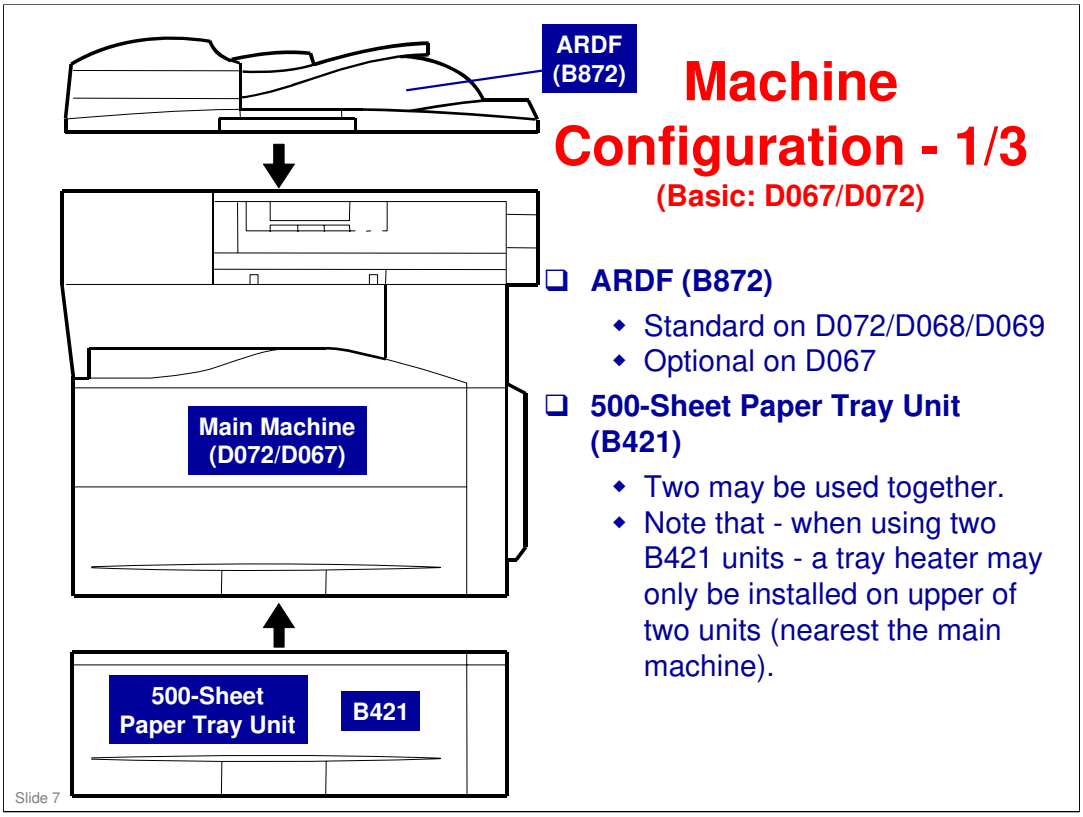
.

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

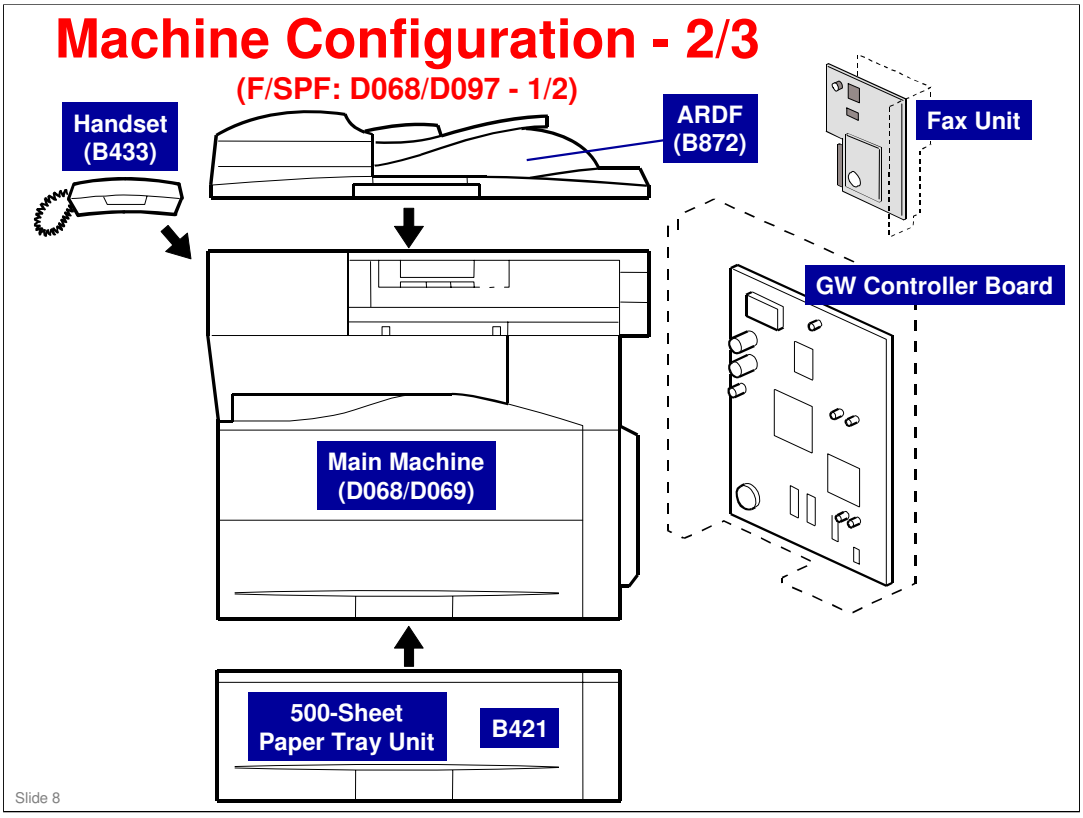
Slide 6

.



- **ARDF (B872)**
  - Standard on D072/D068/D069
  - Optional on D067
- **500-Sheet Paper Tray Unit (B421)**
  - Two may be used together.
  - Note that - when using two B421 units - a tray heater may only be installed on upper of two units (nearest the main machine).

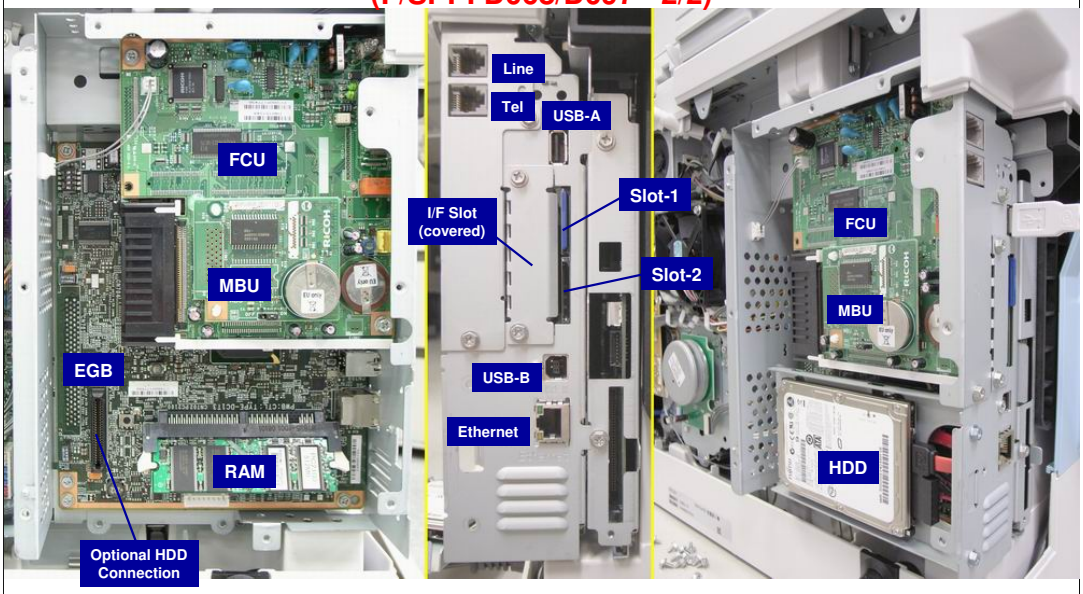
.


Machine Configuration - 2/3
(F/SPF: D068/D097 - 1/2)
Handset
(B433)
ARDF
(B872)
Fax Unit
GW Controller Board
Main Machine
(D068/D069)
500-Sheet
Paper Tray Unit
B421
Slide 8

.

Machine Configuration - 3/3

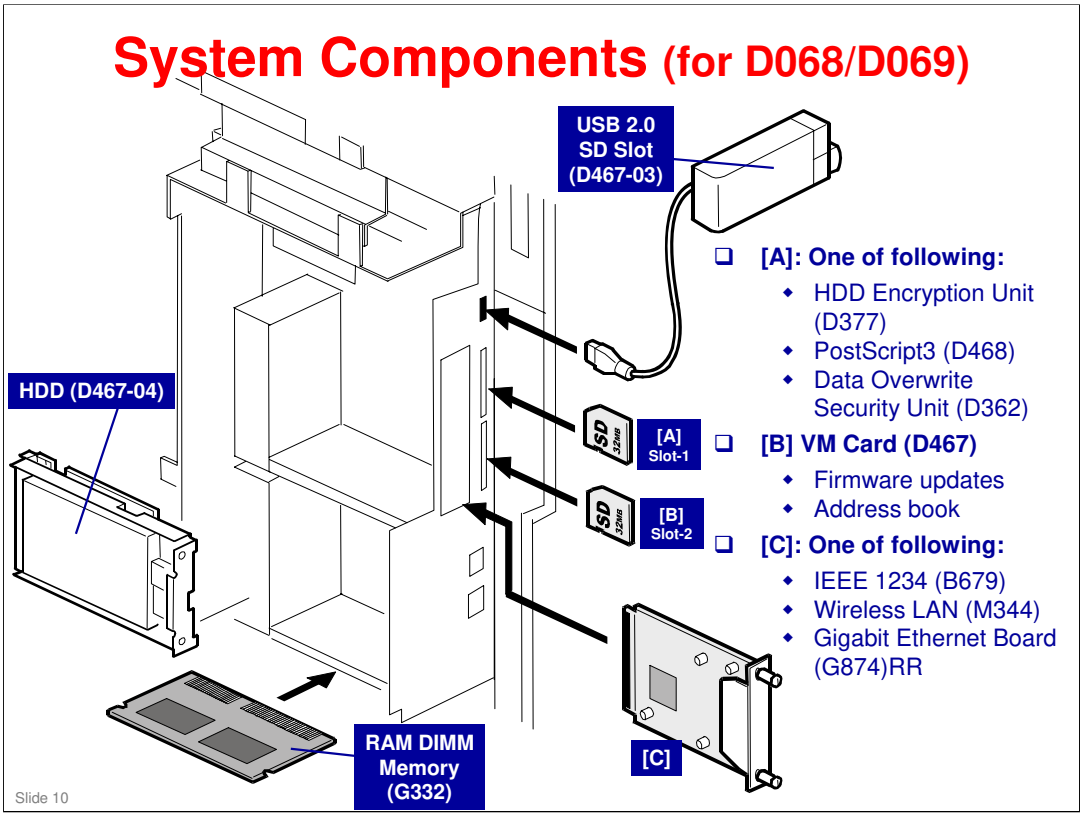
(F/SPF: D068/D097 - 2/2)



- 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

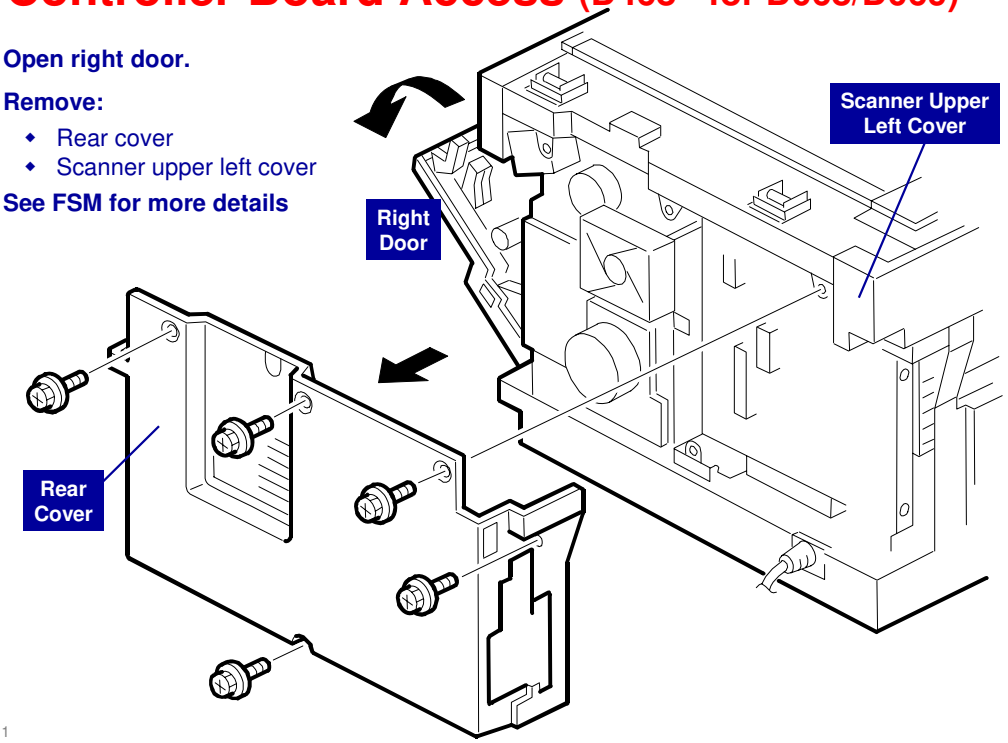
.



RAM DIMM memory distributed with the printer.

Controller Board Access (D468 - for D068/D069)

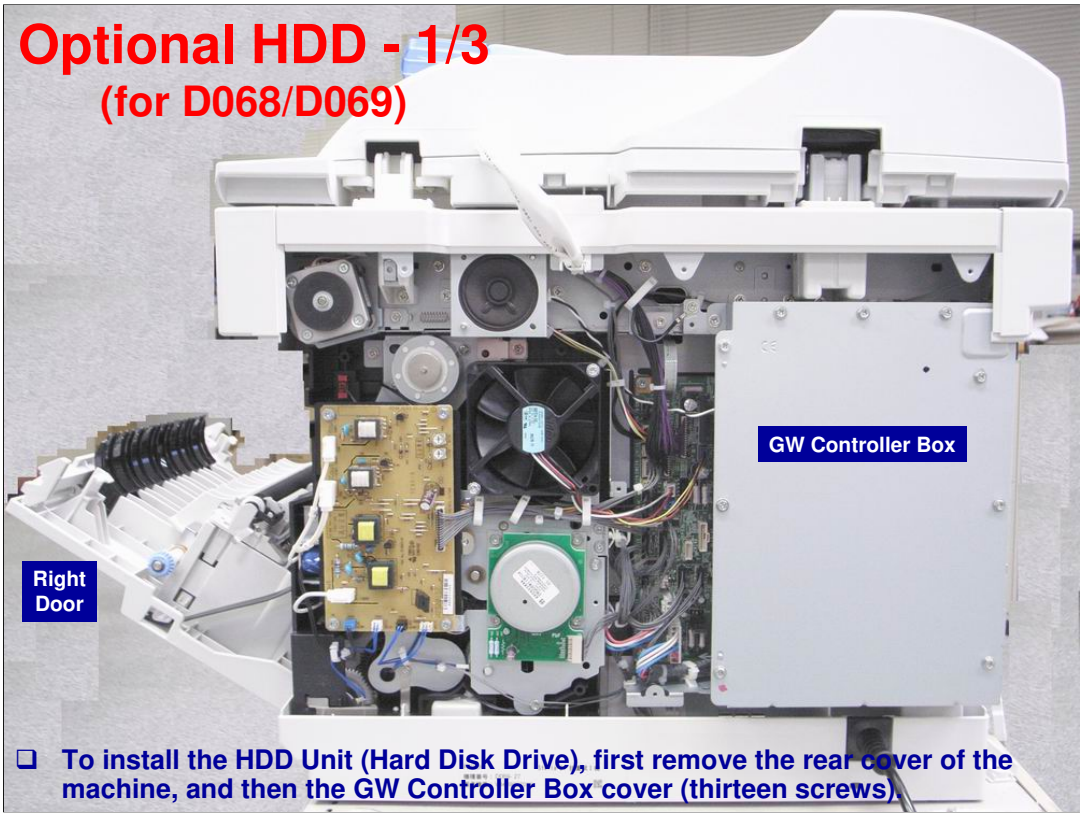
- Open right door.
- Remove:
  - Rear cover
  - Scanner upper left cover
- See FSM for more details



Slide 11

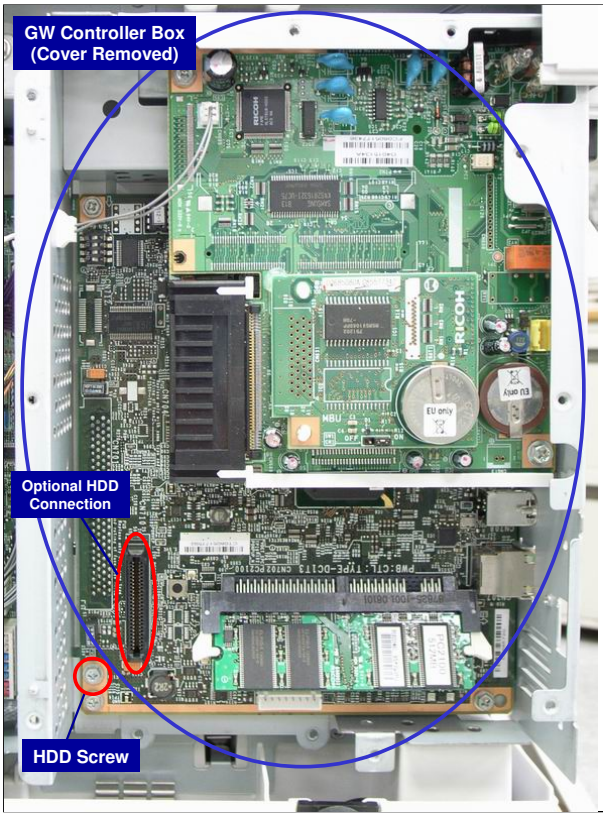
.

Optional HDD - 1/3
(for D068/D069)



- 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).

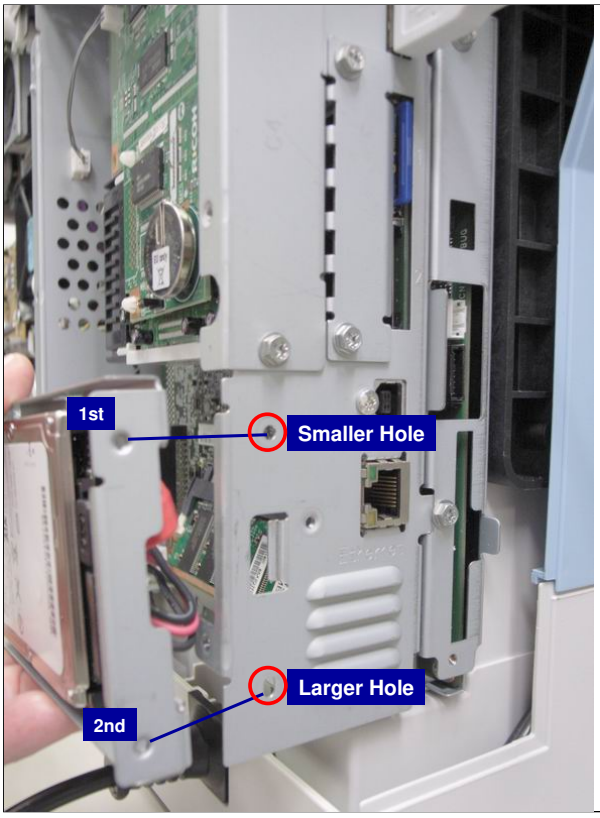
.



Optional HDD - 2/3
(for D068/D069)

- **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
(for D068/D069)

- **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.

.

RICOH

RICOH

D067/D072/D068/D069
Service Training

Specifications

Slide 15

General Specifications

- **Configuration: Desktop**
- **Copy Process: Laser scanning & electrophotographic printing**
- **Copy speed: 17 ppm**
  - A4 / 8 ½" x 11"; 100% (printing from memory)
- **Warm up: (basic) 10 seconds / (other) approx. 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**

Slide 16

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

Slide 17

RICOH

Machine Configuration - 1/2

- **There are four machines in this series - D067, D072, D068, & D069. Machine configuration varies depending on version.**
- **Examine four machine configurations in specifications section of FSM for more details, briefly:**
  - D067 - Basic
  - D072 - With ARDF (Basic + DF)
  - D068 - Fax Model (F)
  - D069 - Printer/Scanner and Fax Model (SPF)
- **Other connectivity options are also available (depending on machine version).**

Slide 18

Machine Configuration - 2/2

- D468-00/01 - Printer/Scanner Unit, Type 171
- D468-04/05/06 - PostScript-3 Unit, Type 171
- B872 - ARDF
- B421 - Paper Tray Unit
- D467-03 - USB-2.0/SD Slot - Type B (only for D069)
- D467-04 - HDD Option, Type 171
- D377-16 - HDD Encryption Unit, Type A
- D362-11 - Data Overwrite Security Unit, Type 1
- B446-83 - PCU (Photo Conductor Unit), Type 1515
- D461 - Accessibility Handle, Type C
- G874-01 - 1000 base-T

Slide 19


RICOH
D067/D072/D068/D069
Service Training
Installation
Slide 20

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.**

Slide 21

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.

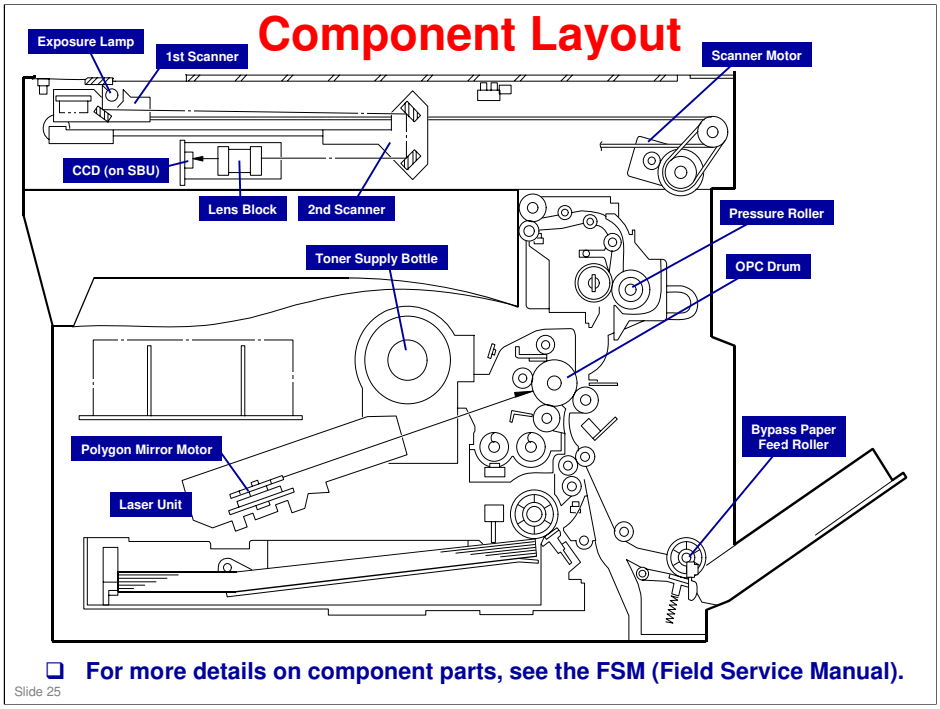
Slide 22

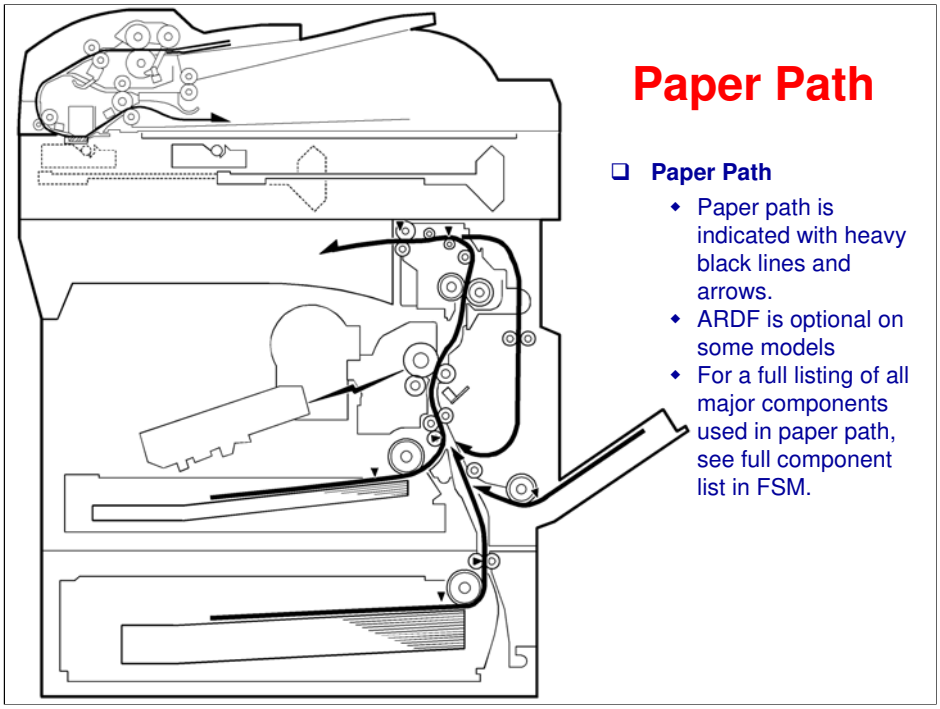
Service Program Mode

- **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


RICOH
D067/D072/D068/D069
Service Training
Machine Overview and Machine Operation
Slide 24

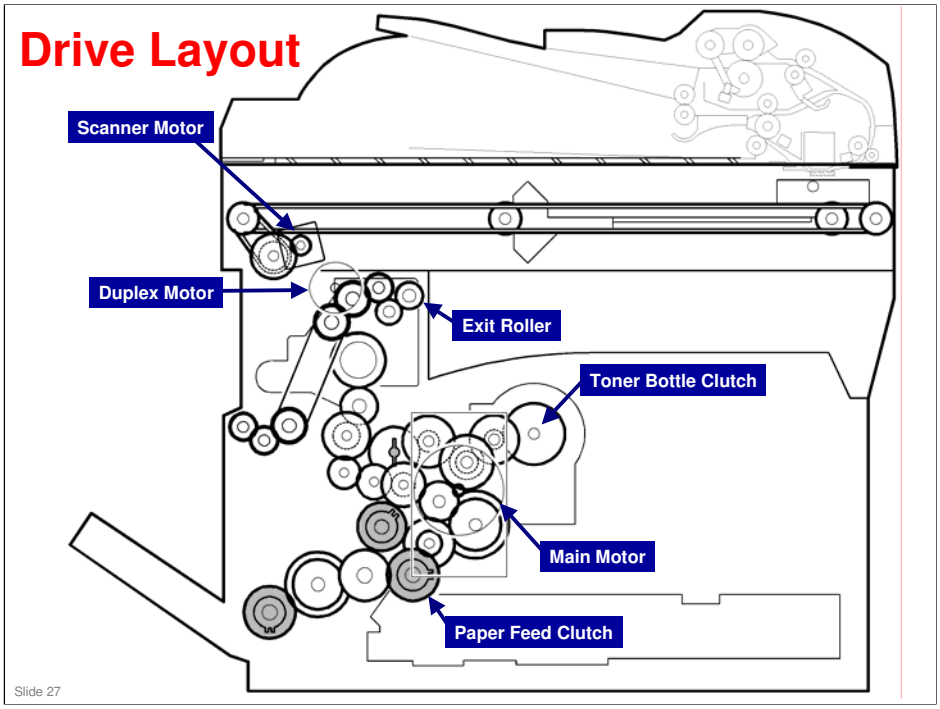

Component Layout
Exposure Lamp
1st Scanner
Scanner Motor
CCD (on SBU)
Lens Block
2nd Scanner
Pressure Roller
Toner Supply Bottle
OPC Drum
Bypass Paper Feed Roller
Polygon Mirror Motor
Laser Unit
❑ For more details on component parts, see the FSM (Field Service Manual).
Slide 25



Paper Path

- **Paper Path**
  - Paper path is indicated with heavy black lines and arrows.
  - ARDF is optional on some models
  - For a full listing of all major components used in paper path, see full component list in FSM.

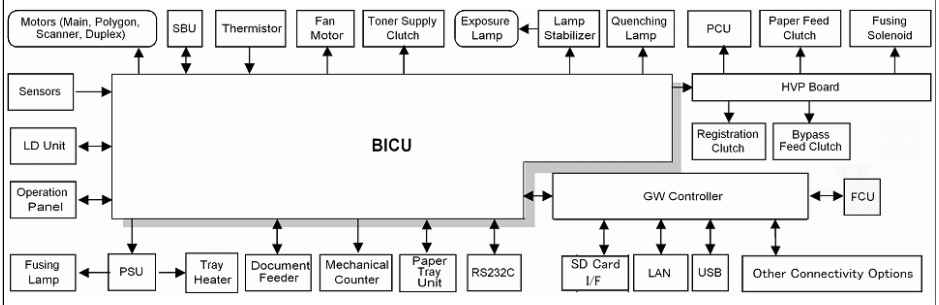
.



Drive Layout

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

Block Diagram

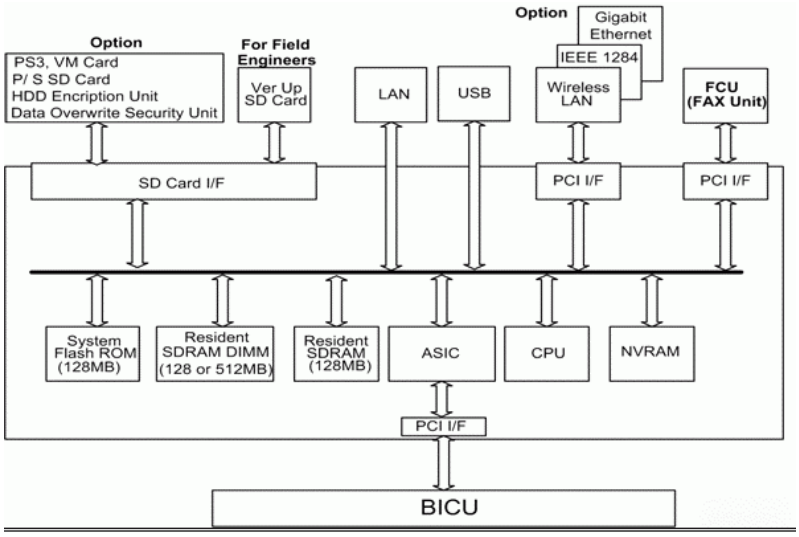


❑ **For additional details, refer to the FSM (Field Service Manual)**

Slide 28

.

Block Diagram (for GW Controller)



❑ **For additional details, refer to the FSM.**

Slide 29

.

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.**

Slide 30

RICOH

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**

Slide 31

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

Slide 32

RICOH

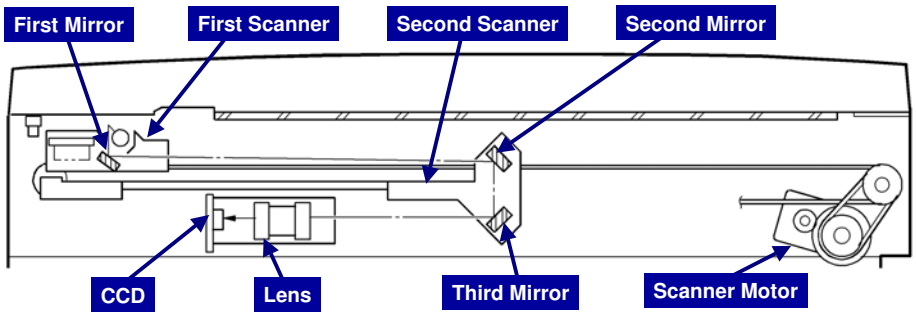
RICOH

D067/D072/D068/D069
Service Training

Scanning and Image Processing

Slide 33

Scanning - Overview



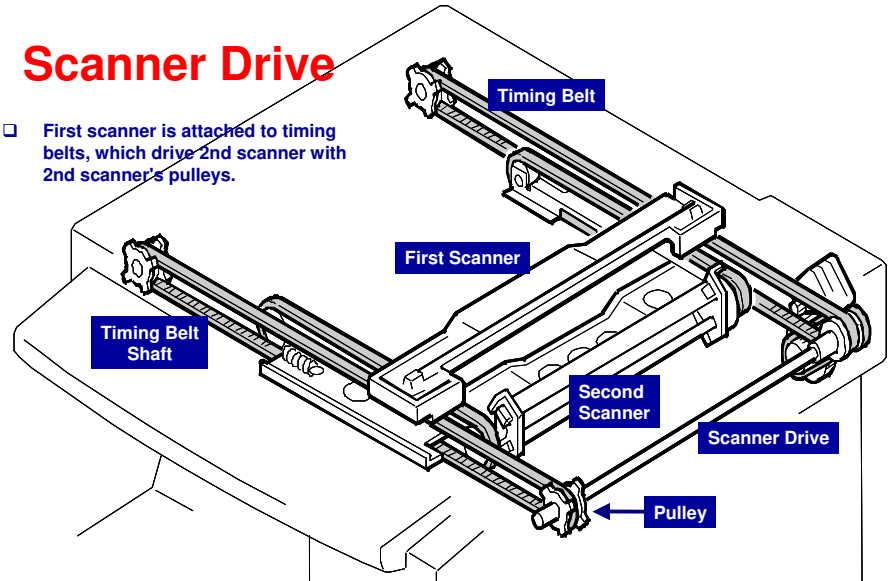
- HP sensor makes sure scanner is at home position.
- To copy, original is illuminated by xenon exposure lamp. Then 1st, 2nd, and 3rd mirrors move reflected light to lens block. After this, lens transmits it to CCD.
- 1st scanner has a reflector. This helps to not let shadows get on pasted originals.

Slide 34

.

Scanner Drive

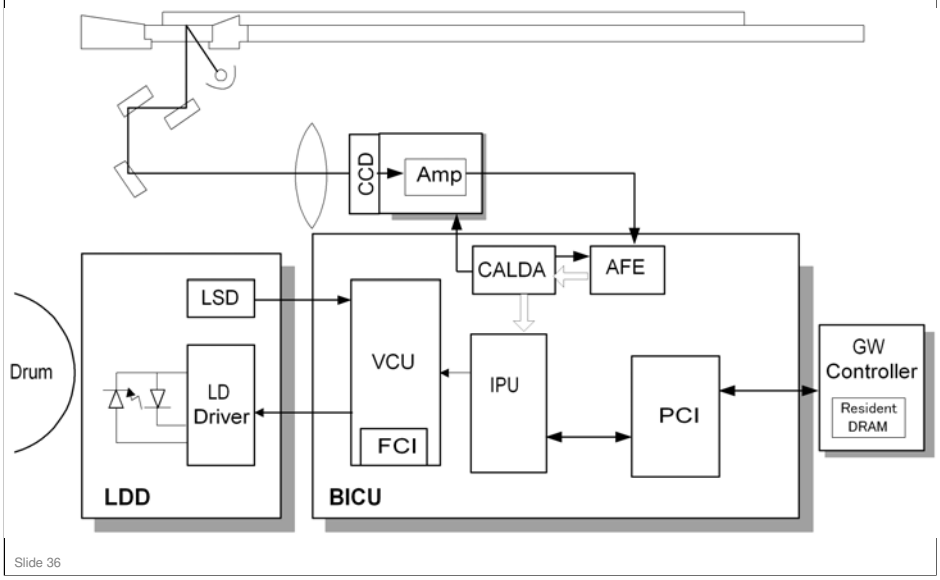
- First scanner is attached to timing belts, which drive 2nd scanner with 2nd scanner's pulleys.



- 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.

Slide 35

Image Processing - Overview



.

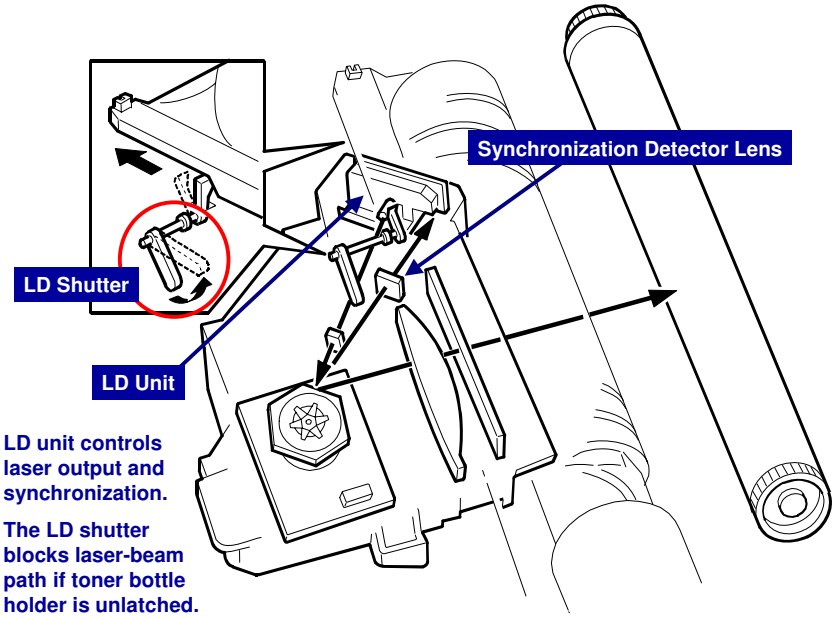
Image Processing - Overview

- **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**

Slide 37


RICOH
D067/D072/D068/D069
Service Training
Laser Exposure and PCU
Slide 38

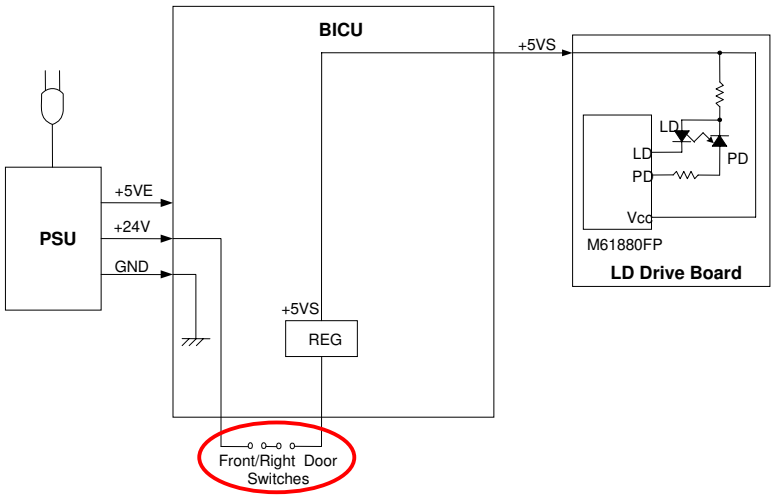
Laser Unit Overview



- LD unit controls laser output and synchronization.
- The LD shutter blocks laser-beam path if toner bottle holder is unlatched.

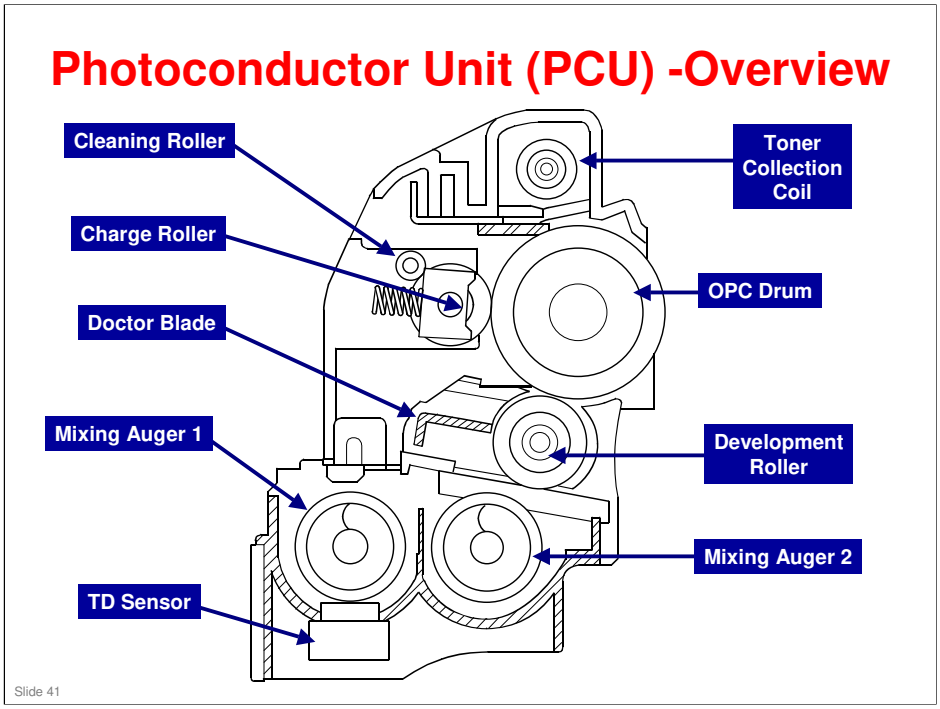
Slide 39

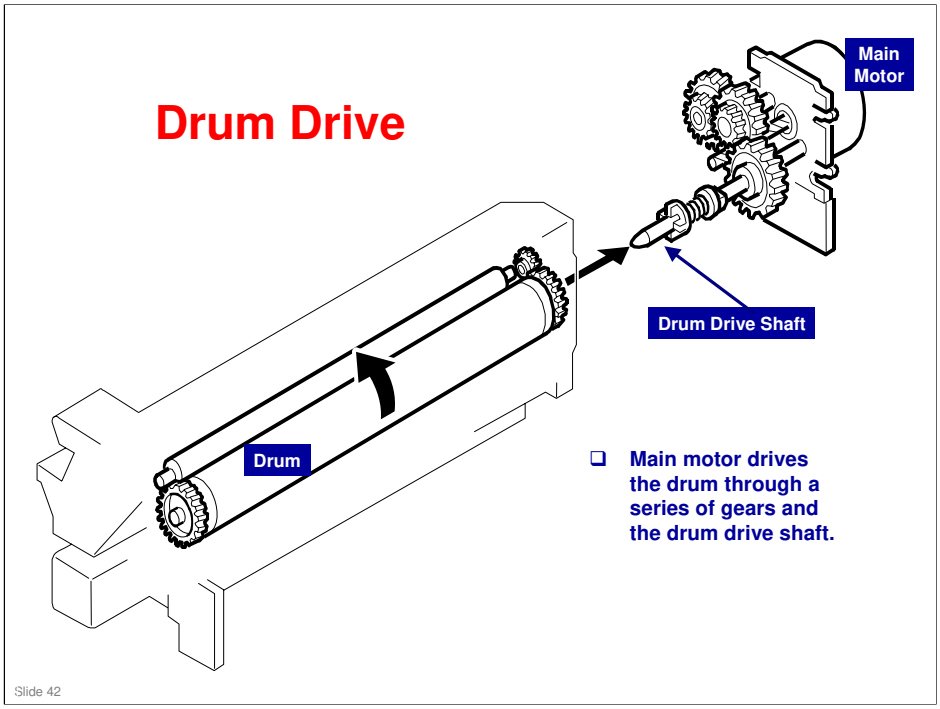
LD Safety Switches



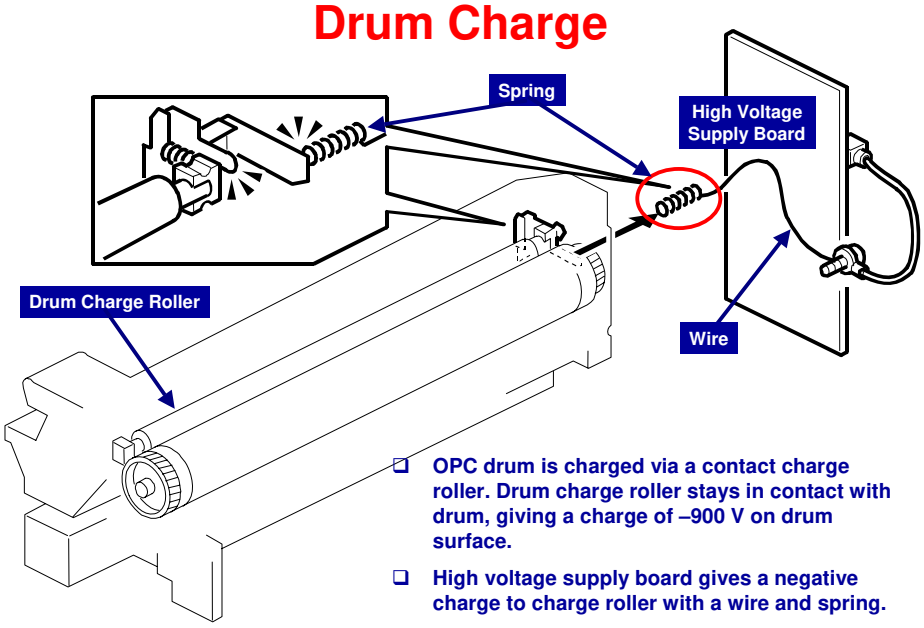
- Safety switches are installed at front and right doors. Machine will cut power to LD drive board if either door is opened. Corresponding switch cuts power supply (+5VS) to laser diode.

Slide 40


Photoconductor Unit (PCU) -Overview
Cleaning Roller
Charge Roller
Doctor Blade
Mixing Auger 1
TD Sensor
Toner Collection Coil
OPC Drum
Development Roller
Mixing Auger 2
Slide 41

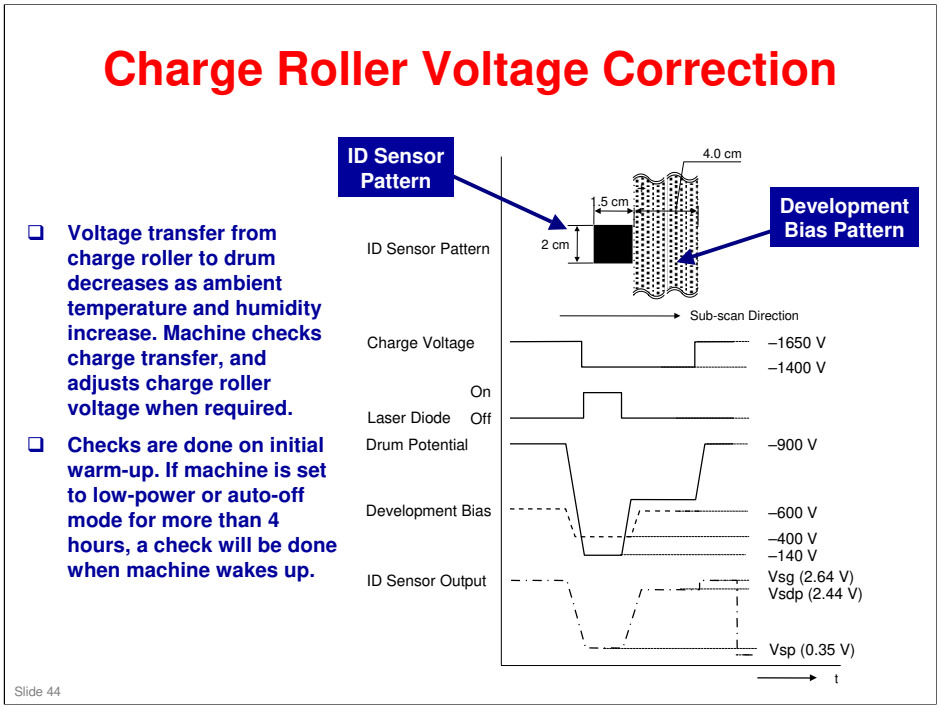

Drum Drive
Main Motor
Drum Drive Shaft
Drum
Main motor drives the drum through a series of gears and the drum drive shaft.
Slide 42

Drum Charge



- OPC drum is charged via a contact charge roller. Drum charge roller stays in contact with drum, giving a charge of –900 V on drum surface.
- High voltage supply board gives a negative charge to charge roller with a wire and spring.
- Default base charge is –1650V. This can be adjusted with SP 2001 1.

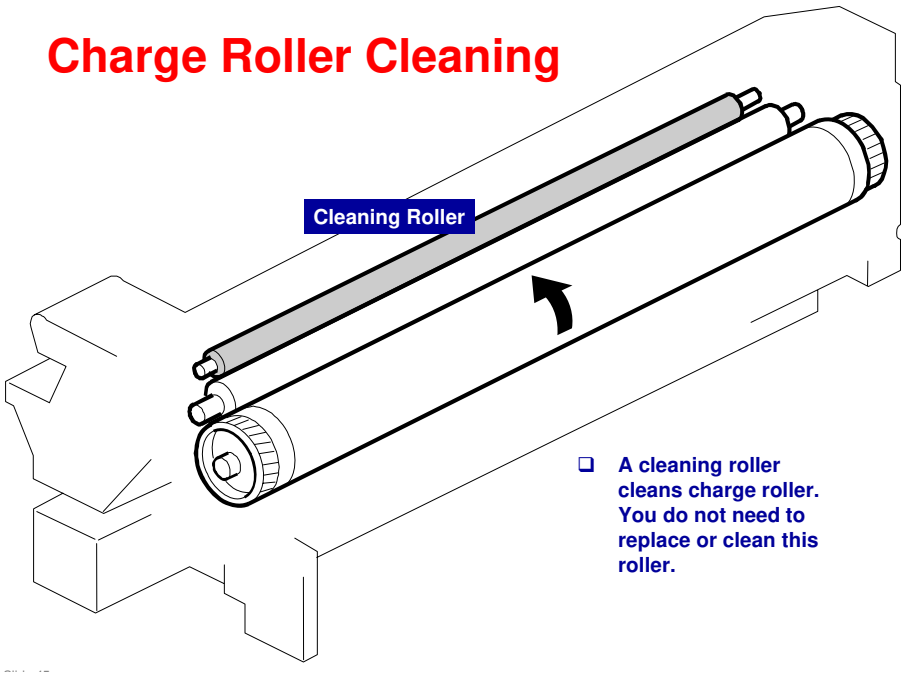
Slide 43



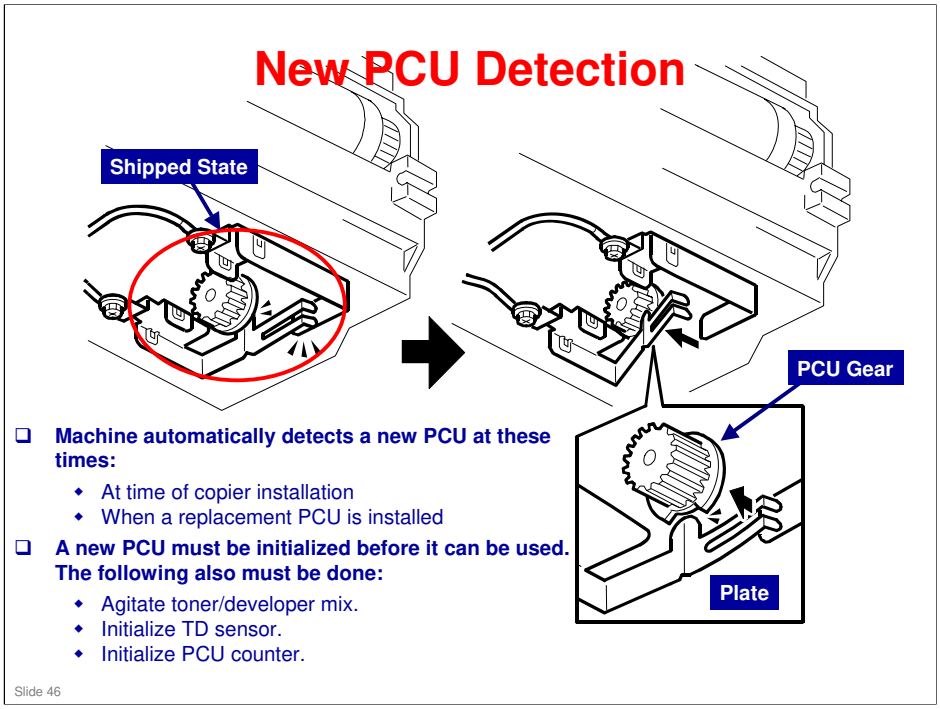
Procedure:

- 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.
  - Vdsp/Vsg > 0.95: Decreases the negative charge on the charge roller by +50 V.
  - Vdsp/Vsg < 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



- A cleaning roller cleans charge roller. You do not need to replace or clean this roller.



- 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.

RICOH

RICOH

D067/D072/D068/D069
Service Training

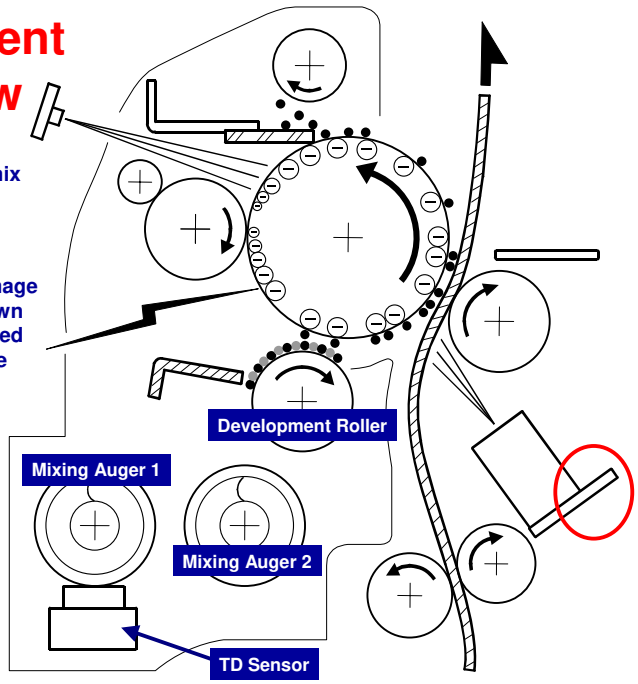
Development

Slide 47

.

Development Overview

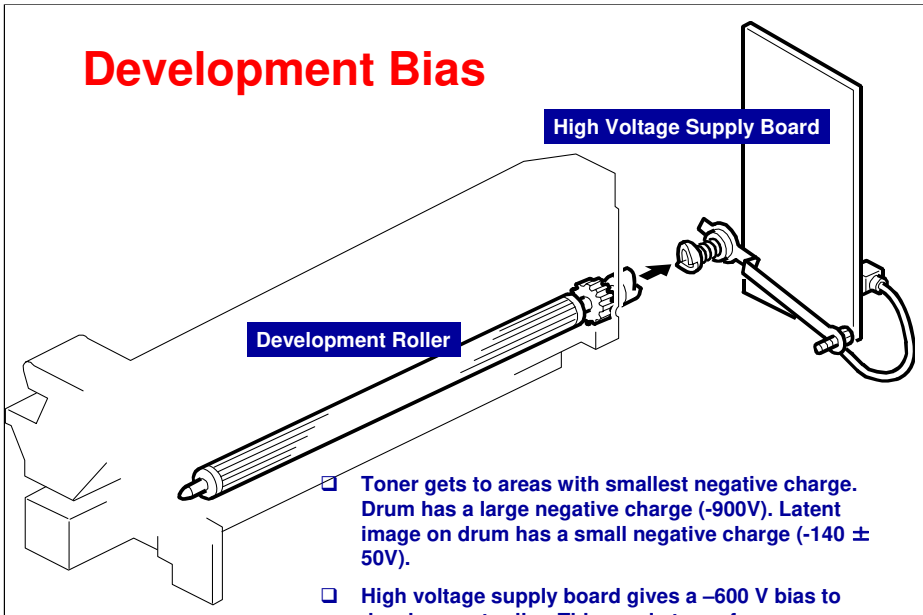
- Two mixing augers mix the developer (carrier/toner mix).
- TD (toner density) sensor and the ID (image density) sensor (shown in a red circle) are used to control copy image density.



Slide 48

.

Development Bias



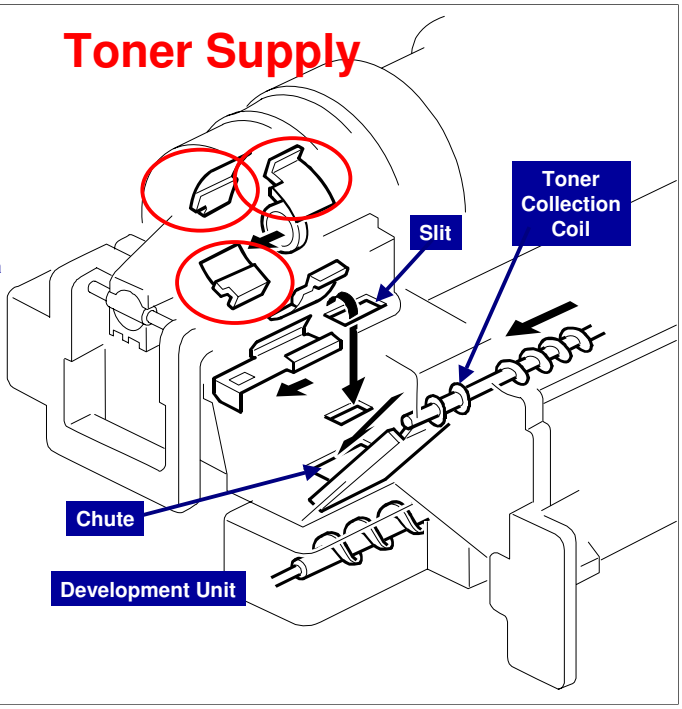
- Toner gets to areas with smallest negative charge. Drum has a large negative charge (-900V). Latent image on drum has a small negative charge (-140 ± 50V).
- High voltage supply board gives a –600 V bias to development roller. This sends toner from development roller to latent image.
- Development bias can be adjusted with SP 2201 1

Slide 49

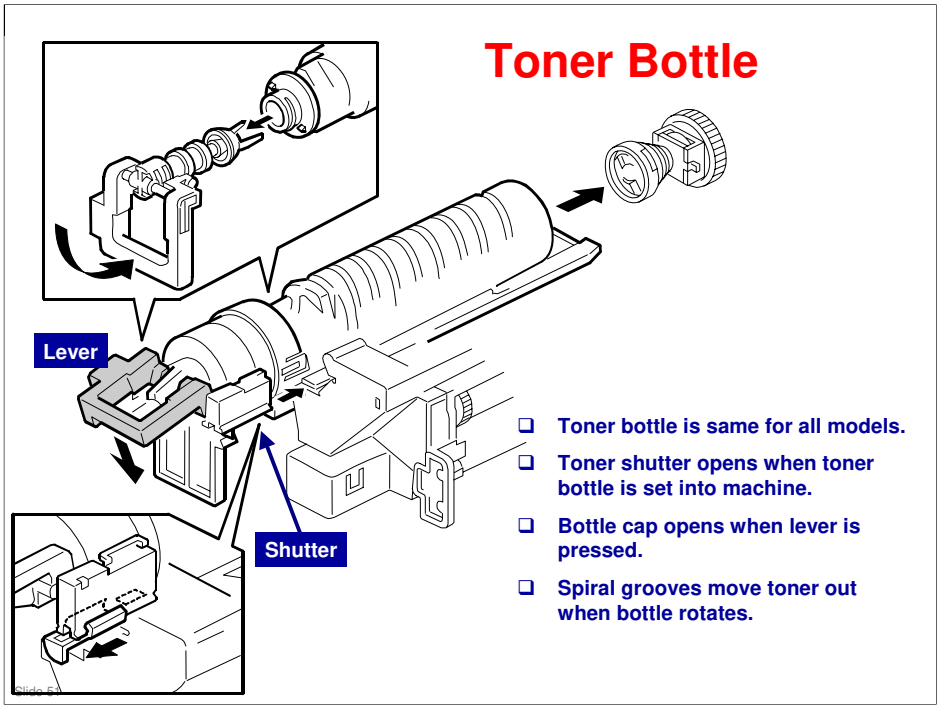
.

Toner Supply

- Toner path is same for all models. There are two sources of toner: new toner and recycled toner.
- A shutter is pushed open by PCU body when a toner bottle is set in machine. Toner bottle cap is held with a chuck. Cap comes off when lever is pushed.
- Spiral grooves move toner out of bottle. Mylar blades (circled in red) move toner through a slit into development unit. This happens when clutch turns toner bottle.
- Toner collection coil recycles toner it gets from OPC drum. Recycled toner moves down chute and goes into development unit through a slit.



Slide 50


Toner Bottle
Lever
Shutter
Toner bottle is same for all models.
Toner shutter opens when toner bottle is set into machine.
Bottle cap opens when lever is pressed.
Spiral grooves move toner out when bottle rotates.
Slide 51

.

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**

Slide 52

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

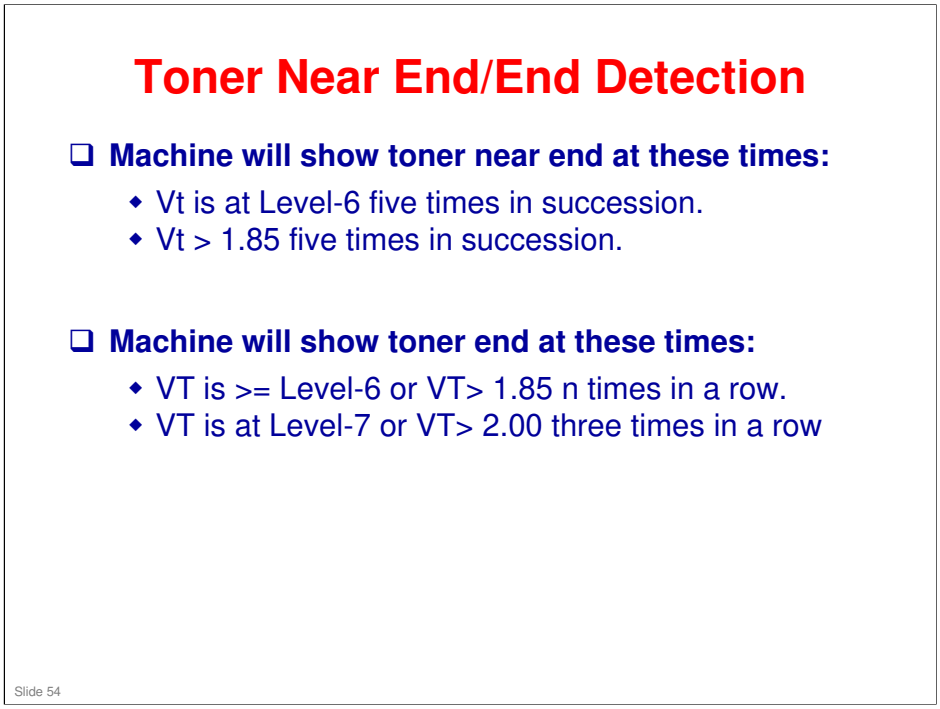
- The machine gives toner if Vt gets to more than the reference voltage. You can see current Vt and reference voltage values with SP 2220.
- You can see other ID sensor values with SP 2221.

Toner Errors

- **Sensor errors occur at these times:**
- **ID Sensor:**
  - Vsg ≤ 2.5 (when Vsg is read)
  - Vsg < 3.5 (at maximum power)
  - Vsp ≥ 2.5
  - Vt ≥ 2.64 or Vt < 0.20
- **You can see current readings with SP 2221**
- **TD Sensor**
  - TD < 0.20 V
  - TD > 2.64 V
- **If machine gets error readings 10 times in succession, SC 390 will be shown. You can see current value with SP 2220**

Slide 53

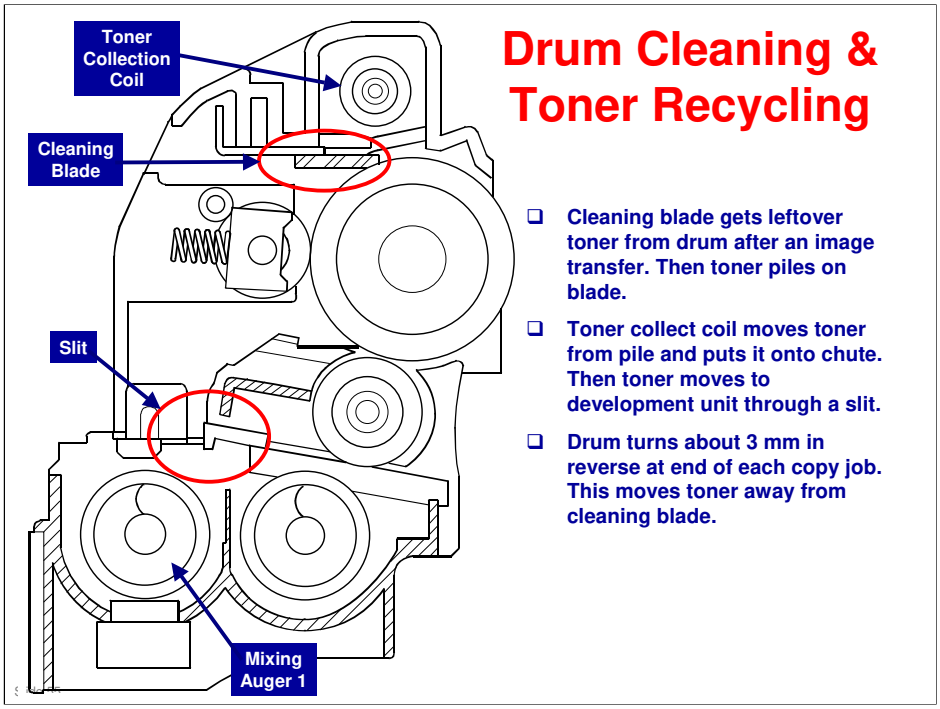
.



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.


Toner Collection Coil
Cleaning Blade
Slit
Mixing Auger 1
Drum Cleaning & Toner Recycling
Cleaning blade gets leftover toner from drum after an image transfer. Then toner piles on blade.
Toner collect coil moves toner from pile and puts it onto chute. Then toner moves to development unit through a slit.
Drum turns about 3 mm in reverse at end of each copy job. This moves toner away from cleaning blade.

.

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

Slide 56

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

Slide 57

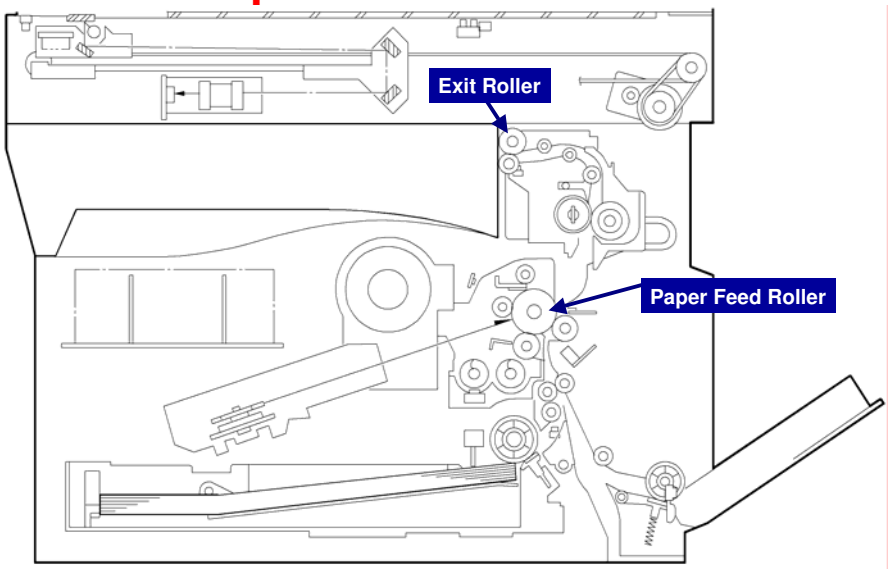
RICOH

D067/D072/D068/D069
Service Training

Paper Feed

Slide 58

Paper Feed - Overview

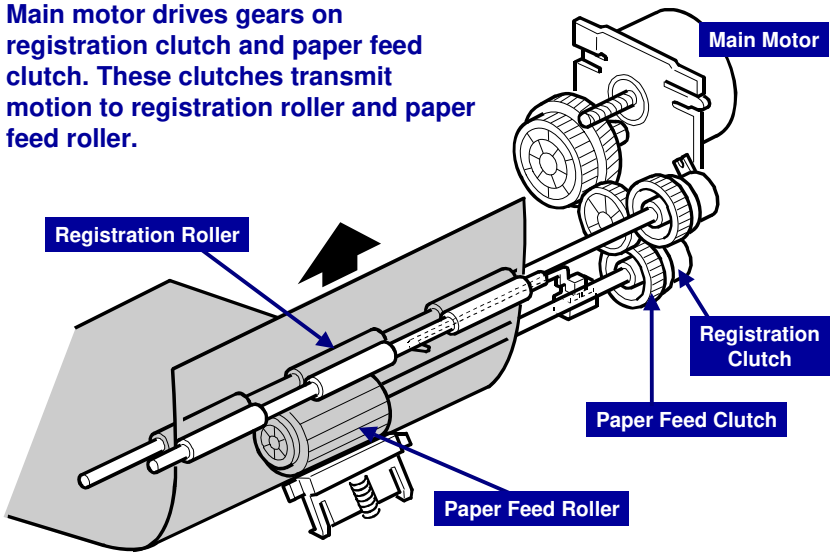


- See the FSM for a more complete list of components.

Slide 59

Drive Mechanism - From Paper Tray

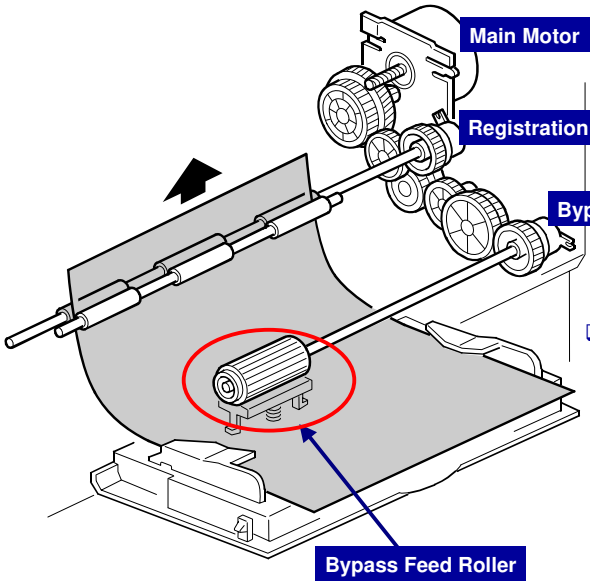
- Main motor drives gears on registration clutch and paper feed clutch. These clutches transmit motion to registration roller and paper feed roller.



Slide 60

.

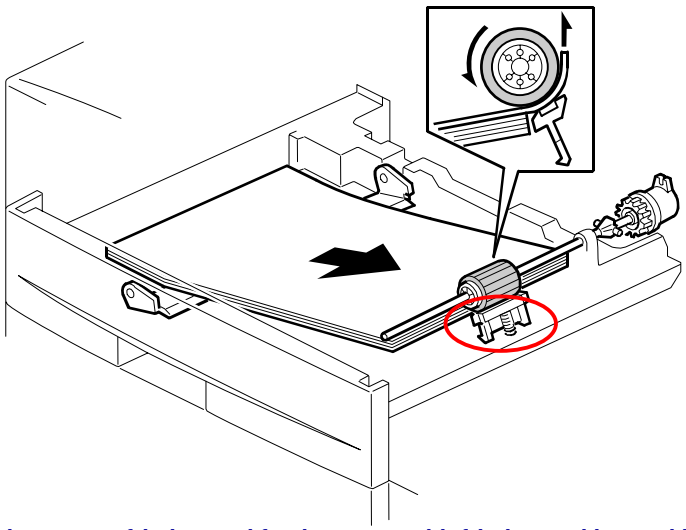
Drive Mechanism - Bypass Tray



- Main motor drives gears of registration clutch and bypass feed clutch. Bypass feed clutch moves bypass feed roller.

Slide 61

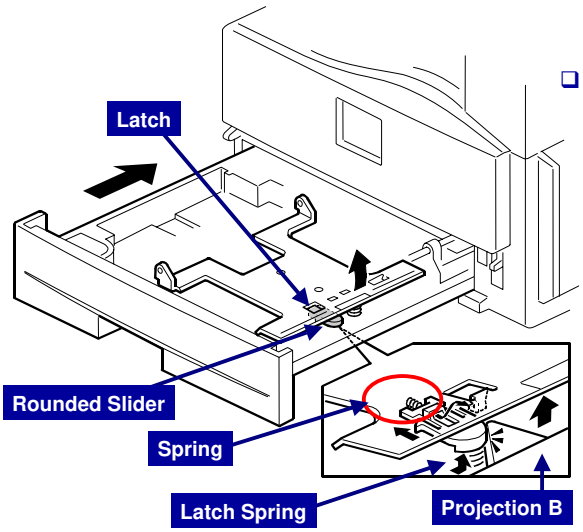
Paper Feed And Separation



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

Slide 62

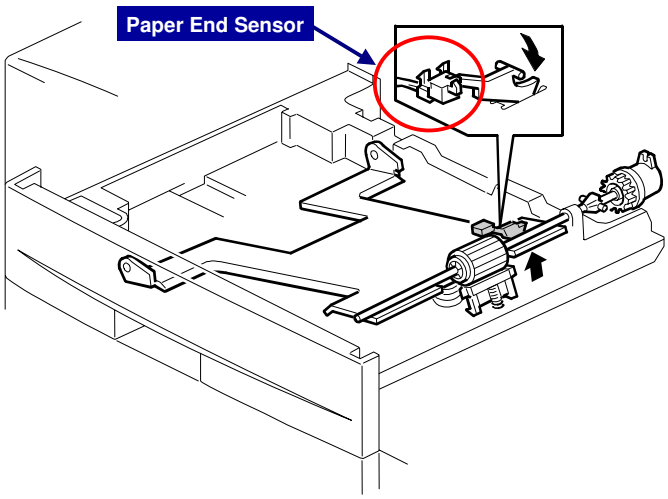
Paper Lift Mechanism



- Protrusion on frame pushes rounded slider in against spring when tray is closed (by sliding it into machine). This retracts latch, allowing spring to push plate up.

Slide 63

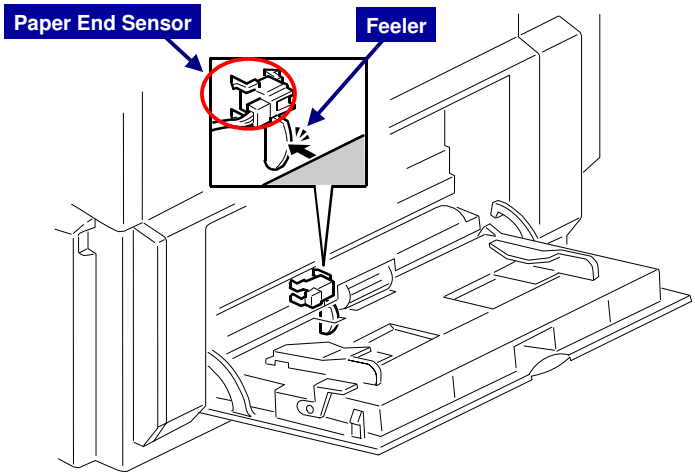
Paper End Detection-Main Tray



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

Slide 64

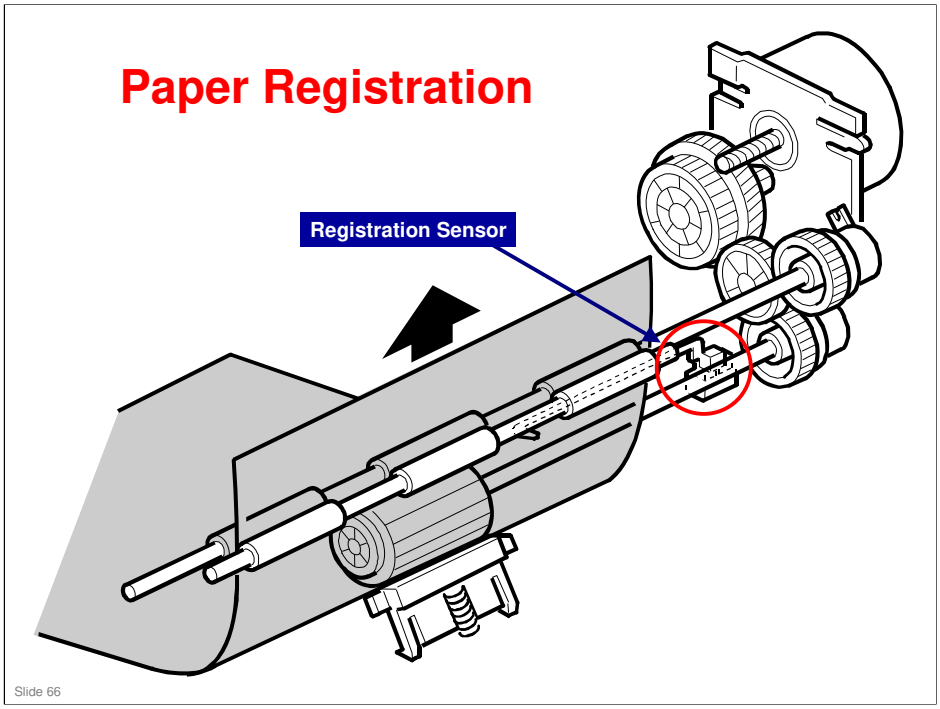
Paper End Detection - Bypass Tray



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

Slide 65

.


Paper Registration
Registration Sensor
Slide 66

.

RICOH

D067/D072/D068/D069
Service Training

Image Transfer And Paper Separation

Slide 67

Image Transfer and Paper Separation

- Image transfer and paper separation will be covered.

In this section you will do these things:

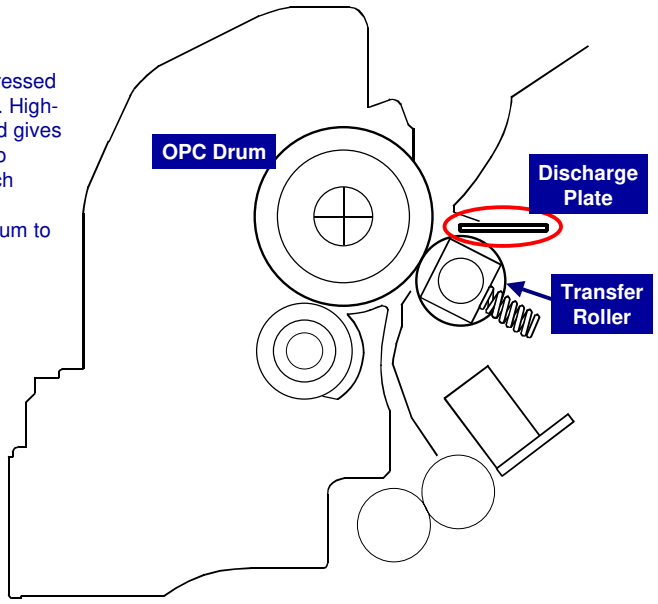
- Examine how paper is fed through the machine.
- Examine transfer current.

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.



Slide 68

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.

Slide 69

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

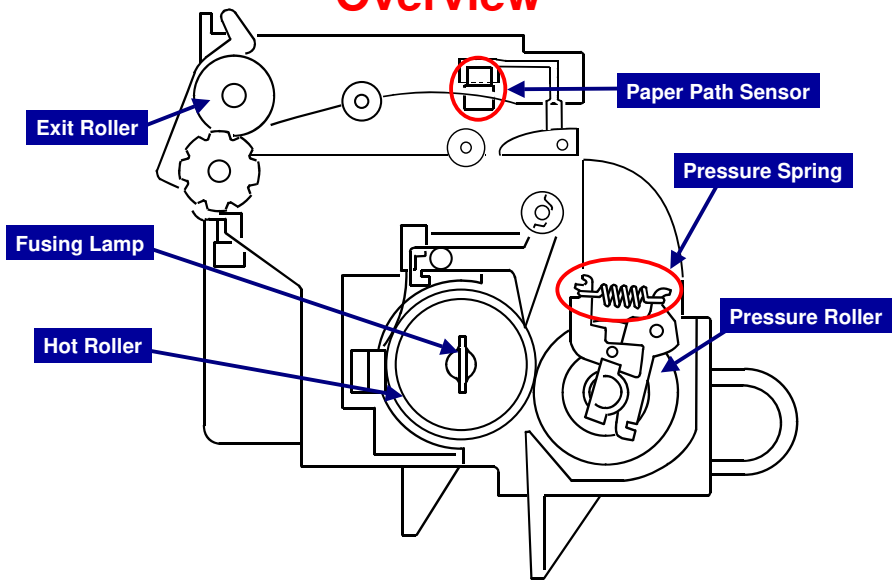
RICOH

D067/D072/D068/D069
Service Training

Fusing and Paper Exit

Slide 71

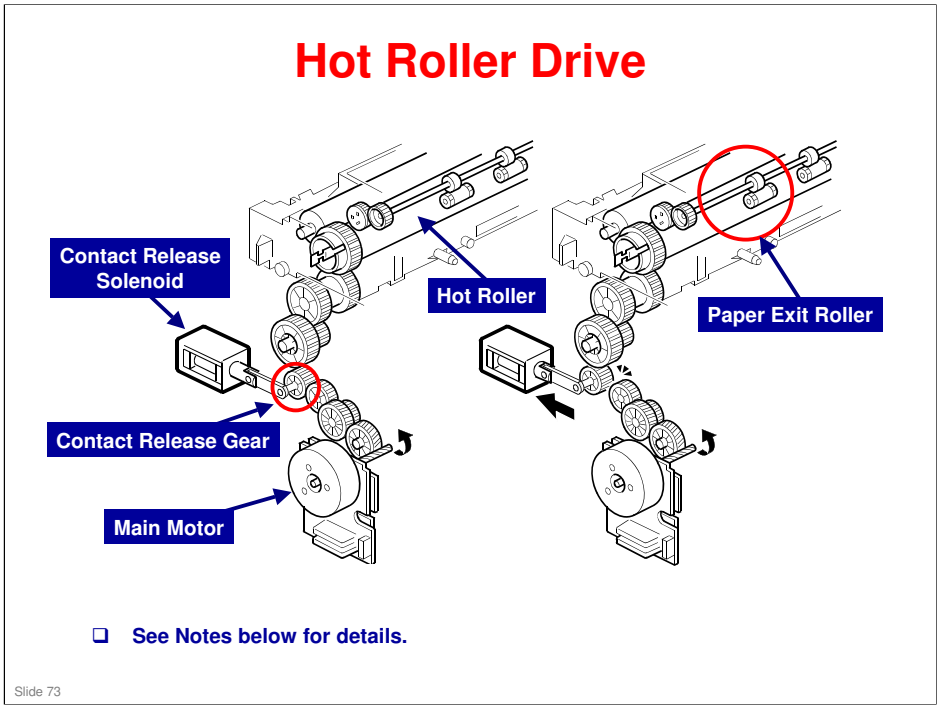
Overview



- This slide shows some of components for fusing unit. For more details, see FSM.

Slide 72

.



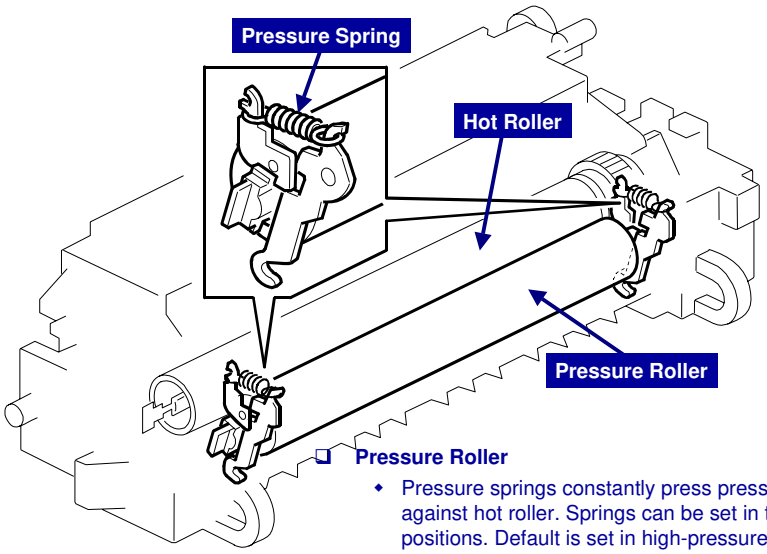
Hot Roller Drive Mechanism

- 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.

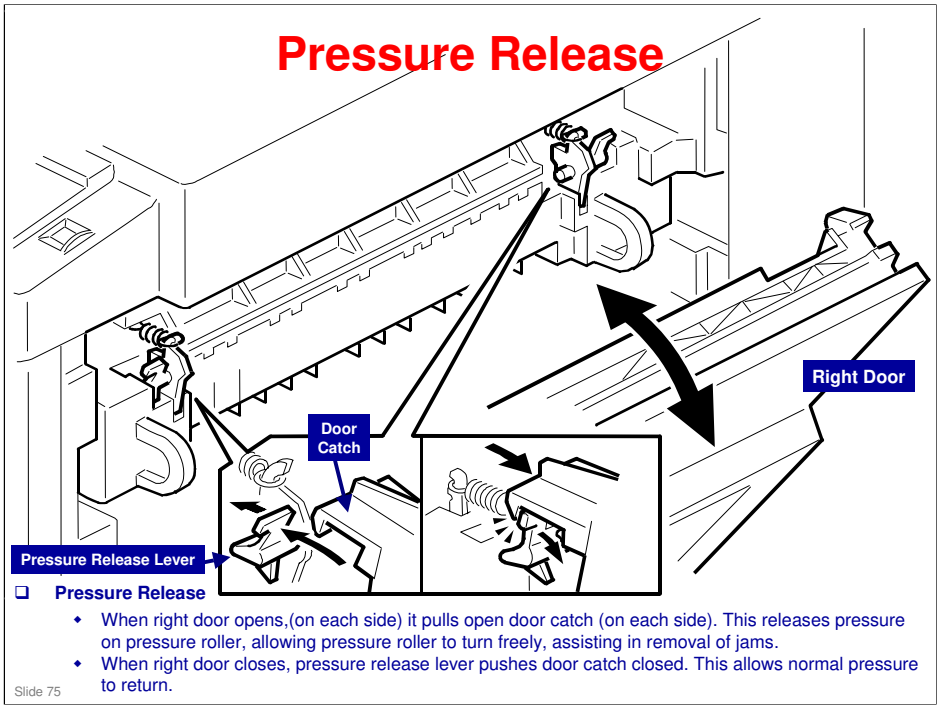
Pressure Roller



❑ **Pressure Roller**

- Pressure springs constantly press pressure roller against hot roller. Springs can be set in two different positions. Default is set in high-pressure (lower position) position.
- You can move springs to low-pressure (upper position) position if you want to lower the pressure.

Slide 74

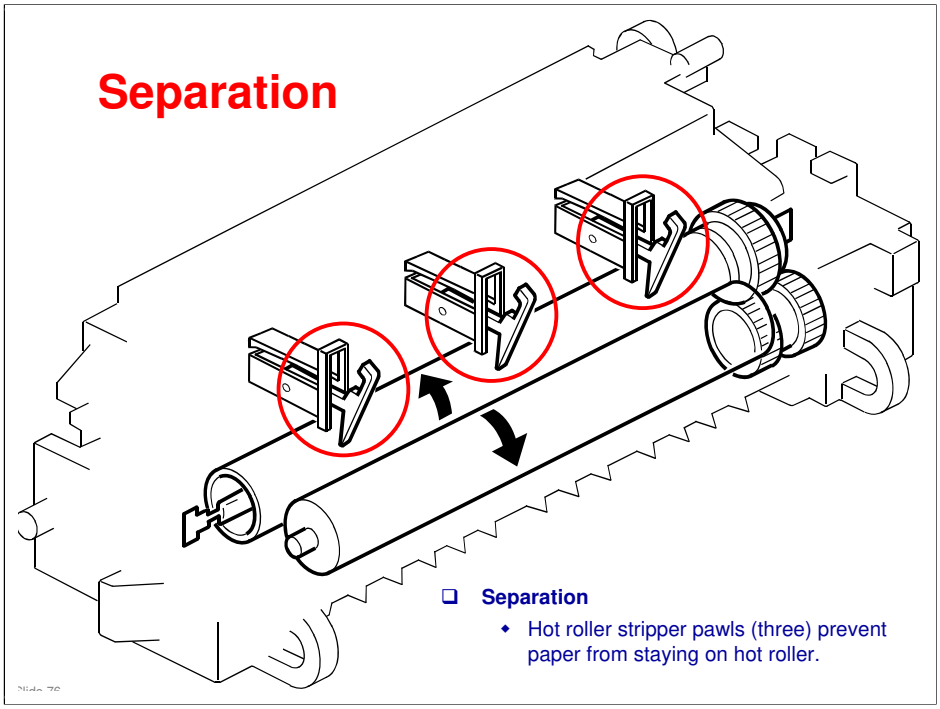


❑ **Pressure Release**

- When right door opens,(on each side) it pulls open door catch (on each side). This releases pressure on pressure roller, allowing pressure roller to turn freely, assisting in removal of jams.
- When right door closes, pressure release lever pushes door catch closed. This allows normal pressure to return.

Slide 75

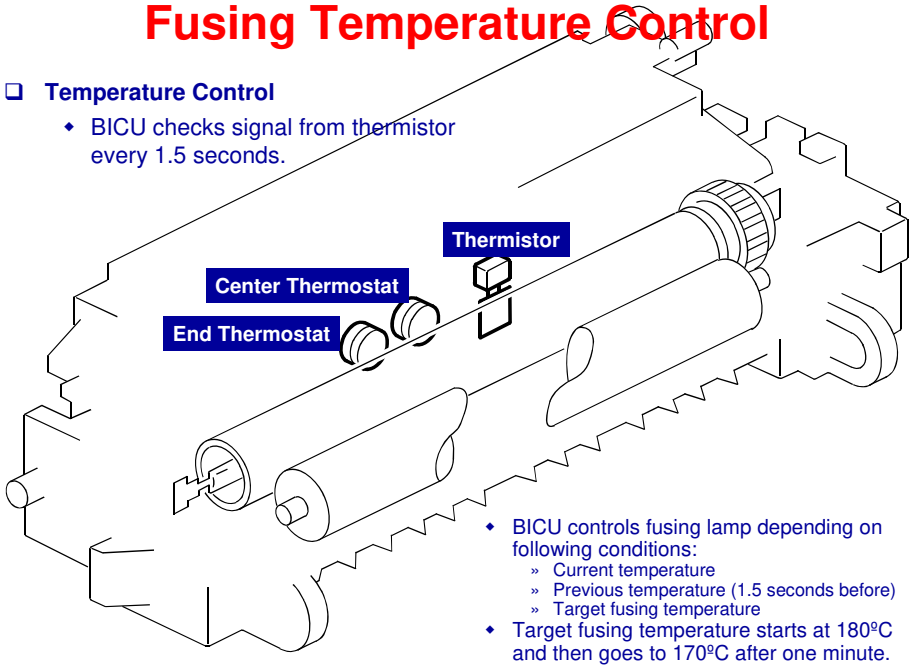
.


Separation
Separation
Hot roller stripper pawls (three) prevent paper from staying on hot roller.

.

Fusing Temperature Control

- **Temperature Control**
  - BICU checks signal from thermistor every 1.5 seconds.



- BICU controls fusing lamp depending on following conditions:
  - » Current temperature
  - » Previous temperature (1.5 seconds before)
  - » Target fusing temperature
- Target fusing temperature starts at 180ºC and then goes to 170ºC after one minute.

Overheat Protection

- **BICU checks fusing temperature through thermistor. Copier has five features to safeguard machine from overheating.**

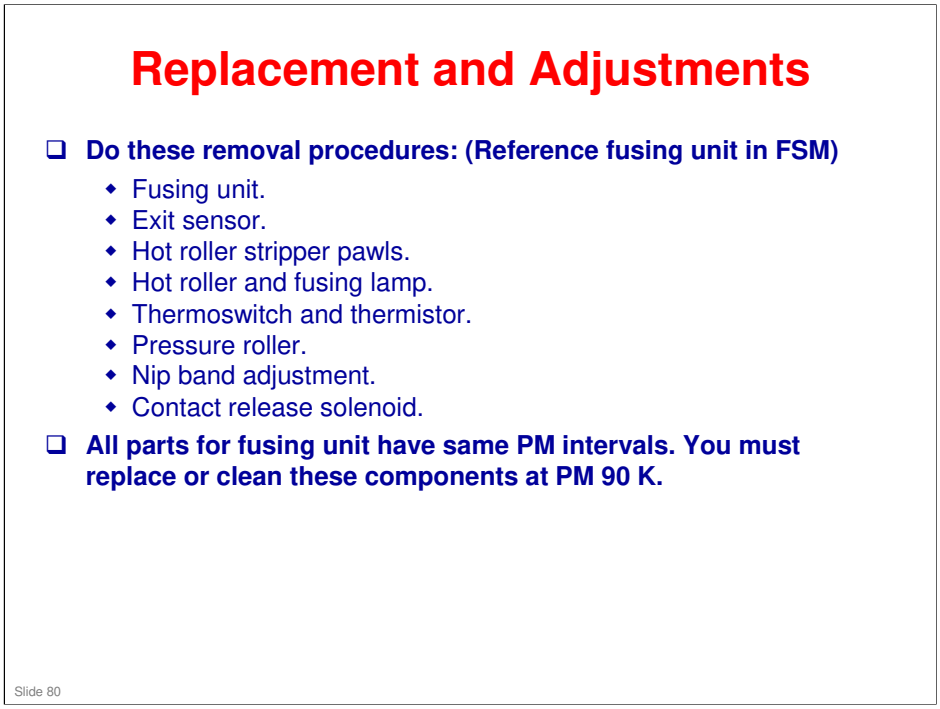
- **Feature 1**
  - BICU switches fusing lamp off when fusing temperature gets too high.
- **Feature 2**
  - BICU (Base engine & Image Control Unit) stops machine when thermistor detects an abnormal condition. Then machine will show one of these SC codes:
    - » SC 543, SC 544, SC 545, SC 546
- **Feature 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 160ºC. Thermo-switch near end cuts power to fusing lamp at 170ºC. 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.

Slide 78

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.

Slide 79



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

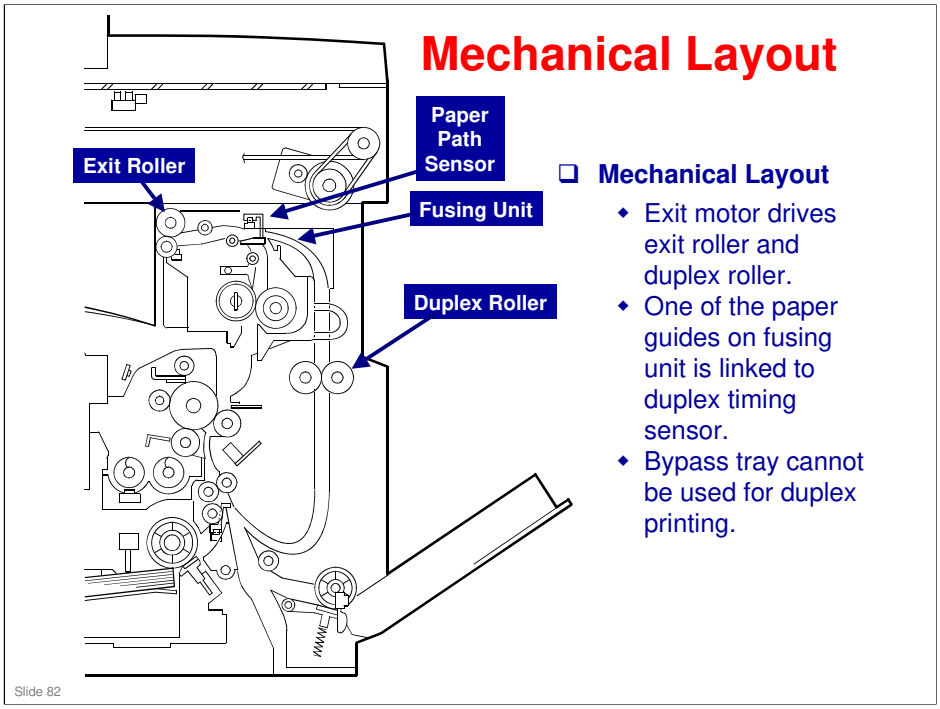
- ❑ The duplex unit will be covered.

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?


Mechanical Layout
Paper Path Sensor
Exit Roller
Fusing Unit
Duplex Roller
Mechanical Layout
Exit motor drives exit roller and duplex roller.
One of the paper guides on fusing unit is linked to duplex timing sensor.
Bypass tray cannot be used for duplex printing.
Slide 82

.

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

Slide 83

.

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

Slide 84

Paper Tray Unit (B696)

- ❑ The ARDF will be discussed.

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?

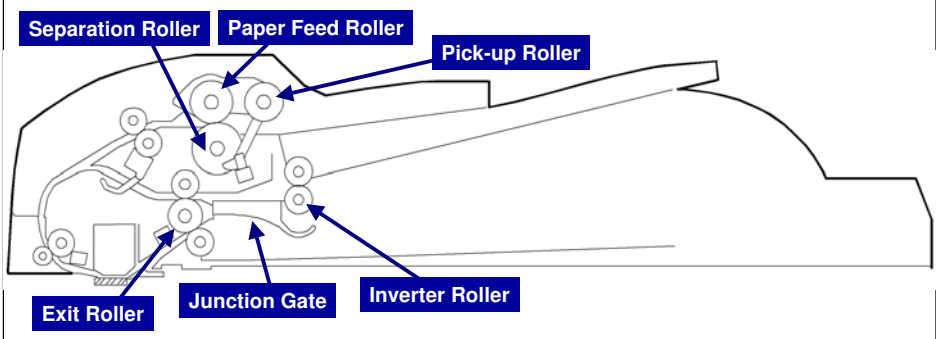
RICOH

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**

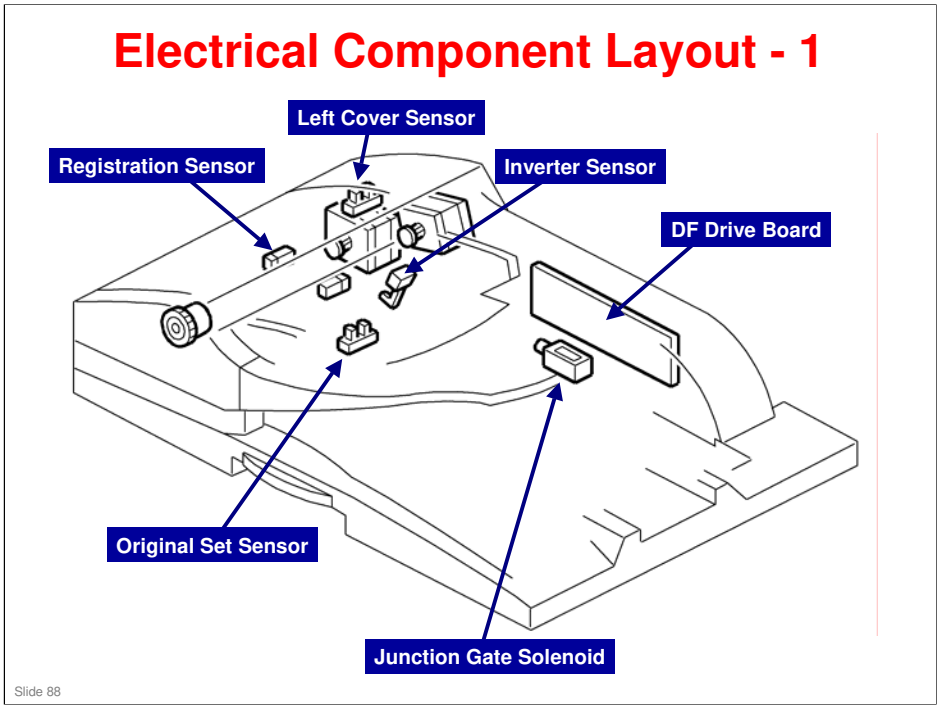
Slide 86

Mechanical Layout



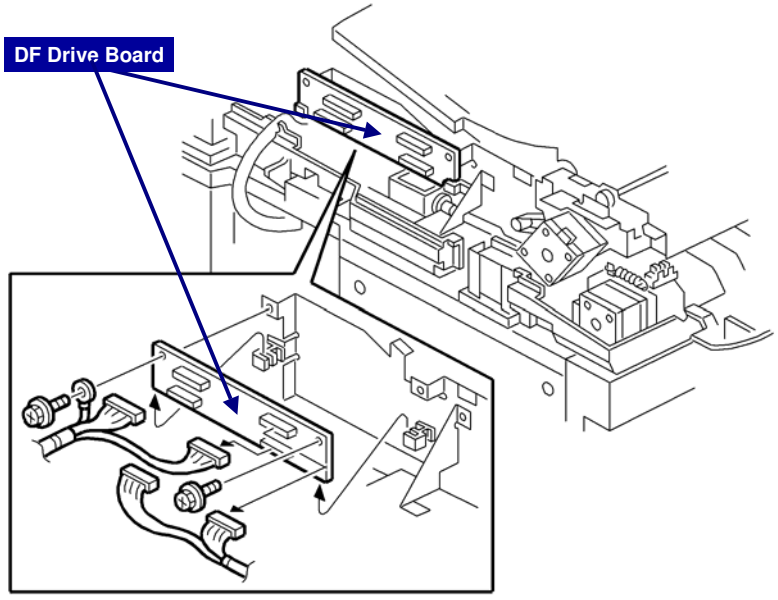
- **Mechanical Layout**
  - This slide shows some of components for ARDF. See ARDF DF1000 (B872) in FSM for full details and technical drawings.

Slide 87


Electrical Component Layout - 1
Left Cover Sensor
Registration Sensor
Inverter Sensor
DF Drive Board
Original Set Sensor
Junction Gate Solenoid
Slide 88

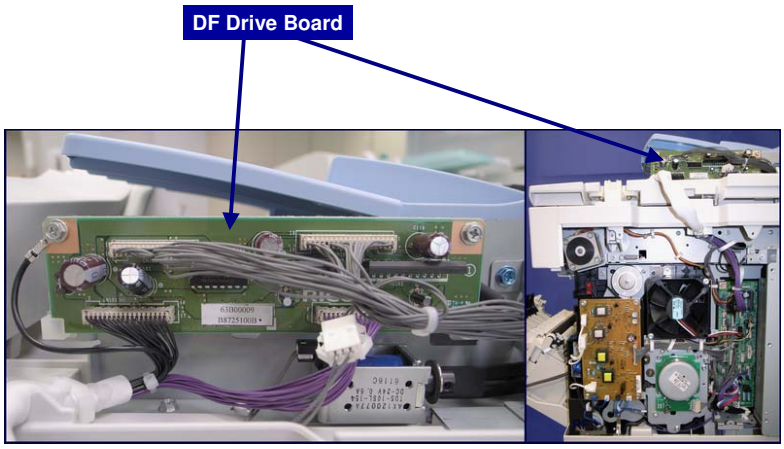
.

Electrical Component Layout-2



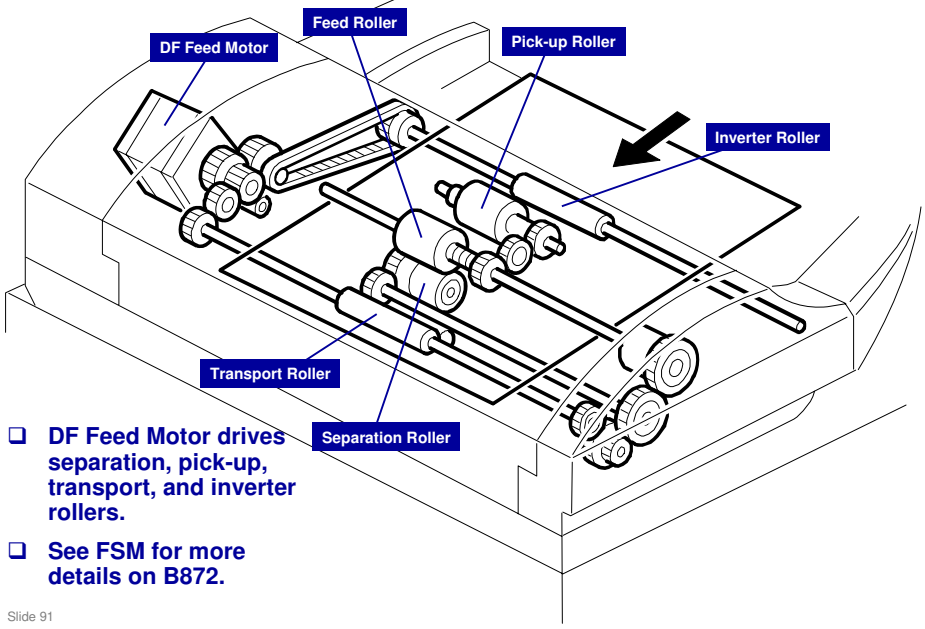
Slide 89

Electrical Component Layout - 3



Slide 90

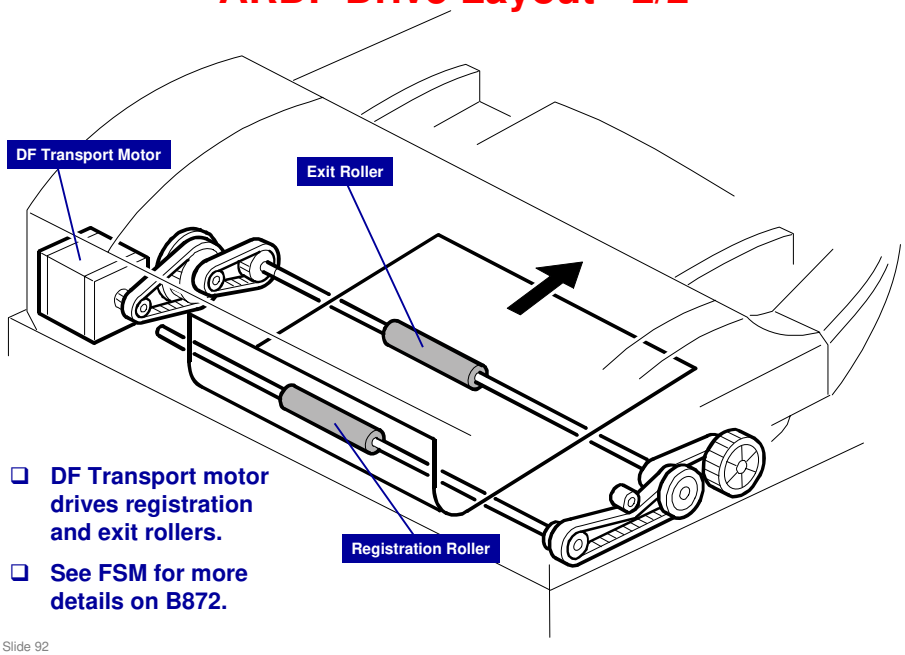
ARDF Drive Layout - 1/2



- DF Feed Motor drives separation, pick-up, transport, and inverter rollers.
- See FSM for more details on B872.

Slide 91

ARDF Drive Layout - 2/2

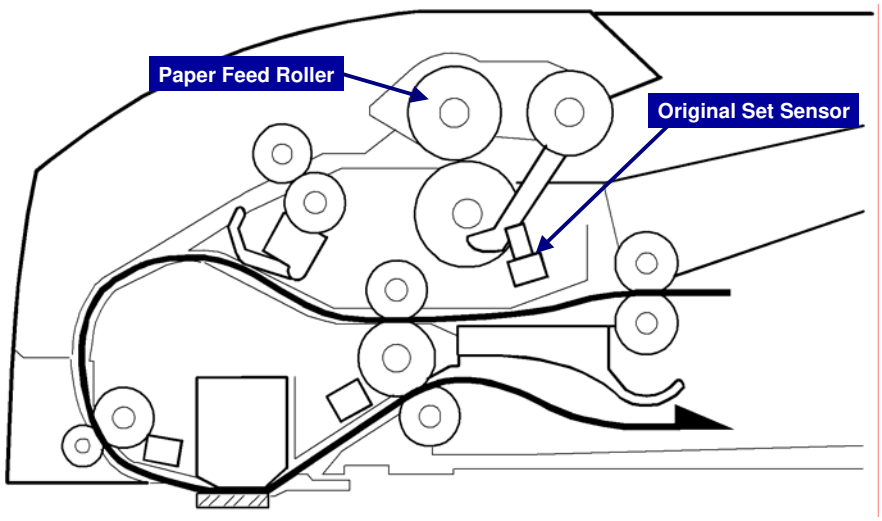


- DF Transport motor drives registration and exit rollers.
- See FSM for more details on B872.

Slide 92

.

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.

Slide 93

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.

Slide 94

Paper Transport - Two-sided Originals

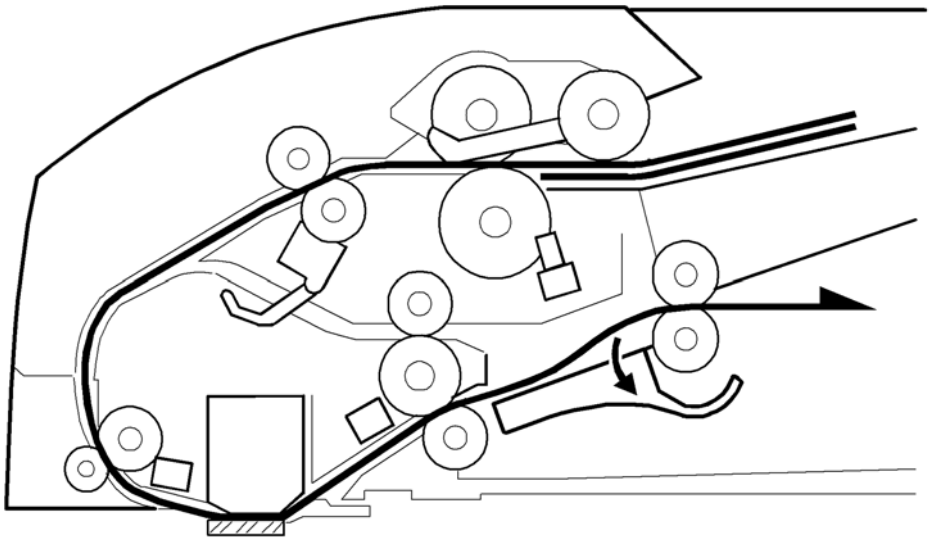
- **Two-sided Transport Details**
  - After original has been fed to registration sensor by transport roller, DF feed motor briefly stops.
  - After scanner moves to DF scan position, front side of original is scanned.
  - When exit sensor detects leading edge of original, junction gate solenoid is activated, 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.

Slide 95

See ARDF illustrations on following pages.

RICOH

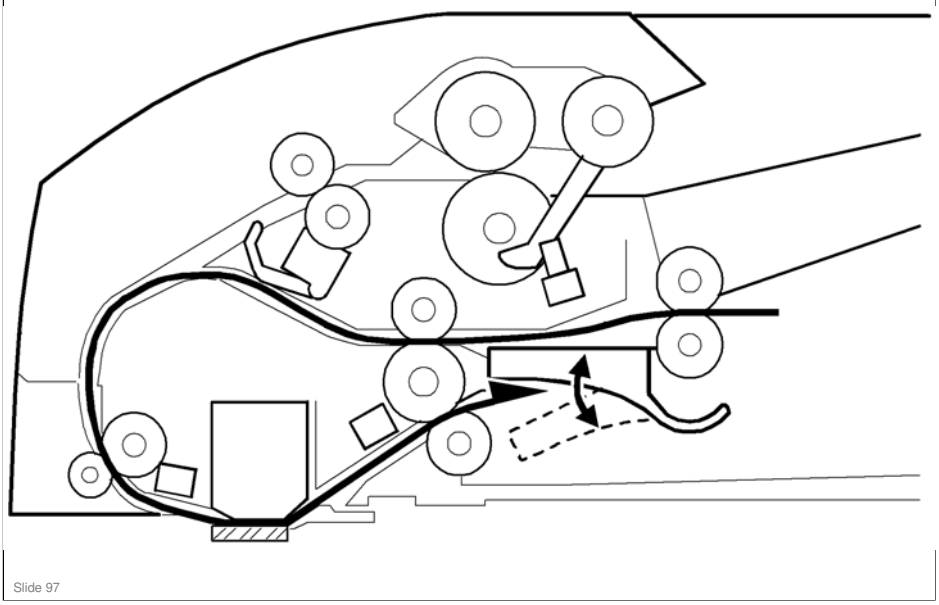
Paper Transport - Two-sided Originals - 1/3



Slide 96

.

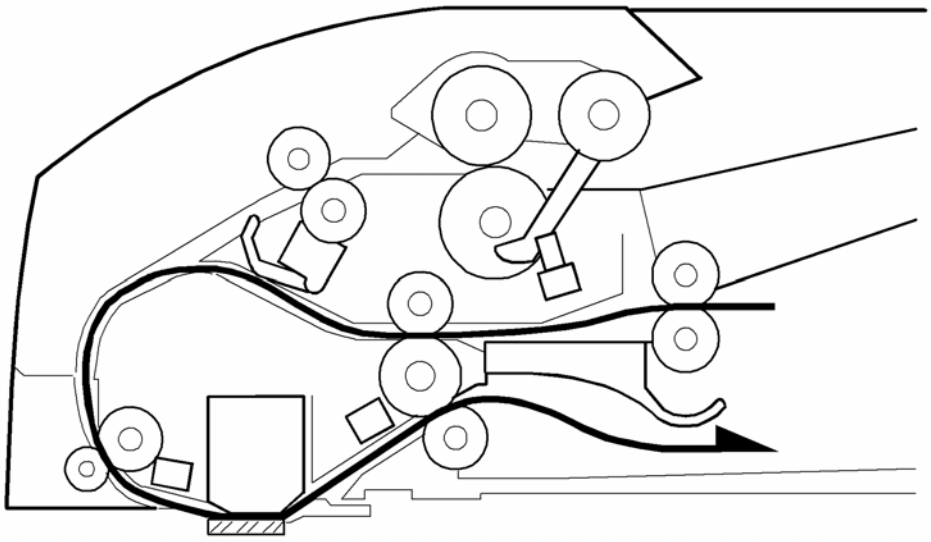
Paper Transport - Two-sided Originals - 2/3



Slide 97

.

Paper Transport - Two-sided Originals - 3/3



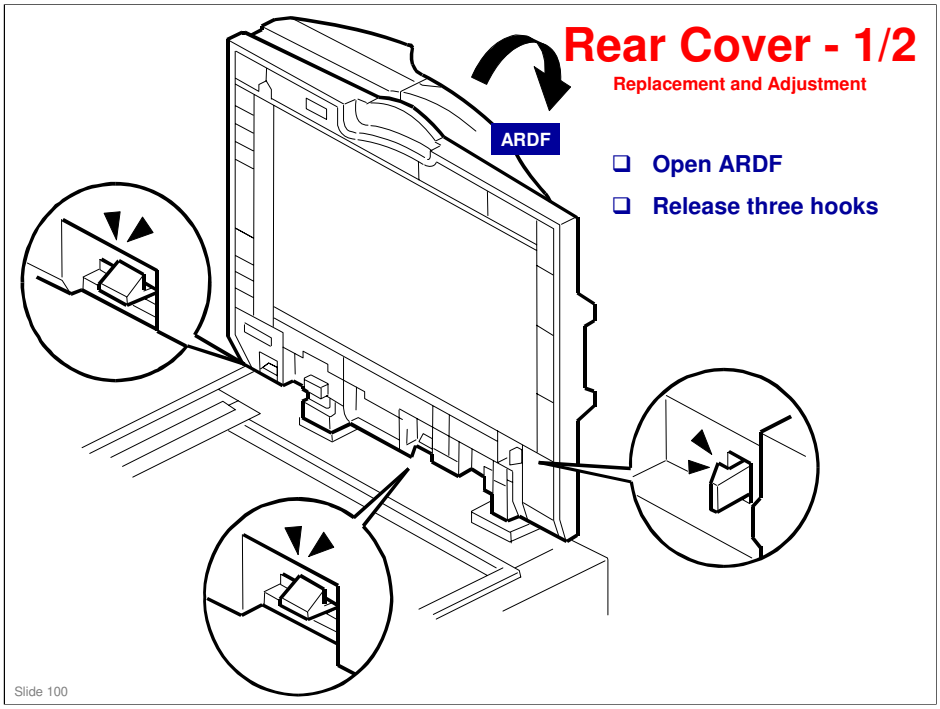
Slide 98

.

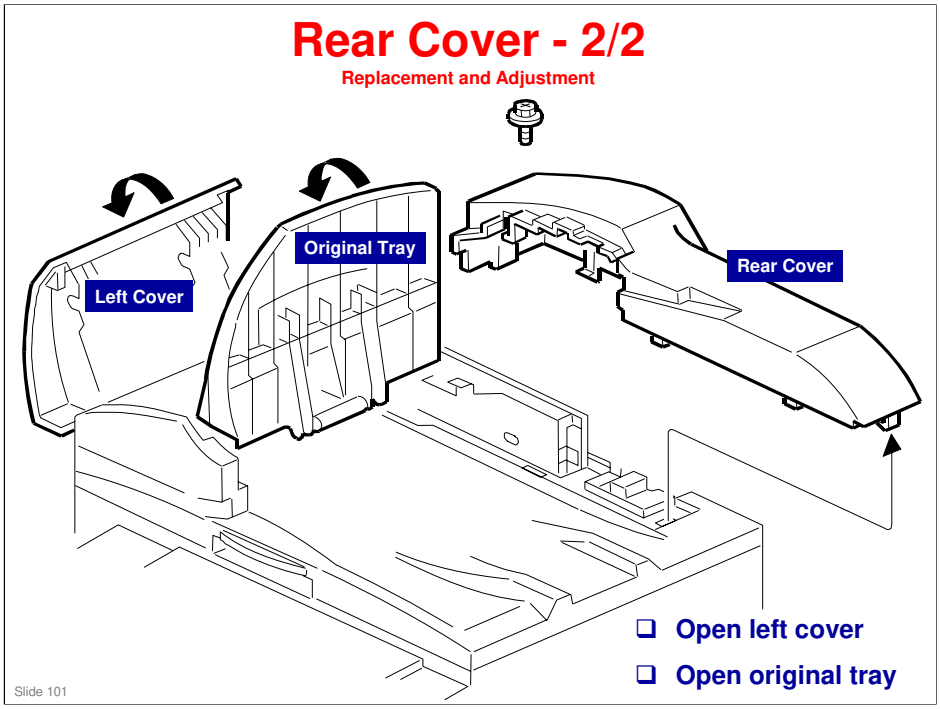
Replacement and Adjustment

- **Before you start:**
  - Remove exterior cover and original table. (See Replacement and Adjustment section of ARDF DF1000 (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

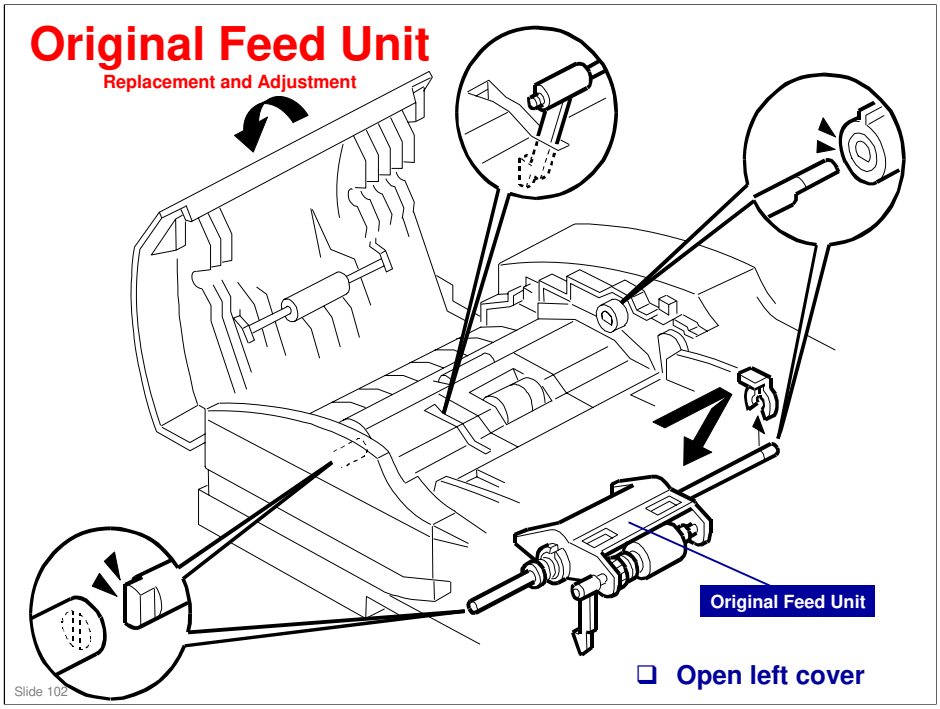
Slide 99


Rear Cover - 1/2
Replacement and Adjustment
ARDF
Open ARDF
Release three hooks
Slide 100

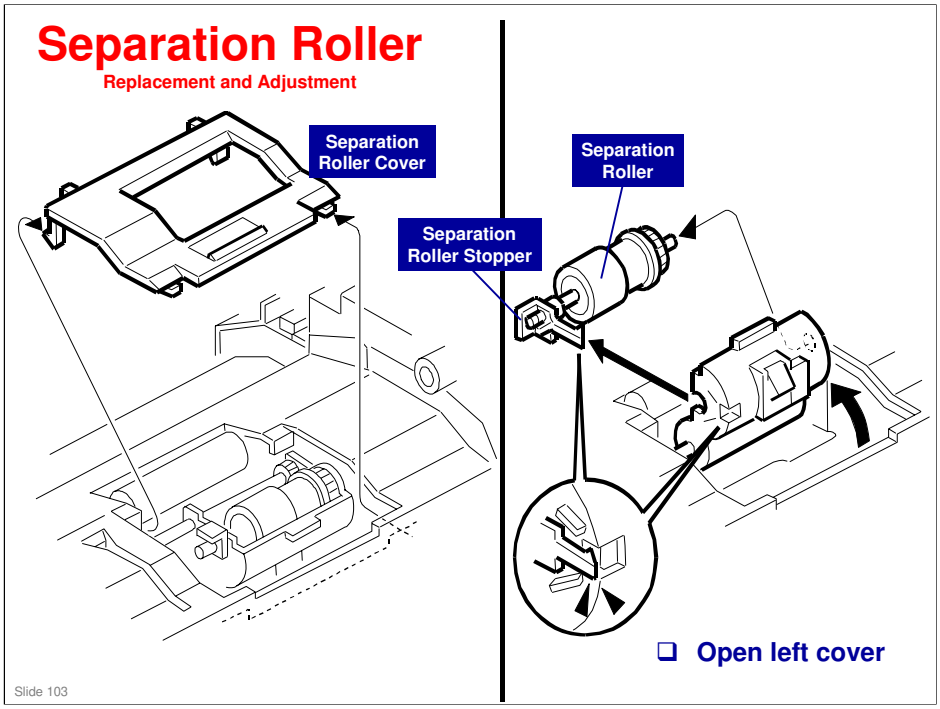
.


Rear Cover - 2/2
Replacement and Adjustment
Original Tray
Left Cover
Rear Cover
❑ Open left cover
❑ Open original tray
Slide 101

.


Original Feed Unit
Replacement and Adjustment
Original Feed Unit
Open left cover
Slide 102

.


Separation Roller
Replacement and Adjustment
Separation Roller Cover
Separation Roller
Separation Roller Stopper
❑ Open left cover
Slide 103

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.**

Slide 104

Preventive Maintenance

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

Slide 105

RICOH

D067/D072/D068/D069
Service Training

Paper Tray Unit (B421)

Slide 106

Paper Tray Unit (B421)

- ❑ 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.**

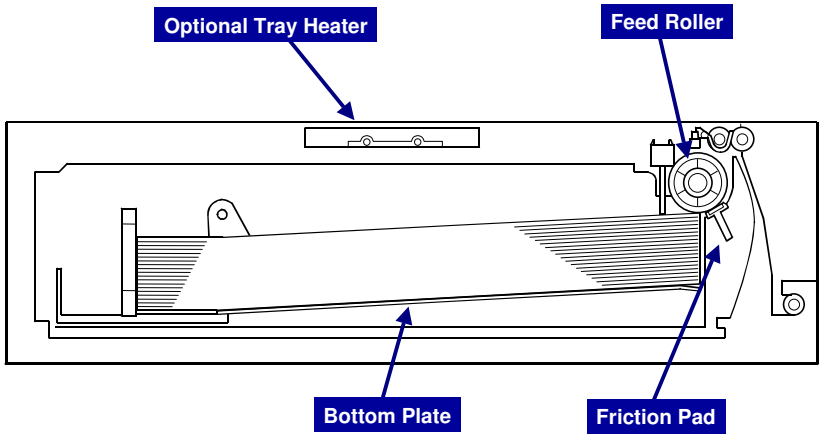
Slide 107

Specifications

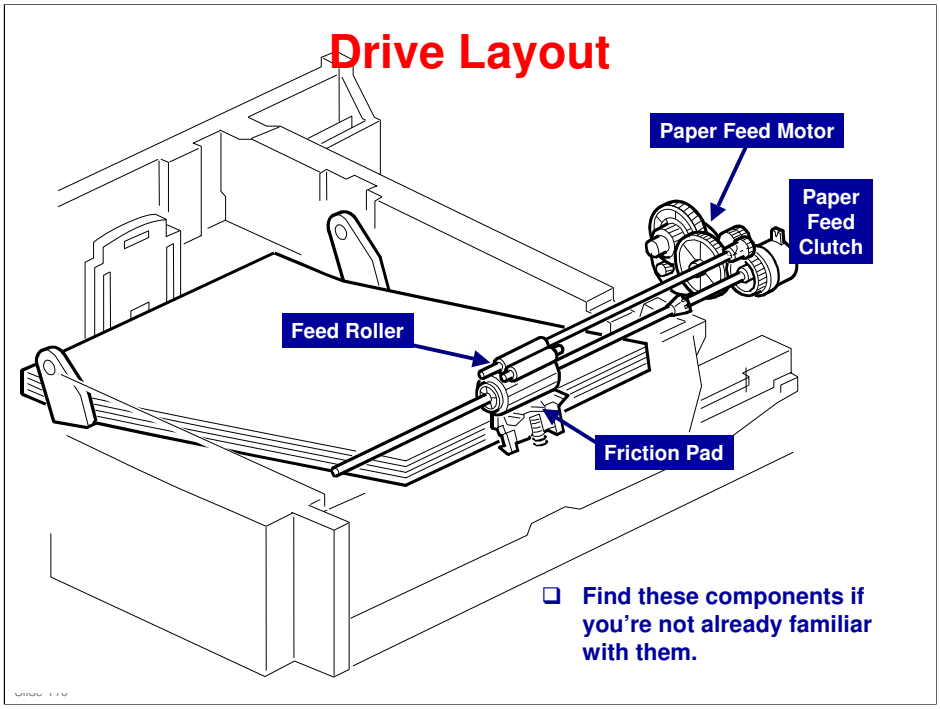
- **Paper sizes:**
  - A4 SEF
  - 8 ½ " x 11“ SEF
  - 8 ½ “ x 13 “ SEF
  - 8 ½ “ x 14 “ SEF
- **Paper weight: 60-90 g/m² (16-24 lb.)**
- **Tray Capacity: 500 sheets**
- **Paper feed system: Feed roller and friction pad**

Slide 108

Mechanical Component Layout

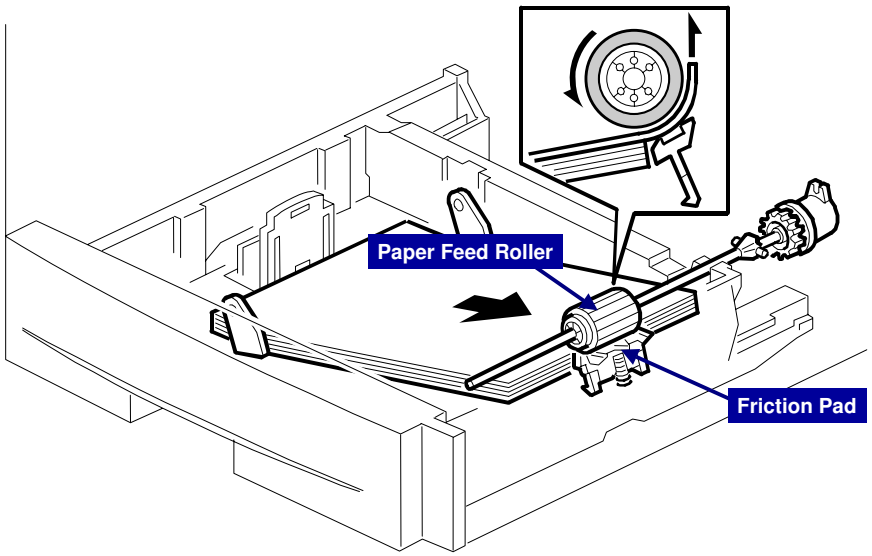


Slide 109


Drive Layout
Paper Feed Motor
Paper Feed Clutch
Feed Roller
Friction Pad
Find these components if you're not already familiar with them.

.

Paper Feed and Separation

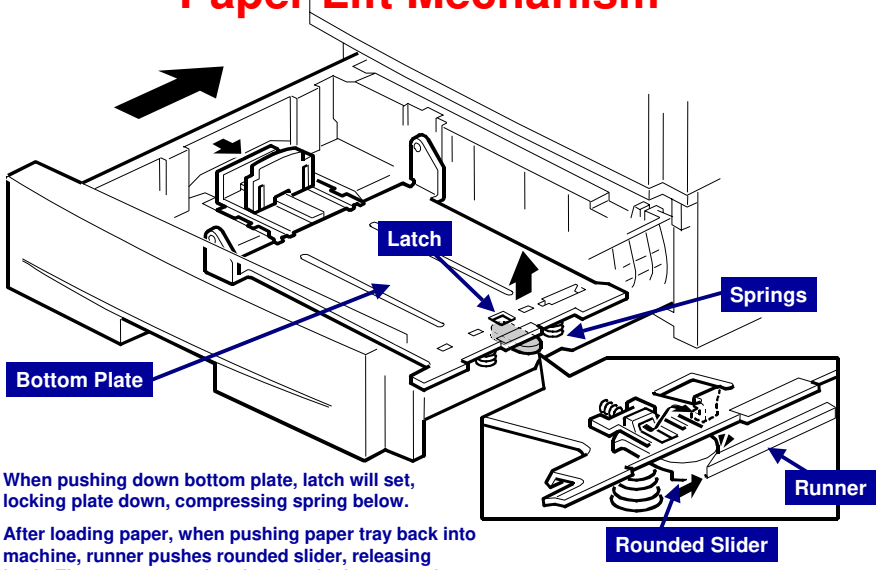


- Find these components if you're not already familiar with them.

Slide 111

.

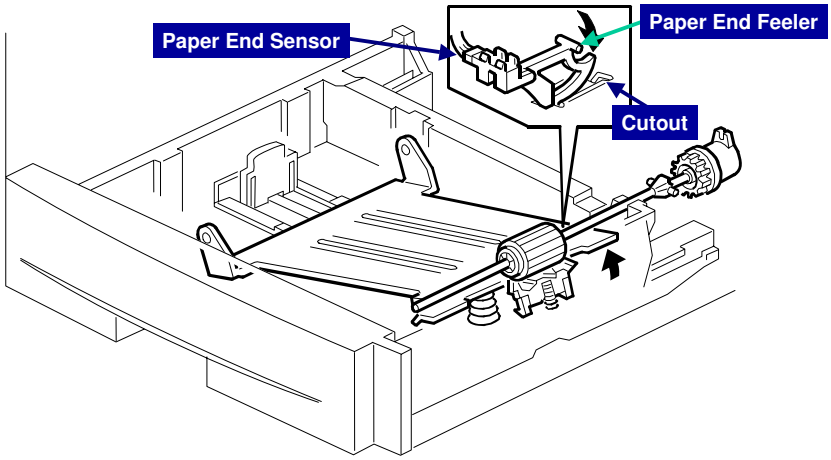
Paper Lift Mechanism



- When pushing down bottom plate, latch will set, locking plate down, compressing spring below.
- After loading paper, when pushing paper tray back into machine, runner pushes rounded slider, releasing latch. Then compressed springs push plate up and keep latch retracted (preventing plate from becoming locked down under a full load of paper.)

Slide 112

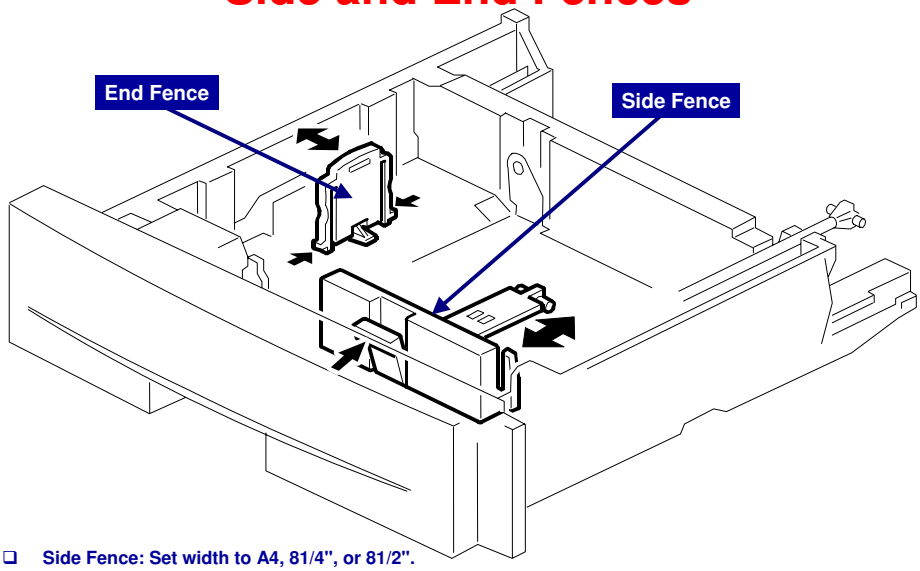
Paper End Detection



- 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.

Slide 113

Side and End Fences



- Side Fence: Set width to A4, 81/4", or 81/2".
- End fence: Set from 11" to 13", with standard settings at 11", A4, and 13". To feed 14" paper, end fence must be removed (and stored in an internal storage compartment).
- You can secure both fences with screws at standard positions.

Replacement and Adjustment

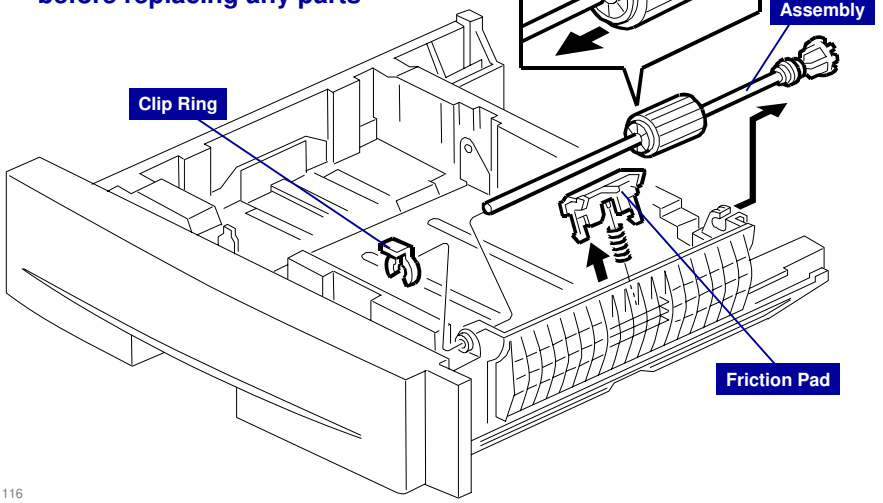
- **Examine how to remove paper tray unit from machine before you do replacement procedures. (Read Paper Tray Unit section of FSM.)**
- **You will usually have to replace these (PM interval every 120K) in the field due to normal wear and tear. Practice these removal procedures:**
  - Feed roller and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

Slide 115

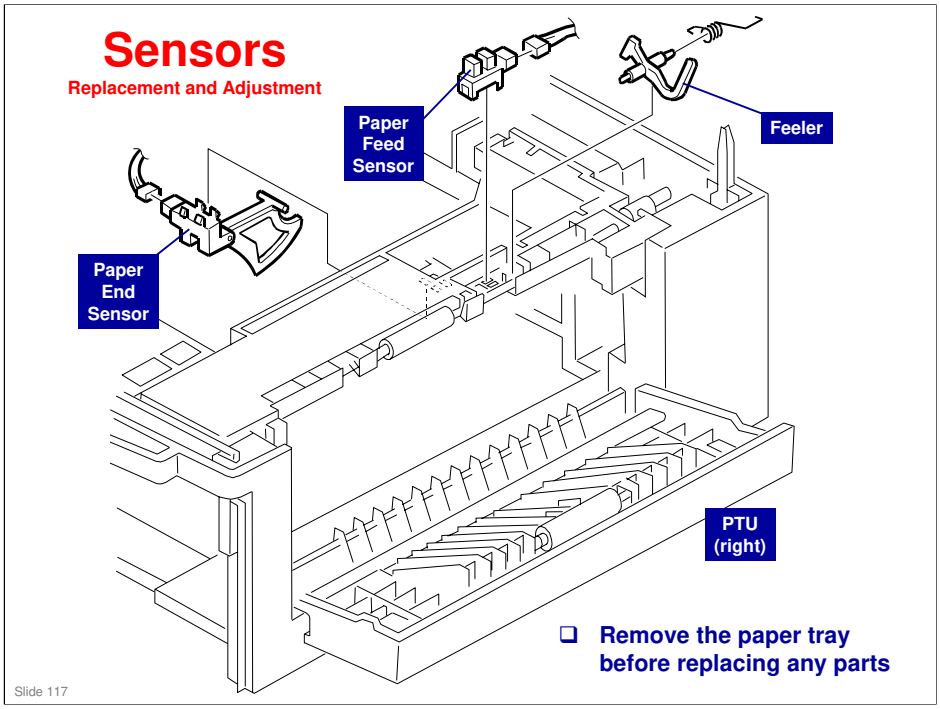
Feed Roller & Friction Pad

Replacement and Adjustment

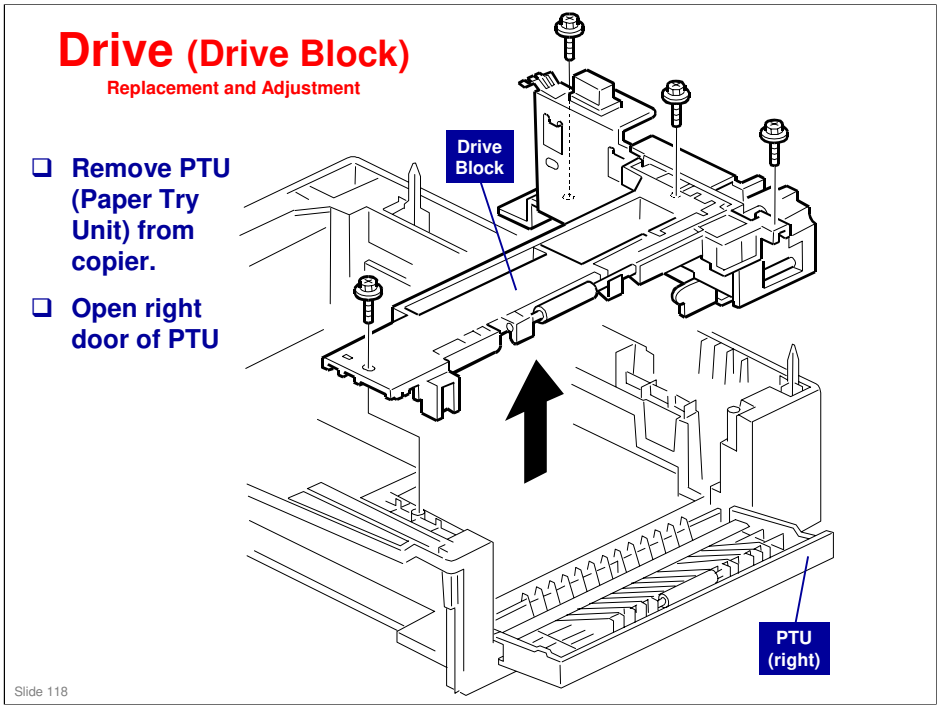
- Remove the paper tray before replacing any parts



Slide 116



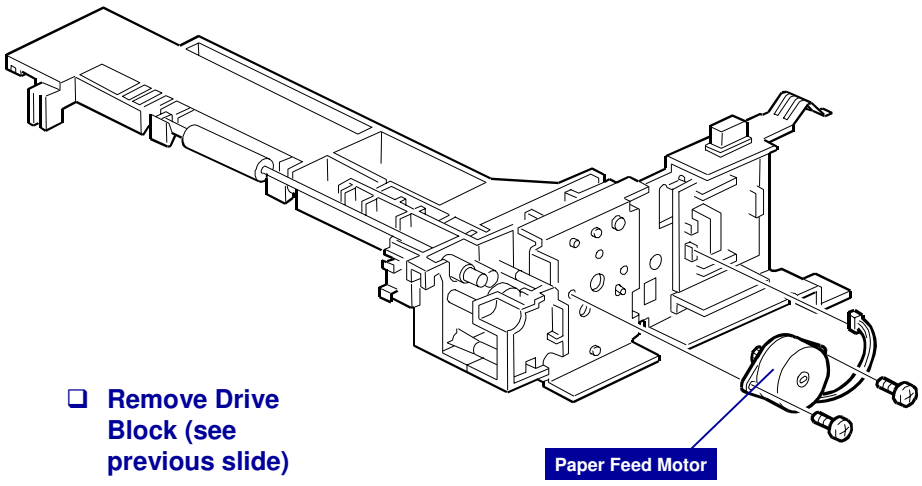
PTU - Paper Tray Unit



PTU - Paper Tray Unit

Drive (Paper Feed Motor)

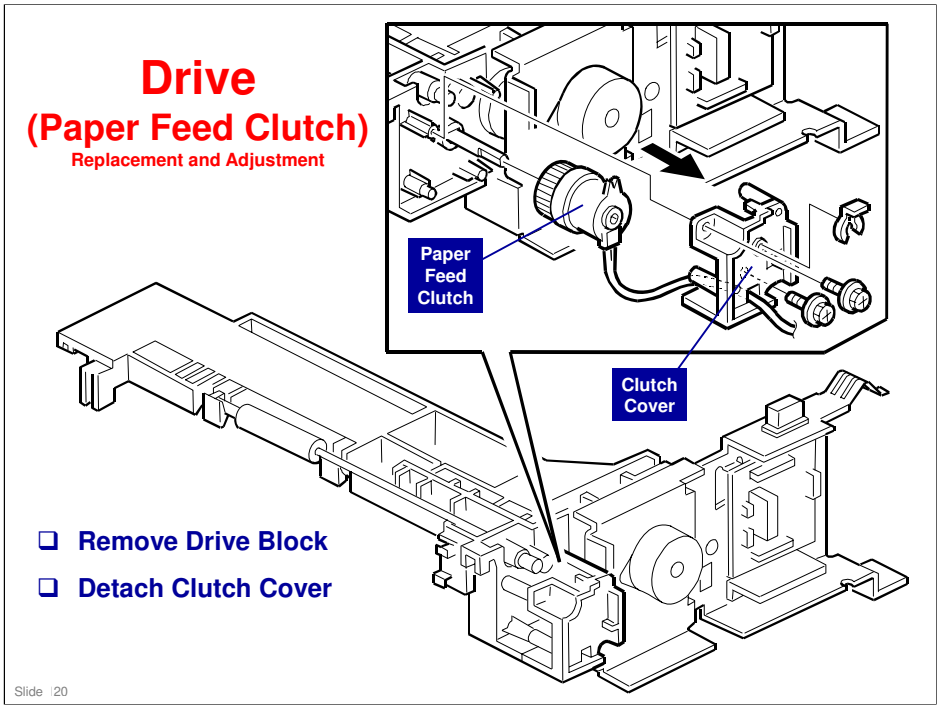
Replacement and Adjustment



- Remove Drive Block (see previous slide)

Paper Feed Motor

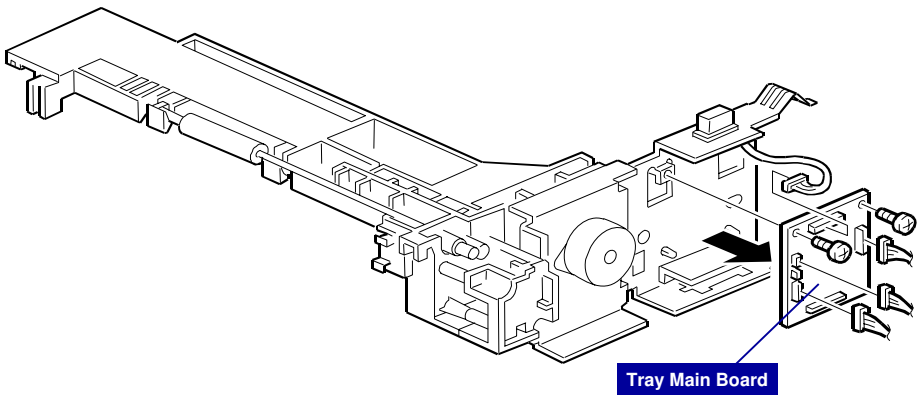
Slide 119


Drive
(Paper Feed Clutch)
Replacement and Adjustment
Paper Feed Clutch
Clutch Cover
Remove Drive Block
Detach Clutch Cover
Slide 20

.

Drive (Tray Main Board)

Replacement and Adjustment



Slide 121

RICOH

RICOH

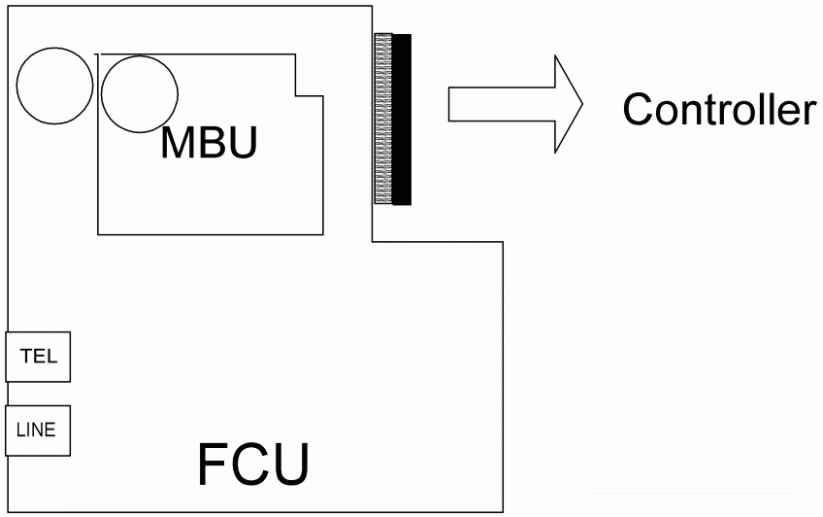
D067/D072/D068/D069
Service Training

Fax Unit

Slide 122

.

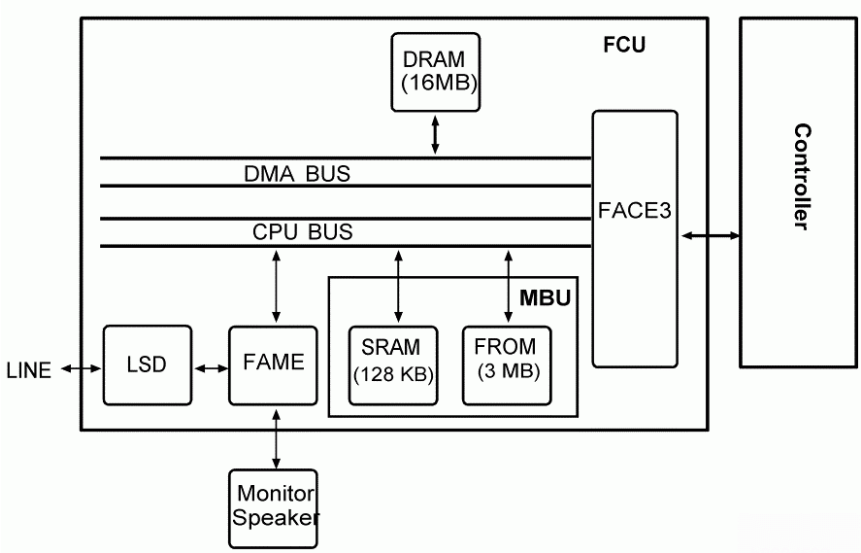
Fax Unit - Overview



- 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.

Slide 123

FCU Board



- FCU (Facsimile Control Unit) controls fax communications, video interface to base copier's engine, and all the fax options.

Slide 124

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.

Slide 125

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.

Slide 126

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.**

Slide 127

Specifications:

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

RICOH

RICOH

D067/D072/D068/D069
Service Training

Preventive Maintenance

Slide 128

.

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)

Slide 129

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

Slide 130

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

Slide 131

.

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.

Slide 132

RICOH

RICOH

D067/D072/D068/D069
Service Training

Troubleshooting

Slide 133

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.

Slide 134

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.

Slide 136

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

Slide 137

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

Slide 138

End of Course

Slide 139