RICOH

B246 SERIES TRAINING

COPIER ENGINE

PRODUCT OUTLINE

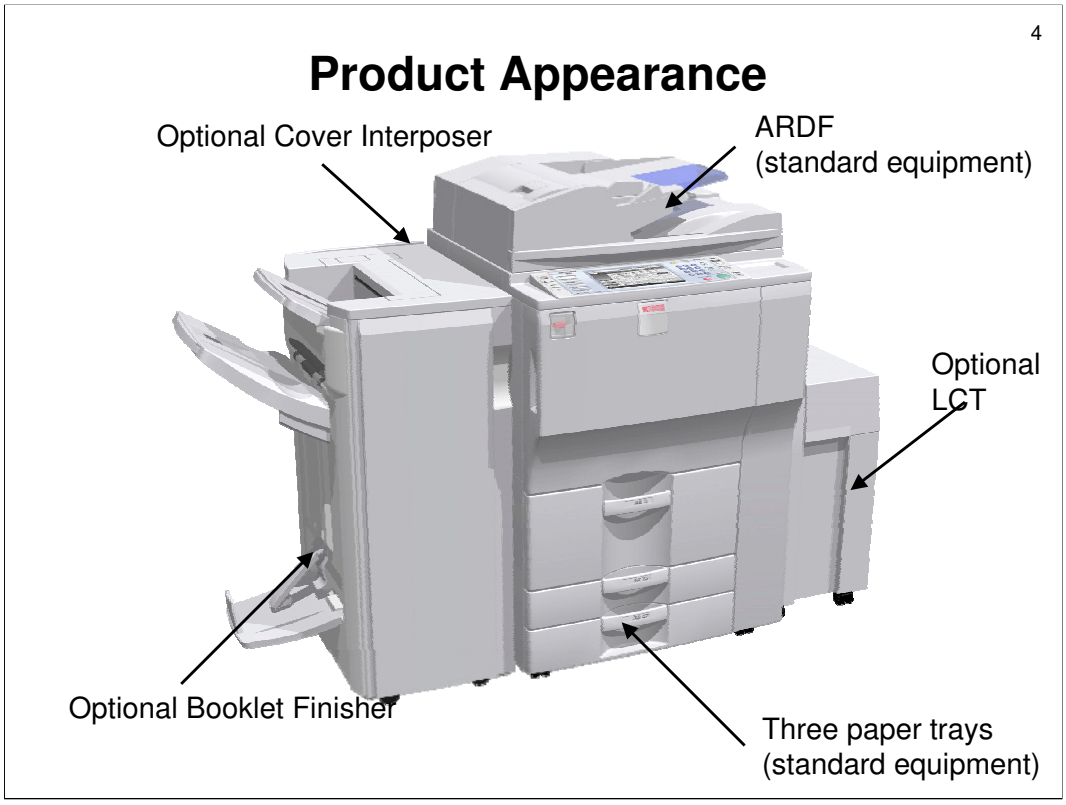
- The model will be introduced to the class.
- The optional peripherals will be introduced to the class.
- The product concept, sales points, and targets will be presented.

Basic Information about the B246 Series

How many Models in the Series?

- **Six models**
  - B246/B250: 55 cpm
  - B248/B252: 65 cpm
  - B249/B253: 75 cpm
- **B250, B252, B253 contain the printer/scanner unit as a standard component.**
- **The printer/scanner unit is an option for the B246, B248, and B249.**

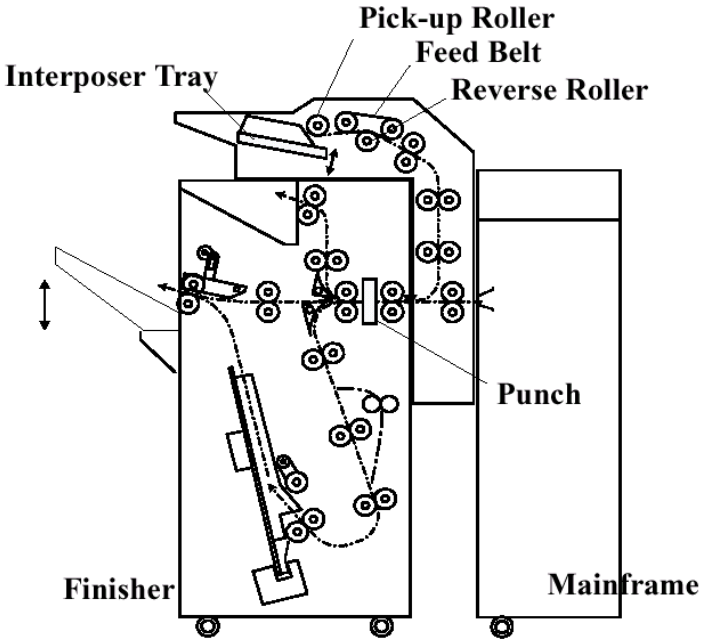
❒ The copy speeds are for A4/LT LEF.



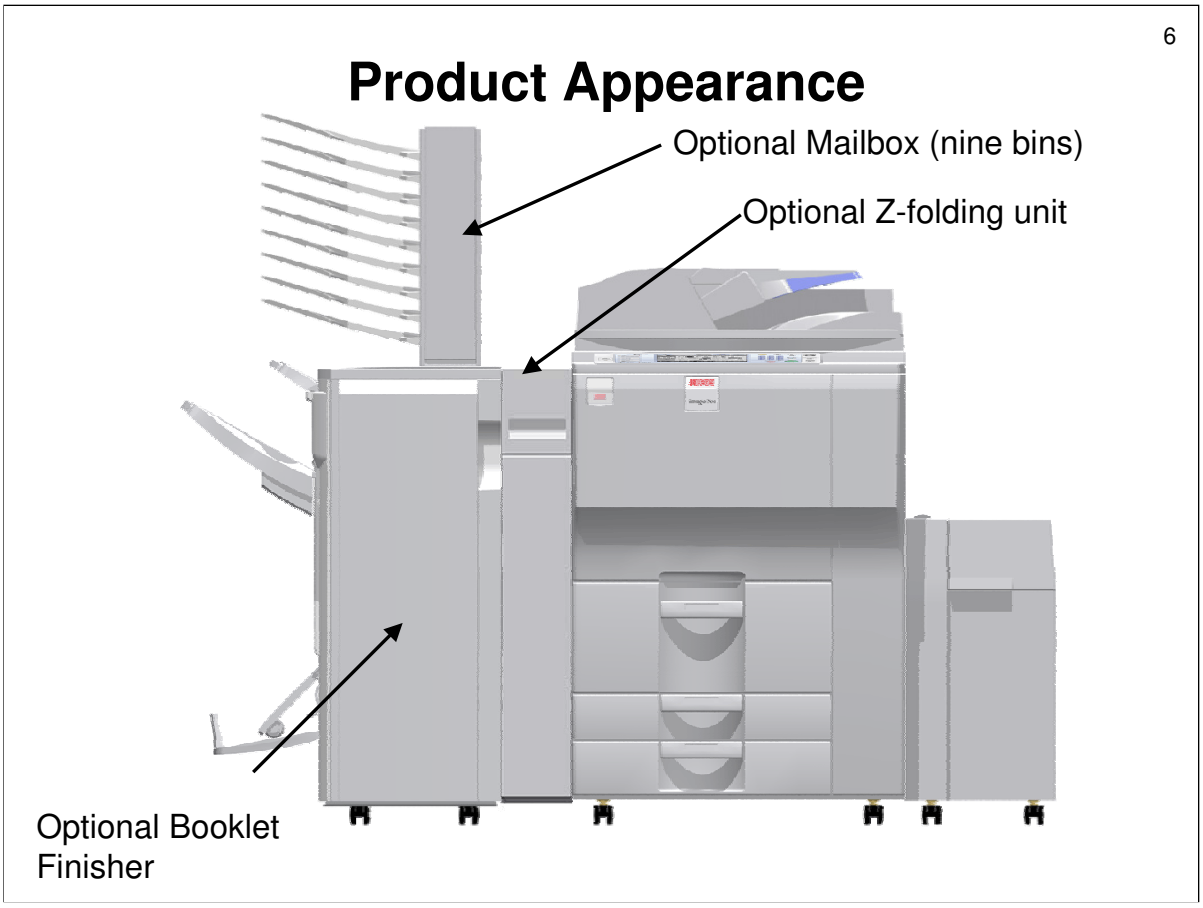
PRODUCT APPEARANCE

- The first few slides illustrate what the machine looks like, with some of the options connected.
- Here we see a finisher and an LCT attached.
- The ARDF (capacity: 100 sheets) is standard equipment for this model, not an option. It has a CIS built in, which allows both sides of a double-sided original to be scanned at the same time.
- The three built-in paper trays are as follows:
  - Tray 1: 1550 sheet x 2, tandem LCT
  - Trays 2 and 3: 550 sheets each
  - In addition, the built-in bypass tray has a capacity of 100 sheets.
  - Optional LCT: 4,000 sheets (2,500 if the LG/B4 kit is installed)
  - Adding it all up, the machine has a maximum paper capacity of 8,300 sheets (A4/LT).
- The tandem tray (main frame, tray 1) can only handle sizes up to A4/LT. The DLT/A3 tray allows tray 1 to hold sizes up to DLT/A3 (1000 sheets). However, this will not be a tandem tray.
- Trays 2 and 3 are adjustable to hold a wide range of paper sizes.
- The LCT can only handle sizes up to A4/LT. The LCT can be fitted with an LG/B4 option to allow it to hold paper sizes up to LG and B4.
  - However, if the tray is modified in this way, some short paper sizes, such as A4SEF, cannot be added, because the end fence will not reach them. A4LEF can still be used.
- The cover interposer is used with the finishers. It inserts cover sheets in the locations specified by the user.

Interposer Tray



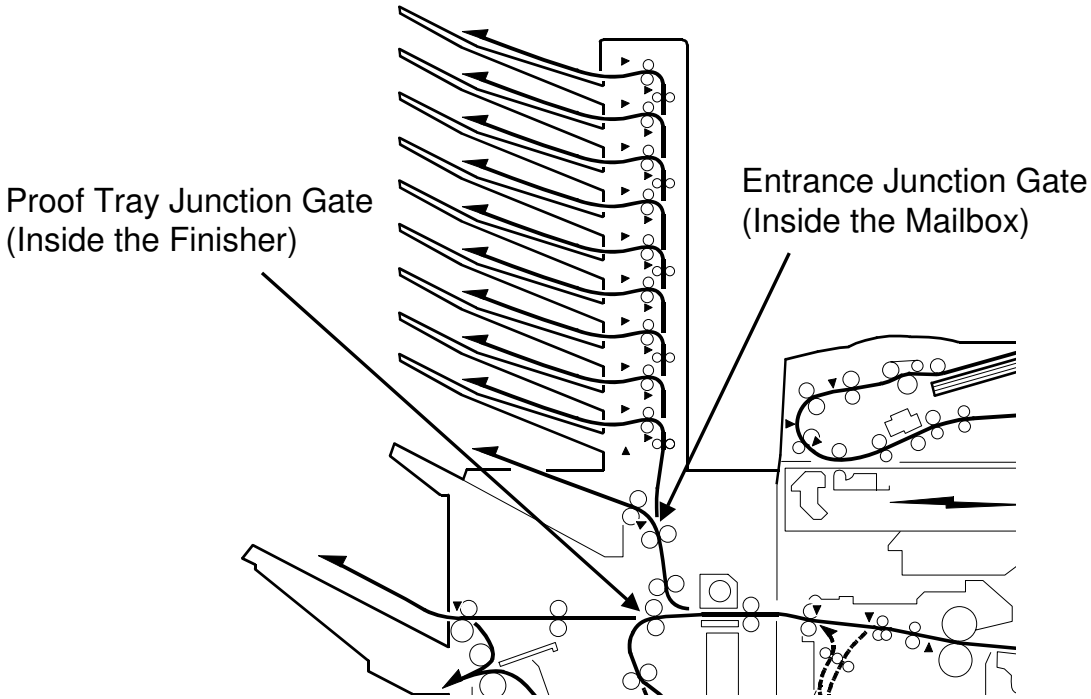
- This slide shows how cover sheets are fed into the paper feed path between the mainframe and the finisher.
- The cover interposer allows cover sheets to be inserted at the times selected by the users. It is installed between the mainframe and the finisher, but is like an ADF, feeding cover sheets into the paper feed path between the copier and the finisher.
  - It requires a finisher, but cannot be installed if the optional mailbox is installed.



PRODUCT APPEARANCE

- Here, the cover interposer is replaced with a nine-bin mailbox.
- A z-folding unit is also installed. This can only be used with a finisher (B700 or B701, not the B706).
  - It must be installed between the finisher and the copier.
- The mailbox bin capacity is 100 sheets per bin. The mailbox can only be installed if a B700/B701 finisher is installed. But it cannot be used with the B706 finisher.
  - In the B700/B701 finishers, a junction gate directs paper either to the proof tray or to the other output trays. If the mailbox is installed, another junction gate inside the base of the mailbox then directs paper either up to the mailbox or out to the proof tray.
  - The B706 finisher cannot divert paper up to the mailbox.

Paper Path to the Mailbox



- In this model, the mailbox is connected to the optional finisher, not to the main copier. This is unusual.
- The proof tray junction gate diverts the paper either out to the proof tray or into the finisher for various stapling, shift sorting, or folding operations.
- If the mailbox is installed, the entrance junction gate inside the base of the mailbox then diverts the paper either up into the mailbox or out to the finisher proof tray.

What Options Does the Machine Have?

Engine Options

- **A3/DLT Kit for Tray 1: Same as the B140 series**
- **Tab Sheet Kit: Same as the B140 series**
  - This can be installed at any time in paper tray 2 or 3 to let it feed tab sheets.
- **Large Capacity Tray (LCT): Same as the B140 series**
- **LG/B4 Kit for the LCT: Same as the B140 series**
- **Copy Tray: Same as the B140 series**
- **Cover Interposer: Same as the Venus-C1 (almost the same as B140)**
  - Cannot be installed if the mailbox is installed
- **Mailbox: Same as the B140 series**
  - Cannot be installed with the cover interposer or B706 finisher

Engine Options - Finishers

- **B700: 2000-sheet Booklet Finisher (same as Venus-C1)**
  - This finisher has three trays: a proof tray on top of the finisher, an upper (shift) tray, and a lower tray for booklets.
- **B701: 3000-sheet Finisher (same as Venus-C1)**
  - This finisher has two trays: a proof tray on top of the finisher and the upper (shift) tray.
  - This finisher does corner stapling only. It does not have a lower tray for stapled and folded booklets.
- **B706: 3,000-sheet finisher with 100-sheet stapler (same as the B140 series)**
  - This finisher contains a jogger mechanism for z-folded output. But the z-folding unit cannot be attached to this finisher when installed on the B140/B246 series.

- There are three types of finisher for this model.
- A range of hole punch units is available for each finisher.
- The B706 finisher with 100-sheet stapler also has an optional jogger unit which tidies up the copy stack as it leaves the finisher exit. The jogger unit can only be used with the B706.

Engine Options

- **Finisher Options**
  - Z-folding unit: Same as the Bellini-C3
    - A B700 or B701 finisher must be installed. The B706 finisher cannot be used with the z-folding unit.
  - Punch units
    - There are optional punch units for each finisher. The punch units for the B700/B701 are different from the ones for the B706.
    - Each punch unit has three types, for different parts of the world.
  - Jogger unit
    - The B706 finisher has an optional jogger unit. This unit jogs the edges of the copy stack when it goes out from the finisher exit.
    - The jogger unit can only be used with the B706.

- **Z-folding unit:** This unit puts two folds in the output before feeding it out.
  - B140 series: Uses the B660-17, -26, -27 z-folder
  - B246 series: Uses the B660-57, -66, -67 z-folder, not the same as the B140 series.
- Punching and z-folding cannot both be done in the same job.

Other Engine Options

- **Media link board: New**
- **Copy connector kit: New**
- **Copy tray: Same as the B140 series**
  - The user must install a finisher, a mailbox, or this copy tray.
- **Data Overwrite Security (DOS) unit: Same as the B140 series**
- **Copy Data Security Unit: New**
- **Key counter**
- **USB Host Interface: New**
- **Browser unit: New**
- **VM card: New**

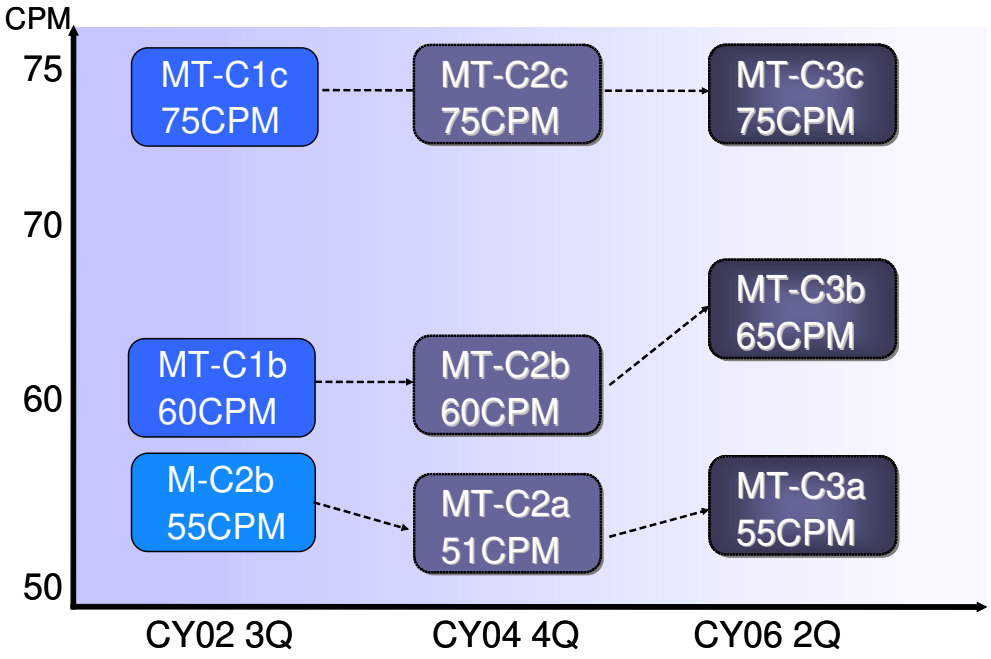
- **Media link board:** This is also called the 'file format converter'.
- **Copy tray:** If the customer does not want a finisher or a mailbox, they will need this tray, which they must obtain as an option (it is not a standard part of the machine). The capacity is 500 sheets (A4/LT) or 250 sheets (A3/DLT).
- **Cumin-M**
  - The machine has a built-in network interface for @Remote, called 'Cumin-N'. This is for connection to the remote service station with a network connection.
  - For users who must use the telephone line to dial up the service station, the Cumin-M must be installed.

Controller Options

- **Printer/scanner kit: New**
  - B250, B252, B253 contain the printer/scanner unit as a standard component.
  - The kit contains an SD card with the scanner/printer firmware, a USB/Ethernet board, and a 256-MB memory DIMM.
- **PostScript3 kit: New**
- **Interfaces: Only one of these can be installed at the same time:**
  - IEEE1284 interface
  - IEEE1394 interface
  - IEEE802.11b interface
  - Bluetooth interface
  - @Remote interface for telephone line connection (also called 'Cumin-M'): New
- **Gigabit Ethernet interface**

❒ If a printer/scanner kit is installed, the 256 MB memory must be installed.

Positioning



Sales Points

- **Improved Usability**
  - Large WVGA display (8.5 inch W-VGA panel, 800x480)
  - Reduced steps for LDAP search
  - “Simplified display” button: Displays fewer functions.
  - Login/Logout Hardware Key
  - Better access for user authentication
- **Productivity**
  - Two-sided scanning ADF: Faster two-sided copying
- **Security**
  - Copy Data Security Unit
  - Data Overwrite Security unit
  - Authentication
- **Quick Start: 30 seconds to warm up**

Two-sided scanning in the ADF

- The ARDF contains a CIS that scans the reverse side of originals passing through the ARDF. The CCD in the scanner scans the front side. This means that both sides of two-sided originals can be scanned at the same time. There is no inverter mechanism in the ADF.
- Because of this, the copying speed is unchanged for ADF 1 to 1 copying.

Faster Warm-up

- **To decrease warm-up time, a smaller number of steps is done immediately after the machine power is turned on. These are the steps.**
  - Drum potential sensor calibration
  - Development bias adjustment
  - Grid voltage adjustment
  - Laser diode power adjustment
- **The number of steps is controlled by SP 3904.**
- **The default is 0 (the minimum number of steps is done), and the charge corona wire is not cleaned. The machine is ready after 30 seconds.**
- **Other settings of SP 3904**
  - 1: The charge corona wire is also cleaned. Warm-up time is 70 seconds
  - 2: Full process control is done. The same as the B064. Warm-up time is 240 seconds

Reliability and Service Targets

- **Average Monthly Copy Volume**
  - B163: 25 k
  - B140: 30 k
  - B141: 50 k
- **Maximum Monthly Copy Volume: 150 k**
- **PM Interval: 300 k**
- **EM Interval: 100 k**
- **MCBC: 75 k**
- **Estimated Unit Life: 9000k prints or 5 years**
- **Time necessary to install the machine: 30 minutes for the main copier.**

Target Yields

- **Toner: 43k copies per bottle**
- **Developer: 350k copies per bottle**
  - The PM cycle is 300 k, so the developer will often be changed at 300 k.
- **Compatibility**
  - The toner and developer can be used with the B064 and B140 series.
  - The OPC drum is new and cannot be used with the B064 and B140 series.

TARGET YIELD

❒ Toner yield is based on a Ricoh 6% A4 chart under normal operating conditions.

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COPIER ENGINE

SPECIFICATIONS

❒ This section will take a quick look at the important specifications.

Specifications - 1

- **Copying Speed (A4/LT LEF)**
  - B246/B250: 55 cpm
  - B248/B252: 65 cpm
  - B249/B253: 75 cpm
- **First Copy Time (A4/LT LEF, Tray 1, face up, platen mode)**
  - B246/B250: 4.2 s, B248/B249/B252/B253: 3.5 s
- **Warm-up Time**
  - Less than 30 s from auto off mode, and from energy saver mode

First Copy Time

- Face-down is slower

Specifications - 2

- **ADF capacity: 100 sheets (12 mm stack thickness)**
- **Original size (ADF)**
  - A3 – B6 (for one-sided copying)
  - 11”x 17” – 5 1/2” x 8 1/2”
- **Original weight**
  - 1-sided original: 40 ~ 128 g/m^2 (11 ~ 34 lb.)
  - 2-sided original: 52 ~ 128 g/m^2 (14 ~ 34 lb.)

Specifications - 3

- **Paper capacity**
  - Standard: 4,300 sheets
  - With optional LCT: 8,300 sheets
- **Paper sizes**
  - Paper tray, Duplex: A3/11" x 17" – A5 SEF/5.5" x 8.5"
  - By-pass tray: A3/11" x 17" – A6 SEF/5.5" x 8.5"
  - Non-standard sizes
    - Width: 100 – 305 mm (4" x 12")
    - Length: 148 - 600 mm (5.5" x 23.4")
- **Paper weight**
  - Paper Tray: 52.3 ~ 127.9 g/m^2 (14 ~ 34 lb.)
  - Duplex: 64 ~ 127.9 g/m^2 (17 ~ 34 lb.)
  - By-pass: 52.3 ~ 216 g/m^2 (14 ~ 58 lb.)

❒ LCT capacity: 4,000 for A4/LT, 2,500 if the LG/B4 kit is installed

Specifications - 4

- **Output Tray Capacity:**
  - A4/8.5" x 11" and smaller: 500 sheets
  - B4 and larger: 250 sheets
- **RAM: 256 MB (expandable to 512 MB)**
- **HDD: 80 GB**
- **Scan Resolution: 600 dpi**
- **Print Resolution: 1,200 dpi**

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B246 SERIES TRAINING

COPIER ENGINE

INSTALLATION

- This section explains how to install the copier and all the optional peripherals.
- Installing the scanner/printer controller hardware will be covered. However, installing drivers and software will not be covered in this course.
- Make sure the class members all get a chance to install all of the peripherals.
- Go over the slides with the class before starting the installation. These slides cover a few important points about installation.

Overview

❒ This section tells you what units the class will install.

Installation Procedure – Main Units (1)

- **Install the copier**
  - Adjust the tandem tray to the size required by the user
  - One one machine, install the optional A3/DLT tray kit.
- **Install the LCT**
  - Install the LG/B4 feeder kit for the LCT on one LCT before putting it in the machine
- **Install the finisher but do not dock it to the machine.**
  - Install the B706 finisher on one machine, and the B700 or B701 finisher on another machine
  - In the B706 finisher, install the optional jogger unit
- **Install the cover interposer on the finisher**
- **Install the optional z-folding unit**
  - You can only install this on the B700 or B701 finisher
- **Dock the finisher/cover interposer assembly to the machine**

- Have the class install the copier and its peripherals in the order shown on the slide.
- **The class members must follow the procedures in the manual, and take note of all warnings and cautions in the procedures.**
- Tandem tray: If the user doesn't wish to use the default paper size, the technician has to adjust the tray and change an SP setting. The class must try this on one of the machines.
- LG/B4 kit for the LCT: To install this, you have to take the LCT off the machine. So, have the class do it on one of the LCTs before installing the LCT in the main machine.
- The cover interposer tray and the mailbox cannot be installed on the same machine, so install one of each one separate machines.
- Scanner/printer controller: At this stage, the class can install drivers and software on their computers if you wish. However, we are not covering that in this instructors guide.
- There is also an optional scanner anti-condensation heater. Have the class install this also.
  - The procedure is in the Replacement and Adjustments section of the service manual (section 3.4.11).
- The other anti-condensation heaters (transfer belt, paper trays) are standard equipment, not options.

Installation Procedure – Main Units (2)

- **Install punch units inside the finishers**
  - Make sure you install the correct type of punch unit for each finisher.
- **Install the nine-bin mailbox**
  - This must be a machine with a B700/B701 finisher
  - You cannot install the mailbox on the same machine as a cover interposer.
- **Install the scanner/printer controller and the options**

- Have the class install the copier and its peripherals in the order shown on the slide.
- **The class members must follow the procedures in the manual, and take note of all warnings and cautions in the procedures.**
- Tandem tray: If the user doesn't wish to use the default paper size, the technician has to adjust the tray and change an SP setting. The class must try this on one of the machines.
- LG/B4 kit for the LCT: To install this, you have to take the LCT off the machine. So, have the class do it on one of the LCTs before installing the LCT in the main machine.
- The cover interposer tray and the mailbox cannot be installed on the same machine, so install one of each one separate machines.
- Scanner/printer controller: At this stage, the class can install drivers and software on their computers if you wish. However, we are not covering that in this instructors guide.

Important Points about Installation: Copier

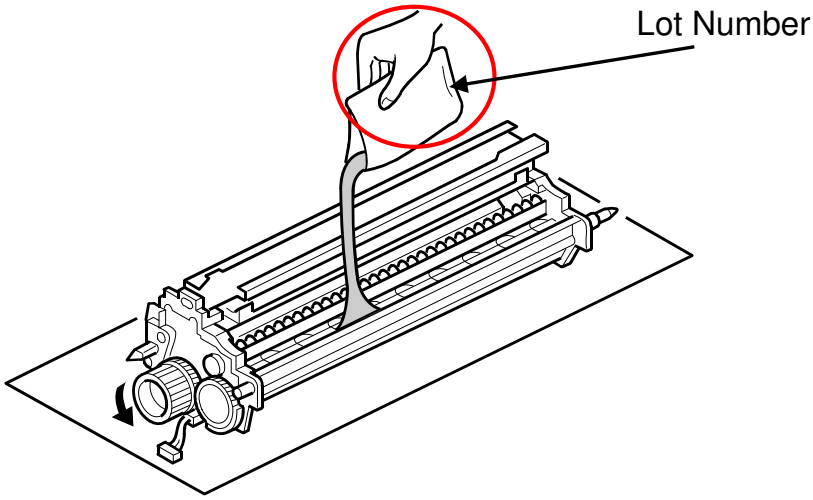
- These next few slides will explain the important points about installation.
- Go over these points with the class. Then the class will install their machines.

Development Unit

- **Before you start work on the development unit, you must check if there is a toner bottle installed.**
- **If there is a toner bottle, remove it.**
- **If you do not do this, the toner bottle holder will be damaged during the installation procedure.**

Removing and Filling the Development Unit, before step 1

Development Unit

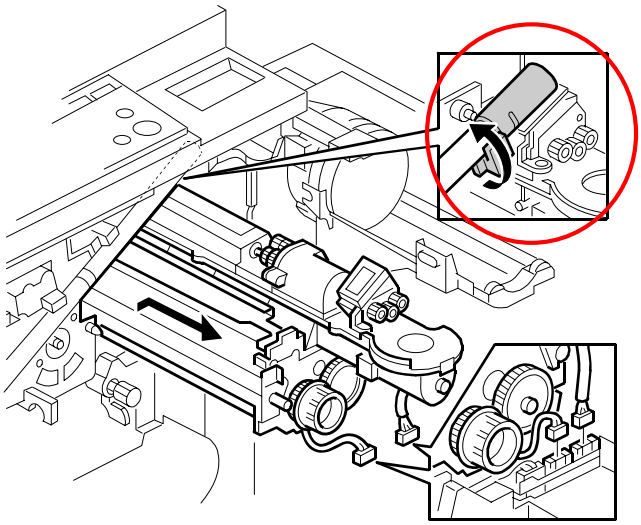


- **Don’t lose the developer bag - you will need the lot number later on in the installation.**

Removing and Filling the Development Unit, step 12

- You have to input the developer lot number as part of the developer/process control initialization procedure - we shall see later.
- This allows machines with bad lots of developer to be traced more easily if problems occur.
- This will be a common procedure in all models from now on.

Development Unit

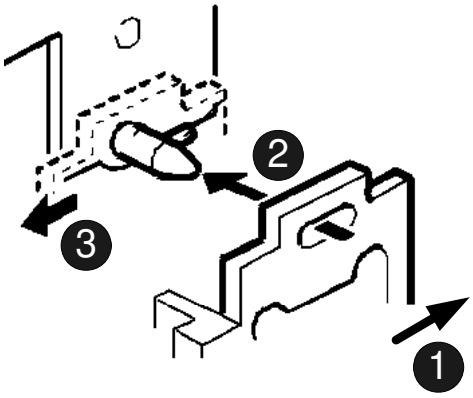


- **Do not forget to rotate the shutter back down after putting the development unit back.**
- **Otherwise, the door will not close.**

Removing and Filling the Development Unit, step 14

❒ So, if the door wont close, don't try to force it. Maybe someone forgot to put the shutter back in the correct position.

Development Unit



Correct

Incorrect

- **This step ensures that the gears mesh correctly.**

Reinstalling the Development Unit

❒ Follow the instructions on this page carefully when putting the development unit back. This ensures that the gears mesh properly.

SP 2963 - Initialization

- **SP 2963: Initializes the following items**
  - Developer, Toner supply mechanism, Process control settings
- **Do it immediately after installation, before making test copies.**
- **Open the front door. Then switch the machine on.**
- **Then go into the SP mode. Then close the front door.**
- **Then do SP 2963.**
  - SP 2963 must be done before the first auto process control. If you open the front door before you turn the machine power on, auto process control will not start at this time.
  - This SP is only used during installation.
  - During SP 2963, you must input the lot number that is written on the developer packet.
- **When adding new developer in a machine already installed, use SP 2801.**
  - Do not use 2801 at installation.

Initializing the Drum Settings (B140/B246 Series)

❒ Go over the points on the slide.

❒ After the power is switched on, auto process control is done. In a new machine, if SP2963 is not done first, auto process control will not initialize the machine correctly. So it is important to open the door before you start to do SP 2963.

Tandem Tray

- **Check with the customer what paper size they wish to use.**
  - The customer cannot change the paper size themselves.
- **If necessary, set up the tandem tray for a different paper size.**
- **Then, set SP 5959 001 to the correct paper size.**

Tandem Tray

- If the user doesn't wish to use the default paper size, the technician has to adjust the tray and change an SP setting.
  - Don't forget to change the SP mode setting after changing the size. The users do not have a user tool to do this if you forget.
- The class must try this on one of the machines.

SP Modes

- **SP5302: Time zone setting**
- **SP5812 001~004: Service and supply Telephone Number Settings**
- **SP5841 001: Supply Name Setting – Toner Name Setting: Black**

SP codes

- The toner name appears on the display when the user presses the Inquiry button on the user tools screen.
- Key cards: This is not officially supported outside Japan. If you try to use a key card, note the use of SP5921 and 5113 (see the SP table).

Downloading Stamp Data

- **Normally only needed after replacing the hard disks.**
- **Must also be done during the machine's installation procedure.**
- **Copy from the firmware using SP5853.**

Service Manual, section 5.4.1

- Stamp data is on the hard disks. It is on both hard disks, and the data on each disk must be exactly the same.
- New hard disks (spare parts) have no stamp data.
- If a hard disk breaks and must be replaced, both hard disks must be replaced, and the stamp data must be copied back from the firmware onto the new hard disks.
- The stamp data is not copied from a card. It is part of the firmware and can be copied onto the disks with SP 5853.
- Why not have the stamp data on the disks to begin with? Why do we have to copy it in the field? The same types of disk may be used on different models, and the data required for each model may not be the same.

Installation: Copier

Install your Copiers

- **Installation Procedure**
  - Service manual, section 1.2.2
  - Do the procedure in the manual.
  - Obey all warnings and cautions in the procedure.

❒ Do not install the options at this time.

Important Points about Installation: Options

- These next few slides will explain the important points about installation.
- Go over these points with the class. Then the class will install the options.

A3/DLT Kit for the Tandem Tray

- **Install in tray 1 if the user needs A3/DLT in tray 1, and does not require the tandem tray.**
- **Then, set SP 5959 001 to the correct paper size.**

Service manual, section 1-3

❒ Don't forget to change the SP mode setting after changing the size. The users do not have a user tool to do this if you forget.

Installing the LCT

- **Make sure that the paper size is suitable for the user.**
  - Users cannot adjust the paper size for the LCT themselves.
- **If it is not, move the side fences (see the B473 manual), then change SP 5959 005.**
  - If the user wants to put B4 or Legal paper in the LCT, you have to install the B4/LG feeder kit, then change SP 5959 005.

Service manual, section 1-4

❒ The installation procedure for the LCT is here

Service manual, section 1-5

❒ The installation procedure for the B4/LG feeder kit starts here.

B473 service manual, page 6

❒ The procedure for adjusting the LCT for another paper size is not in the main copier service manual.

❒ Don't forget to change the SP mode setting after changing the size. The users do not have a user tool to do this if you forget.

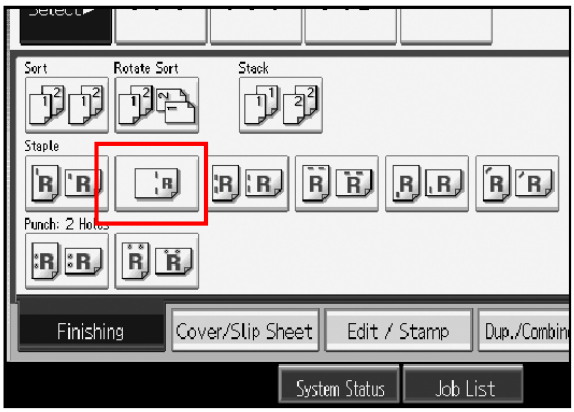
Installing the B706 Finisher

- **After installing the finisher, input the staple types with SP 5841.**
- **If you install the cover interposer, wait until after you install the cover interposer before you dock the finisher to the machine.**

Service manual, section 1-10

Installing the B700/B701 Finishers

- **Move the finisher slowly, to avoid bending the entrance guide plates.**
- **After installing the finisher, input the staple types with SP 5841.**
- **For the B700 finisher, to use booklet stapling, you must make sure that the center-position stapling option is displayed (see below). If it is not, select the center-position stapling mode with a user tool.**
  - Copier/Document Server Features - Input/Output - Stapling Position
  - Touch any staple position button, and select the centre-stapling option.



Service manual, section 1-14

❒ The staple types, input with SP5841, appear on the screen when the user presses the Inquiry button in the user tools screen.

➢ This feature lets the user display information about ordering supplies.

Installing the B700/B701 Finishers

- **If you install the cover interposer, wait until after you install the cover interposer before you dock the finisher to the machine.**

B700/B701 Finishers – Auxiliary Trays

- **During the installation, the auxiliary trays are stored in a pocket at the back of the finisher.**
- **Make sure that the customer understands the purpose of these trays.**
  - The service manual contains an explanation.

Service manual, section 1-14, Auxiliary Trays

B700/B701 Finishers – Jogger Unit

- **Set SP 6118 to 1 after you install the B703 jogger unit option.**

Punch Units

- **Make sure that you install the correct punch unit for each finisher.**
  - The B700 and B701 use the same punch unit, but the B706 uses a different one.

Installing the Cover Interposer (B704)

- **Use the procedure for the B704 cover interposer, not the B470.**
- **Procedure:**
  - First, prepare the finisher
  - Attach the extensions
    - The procedure for the B700/B701 finisher is not the same as for the B706 finisher.
  - Attach the cover interposer to the finisher.
  - B706 finisher only: Install the corner plates
- **Do not dock the cover interposer to the machine until after you install the z-folder unit.**
- **After you install everything:**
  - If the correct size is not detected or displayed on the operation panel, use SP 6107.

Service manual, section 1-16

❒ In some cases, the machine displays the wrong paper sizes for paper in the cover interposer.

❒ This is because some sizes cannot be distinguished by the sensors. SP 6107 helps the machine to detect the size when it gets it wrong.

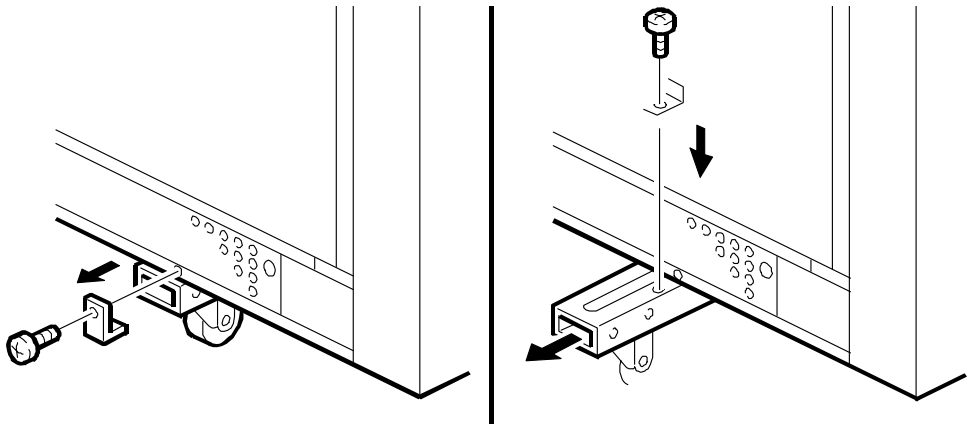
Installing the Z-folding Unit

- **You can only install this on the B700 or B701 finisher.**
- **Procedure:**
  - Dock the z-folder to the finisher
    - Extend the supports at the base (see the next slide).
  - Dock the z-folder/finisher/cover interposer assembly to the copier
  - Test the breaker switch

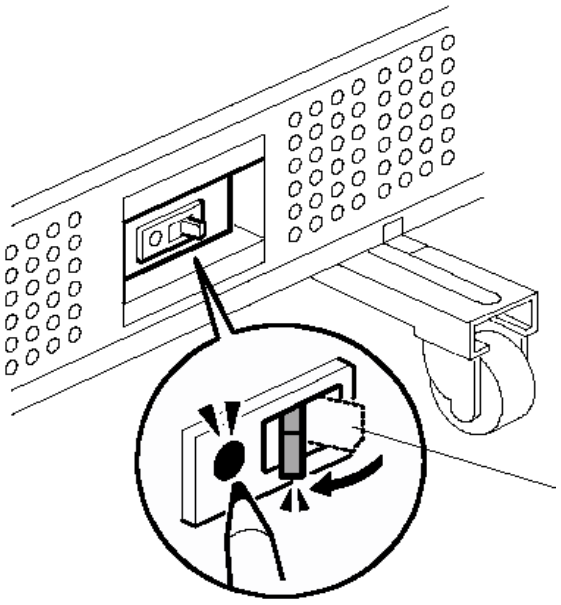
Service manual, section 1-13

Installing the Z-folding Unit

- **Extend the feet as shown below.**
  - The Z-folding unit is not stable, with or without the feet extended. Do your work carefully; do not tilt the unit.



Testing the Breaker Switch on the Z-Folder



- **The breaker switch is at the lower right side of the z-folder.**
  - You must disconnect the unit physically from the machine, but not electrically.
- **Make sure that it is set to the right (this is the 'on' position).**
- **Make sure that the main power switch of the copier is off.**
- **Push the breaker test button with the tip of a screw driver until the breaker switch snaps to the off position (left).**
- **Reset the breaker switch to the on position.**

- There is no breaker switch in the copier.
- The power cord for the z-folder unit supplies power to the z-folder only. The power cord to the main copier supplies power to the main copier and all other options except for the z-folder.

Installing the Mailbox (B762)

- **Use the procedure for the B762 cover interposer, not the B471.**
- **If the cover interposer is installed, you must remove it before you install the mailbox.**

Service manual, section 1-18

Installation: Options

Install the Options - 1

- **B475 A3/DLT kit for the tandem tray: Section 1.3**
- **B473 LCT: Section 1.4**
- **B474 LG/B4 kit: Section 1.5**
- **B700/B701 finisher: Section 1.14**
  - Do not dock it to the machine at this time.
- **B704 cover interposer: Section 1.16**
- **B660 z-folding unit: Section 1.13**
  - Dock the B700/B701 finisher/cover interposer/z-folder assembly to the copier.
  - Test the breaker switch
- **B702 punch unit: Section 1.15**
- **B703 jogger unit: Section 1.17**
- **B762 mailbox: Section 1.18**

❒ The class will install the options in the above order.
❒ Remind the class to obey all notes and cautions in the manual.

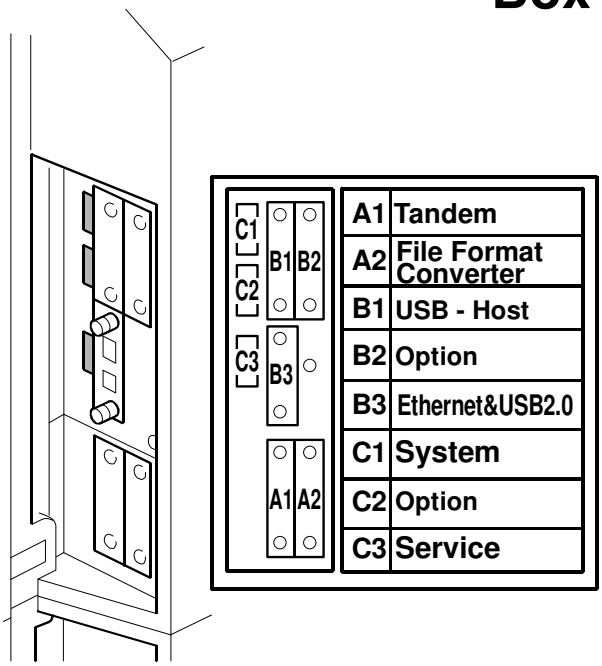
Install the Options - 2

- **Other options:**
  - B756 copy tray: Section 1.19
  - B842 copy connector kit: Section 1.21.3
  - Brackets for key card and key counter: Section 1.20

Important Points about Installation: Printer/Scanner and Options

- These next few slides will explain the important points about installation.
- Go over these points with the class. Then the class will install the options.

What are the Slots on the Controller Box?



- **On the controller box, there are 5 slots (A1, A2, B1 to B3) for boards, and 3 slots (C1 to C3) for SD cards.**
- **The function of each slot is shown on the cover. See the diagram.**
  - 'A1: Tandem' – This is for the copier connector kit
- **Each board or SD card must be put in the correct slot.**

❒ 'Tandem': Copying with the copier connection kit is sometimes called 'tandem copying'. Do not confuse this with the 'tandem tray' (tray 1).

What are the Board slots for?

- **A1: Copier connection kit**
- **A2: File format converter**
- **B1: USB Host interface**
- **B2: Interface option (one of five possible choices)**
  - IEEE1284 Interface (Centronics)
  - IEEE 1394 Interface (FireWire)
  - IEEE 802.11b Interface (Wireless LAN)
  - Bluetooth Interface
  - Cumin-M (NRS interface)
- **B3: Gigabit Ethernet/USB card**
  - This slot already contains an Ethernet/USB card, pre-installed at the factory, but this card can be replaced with the Gigabit Ethernet/USB option

What are the SD card slots for? - 1

- **C1: System card. DO NOT REMOVE, OR THE MACHINE WILL NOT WORK**
- **C2: Applications: This is the only slot for applications. To install more than one application, you must merge the software onto one card.**
  - Procedure: Service manual, section 1.23.1
  - Possible applications:
    - Printer/Scanner Kit
    - VM Card
    - Data Overwrite Security Unit
    - PostScript Unit
  - Do not copy the PostScript card onto another card. This violates Adobe's copyright.

What are the SD card slots for? - 2

- **C3:**
  - This is used for installing new firmware.
  - It is also used during the installation procedure for the browser unit.
    - The machine copies firmware from the SD card to the hard disk during the procedure.
    - You must remove the SD card from slot C3 after you install the browser unit.

Storing the Original SD Cards after Merging

- **After you merge applications onto one SD card, the original card is de-activated.**
  - It can be re-activated with the ‘Undo Exec’ procedure in section 1.23.1
- **But the customer must keep it as a proof of purchase.**
- **The original cards can be attached to the inside of the front door with tape.**
  - There is no secret compartment in this model.

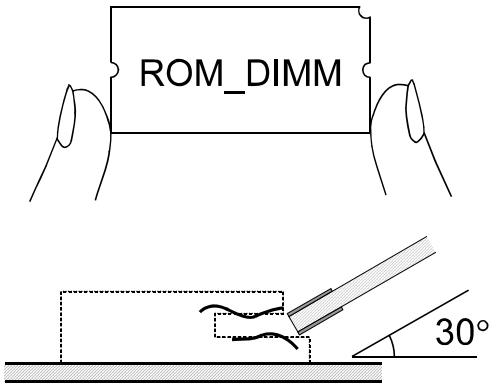
Installing the Printer/Scanner Kit

- **The printer/scanner option contains:**
  - Printer/scanner firmware SD card
  - 256MB memory DIMM
- **A 256 MB RAM DIMM must be installed in the empty memory slot.**
  - SP 7836 shows the size of the memory installed in the machine at this time.

Service manual, section 1.24.3

❒ If the extra memory is not installed, the machine will not recognize the printer/scanner option.

Installing the Printer/Scanner Kit



- **Note the correct way to install a DIMM**
  - Service manual, section 1.22.2

Service manual, section 1.22.2

Installing the Printer/Scanner Kit

- **After installation, you must change SP 5985 001 and 002 from '0' to '1', then turn the main power switch off and on.**
  - If you do not do this, the machine will not be able to use the Ethernet and USB interfaces.
- **Other SP settings:**
  - SP5907 - Plug & Play

❒ Network and driver settings are not covered in this class.

Installing the Data Overwrite Security Unit

- **Make sure that you have a type C unit.**
  - If you have the wrong type, you must replace the NVRAM inside the copier before you install the correct DOS unit.
  - After you install the unit, print an SMC report and check that you have installed the correct type.
- **Before you can install this unit, the customer must store some names and passwords related to authentication.**
- **Step 10: To do SP5878, push 'Execute'**

Service manual, section 1.24.9

Installing the Browser Unit

- During the installation procedure, you put an SD card in slot C3.
- Then, the machine copies some software from the SD card.
- After installation, you must remove the SD card from slot C3.

Service manual, section 1.24.12

Installing the Copy Data Security Unit

- **This is an IPU board.**
  - When the machine is shipped from the factory, the IPU does not have this application.
  - You must always install a new IPU board when you install the Copy Data Security Unit option.
- **Then, enable the Copy Data Security feature with a user tool.**
  - System Settings – Administrator Tools – Data Security for Copying

Service manual, section 1.24.13

Installation: Printer/Scanner and Options

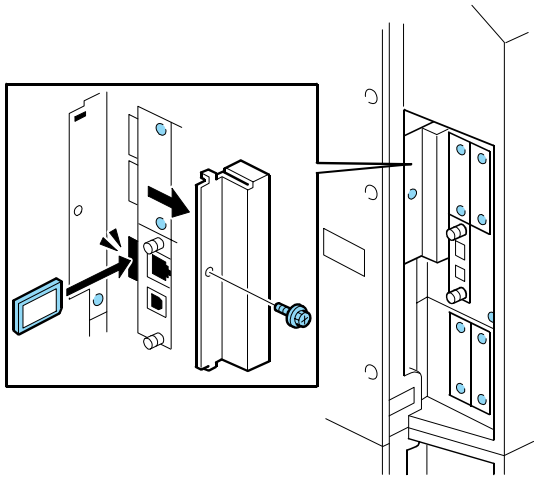
Service manual, section 1.24

Install the Options

- **Use the procedures in the service manual, section 1.24**

Updating the Firmware

Firmware Update



- **The procedure uses SD cards.**
- **Use the C3 card slot only.**
- **Procedure: Service manual, section 5-4-1**
  - If power is turned off during the procedure, download the firmware again.
  - If an error occurs, see the error code and do the instructions in the error code table
  - Also see section 4-1-3 for more information on error codes

Service manual, section 5-4-1

- ❒ Have the class update the machine firmware.
- ❒ The procedures are all in the manual.
- ❒ 'Downloading Stamp Data' is not a firmware upgrade. It copies the standard stamp data from a flash card onto a blank hard disk. After the hard disk has been formatted, this data is not on the disk. So the data must be copied onto the disk or the user cannot use any of the standard preset stamps.

RICOH

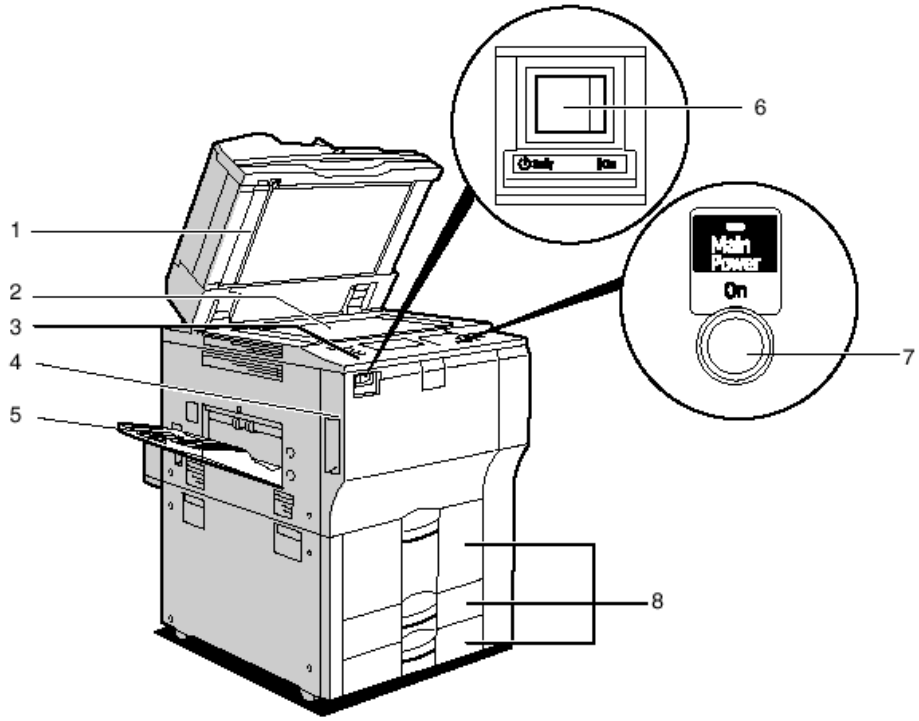
B246 SERIES TRAINING

COPIER ENGINE

OPERATION

- This section will cover important points about operation, the SP modes that are related to operation, and some of the user tools.
- Have the class try out the features covered in this section.

Main Components



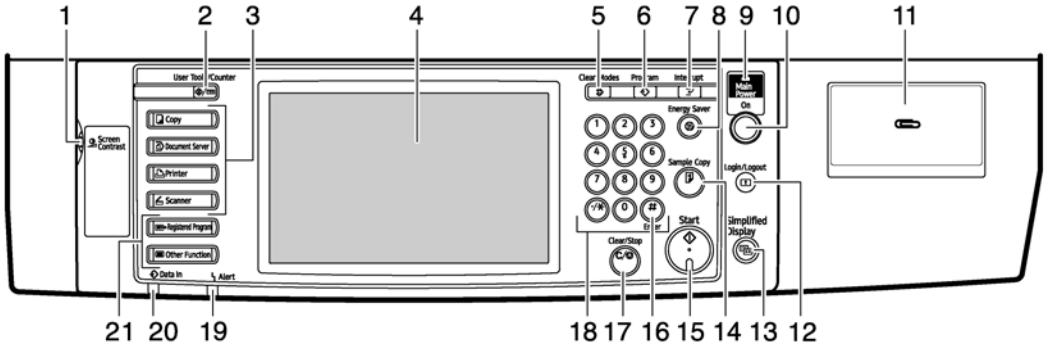
Operating Instructions – About the Machine - Getting Started – Guide to Components

- ❒ Make sure that the class is familiar with the components of the machine.
- ❒ Note the following:
  - ➢ 1. ADF: This also acts as the platen cover in book scanning mode. When scanning a two-sided document, the ADF scans both sides of the original at the same time without inverting
  - ➢ 8. Paper trays: The top tray is a tandem tray. It can be converted to a conventional paper tray for users who wish to feed sizes up to A3/DLT from this tray. Trays 2 and 3 are universal trays.

Operating Instructions - About the Machine - Getting Started - Turning on the Power

  - ➢ 6. Main power switch, and 7. Operation switch: Ask the class to study this section of the operation manual, to understand how to use the power switches.

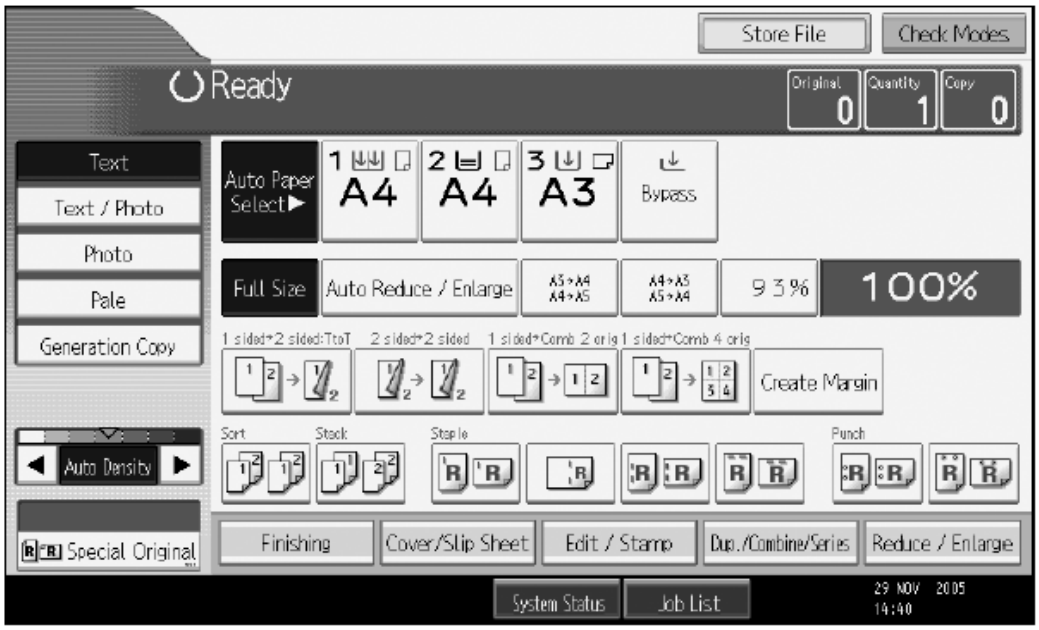
Operation Panel



Operating Instructions – About the Machine - Getting Started – Control Panel

❒ Ask the class to study this section of the operation manual, to make sure that they understand what all the buttons do.

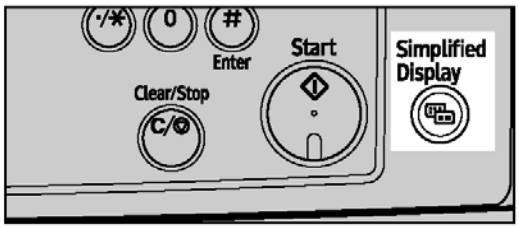
Display Panel

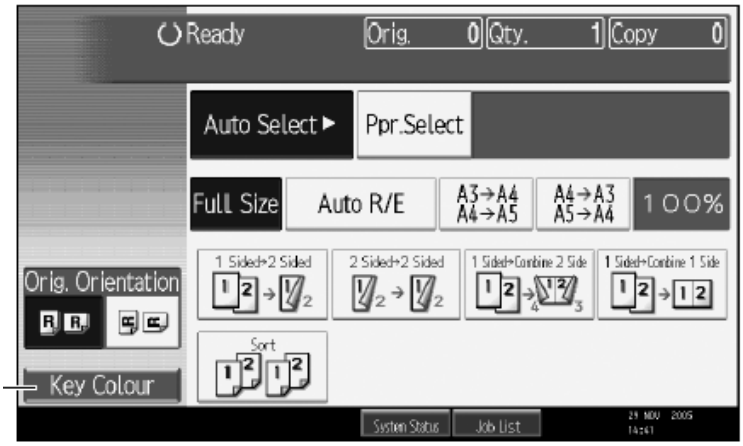


Operating Instructions – About the Machine - Getting Started – Display Panel

- ❒ Ask the class to study this section of the operation manual.
- ❒ Note the user function keys. These can be programmed with the following user tool.
  - ➢ User tools - Copy/Document Server Features - General Features – Customize Function: Copier
- ❒ The General Settings Guide, Copy/Document Server Reference, Printer Reference, and Scanner Reference operation manuals also contain sections about the display panels that appear in each operating mode.
  - ➢ The class should also look at these sections, and check the display panels on their machines.
- ❒ Note the use of the ‘simplified display’ button – see the next slide.

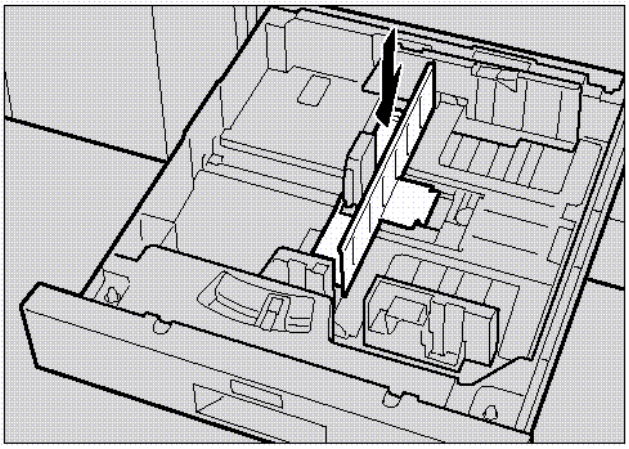
Simplified Display





❒ Here is an example of the simplified display.

Copying onto Tab Sheets - 1

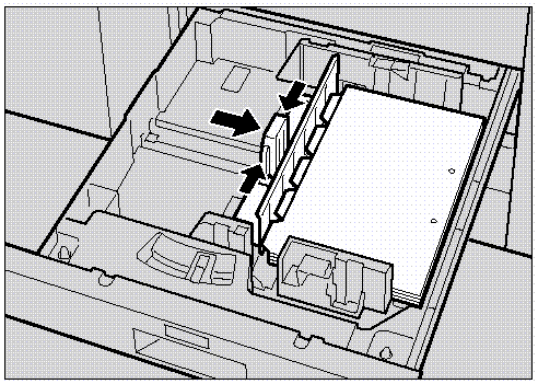


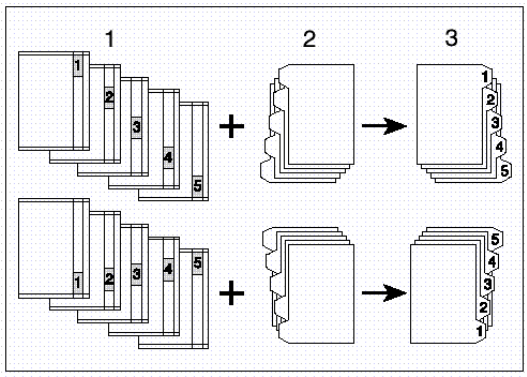
- **With the user tools, specify which tray contains the tab stock, and the index tab dimensions**
  - System Settings - Tray Paper Settings - Paper Type: Tray 2 or 3
  - You cannot use tray 1 for tab stock.
- **Install the optional tab sheet tray in the selected tray.**

Operating Instructions - Copier Reference - Copying – Basic Procedure Copying onto Tab Stock

❒ Make sure that the class is familiar with how to use this feature.
❒ For each tray, you can use this tool to input the height of the tab (how far it sticks out from the paper)

Copying onto Tab Sheets - 2

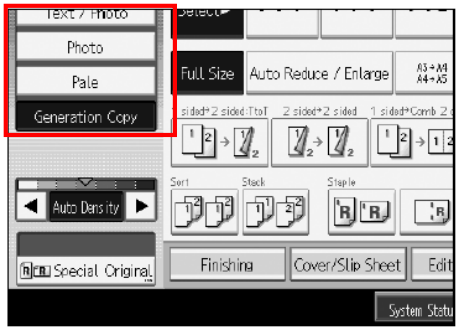




- **The side without the tabs must feed into the machine first.**
- **Take care which way up you put the stack of tab sheets in the tray.**

Original Types

- **Five main original types**



- **Each original type has four sub-types**
  - Select with User Tools - Copy/Document Server Features - General Features - Copy Quality
- **One of the four sub-types is a 'custom setting' mode, which can be customized with SP settings**

Operating Instructions - Copier Reference - Copying - Copier Functions - Selecting Original Type

- Go over the points on the slide.
- The five main original types are Text, Photo, Text/Photo, Generation Copy, and Pale Original.

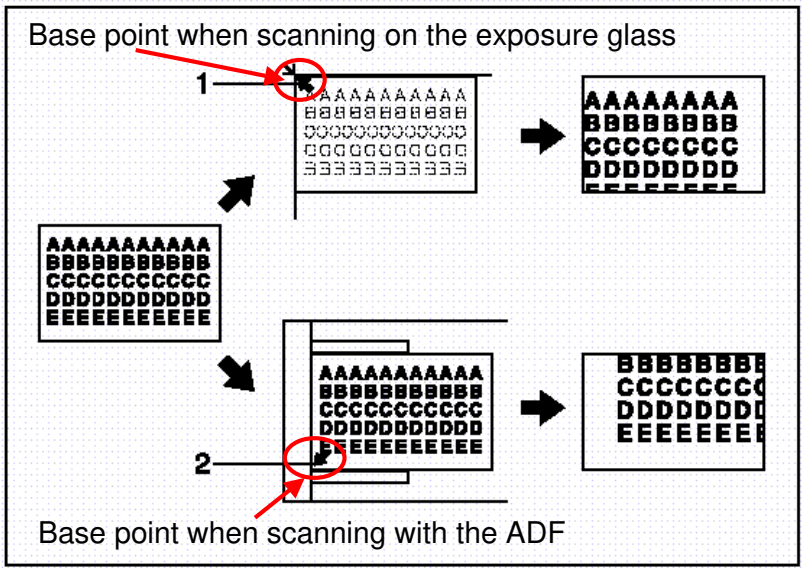
Service manual, section 6.6.4

- The table in the service manual shows which original types are suited to each of the original type settings.
- The SP modes that are used to adjust the custom settings will be covered in the Image Processing section of the course.

Operating Instructions - Copier Reference – Copying - Placing Originals – Placing Originals

- For the use of the Special Original key, see this section of the operation manual. This key is used with the ADF for mixed size mode, SADF, and other types of special original modes.

Enlargement/Reduction Processes

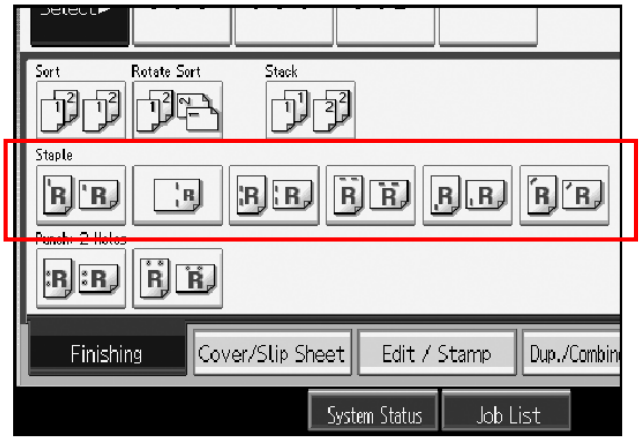


- **Note the different results**
  - Exposure glass (book scanning) - data is lost at the bottom edge
  - ADF - data is lost at the top edge

Operating Instructions - Copier Reference - Copying - Copier Functions - Preset Reduce/Enlarge

- Enlargement and reduction are similar to other models. However, it is worth mentioning the point shown on the slide.
- To illustrate the difference between scanning from the exposure glass and from the ADF when using enlargement and reduction, the diagram shows what happens when copying to paper of the same size as the original.
- On the slide, the terms ‘bottom edge’ and ‘top edge’ are in relation to the diagram on the slide, not to original or paper feed direction.

Stapling



- **The types of stapling available depend on which finisher has been installed, and on the user tool settings.**
- **If the required stapling type is not displayed, change the following user tool setting:**
  - Copy/Document Server Features - Input/Output - Staple Position

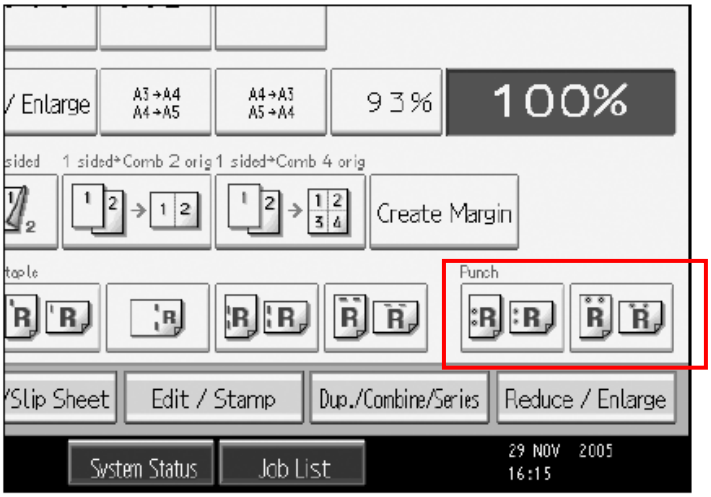
Operating Instructions - Copy Reference - Copying - Copier Functions - Stapling

❒ Try various staple position settings (inside the red circle on the slide).

❒ Refer to the diagrams in the operation manual that show the relation between selected stapling mode, original orientation, and result.

❒ Not all of the stapling types can be displayed on the operation panel at the same time (see inside the red box). If you want to use a type that is not on the display, you can change the user tool setting.

Punch



- **If the required punching method is not displayed, change the following user tool setting:**
  - User Tools – Copier/Document Server – Input Output – Punch Type
- **Punching is not allowed with z-folding.**

Operating Instructions - Copier Reference - Copying - Copier Functions - Punch

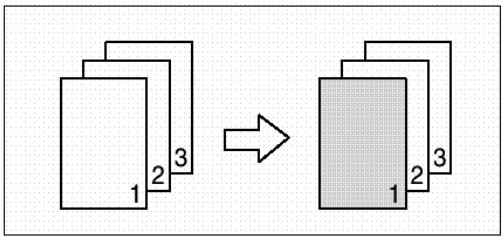
❒ Try various punch position settings (inside the red box on the slide).

❒ Refer to the diagrams in the operation manual that show the relation between selected punching mode, original orientation, and result.

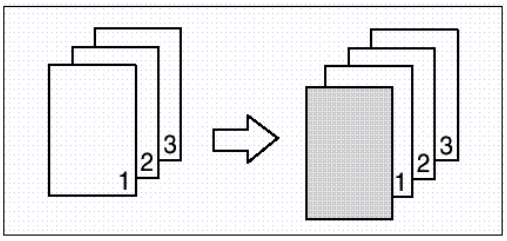
Making Covers

Front Cover

- Copy

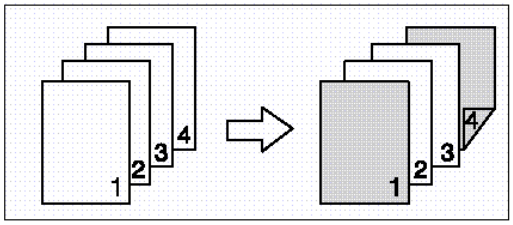


- Blank



Front and Rear Covers

- Copy



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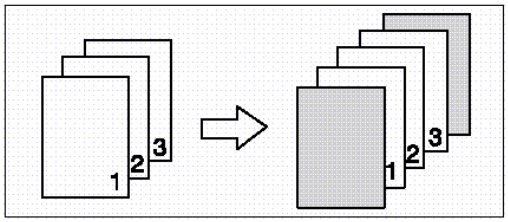
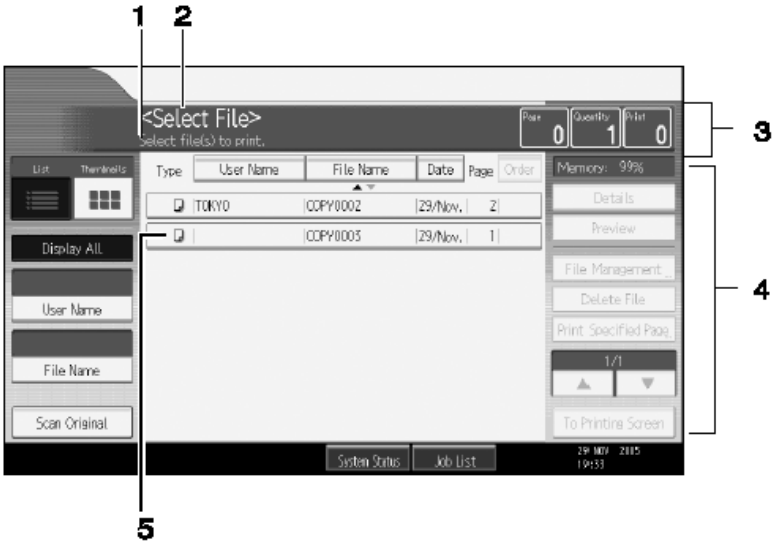


Operating Instructions - Copier Reference - Copying - Copier Functions - Covers

- ❒ Front and back cover modes are available. The procedures are similar.
- ❒ Select the trays that you want to feed the cover paper from.
  - ➢ User Tools - System Settings - Tray Paper Settings – Front Cover Sheet Tray, Back Cover Sheet Tray
  - ➢ If you select the cover interposer as the source for the cover sheets, you cannot copy on them. Any designs required on the cover must be copied on in advance.

Document Server



- **Files are deleted 3 days after they were stored.**
  - Change with System Settings - Administrator Tools - Auto Delete File in Document Server

Operating Instructions – Copier/Document Server Features - Document Server - Using the Document Server

- The Document Server enables you to save documents on the hard disks and then print them and delete them as you want.
- Most of the features are fairly straightforward. Have the class work through the Document Server section of the operation manual.
  - This only covers scanning, storing, and printing at the operation panel. It does not cover any operations that can be carried out remotely from a computer.
- Note that the machine is set up to delete a file 3 days after it has been stored. To alter this, use the following user tool:
  - System Settings - Administrator Tools - Auto Delete File in Document Server
  - To prevent data loss due to machine failure, it is best to move important files off to a computer for long-term storage (use DeskTopBinder).
- Other user tools
  - Administrator Tools - Delete All Files in Document Server: All documents stored in document server will be deleted, even if they have passwords.

Energy Saver Modes

- **After 60 seconds (energy saver mode):**
  - Fusing unit temperature falls a little; recovery time is less than 3 seconds.
- **After 60 seconds (low power mode):**
  - Fusing unit temperature falls a little more; recovery time is 10 seconds.
- **After 60 seconds (auto off mode):**
  - Fusing lamp switched off ; recovery time is 30 seconds
  - If no printer option is installed, the main power switches off
    - If a printer option is installed, the machine uses 'night mode' instead of auto off mode - the main power does not switch off
  - System Setting – Administrator Tools – AOF: This enables and disables auto off mode.

Service manual, section 6.14

- The slide shows the details of how the machine handles energy saver mode, in accordance with the default settings.
- The service manual explains all the details of each mode.
- Timers can be set for each day of the week for the machine to turn off and on.
  - System Setting - Timer Setting - Timer (Monday to Saturday):
- The timer can be overridden in case of emergency if a code is input. This code can also be specified with a user tool. When the weekly timer has the machine switched off, if the correct code is not input, the machine cannot be used even if somebody switches it on.
  - System Setting - Timer Setting - Weekly Timer Code
  - Weekly Timer (Monday to Saturday):

Energy Saver Modes

- **The default values of the timers are all the same (one minute; see the previous slide).**
  - The timers can be adjusted with user tools (System Settings > Timer Settings).
- **Because of this, the machine goes into auto off mode after 1 minute.**

SP Modes

- **Registration**
  - 1001: Paper Tray Leading Edge Registration
  - 1002: Paper Tray Side-to-Side Registration
  - 4010: Scanner Leading Edge Registration
  - 4011: Scanner Side-to-Side Registration
  - 6006: ADF Registration
- **Margins**
  - 2101: Printing Erase Margin
  - 4012: Scanner Erase Margins
  - Scanner SP 1005: Scanner Mode Erase Margin

- These SPs are related to machine operation. Have the class experiment with any of the settings that are not familiar.
- All SPs are copier SPs unless stated otherwise.
- Margins: Also note the user tools for this (Copier/Document Server Features - Edit Menu).

SP Modes

- **Magnification**
  - 2909: Print Engine Main Scan Magnification
  - 2910: Print Engine Sub Scan Magnification
  - 4008: Scanner Sub Scan Magnification
  - 6017: ADF Magnification

❒ Note the difference between SP 2910 and 4008, as mentioned on the slide. The manual is not too clear about this.

SP Modes

- **Originals**
  - 4303: Determines what happens when the original size sensors in the scanner cannot detect the size
  - 5126, 6016: Determines what original sizes are detected in the ADF, for certain sizes that are hard to distinguish
    - See the Document Feeder section for details.

SP Modes

- **Paper Trays**
  - 5047: Paper printed one one side - display which tray it is in
  - 5112: Non-standard paper sizes in universal trays, enabled/disabled
  - 5129: Sets the paper size that the machine detects when the 8 x 13 dial setting on a paper cassette is used (LT/DLT version only).
  - 5150: Allows long paper (up to 600 mm) in the bypass tray (disables jam detection)
  - 5154: 'Limitless' paper feed (follow the instructions in the SP table)

- Experiment with these SP settings. Also take a look at the user tools. Some of these settings may be the same as some of the user tool settings (System Settings - Tray Paper Settings - Paper Type).
- 5047: For users who wish to reuse paper which has already been printed one one side, this SP can be enabled. Then the user can specify which tray contains this type of paper and it will be displayed on the machine in the copy paper selection area of the display panel.
  - Select 'back copied paper' with User Tools - System Settings - Tray Paper Settings - Paper Type
- 5112: The machine default is 'disabled' which means the user cannot use non-standard paper sizes. However, this is changed to 'enabled' at the factory. But if a RAM reset is done, this will revert to 'disabled'.
- 5150: If you enable long feed, the user must specify the length of each sheet before making the copy.

SP Modes

- **5024: Display units (mm/inches)**
- **5307: Daylight saving time – day to start and end, and number of hours to change**
- **5106: ADS - Image density of the central position**
- **5212: Adjusts the position of page number printing in duplex mode**
- **5404 001: Resets all user code counters**
- **5913: Wait time when switching between applications**
- **5914: Determines which counters are displayed (copier mode, printer mode)**
- **5918: Determines whether the counter is displayed when entering administrator mode in the user tools**
- **5967: Document server enable/disable**

❒ 5913: Determines how long the machine must wait before switching between applications (such as from copier to printer) if one application is active but user operation panel input appears to have stopped

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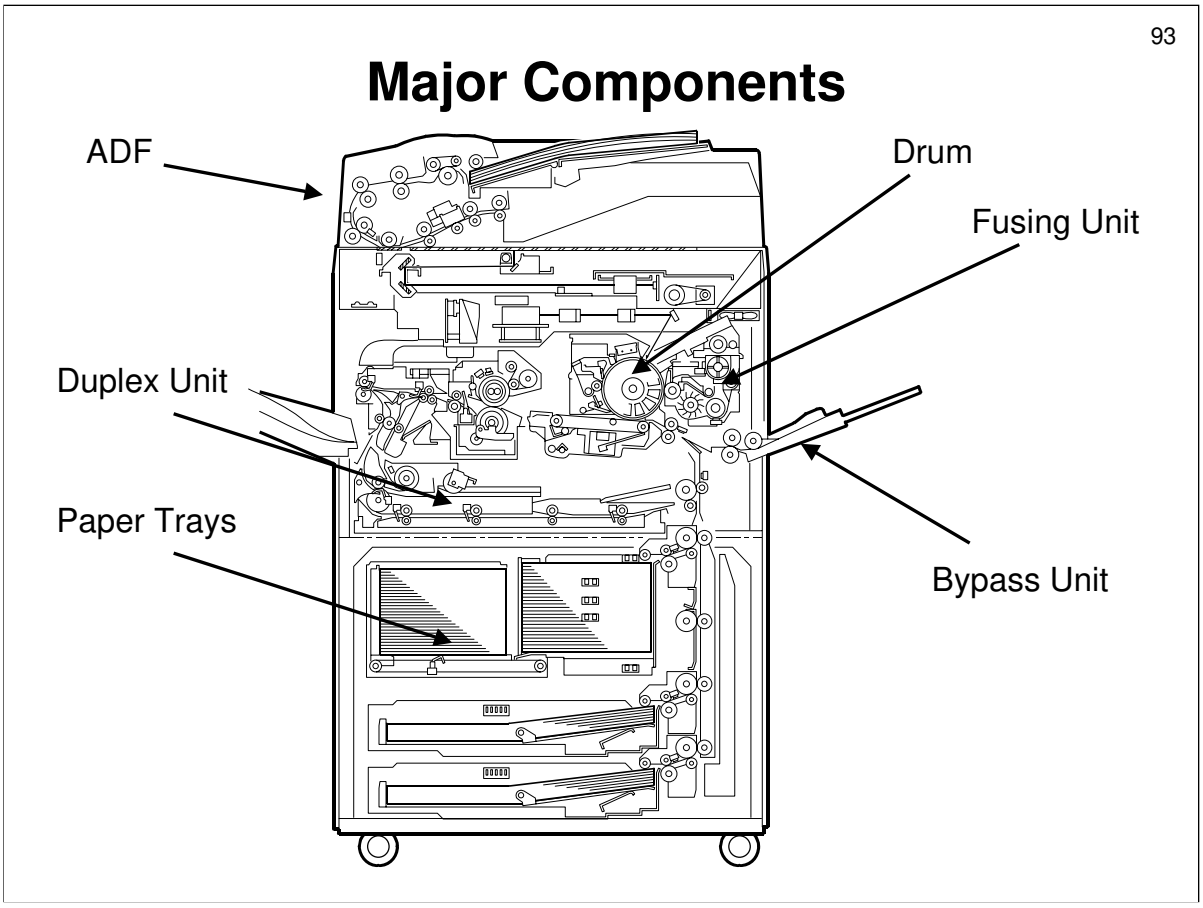
B246 SERIES TRAINING

COPIER ENGINE

MACHINE COMPONENT OVERVIEW

- The components will be discussed.
- The paper feed path and copying process will be outlined.
- The machine's organization and overall PCB structure will also be covered.

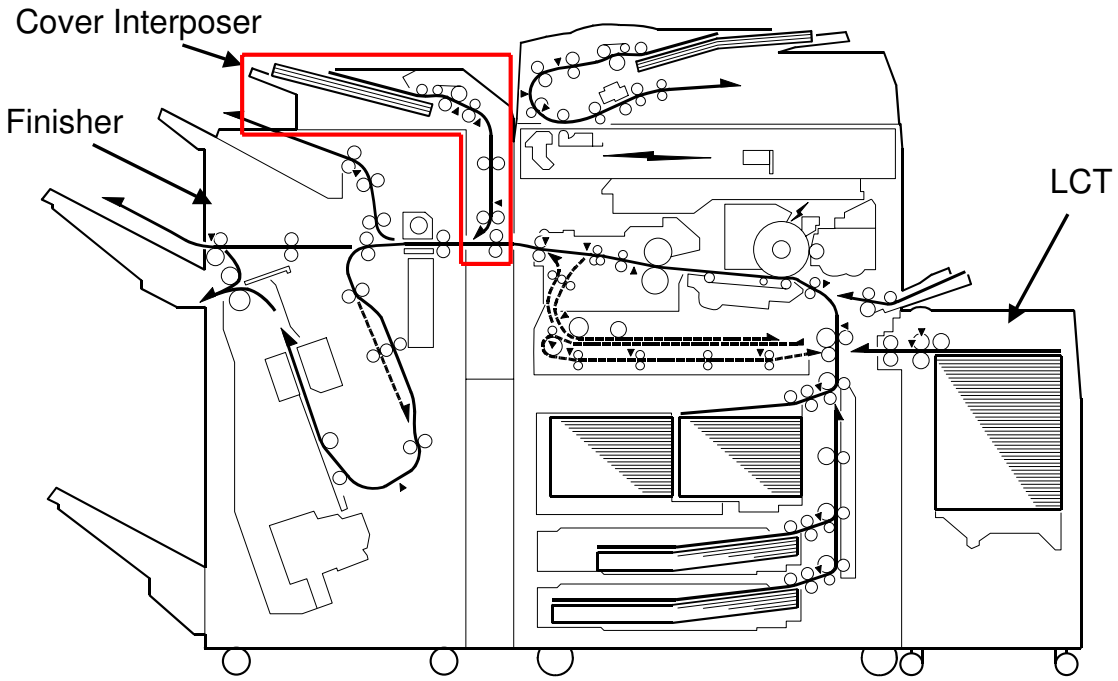


Service manual, pages 6-1 and 6-2

Point out the following:

- ❒ ADF: This is built in. there is no inverter. The reverse sides of two-sided originals is scanned using a CIS built into the ADF.
- ❒ The drum is similar to the Mojito. However, the toner recycling system is new.
- ❒ The fusing unit contains a web unit for cleaning. The fusing and exit units can be separated for easier servicing.
- ❒ The duplex unit is built into the machine. So is the bypass tray.
- ❒ The top paper tray is a tandem feed tray (LT/A4 only). It can be converted into a non-tandem tray for sizes up to A3.
- ❒ The other two trays are universal trays.
- ❒ An optional LCT can be added to the right side of the machine.

Paper Path - With Cover Interposer



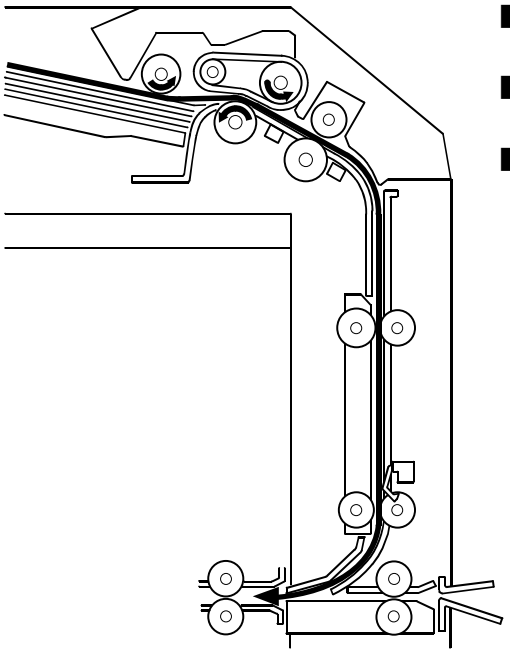
Service manual, page 6-3

❒ Demonstrate the following:

- Original feed path - there is no inverter
- Paper input paths from LCT, bypass, and standard trays
- Paper output paths to finisher (proof tray and lower feed out slot for trays 1 and 2)
- Demonstrate how the cover interposer fits into the paper path.

  The cover interposer is surrounded by a red box in the diagram. Follow the path of paper out of the cover interposer, down into the machine just after the fusing exit, and into the finisher.

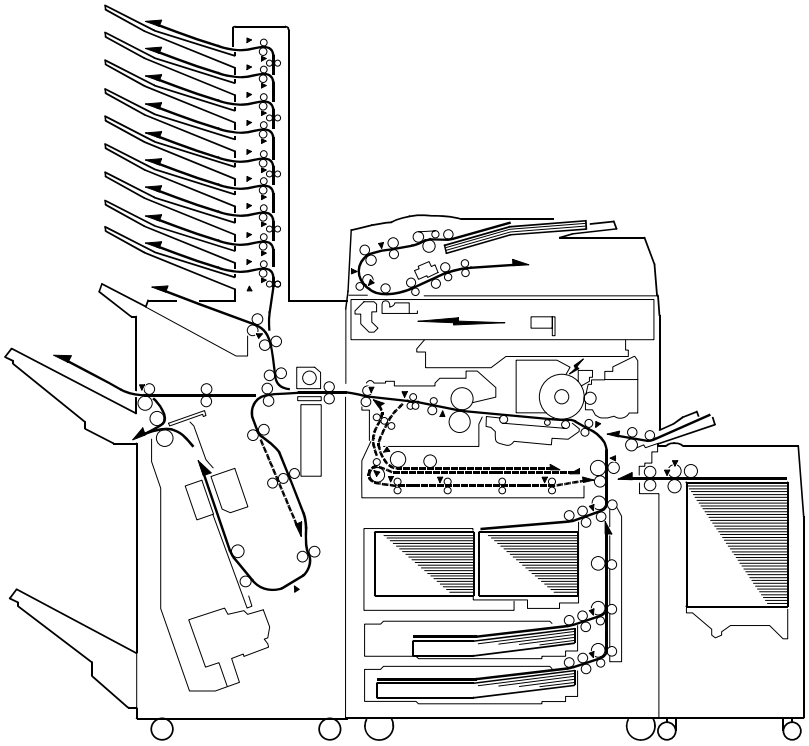
Cover Interposer



- **Capacity 200 sheets**
- **Paper weight up to 216 g/m^2**
- **Feed belt and separation roller system**

❒ This diagram is a close-up of the cover interposer's feed-in path.

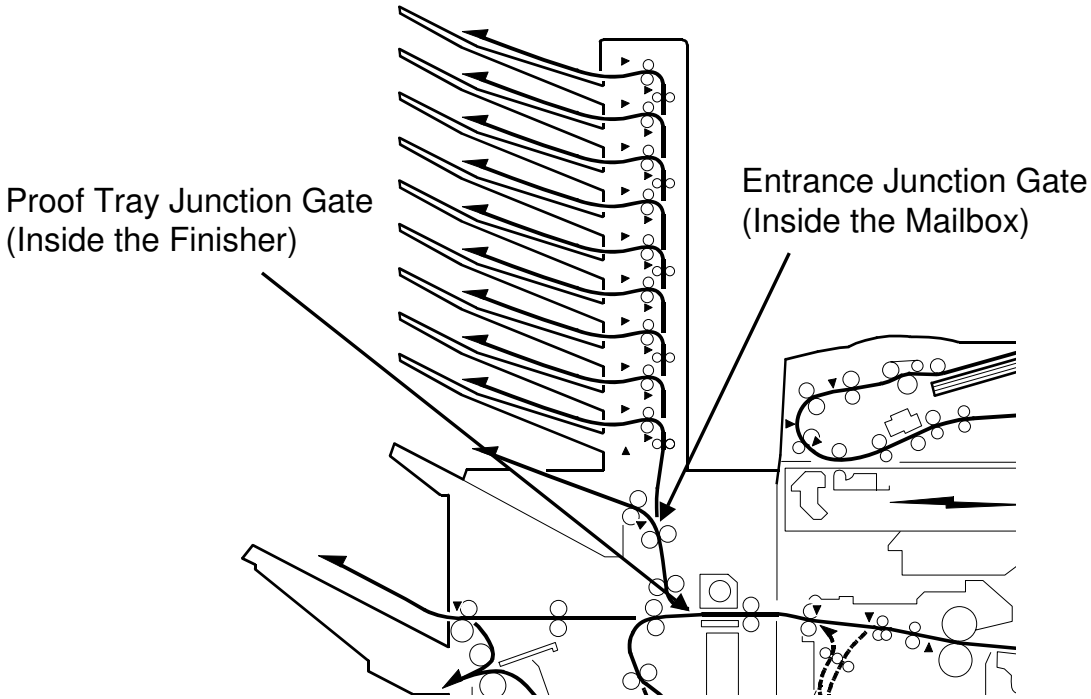
Paper Path - With Mailbox



Service manual, page 6-4

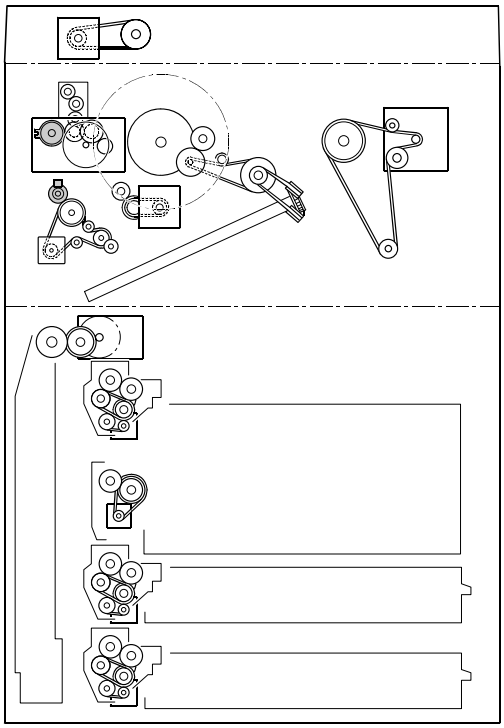
- ❒ This diagram shows the machine with a mailbox installed instead of a cover interposer.
- ❒ Demonstrate the paper exit path up to the mailbox. There are some more details on the next slide.

Paper Path to the Mailbox



- In this model, the mailbox is connected to the optional finisher, not to the main copier. This is unusual.
- The proof tray junction gate diverts the paper either out to the proof tray or into the finisher for various stapling, shift sorting, or folding operations.
- If the mailbox is installed, the entrance junction gate inside the base of the mailbox then diverts the paper either up into the mailbox or out to the finisher proof tray.

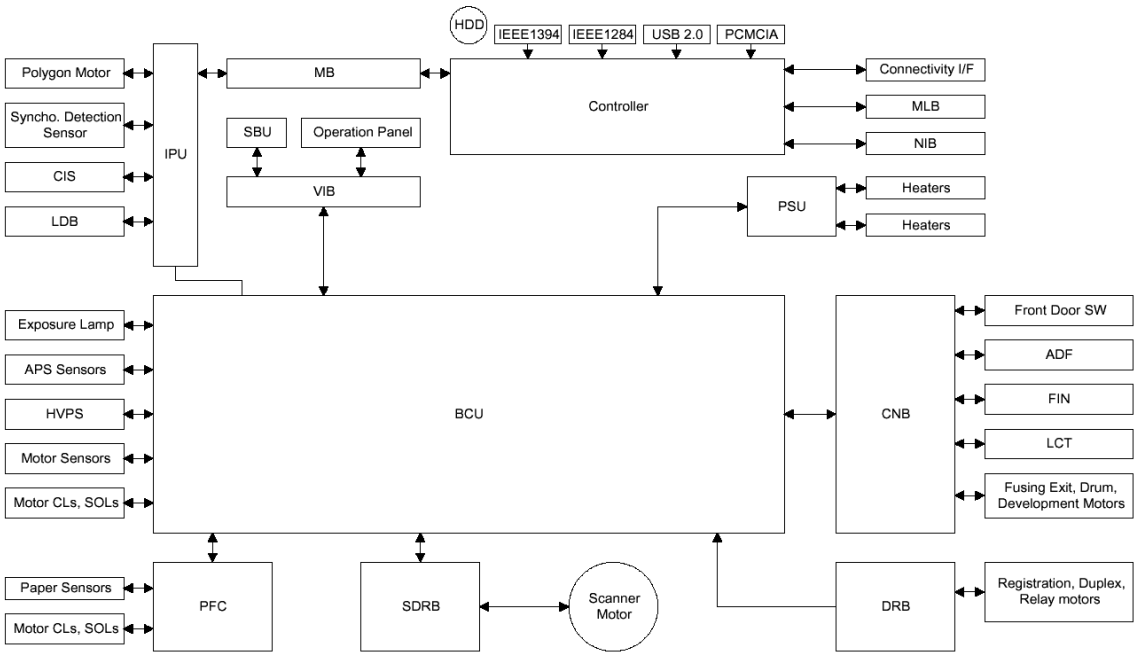
Drive Layout



Service manual, page 6-5

- ❒ This diagram shows the motors.
- ❒ At this time, introduce the component layout diagrams and the point-to point diagram.
- ❒ Also hand out copies of the component list (components.doc). This list explains what each component in the machine does.

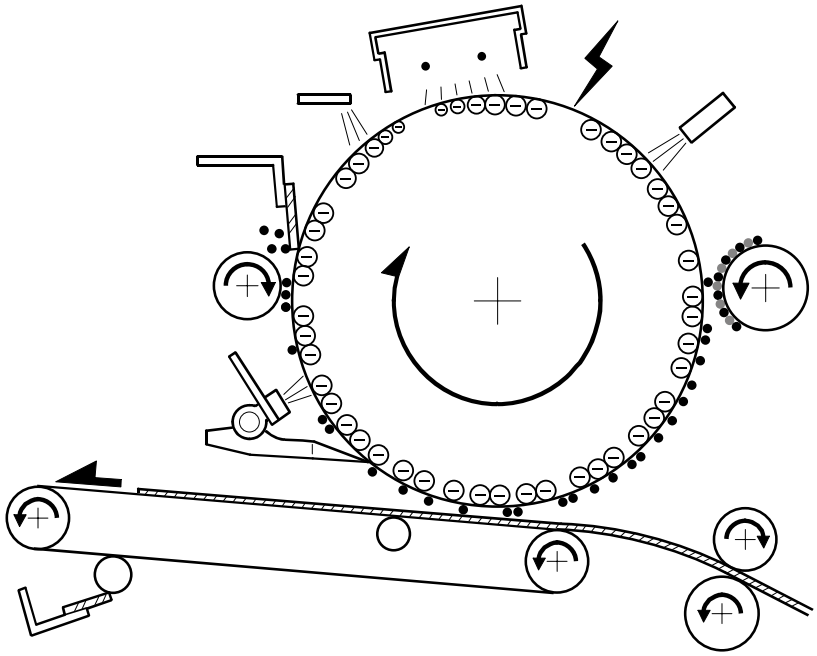
Board Structure



Service manual, section 6.2

- ❒ This section lists the functions of the boards inside the machine.
- ❒ The BCU is the main board.
- ❒ The controller board interfaces the machine with computer networks, and connects to all the printer/scanner options and memory devices. Software upgrades are also done through an SD card slot on this board.

Copy Process Overview



Service manual, section 6.3

- ❒ This is very similar to the Mojito and SP5.
- ❒ There is only one development roller in this model.
- ❒ Process control includes a new step - development bias adjustment.

Replacement

- **Do the procedures in section 3.12 of the service manual.**
- **Obey all notes and cautions in the manual.**
- **Controller**
  - Remove the NVRAM from the old board and put it on the new board.
  - Make sure that you put the system SD card in slot C1 after reassembly, or the machine will not operate.
- **NVRAM**
  - There is an NVRAM on the controller board only
  - Also see the next slide.

REPLACEMENT

Service manual, section 3.12

- ❒ Have the trainees remove and replace the parts in this section.
- ❒ Remind them to follow all notes and cautions in the manual.
- ❒ Many of these procedures have SPs that must be performed. These are listed in the manual.
- ❒ NVRAM:
  - ➢ Also set SP 1902 001 (amount of fusing unit web used so far) to the most recent setting (should be on the SMC list).

Service manual, section 6.2.2

- ❒ Hard disk:
  - ➢ This part of the manual contains some information on the composition of the hard disk, how errors may occur, and some important points about hard disk replacement.

NVRAM Replacement

- **If you change a defective NVRAM, you can put back the settings to their previous condition.**
  - But you can only do this if you made a backup of the NVRAM to an SD card on a previous visit.
  - But you cannot get back settings that were made after that visit.
- **If you replace the NVRAM, the Data Overwrite Security Unit will not work. The user must buy a new one.**

Hard Disk Removal

- **Remove the hard disks.**
- **After installing new disks:**
  - Format them with SP 5832 001 (recommended but not required)
  - Copy the stamp data to the disks from the firmware: SP5853. Then switch the machine power off/on.

Service manual, section 3.12.7

❒ Have the class remove and replace the hard disks.
❒ The stamp data is copied directly from the firmware, not from SD or flash cards.

Hard Disk Removal

- **Explain to the customer that the following information stored on the HDD is lost when the HDD is replaced:**
  - Document server documents
  - Custom-made stamps
  - Document server address book
- **The address book and document server documents (if needed) must be input again. Custom-made stamps must be re-made and stored again**
- **If the customer is using the Data Overwrite Security feature, the DOS function must be set up again.**
- **If the customer is using the optional Browser Unit, this option must be installed again.**

Disposal of HDD Units

- **Never remove an HDD unit from the work site without the consent of the client.**
- **If the customer has any concerns about the security of any information on the HDD, the HDD must remain with the customer for disposal or safe keeping.**
- **The HDD may contain proprietary or classified (Confidential, Secret) information.**
  - Specifically, the HDD contains document server documents and data stored in temporary files created automatically during copy job sorting and jam recovery.
  - Such data is stored on the HDD in a special format so it cannot normally be read but can be recovered with illegal methods.

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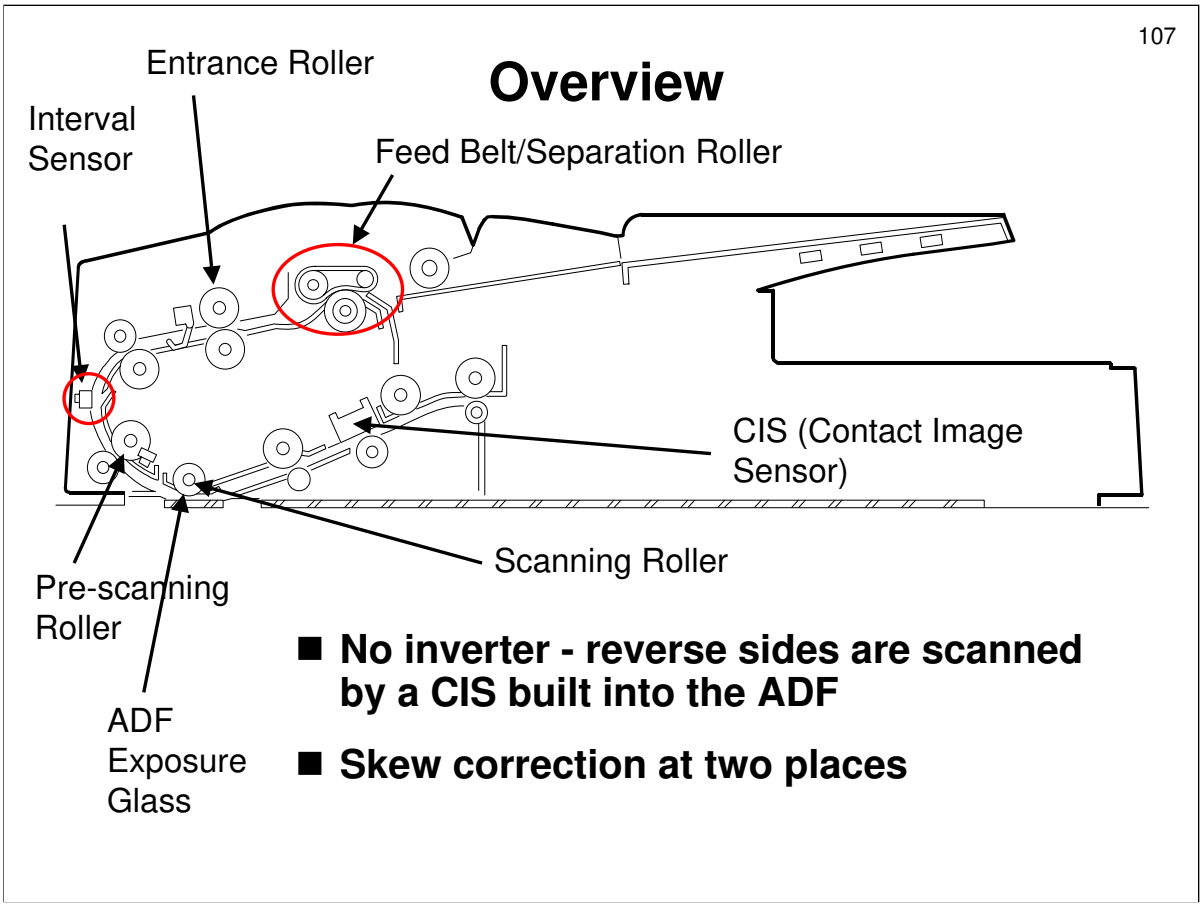
B246 SERIES TRAINING

COPIER ENGINE

DOCUMENT FEEDER

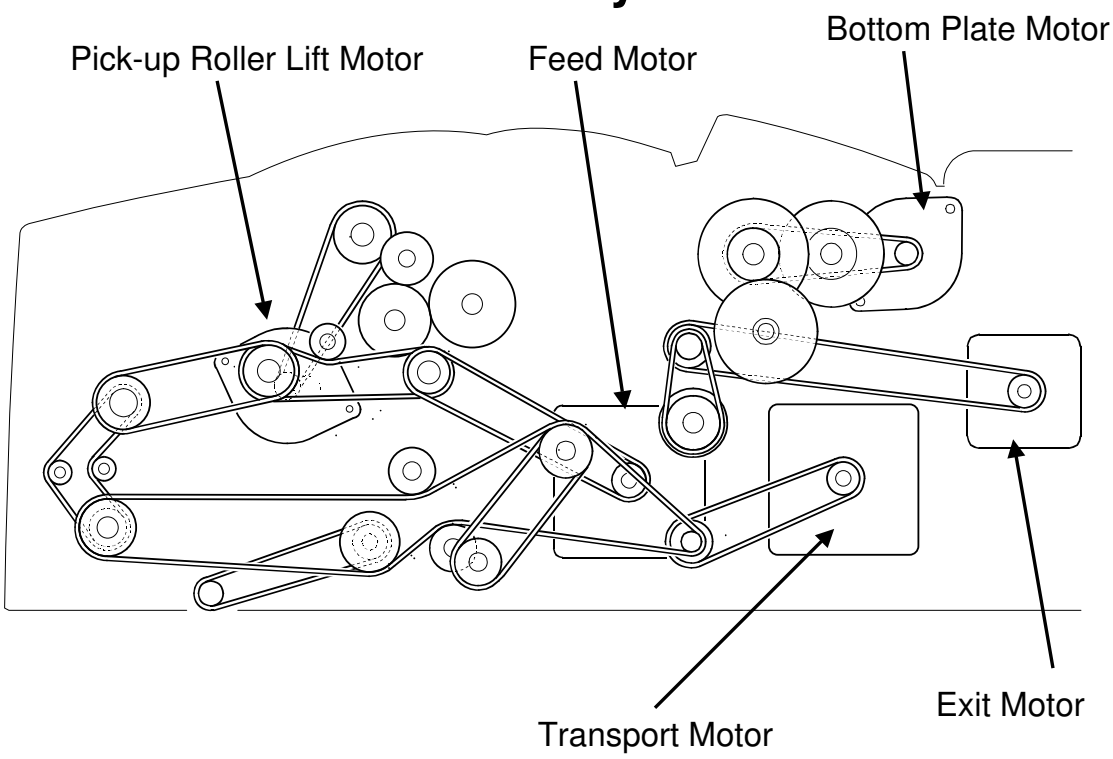
- The ARDF is a standard component of the machine.
- This section of the course will explain the ARDF's mechanisms.



- ❒ The most important points are on the slide.
- ❒ Here is a brief overview of how the ADF works.
  - ➢ A feed belt and separation roller system feeds the originals in.
  - ➢ The leading edge stops at the entrance roller to correct skew.
  - ➢ When the interval sensor detects the leading edge, the pre-scanning roller stops for skew correction, but only for small original sizes (B6, A5, HLT), or for duplex scanning (any size).

    For sizes larger than A5, the pre-scanning roller slows, which buckles the paper and corrects skew (the entrance roller is still turning at the original speed, which is now faster than the pre-scanning roller, so the paper buckles and skew is corrected).
  - ➢ The CCD is below the ADF exposure glass, where the original is scanned.
  - ➢ For two-sided original scanning, the CIS scans the reverse side while the original leaves the ADF.

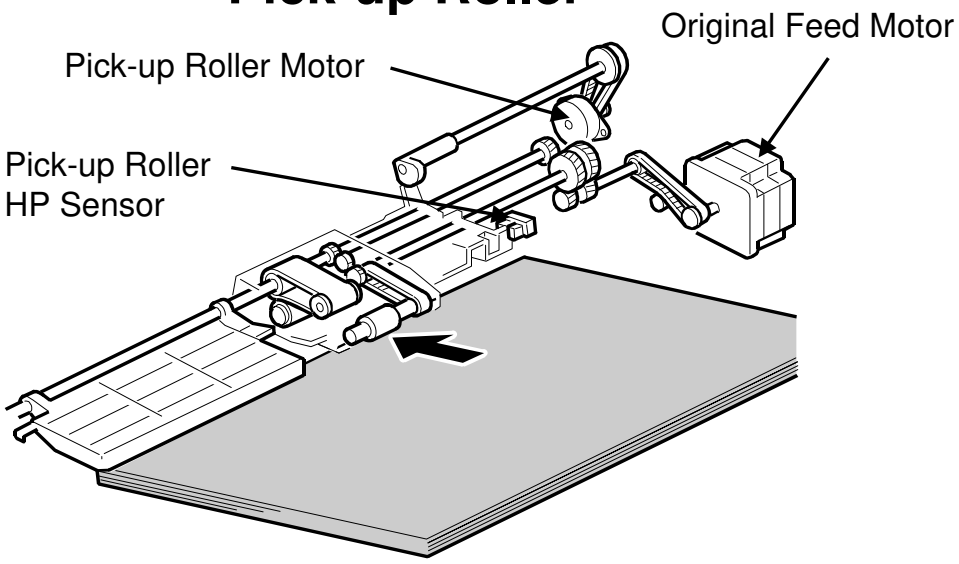
Drive Layout



Service manual, section 6.4.2

❒ The diagram looks like a plate of spaghetti. However, the manual explains which motor is driving what roller.

Pick-up Roller



- **Pick-up roller motor: Drops the pick-up roller onto the stack of originals**
- **Feed motor: Rotates the pick-up roller**

Service manual, section 6.4.3

- Just after the original set sensor detects an original, the pick-up roller motor switches on, to drop the pick-up roller onto the original stack.
- When the leading edge of the original reaches the entrance sensor, the pick-up roller motor switches on again, to lift the pick-up roller away from the original stack.
  - Home position is detected by the pick-up roller HP sensor.
- When the trailing edge of the original passes the entrance sensor, and there are still some originals on the tray, the pick-up roller is again dropped onto the stack of originals.
- Details of the mechanism are as follows:
  - When there are no originals: See the manual
  - Just after an original is placed on the tray: See the manual.
  - When the leading edge of the original reaches the entrance sensor: Motor [A] switches on again. Cam [B] pushes lever [C] down until the actuator enters sensor [E] and switches off the motor. This stops the pick-up roller at the home position.
  - When the trailing edge of the paper passes the entrance sensor with originals still waiting for scanning: Motor [A] switches on to feed in the next sheet.

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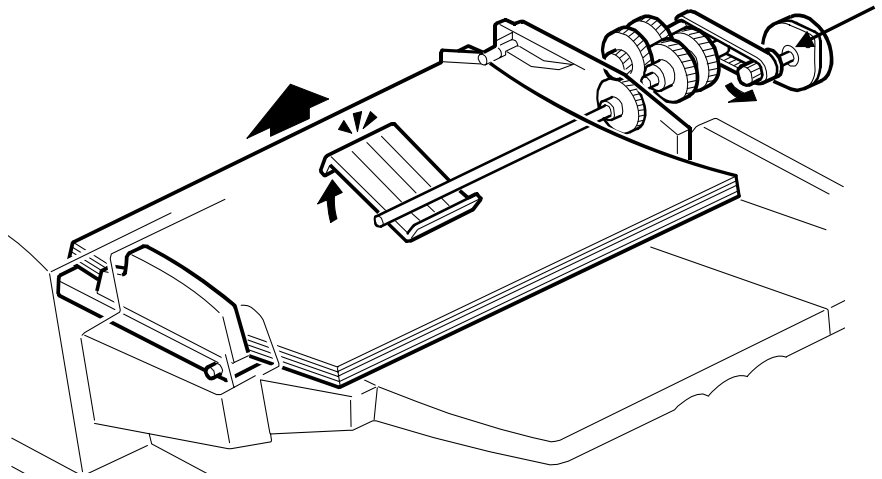
Bottom Plate Lift

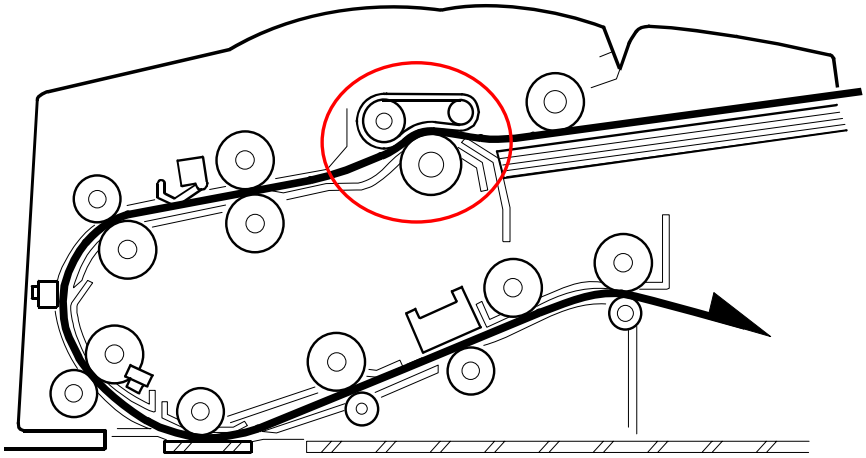


- **The bottom plate lift motor lifts the bottom plate at the following times:**
  - Just after the original set sensor detects an original
  - When some originals have been fed, and the top of the stack needs lifting

Service manual, section 6.4.4

- ❒ The main points are on the slide.
- ❒ The timing for the bottom plate motor to lift the bottom plate can be changed with SP 6900. The default is when an original is detected (as shown on the slide). However, this can be changed to after the Start key is pressed.
- ❒ The bottom plate sensor determines whether the plate needs lifting.
  - ➢ At the start of the job, just after the pick-up roller has dropped onto the stack, the bottom plate sensor is activated. The plate must be lifted until the sensor switches off again.
  - ➢ If the sensor switches on again during the job, the motor lifts the plate again.
- ❒ The bottom plate home position sensor tells the motor when to stop when returning the plate to home position after the job.

Original Separation and Transport



- **FRR with feed belt**
- **Simplified feed path (no inverter mechanism)**

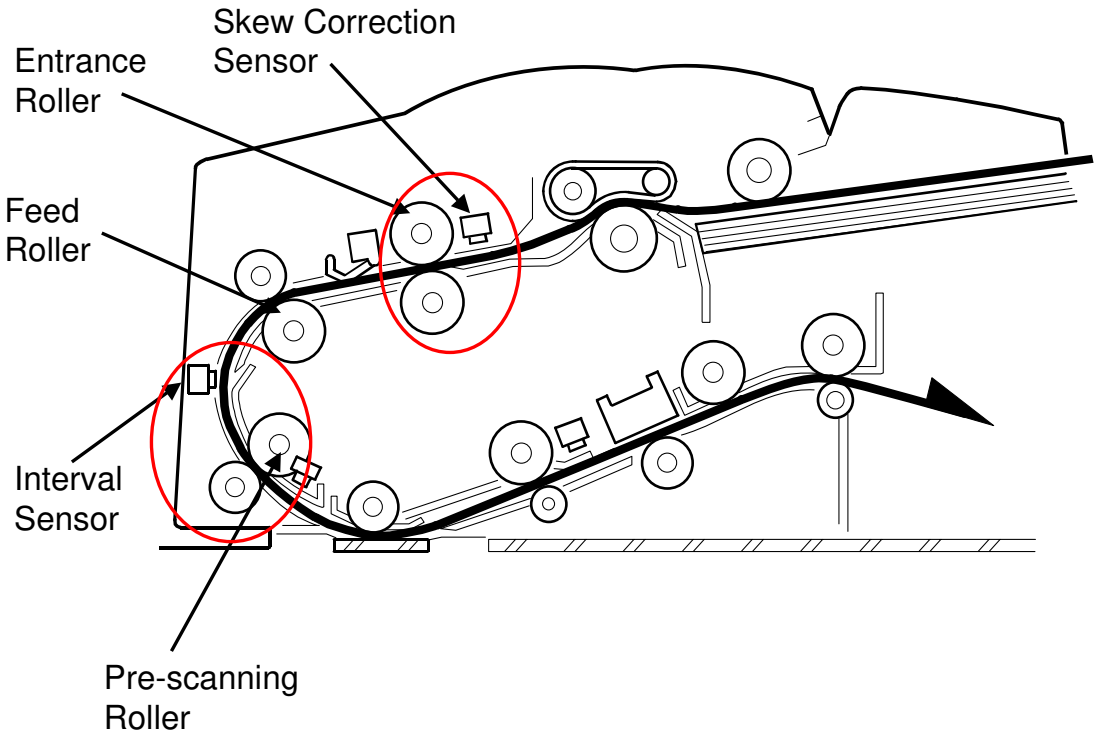
Service manual, section 6.4.5

- FRR with feed belt is a standard original separation technique. Details can be found in the core technology manual.

Service manual, section 6.4.6

- Full details of the feed path are in the manual.
- Remember that there is no inverter. The second side is scanned by the CIS, which is near the exit roller.
  - There are some differences in copy quality between the images scanned by the CCD and by the CIS. There are some SPs which try to address this issue. They will be covered in the Image Processing section of the course.
- Skew correction is covered in more detail in the next slide.

Skew Correction



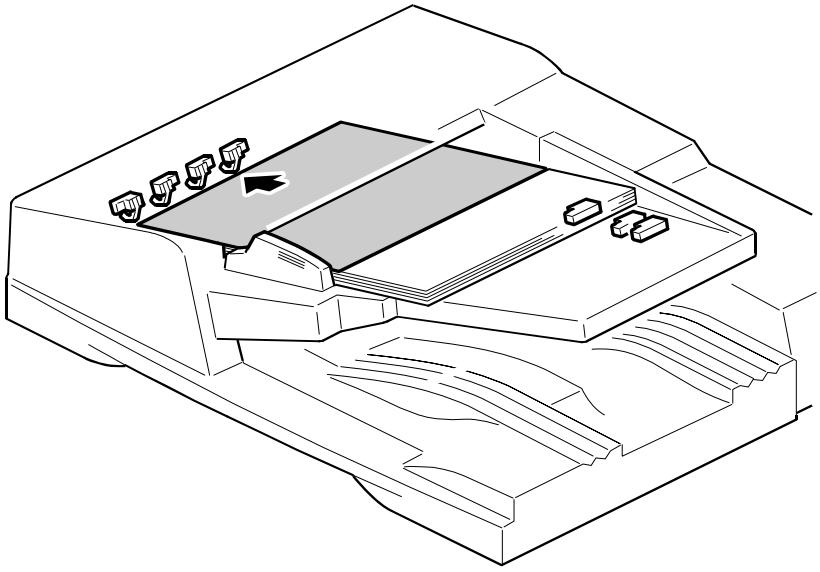
Service manual, section 6.4.7

- Skew correction is done at the two circled locations.
  - Skew correction sensor/entrance roller: When the sensor detects the leading edge of the original, the roller stops for a certain period. This buckles the original and corrects the skew.
  - Interval sensor/pre-scanning roller: The actual method depends on the paper size, and whether both sides will be scanned.

    For single-sided scans larger than A5, the pre-scanning roller slows, while the feed roller is still at the same speed. This is an attempt to keep the copy speed as high as possible even for larger original sizes. If SP6020 is changed from the default, the roller will stop (like for other job types), for more precise skew correction. However, copy speed will be reduced.

    For other types of job, the pre-scanning roller stops. All duplex scans are stopped at this roller, for the best possible skew correction. This is because both sides are scanned at the same time, by sensors on opposite sides of the paper. Any skew in the ADF would therefore be noticeable on the copy.
- The rollers are driven by different motors, which makes it possible for one roller to stop or be slower while the other one is still going.
  - Entrance roller: Driven by the feed motor
  - Feed roller (1st transport roller): Also driven by the feed motor
  - Pre-scanning roller: Driven by the transport motor
- Note that the amount of buckle at each location can be adjusted with SP 6006.
  - 6006 005: Corrects the amount of buckle at the entrance roller
  - 6006 006: Corrects the amount of buckle at the pre-scanning roller

Original Size Detection



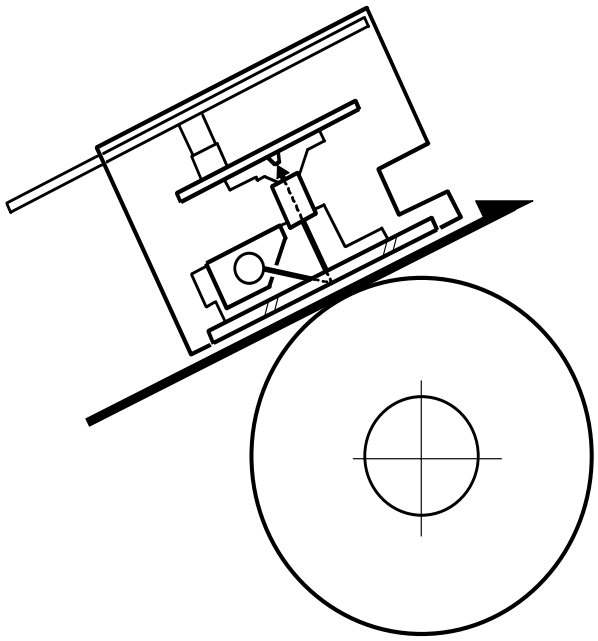
- **Original length and width are read when the original passes the skew correction sensor**

Service manual, section 6.4.8

- The original width sensors cannot detect the width until the original has passed the entrance roller.
- Some small sizes cannot be detected by the sensors (A5SEF, B6SEF, B6LEF), because the sensor outputs for these sizes are identical (all sensors are off). In this case, the length is detected using the skew correction sensor and clock pulse counts from leading edge to trailing edge.
- The machine cannot tell the difference between certain original sizes, such as DLT (11 x 17") and 11 x 15". The machine assumes such originals are 11 x 17. To change this, use SP 6016 and SP 5126.
  - North America: There are two sets of four sizes. To switch from the default set to the other, input 120. The other set of four sizes will then be detected. To change back again, input 0.
  - Europe: There are two sets of three sizes. To switch from the default set to the other, input 7. The other set of three sizes will then be detected. To change back again, input 0.
  - It is not possible to change just one of the settings. All three (or all four in the case of N. America) must be changed at the same time.

    Writer's note: If this SP is likely to be useful, I recommend testing this in the class, using the paper sizes that you will encounter in your market. The description in the manual could be incorrect (not sure about this). Perhaps you have to enter a decimal number equivalent to the 0/1 settings of an 8-bit register. Look at the accompanying file 'SP6016-alternativemethod.doc' for what may actually happen. Test the machine in class and find out what actually happens.
- The maximum length of an original in the ADF is 440 mm (17"). This can be changed to 1260 mm (49.5") with the Special Original function at the operation panel.

CIS



- **The CIS scans the reverse side of the original, if two-sided scanning has been selected.**
  - This means that for two-sided scanning, the original feeds though the scanner one time only.
- **The resolution is 600 dpi, the same as the CCD.**
- **The white roller below CIS is used as a white reference point**

Service manual, section 6.4.9

Feed Timing and Jam Detection

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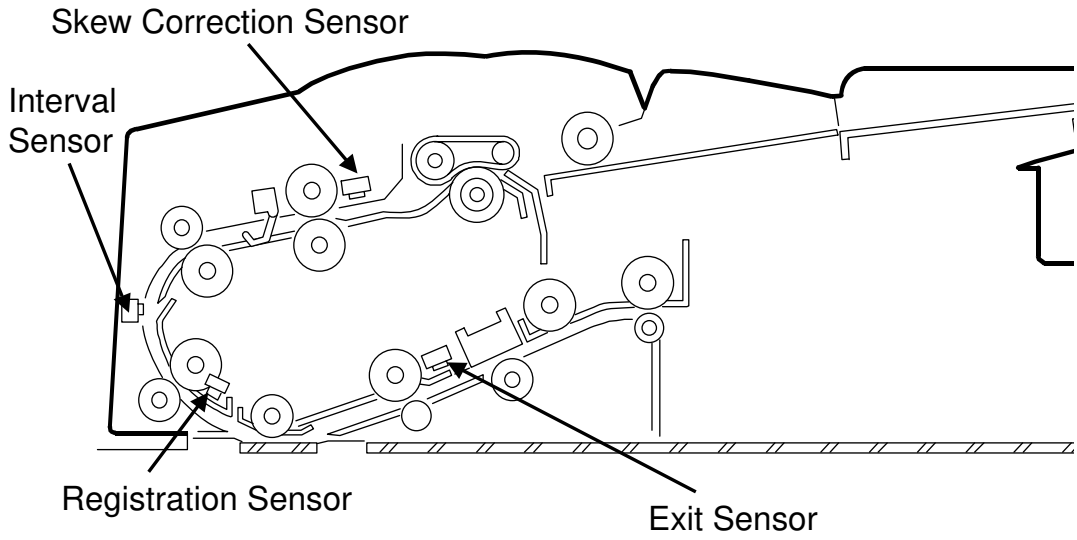

- **Feed timing controlled by the skew correction and registration sensors**
- **Jam detection at the skew correction, interval, registration, and exit sensors**

Service manual, section 6.4.10

❒ The service manual describes jam detection.

Dust Detection (SP 4020)

- **This function checks the ADF exposure glass for dust that can cause black lines in copies.**
- **If dust is detected, a message is displayed on the operation panel, but the machine does not stop.**
- **SP 4020 001: Enable/disable (default – disabled)**
- **SP 4020 002: Sensitivity adjustment**
- **SP 4020 003: Adjusts image processing parameters to remove thin vertical lines caused by dust**
  - A speck of dust on the ADF exposure glass causes a thin vertical line on the scanned image. This is because the ADF feeds the paper over the exposure glass during scanning. Dust on the glass appears on each line of the scanned image.
- **SP 7852: Counts how many times the machine detected dust on the ADF.**

Replacement

- **Do the procedures in section 3.13 of the service manual.**
- **Obey all notes and cautions in the manual.**
- **CIS power supply and CIS**
  - These two items must be replaced as a set

REPLACEMENT

Service manual, section 3.13

- ❒ Have the trainees remove and replace the parts in this section.
- ❒ Remind them to follow all notes and cautions in the manual.
- ❒ CIS: Do not try to calibrate with SP4705 after replacing. This SP only works if you have exactly the same paper type as used in factory to perform the calibration.

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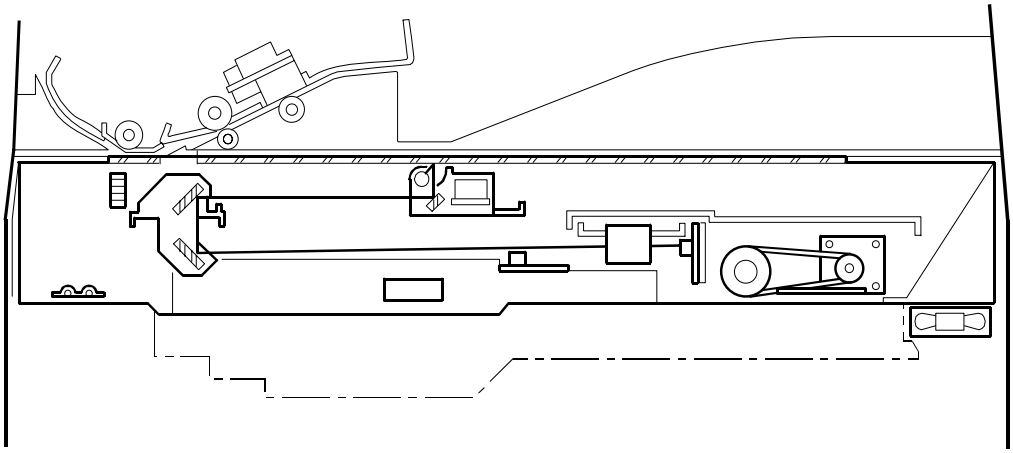
B246 SERIES TRAINING

COPIER ENGINE

SCANNER

- The scanner mechanism will be discussed in this section.
  - It only covers the movable scanner inside the main body of the machine, and not the CIS inside the ADF. This was covered already.
  - Image processing is covered in the next section.

Overview



- **600-dpi CCD**
- **Xenon exposure lamp**
- **Two exposure glasses**
  - Book mode, ADF mode

Service manual, section 6.5.1

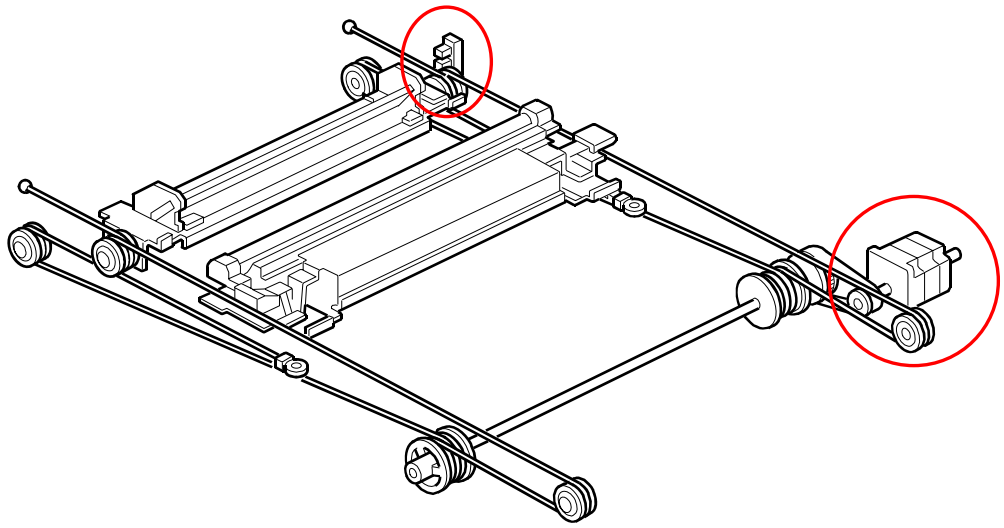
❒ This is a typical CCD scanner mechanism.

❒ Point out the main components, as shown in the diagram in the manual.
  - ➢ The USA version contains two length sensors.

❒ In this machine, there is an ADF exposure glass. In ADF mode, the scanner moves below this glass and scans the original while the ADF feds it past this glass.
  - ➢ In the Mojito and SP5, there was no ADF exposure glass. The ADF fed the page onto the exposure glass, where it was scanned in the same way as for book mode.

❒ There is also an optional anti-condensation heater for the scanner.
  - ➢ The heaters for the paper trays and transfer unit are standard equipment.

Drive

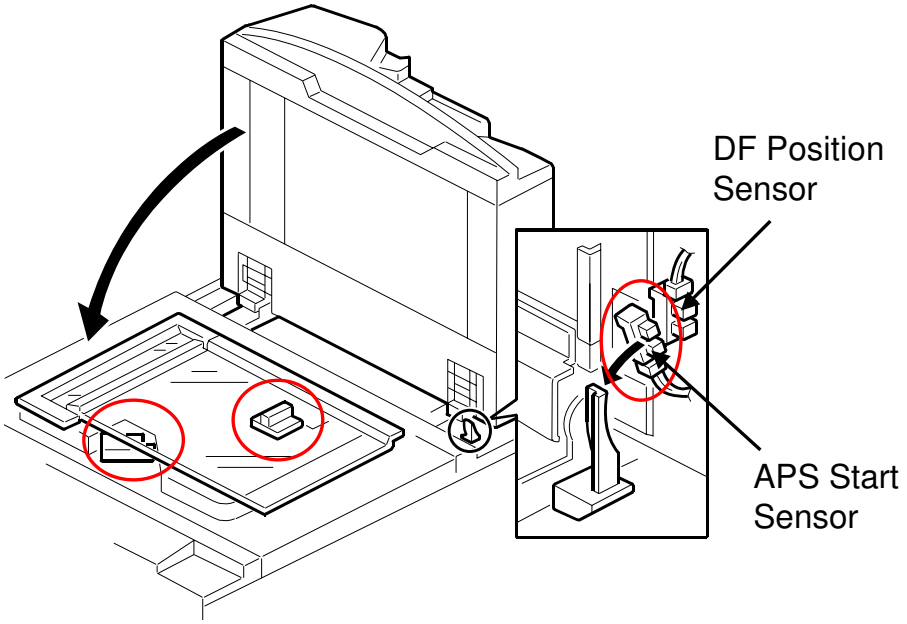


- **Scanner motor: Drives the scanners**
- **Scanner home position sensor: Detects when the scanner is at home position**

Service manual, section 6.5.2

- ❒ The main points are on the slide.
- ❒ The scanner speed is in the service manual. It depends on the reproduction ratio. The speed is double the normal speed when returning to home position.
- ❒ The first scanner contains the exposure lamp, reflectors, the 1st mirror, and the lamp regulator. The second scanner contains the 2nd and 3rd mirrors.
  - ➢ The regulator is mounted on the scanner to reduce the wiring between the lamp and the regulator.
- ❒ The second scanner moves at half the speed of the first scanner. This is to maintain the focal distance between lens and original.
- ❒ In this machine, wires are used instead of timing belts. These are more difficult to replace, but copy quality is better (less jitter).

Original Size Detection



- **1 length sensor (USA: 2 length sensors)**
- **3 width sensors**

Service manual, section 6.5.3

- Describe the sensors.
  - The diagram in the service manual gives exact measurements of where these sensors are.
- Make sure that the class is familiar with the table of sensor output vs original size.
- Make sure that the class understands what happens when all sensors are off (such as when A5 sideways is set - too small for the sensors to detect).
  - Use SP 4-303 this to select the machine's behaviour if the sensors cannot detect the size.
- The service manual explains how the width and length sensors work in the following modes:
  - Book (ADF open): The CPU checks the sensors when the Start key is pressed.
  - ADF: The CPU checks the sensors when the cover is lowered (detected by the APS start sensor)

    The other sensor near the APS start sensor detects when the ADF is open or closed (DF position sensor).
  - If paper is fed from the bypass tray: The sensors are ignored. The area that is scanned depends on width detected at the bypass tray and the length detected at the registration sensor. However, for the first sheet of copy paper, this is unknown, so the entire exposure glass is scanned. This means that the first copy will be slower.

Magnification

- **Main scan: Done by image processing**
- **Sub scan: Done by changing the scanner motor or ADF feed motor speed**

Service manual, section 6.5.4

- This is the same as for other models.
- Note that below 50%, the scanner cannot move fast enough, so image processing is used again - alternate lines are cut out. The details are in the manual.

ADS

- **CCD**
  - Reads reference white from the underside of the scale.
  - Starts 15 mm in from the edge, and reads 60mm across the main scan from that point
- **CIS**
  - Reads reference white from the white roller opposite the CIS.
  - Starts 20 mm in from the edge, and reads 65mm across the main scan from that point

Service manual, section 6.5.5

❒ Note the slight differences in the method.

SP Modes

- **Reference white scanning position adjustments**
  - SP4016: Platen mode (CCD)
  - SP4018: ADF mode (CIS)
- **SP 5106: Image density for the central notch in ADS mode**

❒ These SPs allow you to adjust the location where the reference white is read from, in case the DF exposure glass or reference white plate is defective.

Service manual, page 3-146

❒ In the case of SP 4018, refer to this page in the service manual.

Replacement

- **Do the procedures in section 3.4 of the service manual.**
- **Obey all notes and cautions in the manual.**

REPLACEMENT

Service manual, section 3.4

- ❒ Have the trainees remove and replace the parts in this section.
- ❒ Remind them to follow all notes and cautions in the manual.
- ❒ Note that the copy adjustments must be done after replacing the lens block or the scanner motor. There is no need to do them in the class, unless the trainees need some practise.

Service manual, section 3.1.4

- ❒ First, make sure that the class is aware of the service notes for the scanner unit.
- ❒ CCD: Do not try to calibrate with SP4605 after replacing the lens block. This SP only works if you have exactly the same paper type as used in factory to perform the calibration.

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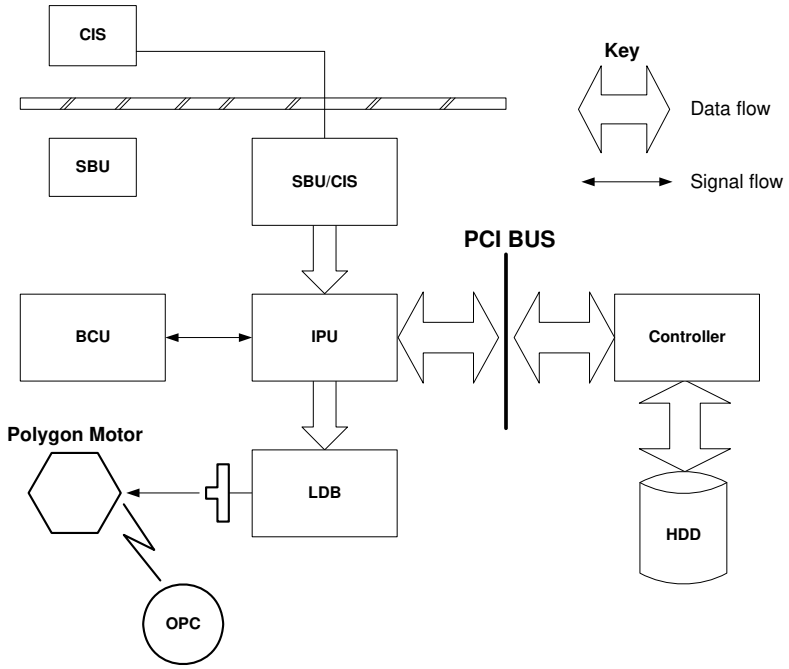
B246 SERIES TRAINING

COPIER ENGINE

IMAGE PROCESSING

❒ This section explains the image processing done inside this machine.

Components in the Image Processing Circuit

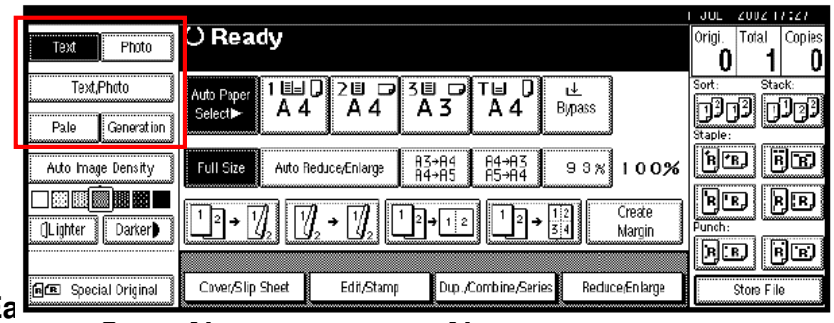


Service manual, section 6.6.1

- This diagram shows which parts of the machine take part in image processing.
- The CIS is in the ADF, as mentioned earlier. It scans the reverse side of two-sided originals.
- The CCD is in the scanner under the main exposure glass.
- The adjustments have been greatly simplified compared with earlier models.

Original Types

- **Five main original types**



- **Ea**
  - Select with User Tools - Copy/Document Server Features - General Features 1/5 - Copy Quality
- **One of the four sub-types is a 'custom setting' mode, which can be customized with SP settings**

Service manual, section 6.6.3

❒ The table in the service manual shows which original types are suited to each of the original type settings.

Service manual, section 6.6.4

❒ The SP modes that are used to adjust the custom settings are shown on these pages.

❒ Notes below each table explain how to adjust the SP modes.

Custom Settings

- **The following items can be adjusted using the custom setting SP modes**
  - Image quality
  - Line width correction
  - Duplex scanning image quality

❒ There are only three sets of adjustments for the ‘custom setting’ original types.
❒ These are listed on the slide, and will be explained in the next three slides.

Image Quality

- **SP 4903 001 to 024**
- **These SPs affect items such as MTF and smoothing**
- **Photo mode has two sets of image quality custom settings**

Service manual, section 6.6.4, Image Quality

- There are no complex MTF or smoothing SP adjustments. Just adjust these SPs, as described in the tables on the above pages.
- Note that there are two sets of custom settings for photo mode. These are 'dithering' and 'error diffusion'. The set of custom settings that will be used depends on the setting of SP 4904 002.
  - The dither matrix size setting affects the quality of photo images. If the customer complains about the quality of photo images, experiment with this SP until you get the best results.

Service manual, pages 6-40 and 6-41

- Just to give you an idea of what the SP settings do, the manual includes some tables relating the SP settings with the various original type settings.
- For example, in text mode, if you want the 'custom setting' to have an effect halfway between the 'Soft' sub original type and 'Normal', set the SP mode to 3.
- Note that there are different SPs for different ranges of reproduction ratio.

Line Width Correction

- **SP 4903 080 to 094**
- **You can strengthen the effect of line width correction with SP4904 020 to 024.**

Service manual, section 6.6.4, Line Width Correction

❒ These tables explain how to use the SP modes that control line width correction.
❒ The extra adjustment (SP 4904 020 to 024) will make lines even thinner if required.

Duplex Scanning Image Quality

- **Front side: Scanned by the CCD inside the main body of the machine**
  - SP 4901 010 to 014: one adjustment for each original mode
- **Rear side: Scanned by the CIS in the ADF**
  - SP 4902 010 to 014: one adjustment for each original mode
- **Adjustments are needed for the following reasons:**
  - To match the image quality of the two scans
  - To remove defects in the image caused by borders between blocks of elements

Service manual, section 6.6.4, Duplex Scanning Mode Image Quality

- The slide explains why we need adjustments for duplex scanning.
- There are 10 adjustments
  - Five original modes, two adjustments for each original mode (front side image quality, rear side image quality)
- If the image quality of the front and rear sides are different, adjust either SP4901 or SP4902 until the quality is about the same.
- In some original modes, if halftones (photos) are present, vertical white lines may appear in the scan. To remove these, adjust SP 4902 for that original type.
  - Then, you may have to adjust SP 4901 for that original type, to make the image quality for front and rear scans the same.

Service manual, page 6-38, and 6-42 to 6-44

- The front side adjustments (SP 4901 010 to 014) are normally only applied during duplex scanning. However, by changing SP 4901 019 to 1, you can apply the adjustment to both single-sided scans and the front sides of two-sided scans.
  - This may be needed if users are remarking on the difference in image quality between single-sided scans and the front sides of two-sided scans.
  - Note that such differences are less likely in Text/Photo mode, so one workaround is to try using Text/Photo mode for troublesome originals.
- Remember that all these adjustments are only valid for the ‘custom setting’ original types.

Independent Dot Erase

- **Affects all original types**
  - Not only the ‘custom setting’ original sub-types
- **SP 4903 060 to 064**

Service manual, section 6.6.4, Settings Adjustable for Each Original Mode

❒ These tables explain how to use the SP modes that control independent dot erase.
❒ This adjustment affects all original type settings, not only the ‘custom settings’

Background Erase

- **Affects all original types**
  - Not only the ‘custom setting’ original sub-types
- **SP 4903 070 to 074**

Service manual, section 6.6.4, Settings Adjustable for Each Original Mode

❒ These tables explain how to use the SP modes that control background erase.
❒ This adjustment affects all original type settings, not only the ‘custom settings’

Other SPs

- **2111: FCI shading detection (only when using the printer controller)**
- **2114: Edge processing (only when using the printer controller)**

❒ Look at the SP tables, and try to study the effects of these SPs on various types of image.

Scanner and Fax Mode SPs

- **SP 4550 to 4585**

❒ These SPs are available to adjust image processing for fax and scanner modes.

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COPIER ENGINE

LASER UNIT

❒ This section explains how the laser unit converts the image data signal into laser pulses for writing the latent image on the OPC.

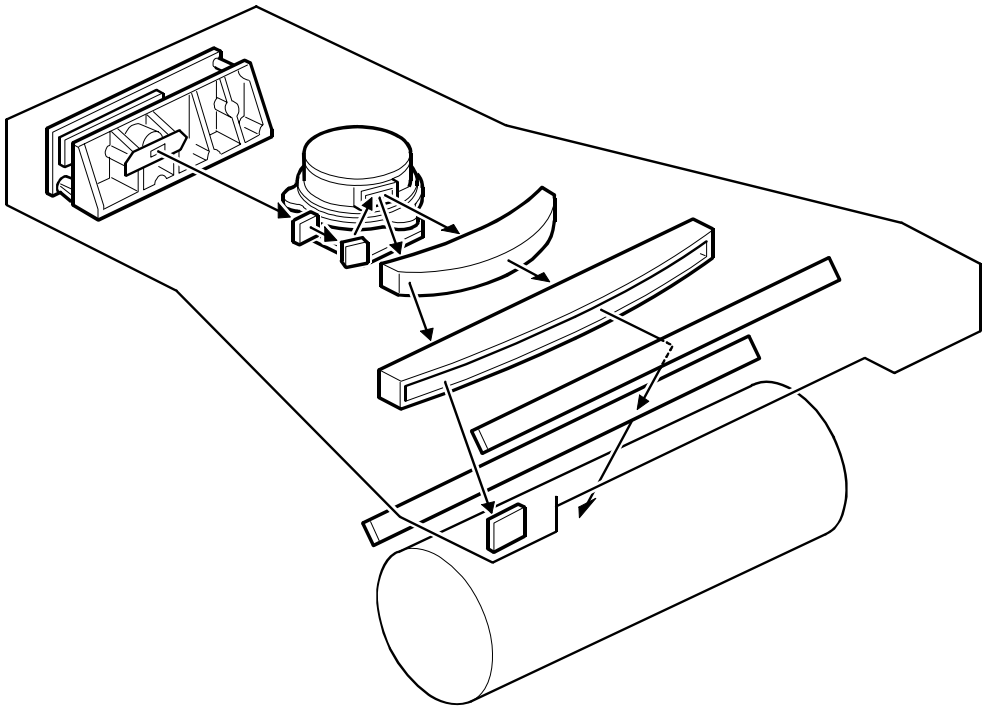
Overview

- **Four laser diodes, six-sided mirror**
  - 24 scan lines per mirror rotation
- **Up to 5 levels per pixel (using Pulse Width Modulation only)**
- **1200 dpi**
  - Fixed at 1200 dpi, so no beam pitch adjustments

Service manual, section 6.7.1

- The main points are on the slide. More detailed specs are in the service manual.
- Normally, only two levels are used. However, when FCI smoothing (also called 'edge smoothing') is used, the full 5 levels are used to produce 5 shades of grey.
  - FCI is automatically selected when printer mode is used. It is never used during copy mode.

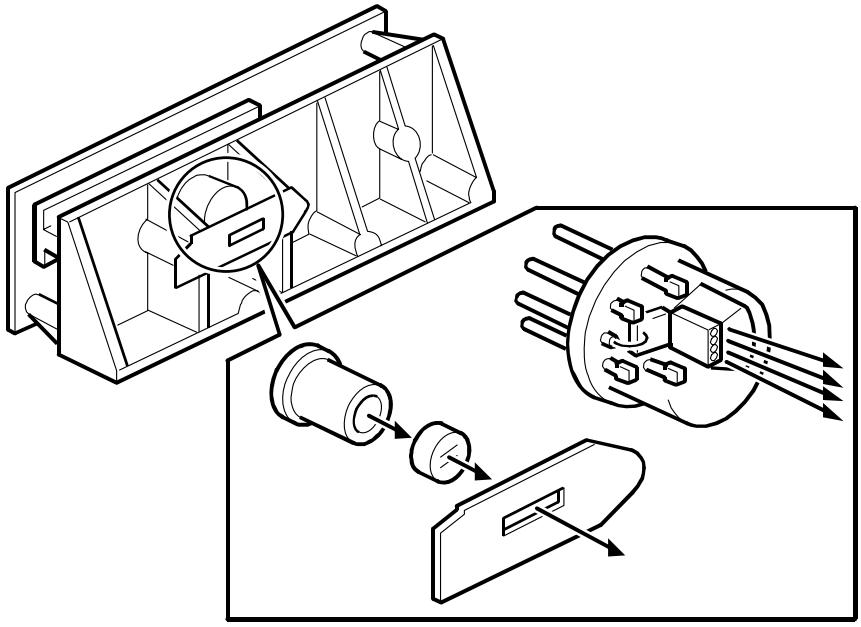
Optical Path



Service manual, section 6.7.2

- ❒ This is a standard laser optics unit, with only one laser synch detector.
- ❒ The Core Technology Manual has more information on laser optics components.

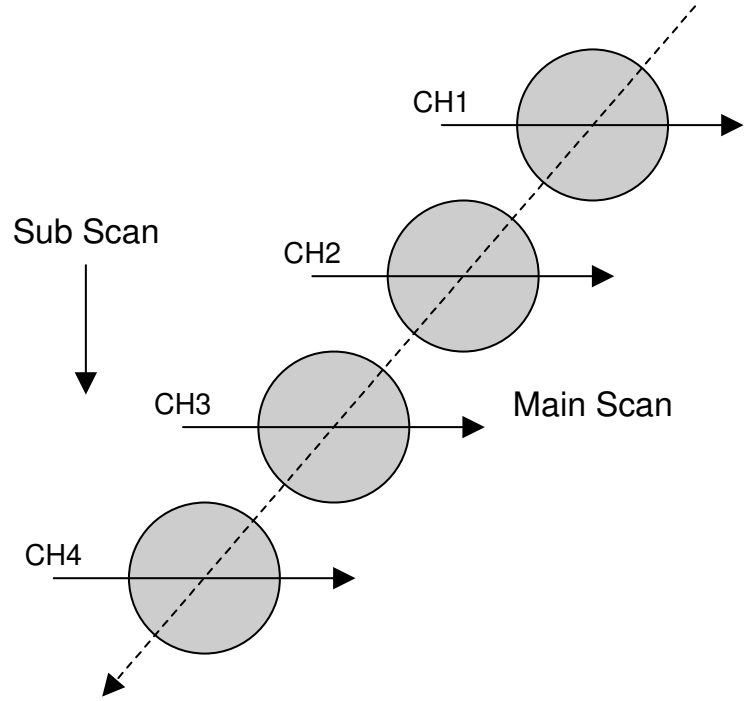
LD Unit



Service manual, section 6.7.3

❒ This diagram shows the laser diode unit with the four laser diodes.

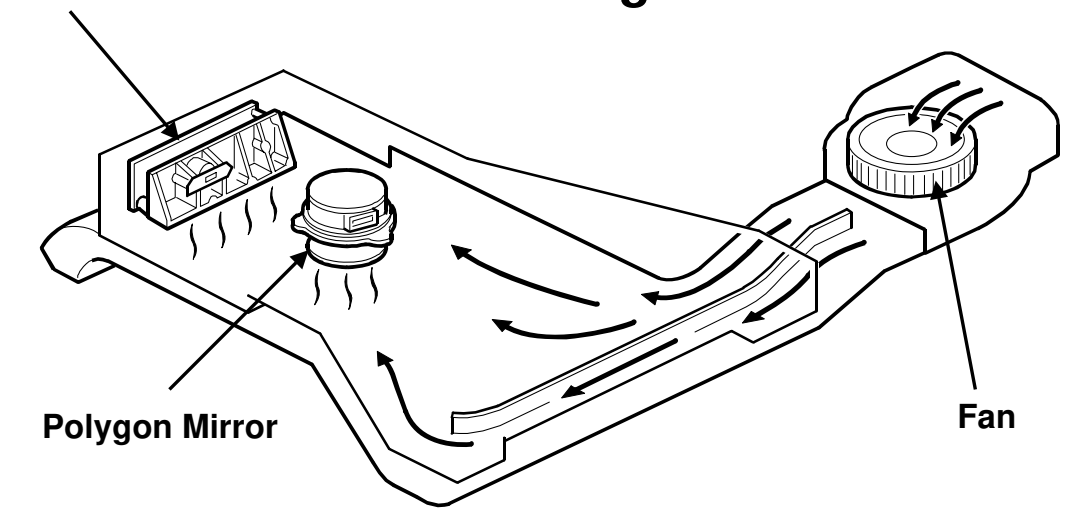
1,200-dpi Laser Printing



Service manual, section 6.7.3

- ❒ The four main scan lines overlap slightly.
- ❒ The close spacing of the dots provides 1,200 dpi resolution.

Cooling

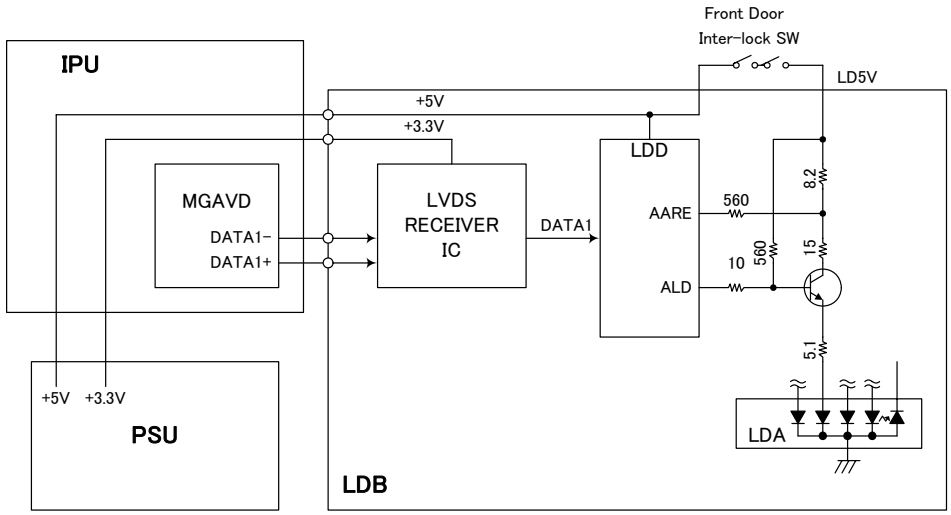


- **The fan is always on when the mirror is turning.**
- **The mirror only stops in auto off or night mode, or when the machine is switched off.**

Service manual, section 6.7.4

❒ The main points are on the slide.

Safety Switch



- **When the front cover is open, the 5V line to the laser diodes is disconnected.**
  - Switch name: Front door safety switch

Service manual, section 6.7.5

❒ Go over the points on the slide.

Replacement

- **Do the procedures in section 3.5 of the service manual.**
- **Obey all notes and cautions in the manual.**

REPLACEMENT

Service manual, section 3.5

- ❒ Have the trainees remove and replace the parts in this section.
- ❒ Remind them to follow all notes and cautions in the manual.
- ❒ Especially, draw attention to the laser beam cautions. Laser beams can seriously damage the eyes.
- ❒ Note that several adjustments must be done after replacing the LD unit.
  - ➢ SP2962 - forced process control
  - ➢ SP2115 - input the values from the decal. Demonstrate this in the class.
  - ➢ Copy adjustments - There is no need to do these in the class, unless the trainees need some practise. However, they need to be aware

Service manual, section 3.1.5

- ❒ First, make sure that the class is aware of the service notes for the laser unit.

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B246 SERIES TRAINING

COPIER ENGINE

PROCESS CONTROL

❒ In this section, process control will be described.

Process Control Components

- **Toner Supply Control**
  - TD sensor
  - ID sensor
  - Image pixel count
- **Latent Image Control**
  - Grid voltage
  - Drum potential sensor
  - Laser diode power
  - Development bias

- In this machine, process control consists of the following.
  - Toner supply control, controlled by the TD sensor, the ID sensor, and the image pixel count. For details, see the Toner Supply section of the course.
  - Latent image control (also called 'drum potential control'), using the drum potential sensor, charge corona grid voltage, development bias, and laser diode power, to correct drum potential to compensate for the points listed in the service manual.
- This section of the course will mainly deal with latent image control. The Development and Toner Supply section of the course handles toner supply.
  - However, Auto Process Control has some bearing on toner supply, and this will be discussed as we get to it.
- Normally in digital copiers, there is no drum potential control. However, in this machine, the high process speed can lead to an unstable image density. Therefore, drum potential control is used in this model.

Short Process Control

- To decrease warm-up time, a smaller number of steps is done immediately after the machine power is turned on.
- The number of steps is controlled by SP 3904.
- The default is 0 (the minimum number of steps is done), and the charge corona wire is not cleaned. The machine is ready after 30 seconds.

Auto Process Control

- **Drum potential sensor calibration**
- **Development bias adjustment**
- **Grid voltage adjustment**
- **Laser diode power adjustment**
- **ID sensor calibration (not done during Short Process Control)**
- **Toner density sensor reference voltage calibration (not done during Short Process Control)**

Service manual, section 6.8.11, What Happens at Power On

❒ The machine automatically does the operations listed this slide (in the order that is listed).

Auto Process Control Timing

- **Immediately after the main switch is turned on (and when it comes back from auto off mode)**
  - Process control is done if these conditions occur:
    - If fusing temperature is less than 100 °C
    - If SP 3901 (auto process control enable/disable) is on
  - If SP 3904 is at 2, the full process control will be done. The default is 0 (short process control, the wire is not cleaned).
- **At the end of a job, if process control was not done for more than 24 hours (the charge corona wire is also cleaned)**
  - This interval is set with SP 2966. At this time, a full process control is done, and not a short process control.
- **Forced process control**
  - When SP 2962 is done
    - This is a forced process control; use this SP to do the process control procedure when it is necessary

Service manual, section 6.8.11, What Happens at Power On

❒ Auto Process Control is done at the times listed on this slide.

❒ SP2966: Adjust it if process control needs to be done more often, especially if the wire keeps getting dirty.

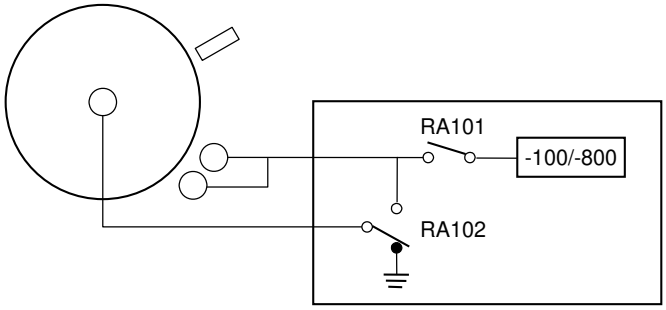
➢ Normally, process control is done only at power-on, and this may only be a short process control, so if the machine is always kept on, this SP may be useful.

❒ If SP3901 is disabled, auto process control is not done. Then, development bias, grid voltage, and laser power are set to the values in the SP modes listed in the manual.

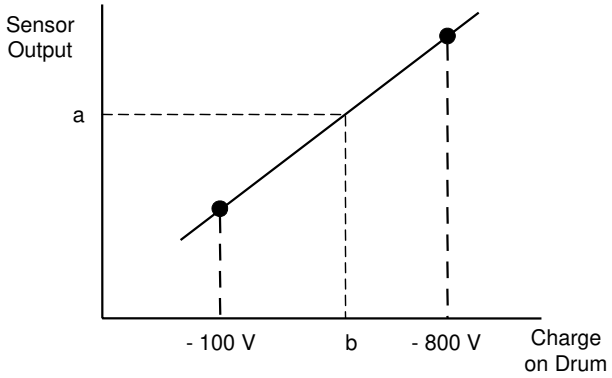
Service manual, page 6-75

➢ In addition, if process control is disabled, the ID sensor pattern is calibrated differently.

Drum Potential Sensor



- **Corrects drum potential sensor output for temperature and humidity**



- **Two-point calibration**
- **Linear relationship assumed**

Service manual, section 6.8.11, Drum Potential Sensor Calibration

- This corrects the sensor output for effects of temperature and humidity.
- The development power pack applies two different voltages to the drum shaft.
  - The voltages applied to the shaft are such that the drum voltage is first –100V, then –800V.
- The drum potential sensor outputs are taken for each of these two applied voltages.
- From these two readings, the machine can determine the actual drum potential from sensor output during operation.
  - The machine assumes a linear relationship. For example, in the diagram, if the sensor output is ‘a’, the voltage on the drum is determined to be ‘b’.
- If the gradient of the sensor response is abnormal, auto process control is switched off, and grid voltage and laser diode power are fixed to the SP mode values. An error code is logged, but the machine can still be used.
  - Grid voltage: SP2001 001
  - LD power: A fixed value in the firmware
  - Development bias: SP2201 001

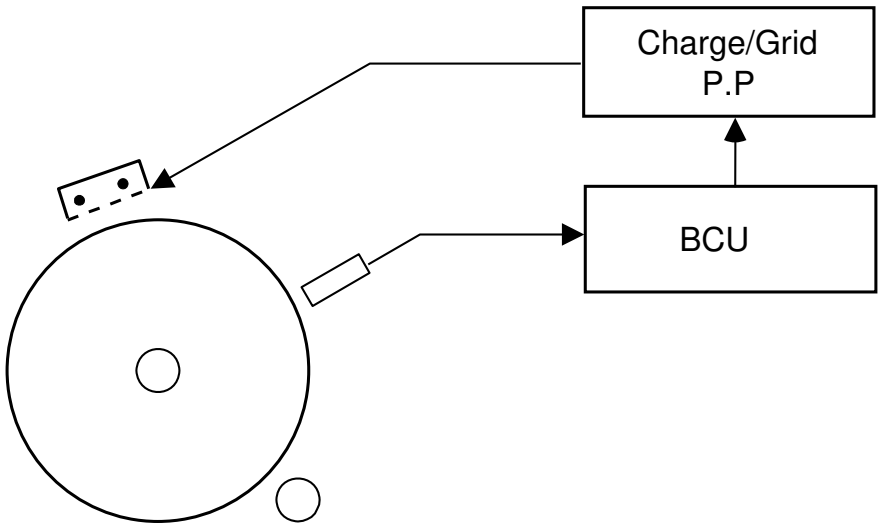
Development Bias Adjustment

- **A latent image is written to the drum, using the default values for development bias, grid voltage, and laser power**
- **The drum potential sensor reads the potential on this latent image.**
- **The potential (VL) should be -130V**
- **If the potential is not correct, the development bias is adjusted to make the potential correct.**

Service manual, section 6.8.11, Development Bias, Bias Grid, and LD Adjustment

- The next step is to calibrate the development bias.
- This step was not done in the Mojito or SP5. In the Mojito, development bias was fixed at -900V.
- The slide describes how it is done.
- For example, if VL is -200V, the difference from the target (-130V) is 70 Volts. So the development bias is changed from the default (-800V) to -870 Volts to keep the potential at -130V.
- This system compensates for dirty laser optics, which would affect the potential on exposed areas of the drum (Vd), because the full power of the laser would not reach the drum.

Grid Voltage Adjustment



- **The drum potential sensor output for unexposed areas of the drum (V_D) must be -800 ± 10V .**
- **If not, the grid voltage (V_G) is adjusted.**

Service manual, section 6.8.11, Development Bias, Bias Grid, and LD Adjustment

- The potential on unexposed areas of the drum (V_D) gradually changes during drum life.
- To keep V_D constant, the grid voltage (V_G) is adjusted.
- If V_D is not within the target range (-800V ±10V), V_G is adjusted until V_D is acceptable.
- If it cannot be adjusted within 5 attempts, Vg is fixed to -1000 V.

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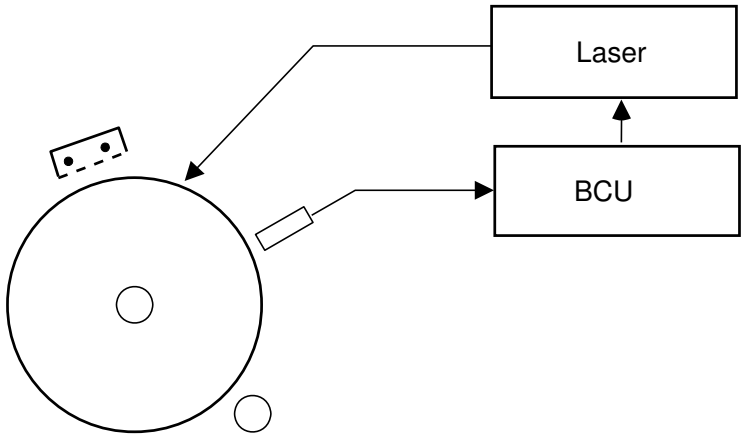
LD Power Adjustment

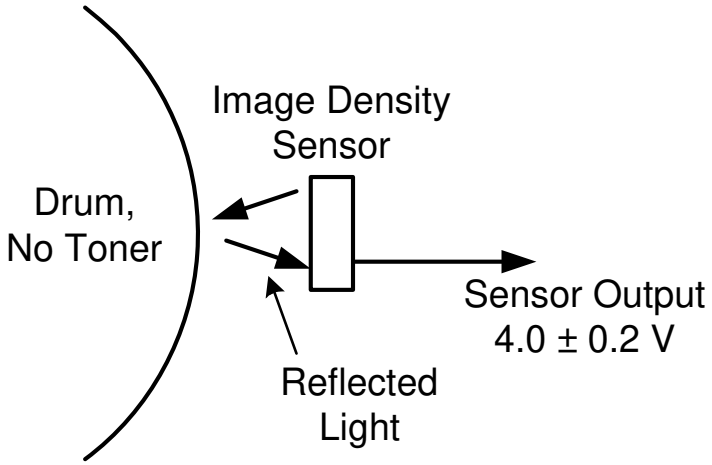


- **The drum potential sensor output for the pattern (V_H) must be -300 ± 20V .**
  - This pattern has the same density as the ID sensor pattern.
- **If not, the laser diode power is adjusted.**

Service manual, section 6.8.11, Development Bias, Bias Grid, and LD Adjustment

- This process ensures that the ID sensor pattern is always at the same intensity, so that the TD sensor reference voltage V_{REF} updates correctly.
  - NOTE: V_{REF} is also updated regularly, using the ID sensor pattern. However, LD power adjustment for the ID sensor pattern is not done at that time. LD power is only adjusted during auto process control (normally at the start of the day when the machine is switched on).
- The machine makes a pattern of the same density as the ID sensor pattern (not fully black).
- The drum potential sensor for this pattern must be –300V ±20V.
- If it is not, the laser diode power is adjusted. It must be adjusted successfully within 25 attempts or the laser power is set to the previous value.

ID Sensor Calibration



- **Adjusts the output when light is reflected from the bare drum to 4.0 ± 0.2V**
- **This is known as V_{SG}**

Service manual, section 6.8.11, ID Sensor Calibration

- The ID sensor is used for toner supply control.
- The response of the sensor to the bare drum is calibrated during auto process control.
  - The intensity of light shining on the drum from the sensor is adjusted until the output is 4.0 ± 0.2V
- At certain intervals during the day (for details, see Development and Toner Supply), the output is measured and compared with the reading from a standard sensor pattern. This controls the toner supply.
  - During toner supply control, the sensor is not calibrated; this only happens during Auto Process Control.
- If the ID sensor output cannot be adjusted to within the standard, the TD sensor becomes the only control for the toner density.
- SP 2967: Also, the ID sensor can be disabled. In some environments, such as places where there is an abnormal amount of ammonia in the air, the ID sensor is unreliable. See the SP table for details.

TD Sensor Reference Value

- **The TD sensor reference value is corrected using readings from the ID sensor**
  - V_{SG}: From the bare drum
  - V_{SP}: From the ID sensor pattern

Service manual, section 6.8.11, TD Sensor Calibration

- This is done to keep the concentration of toner in the developer as stable as possible.
- Readings from the ID sensor (from the bare drum and from the ID sensor pattern) correct the TD sensor reference voltage.

SP Modes

- **2001: Charge corona unit grid voltage**
- **2201: Development bias voltage**
- **2962: Manually executes a process control**
  - Process control must be enabled with SP 3901 or it will not work.
- **2966: Process control and corona wire cleaning interval**
- **3001 002: Manually initializes the ID sensor**
- **3103: ID sensor output display**
- **3901: Auto process control enable/disable**
- **3902: Process control data display**
- **3903: Continued drum rotation after process control**
- **3904: Controls what the machine does immediately after the power is turned on**

SP MODES

- 2001 001: This is the value used during copying if process control is disabled with SP3901)
- 2001 002: This is the voltage used to make the ID sensor pattern
- 2001 004: This is used during copying, but is changed next time process control is done. Use this for testing the effects of a certain value.
- 2001 005: This is the grid voltage used when copying to OHPs
  - In OHP mode, process control values are not used. The SP values for OHP mode are used.
- 2201 001: This is the value used during copying if process control is disabled with SP3901)
- 2201 003: This is the voltage used when copying to OHPs (see 2001 005 above)
- 2966: This is 24 hours by default. Adjust it if process control needs to be done more often, especially if the wire keeps getting dirty (uneven density across the page).
- 3001 002: Forced ID sensor initialization (this is also done during auto process control)
  - This must be done after replacing certain parts, such as the NVRAM. If you forget to do this, an SC code will appear (350 to 355 - not sure which one). Then, to recover the machine, you must reset 3001 001 to the default.
- 3903: Note the use of this SP if the image on copies is unfocused.
  - 3903 002 adjusts the length of time that the drum rotates.

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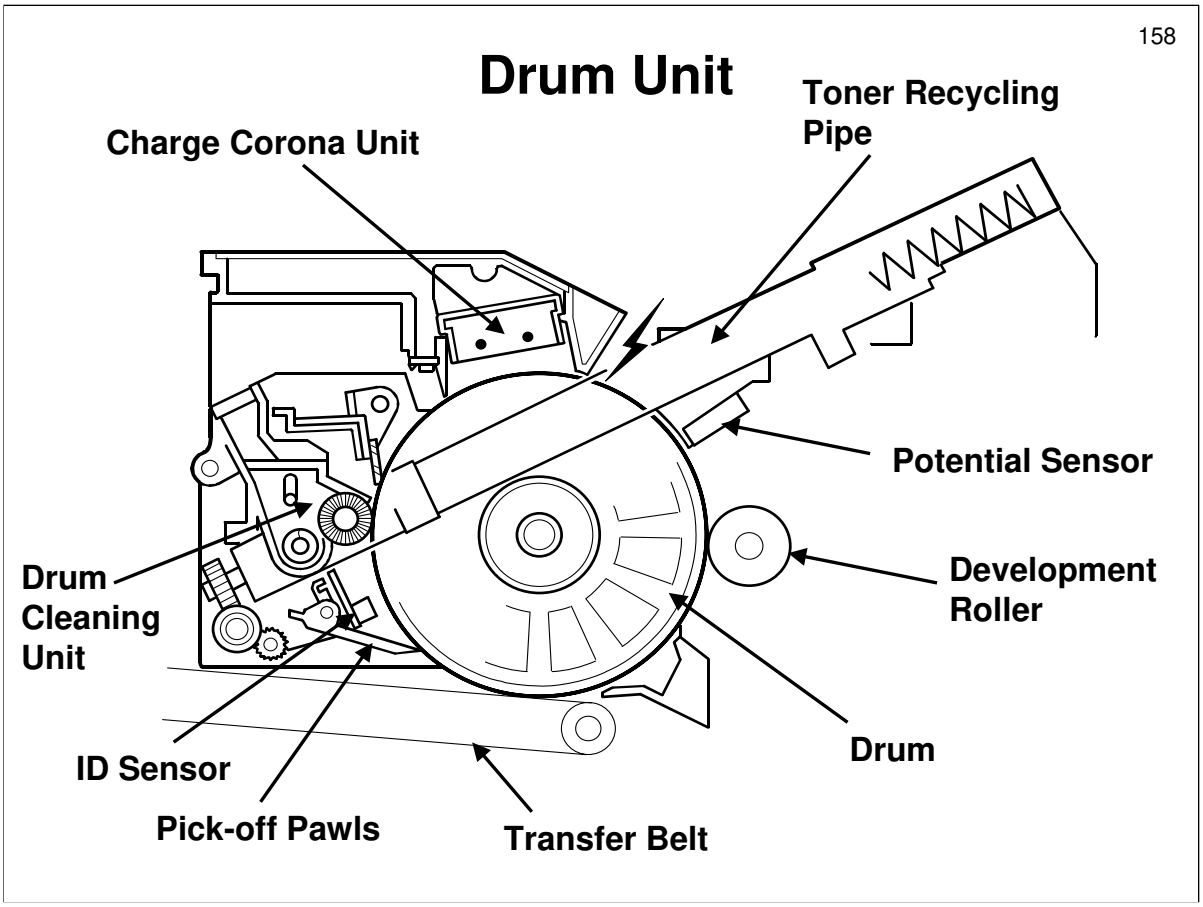
COPIER ENGINE

PROCESSES AROUND THE DRUM

- This section describes the drum and the processes around it, including quenching, charge corona unit, drum cleaning, and toner recycling.
- There are a lot of fans to cool the machine. Without cooling, the extra heat generated by the increased speed of the machine could cause the toner to stick together and block the mechanism.



Service manual, section 6.8.1

❒ The main components are indicated on the slide. Go over the following points.

- OPC Drum (100 mm diameter)
- There is a Drum Potential Sensor and ID Sensor
- Charge Corona Unit

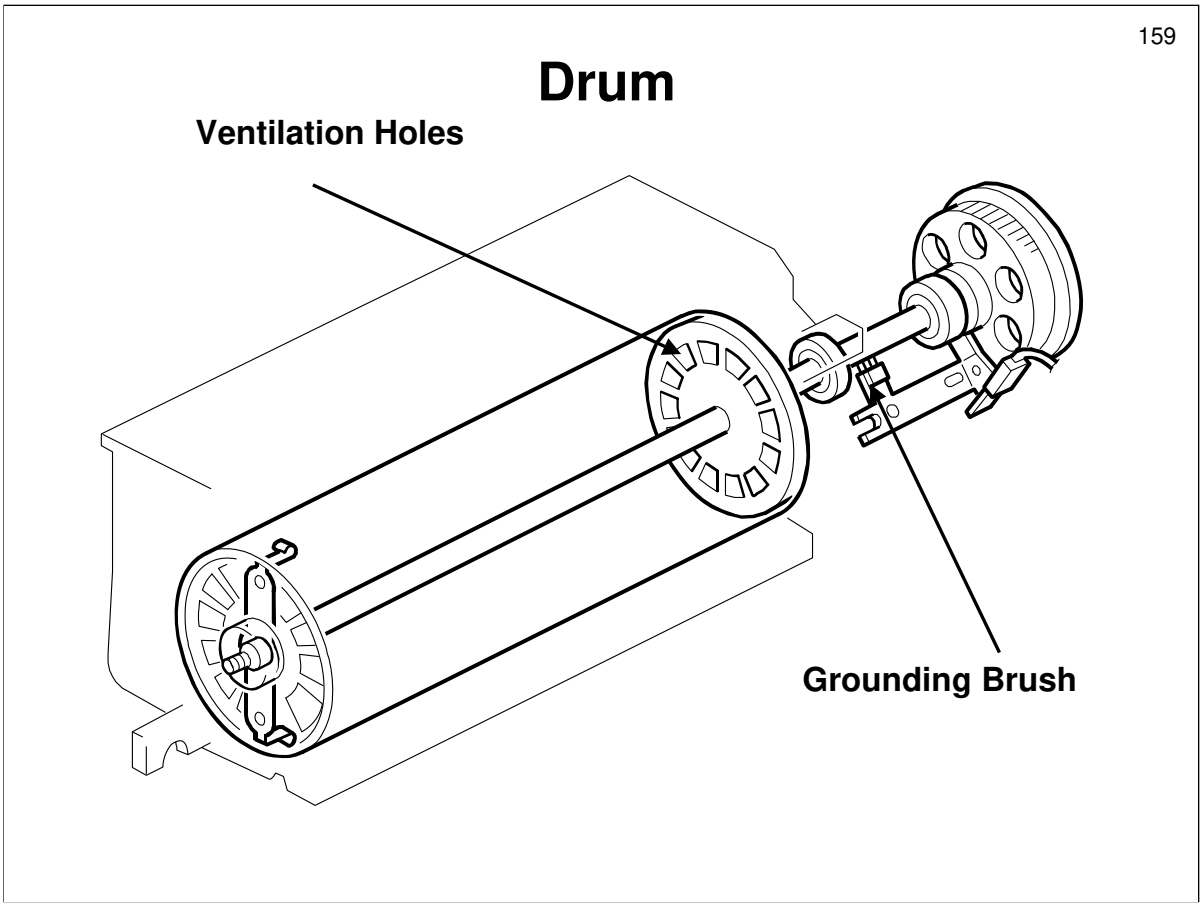
  With cleaning pads
- Pick-off Pawls

  The spurs rotate and move the pawls into contact and away from the drum as they turn.
- Cleaning Unit

  Counter blade mechanism

  Edge cleaning mechanism

  Toner recycling (the toner recycling pipe carries toner up to the toner hopper, where recyclable toner is separated from waste toner)
- Only one development roller in this model - this will be discussed in the Development section.



Service manual, section 6.8.2

❒ Note the ventilation holes and the grounding brush.

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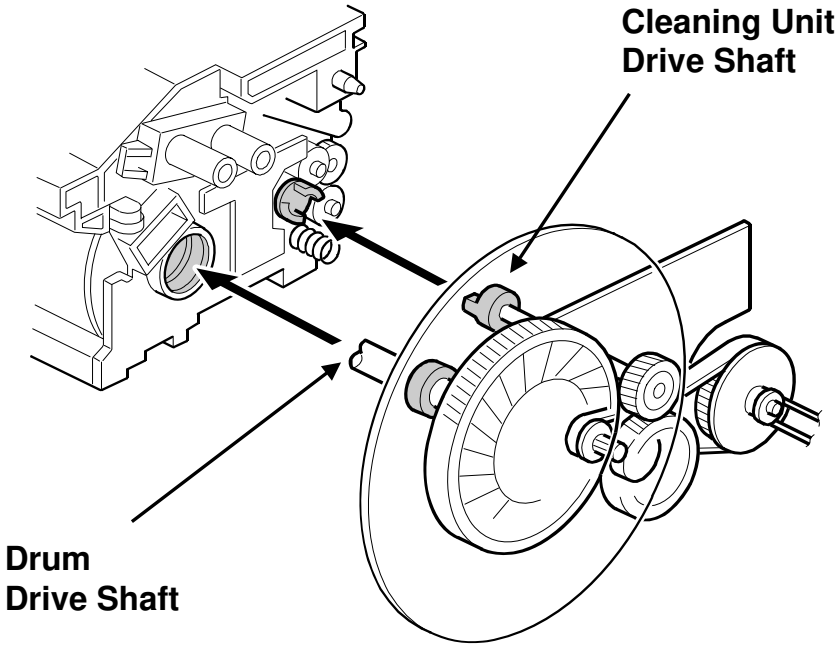
Drum Drive Mechanism



■ **The drum motor drives the drum**

Service manual, section 6.8.3

❒ The drum motor drives the drum, through the shaft on the left of the drawing. It also drives the drum cleaning unit, through the shaft on the right.

❒ The flywheel on the drum shaft stabilizes the rotation speed. This prevents banding on copies.

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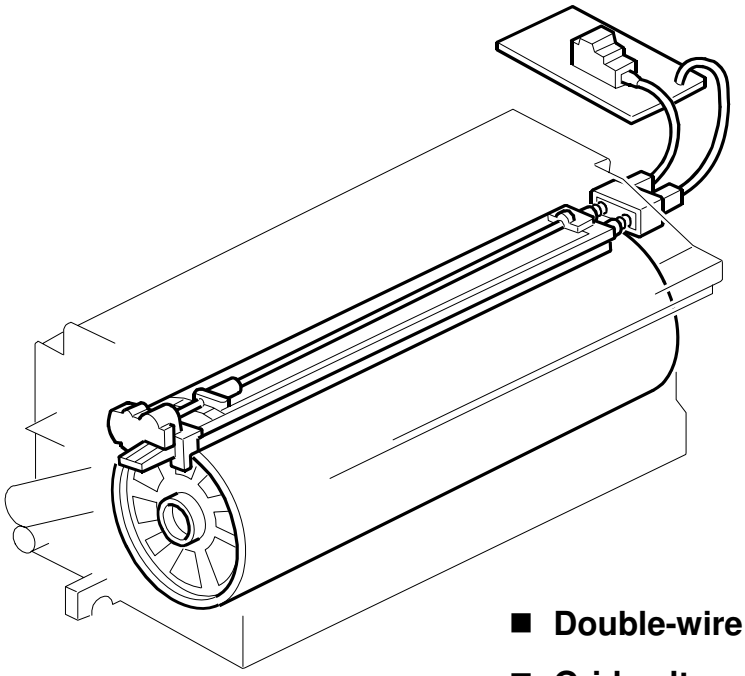
Charge Corona Unit

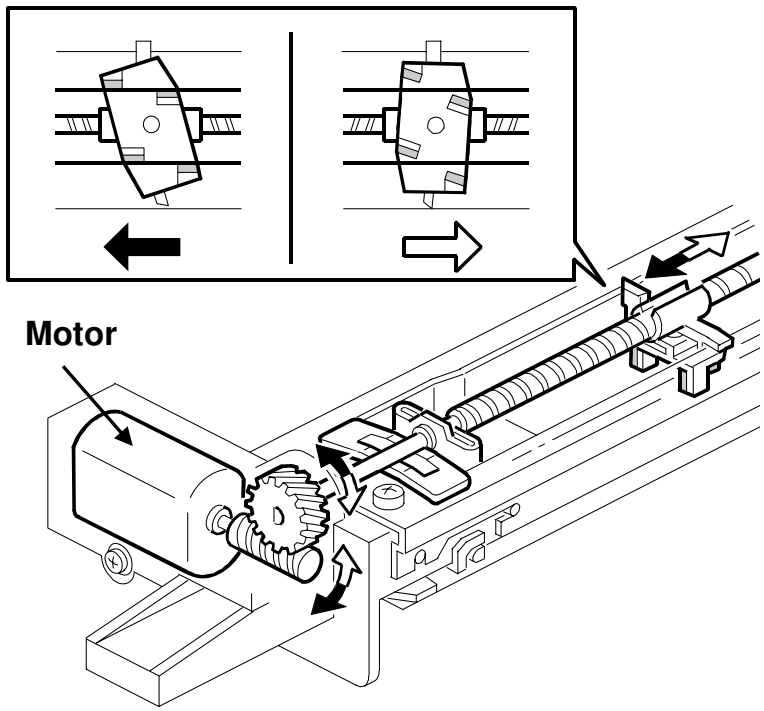


- **Double-wire scorotron**
- **Grid voltage controlled to maintain copy quality**

Service manual, section 6.8.4

- ❒ The main points are on the slide.
- ❒ Charge rollers are not much good for very fast machines. This is because they only contact a very narrow area of the drum. If the drum rotates quickly, it may not have sufficient charge.

Corona Wire Cleaning



- **Removes dust and toner**
  - Prevents low density bands on copies

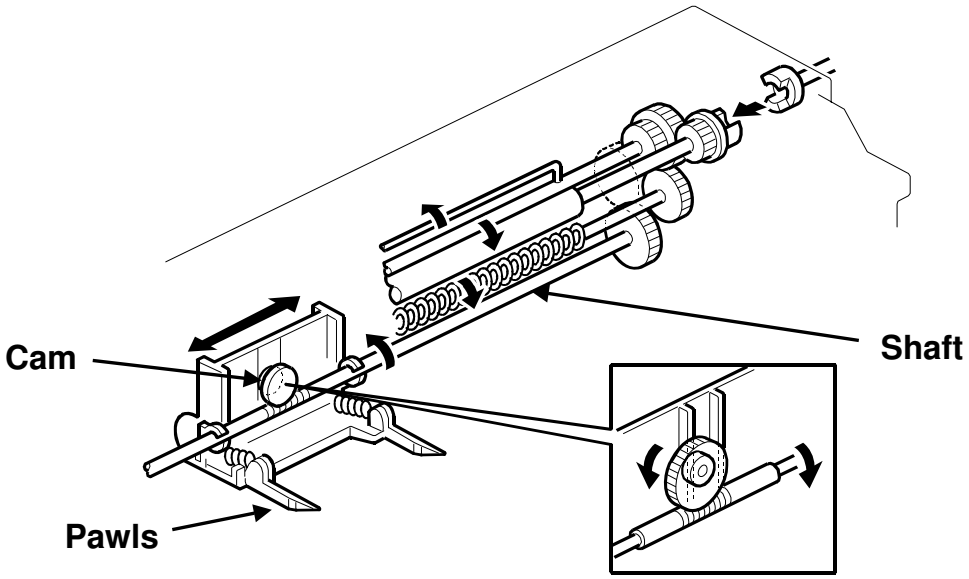
Service manual, section 6.8.5

❒ This mechanism removes dust from the wire to prevent pale banding on copies.
❒ The cleaner moves from front to rear and back again.
❒ Cleaning occurs on the way from front to rear.

When is the Corona Wire Cleaned?

- **Immediately after the machine power is turned on, if one of the following conditions occurs**
  - SP 3904 is at 1 or 2. The default is 0 (not cleaned).
- **At the end of a job, if one of these conditions occurs:**
  - The wire was not cleaned for 24 hours or more
    - You can change this interval with SP 2966
  - 5,000 copies or more were made after the last time that the wire was cleaned
    - The interval is set with SP 2804 002
    - Wire cleaning at a set interval can be enabled or disabled with SP 2804 001
- **Forced cleaning**
  - SP 2803

Pick-off Pawls

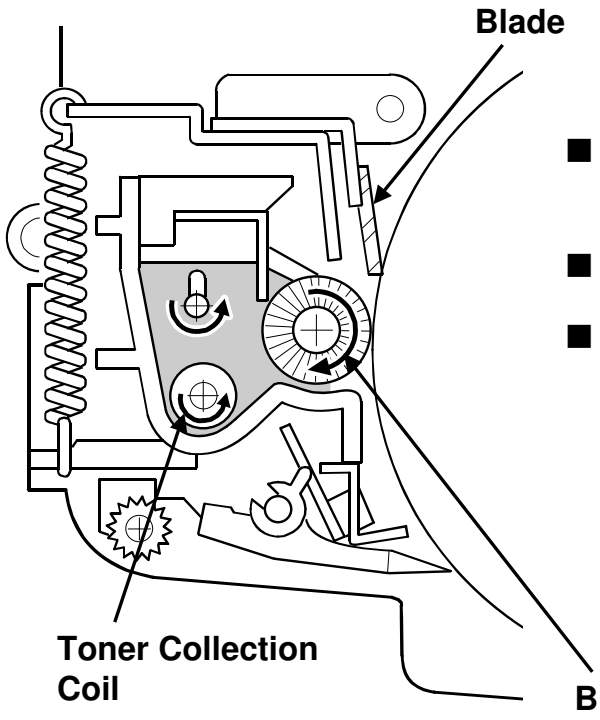


- **Always contact the drum**
- **Side-to side movement during copying to prevent drum wear.**

Service manual, section 6.8.6

❒ Describe the side-to-side movement mechanism and the reason for it.
❒ Remind the class of the spurs, described on the overview slide of this section.

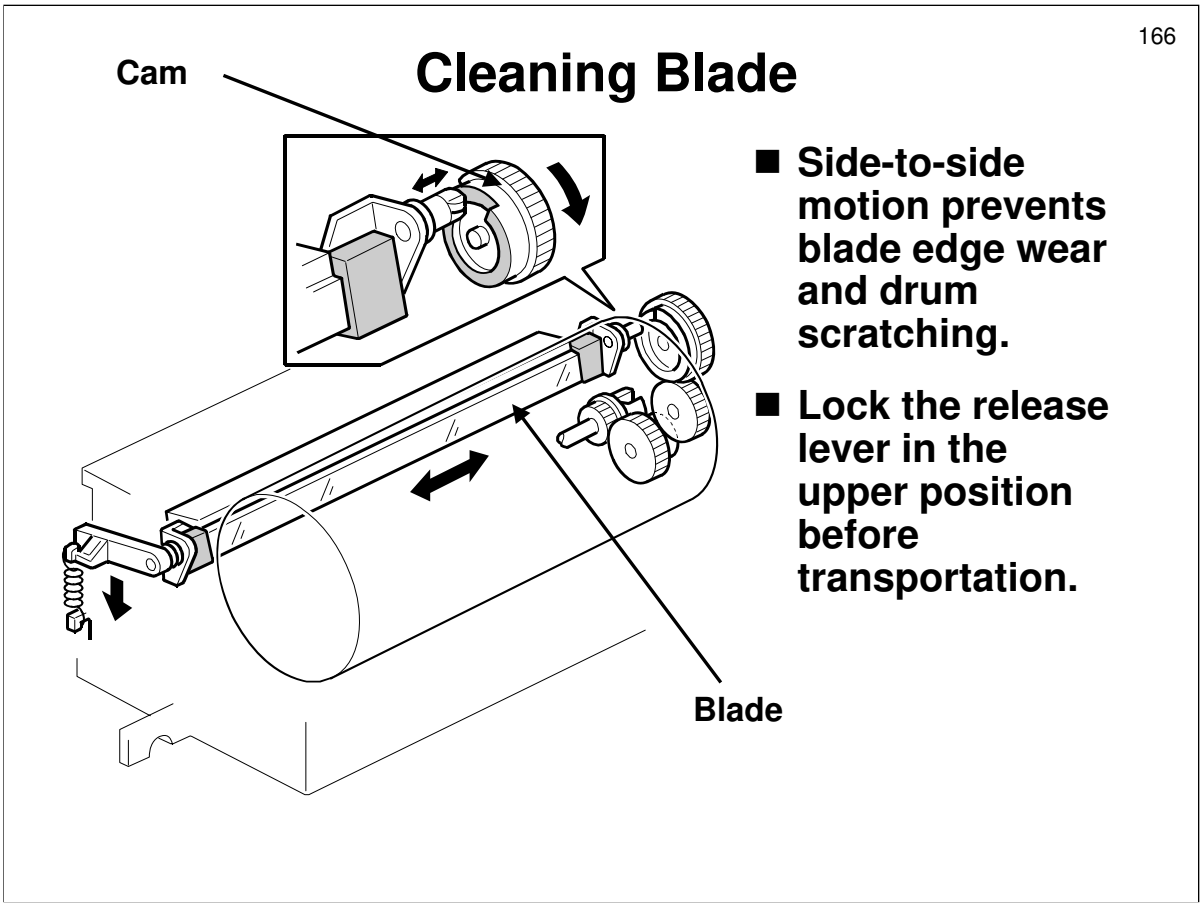
Cleaning Unit Overview



- **Counter blade and brush system**
- **Side-to-side movement**
- **Drum reverse rotation to clean the blade edge**
  - At the end of copy jobs
  - Can be enabled during long jobs, using SP2-506

Service manual, section 6.8.7

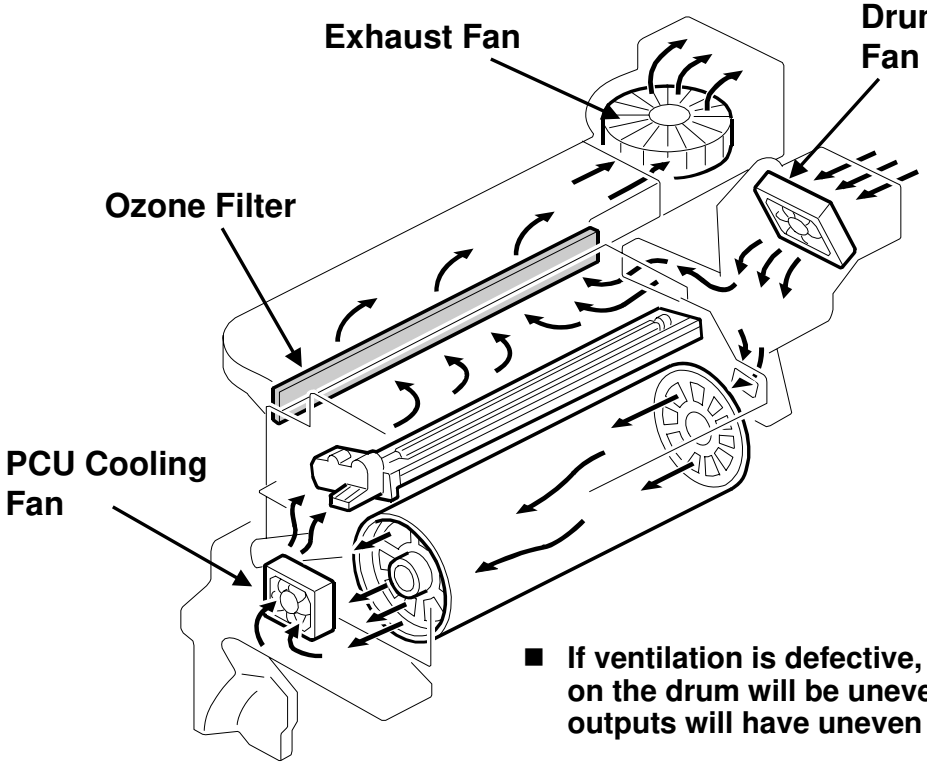
- This machine uses a brush and counter blade.
- The brush removes the toner, and the blade removes bits that the brush missed.
- The toner collection coil carries the toner in the cleaning unit back to the development unit.
- The blade moves from side to side.
- At the end of every copy job, the drum reverses for 10 mm to scrape toner off the edge of the cleaning blade.
- In addition, SP2-506 can be programmed to have this done at intervals during long copy runs. The default setting is disabled.
  - If enabled, an ID sensor pattern for toner supply control will be made at the same time.



Service manual, section 6.8.7

- ❒ The blade always contacts the drum.
- ❒ A cam moves it from side to side during copying, to prevent wear at any particular place.

Drum Ventilation

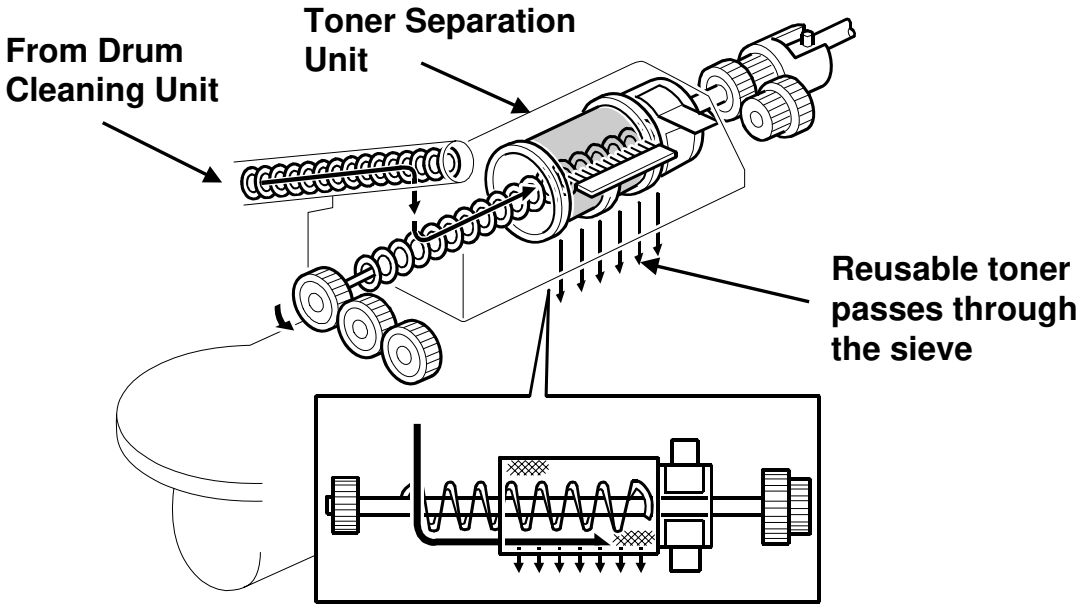


- **If ventilation is defective, the charge on the drum will be uneven, and outputs will have uneven density.**

Service manual, section 6.8.8

- ❒ Follow the flow of air in from the drum cooling fan, through the drum, and out through the ozone filter.
  - ➢ There is an ozone filter, because corona units make a lot more ozone than charge rollers.
- ❒ The on/off timing of the fans is covered in the service manual.
- ❒ Cooling prevents uneven drum surface charge.

Toner Recycling

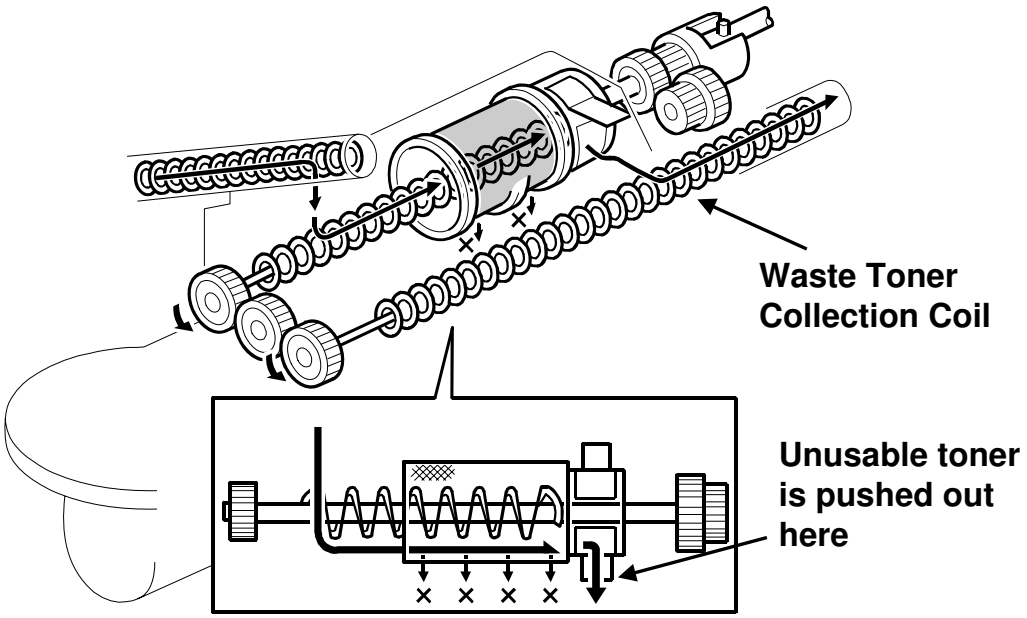


■ **Re-usable toner from the drum cleaning unit goes back to the development unit.**

Service manual, section 6.8.9

- ❒ The toner separation unit is inside the toner hopper.
- ❒ Toner that passes through the sieve goes into the toner hopper and on to the development unit for re-use.
  - ➢ The next slide shows what happens to toner that does not pass through the sieve.
- ❒ The components are driven as follows:
  - ➢ Toner collection coil (from drum cleaning unit): Driven by the drum motor
  - ➢ Toner separation section: Driven by the development motor

Waste Toner Collection - 1



■ **Toner that cannot be used again goes to the waste toner bottle via the waste toner collection coil.**

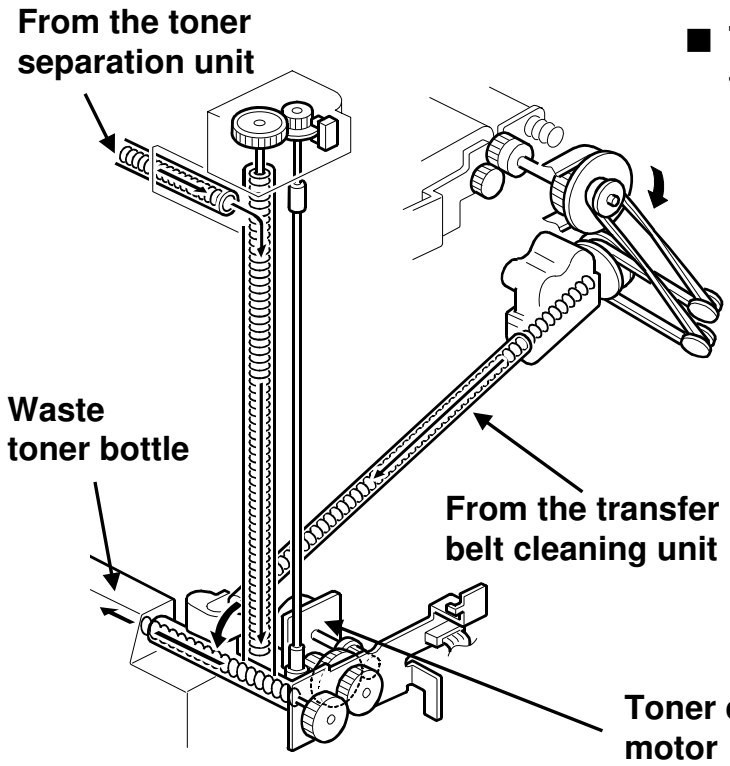
Service manual, section 6.8.9

❒ Part of the recycled toner from the drum unit cannot be reused. This slide shows how the unusable toner is pushed out to the waste toner collection coil.

❒ The waste toner collection coil moves this toner out towards the waste toner collection bottle.

- ➢ Waste toner collection coil: Driven by the development motor

Waste Toner Collection - 2



- **The following goes to the waste toner bottle:**
  - All waste toner from the transfer belt cleaning unit
  - The toner from the drum cleaning unit that is rejected by the toner separation unit (in the toner hopper)

Service manual, section 6.8.10

- This slide shows how waste toner is delivered to the waste toner bottle.
  - The service manual gives the capacity and expected life of the bottle.
- The coils are driven by the following motors
  - Toner collection motor: Drives the vertical coil, and the coil inside the toner collection bottle
  - Drum motor: Drives the sloping coil that comes from the transfer unit
  - Development motor: Drives the coil that leads from the separation unit in the toner hopper (the end of this coil can just be seen at the top left of this diagram)
- The service manual explains the error detection mechanisms, which depend on sensors attached to the toner collection mechanisms.
- Note that SC 590 appears if the vertical coil is blocked, and SC 495 is if the sloping one is blocked.

SP Modes

- **Charge Corona Unit**
  - 2001: Charge corona grid voltage adjustments
  - 2803: Forced charge corona wire cleaning
  - 2804, 2966: Discussed earlier in this section

SP MODES

Charge Corona Unit

- 2001: Grid voltage was discussed in the Process Control section
- 2803: Forced charge corona wire cleaning
  - Use this to clean the corona wires if cleaning is needed
- 2804 001: The default is enabled
- 2804 002: The default is every 5000 copies
- 2966: This was discussed in the Process Control section.

SP Modes

- **Cleaning Unit**
  - 2506 001: Cleaning blade edge cleaning during multicopy jobs, enable/disable
  - 2506 002: Interval at which multicopy jobs are stopped for blade edge cleaning
  - 2912 001: Periodic cleaning blade edge cleaning
  - 2912 002: Cleaning interval
  - 2968: Forces used toner into the used toner collection bottle

Cleaning Unit

- 2506 001: Cleaning blade edge cleaning during multi-copy jobs, enable/disable
  - To clean the blade edge, the drum turns in reverse for 4 mm. The default is 'disabled'. However, the blade edge is cleaned at the end of every job.
  - An ID sensor pattern for toner supply control is also made at this time if this SP is enabled.
- 2506 002: Interval at which multi-copy jobs are stopped for blade edge cleaning
- 2912 001: This is disabled by default. If enabled, the machine will stop every few minutes (interval is set with SP 2912 002) and reverse the drum to clean the blade.

Replacement

- **Do the procedures in section 3.6 of the service manual.**
- **Obey all notes and cautions in the manual.**
- **ID Sensor**
  - After installing a new sensor, do SP 2962 (process control initialization) then initialize the sensor (SP 3001 002).
  - After cleaning the sensor, initialize it only (SP 3001 002).

REPLACEMENT

Service manual, section 3.6

- ❒ Have the trainees do the procedures in section 3-6.
- ❒ Remind them to follow all notes and cautions in the manual.

Service manual, sections 3.1.1, 3.1.2, and 3.1.6

- ❒ First, make sure that the class is aware of the service notes for the drum, drum unit, and charge corona unit.

Development Unit

- ❒ If temporarily installing a used development unit for test purposes, do SP 2-220 after installation.
  - ➢ This inputs the value of VREF for that development unit for use during the test.
- ❒ **Development unit reinstallation:** Note the correct way to re-install the development unit. This was explained also in the Installation section.

Drum Unit

- ❒ Don't forget the service remarks for the drum.
- ❒ After installing a new drum, do the following SP modes.
  - ➢ 2001 001, 002, 004, 005: Charge corona voltages – must be at the default settings
  - ➢ 2962: Process control initialization (only works if process control is enabled, and the fusing unit temperature must be less than 100 C).

Charge Corona Wires

- ❒ After installing a new wire, make sure that al the SP 2001 settings are at the defaults.

Drum Potential Sensor

- ❒ After installing a new sensor, do SP 2962 (process control initialization). See the notes for the drum unit above - the fusing unit must be cooled down.

Cleaning Blade

RICOH

B246 SERIES TRAINING

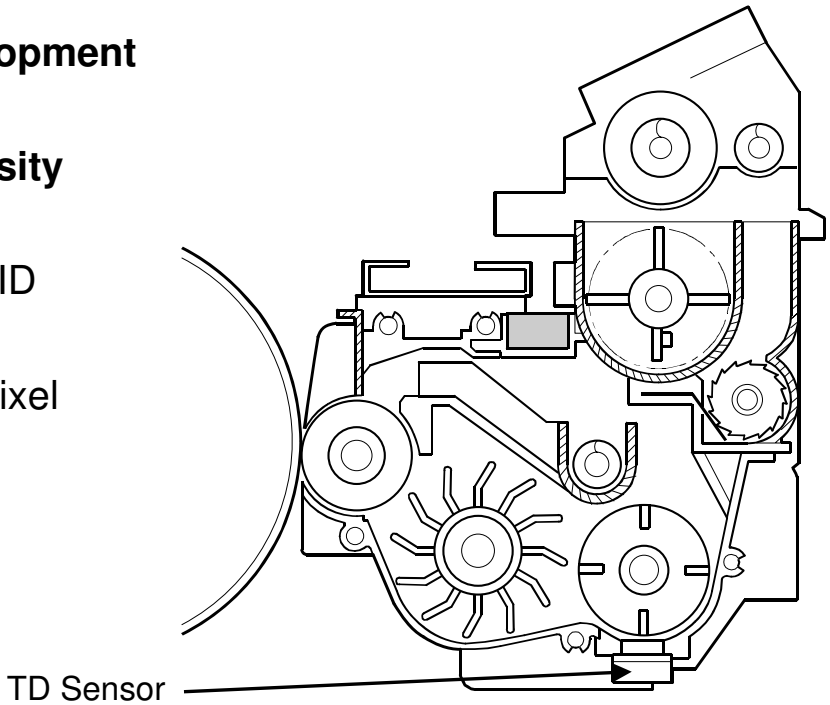
COPIER ENGINE

DEVELOPMENT AND TONER SUPPLY

- The development process will be described.
- The toner supply mechanism will be described.
  - Toner supply control maintains the correct proportion of toner in the developer mixture. The proportion of toner to developer may require adjustment to account for changes in the reflectivity of the OPC drum over time, or to respond to changes in conditions around the drum caused by variations in temperature or humidity.
- The toner near-end and toner end detection methods will be discussed.

Overview - Development Unit

- **One development roller**
- **Toner density control**
  - TD and ID sensors
  - Image pixel count



Service manual, section 6.9.1

❒ Outline the development mechanism for this machine. Point out the following:

❒ A single-roller development system is used.

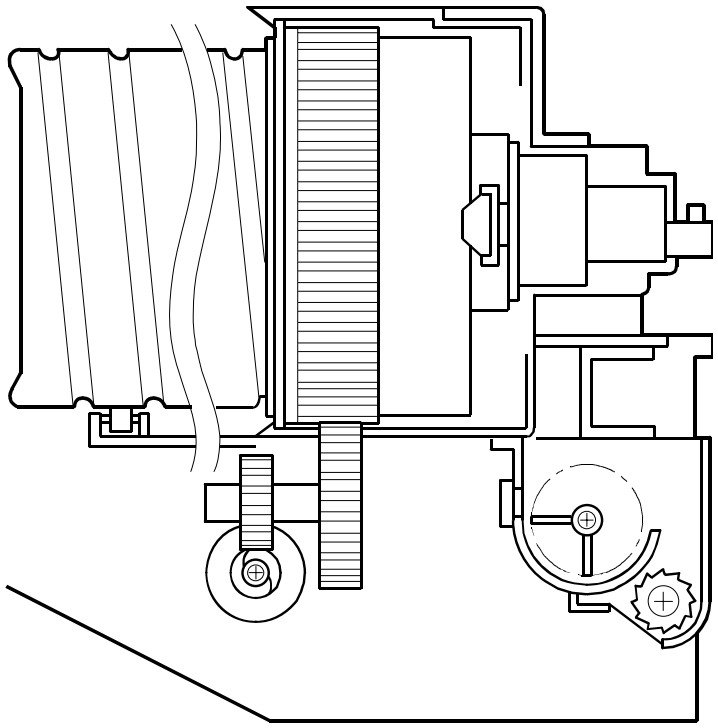
- In the SP5 and Mojito, a double-roller system was introduced to solve certain copy quality problems. However, in the Martini, a finer toner and developer is used, and the technology of the copy process has been improved sufficiently to allow the return of the single-roller system.
- This extremely fine toner and developer has improved image quality, especially for thin horizontal lines, the trailing edges of half-tone areas, and hollowing out near the points where black lines cross.

❒ The toner density sensor is below the development unit. It measures toner concentration in the developer, and is one of the main components used for toner supply control (the other is the ID sensor).

❒ The toner and carrier are both finer than in the Mojito.

Overview - Toner Hopper

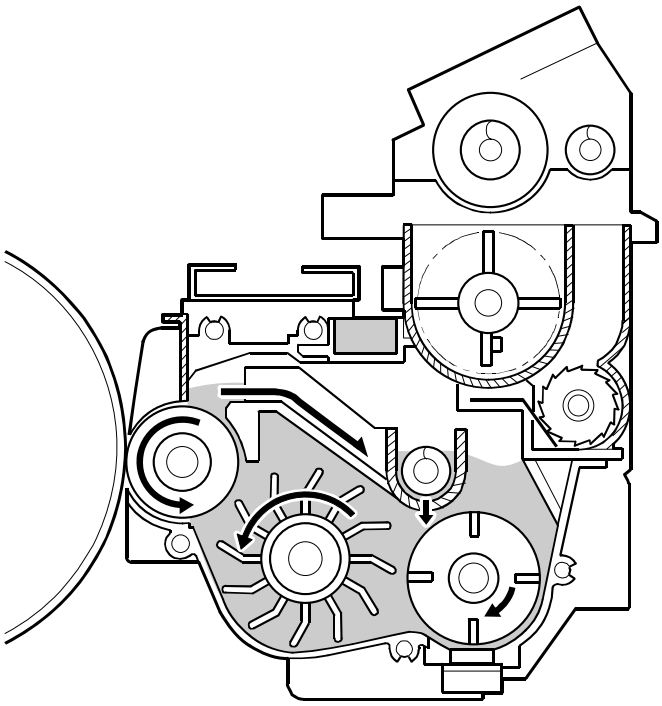
- **Toner recycling system**



Service manual, section 6.9.1

- ❒ Recycled toner from the drum cleaning unit mixes with new toner.
- ❒ The toner density sensor, image density sensor, and image pixel count for the page control the toner supply.

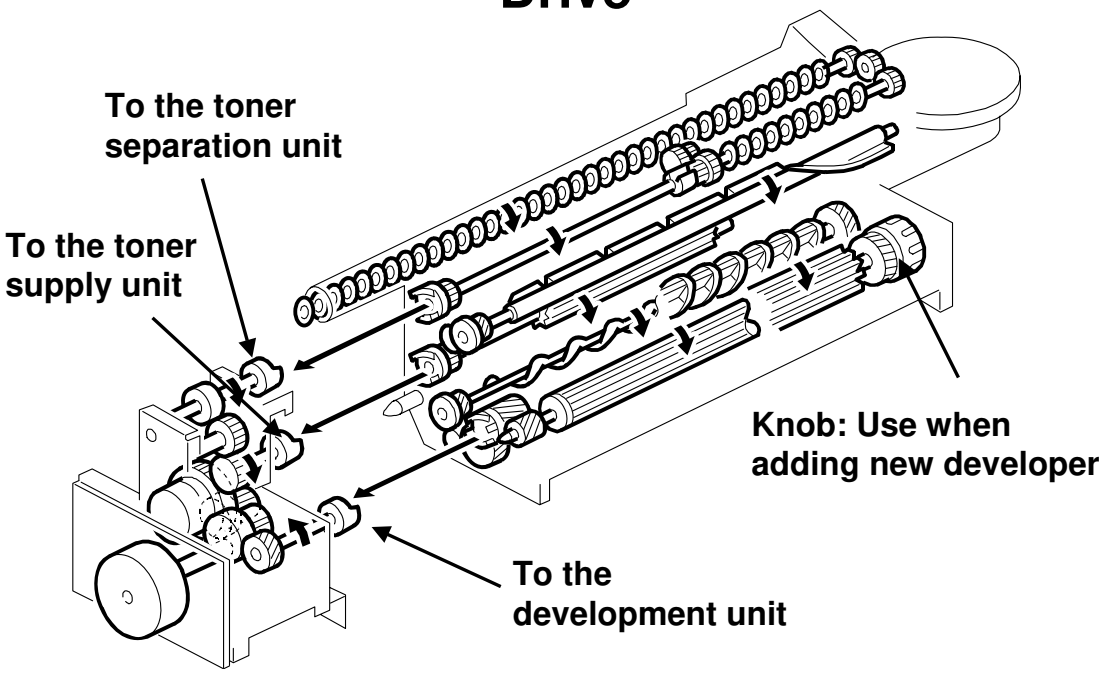
Development Mechanism



Service manual, section 6.9.2

❒ This is very similar to other machines that use dual-component developer.

Drive



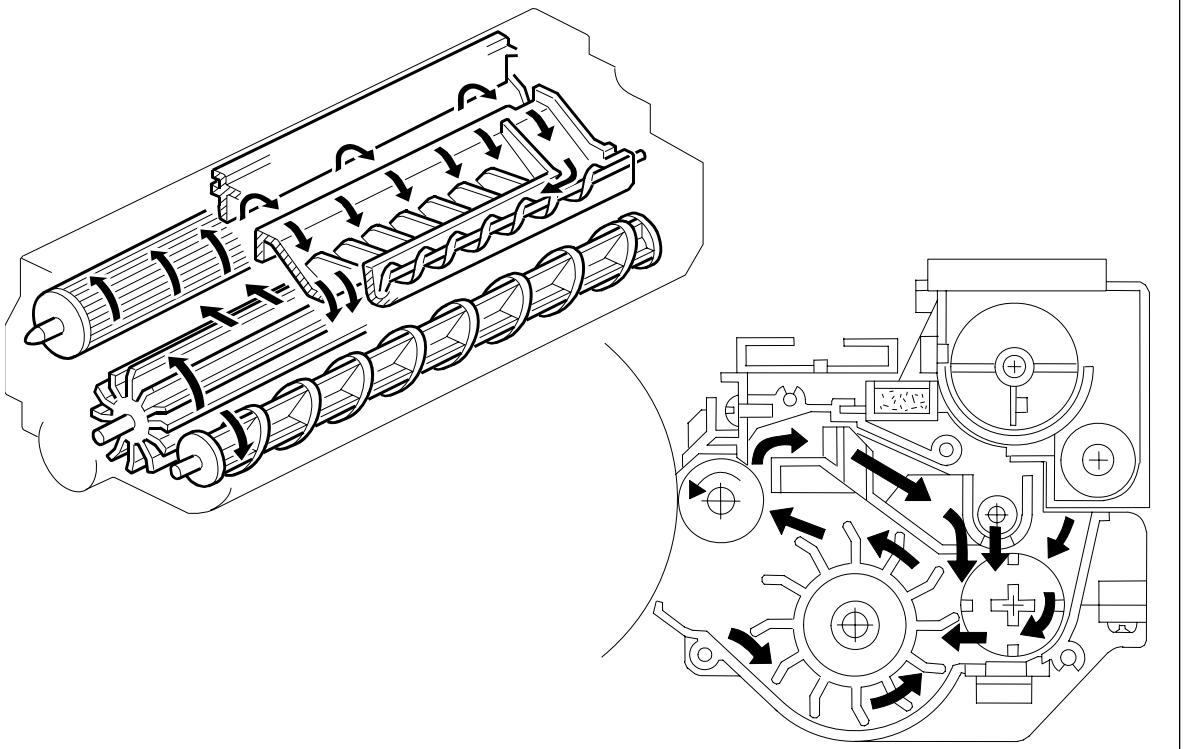
■ **Driven by the development motor**

Service manual, section 6.9.6

❒ A separate motor, dedicated to the task, drives the development roller.
  ➢ This reduces the load on the drum motor to stabilize drum motor rotation.

❒ The development motor drives the three mechanisms indicated on the slide.
  ➢ The toner supply clutch transfers motor power to the toner supply unit at the appropriate time. This is determined by the toner supply control processes, which are described later.

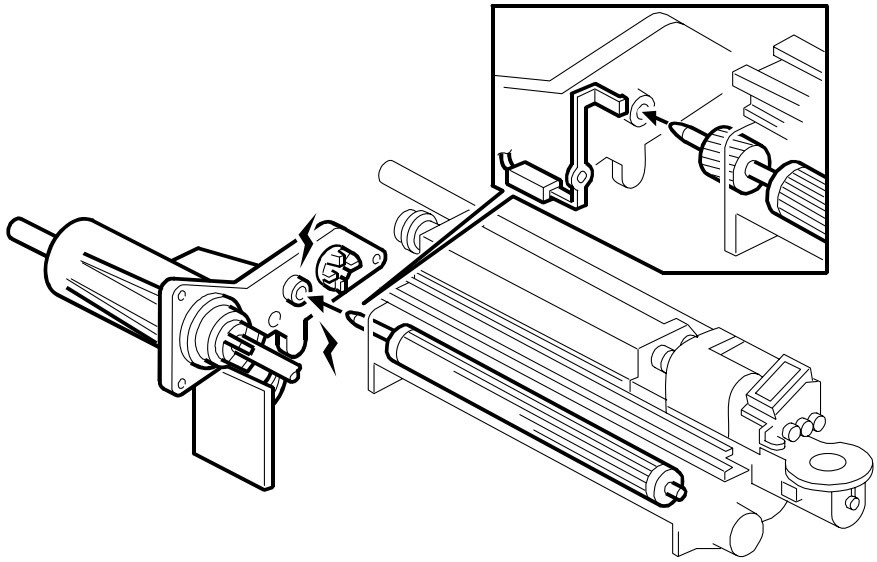
Crossmixing



Service manual, section 6.9.3

- ❒ Demonstrate the following steps of the mixing process on the slide.
- ❒ A mixture of new toner from the toner bottle and recycled toner enters the development unit from the toner hopper.
- ❒ The agitators move the toner to the development roller.
- ❒ Toner split off by the doctor blade goes to the backspill plate.
- ❒ The mixing vanes transport this toner towards the rear.
- ❒ Some toner falls onto the auger and is transported toward the front.
- ❒ Mixing does the following:
  - ➢ Keeps the toner and developer evenly mixed
  - ➢ Prevents lumps from forming
  - ➢ Helps create the turboelectric charge on the toner.
- ❒ The doctor blade splits the developer into two parts.
  - ➢ One part goes to the development roller to form the magnetic brush and the latent image on the drum.
  - ➢ The other part is returned to the development unit, where it is mixed with new developer (and recycled toner) and moved back to the development roller.

Development Bias



- **Development bias: -550 V**
  - From the development power pack

Service manual, section 6.9.4

❒ Describe how bias is applied. Point out the following:

- The development bias is –550V.
- White areas of the latent image on the drum remain at a high –ve voltage (about -950 V). The laser exposes the black areas. Then, the black areas drop to a low –ve voltage (about -150 V).
- The bias is also applied to the lower casing to prevent toner from being attracted back from the drum.

Toner Supply Mechanism

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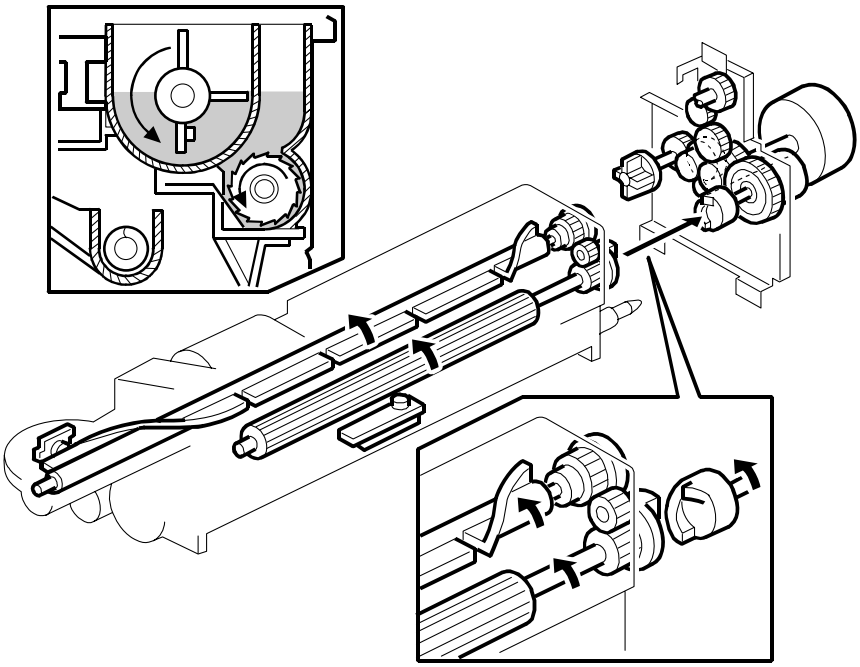


■ **Driven by the development motor and toner supply clutch**

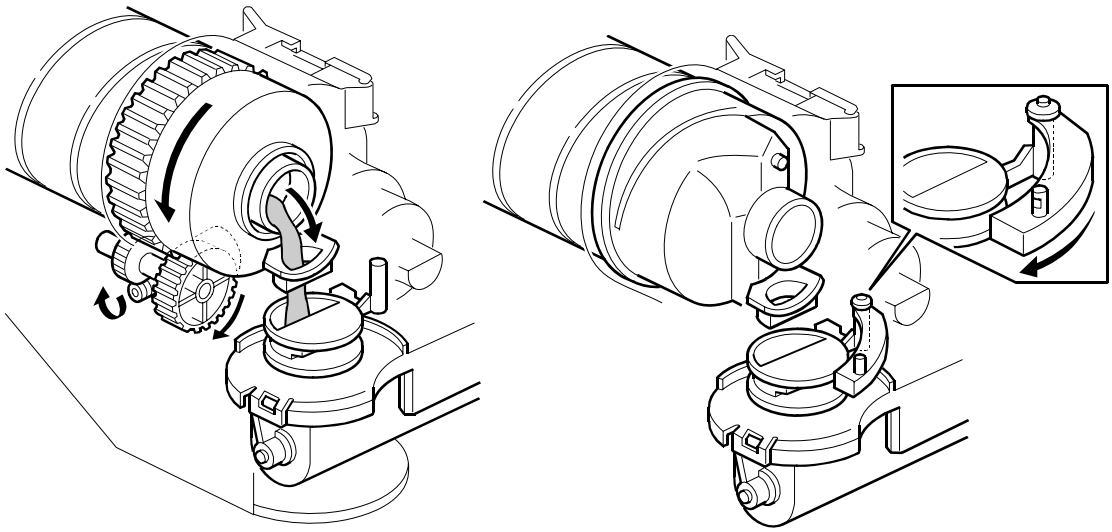
Service manual, section 6.9.5

❒ Describe this mechanism.

❒ The development motor drives the toner supply roller.

- ➢ The toner supply clutch is included in the development motor assembly. The toner supply clutch turns on the agitator and toner supply roller, which lets toner in from the bottle into the development unit.

Toner Bottle Mechanism



■ **Driven by the toner supply motor**

Service manual, section 6.9.9

❒ Describe this mechanism.

❒ Describe how the bottle drive mechanism moves toner into the development unit.

Service manual, section 6.9.8

❒ Describe how the shutter prevents scattering.

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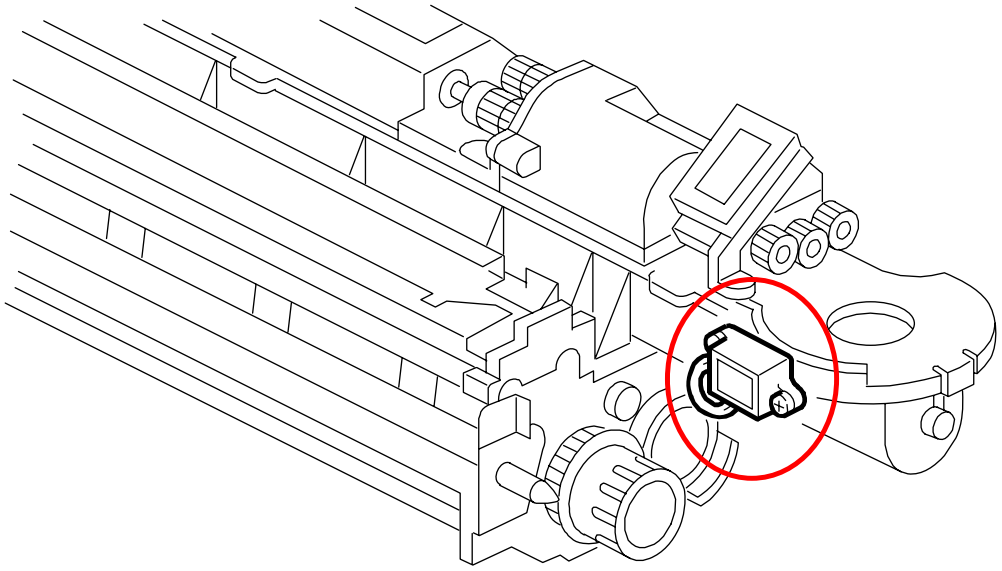
Toner End Sensor

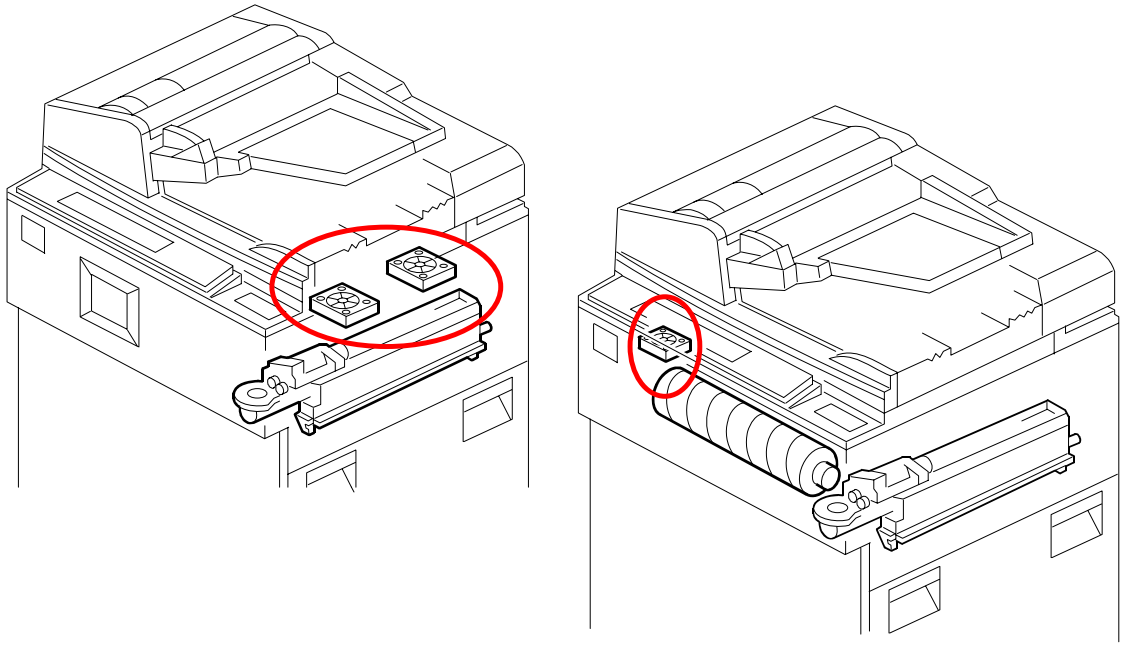


- **Pressure sensor**
- **Checked every copy**

Service manual, section 6.9.7

❒ The toner end sensor detects when the amount of toner in the hopper is low.
❒ More about toner end detection will be explained shortly.

Ventilation



VENTILATION

- Cooling prevents toner particles from sticking together, and from sticking to the drum surface.

Service manual, section 6.9.6

- Development unit: Two fans above the bypass tray. They switch on when the drum motor switches on, and stay on for 110 seconds after the drum motor switches off.

Service manual, section 6.9.9

- Toner supply unit: One fan below the operation panel. It switches on and off at the same time as the polygon mirror motor.

Toner Supply

- **Factors**
  - Toner density (TD) sensor
  - Image density (ID) sensor
  - Image pixel count (number of black pixels on the page)
- **Two toner supply modes**
  - Sensor control mode
    - Uses all the above factors
  - Image pixel count mode
    - Does not use the TD/ID sensors

Service manual, section 6.9.10

Overview

- To control toner supply, the machine monitors the following:
  - Toner density (TD) sensor – checked every copy
  - Image density (ID) sensor – checked just after the machine is switched on (if the machine does process control), at the end of each job (if not been checked for 10 pages or more), in the middle of a long job (if not been checked for 100 pages)
  - Image pixel count (number of black pixels in the page)
- Readings from the TD sensor keep the toner concentration in the developer constant. However, variations in how chargeable toner is affect the image on the drum. Therefore, the ID sensor monitors a reference pattern on the drum, and the readings are used to change the toner concentration to keep the density of this pattern constant. Use of the ID sensor also takes changes in drum reflectivity with time into account.

Toner Supply Modes

- There are two toner supply modes:
  - Sensor control mode: The machine varies toner supply for each copy, to maintain the correct proportion of toner in the developer. This mode uses the TD and ID sensors, and the image pixel count
  - Image pixel count mode: This mode does not use the TD and ID sensors. The machine switches to this mode when both the TD and ID sensors are defective.
  - If only one of the two sensors is defective, the following occurs:

    TD sensor defective: The ID sensor is used in combination with the image pixel count

    ID sensor defective: The TD sensor controls the toner supply, but the TD sensor reference voltage is not recalibrated.

TD Sensor Initial Setting

- **Initialization: Done every time new developer is installed.**
  - TD sensor input is calibrated to give 3.0 V output. This is the TD sensor reference voltage VREF
- **VREF Update: Immediately after the machine is turned on, or after recovery from auto off mode, if all these conditions occur:**
  - If fusing temperature is less than 100 C
  - If SP 3901 - Auto Process Control is enabled
  - If SP 3904 is at 2
- **VREF Update: Immediately after the machine is turned on, or after recovery from auto off mode, if process control was not done for 24 hours or more**
  - The interval can be changed with SP 2966.

Service manual, section 6.9.10

- This must be done every time new developer is installed.
  - VCONT (voltage input to the TD sensor) is calibrated so that VT (TD sensor output) is about 3.0 V for new developer.
  - This output voltage is VREF, and is the toner supply reference voltage.
- VREF is adjusted at the times shown on the slide, using readings from the TD and ID sensors. At these times, the ID sensor and TD sensor are both recalibrated.
  - To avoid reductions in copy speed, the calibration in the middle of a job can be disabled with SP 2507 001.

Sensor Control Mode

- **Current TD sensor output is compared with the reference voltage.**
  - The difference affects how much toner will be added.
- **The amount of black on the page is measured (image pixel count).**
- **The toner supply clutch turns on.**

Service manual, section 6.9.10

This process is done for every copy. No flowcharts this time. Just explain it simply.
For every copy, the following process is done.

- VT (toner density sensor output) is read.
- The image pixel count is then taken. This is a measure of the amount of toner used for the page.
- VT is compared with VREF. If it is consistently greater than VREF, concentration is getting low.
- GAIN is calculated from current and recent TD sensor readings. This is another of the coefficients used in the toner supply calculation. If image pixel count mode is in use, this figure remains at 0.7.
  - The value of GAIN is determined as follows.

(VREF – VT) < -0.2	GAIN = 4
–0.2 < (VREF – VT) < -0.1	GAIN = 3
–0.1 < (VREF – VT) < -0.05	GAIN = 2
–0.05 < (VREF – VT) < 0	GAIN = 1
(VREF – VT) > 0	GAIN = 0

- The toner supply motor then turns on for the time calculated by the formula.
  - All factors in this formula have been discussed so far except for the toner supply rate. SP2-209 adjusts this factor.

    When toner supply starts, the toner supply motor turns on and stays on. However, the toner supply clutch does not remain on all the time. It switches on and off at intervals during the time that the toner supply motor is on.

    This SP mode changes the ratio of clutch on time to off time. A higher value gives a higher toner supply rate, requiring less time for toner supply. This is important if the user commonly copies documents with a high proportion of black.

Image Pixel Count Mode

- **The TD and ID sensors are ignored.**
- **The amount of black on the page is measured.**
  - All other toner supply factors are kept unchanged
- **The toner supply motor turns on.**

Service manual, section 6.9.10

- In image pixel count mode, GAIN is fixed at 0.7.
- All other parameters remain at the values that used when the machine left sensor control mode, except for the image pixel count, which varies every copy.

How Often is the ID Sensor Pattern Read?

- **Every 10 copies (SP 2210)**
  - Does not stop during a job; a pattern is taken at end of the job if 10 copies were made after the last test
- **Every 100 copies in the middle of a large job (SP 2507)**
- **Every 15 minutes in the middle of a large job (SP 2506)**
  - The drum cleaning blade is also cleaned. If copies get too pale or too dark during long jobs, enable this feature using SP 2506 001. If it has no effect, try a shorter interval (SP2506 002).
- **At power on, if process control was not done for 24 hours or longer (SP 2966)**
- **At power on, if all these conditions occur:**
  - If fusing temperature is less than 100 C
  - If SP 3901 - Auto Process Control is enabled
  - If SP 3904 is at 2 (see the Process Control section)
- **Forced process control (done with SP 2962)**

What happens if the TD and/or ID Sensors are Defective?

- **SC codes are logged**
- **The machine continues to operate, but defective components are disabled**

Service manual, section 6.9.10

- The manual explains what happens when either or both of these sensors are defective.
  - An SC code is logged, but not displayed, and the machine can still be used, even if both sensors break (the operating mode changes as shown in the table at the top of the page). However, the customer may become concerned about copy quality. Then look at the SC codes and replace the sensor(s).
- The manual also explains how the machine decides whether a sensor is defective.

Toner Near End & End Detection

- **After the toner supply clutch has turned on, the machine checks the toner end sensor.**
  - The clutch turns on every copy for at least 16 ms as part of the toner supply process.
- **If the sensor detects low toner for two consecutive copies:**
  - The toner supply motor turns the toner bottle.
  - If the motor has turned on more than 30 times in the last 100 copies, “Toner Near End” is displayed.
  - If 1,000 consecutive copies have been made with low toner, “Toner End” is displayed.

❒ The toner end sensor is used.

Service manual, section 6.9.7

➢ The sensor is at the bottom of the toner hopper.

Service manual, section 6.9.10, Toner End Detection

❒ The slide outlines the steps in the toner end detection process.

Service manual, section 6.9.10, Sensor Control Mode

❒ Look at the equation for toner supply, and you will see that the clutch always turns on for the ‘clutch startup time’ of 16 ms, even if ‘GAIN’ is zero.

Toner End Recovery

- **If the front cover is opened and closed during toner near-end/end:**
  - The toner supply motor turns on for 1.1 s
  - Then the toner supply clutch turns on for 1 s
- **Then, if the toner end sensor detects toner:**
  - The machine compares the current TD sensor output (V_T) with the reference voltage (V_{REF}).
  - If V_T is less than or equal to V_{REF}, there is enough toner. Toner near-end/end is cleared.
  - If V_T is more than V_{REF}, the clutch turns on again. If still no good after 7 attempts, toner near-end/end remains.

Service Manual, section 6.9.10, Toner End Recovery

❒ The machine uses the TD sensor to determine whether the toner concentration has risen sufficiently.

❒ The slide summarizes this procedure.

SP Modes

- **Development**
  - 2201: Development bias for copying

SP MODES
Development
- ❒ 2201: This was covered in Process Control

SP Modes

- **Toner Supply**
  - 2207: Forced toner supply
  - 2208: Toner supply mode
  - 2209: Toner supply rate
  - 2210, 2506, 2507, 2966: ID sensor pattern intervals
  - 2223: TD sensor output
  - 2801: TD sensor initial setting
  - 2906 002: Displays the TD sensor initial setting
  - 2967: Disable the ID sensor
  - 2972: Toner bottle cooling fan control mode
  - 3001 002: ID sensor initial setting
  - 3103: Latest ID sensor output

Toner Supply

- 2207: Forced toner supply.
- 2208: Toner supply mode.
  - Keep at sensor control mode . The machine automatically changes to pixel control mode if the TD sensor is broken. Make sure that it changes back to sensor control mode after replacing the sensor.
- 2209: Toner supply rate.
  - A higher value gives a higher toner supply rate, requiring less time for toner supply. This setting is important if the user commonly copies documents with a high proportion of black.
- 2210 etc: ID sensor pattern intervals were discussed on an earlier slide in this section.
- 2223: Displays the average of the latest 16 TD sensor output voltages measured.
- 2801: TD sensor initial setting
- 2967: As mentioned in the Process Control section, the ID sensor is unreliable in some environments
- 2972: In very hot environments, this SP setting must be changed, so the fan will stay on all the time (unless the main switch is turned off). This will prevent toner particles from sticking together.
  - Normally, the fan turns off in night mode and when the operation switch is switched off.
- 3001 002: ID sensor initial setting
  - Use 3-001-1 if you forgot to do an ID sensor initial setting after resetting or replacing the NVRAM on the BICU.

    PWM (Pulse Width Modulation) for the ID sensor refers to the input voltage required to get the standard output of 4 ± 0.2 V.
- 3103: Latest ID sensor output – this displays VSG (from the bare drum) and VSP (from the black ID sensor pattern)

Replacement and Adjustment

- **Do the procedures in section 3.7 of the service manual.**
- **Obey all notes and cautions in the manual.**
- **After installing new developer, open the front door before you turn the power on. Then initialize the TD sensor (SP2801) after the machine has warmed up.**

REPLACEMENT

Service manual, section 3.7

- ❒ Have the trainees remove and replace the parts in this section.
- ❒ Remind them to follow all notes and cautions in the manual.

Service manual, section 3.1.7

- ❒ First, make sure that the class is aware of the service notes for the development and toner supply components.

Developer

- ❒ After installing the new developer, initialize the TD sensor (SP2801) after the machine has warmed up. Note that you will need the developer lot number on the bag.
- ❒ The door must also be open before you turn the power on: Follow the procedure in the manual carefully. Use the procedure for B140/B246.
- ❒ There is no need to replace the developer in the class, because we did it at installation. However, the class should be aware that the SP number is different when adding new developer.

TD Sensor

- ❒ After installing a new sensor, initialize the TD sensor (SP 2801), and then initialize the auto process control (SP 2962).
  - ➢ Also, make sure that SP2208 is set for sensor control mode (that instruction is not in the manual)
  - ➢ 2962: Process control initialization (only works if process control is enabled, and the fusing unit temperature must be less than 100 C).

RICOH

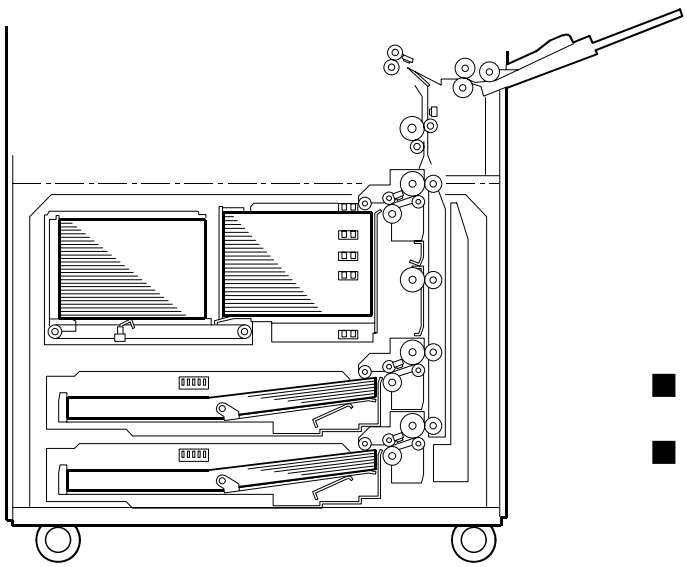
B246 SERIES TRAINING

COPIER ENGINE

PAPER FEED

❒ Paper feed mechanisms built into the machine will be described in this section.
❒ The optional LCT will be covered in a separate section.

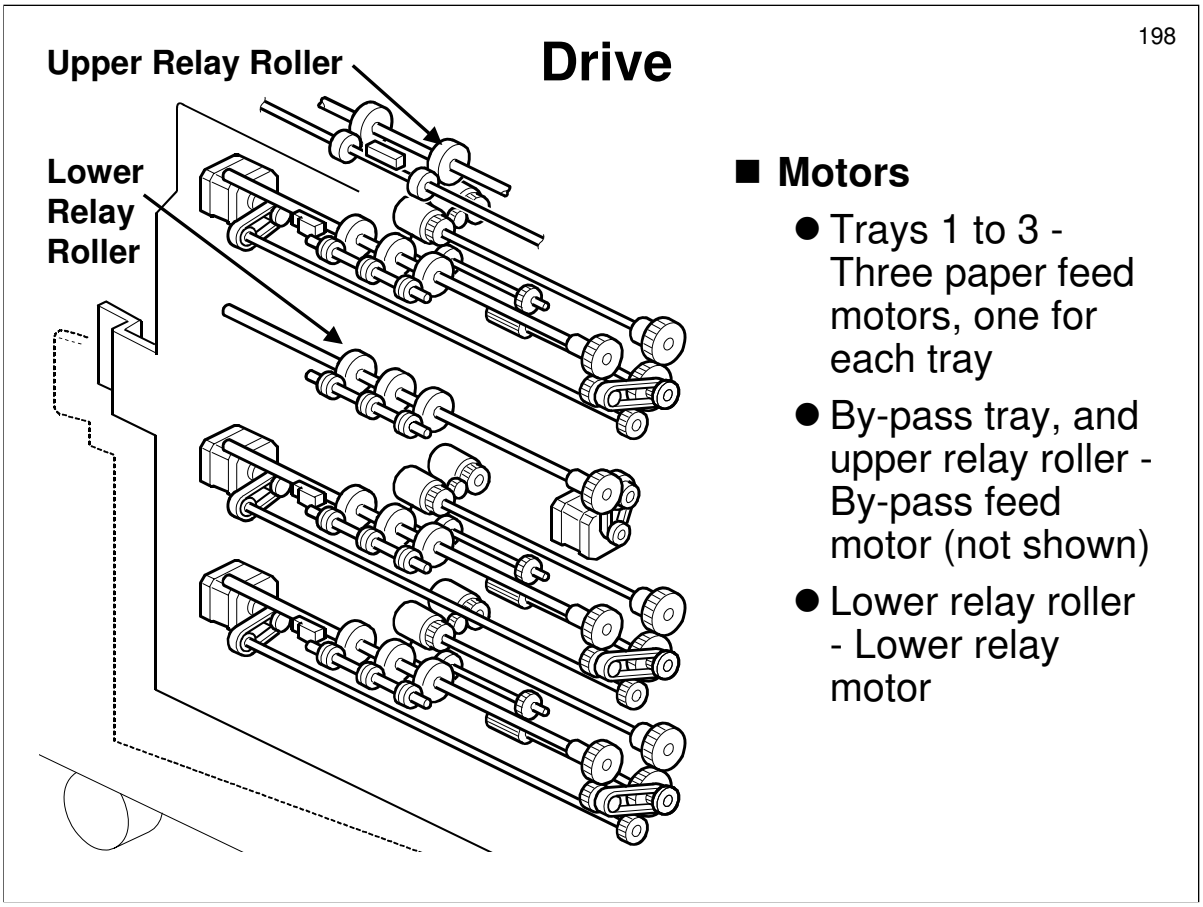
Overview



- **Four trays**
  - Tray 1 - Tandem feed tray (1550 x 2)
  - Tray 2 - Universal tray (550 sheets)
  - Tray 3 - Universal tray (550 sheets)
  - Bypass tray - 100 sheets
- **FRR feed system**
- **No size sensor in tray 1**

Service manual, section 6.11.1

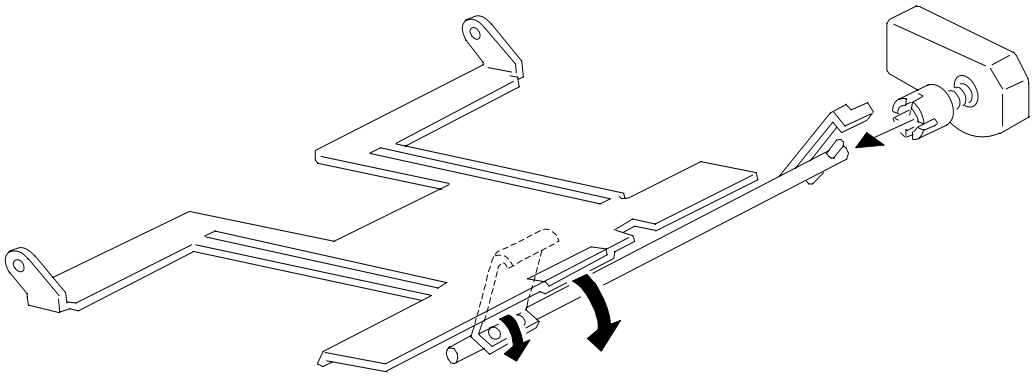
- The diagram shows the four built-in feed stations.
- Go over the notes in the service manual, which summarize the main points about these trays.
- There are no clutches. Each feed station has a motor.
- Point out the following locations
  - Feed/separation rollers (in trays 1, 2, and 3)
  - Grip rollers (in trays 1, 2, and 3) - these pull the paper out into the vertical feed path
  - Vertical feed path - vertical transport rollers opposite the grip rollers
  - Lower relay roller - this is needed to feed paper between the 2nd and 1st feed stations
  - Upper relay roller - this is needed to feed paper between the 1st feed station and the registration roller
  - Registration roller



Service manual, section 6.11.2

- The slide shows the motors involved in paper feed from the trays.
  - The by-pass motor is not shown here. We will see it a bit later.
- Each tray has a motor. The motor drives the pick-up, feed, separation, and grip rollers at each station.
  - The grip roller pulls the paper out of the tray and feeds it into the vertical transport path.
- Pick-up and feed timing is controlled by two solenoids in each tray, except in the bypass tray, where there is a solenoid and a clutch.

Tray Lift (Trays 2 and 3) - 1



■ **The tray lift motor lifts the tray.**

Service manual, section 6.11.3

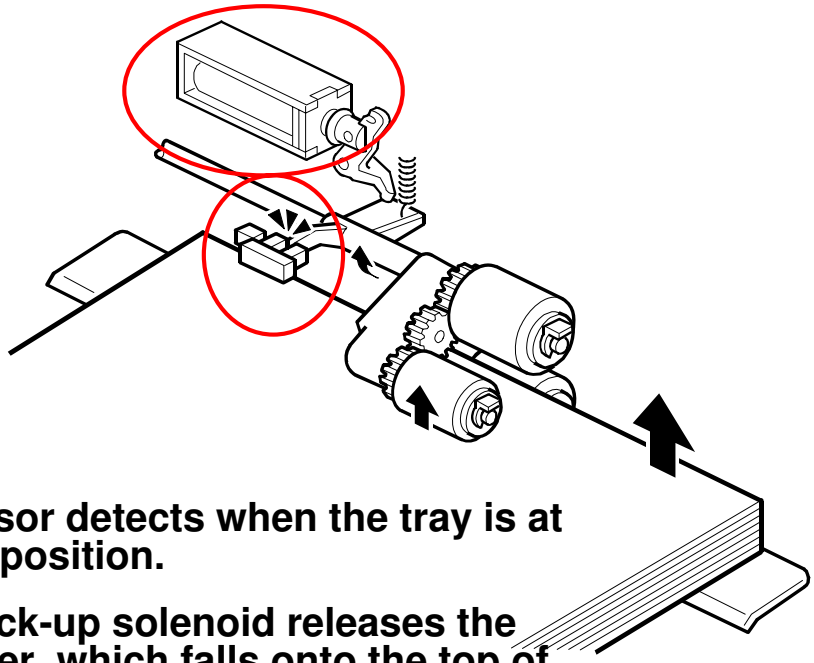
❒ Describe how the lift motor raises the tray.

❒ The machine detects that the tray is in place as follows:

- 1st tray – Electrical connection between tray and main body
- 2nd and 3rd trays – Paper size switch

200

Tray Lift (Trays 2 and 3) - 2



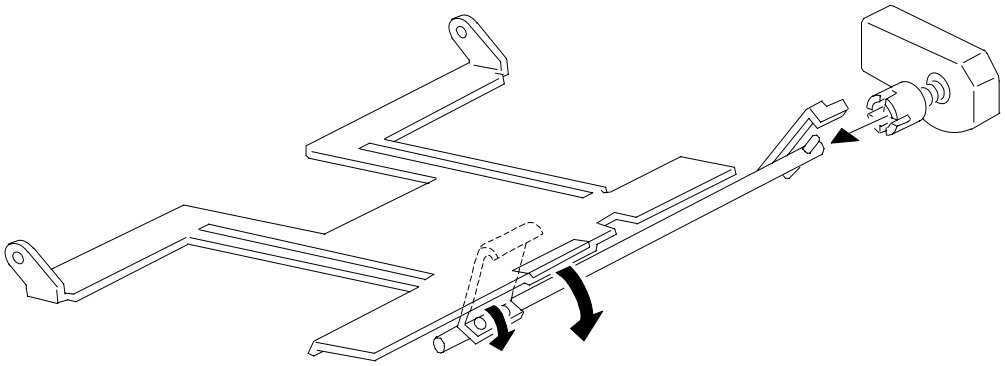
- **The lift sensor detects when the tray is at the correct position.**
- **Then the pick-up solenoid releases the pick-up roller, which falls onto the top of the stack.**

Service manual, section 6.11.3

❒ The lift sensor detects when the paper stack is at the correct height.

❒ Describe how the paper height sensor and tray lift motor keep the top of the stack at the correct height for paper feed.

Tray Lift (Trays 2 and 3) - 3



■ **The bottom plate drops under its own weight when the tray is pulled out of the copier.**

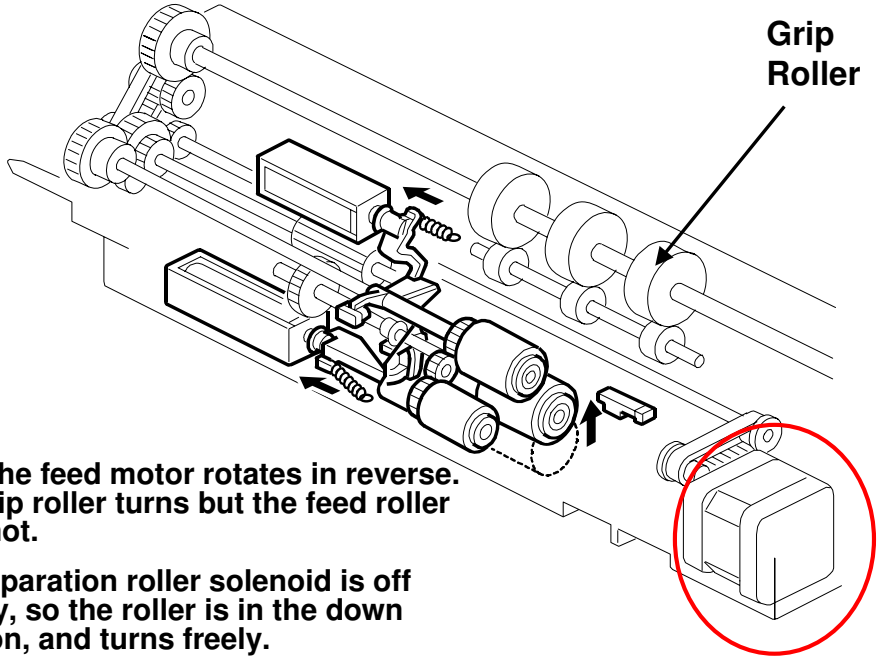
Service manual, section 6.11.3

❒ Describe what happens when pulling out the tray.

- ➢ In the 2nd and 3rd trays, the bottom plate lowers under its own weight when the tray is pulled out.
- ➢ For the 1st tray, this mechanism is more complex, because of the tandem tray mechanism. A later part of this section will describe this mechanism.

Pick-up and Feed

Before the first page, and between pages



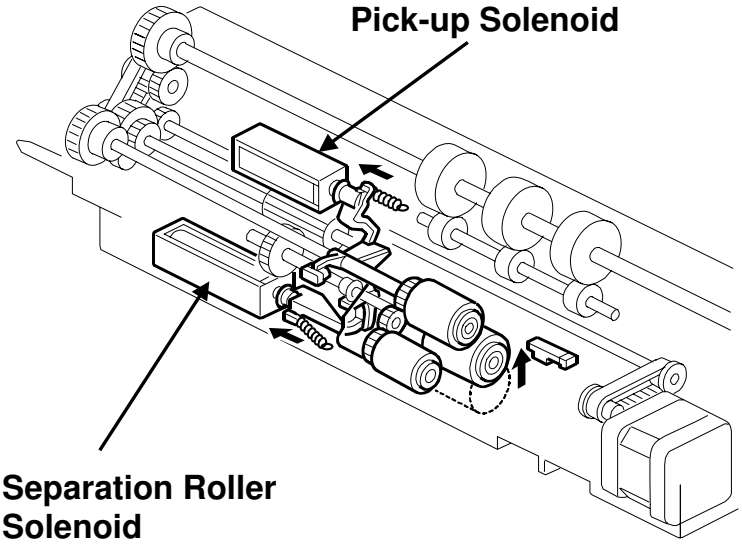
- **First, the feed motor rotates in reverse. The grip roller turns but the feed roller does not.**
- **The separation roller solenoid is off initially, so the roller is in the down position, and turns freely.**

Service manual, section 6.11.3, Paper Feed and Separation: No Paper Present

- Between pages, the grip roller has to turn, because there may still be some paper in the vertical feed path.
- However, the feed roller must not turn, so that paper does not leave the tray.
- An arrangenent of clutches on the roller shafts ensures that if the feed motor reverses, the feed roller will not turn.

Pick-up and Feed

Pick-up and Feed



- **Separation roller stays away from feed roller, until Start key pressed.**
- **Separation roller solenoid**
  - Lifts the separation roller
- **Pick-up solenoid**
  - Drops the pick-up roller

Service manual, section 6.11.3, Paper Feed and Separation

❒ Describe this mechanism.

- ➢ To start paper feed, the separation roller solenoid and pick-up solenoid both turn on. There is no feed clutch, because each tray has its own motor.

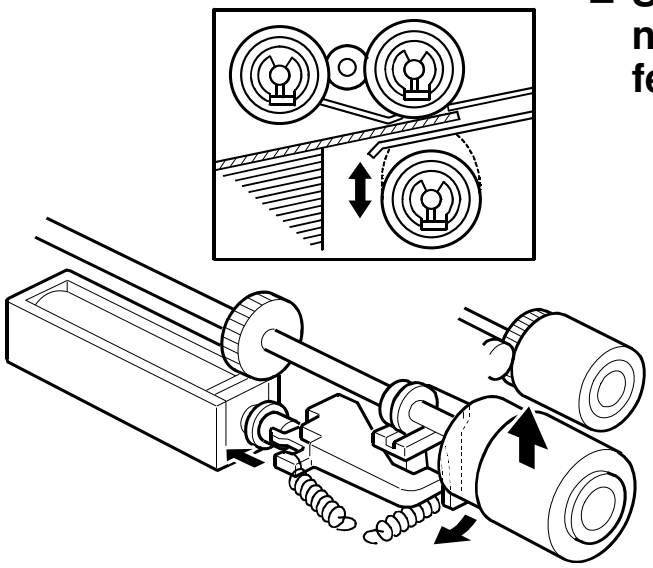
  When the separation roller solenoid turns on, the separation roller contacts the paper feed roller.

  When the pick-up solenoid turns on, the pick-up roller drops onto the top sheet of the paper stack.
- ➢ The feed motor turns forwards, to drive both the feed roller and the grip roller.
- ➢ When the paper feed sensor detects the leading edge of the paper, the pick-up solenoid switches off and the pick-up roller lifts.

❒ Paper is separated using the FRR principle.

Pick-up and Feed

Separation Roller Release



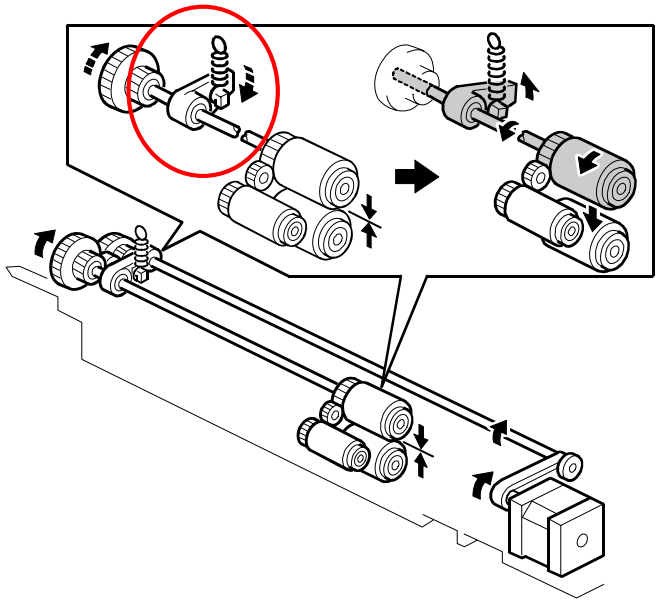
- **Separation roller normally away from feed roller**

Service manual, section 6.11.3, Separation Roller Release

- ❒ The separation roller is normally away from the feed roller.
- ❒ List the advantages of this:
  - ➢ Reduced wear on rollers – no contact between rollers when another tray is in use
  - ➢ Less chance of damage to paper stuck between rollers
  - ➢ Easier jam removal

Pick-up and Feed

Separation Roller Release

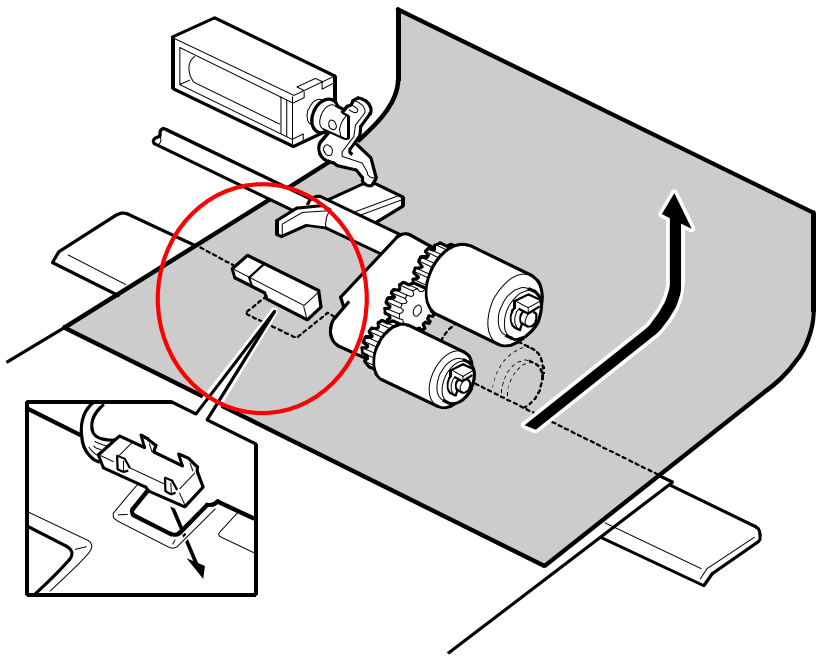


- **If the feed roller starts to reverse, an arm comes down, which moves the feed roller forward slightly, to pull it away from the separation roller**

Service manual, section 6.11.3, Separation Roller Release

- This new mechanism ensures that the feed and separation rollers do not stick together at the start of a job just after the machine leaves standby mode.
- When the feed roller reverses at the start of the job, a small arm pushes the feed roller slightly forward so that it comes away from the separation roller.
- If the rollers stay stuck together, the motor may not be able to turn the rollers. When reversing at the start of the job, only a small amount of power is applied from the motor, and this may not be enough to unstick the rollers.

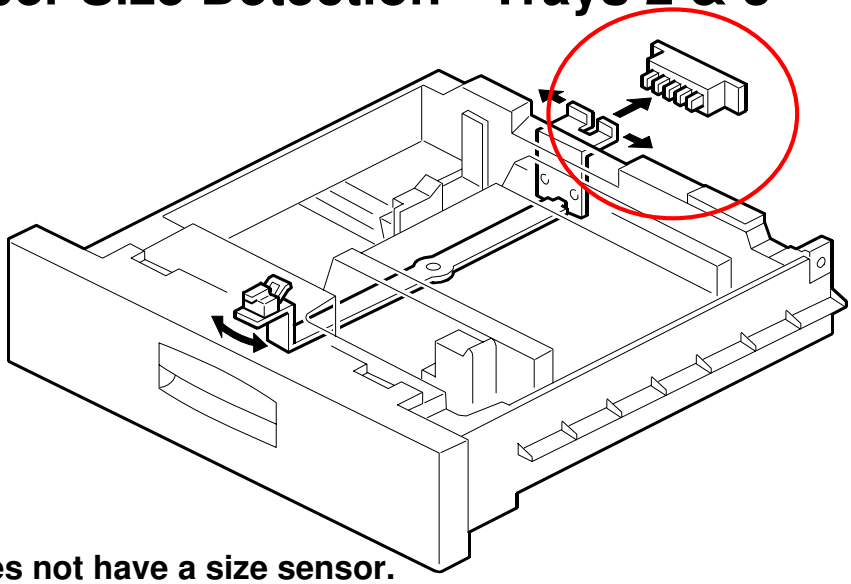
Paper End Detection



Service manual, section 6.11.5

- There is no near near-end sensor. Near-end is detected by counting the number of tray lift motor pulses that have been made while lifting the bottom plate.
- When paper runs out, a feeler drops through the cutout in the bottom plate.

Paper Size Detection - Trays 2 & 3

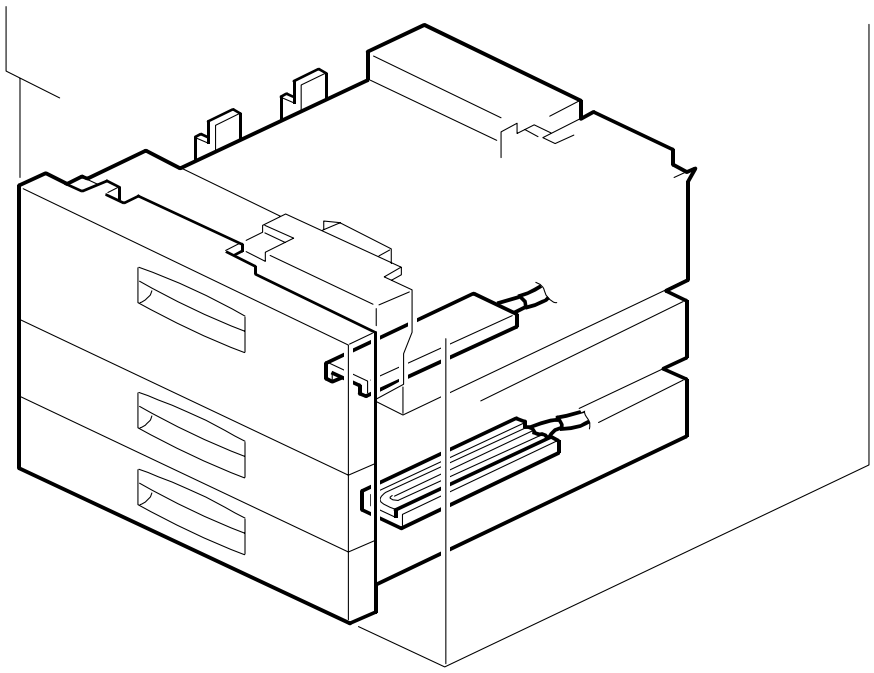


- **Tray 1 does not have a size sensor.**
  - Input the paper size with SP5959 001.
- **Trays 2 and 3: For the * setting, select the paper size with User Tools - System Settings - Tray Paper Settings - Tray Paper Size**
  - Only works if SP 5112 is enabled

Service manual, section 6.11.6

- The service manual shows how the machine interprets the sensor outputs.
- Trays 2 and 3 can be set up for a wide range of paper sizes using the ‘ * ‘ setting on the dial, and a User Tool.
  - The service manual shows the range of settings that can be accepted.
  - Note SP 5112 however: The machine default is ‘disabled’ which means the user cannot use non-standard paper sizes. However, this is changed to ‘enabled’ at the factory. But if a RAM reset is done, this will revert to ‘disabled’.
  - Also note the use of SP 5129. This tells the machine which paper size to detect if the dial is at the ‘11000’ position. It only works for inch versions (North American paper sizes).

Anti-condensation Heaters

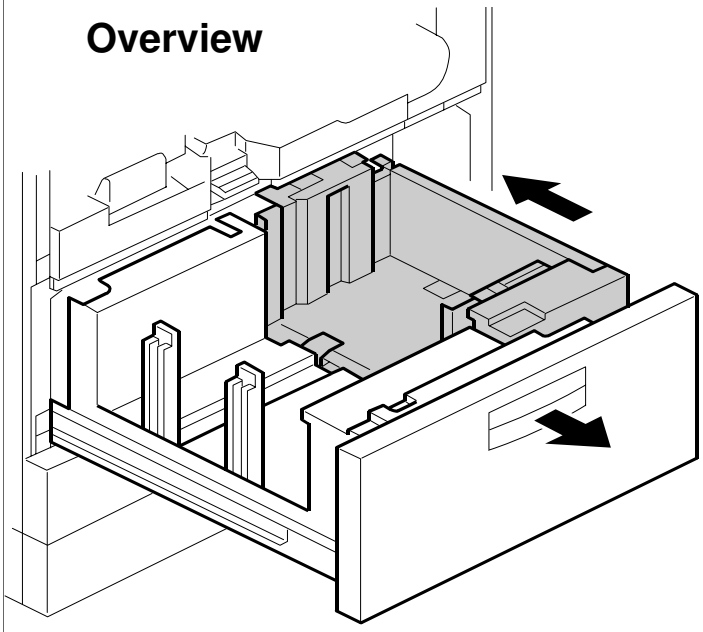


Service manual, section 6.11.7

- ❒ Note the locations of these two heaters.
- ❒ They turn on automatically, at the times mentioned in the manual.
- ❒ In this machine, the heaters are not optional.

Tandem Feed Tray

Overview



- **Two paper stacks in one tray**
- **Paper feeds from the right tray**
- **When the paper in the right tray runs out, the stack in the left tray is moved across to the right tray**
- **After that, paper feed resumes**
- **Paper can be added to the left tray without interrupting copying**

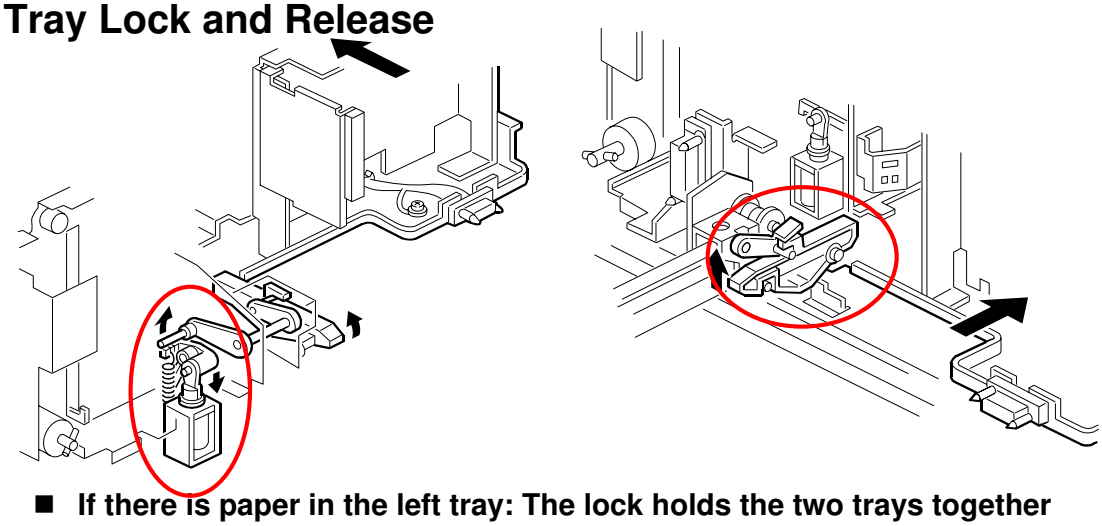
Service manual, section 6.11.8, Overview

❒ Describe the tandem tray system (see the slide).

❒ Describe how the trays lock together until the left-hand paper stack moves across to the right. Then the left tray is released so that paper can be added without interrupting copying.

Tandem Feed Tray

Tray Lock and Release

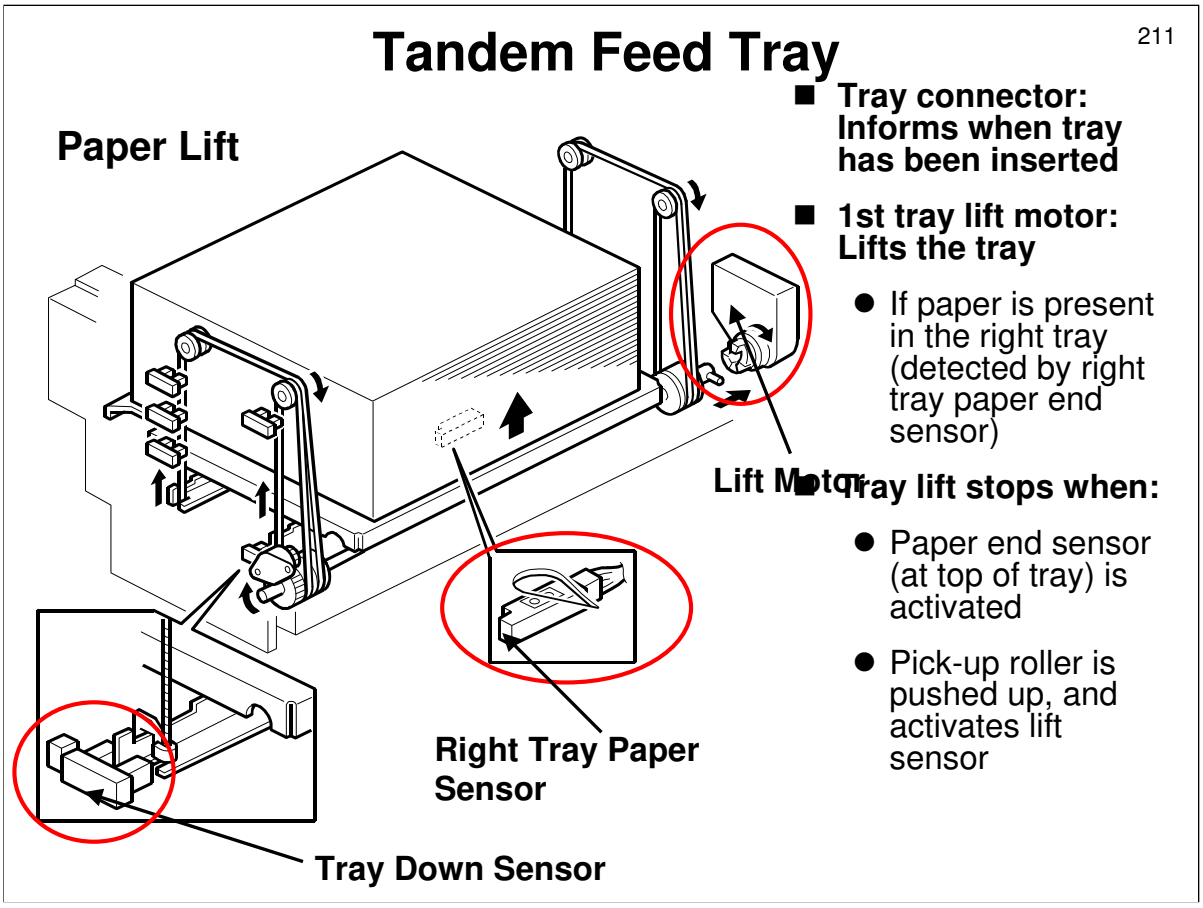


- **If there is paper in the left tray: The lock holds the two trays together**
- **If there is no paper in the left tray: Right tray lock solenoid releases the lock**
  - The user can add paper to the left tray, even while paper is feeding from the right tray

Service manual, section 6.11.8, Connecting the Left and Right Sides of the Tray

❒ The main points are on the slide.

❒ The service manual contains a diagram showing how the lock is released.



Service manual, section 6.11.8, Paper Lift/Remaining Paper Detection

❒ The main points are on the slide.

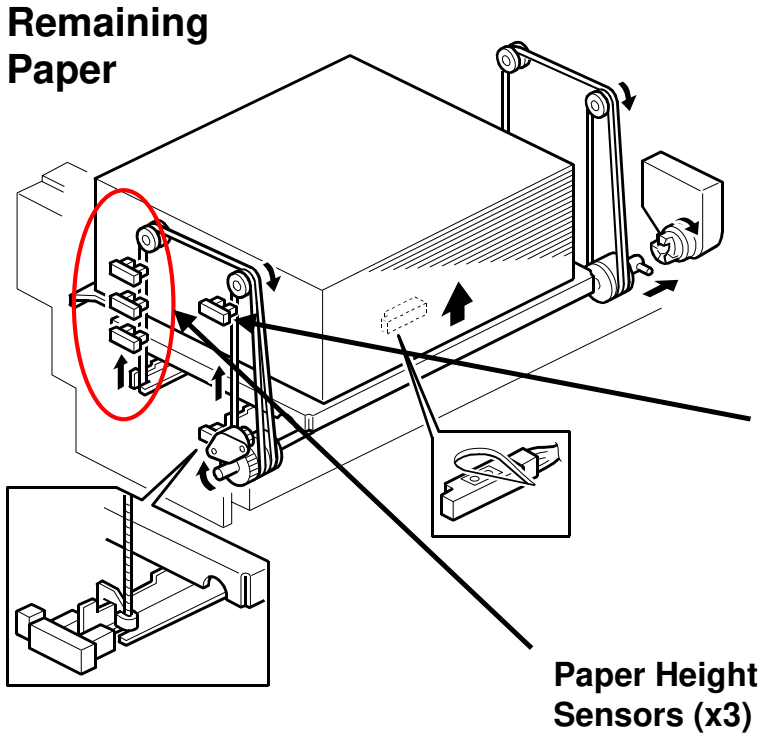
❒ Make sure that the class understands how the sensor at the bottom of the tray (right tray paper end sensor) saves time when checking if the tray has any paper or not before starting to lift the tray to the paper feed position.

Service manual, section 6.11.8, Paper Lift/Remaining Paper Detection (end of the section)

❒ There are two tray lowering mechanisms.

- ➢ Mechanism 1. When the user pulls the tray out, the tray falls under its own weight, slowed by a damper.
- ➢ Mechanism 2. When the stack in the right side has finished, the tray bottom plate must lower automatically before the stack in the left side can move across. The tray lift motor lowers the plate until the tray down sensor detects the actuator on the bottom plate. Then the stack in the left side can move across.

Tandem Feed Tray



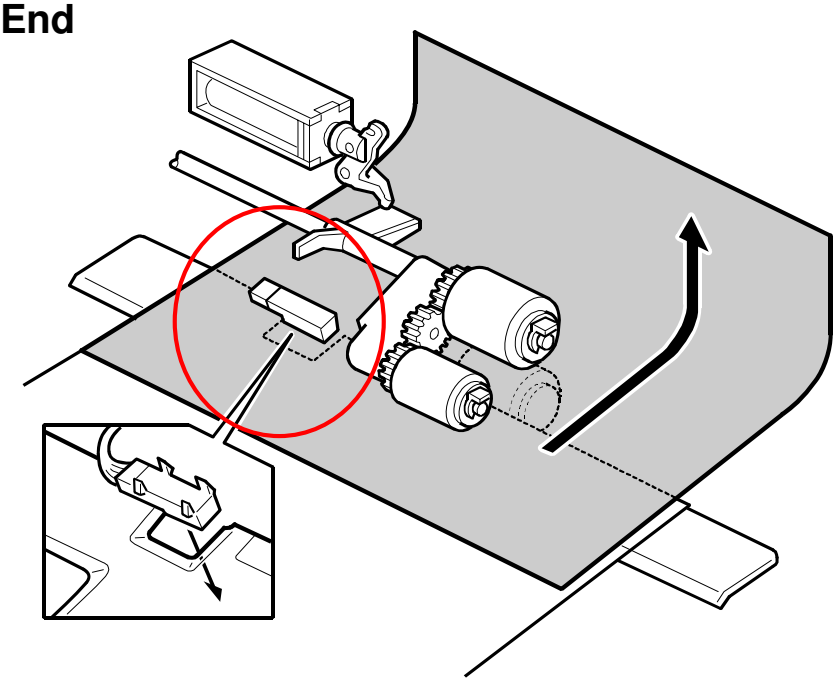
■ **Paper height and near-end sensors: Detect amount of paper remaining**

Service manual, section 6.11.8, Paper Lift/Remaining Paper Detection

- ❒ These four sensors detect the amount of remaining paper. The mechanism is explained in the manual.
- ❒ These sensors cannot detect when the tray is empty. When the tray is at the top, the height sensor actuation status is the same for a full tray (the actuator is outside all three sensors).
- ❒ See the next slide for how paper end is detected.

Tandem Feed Tray

Paper End



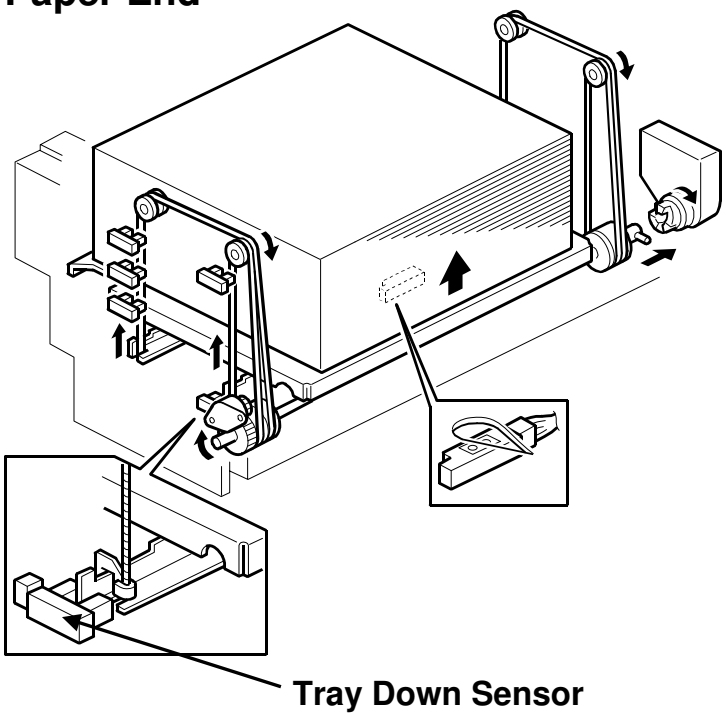
Service manual, section 6.11.8, Paper Lift/Remaining Paper Detection (end of the section)

❒ When paper runs out, a feeler drops through the cutout in the bottom plate. This is the same as for trays 2 and 3.

Service manual, section 6.11.8, Paper Lift/Remaining Paper Detection, (previous page)

➢ The service manual is incorrect. The end sensor under the bottom plate is for other purposes, as explained earlier.

Tandem Feed Tray



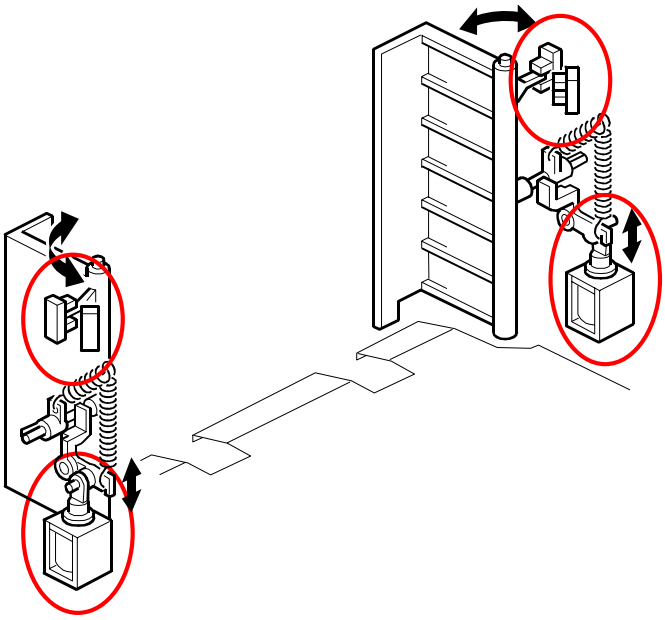
- **Tray down sensor: Detects when the tray has been lowered all the way**

Service manual, section 6.11.8, Paper Lift/Remaining Paper Detection (end of the section)

- When paper runs out, the tray must be lowered, so that the stack in the left tray can be moved across to the right tray.
  - The lift motor reverses to lower the tray. The tray down sensor detects when the tray has been lowered all the way down.
  - This was explained on a previous slide.

Tandem Feed Tray

Side Fence Drive



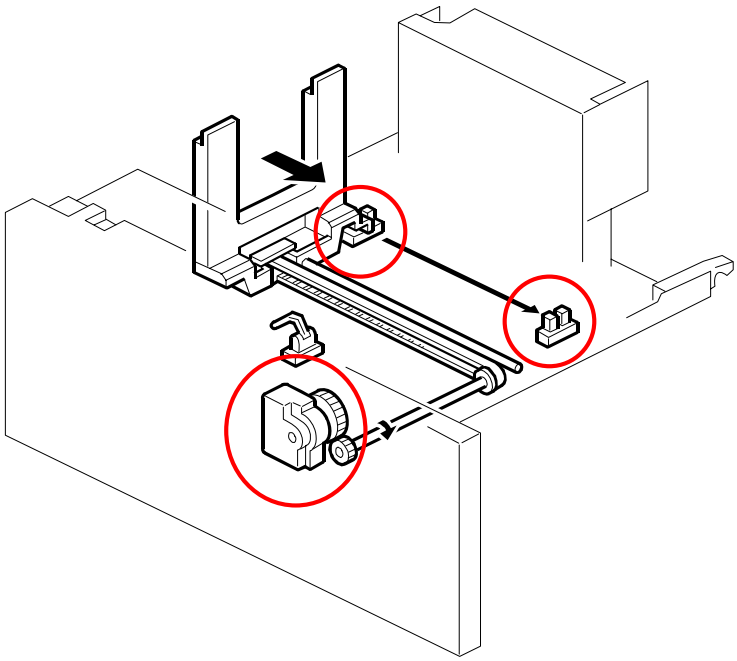
- **Side fence solenoids**
  - Open and close the fences
- **Side fence open/closed sensors**
  - Detect the open and closed positions

Service manual, section 6.11.8, Fence Drive

- The side fences open only when the stack of paper in the left tray is moving across to the right tray.
- Describe how the side fence solenoids open the side fences.
  - The side fence open sensor detects when the fences are open fully.
- The motor closes the fences again after the stack has moved across.
  - The side fence close sensor detects when the fences are closed.
- The user can then load some paper into the left side of the tandem tray (even during copying).

Tandem Feed Tray

Rear Fence Drive

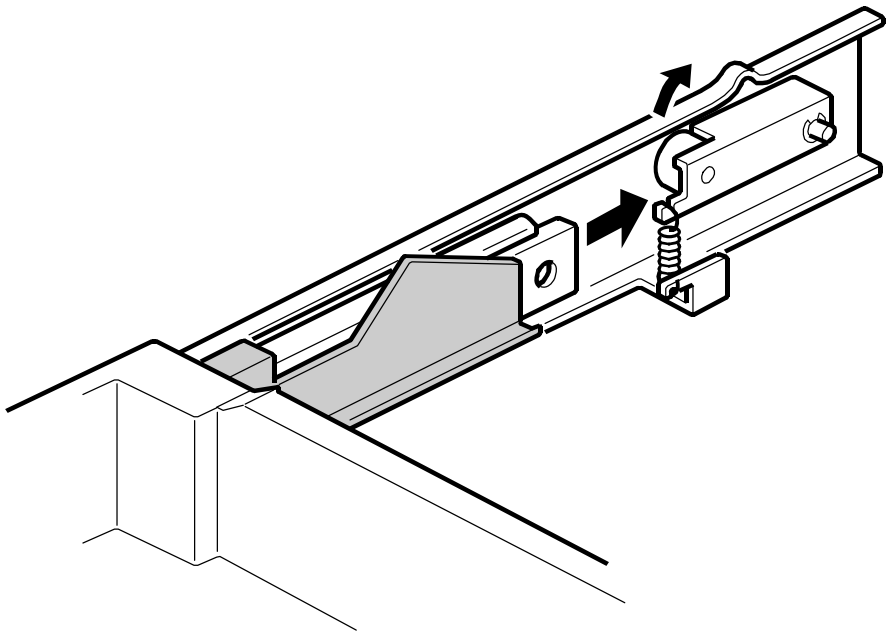


- **Rear fence drive motor: Pushes the paper stack into the right tray**
- **Rear fence home position/return sensors: Detect the rear fence home and return positions**

Service manual, section 6.11.8, Rear Fence Drive

- ❒ If the right tray is empty but the left tray is full, the paper in the left tray is moved across to the right tray.
- ❒ The rear fence drive motor pushes the paper stack into the right tray.
- ❒ The return sensor detects when the fence is as far as it can go.
- ❒ The rear fence home position sensor detects when the rear fence moves back to home position.
- ❒ While the paper stack is being moved across, the left tray is locked using the left tray lock solenoid, as shown in the service manual. This stabilizes the left tray while the stack is being pushed across.

Tray Positioning

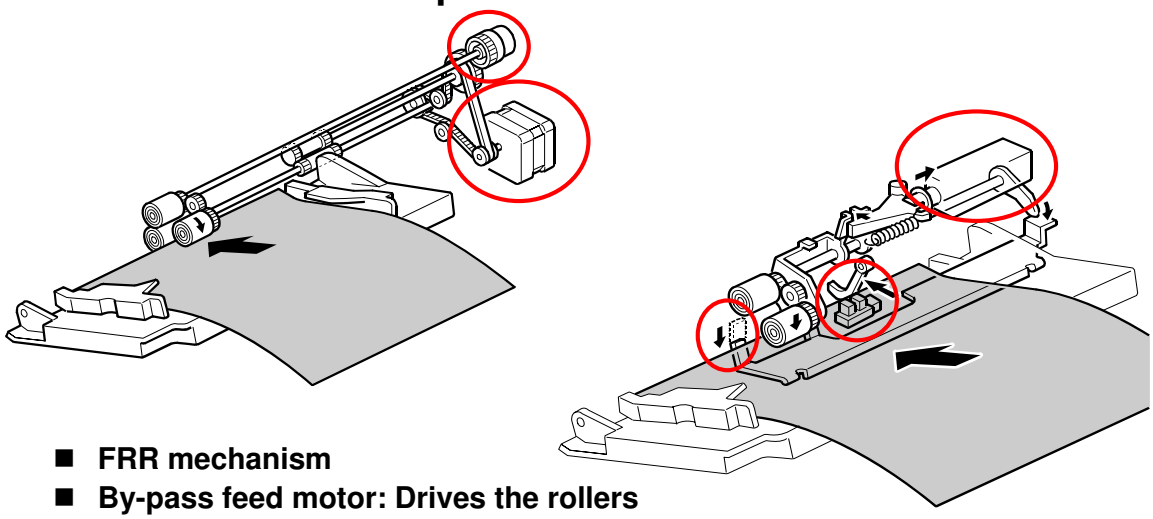


Service manual, section 6.11.9

- ❒ Describe how the tray is locked in place.
- ❒ This is the same for all three trays.

By-pass Feed Table

Feed Mechanism / Paper End Detection



- **FRR mechanism**
- **By-pass feed motor: Drives the rollers**
- **Pick-up solenoid: Drops the pick-up roller and moves the stopper out of the feed path**
- **By-pass feed clutch: Starts the feed roller**
- **Paper end sensor: Detects paper end**

Service manual, section 6.11.10

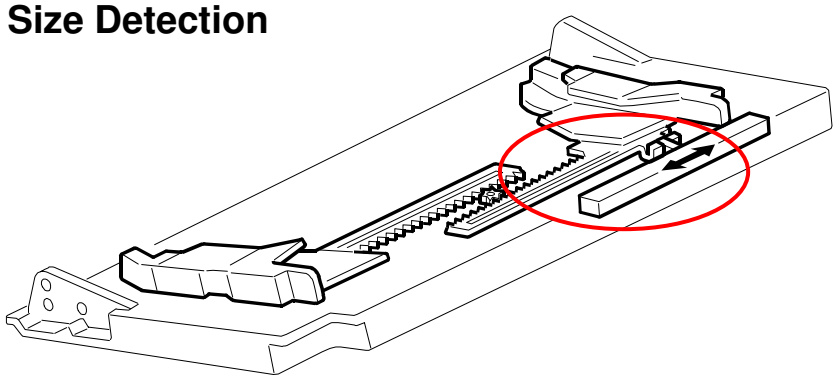
❒ Describe this briefly.

❒ Notice the small stopper which prevents the user from pushing paper too far into the tray. This stopper moves out of the way when the pick-up roller drops.

➢ The stopper is not described in the manual. On the slide, it is inside the left-most red circle in the lower diagram.

By-pass Feed Table

Paper Size Detection



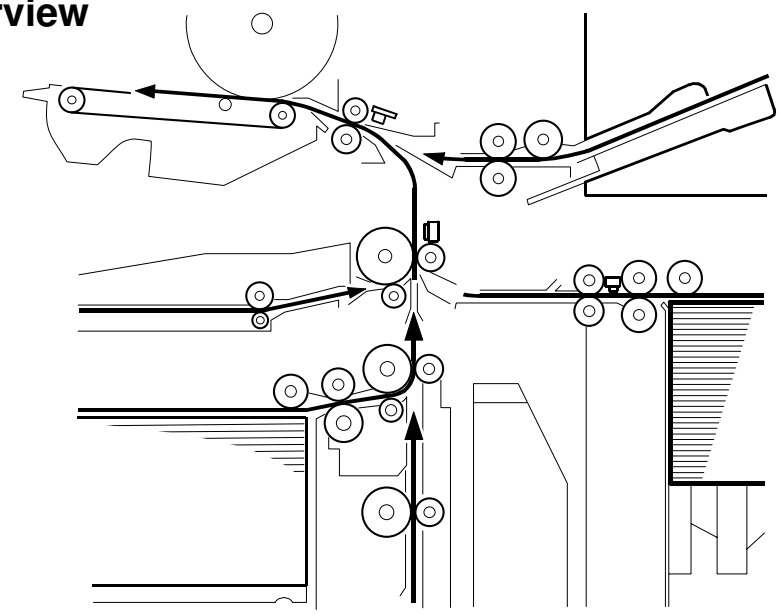
- **By-pass paper width sensor: Electrical resistance changes when the guides move to a different position**
- **Paper length: Detected using the registration sensor and a pulse counter**
- **When 8.5"-width paper is fed from the by-pass tray, the paper size is first detected as 8.5" x 14". Then, if the paper length is detected as 11”, not as 14”, the machine changes the detected paper size to 8.5" x 11".**

Service manual, section 6.11.10

❒ Describe the sensor briefly. It is the same type as used in many recent models.
❒ Non-standard sizes have to be specified by the user at the operation panel. The range of acceptable sizes is shown in the service manual.
❒ Make sure that the class is aware of the purpose of SP 1904 and 1905. The procedure for SP1904 will be dealt with later, in the Practical Work section.

Paper Registration

Overview

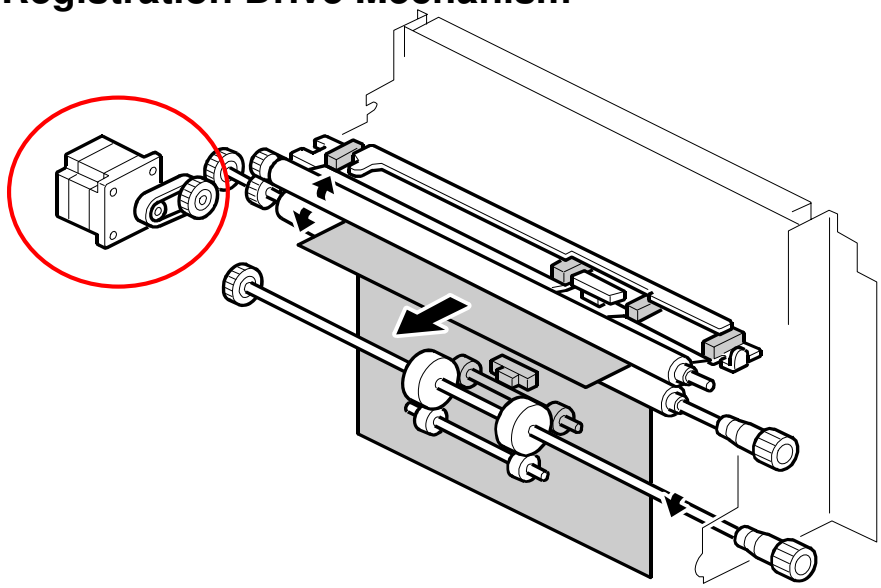


Service manual, section 6.11.11, Overview

- ❒ The diagram shows the path of paper from all trays, including the duplex unit and optional LCT.
- ❒ The registration roller is driven by a motor dedicated to this task.
- ❒ The registration sensor also detects jams.

Paper Registration

Registration Drive Mechanism



■ **The registration motor drives the lower registration roller.**

Service manual, section 6.11.11, Paper Registration Drive

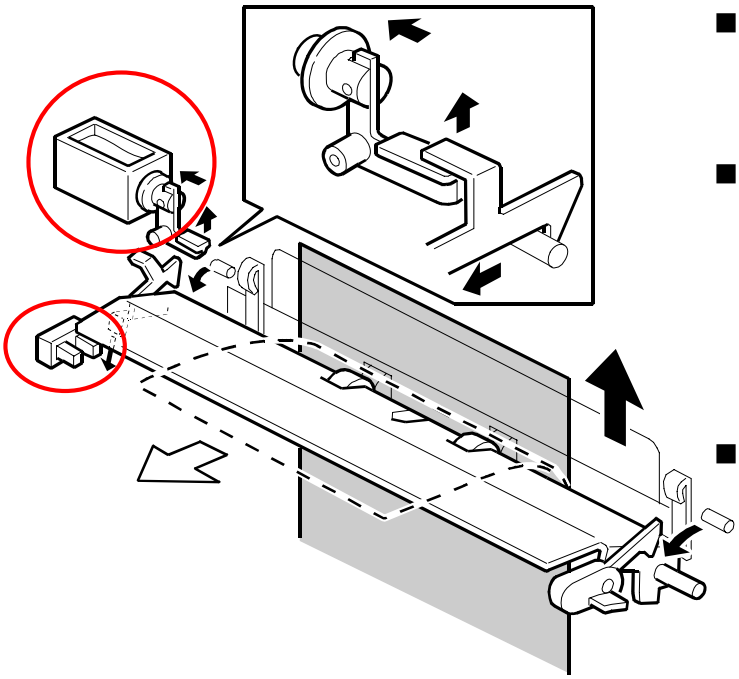
❒ The registration roller has a dedicated motor, instead of a clutch. The shock of a clutch turning on can agitate the toner on the latent image. This causes jitter near the leading edge.

❒ The motor drives the lower roller.

❒ There is a paper dust remover above the upper roller.

Paper Registration

Guide Plate Release Mechanism



- **The guide plate opens if the registration sensor does not detect paper at the correct time.**
- **The guide plate blocks the paper path and diverts the next sheet of paper into the duplex tray, to prevent a pile-up between the registration roller and the vertical transport rollers.**
- **The user must remove jammed paper in the vertical feed path, the sheet in the duplex tray, and manually close the guide plate.**

Service manual, section 6.11.11, Jam Removal at Paper Registration

- ❒ This mechanism stops paper piling up when a jam has occurred in the vertical feed path before reaching the registration roller.
  - ➢ When a jam occurs here, the next sheet is already on its way up from the paper tray, and must be stopped before it gets to the jam location.
- ❒ Go over the points on the slide.
- ❒ Describe how the guide plate solenoid opens the guide plate.
- ❒ The guide plate diverts any paper that is coming along the feed path into the duplex tray until the jam is cleared.
- ❒ Copying is disabled while the guide plate is open.
  - ➢ Detected by the guide plate position sensor.
- ❒ The user has to close the guide manually after the jam is removed. If the user forgets, a message appears on the LCD panel.
  - ➢ Also detected by the guide plate position sensor.

SP Modes

- **1003: Paper feed timing**
- **1007: By-pass feed paper size sensor output**
- **1904: By-pass tray paper size sensor calibration**
- **1905: By-pass clutch operation for thick paper mode**

- 1003: Paper feed timing. Adjusts the paper buckle at the registration roller by adjusting the relay clutch timing.
- 1007: By-pass feed paper size sensor output
- 1904: By-pass tray paper size sensor calibration
  - Do this after changing the by-pass paper feed sensor board.
- 1905: By-pass clutch operation for thick paper mode
  - By default, the clutch turns on twice in thick paper mode. This is because once sometimes is not enough for very stiff paper – the paper slips away from the gap between the registration rollers during buckling, and does not go through. Therefore, the clutch turns on again almost immediately after it turns off, to give the paper an extra push.

Replacement and Adjustment - 1

- **Tandem tray**
  - Tandem tray removal
  - Right tray paper sensor removal
  - Bottom plate lift wire removal
  - Paper size change
- **Trays 1 to 3**
  - Pick-up, feed, and separation roller removal
  - Separation roller pressure adjustment
    - Adjust if there are jams when feeding in from the paper tray.
  - Feed unit

Service manual, section 3.11

❒ Have the trainees do the procedures on the slide.
❒ Remind them to follow all notes and cautions in the manual.

Service manual, section 3.1.10

❒ First, make sure that the class is aware of the service notes for the paper feed components.

Tandem tray paper size change

❒ The users cannot do this themselves.
❒ Don't forget to change the SP mode setting after changing the size. The users do not have a user tool to do this if you forget.
❒ Do the copy adjustments after changing the paper size. (No need to do this in the class unless the trainees need practise.)

Pick-up, feed, and separation rollers

❒ The rollers in trays 1 to 3 are different from those in the by-pass tray and optional LCT.

Pressure adjustment

❒ Note the use of this adjustment to solve feed problems at the feed-in area.

Replacement

- **By-pass**
  - Pick-up, feed, and separation roller removal
  - Paper size detection board removal
  - Separation roller pressure adjustment
- **Registration and by-pass units**

Pressure adjustment

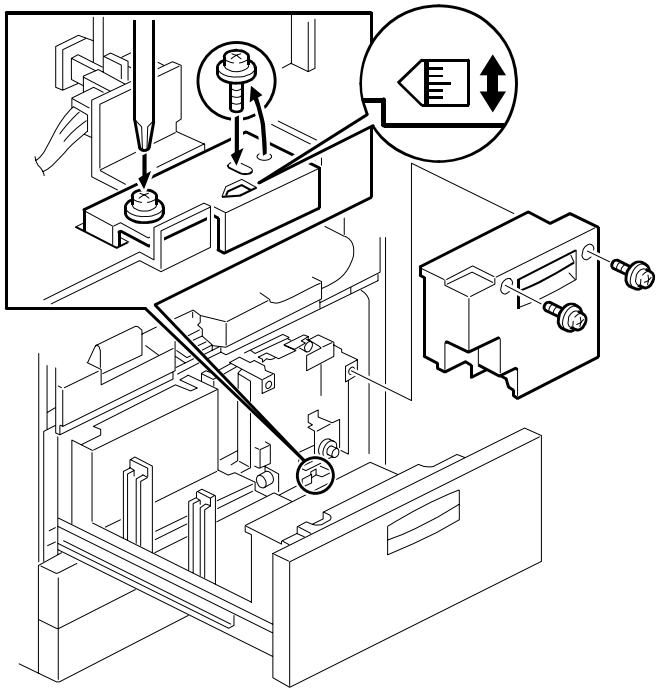
❒ Note the use of this adjustment to solve feed problems at the feed-in area.

By-pass paper size sensor board

❒ After installing a new board, calibrate the sensor using SP 1904 001 and 1904 002.

Tandem Feed Tray

Side-to-side Registration



- **Move the positioning plate to adjust the side-to-side registration**

Service manual, section 6.11.8, Tray Side-to-side Positioning

❒ Note this adjustment.

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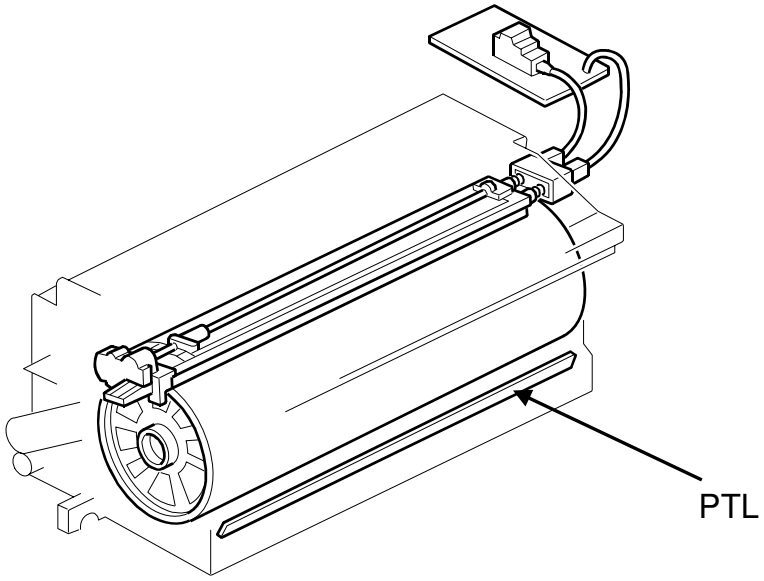
B246 SERIES TRAINING

COPIER ENGINE

TRANSFER AND SEPARATION

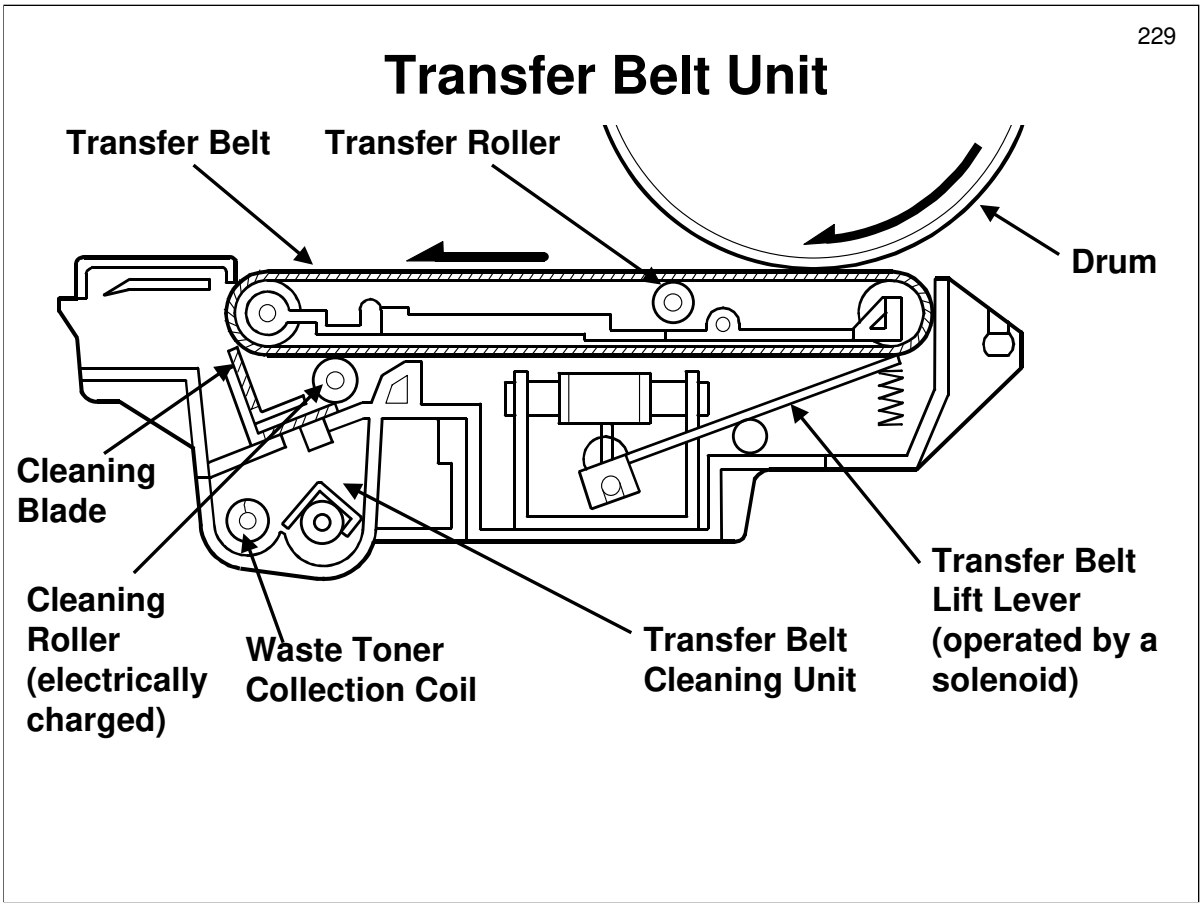
❒ Image transfer and paper separation mechanisms will be described in this section.

Pre-Transfer Lamp (PTL)



- **Gives better separation of paper from the drum.**
- **You can adjust the lamp turn-on timing with SP 2602.**
- **The PTL does not operate when you use OHP, tab sheets, or thick paper.**

❒ After the latent image is developed but before the image is transferred to the copy paper, the photoconductor surface is illuminated by a lamp.
❒ This illumination functions in much the same way as the exposure process. The light neutralizes some of the charge on the photoconductor, and thus reduces the attraction of the toner to the photoconductor.
❒ This prevents the toner particles from being re-attracted to the photoconductor during the paper separation process.
❒ It also makes image transfer and paper separation easier.

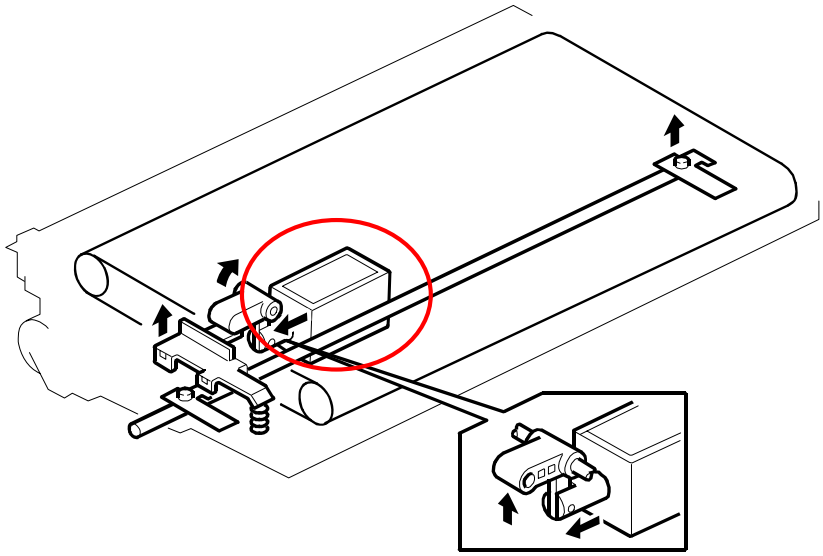


Service manual, section 6.10.1

- ❒ This model uses a transfer belt.
- ❒ The belt has a high electrical resistance, so that it can hold a high positive voltage to attract toner from the drum to the paper.
- ❒ The belt has a cleaning roller to remove toner from the belt. This prevents the backside of copies from getting dirty.
  - ➢ The roller is given a positive charge.
  - ➢ The cleaning roller has its own cleaning mechanism (a counter blade).
  - ➢ The toner collection coil in the transfer belt-cleaning unit sends waste toner to the collection bottle.
  - ➢ The bottle contains a toner overflow sensor.
  - ➢ This toner is not recycled, because it contains paper dust.
- ❒ A solenoid lifts the belt into contact with the drum at the required time.
- ❒ The transfer belt has the following advantages over a corona wire system:
  - ➢ The belt contacts the full width of the drum to ensure better transfer
  - ➢ Less ozone
  - ➢ More stable paper separation and transportation

    A transfer roller is not used in a high cpm machine because the efficiency of transfer charge is not as high as with a belt.
- ❒ Describe how paper separates from the drum.
  - ➢ Electrostatic attraction and the pick-off pawls both play a part.

Belt Contact Mechanism 1

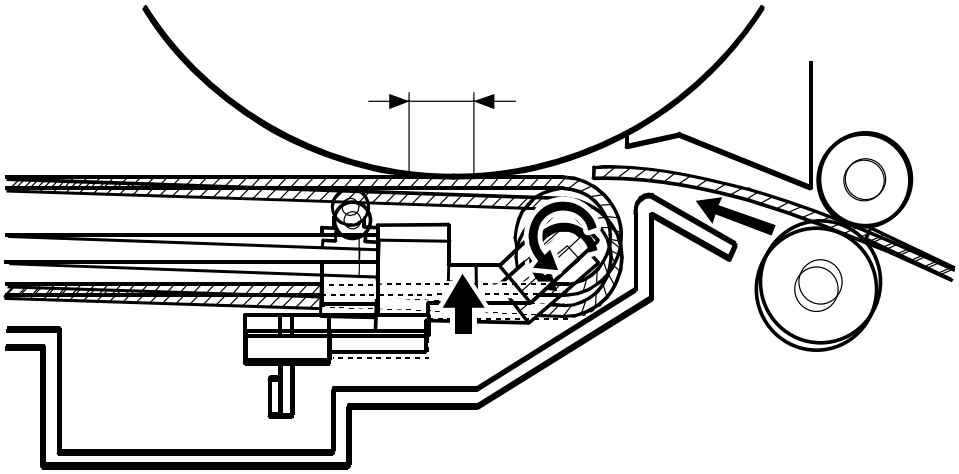


- **Transfer belt lift solenoid: Lifts and lowers the belt**
  - Belt lifts 500 ms after the drum motor starts at the beginning of the job
  - Belt lowers at the end of the copy job

Service manual, section 6.10.2

- ❒ Describe the mechanism.
- ❒ The belt lift timing (500 ms after drum start) is about the same time as the leading edge of the first sheet passes the registration sensor.
- ❒ The transfer belt must be released from the drum for the reasons given in the service manual:
- ❒ The next slide is a two-step animation. Use the page-up and page-down keys to demonstrate the contact and release mechanism on-screen.

Belt Contact Mechanism 2



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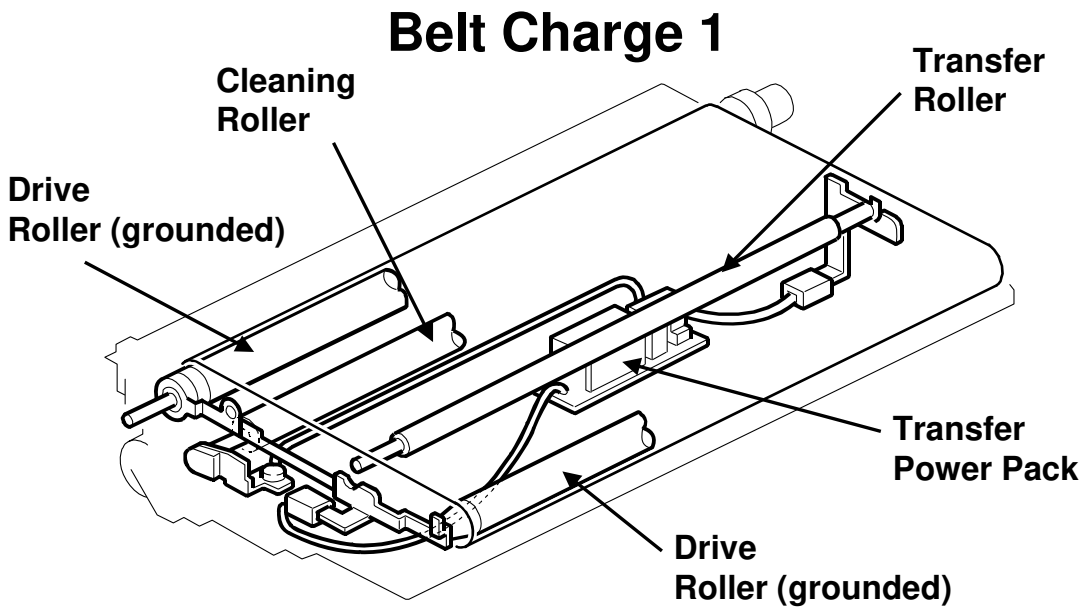


- **The transfer power pack applies a positive charge**
  - Transfer roller: About 7,000 volts
  - Cleaning roller: About 1,000 volts

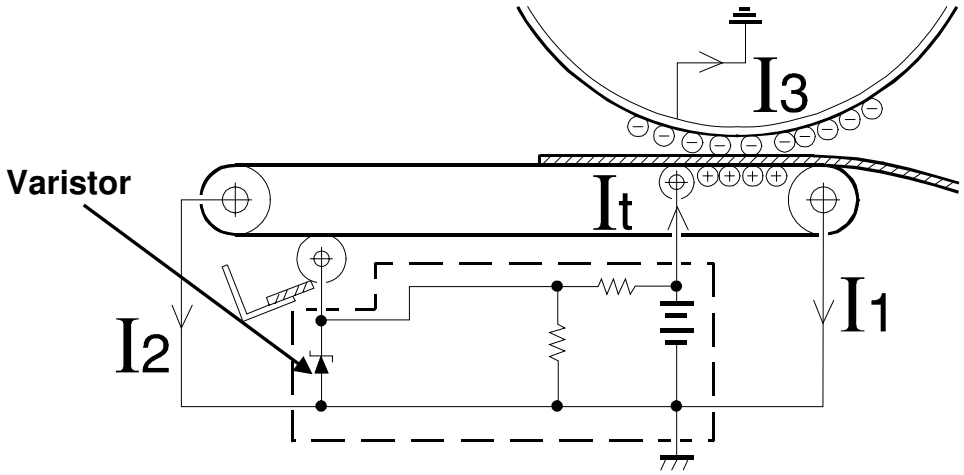
Service manual, section 6.10.3

- The positive charge applied to the transfer belt pulls the toner off the drum and onto the paper.
- The rollers at each end of the belt discharge the paper and the belt.

Service manual, section 6.10.4

- The service manual contains a table of default settings of the transfer current for various paper types.
- The charge for cleaning is applied, even during the interval between sheets of copy paper.
- At the following times, the transfer roller output drops to 2.6KV, and the cleaning roller output stays at 1000V.
  - When the job ends
  - Whenever the drum motor is on but there is no toner image on the drum on the drum (that is, whenever the drum is turning except during copying and process control). Between pages, the drum motor still turns, but the transfer voltage drops.
- There is no adjustment in this machine for narrow paper, unlike in the NAD series. This machine's transfer system is based on the F400/F401, and there have not been any problems related to this feature.
  - However, there is a separate adjustment for post card size paper from the by-pass feed table.
- Transfer current can be adjusted for paper fed at the by-pass table, which can be thicker than normal (SP2-301-3).
- The timing for starting to apply current at the leading edge, and for switching off at the trailing edge can be changed (SP 2931 to 2936).

Belt Charge 2



- **$I_t = I_1 + I_2 + I_3$**
- **The power pack monitors I_1 and I_2.**
- **The power pack varies its output (I_t) to keep current to ground through the drum (I_3) constant**

Service manual, section 6.10.5

- The power pack adjusts the current to the transfer roller to maintain a small, but constant, current flow (I_3) to ground through the belt, paper, and drum.
  - If this current is not constant, the toner transfer and paper separation efficiency will vary with humidity and paper thickness.
  - I_3 must remain constant. $I_3 = I_t - I_1 - I_2$. The machine measures I_1 and I_2, and varies I_t to keep I_3 constant.
- The varistor ensures that the voltage at the cleaning roller is constant.

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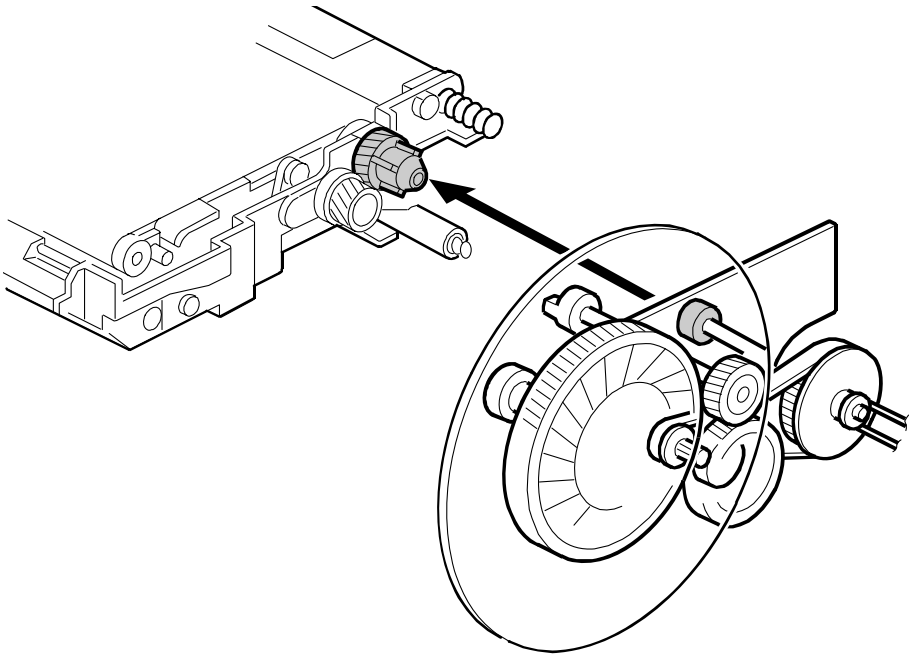
Belt Drive



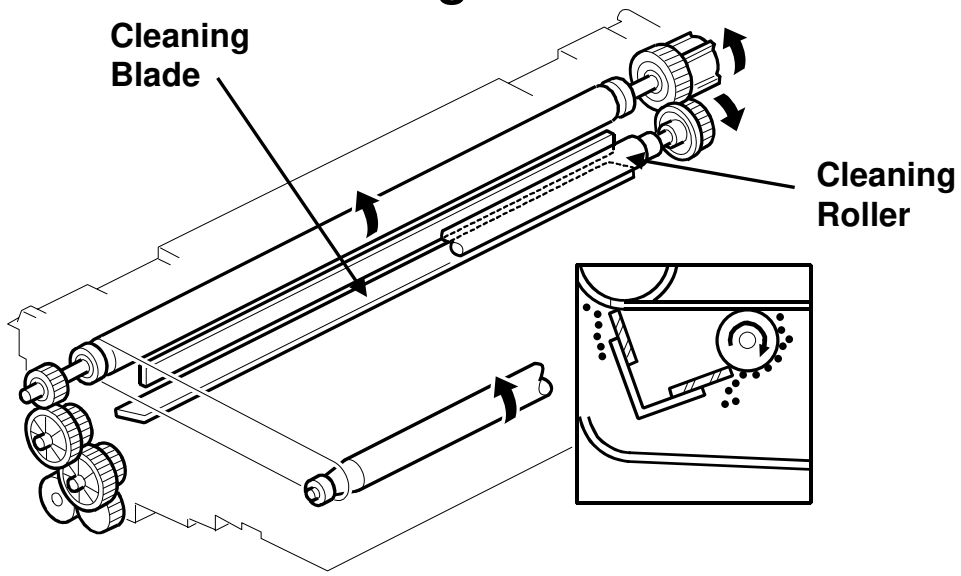
■ **The drum motor drives the transfer belt.**

Service manual, section 6.10.6

Describe the mechanism. Point out the following:

- ❒ The drum drive motor drives the transfer belt.
- ❒ There is no transport fan, because the belt attracts the paper electrostatically.
- ❒ A separation corona is not necessary; the paper separates from the belt when the belt curves sharply away.
- ❒ Note how the tapered ends of the roller help keep the transfer belt in the center, so that it does not run off the rollers.

Belt Cleaning Mechanism

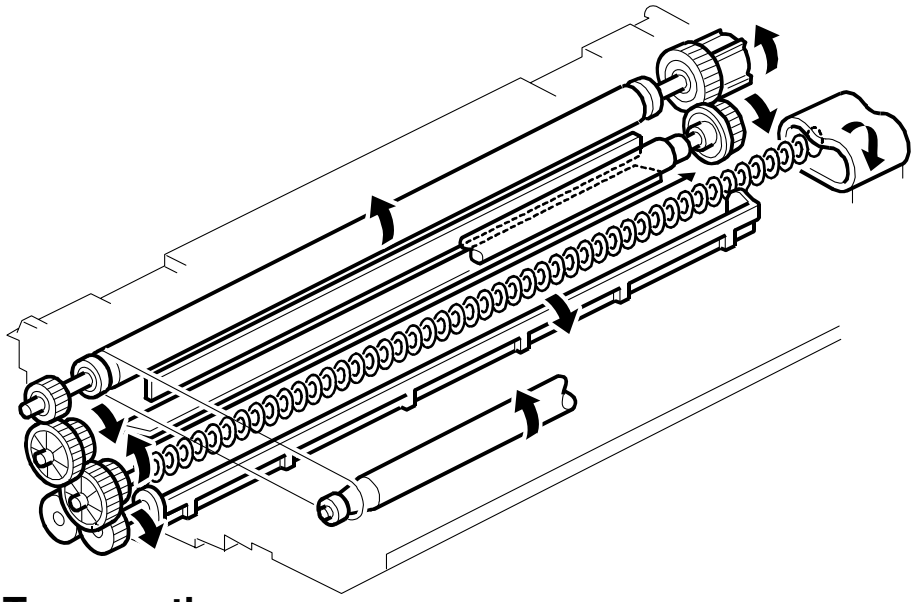


- **Cleaning roller always in contact with the belt**
- **Positive charge applied to the roller to attract negatively charged toner**
- **Cleaning roller cleaning blade: Counter blade**

Service manual, section 6.10.7

- ❒ Describe this mechanism using the slide and the service manual.
  - ➢ The Mojito had a cam for side-to-side movement, but this model has no cam.
- ❒ This gives better cleaning than the application of a blade to the transfer belt.
- ❒ The charge for cleaning is applied even during the interval between sheets of copy paper.
- ❒ If the class asks why SP 2-964 is now a 'DFU' (not to be used in the field), explain that if this SP is enabled, the rear sides of the paper is likely to get dirty.
  - ➢ In the SP5 and Mojito, SP2-964 allowed the transfer cleaning roller-cleaning blade to be lubricated occasionally with toner to prevent it from peeling off its bracket. This blade flipping problem only occurs rarely, so it is OK to DFU this SP mode.
  - ➢ There is always a chance of this happening with a counter blade system.

Toner Collection

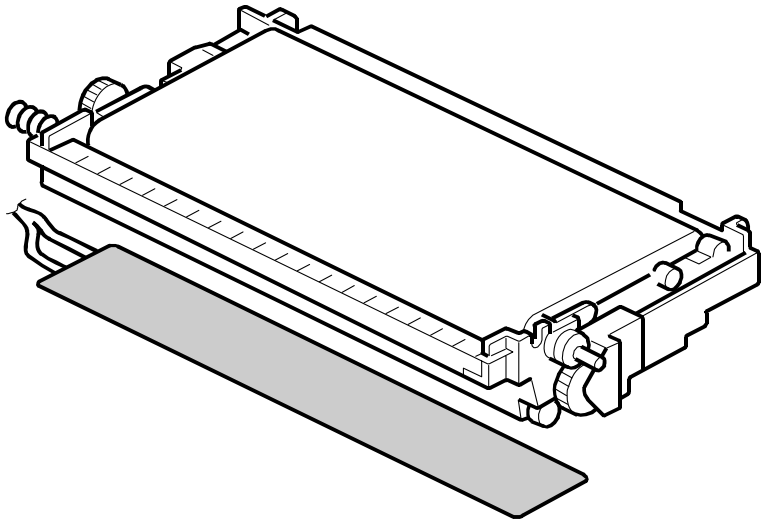


- **Toner path:**
  - Toner collection coil - Waste toner collection bottle

Service manual, section 6.10.7

- Toner removed from the belt by the previous mechanism is transferred to the waste toner collection bottle.
- In this model, the agitator plate does not move from side to side (no cam).
- The ‘Processes around the Drum’ section of the course described the toner collection mechanism in full.

Anti-condensation Heater



- **Below the transfer belt drive roller.**

Service manual, section 6.10.8

❒ This is not an option in this model. It is a standard part of the machine.
❒ It switches on automatically at the times stated in the manual.

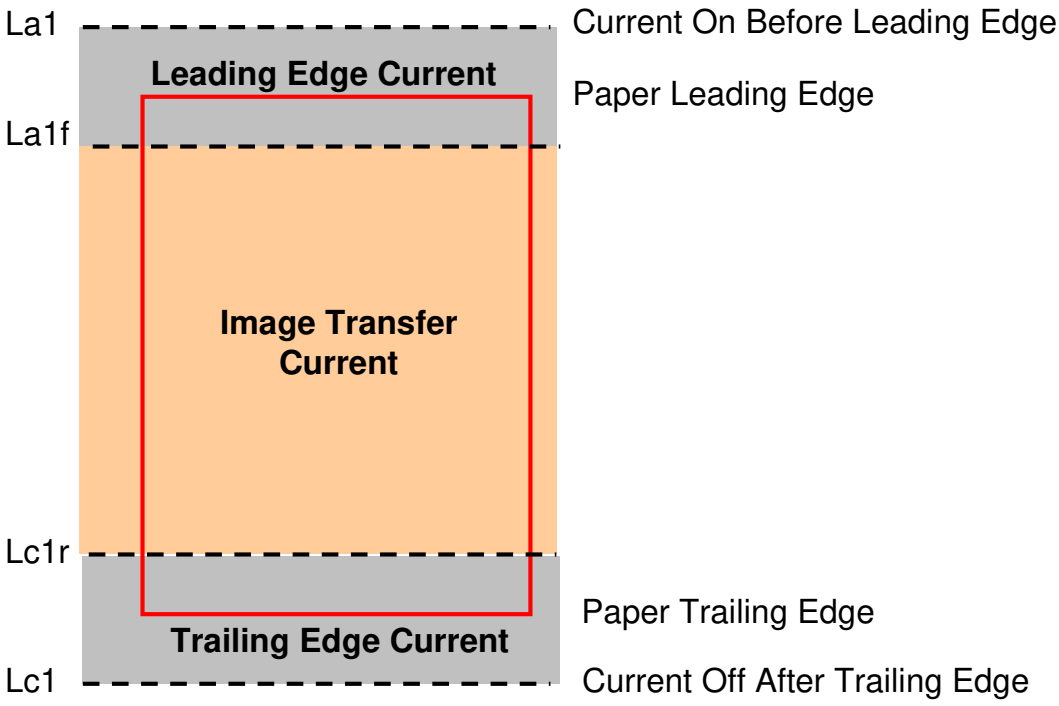
SP Modes

- **2301: Transfer current for various paper types and parts of the image**
- **2931 to 2936: Transfer current on/off timing**
  - 2931: LCT
  - 2932: Tray 1
  - 2933: Tray 2
  - 2934: Tray 3
  - 2936: By-pass tray
- **2602: Controls the PTL (enable/disable, timing)**

SP MODES

- Many of these SPs are DFU, but this is how they work, anyway.
- 2-301: Transfer current adjustments
  - Paper has resistance. If the user changes to a thicker paper, an increase in current may be necessary, because the paper resistance is higher.
  - 2301 001, 002: These are for the front and rear sides of duplex copying; the service manual is not clear about this point.
  - Note the different SPs for sides 1 and 2, and for the leading and trailing edge areas.
  - The leading and trailing edge areas are defined using SP 2931 to 2936.
- 2931 to 2936: Transfer current on and off timing
  - If the paper sticks on the drum at the leading edge, or will not separate at the trailing edge, try adjusting the timing with this SP mode.
  - For details on these SPs, see the next slide.

Transfer Current Timing Adjustments



- This slide attempts to explain the meanings of SP 2931 to 2936.
  - As shown on the previous slide, the settings can be adjusted for each paper tray.
- The settings are arranged in groups of four.
- The first group of four settings (La1, La1f, Lc1f, and Lc1) is for copying the front side.
- The second group (La2, La2f, Lc2f, and Lc2) is for copying the rear side.
- The third group (La3, La3f, Lc3f, and Lc3) is for thick paper.
- The fourth group (La1, La4f, Lc4f, and Lc1) is for OHPs, and is for the by-pass tray only.
- The example on the diagram shows the settings La1, La1f, Lc1f, and Lc1. The other groups of four (La2, La2f, Lc2f, Lc2, and so on) are similar in style.
- The red rectangle in the diagram is a sheet of paper.
- On the slide, the La1 setting determines when the transfer current turns on before the leading edge arrives at the transfer roller. The current for the leading edge area is applied at this time.
- The La1f setting determines when the transfer current changes to the current used for image transfer.
- The Lc1f setting determines when the transfer current changes to the trailing edge current.
- The Lc1 setting determines when the transfer current switches over to the value used between pages.
- SP2301 determines the actual currents that are used.

Replacement

- **Do the procedures in section 3.8 of the service manual.**
  - The procedure for the PTL is in section 3.6.6.

REPLACEMENT

Service manual, section 3.8

- ❒ Have the trainees remove and replace the parts in this section.
- ❒ Remind them to follow all notes and cautions in the manual.

Service manual, section 3.1.3

- ❒ First, make sure that the class is aware of the service notes for the transfer unit.

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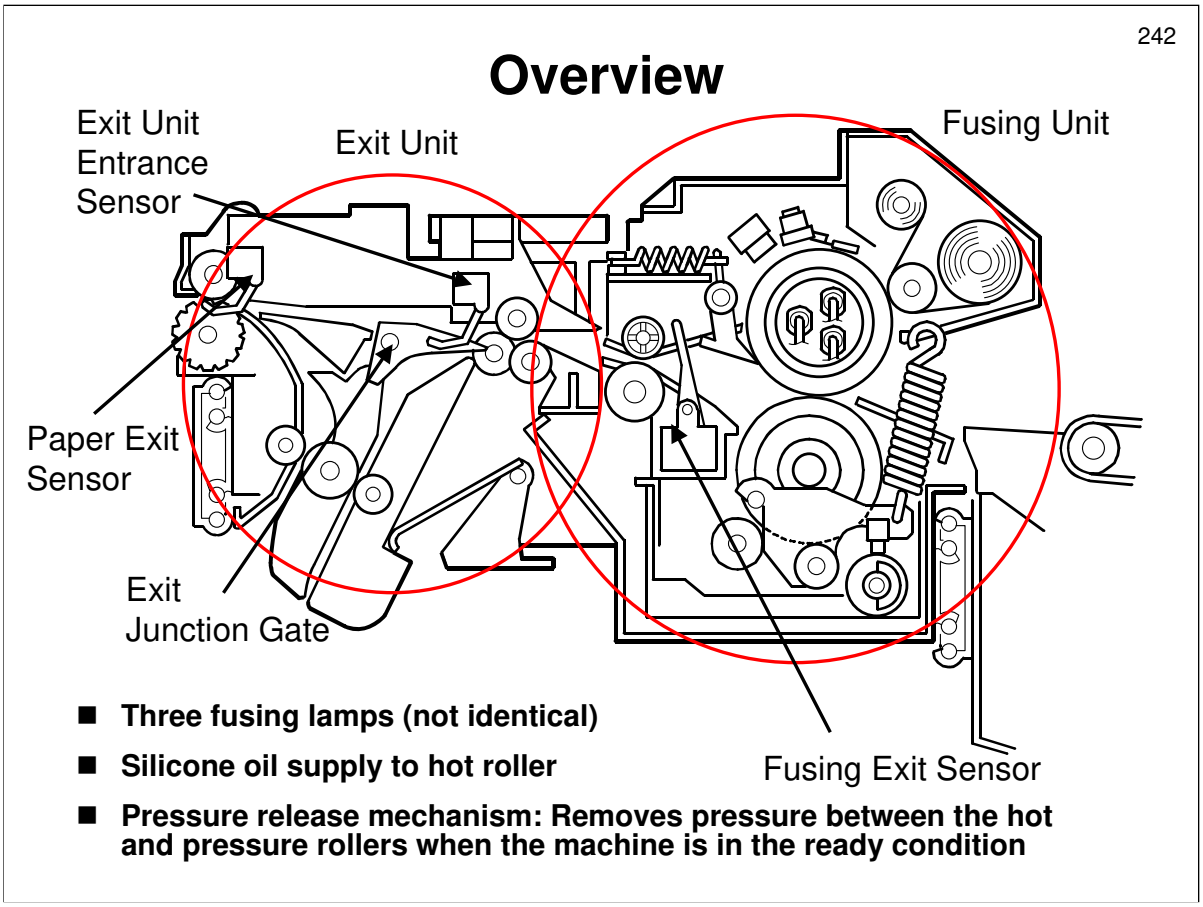
FUSING

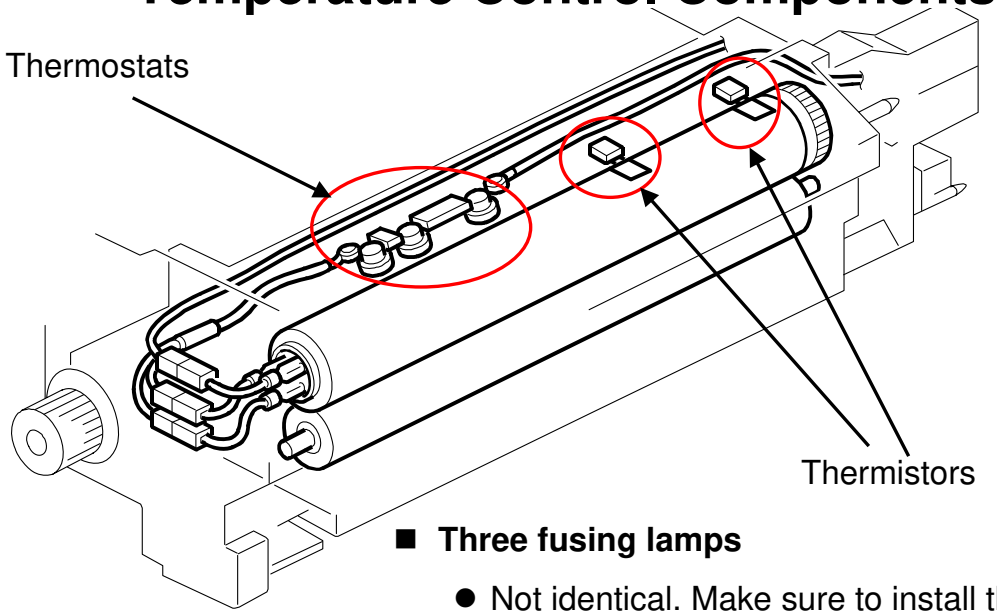
❒ Fusing will be described in this section.



Service manual, section 6.12.1

- The diagram shows the fusing unit (on the right) and the exit unit (on the left), which directs paper either down to the inverter/duplex unit, or out to the copy tray or finisher.
- The fusing and exit units have been made into separate modules, which can be easily separated from each other. This makes part replacement easier.
- Briefly, outline the components of the fusing unit as explained in the service manual.
- Note the web cleaning unit, which contains a web moistened with silicone oil for cleaning the hot roller.
- Note the purpose of the fusing exit sensor, to detect concertina jams in the fusing unit.
  - This sensor was introduced for the Mojito.
- The fusing and exit units have been separated, so an extra sensor has been added. This is the exit unit entrance sensor.

Temperature Control Components

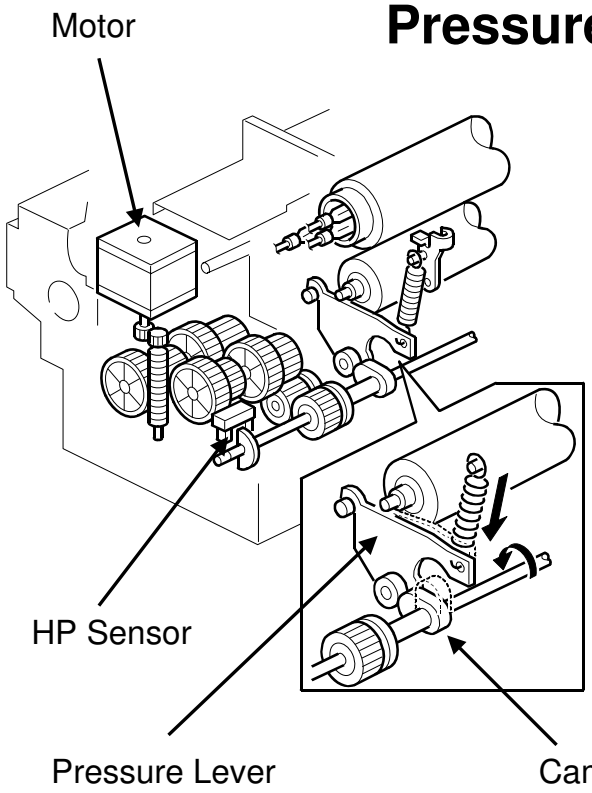


- **Three fusing lamps**
  - Not identical. Make sure to install them in the correct locations.
- **Two thermistors, three thermostats**
  - The thermostats prevent overheating.

Service manual, section 6.12.2

- The two thermistors are used to control the fusing temperature.
- The three thermostats are used to detect when the fusing unit temperature gets too high. If a thermostat trips, it must be replaced.
  - The thermistor at the end of the roller is important when narrow-width paper is continuously being fed through the fusing unit. At such times, the temperature at central parts of the roller will drop because paper is constantly passing through and cooling it down. However, the ends of the roller remain at high temperature.

Pressure Roller

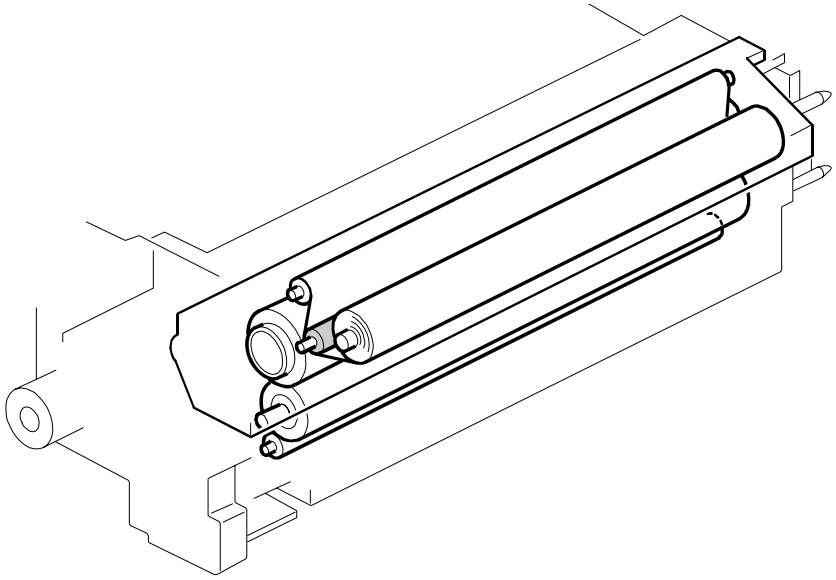


- **This mechanism makes sure that the hot roller and pressure roller touch only when the machine makes copies.**
- **This prevents damage to the pressure roller.**
- **This is done with a cam and pressure lever.**
- **The fusing pressure release motor controls the mechanism.**
- **The fusing pressure release HP sensor detects the correct time to switch the motor off.**
- **There is no pressure adjustment. Pressure is applied, or not applied.**

Service manual, section 6.12.3

❒ Ask the class to study the description of the mechanism in the service manual, and to study the mechanism on the machines in the classroom.

Hot Roller Cleaning



- **A web coated in silicone oil is pressed against the hot roller.**

Service manual, section 6.12.4

❒ The main point is on the slide. The service manual points out the rollers in this web cleaning unit, which is quite a simple one.

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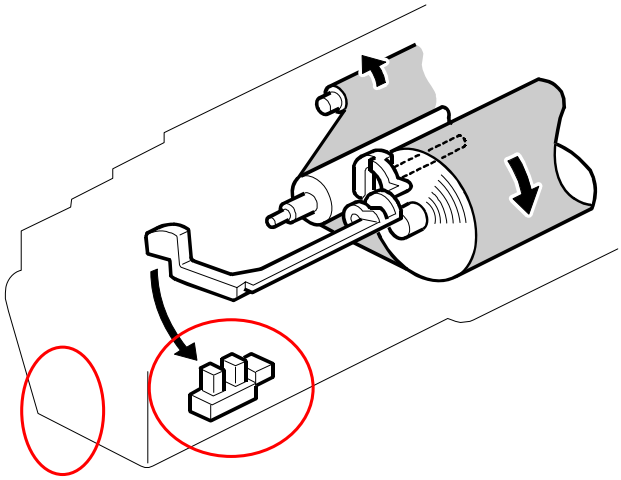
Web Unit Drive



- **Web motor: Drives the web cleaning unit**
- **Near-end: SP 1902 004 determines when to issue the near-end alert (default: after 80% used)**
- **Web end sensor: Detects when the web has all been used up**
- **Lifetime: About 300K copies**

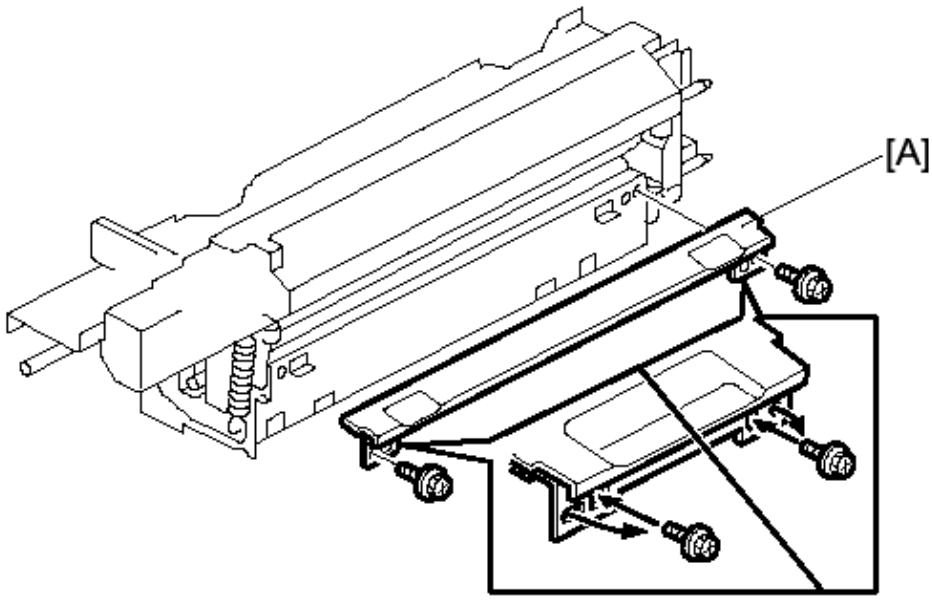
Service manual, section 6.12.4

- ❒ The main points are on the slide.
- ❒ The web motor turns on every 15 seconds during copying (this can be changed with SP 1902 002 if the fusing unit is not being cleaned enough).
  - ➢ The location of the motor is shown by the red circle on the left of the diagram. Unfortunately, the motor itself is not shown.
  - ➢ The length of time that the motor turns on is determined automatically by the machine. It will be between 0.8 s and 2.8 s.

    The diameter of the web remaining on the take-up roller changes with time, as the web is used up. The machine estimates the current diameter of the roller when determining how long to keep the motor on.
  - ➢ The motor can also be switched on after each job, if SP 1903 001 is turned on. This may be necessary if a lot of paper dust is sticking to the fusing unit rollers.

    If this feature is on, the motor will run if the job is longer than the time specified by SP 1903 002, and will run for the time specified by SP 1903 003. Again, the actual time depends on the current roller/web diameter; the SP is just a multiplication factor.
- ❒ Web near end is determined by adding up how much time the web motor has operated since a new roll was installed. When the machine determines that there is less than a certain amount left on the roll, then a near-end alert is issued.
  - ➢ This means that if you install a partially used web instead of a new one, you have to estimate how much has been used, and input it into SP 1902 001 (when installing a new web, this SP must be reset to 0).
  - ➢ The near-end threshold can be adjusted with SP 1902 004. The default is when 80% of the web has been used.
- ❒ The service manual describes the web end sensor mechanism.
- ❒ The theoretical lift of the web is about 330 K. However, the web should be changed at PM, which is at 300 K.

Fusing Entrance Guide



- **Normal position (normal paper, thick paper)_ - upper position**

Service manual, section 6.12.5

- ❒ The manual explains how to use this adjustment.
- ❒ The manual contains some guidelines, but it is not easy to recommend any one setting. Only change the setting when wrinkling occurs in the fusing unit. In such cases, use the setting that works best under the situation.

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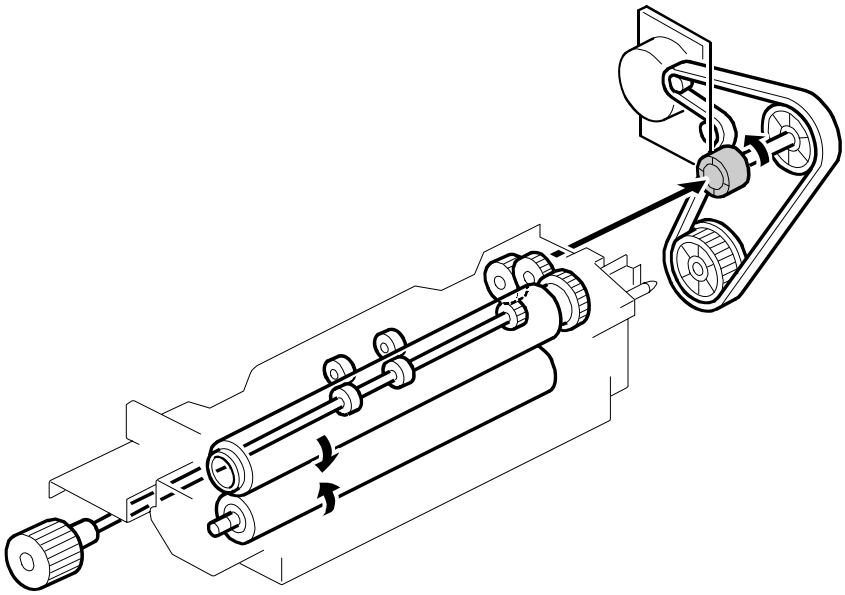
Fusing Drive Mechanism



- **The fusing/duplex motor drives the hot roller.**
- **The pressure roller is driven by friction with the hot roller.**

Service manual, section 6.12.6

❒ Outline this mechanism.

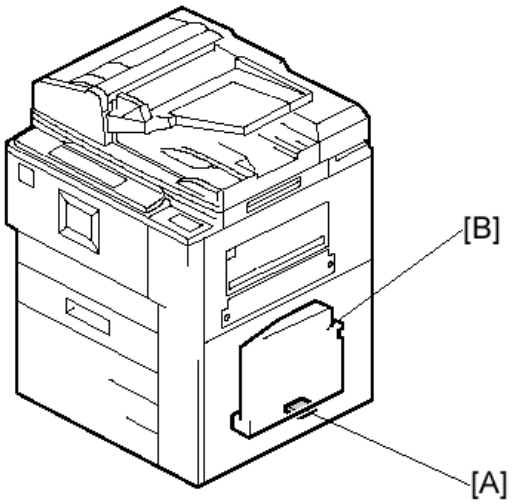
Automatic Copy Speed Reduction

- **Also called 'CPM Down Mode'**
- **Makes sure that fusing is completed correctly in all conditions**
- **Two processes**
  - Copy speed automatically decreases if the user selects thick paper or OHP at the bypass tray.
  - Copy speed automatically decreases if the centre thermistor detects that the temperature is below a set value.
    - The room temperature also controls this process.
    - The room temperature is detected by the temperature/humidity sensor (see the next slide)

Service manual, section 6.12.7

- Copy speed automatically decreases if the user selects thick paper or OHP at the bypass tray. This ensures that the image is fused properly, because thicker paper cools down the fusing unit too much at the usual copy speeds.
  - If the user uses tab paper or thick paper in any of the other trays, the copy speed can also be reduced, by adjusting SP 1901 (by default, the speed is reduced to 40 cpm if the user selects thick paper, and to 25 cpm for tab sheets).
- Copy speed is automatically reduced if the centre thermistor detects that the temperature is below a set value.
  - The details of this process are in the service manual.

Temperature/Humidity Sensor



- **This sensor [A] is below the waste toner collection bottle [B].**
- **The copy speed automatically decreases if the hot roller temperature goes below a set value. This set value is controlled by the room temperature.**

Service manual, section 6.12.7

Fusing Temperature Control

- **Fusing idling**
  - Done at the start of jobs on OHP or thick paper (controlled by SP 1907)
- **The fusing unit gets very quickly to the ready and printing temperatures.**
- **Because of this, fusing idling is normally not necessary, and is not done.**
- **SP1105 controls the fusing temperatures for different paper types.**

Service manual, section 6.12.8

Fusing Lamp Operation

Start-up

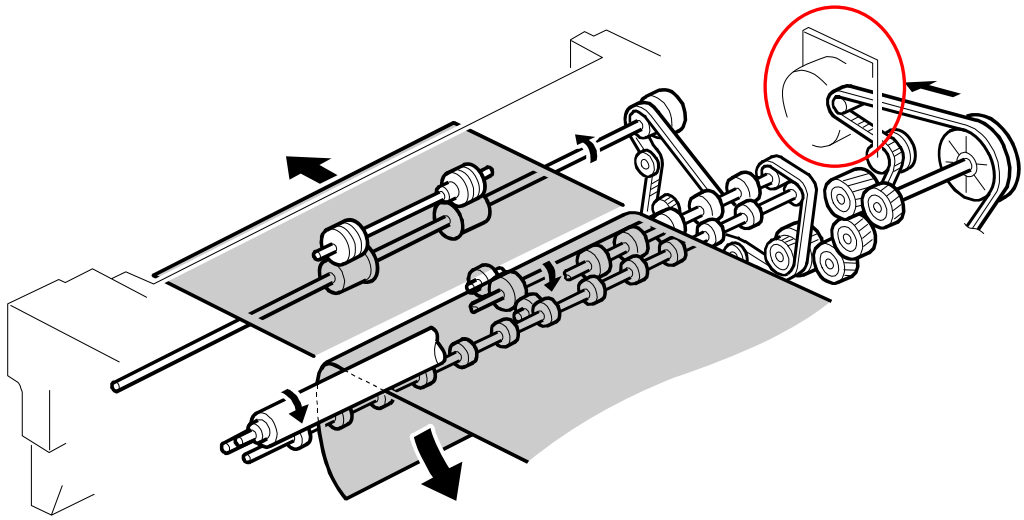
- ❒ When the power is turned on, the CPU checks the mains frequency for 0.5 s. The CPU requires the mains frequency if phase control mode is active (see Fusing Unit Control Modes).
- ❒ Then the fusing lamps turn on.

Fusing Idling

- ❒ There is no fusing idling in this machine, except in the cases shown on the slide, because the fusing unit warms up at a high speed.
- ❒ What happens in fusing idling?: The fusing motor turns the hot roller with no paper in the fusing unit. This ensures that the hot roller reaches the correct temperature. The paper stops at the registration roller, then the roller resumes its rotation after the hot roller reaches the correct temperature.

Printing temperature: Can be adjusted for all paper types with SP 1105.

Paper Exit Mechanism - Drive



■ **The fusing/exit motor drives the rollers.**

Service manual, section 6.12.9

❒ Describe this briefly.

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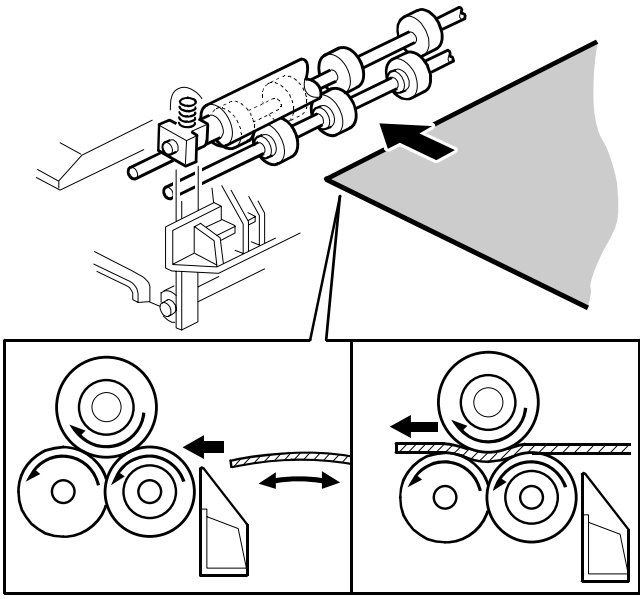
Paper Exit Mechanism - Curl Correction

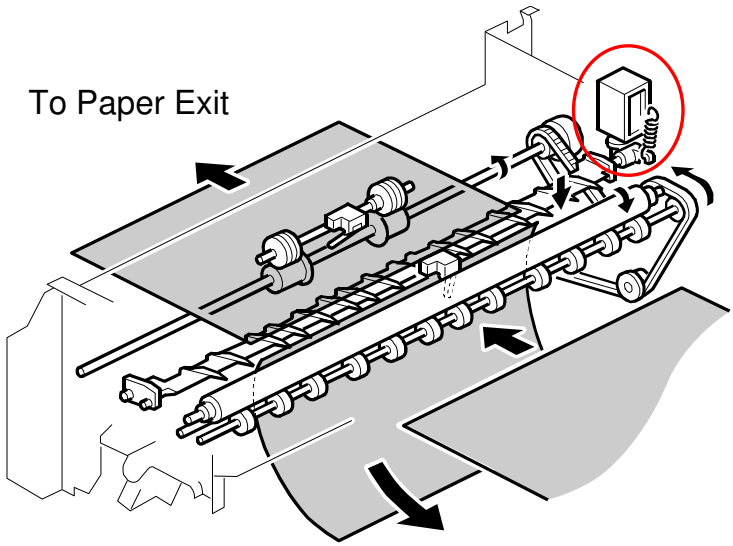


- **The curl correction rollers remove curl produced during fusing.**

Service manual, section 6.12.9

❒ Describe this briefly.

Paper Exit Mechanism - Junction Gate



- **Paper goes either:**
  - Straight through to the output tray or finisher
  - Down to the inverter and duplex unit

Service manual, section 6.12.10

❒ Show how the exit gate solenoid directs paper through to the output tray or down to the finisher.

Fusing Unit Jams

- Normally, the user will remove fusing unit jams.
- But, if SP 1159 is changed to ‘on’, the machine stops if a jam occurs in the fusing unit for three consecutive paper feeds. Then, SC559 appears. The technician must remove the jam.

SP Modes

- **1103: Fusing idling**
  - 70 seconds at power on
  - No idling when recovering from low power mode
- **1102, 1105: Fusing temperature adjustments**
- **1106: Displays the fusing temperature**
- **1901: Copy speed change for thick paper**
- **1902, 1903: Web unit settings**
- **1906: Displays the readings from the temperature and humidity sensor (below the toner collection bottle)**
- **1907: Idling before fusing, for OHP and thick paper (default: enabled)**

SP Modes

- 1105: Fusing temperature adjustment
  - There are separate adjustments for OHP and thick paper.
  - 1102: For duplex mode
- 1106: Displays the fusing temperature
- 1901: Copy speed change for thick paper and tab sheets
  - This counteracts insufficient fusing problems caused by drops in hot roller temperature due to the thick paper going through the fusing unit (this cools the fusing unit much quicker than normal paper).
  - Reduce the speed if these problems occur.
- 1902, 1903: These were discussed earlier in this section.

Replacement and Adjustment

- **Do the procedures in section 3.9 of the service manual.**
- **Obey all notes and cautions in the manual.**
- **Web unit**
  - After installing a new web, reset SP1902 001 to 0.

Service manual, section 3.9

❒ Have the trainees do the procedures in this section.

❒ Remind them to follow all notes and cautions in the manual.

Service manual, section 3.1.9

❒ First, make sure that the class is aware of the service notes for the fusing unit.

Thermistors and thermostats

❒ Note the cautions for reassembly (copied from a B140 technical bulletin).

Web unit

❒ Users cannot install a new web.

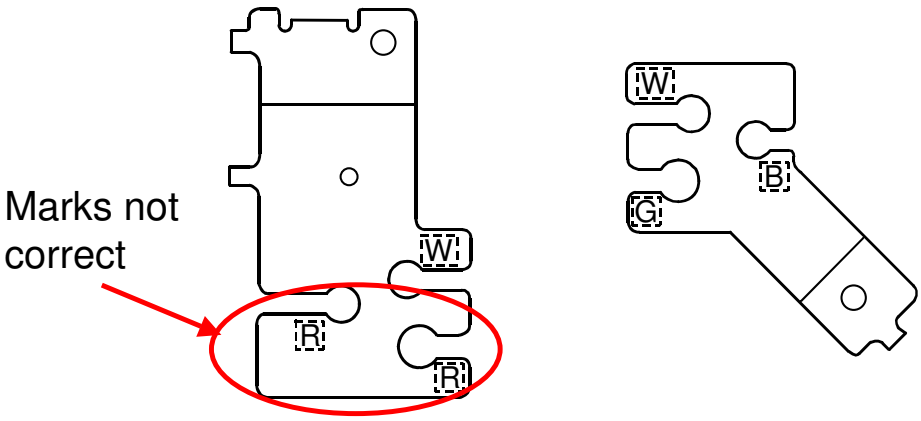
❒ After installing a new web, reset SP1902 001 to 0.

Pressure roller

❒ Note that there are two procedures. If you are only removing the pressure roller, and not removing the fusing lamps and hot roller at the same time, then use the shorter procedure.

Fusing Lamp Replacement

- **The three fusing lamps are all different. To make sure that you connect the lamps to the correct places, the connectors on the lamps have colours (white, blue, green).**
- **The connectors on the machine also have the same colours. Because of this, it is not possible to make an error.**
- **Also you can use the W, B, and G marks on the lamp holders.**
  - The marks on the front lamp holder are not correct (W, R, R)



RICOH

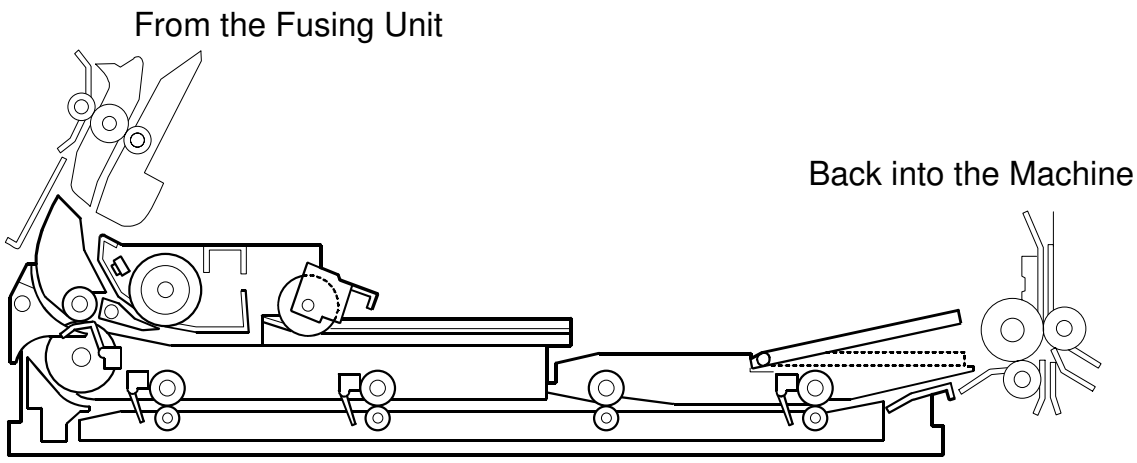
B246 SERIES TRAINING

COPIER ENGINE

DUPLEX

- The duplex mechanisms will be described.
- The duplex tray is a standard component of this model.

Overview

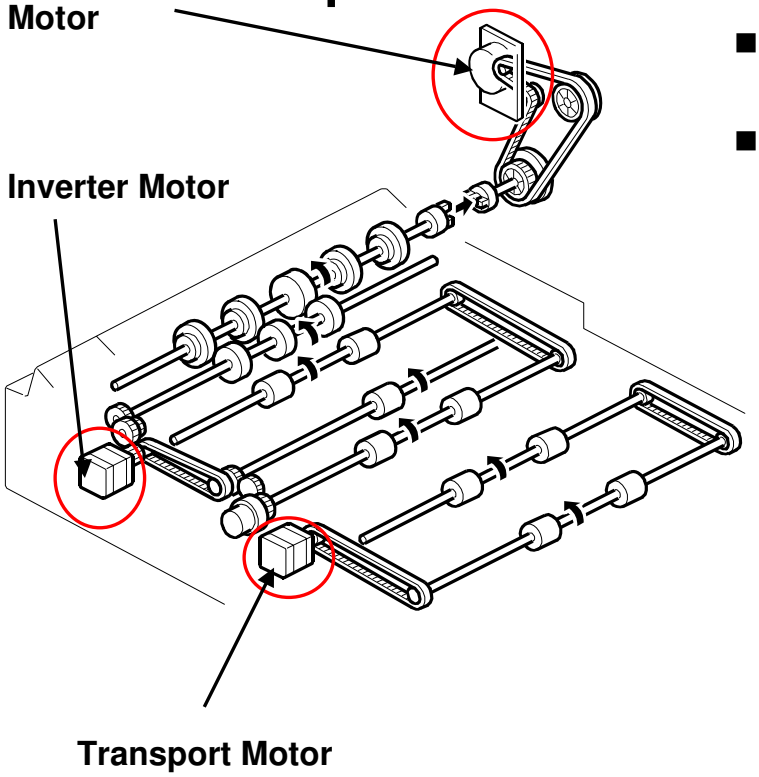


- **Face-up output: The page goes out of the fusing unit to the tray directly.**
- **Face-down output: The page goes to the inverter before being fed out to the tray.**
- **Duplexing: The page goes through the inverter to the duplex tray.**

Service manual, section 6.13.1

- ❒ This unit is a standard part of the machine, not an optional unit.
- ❒ For face-up output, the page passes out of the fusing unit to the tray directly.
- ❒ For face-down output, the page passes to the inverter before being fed out to the tray.
- ❒ Platen mode output is face-down by default (can be adjusted) and ADF mode is always face up (no adjustment). This was discussed in the Operation section of the course.
- ❒ For duplexing, the page goes through the inverter to the duplex tray.
- ❒ Note the trailing edge guide plate, which is a new component for the duplex unit.

Duplex Drive Mechanism

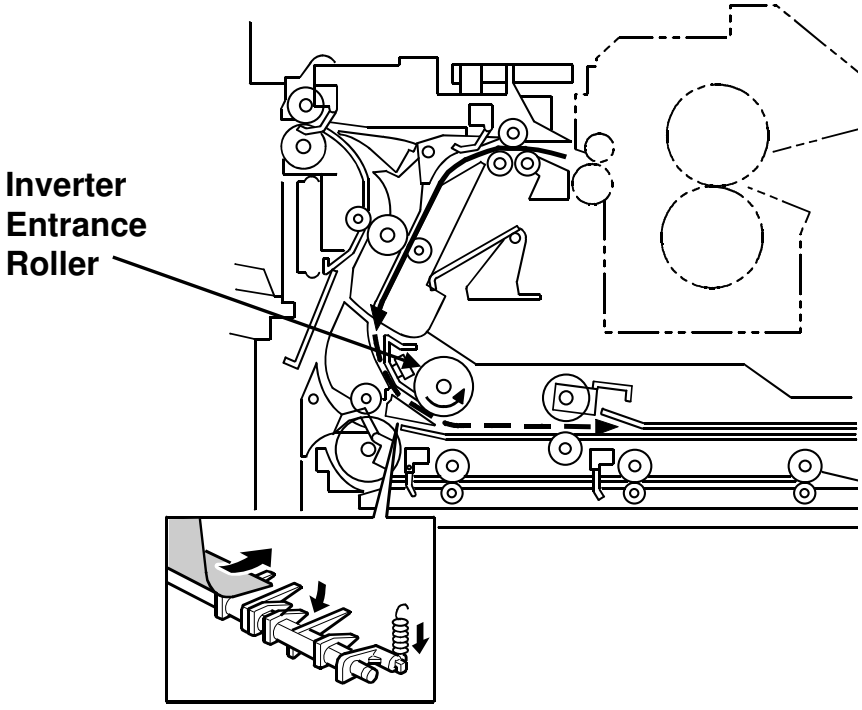


- **Fusing/duplex motor: Drives the inverter**
- **Duplex inverter and transport motors: Drive the duplex transport rollers**

Service manual, section 6.13.2

❒ Describe this briefly.

Inverter - Feed-in



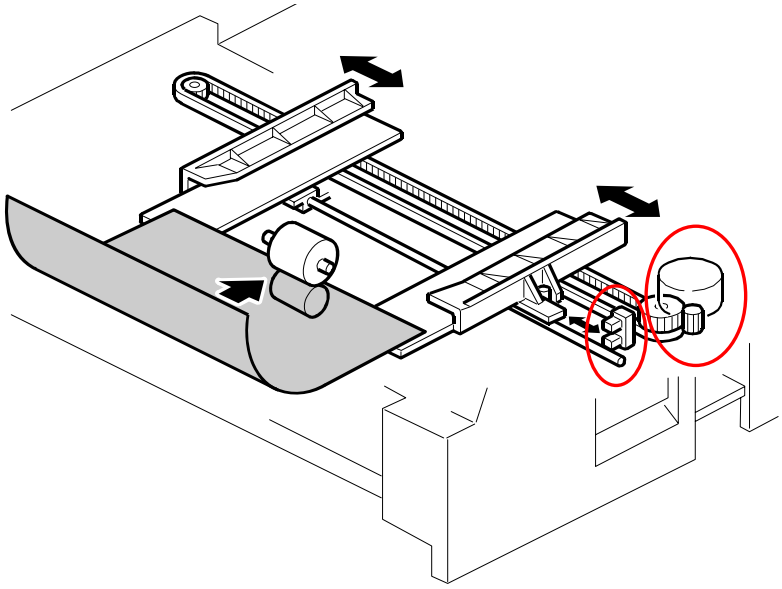
■ **Inverter entrance roller: Feeds paper into the inverter**

Service manual, section 6.13.3

❒ If the paper exit mechanism directed the paper down towards the inverter, the inverter feed roller passes it to the jogger unit.

❒ The weight of the paper pushes down the junction gate. A spring lifts the gate again after the paper has gone through. There is no solenoid.

Inverter - Jogging



- **Jogger motor: Moves the jogger fences**
- **Jogger home position sensor: Detects the jogger fence home position**

Service manual, section 6.13.3

❒ Jogging ensures that the paper is straight.

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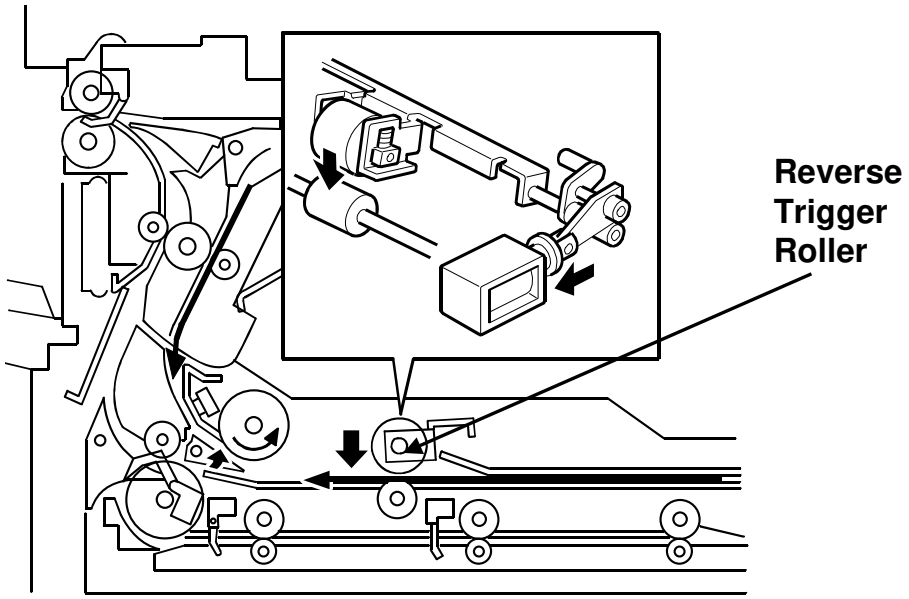
Inverter - Feed-out 1



- **Reverse roller solenoid: Lowers the reverse trigger roller**

Service manual, section 6.13.3

❒ The next two slides show how paper is fed out of the inverter unit.

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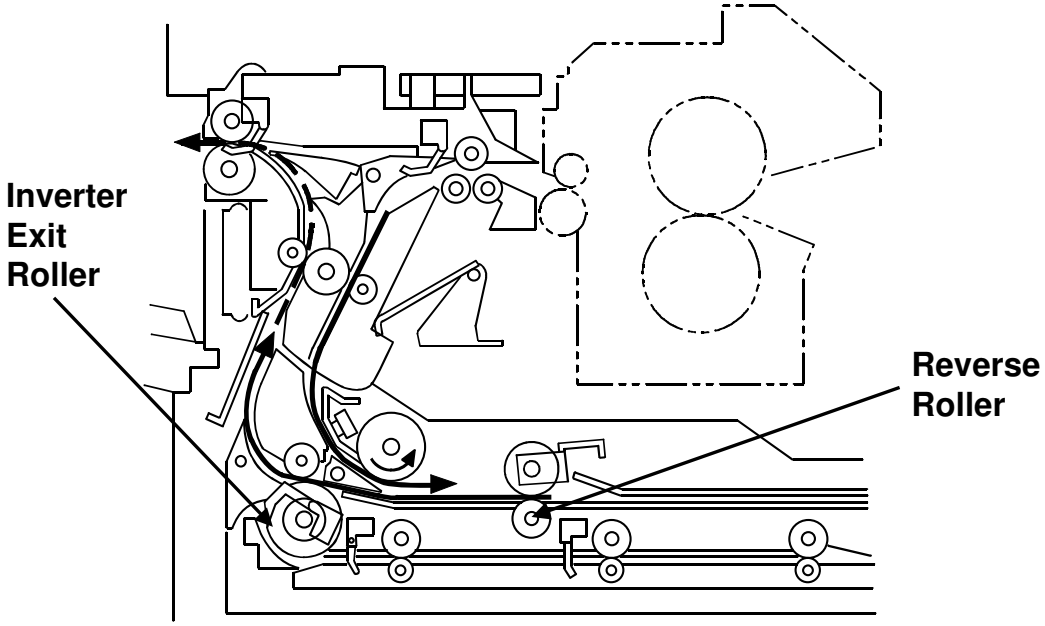
Inverter - Feed-out 2



- **Reverse roller: Feeds the paper back**
- **Inverter exit roller: Feeds the paper upwards**

Service manual, section 6.13.3

❒ In the red circle, it is not easy to see, but the inverter sensor is just past the inverter roller, so this sensor detects when the paper has just been caught by this roller. Then, the reverse roller stops and is lifted away from the paper.

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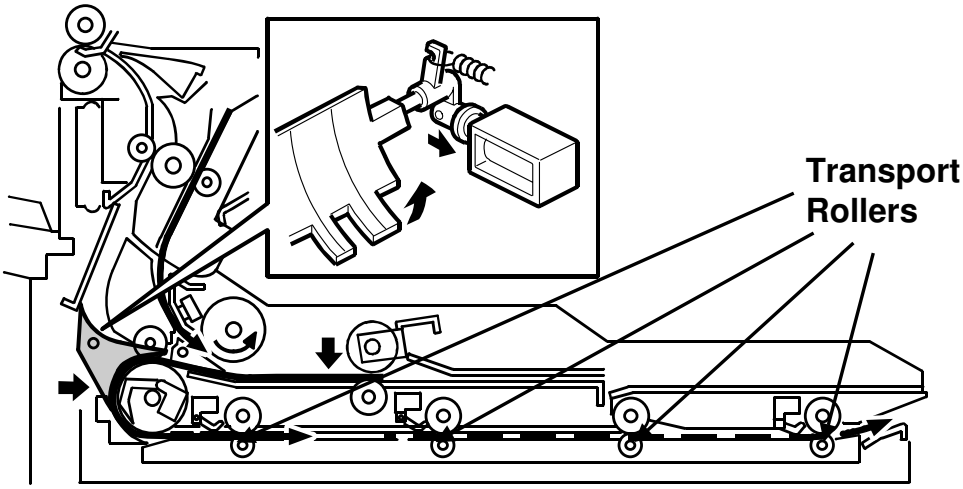
Duplex Tray Feed Mechanism



- **Duplex inverter solenoid: Moves the junction gate, directs the paper down to the duplex tray**
- **Duplex transport rollers: Feed the paper into, through, and out of the duplex tray**

Service manual, section 6.13.4

❒ In duplex mode, the junction gate switches and the inverter feeds the paper down into the duplex unit instead of back up to the machine.

SP Modes

- **1008: Distance between the jogger fences**

SP Modes

- 1008: Distance between the jogger fences. The SP table explains when to adjust this setting (skewing, or paper creasing)

Replacement and Adjustment

- **Do the procedures in section 3.10 of the service manual.**
- **Obey all notes and cautions in the manual.**

Service manual, section 3.10

❒ Have the trainees do the procedures in this section.
❒ Remind them to follow all notes and cautions in the manual.
❒ The manual explains the purpose of the adjustments.