

 $\hfill\square$ This is a full training course for the new model in the K series.



Contents 1. Product Outline 11. Transfer and Separation 2. Specifications 12. Paper Feed 3. Installation 13. Fusing 4. Machine Overview 14. Paper Exit 5. Scanner 15. Duplex 6. Laser Exposure 16. Peripherals 7. PCU 17. Maintenance 8. Drum Charge **Development & Toner** 9. Supply 10. Drum Cleaning & Toner Recycling Slide 2





□ The name 'Aficio' is no longer used on Ricoh products.











Compare the Operation Panels



- □ The SD/USB slots support scan to media and print from media.
- □ An optional HDD must be installed to use these features.

	K-C4a	K-C4Lb	K-C4Lc	K-C4b	K-C4c
Model Type	Basic	GDI	GDI	GW+	GW+
СРМ	20	20	25	20	25
1 st Copy Time	6.5 s	6.5 s	6.5 s	5.5 s	5.5 s
Paper Feed (Main Machine)	250 x 1	250 x 1	250 x 2	250 x 1	250 x 2
Duplex	No	Yes	Yes	Yes	Yes
Warm-up Time	Less than 11 s	Less than 11 s	Less than 11 s	Less than 20 s	Less than 20 s
PC Scanner Type	No	Color (CIS)	Color (CIS)	Color (CCD)	Color (CCD)
Memory	128 MB	128 MB	128 MB	1024 MB	1024 MB
HDD	N/A	N/A	N/A	250 GB optional	250 GB optional
Dimensions mm (W x D x H)	586.8 x 568 x 430.5	586.8 x 568 x 430.5	586.8 x 568 x 528.5	586.8 x 568 x 460	586.8 x 568 x 558
Panel	4-line display	4-line display	4-line display	4.3-inch touch panel	4.3-inch touch panel

- □ K-C4a can only scan for the purpose of photocopying. It has no MFP-type scanner or printer capability.
- □ K-C4Lb/c: New scanner, lower in cost than the previous model but has color scanning



- □ No ADF option for the K-C4 series. Both models are ARDF.
- □ Common: In the table, this means the same option is used in other models previously launched.
- □ There is no optional memory unit for the fax option.
- □ There is no App2Me.



Options: Original Feed

		Also used with these models:	Similar to:	Note
ARDF (D684): DF2020	New		New model	For K-C4b, K-C4c
ARDF (D724): DF2030	New		OR-C1, AT-C3	For K-C4a, K-C4Lb, K-C4L
D593: ADF Handle Type C		AI-C2, Mt-C5		For all K-C4 models
Platen cover (D700): Platen Cover PN2000	New			For all K-C4 models

Options: Paper Feed and Finishing

		Also used with these models:	Similar to:	Note
One-tray paper feed unit (D698): PB2000	New		Di-C1, Di-C1.5	For all K-C4 models
Two-tray paper feed unit (D699): PB2010	New		Di-C1, Di-C1.5	For all K-C4 models
One-bin tray (D697): BN2010	New		New model	K-C4b, K-C4c

Options:	Printer.	Scanner.	&	Fax	Units
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		Also used with these models:	Similar to:	Note
D701: DDST Unit Type M1	New			K-C4Lb, K-C4Lc
D701: PostScript3 Unit Type M1	New			K-C4b, K-C4c
D701: Hard Disk Drive Option Type M1	New			K-C4b, K-C4c
D701: Memory Unit Type M1	New			K-C4b, K-C4c
D702: Fax Option Type M1	New			K-C4b, K-C4c
D645: Handset Type C5502		AL-C2, AP-C3		K-C4b, K-C4c
D701: Fax Connection Unit Type M1	New	AP-C3		K-C4b, K-C4c
H903: Marker Type 30		In use with many models		K-C4b, K-C4c

DDST Unit Type M1 The GDI controller that comes with the machine has no network interface. The optional DDST unit is a GDI controller with a network interface.

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		Also used with these models:	Similar to:	Note
D566: Bluetooth Interface Unit Type D	USB	In use with many models		K-C4b, K-C4c
B679: IEEE 1284 Interface Board Type A		In use with many models		K-C4b, K-C4c
D377: IEEE 802.11a/g Interface Unit Type J		In use with many models		K-C4b, K-C4c
D377: IEEE 802.11g Interface Unit Type K		In use with many models		K-C4b, K-C4c
D701: Browser Unit Type M1				K-C4b, K-C4c
D701: SD card for NetWare printing Type M1	New			K-C4b, K-C4c
D641: SD Card for Fonts Type D		S-C5, Gr-C1, Mt-C5		K-C4b, K-C4c
D640: VM Card Type U		Al-C2, S-C5, Gr-C1, Mt- C5		K-C4b, K-C4c

- □ No gigabit Ethernet option (standard for K-C4b and K-C4c)
- □ No Camera Direct Print (PictBridge) option



	Also used with these new models:	Similar to:	Note
B870: Optional Counter Interface Unit Type A	In use with many models		For all K-C4 models
D377: File Format Converter Type E	In use with many models		K-C4b, K-C4c
D640: Copy Data Security Unit Type G	In use with many models		K-C4b, K-C4c







□ See the fax unit's service manual for the procedure.



- □ The SD Card slots are discussed in more detail on the next few slides.
- □ The small USB slot below the board slot is for designer's use only.







□ Note that PostScript 3 and PDF Direct can now be moved to another SD card. In previous models, this is not possible because of licensing restrictions.











- □ Refer to the field service manual for detailed specifications.
- □ For the previous model in this series:
 - Print speed

K-C3.5Lb: 16 cpm (18 cpm for B268-50) K-C3.5Lcd: 20 cpm

First copy time

Less than 6.5 seconds (A4/8½" x 11" LEF)

Warm-up

Less than 15 seconds







Improvements Since K-C3 Series

	K-C3b/cd	K-C4b/c
СРМ	16/20	20/25
Operation Panel		
Scanner	BW	Color
Memory	400MB	1024MB
HDD	None	Optional: 250GB
First Copy Time	6.5 sec	5.5 sec
Warmup Time	Less than 26 sec	Less than 20 sec

	K-C3Lb/Lcd	K-C4Lb/Lc
СРМ	16/20	20/25
Operation Panel		
Scanner	BW	Color
Memory	64MB	128MB
Duplex	C3Lb : No, C3Lcd : Yes	Yes
ID Copy	No (GW-C : Yes)	Yes
First Copy Time	6.5sec	6.5sec
Warmup Time	Less than 15 sec	11sec











□ This section covers the main points about installation. For full details see the service manual.
























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More on Drive Layout

- $\hfill\square$ The top diagrams shows the scanner. The scanner has one motor.
- □ The bottom diagram shows how the main motor drives the fusing unit, PCU, and development unit.
- □ The main motor also drives the paper feed mechanisms via gears and clutches.





More on the Copy Process

- □ The photoconductor unit (PCU) contains the drum, development roller, and charge roller.
- □ A charge roller gives the drum a negative charge.
- □ The laser beam writes a latent image on the drum, switching on to discharge the drum when writing black parts of the image. Toner is attracted to these discharged parts of the drum.
- □ The transfer roller applies a positive current to the reverse side of the paper (the size of the current depends on the resolution and the paper size). This pulls the toner off the drum and onto the paper.
- □ The electrostatic pull from the transfer roller separates the paper from the drum. There is also a discharge plate, which is grounded.
- □ The quenching lamp removes residual charge from the drum.
- □ The ID sensor and TD sensor are used for toner supply control.

Replacement and Adjustment General Caution

- □ If the AC power cord is connected, power is supplied to the controller, control panel, and the circuit that detects the main power switch status even if the main power is turned off.
- □ Therefore, even if the machine has shut down, the power is still supplied to the interior components. If you attempt to replace the controller or control panel in such a state, the related components may become damaged.
- □ Be sure to pull off the AC power cord before replacing components (such as a circuit board).

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Before Replacing the GW+ Controller Board in a machine without a HDD

- When you replace the controller board in a machine without a HDD, address book data can be copied from an old controller board to a new controller board using an SD card.
- □ Copy the address book data to an SD card from the flash ROM on the controller board with SP5846-051 if possible.







Basic (D170)	All -1 - 6 -		
· · · ·	All data	BICU	SP5-801-002
GW+ (D158/D159)	Engine data	BICU	SP5-801-002
	Controller data	GW + Controller	SP5-801-001-003 to -025
GDI (D160/D161)	Engine data	BICU	SP5-801-002
	Controller data	GDI Controller	SP5-801-001-003 to -025

See the field service manual (5. Service Tables > Using SP Modes) for procedures on how to use SP5-801-002.

SP5-801-002 (Memory Clear - Engine) clears most of the settings and counters stored in the NVRAM on the BICU (the values return to their default values). However, the following settings are not cleared:

- SP5-811-001 (Serial Num Input [Code Set])
- □ SP5-812-001 (Service TEL [Telephone])
- □ SP5-812-002 (Service TEL [Facsimile])
- □ SP5-907-001 (Plug & Play)
- □ SP 7 (Data Log)
- □ SP 8 (History)



- □ The shutdown message does not appear in the following cases:
 - If the main power goes off suddenly
 - > If the main power switch is turned off when the controller is off
 - If the main power switch is turned off during a special operation such as deleting all data on the hard disk, updating firmware, encrypting data on the hard disk, or detecting changes to the device configuration
 - > If the main power switch is turned off during a reboot

<section-header> braced Shutdown f the machine freezes, hold the main power switch down down so seconds. however, this method can damage the hard disk of controller board, or cause data loss. forced shutdown should only be carried out when in contact with a call center operator, or by a technician, after optication to the customer. f the normal shutdown process will not function correctly, and SiC on the CTL board might be broken. In this case, a cuncican visit is necessary. on on use Forced Shutdown excessively. bas, be careful not to hold the main power switch down bas and the main power switch bas and the main power switch down bas and the main power switch bas and the main power switch bas and the main bas and the main power switch bas and the main b



- □ The scanners are different from the previous model in the series.
- □ The D158/D159 scanner uses a CCD.
- □ The D160/D161/D170 scanner uses a CIS.





- □ The original on the exposure glass or ARDF exposure glass reflects the light emitted from the scanner lamp. The reflected light goes to the CCD on the sensor board by way of the 1st and 2nd scanners. The sensor board converts the CCD analog signals into digital signals.
- When the original is manually placed on the exposure glass, the scanner motor pulls the 1st and 2nd scanners via mechanical linkage. The original is scanned from left to right.
- □ When the original is fed from the optional ARDF, it is automatically fed over the ARDF exposure glass, and to the original exit. The 1st and 2nd scanners stay at their home positions below the ARDF exposure glass.
- The anti-condensation heater is available as an optional unit. It prevents condensation on the mirrors. Condensation can occur when the scanner unit is, for example, moved from a cold room to a warm room. Condensation can cause abnormal images.



Book mode

- The SBU board controls the scanner drive motor. The 2nd scanner speed is half that of the 1st scanner.
- In reduction or enlargement mode, the scanning speed depends on the magnification ratio. The returning speed is always the same, whether in full size or magnification mode. The image length change in the sub scan direction is done by changing the scanner motor speed. In the main scan direction it is done by image processing on the BICU board.
- □ You can adjust the magnification in the sub-scan direction by changing the scanner motor speed with SP4-008.

ARDF mode

- The scanners always stay in their home position (the scanner HP sensor [F] detects the 1st scanner) to scan the original. The ARDF motor feeds the original through the ARDF. In reduction/enlargement mode, the image length change in the sub-scan direction is done by changing the ARDF motor speed. Magnification in the main scan direction is done in the BICU board. This is the same as for book mode.
- □ You can adjust magnification in the sub-scan direction by changing the ARDF motor speed with SP6-017.



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□ SP 4009 is only used for D160/D161/D170.



 $\hfill\square$ The laser unit is different from previous models in this series.



More on Laser Optics

□ The LSD (laser synchronisation detector) is part of the laser diode unit, and cannot be replaced separately.

Laser beam

□ There is only one in this model.

Automatic Power Control

Laser power is controlled automatically.

Shutter

□ There is no mechanical shutter to stop the laser beam.

Safety Switches

□ A safety switch stops power to the laser beam if the front or right cover is open.

Soundproof Glass

□ Reduces the effects of vibrations on the operation of the polygon mirror

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 $\hfill\square$ This section is similar to previous models in this series.





□ The ID sensor and quenching lamp are not included in the PCU.



PCU Details

□ The PCU contains the following.

- OPC drum
- Development unit (including development roller and TD sensor)
- Charge roller and charge roller cleaning brush
- Drum cleaning unit (blade, toner collection coil)
- Pick-off pawls

□ The PCU does not contain the following.

- Transfer roller
- ID sensor
- Quenching lamp
- Toner bottle

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 $\hfill\square$ This section is similar to previous models in this series.



More on Drum Charge Roller

- □ The charge roller is part of the PCU unit.
- □ The charge roller turns by friction with the drum.
- □ A charge roller does not generate much ozone, so there is no ozone filter







 $\hfill\square$ This section is similar to previous models in this series.



This machine uses a single-roller development system. Two mixing augers mix the developer. The toner density (TD) sensor and image density (ID) sensor (see the illustration in the PCU section) are used to control the image density.

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More on Developer Mixing

- □ Mixing does the following:
 - > Keeps the toner and developer evenly mixed
 - Prevents lumps from forming
 - > Helps create a triboelectric charge on the toner.
- □ The doctor blade splits the developer into the following 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.



More on Development Bias

- □ This machine uses a negative-positive development system, in which black areas of the latent image are at a low negative charge and white areas are at a high negative charge.
- To attract negatively charged toner to the black areas of the latent image on the drum, the high voltage supply board applies a bias to the development rollers throughout the image development process. The bias is applied to the development roller shaft [A] through the drive shaft [B].





More on Toner Bottle Replenishment

- □ When the bottle is placed in the machine, the shutter opens to allow toner to go into the development unit.
 - > The shutter mechanism is shown in the bottom right part of the diagram.
- □ Then, when the holder is released, the top of the bottle is pulled out.
 - > The holder mechanism is shown in the top left part of the diagram.







More on Toner Supply Input to the Development Unit

- □ Toner enters the development unit through the shutter.
 - This shutter is opened when a bottle is put in the machine, as explained earlier.
- □ Note where the new toner enters the development unit.
 - Recycled toner also enters through the same opening. The toner collection coil for recycled toner can be seen at the top right side of the drawing on the right hand side of the slide.
- □ Toner recycling is covered in the next section of the course.



There are four modes for controlling toner supply which can be changed with by SP 2921. The factory setting is SP2921 = 0.

Basically, the toner concentration in the developer is controlled using the standard TD sensor voltage (Vts), toner supply reference voltage (Vref), actual TD sensor output voltage (Vt), and ID sensor output data (Vsp/Vsg).

The Four Modes

- Sensor Mode 1: SP2921 = 0, Normal sensor control mode
- Sensor Mode 2: SP2921 = 1, Design use only (don't use)
- Fixed Mode 1: SP2921 = 2, Design use only (don't use)
- Fixed Mode 2: SP2921 = 3: Use temporarily if the TD sensor needs to be replaced.







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More on abnormal sensor conditions

ID Sensor

Readings are abnormal if any of the following conditions occur:

- Vsg 2.5V
- Vsg < 3.5V when maximum power (979) is applied
- Vsp 2.5V
- (Vsg Vsp) < 1.0V
- Vt 4.5V or Vt 0.2V

When this is detected, the machine changes the value of Vref to 2.5 V then does the toner density control process (in a similar way to sensor control mode 2).

No SC code is generated if the ID sensor is defective.

TD Sensor

The TD sensor output is checked every copy. If the readings from the TD sensor become abnormal, the machine changes the toner density control mode to fixed supply mode 2, and the toner supply amount per page is always 200 ms, regardless of the value of SP 2925 (toner supply rate). If the machine detects the TD sensor error condition 10 times consecutively, an SC code is generated (SC390) and the machine must be repaired.









 $\hfill\square$ This section is similar to previous models in this series.



More on Drum Cleaning

- □ This machine uses a counter blade, but no brush.
 - The blade scrapes toner off the drum, and a toner collection coil picks up toner from the top of the pile and carries it back to the development unit.
 - At the end of every copy job, the drum reverses for 5 mm to scrape toner off the edge of the cleaning blade.





More on Toner Recycling

- □ The slider with the two comb-like appendages on it is always vibrating.
 - > The comb-like appendages break up any blockages of toner.
- □ Note the two slots in the development unit.
 - > The one on the left receives fresh toner from the cartridge.
 - > The one on the right receives the recycled toner.
 - > New and recycled toner are mixed together in the development unit.
- Mixing auger 1 in the development unit mixes the recycled toner with fresh toner from the bottle.
- Toner adhering to the transfer roller is sent back to the drum, as we shall see in the Transfer section of the course. This toner is in turn recycled to the development unit. It may contain some small amounts of paper dust.





 $\hfill\square$ This section is similar to previous models in this series.



- □ The high voltage supply board supplies a positive current to the transfer roller, which attracts the toner from the drum onto the paper. The current depends on the paper width, paper type, and paper feed tray.
- □ The discharge plate is grounded.

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More on Transfer Roller Cleaning

- □ Toner may transfer from drum to transfer roller if:
 - A paper jam occurred
 - > The paper size is smaller than the printed image
- □ The transfer roller must be cleaned to prevent toner from being transferred from the roller to the back side of copies.
 - There is no mechanism, just the application of positive and negative current to transfer any adhering toner back to the drum.

The negative current pushes negatively-charged particles back to the drum.

The positive current pushes positively-charged particles back to the drum.

- Note that the roller is not cleaned before each job unless the setting of SP2-996 is changed from the default. This is to keep the copy speed as high as possible.
- □ The toner that transfers back to the drum is recycled with the other unused toner. Paper dust may also find its way into the toner because of this.





□ This section is different from the K-C3.5.





No additional notes







No additional notes



- [A] By-pass tray bottom plate
- [B] Pressure spring
- [C] By-pass tray bottom plate lift cam HP sensor
- [D] Actuator
- [E] By-pass tray bottom plate lift cam (Front and rear)
- [F] By-pass tray bottom plate lift cam clutch



□ When the paper tray is pulled out with no paper in the tray, the shape of the paper end feeler causes it to lift up.





More on Paper Size Detection

- □ The side guides contain ratchets that turn a gear wheel at the center of the sensor. The gear wheel contains terminals. The output of the sensor changes when the gear wheel rotates over the wiring patterns on the rectangular part of the width sensor.
- □ The bypass tray hardware only determines the paper width. The base copier hardware determines the length.



More on Side Fences

- If the tray is full of paper and it is pushed in strongly, the fences may deform or bend. This may cause the paper to skew or the side-to-side registration to be incorrect.
- □ Each side fence can be secured with a screw for customers who do not want to change the paper size.



More on Registration

- □ The paper feed clutch stays on slightly after the registration clutch turns off, so that the paper buckles against the registration roller.
 - > SP 1003 can be used to adjust the amount of buckling.
- □ The paper feed clutch can come on again to help paper feed get started after registration. This is a good idea if there are frequent jams at the registration roller just after registration.
 - These jams occur when the paper jumps over the registration instead of going between them. The clutch comes on again for certain paper types, such as thick paper, to try to push the paper between the rollers.
 - > SP 1903 adjusts this feature.
 - In lab tests, this problem was not found when feeding from tray 1. So there is no adjustment for tray 1.



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 $\hfill\square$ This section is similar to previous models in this series.

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Components

- 1. Paper exit roller
- 2. Exit sensor
- 3. Hot roller strippers
- 4. Pressure roller
- 5. Pressure spring
- 6. Fusing lamps
- 7. Thermistor
- 8. Thermostat
- 9. Hot roller





More on Automatic Release

Pressure release when the cover is open

□ The drive gear releases when the cover is open, so that jams can be removed.

Pressure release during warm-up

- During warm up (just after the main power is switched on, or from standby/energy saver mode), if the temperature is above 18°C, the solenoid turns on and disengages the drive gear, which cuts the drive to the fusing unit.
- □ If the solenoid is off, the drive gear is engaged, and the hot roller turns whenever the main motor is on. When the hot roller turns, it will be cooled down by the pressure roller. So, the machine will take longer to detect the standby temperature.
- □ However, when the machine is cold (below 18°C), the hot roller turns so that it will warm up evenly. Then, at 18°C, the roller will stop turning.



More on Entrance Guide Shaft

- □ The entrance guide can be moved to prevent creasing.
- □ Moving the guide to the right feeds the paper more directly to the gap between the two rollers.









- □ Target temperature depends on paper type and can be adjusted with SP 1105.
 - Thin: 135C
 - Plain 1: 145C
 - Plain 2: 155C
 - Medium Thick: 160C
 - ➤ Thick: 175C





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Overheat Protection □ Three levels of overheat protection Normally, the primary level can fully protect the hardware. The second works as the fail-safe feature for the first one. The third works as the fail-safe feature for the second one. **Primary Level:** • If the fusing temperature reaches 230°C (or higher) and stays so for one second, the controller turns the fusing lamp off. In a case like this, SC543 or SC553 shows. □ Second Level: If the fusing feature reaches 250°C, the controller cuts off the 24V line. (The fusing lamps are on the 24V line.) □ Third Level: · Two thermostats are attached on each line of the two fusing lamps. (four thermostats in total). One of the two thermostats cuts the power supply to the fusing lamp at 179°C, and the other cuts the power supply at 180°C. (Note that the thermostat temperature is somewhat lower than the fusing temperature.) Slide 137



 $\hfill\square$ This section is similar to previous models in this series.

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- $\hfill\square$ This section is similar to previous models in this series.
- □ The D170 does not have a duplex mechanism, and it is not an optional unit for this model. The other models have duplex built in as standard equipment.



More on Overview

- □ The duplex unit consists of an inverter table above the copy exit, and a duplex unit attached to the right side of the machine.
- □ The duplex unit is in the B269/B244 models only









More on Duplex Feed Path

- While the paper is being fed towards the duplex unit, the junction gate goes back to the normal position, to make sure that the paper goes to the duplex unit and not directly down to the fusing unit.
- □ If there are two or more copies being made with A4/8½" x 11" or smaller, the next sheet waits at the registration sensor for the current sheet to exit the inverter.






PURPOSE OF THIS SECTION

□ The optional ARDFs will be described. The D724 is similar to the unit used with the Or-C1 and At-C3 series copiers. The D684 is also very similar, but there are some differences which will be explained on the way through.

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- □ The non-contact scanning method of the D684 ARDF reduces vertical streaks caused by adhesive contaminants.
- □ However, some customers may have more trouble with non-adhesive contaminants. In such cases, it is possible to convert the D684 ARDF to a contact scanning method.
- □ The procedure is in the field service manual (Troubleshooting Image Quality Problems).



- □ The machine cannot detect more than one original width in the same job. But there is a mixed original-length mode, as explained later in this presentation.
- □ Note the functions of the following components:
 - Original sensor: During one-to-one copying, copy paper is fed to the registration roller before scanning, to increase the copy speed. The sensor monitors the stack of originals in the feeder, and detects when the trailing edge of the last page is fed in. This stops paper feed before the next sheet is fed.
 - Original width sensor: Uses an electrode plate, with terminals attached to the document guides. The sensor output changes when the user moves the guides to align with the document width. Because of this, the incorrect width is detected if the user does not put the guides in the correct position.
 - The DF position sensor only detects when the DF is opened. The platen cover sensor triggers the APS sensors.





SP 5126

□ Use SP 5126 to control the size that is detected for the 'F' sizes, which are very similar (8½ x" 13", 8¼" x 13", 8" x 13"), and cannot be distinguished by the sensors.

SP 6016

□ There are 8 bits. Each bit represents two paper sizes that are almost the same. Select 0 or 1 to decide which paper size the machine detects from that pair.



- □ This explains what occurs if the user selects mixed original-length mode.
- Normally, in mixed original-length mode, original length is detected as shown below:
 - The width is detected with the same procedure that is used when all originals are the same size.
 - The machine keeps an area in memory that is sufficient for an original of the detected width and 432 mm length.
 - Printing is done after length detection, and only the part of the memory that contains data up to the detected original length is printed.
- But, if some functions are selected (for example, Auto Reduce/Enlarge), the length must be detected before image scanning starts. Because of this, the machine must measure the length before scanning.
 - It must also make sure that the originals are in the correct sequence before scanning. Because of this, the 3 steps in the manual are done.
 - If the original is duplex, the original is inverted again after scanning the first side. Then the second side is scanned, and the paper is fed out.
- □ Why must the machine measure length first when we use Auto Reduce/Enlarge, Centering, and other functions?
 - With these functions, the machine must know the length of the original accurately.
 - For example, with centering, the image is centered on the copy paper. This cannot be done if the machine does not know the length of the original accurately.
 - Also, with Auto Reduce/Enlarge, the size of the original's image is decreased to fit on the copy paper. This cannot be done if the machine does not know the length of the original accurately.



- Main points about the mechanism
 - The feed motor has two speeds. It feeds the first original to the glass quickly, but is slower for scanning (the speed during scanning is set by the reproduction ratio).
 - The original sensor detects the trailing edge of the last original, before the original set sensor does.
- □ The original set sensor detects if an original is in the feeder. Why not use that sensor? Why is one more sensor necessary?
 - In this machine, the copier feeds copy paper into the machine first, to increase the copy speed. The original sensor tells the copier that there are no more pages to be scanned. The copier can then stop paper feed.
 - Look at the component diagram. The original set sensor is near the scan line, to tell the cpu that an original is in the feeder and is ready to be scanned. This is too far into the machine to tell the cpu sufficiently early to stop the next sheet of copy paper.
 - The original sensor is much nearer to the trailing edge of the stack. This gives sufficient warning to the cpu when the last page of the original is fed in.
- □ Note the functions of the following components:
 - Original sensor: During one-to-one copying, copy paper is fed to the registration roller before scanning, to increase the copy speed. The sensor monitors the stack of originals in the feeder, and detects when the trailing edge of the last page is fed in. This stops paper feed before the next sheet is fed.
 - Original width sensor: Uses an electrode plate, with terminals attached to the document guides. The sensor output changes when the user moves the guides to align with the document width. Because of this, the incorrect width is detected if the user does not put the guides in the correct position.
 - The DF position sensor only detects when the DF is opened. The platen cover sensor triggers the APS sensors.



□ The one-way clutches in the ADF mechanism allow the feed motor to have different effects when rotating forwards and in reverse.





- □ The machine scans the original through the DF exposure glass.
- □ The original stops at the registration sensor. But, there is no skew correction at this time (this is because the feed motor in the ADF stops). The original stops here for timing, to feed the original at the correct time to synchronize with the remaining part of the copy process.





□ The main points are on the next 4 slides.











Stamp (Fax and Scanner) □ This is used in fax mode or in scanner mode. □ The original is stamped if TC. the original was sent. • For memory transmission and scanning, the original is stamped if it is stored successfully. □ SP 6-010: This setting adjusts the stamping position. To do this, it detects when the transport motor stops. Slide 163







PURPOSE OF THIS SECTION

- □ The mechanisms in the optional one-tray paper feed unit will be described.
- $\hfill\square$ It is similar to the paper tray unit used with the Di-C1 series.





- □ There are two motors, one to lift the bottom plate and one to drive the rollers.
- □ There are no clutches.
- □ The feed roller is part of the tray.
 - > When the user pulls out the tray, paper caught between the feed roller and friction pad does not remain jammed inside the machine.



- □ This mechanism has two purposes:
 - > To lift the stack to the paper feed height.
 - > To apply a suitable paper feed pressure.
- □ This slide shows how the shafts engage when the tray is pushed into the machine.



- □ This slide shows how the tray is lifted.
- □ The lift motor turns on, and turns clockwise as viewed on the diagram.
 - The main pressure spring pulls the bottom plate pressure lever, and this lifts the tray bottom plate.
- □ When the top of the stack touches the feed roller, the motor cannot pull up the plate any more, so it pulls the actuator into the lift sensor.
 - The pressure of the feed roller on the paper is now too high, so the lift motor now reverses to reduce this pressure. It reverses for 200 ms or 600 ms, depending on the paper size. For smaller paper, it reverses the larger amount (600 ms) to reduce the pressure more.
- □ Finally, when the tray is pulled out, the lift motor reverses for 1.7 ms. This makes it easier to put the tray back.





- Note that these sensors are not used unless the optional printer controller has been installed. Then the current status can be viewed from the driver. Note that this feature is only available for the optional paper tray units.
- □ The two paper height sensors [A, B] detect the amount of paper in the tray.
- □ The actuator is attached to the bottom plate pressure lever.
- □ The lift motor rotates to increase the feed pressure when the remaining paper falls below a certain amount.
 - When the tray contains paper of a small width, the paper feed pressure may become too low when the thickness of the remaining stack of paper has decreased. To counteract this, the lift motor rotates forward for a short while after the remaining paper falls below a certain level. This increases paper feed pressure, simulating the pressure generated by a full tray.





- □ Only the length is detected directly.
- □ The actuator has patterns of studs on the rear.
- □ These studs turn the paper size sensors on/off.
 - > This also tells the cpu that the tray is in the machine.
 - > For a paper size detection table, see the D331 service manual.
 - If other paper sizes are used, they must be selected with a user tool: System Settings - Tray Paper Settings - Tray Paper Size (Tray 3, Tray 4).



- If the tray is full of paper and it is pushed in strongly, the fences may deform or bend. This may cause the paper to skew or the side-to-side registration to be incorrect.
- □ Each side fence can be secured with a screw, for customers who do not want to change the paper size.





- □ In this section, you will study the mechanisms of the optional paper feed unit.
- □ This is similar to the paper tray unit that is used with the Di-C1.





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 - > To lift the stack to the paper feed height.
 - > To apply a suitable paper feed pressure.
- □ This slide shows how the shafts engage when the tray is pushed into the machine.



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- □ Each side fence can be secured with a screw, for customers who do not want to change the paper size.





 $\hfill\square$ This is a new unit, but it is very similar to previous models.







Feed Mechanism Exit rollers □ At a fixed time after the first sheet of paper passes the copier's registration sensor: • The tray motor turns on to drive the exit rollers • The junction gate solenoid turns on to open the junction gate. □ After the last sheet has C been fed out past the exit sensor: • The tray motor stops **Junction gate** Slide 188



More on Paper Detection

- □ If the paper source is the bypass tray, the output will not go to the one-bin tray, even if the user specified that this type output should go to that tray.
- □ This is because the one-bin tray cannot handle thick paper, which the bypass tray can feed.









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