

- □ This course assumes that you know the AT-C1 (B230 series) colour copiers. If you do not know this machine, you should either:
  - > Take a full course on the AT-C1 before you do this course
  - > Do a full course on the Di-C1.

Date of change	Version History	Description
17-11-2008	1.1	Changed slides 18, 26, 35, 42, 53, 85, 94, 121, 124, 127, 128, 129 (this slide was added), 130 (now 131), 137 (now 132), 138 (now 139), 146 (now 147), 149 (now 150), 151 (now 152), 152 (now 153), 155 (now 156) Numbering in titles of slides 130 to 132 was changed due to insertion of new slide 129





- □ H model: High-end model
- L model: Light model
- □ The Di-C1La/c do not have the following printer features:
  - Sample Print
  - Locked Print
  - ➢ Hold Print
  - Stored Print
  - Store and Print
  - Mail to Print
  - PDF Direct Print
  - > 1200 dpi Support
  - Mobile Driver
  - Bonjour (Rendezvous) Support
  - Wireless LAN Interface Option
- Fax
  - The fax option for the Di-C1a/c is different from the fax option for the Di-C1La/c.
  - The specifications are different. For details, see the Fax section of the course.



- □ Here is a view of the machine with some optional peripherals installed.
- $\square$  There are other options, as we will see later.
- □ ADF is standard equipment.
- □ The finisher can be installed without the punch unit.



- □ The duplex unit is not visible in this photo.
- ADF is standard equipment for Europe and North America; option for Asia and China
- □ The display is similar to the K-C3. The K-C3 is a target model for B-to-C replacement.



□ This chart shows the position of the Di-C1 in the product line-up.





□ There are also a lot of connectivity features, which we will not explain in this class. We will limit ourselves to the engine in this course.





- □ This slide shows what you get with the base machine.
- □ Note that the printer/scanner is standard equipment for this model.

# Paper Handling Options – Di-C1a/c



- You can install one of the following paper feed options
  - One-tray paper feed unit (requires the caster table, or the machine cannot be moved around)
  - Two-tray paper feed unit
- □ You can install the following finishing/output options:
  - > Shift tray and/or one-bin tray (you can install both of these if you wish)
  - Internal finisher

If you install the internal finisher, you cannot install the one-bin tray or shift tray.

If you install the internal finisher, you can install the side tray to receive fax outputs, instead of the one-bin tray.

The side tray can be installed with any of the other finishing options at the same time.

Paper feeds out to the side tray face down. First the paper goes out towards the standard tray, then it switches back to the right side of the machine and out to the side tray, face down.

#### Paper Handling Options – Di-C1La/c L model DI-C1L mainframe includes: Auto Duplex Unit Bypass Tray 250 sheets x 2 NEW Side Trav 1bin Tray NEW 0 ο Note) ARDF and Platen will be provided as options for Asia Pacific region and China regio 500 x 1 paper bank Caster Table \*The Caster Tray is mandatory on 500 x 1 pag 500 x 2 paper bank Slide 12

- □ You can install one of the following paper feed options
  - One-tray paper feed unit (requires the caster table, or the machine cannot be moved around)
  - > Two-tray paper feed unit
- □ You can install the following finishing/output options:
  - > One-bin tray
  - ➢ Side tray
  - > There is no shift tray or finisher.
  - > The side tray can be installed with the one-bin tray at the same time.
- □ There is no USB/SD card option.







D037-17 is the USA model of the Di-C1La (20 cpm model)



D PCL Module option: This is standard for the Di-C1a/c.











- Files saved on a removable memory device will not appear in the list of stored files.
- Files saved on a removable memory device cannot be printed or sent using the machine's operation panel. To perform operations on files saved on a removable memory device, you must use an application on a client computer.
- You cannot specify where the data is saved. Files are saved in the root directory of the removable memory device.
- □ If the removable memory device is partitioned, files are saved on the first partition.

#### **Di-C1** Training

### **RICOH**





#### **Di-C1** Training

Reso	lution			
+ Sc	can: 60	0 dpi		
• PI	IIIL.			
	Copy	Color	600 dpi 4bit	600 dpi 4bit
		B&W	600 dpi 1bit	600 dpi 4bit
		•		1200 dpi 1bit
	Print		600 dpi 2bit/1bit	600 dpi 2bit/1bit
🗆 Maxii	mum C	Drigina	I Size: A3/11" 3	<b>&lt; 17</b> "

- $\hfill\square$  The next few slides show the basic engine specifications.
- □ For more detailed specifications (for example, scanner, printer, fax), see the service manual.

<section-header><section-header><section-header><list-item><list-item><list-item><list-item><list-item><list-item><list-item>

#### **Print Paper Size**

□ For details, refer to "Supported Paper Sizes" in the service manual.

#### **Paper Weight**

- From tray 1, DI-C1 supports thick paper (the same paper weight as AT-C2). Paper weight is a key spec for low segment colour MFP users.
- □ Why is there such a big difference between the trays for paper weight?
  - > Tray 1 has a belt mechanism that assists feed for heavy paper.



□ Standard exit tray: There is no tray full sensor.



- Warm-up time: The new toner melts at a lower temperature, so warm-up is quicker.
- □ Copy speed: Middle thick also 20/25 cpm.



□ The fax option has an additional memory module. The purpose is explained in the Fax section of the course.

Thick	Paper	Prod	uctivity

Thin Paper         52-59.9         20         20         25           Plain Paper 1         -74         20         20         25           Plain Paper 2         -90         20         20         25           Middle Thick         -105         20         20         25           Thick Paper 1         -169         12.5         12.5         12.5           Thick Paper 2         -210         12.5         12.5         12.5	25 25
Plain Paper 1         -74         20         20         25           Plain Paper 2         -90         20         20         25           Middle Thick         -105         20         20         25           Thick Paper 1         -169         12.5         12.5         12.5           Thick Paper 2         -210         12.5         12.5         12.5	25
Plain Paper 2         -90         20         20         25           Middle Thick         -105         20         20         25           Thick Paper 1         -169         12.5         12.5         12.5           Thick Paper 2         -210         12.5         12.5         12.5	1
Middle Thick         -105         20         20         25           Thick Paper 1         -169         12.5         12.5         12.5           Thick Paper 2         -210         12.5         12.5         12.5           Thick Paper 2         -210         12.5         12.5         12.5	25
Thick Paper 1         -169         12.5         12.5         12.5           Thick Paper 2         -210         12.5         12.5         12.5           Thick Paper 2         -210         12.5         12.5         12.5	25
Thick Paper 2         -210         12.5         12.5         12.5           Thick Paper 2         -210         12.5         12.5         12.5         12.5	12.5
	12.5
Thick Paper 3 -256 12.5 12.5 12.5	12.5
OHP, 1200dpi printing _ 12.5 12.5 12.5	12.5

### **Copier Specifications**

	Model DI-C1L	Model DI-C1
ACS	х	0
Mixed Sizes Originals Mode	Х	0
Advanced Reduce/Enlarge Copying	Х	0
Advanced Copier Functions	х	0
(Booklet/Magazine, Covers, Stamps, etc.)		
Electrical Sort	O (Only B&W)	0
Staple/Punch	Х	O (With Finisher)

- □ X: Not available
- O: Available
- ACS: This refers to the machine's ability to detect whether the original is b/w or colour (the L model cannot do this; the user must specify at the operation panel). It does not refer to the motion of the transfer belt away from the CMY drums for black-and-white pages.

#### Di-C1 Training

### **RICOH**

### Scanner/Fax Specifications

	Model Di	-C1L Model DI-C1
Scan to functions	х	0
Document Server (Local Storage)	х	0
LAN FAX	0	0
	(No print fu	nction)
Internet FAX	х	0
IP FAX	х	0
FAX forwarding Solution	x	0

- □ X: Not available
- O: Available

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### **Printer Specifications (1)**

	Model DI-C1L	Model DI-C1
Printing Module	Built in standard	Built in standard
Controller CPU	RM5231A-400MHz	RM7035C-533MHz
Print Speed	C1La: FC 20ppm/ BW 20ppm	C1a: FC 20ppm/ BW 20ppm
(A4/LT LEF)	C1Lc: FC 25ppm/ BW 25ppm	C1c: FC 25ppm/ BW 25ppm
Memory Capacity	512MB (Standard and Max)	Max: 1GB (Standard: 756MB,
		Option: 512MB)
HDD	Not Available	Standard : 60GB
Supported Printer	Standard : RPCS	Standard : RPCS, PCL5c, PCL6
Language	Option : PCL5c, PCL6	Option : Adobe PostScript3
Standard I/F	Ethernet (100 base-TX/10 base-T)	Ethernet (100 base-TX/10 base-T)
	USB2.0 Host, USB2.0 Device	USB2.0 Host, USB2.0 Device
Optional I/F	Not Available	IEEE1284/ECP
		IEEE802.11a/g, g, WPA support
		Bluetooth
		Ethernet 1000 base-T

- Print speed is one-half of the above specification when 1200 x 1200 dpi is selected.
- Memory: Standard is 768MB (2 slots, 512MB + 256MB) and max is 1GB (2 slots, 512MB + 512MB) where optional 512MB replaces the standard 256MB.



# **Printer Specifications (2)**

Network Protocol		TCP/IP(IPv4_IPv6)_IPX/SPX
		AppleTalk
Print Resolution	600 x 600 dpi / 1bit	600 x 600 dpi / 1bit
	600 x 600 dpi / 2bit	600 x 600 dpi / 2bit
		1200 x 1200 dpi / 1bit
Sample Print,	Not Available	Available
Locked Print,		
Hold Print, Stored		
Print, Store and		
Print		
Chaptering	No	Yes





### **Product Comparison**

655 x 725 85 600 - 256 600	670 x 671 x 760 110 600 1200 297 x 600 60 - 256 1200	587 x 568 x 558 47 600 52 - 162
85 600 - 256 600	110 600 1200 297 x 600 60 - 256 1200	47 600 52 - 162
600 - 256 600	600 1200 297 x 600 60 - 256 1200	600 52 - 162
600 - 256 600	1200 297 x 600 60 - 256 1200	600 52 - 162
- 256 600	297 x 600 60 - 256 1200	52 - 162
- 256 600	60 - 256 1200	52 - 162
600	1200	000
		600
600	4400	1600

□ Dimensions and weight are shown for the machine without options installed.



## **Product Comparison**

	Di-C1	Di-C1L	AT-C2a/b	K-C3cd
Copy Speed (A4/LT LEF, cpm)	C1a: 20/20	C1La:	BW: 28/33	BW: 20
	C1c: 25/25	20/20	FC: 28/33	
		C1Lc: 25/25		
1 <sup>st</sup> Copy Speed (seconds)	BW: 6.5 FC: 9.5		BW: 5 FC: 8	BW: 6.5
Warm-up Time (seconds)	Less than 30		45	26
Multiple Copying	1 - 999		1 - 999	1 - 99
Duplex	Stan		dard	
Hard Disk Capacity (GB)	60	No HDD	80	No HDD
Memory (MB)	Std: 768 Max 1024	Std: 512 Max: 512	Std: 1024 Max 1024	Std: 384 Max 384
Optional Finisher	Yes	No	Yes	No





There are two waste toner bottles: drum unit, and image transfer belt. Replace both at the same time.

**Yield Targets** □ Toner Target Yield (A4/LT, 5% coverage) » Black: 10K outputs/cartridge » Cyan / Magenta / Yellow: 5.5K outputs/cartridge Developer Pre-installed in the machine at the factory, and pre-installed in each development unit spare part. » Europe, USA Di-C1a/c: The heat seal is also removed at the factory Under normal conditions, the life of the developer is the same as the machine, so it is not necessary to replace. • No SP needed at installation. Initialization is done automatically after power is switched on for the first time. □ Staples • 5,000 staples per cartridge Slide 36

- □ The toner bottles are not compatible with other products.
  - The toner is the same as the AT-C2, but the shape of the cartridge is different.
- □ The staple refill cartridges are not compatible with other models.




Service manual, Appendix, Maintenance Tables





## PCDU

- □ This contains the drum unit and the development unit.
- The development unit contains the new unit detection mechanism for the PCDU.
  - $\succ$  It uses the ID chip.
- □ So, if you replace the PCDU, or the development unit only, the machine detects the new unit automatically and resets the counters.
  - If you replace the development unit only, set 3902 001 (K), 002 (C), 003 (M), or 004 (Y) to 1 before you switch off the machine. If you forget this, then the drum counters will be reset when you turn the machine on again.
- But if you replace the drum unit only, then you must reset the counters (see the next slide).

### **Toner Collection Bottles**

- □ If the bottle is full or near-full, the counters are reset when the bottle is replaced or emptied.
  - > The counters are reset after the cover is closed.
- But the counters are not reset if you replace a bottle that is not full or nearfull. You must reset the counters manually (see the next slide).

## **RICOH**





RICOH

Service manual, Preventive Maintenance, PM Parts Settings

Study the 'Before removing the old PM parts' and 'After installing the new PM parts' procedures in this section of the manual.



- Service manual, Preventive Maintenance, PM Parts Settings
- □ Ask the class to study the 'Preparation before operation check' procedure in this section of the manual.









- □ In the following models, the tape is removed at the factory.
  - > Europe: All models
  - > USA: Di-C1 a/c









When you turn on the machine, it is not necessary to check if the cover is open or closed.

Appendix, Process Control Error Conditions

□ SP 3014 001: A code is displayed. See the above section of the service manual for details.



D037-17 is the USA model of the Di-C1La (20 cpm model)







## ALSO

## You must lift the copier and put it on top of the paper tray unit.

- □ Always lift with two persons. The copier is too heavy for one person.
- Do not try to lift the copier with the paper tray unit installed. You will damage the lifting handles.

















□ Joint pins: Two red arrows



# **RICOH**





## **USB/SD Slot**

After you install this unit, it must be enabled with an SP mode (see the installation procedure for details).

- Test the operation of this device after installation.
  - Try to scan a document and store it to the SD card or USB memory device.

## Procedure for storing a file on an SD card/USB device

- □ 1.Insert an SD card or USB memory device in the slot.
  - > You can connect only one removable memory device at a time.
- □ 2.Close the media slot cover.
  - If you leave the cover open,static electricity conducted through an inserted SD card could cause the machine to malfunction.
- □ 3.Make sure that no previous settings remain.
  - > If a previous setting remains, press the [Clear Modes] key.
- □ 4.Place originals.

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- **5.Press** [Store File].
- □ 6.Press [Store to Memory Device].
- **7.Press** [OK].
- □ 8.Press the [Start] key.
  - > When writing is complete, a confirmation message appears.
- □ 9.Press [Exit].
- □ 10.Remove the memory device from the media slot.
  - > Do not remove the memory device while writing is in process.





# **RICOH**



# **RICOH**



□ The browser unit SD card is linked to its machine (the machine serial number is registered on the SD card). So a card that has already been installed on one machine cannot be used on another.

# **RICOH**





- □ The photograph shows the Di-C1a/c, with two slots. The slots are the same in function, but you should use the right-hand slot for the USB/SD option.
- □ If you connect the USB/SD option to the left-hand slot, the cable will prevent the user from connecting a camera to the other slot.









## **RICOH**





# IEEE802.11a/g, g Interface (2)










- □ This is a view of the internal structure of the machine.
- □ There are 4 OPC drums.
- Laser beams write latent images on the drums. There is one laser beam for each drum.
- Four toner images are transferred from the OPC drums to the image transfer belt, on one rotation of the belt.
- □ At the paper transfer unit, the four toner images are pushed off the belt onto the paper.
- □ The paper feeds up to the fusing unit, and out of the machine.

## In the AT-C1 series, the order of drums from left to right is YCMK. In the Di-C1 it is YMCK. Why?

- □ K is always at the right end, because it must always contact the transfer belt, which moves away from the colour drums for black-and-white pages.
- ☐ Y is always at the left end, and is the first to be deposited on the belt. The first toner to be deposited has more chance to move around on the belt. If yellow toner moves around on the belt, there is less of an image problem than with M or C, because it is less visible.
- □ The order of M and C depends on the designer's concept for the engine.



□ Other mechanisms are basically the same.



- □ This shows the path of paper through the machine, with no optional paper handling units installed.
- Demonstrate the following feed paths on the diagram.
  - > Up from the paper feed trays
  - > In from the bypass tray
  - > Out at the top of the machine (to the standard output tray)
  - > To the duplex unit, via the inverter



- □ This shows the path of paper through the machine, with the optional finisher, side tray, and paper feed unit (2-trays) installed.
- □ When the finisher is installed, paper feeds out through the top of the finisher to the proof tray, if finishing is not selected.
- □ If finishing is selected, paper follows the dotted line in the diagram, and feeds out to the proof tray also.
- If the finisher is installed, and duplex is selected, the paper goes below the finisher before it is fed to the duplex unit (see the dotted line below the finisher).



- □ This shows the main motors in the machine.
- □ Notes:
  - The PCDU for K has one motor to drive the drum and development unit. Because of this, there is a clutch to start/stop the development unit for K.
  - For CMY, the drum drive motor CMY drives the three drums, and the development drive motor CMY drives the three development units. There are no development clutches for the three colours.



# Ventilation and Cooling





- □ This shows a schematic of the electrical layout of the machine.
- □ The orange line through the centre from the SBU to the LDB is the flow of image data through the machine.
  - > The CCD (Charged Coupled Device) generates analog RGB signals.
  - The SBU (Sensor Board Unit) converts the analog RGB signals to digital signals. It sends these signals to the iCTL board.
  - The iCTL board processes the image. Then the CMYK image data goes to the laser diode drivers.



 $\Box$  Here, the controller box is closed.



- $\Box$  Here, the controller box is open.
- □ HVPS: CB Drum charge and development bias
- □ HVPS: TTS Image transfer



□ iCTL: IPU + Controller

#### **Di-C1** Training









- The process speed is the feed speed from registration roller to the fusing unit.
- The process speed affects various machine parameters, as can be seen if you take a quick look through the SP tables.
- The process speeds for the two models are the same, but the print speeds at 120 mm/s are different for each model. This is because the gap between sheets is shorter for the faster model.
- □ What is 'middle thick paper'? 82 105 g/m2 (22 28 lb.)













- When the ADF is opened, the scanner carriage moves 30 mm from the home position.
- Then, when the ADF is closed, the exposure lamp turns on and the CCD detects the paper width.
  - The lamp turns on when the platen cover sensor detects that the cover is being closed.
  - If the cover stays open during copying, the CPU checks the original size when the Start key is pressed.
- □ When feeding with the ADF, the width and length sensors in the ADF detect the original size.





#### □ Main Exposure Glass

• Position the marker at the front-left corner.

#### □ ADF Exposure Glass

• Position the white marker at the rear-left corner.

No additional notes

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Laser scan synchronization for C and M are explained in the notes on the next slide.



- Main scan synchronization for cyan is calculated by the CPU, based on the reading for K (black).
- Main scan synchronization for magenta is calculated by the CPU, based on the reading for yellow.



The 2nd mirror positioning motors for magenta, cyan, and yellow adjust the angle of the 2nd mirror for these three colours, based on the 2nd mirror position for black.

#### Di-C1 Training

### **RICOH**



 $\hfill\square$  The other two fans in this diagram are for the development unit.



□ The SP mode numbers are different from the Athena-C1.









□ Waste toner collection is described later in this section.





- The red circle shows the significant changes in PCDU structure since the AT-C1.
- □ In the AT-C1, the cleaning roller is to the lower right of the charge roller, and the development unit is deeper.
- □ Lubricant application blade: The cleaning blade spreads the lubricant.



□ This slide allows you to compare the two models.



- The gears at the end of the drum drive the toner collection coil inside each drum unit.
- □ The transfer unit has a separate bottle for collecting waste toner.
- □ The mechanism is similar to the G-P3.
  - In the AT-C1, toner from all four drums is collected in one coil before it goes to the bottle. In the G-P3/Di-C1, there are four openings in the bottle, and toner goes directly from the drums into the bottle, and is distributed by coils inside the bottle.



- □ Di-C1: 2000 copies can be made after near-full detection.
- □ At-C1: 500 copies
- Bottle full is detected by estimating toner coverage since near-full was detected. It does not count 2000 sheets.



- Under normal conditions, the life of the developer is the same as the machine, so it is not necessary to replace.
- Do the ACC procedure after developer initialization. This ensures that the machine's colour characteristics are maintained.

Appendix, Process Control Error Conditions

□ An explanation of the codes displayed by SP3014 001 is in this section of the service manual.




# New Unit Detection (1) The TD sensor assembly contains the ID chip. This chip tells the machine if the PCDU or development unit is new or not. When the machine detects a new PCDU or development unit, the machine automatically does the following: PM counter clear for items related to the PCDU Developer initialization Charge roller voltage control Process control Line position adjustment





### Summary

- □ If you replace the PCDU, do not change SP 3902
- If you change only the drum unit, set SP 3902 009 (K), 010 (C), 011 (M), or 012 (Y) to 1 before you start to work on the machine.
- If you change only the development unit, set SP 3902 001 (K), 002 (C), 003 (M), or 004 (Y) to 1 before you start to work on the machine.





□ This mechanism is the same for each of the four toner bottles in the machine.







□ This slide shows how toner is supplied from the toner bottle.



### **Di-C1** Training



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- This occurs when the bottle is empty, but a small amount of toner remains in the sub hopper.
- The TD sensor detects toner end (same as AT-C1). The toner end sensor continues to check for toner in the hopper, and if it detects toner, the toner end condition is cancelled.
- The two counter values on the slide are stored in the RFID chip on the toner cartridge, and copied to the NVRAM on the BCU.
- The toner end sensor is a fail-safe in case the two counters do not detect near-end correctly. However, 100 sheets is not much time before the toner runs out.



- □ If set to 1, there is no toner in the toner cartridge at the near end condition. The customer can change the bottle immediately.
- If the setting is 0, there may still be toner in the bottle when near-end occurs. Some toner is wasted if the customer changes the bottle immediately. However, the customer has some time to get a new toner cartridge.



□ The above points are different from AT-C1.

- Do not replace the toner end sensor in the field.
  - This sensor is part of the toner hopper unit. Replace the complete toner hopper unit instead. Otherwise, carrier will spill out onto the floor, and will not be present in the hopper after reassembly.
  - > The sensor is not supplied as a spare part anyway.







- The waste toner collection bottle in the ITB unit is separate from the bottle for the drums.
- □ The reverse rotation at the end of the job is also done for the OPCs at the same time, for the same purpose.



- □ This slide shows the AT-C1 for comparison.
- $\hfill\square$  The brush that is shown in a red circle is not used in the Di-C1.

### **Di-C1** Training

### **RICOH**









- When the machine is not being used, the PTR moves away from the transfer belt. If this is not done, the belt becomes damaged (bent, stretched, warped) where the PTR contacts it. This causes copy quality problems, such as horizontal white lines.
- During line position adjustment and process control, patterns are developed on the transfer belt. The PTR is moved away from the belt at this time, or the PTR will remove the patterns before they get to the ID sensors. This also means that the PTR will get dirty.



It is not necessary initialize the ID sensor with SP 3321 after a new ID sensor is installed.







- □ AT-C1: The ITB unit is removed from the front of the machine.
- □ Di-C1: The ITB unit is removed from the right side of the machine.





Normally, the waste toner collection bottle is replaced at the same time as the ITB cleaning unit. But a separate SP has been provided in case it is occasionally necessary to replace them at different times.













- □ The two lamps in the heating roller are in one assembly, and are removed together.
  - In the heating roller, one lamp heats the center and the other lamp heats the ends.



□ This slide shows the At-C1 for comparison.



- □ Here is a three-dimensional drawing of the fusing unit.
- □ The thermopile detects the temperature at the center of the fusing unit, and the thermistor detects the temperature at the end.



□ Here is the At-C1 for comparison











- □ This is a new adjustment (not used in At-C1).
- It is recommended that a setting lower than -0.25% should not be used. Otherwise. some types of thin paper could become creased, and there are no separate settings for different paper types.
# <section-header><section-header><list-item><list-item><list-item><list-item><list-item><list-item><list-item><list-item><list-item><list-item>

### **Cleaning the Entrance Guide Plate**









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- During a job: This process control is longer than other process controls; it takes 40 seconds
  - At 14 pages, a flag is set. This flag is checked every 5 pages. Then, if a condition occurs that requires process control, and the flag happens to be set, process control is done.

If the flag is checked every 5 pages, why is the first check at 20 pages and not 15 pages? The machine does not have time to prepare for process control between page 14 and page 15. So process control is done at the next 5-page interval (page 20).

> AT-C1: The flag is checked every 30 sheets.





- □ For 1200 dpi/OHP/Thick paper mode, it is always approx 30 seconds.
- However, toner adjustment mode can add anything up to an extra minute, depending on the conditions.

### Comparison with AT-C1:

- For process control that is done just after a print job, note that the time is reduced to 11 seconds (for full colour) or 6 seconds (for black-and-white jobs). For the AT-C1 it was always 20 seconds.
- □ Why is it quicker? The sensor pattern is made while the last page of the job is still feeding out of the machine. In the AT-C1, the machine waits until the paper is completely fed out before the patterns are made. Also, for black and white, the Di-C1 only makes the black sensor pattern. Also, in the AT-C1, there are 10 patterns per colour, but in the Di-C1 there are only 5 patterns per colour.



MBD control mode is a new one. It was not used in Athena-C1/C2. See the next slide for more detail.



- Use SP 3-044 if the TD sensor and/or ID sensor breaks and no spare part is available.
- □ After replacing the part, return the SP setting to the default.
- MBD (Model Based Differential) is similar to PID mode, except the formula is different, and tuned for each model. PID uses the same formula for each model, so MBD is more accurate in theory.







□ Belt assisted feed: See the next slide.

### **Di-C1** Training

### **RICOH**





- □ This slide shows the AT-C1 for comparison
- □ Also, in the Di-C1, the duplex and bypass do not share the same roller.
- $\hfill\square$  There is no belt-assisted feed.





□ AT-C2 has the length sensor.





 $\Box$  In the Di-C1, there is no tray lock at the rear.



















 $\hfill\square$  We will discuss the inverter in the Duplex section of the course.







□ This diagram shows the junction gate configuration when paper goes to the standard tray.



□ Here is a three-dimensional view of the mechanism.



- □ Junction gate 2 does not have a solenoid.
- □ Normally, it is held closed by a spring.



□ Here is a three-dimensional view of the mechanism.



□ Junction gate 3 is controlled by a solenoid in the optional side tray unit.







### How can the 20cpm model achieve 25 cpm in duplex mode?

The paper feed speed after leaving the fusing unit increases to about double during switchback and inverting.



Slide 175



New features have been added to help the user prevent transmission to the wrong destination.





New Options	
Side Tray	
Internal Finisher	
Slide 178	

- $\hfill\square$  These two options are new.
- $\hfill\square$  They are explained on the following slides.



- $\hfill\square$  In this section, you will study the mechanisms of the optional side tray.
- □ This unit is new.



### **Overview**

□ The side tray is an additional output tray.

- This can be installed when the 500-sheet finisher is installed, so that the user can (for example) send copy-mode outputs to the finisher tray, and fax-mode outputs to the side tray.
- □ This is because, when the finisher is installed, the one-bin tray cannot be installed.

No additional notes

Slide 180


#### **Di-C1** Training



- □ The solenoid is at the rear of the tray, near the motor.
- When the side tray exit sensor detects the trailing edge of the paper, the side tray gate solenoid turns off and closes the path to the side tray. This sensor also detects paper jams.



- □ In this section, you will study the mechanisms of the optional 500-sheet finisher.
- □ This finisher has some similarities with the finisher for the AT-C1, but a punch unit is added.



- □ The output tray moves down when the stack gets thicker.
  - The output tray does not move from side to side to sort the copies. Because of this, it should not be called a shift tray.
- The jogger tray moves even-numbered sets to one side before it feeds them to the output tray. That is how shift sorting is done with this finisher.
  - The jogger tray is also used for stapling. The stapler is attached to one side of the jogger tray. It is not shown in this diagram.
- The stack height detection lever turns on sensors that tell the machine to lift or lower the output tray.
- The pick-up unit moves up and down, controlled by the selected mode and the part of the job.
  - This is described later.



The pick-up roller motor can turn forward or in reverse. This is necessary because the pick-up roller feeds paper back into the jogger tray, and forward to the output tray.



# Straight feed-out (automatically selected if the paper type is outside the specified weight range for the finisher)

□ Each page is fed out immediately after it comes from the copier.

#### Shift sorting (if selected with the operation panel or printer driver)

□ This lets the user separate the sets easily.

#### Stapling (if selected with the operation panel or printer driver)

- □ Each set is fed the same as even-numbered sets in shift sorting mode.
- □ But, the set is stapled in the jogger tray before it is fed to the output tray.
- □ All sets are moved to one side.







- □ The pick-up roller contact motor moves the pick-up roller unit up and down.
- □ The pick-up roller motor turns the pick-up rollers.





- □ The belt roller position sensor detects the position of the belt roller unit.
- When the belt roller solenoid releases the idle gear, the gear to the right turns. This has a cam and shaft attached to it, and this lifts the belt roller unit.



- □ The paddle roller solenoid controls the paddle roller.
- □ The pick-up roller turns forward or in reverse. The other rollers do not change direction, and are controlled by the paper transport motor.



□ This shows what happens when duplex is selected, if the finisher is installed.



□ This shows how the paper is fed back into the duplex unit of the machine.







#### Di-C1 Training

### **RICOH**





□ The three fences are shown in red circles in the diagram.



- This shows how the stack height is detected. If the stack height is above a set level, the output tray must move down.
- □ The outputs from the two sensors tell the machine what to do.
  - Sensor 1 and 2 both off: The stack height is below the target. The output tray is then lifted to the target position.
  - > Sensor 1 on, sensor 2 off: Target stack height position
  - Sensor 1 and 2 both on: The stack height is above the target. The output tray is then lowered to the target position.
  - Sensor 1 off, sensor 2 on: The stack height detection lever is at home position.
  - > 'Off' means 'Actuator not in sensor'
- □ At the start of a print job, the solenoid turns on. The stack height detection lever comes down, to detect the current stack level.
- When a sheet of paper is being fed out, the solenoid turns off and the lever goes back up to home position (inside the unit).
- After paper has been fed out, the solenoid turns on again, and the lever detects the level of the stack.





#### Overview

- □ The output tray motor gear lifts/lowers the tray if the stack height is not at the target position.
- □ The output tray motor turns the two sector gears. These gears keep the tray at the same angle during up/down movement.

#### **Output Tray Downward Movement**

- The top of the paper stack is checked after every page (or set of pages) has been fed out. If the top of the stack is higher than the target level, the output tray motor moves the tray down.
- When the tray lower limit sensor detects the actuator on the sector gear (the gear on the left in the diagram), a stack near-limit signal is transferred to the main frame. The tray cannot move any lower. The next time the top of the stack height is above the target level, printing stops.

#### **Output Tray Upward Movement**

- □ If paper is removed from the stack, the top of the stack will be lower than the target level, and the output tray motor moves the tray up.
- When the tray upper limit sensor detects the actuator on the other sector gear, the tray cannot be moved up any more, so the motor stops.



□ The punch slider unit is surrounded by the red dotted line in the photo.



□ The registration home position sensor detects when the slide unit is at home position (in other words, when the paper edge sensors are at home position).



□ The paper sizes shown above are for short-edge feed (SEF).







- □ The two-hole punch unit and the four-hole punch unit have the same mechanism.
- □ The two-hole punch unit is described here.





- The punch motor alternately turns forward and in reverse for alternate sheets of paper. But the slider plate always moves to the rear to punch the paper, because of the shape of the groove in the cam.
- Why does the punch unit change direction between sheets? This is so that the actuator of the punch waste detection mechanism can move back across the punch waste hopper. It is driven by the same motor, and if the motor turns in the same direction for a long time (during a long job), punch waste can build up without being detected.





□ If the slider plate is moved to the front from home position, the three-hole punches do not move down to the paper. However, the two-hole punches do move down, as we shall see on the next slide.

#### **Di-C1** Training

### **RICOH**



□ If the slider plate is moved to the rear from home position, the two-hole punches do not move down to the paper. However, the three-hole punches do move down, as we saw on the previous slide.



- The punch hopper full sensor checks the actuator at initialization and while the punch unit is active.
- If the punch hopper is not set in the punch unit and the punch full sensor does not detect the actuator after a set time at power on, the machine also decides that the punch hopper is full.
  - There is no punch hopper set sensor. If the waste hopper is not in the machine when you turn the power on, the machine will not detect the actuator, and will display 'punch waste hopper full'.
- Two/four hole punch unit: The punch motor changes direction between sheets. This is so that the actuator can move back across the punch waste hopper. It is driven by the same motor, and if the motor turns in the same direction for a long time (during a long job), punch waste can build up without being detected.







