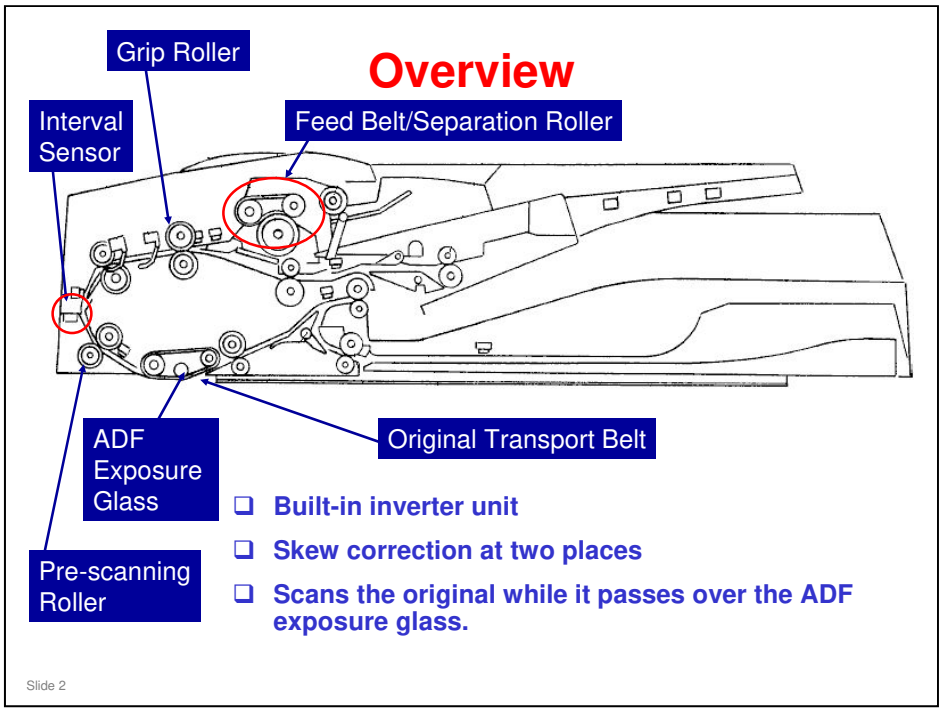
RICOH

D014/D015 TRAINING
COPIER ENGINE

DOCUMENT FEEDER

Slide 1

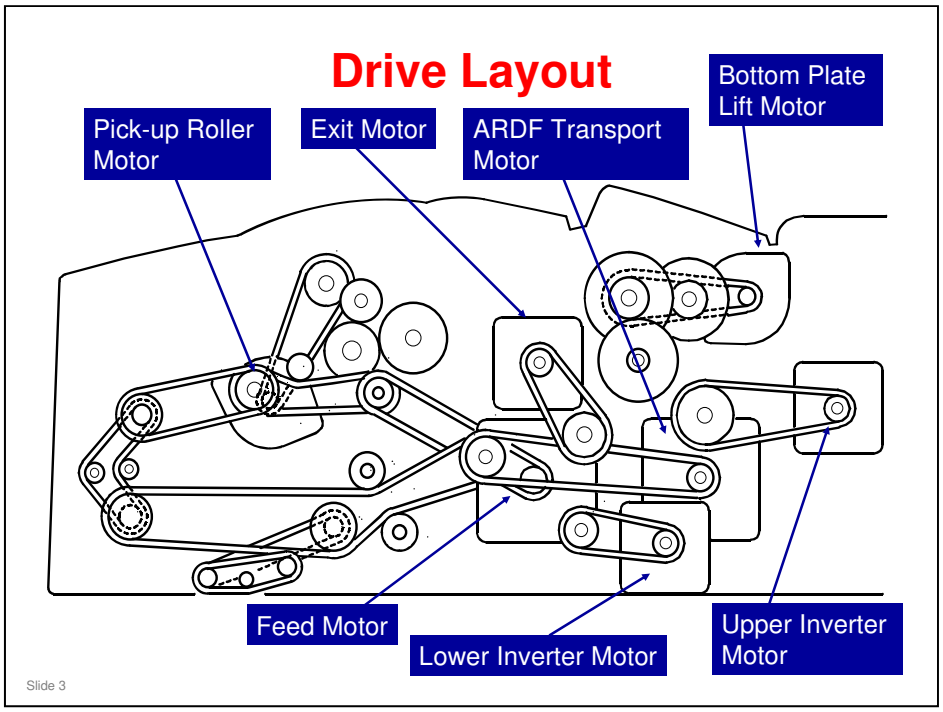
- The ARDF is a standard component of the machine.
- This section of the course will explain the ARDF's mechanisms.



B132 series Service manual, page 6-13

- 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 grip roller to correct skew.
  - When the interval sensor detects the leading edge, the pre-scanning roller stops for skew correction, for some paper sizes.
  - The time that the leading edge takes to feed between the skew correction and separation sensors is compared with the feed speed. The machine then detects if the paper is slipping in the ARDF.

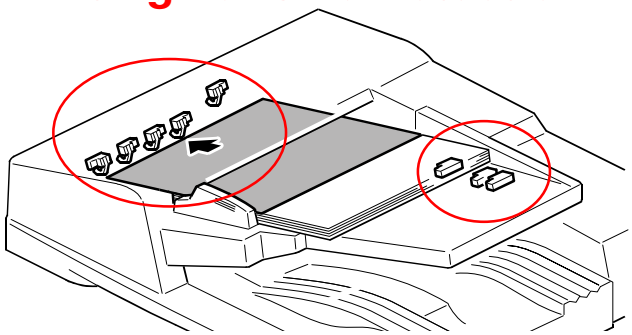
    The skew correction and separation sensors are the two sensors in front of the grip roller.
  - The CCD is below the ADF exposure glass, where the original is scanned.
  - To scan a two-sided original, the ADF inverts the page and feeds it back into the scanner.



B132 series Service manual, page 6-16

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

Original Size Detection



- 5 width sensors, 3 length sensors
- Original length and width are read when the original passes the skew correction sensor
- Use SP6016 to make sure that the machine detects the correct size for sizes that are almost the same (for example, A3 and DLT).
- Use SP5126 to make sure that the machine detects the correct “F size”.

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B132 series Service manual, pages 6-17 to 6-19

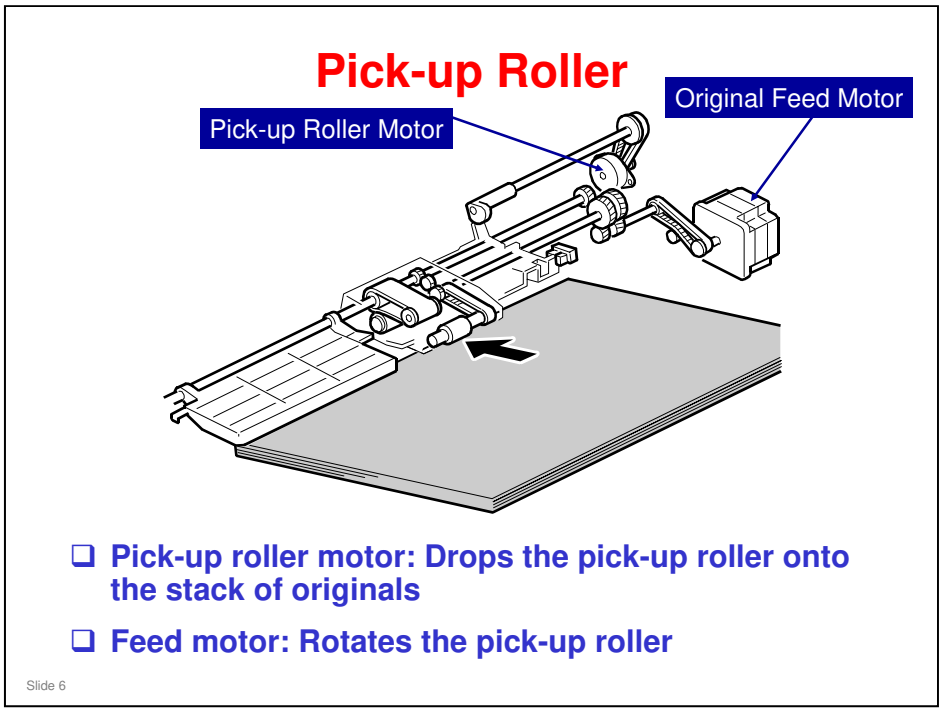
- The original width sensors cannot detect the width until the original has passed the grip roller.
- Some small sizes cannot be detected by the sensors, because the sensor outputs for these sizes are identical (all sensors are off). In this case, the length is detected using the skew correction sensor and clock pulse counts from leading edge to trailing edge.
- The machine cannot tell the difference between some original sizes, for example DLT (11 x 17”) and 11 x 15”. The machine assumes such originals are 11 x 17. To change the sizes that are detected, use SP 6016 as explained in the manual.
- There are three F sizes that are very similar. Use SP5126 to make sure that the machine detects the correct one for the customer.
- 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.

Mixed Original Length Mode

- **Width detection: Same as for normal mode**
- **Length detection: Done for each sheet**
  - So scanning is slower if the user selects mixed size mode
- **Length detected by counting ARDF transport motor pulses from registration sensor on until registration sensor off**

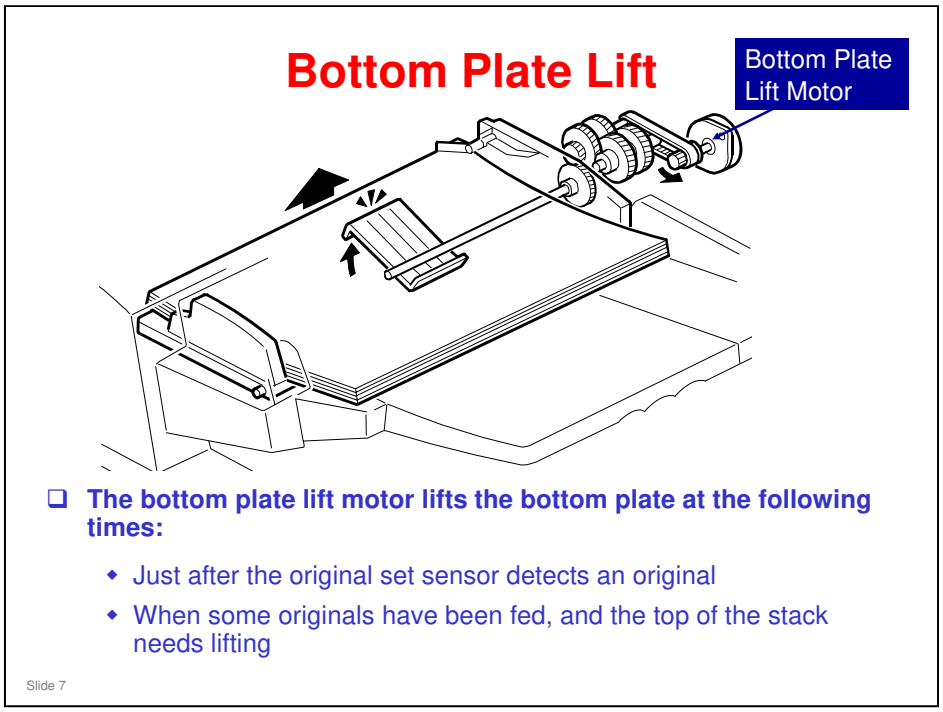
Slide 5

- This explains what happens if the user selects mixed original length mode.
- The length is detected as explained on the slide.
- However, if the length cannot be detected in this way, the ADF has to check more carefully, as listed in the manual, and that takes a lot of time.
  - However, this is only needed if certain features are selected, such as Auto Reduce/Enlarge.
- To store an image, a large area of memory (the detected original width x 432 mm length) is prepared, because the length is not yet known.
  - Printing takes place after length detection, and only the portion of the memory containing data up to the detected original length is printed.



B132 series Service manual, page 6-20

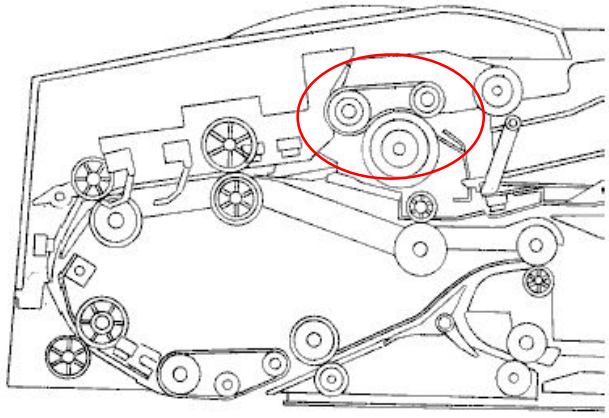
- Just after the original set sensor detects an original, the pick-up roller motor switches on, to drop the pick-up roller onto the original stack.
- When the leading edge of the original reaches the skew correction sensor, the pick-up roller motor switches on again, to lift the pick-up roller away from the original stack.
  - Home position is detected by the pick-up roller HP sensor.
- When the trailing edge of the original passes the skew correction 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 skew correction sensor: The pick-up motor turns on again until the HP sensor detects the actuator. This stops the pick-up roller at the home position (up).
  - When the trailing edge of the paper passes the skew correction sensor with originals still waiting for scanning: Motor [A] switches on to feed in the next sheet. The pick-up roller drops onto the paper.



B132 series Service manual, page 6-21

- 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

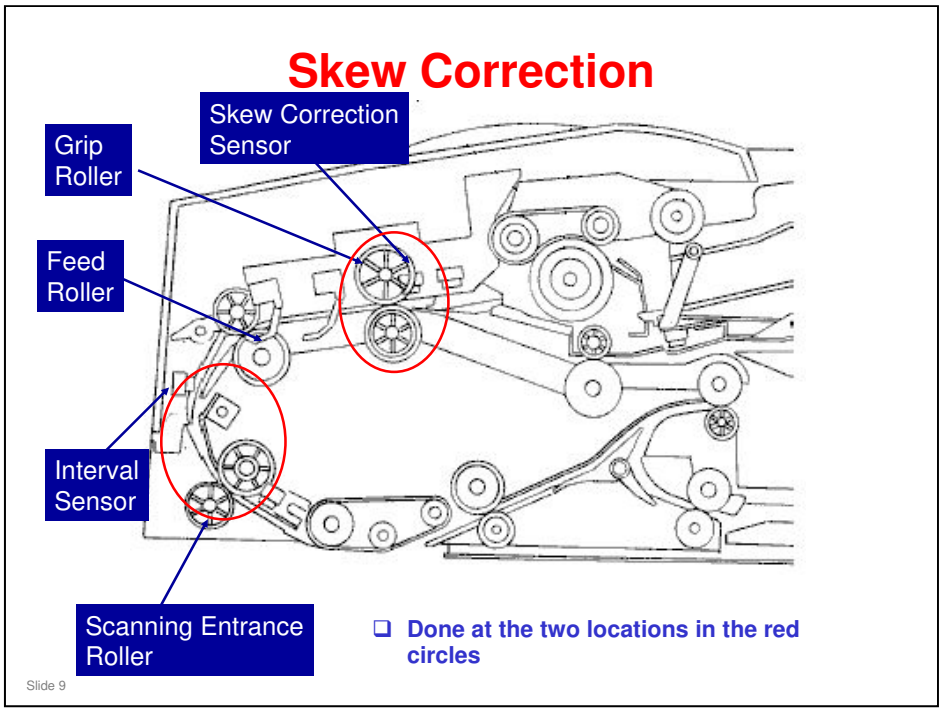


- FRR with feed belt

Slide 8

B132 series Service manual, page 6-22

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



B132 series Service manual, page 6-23

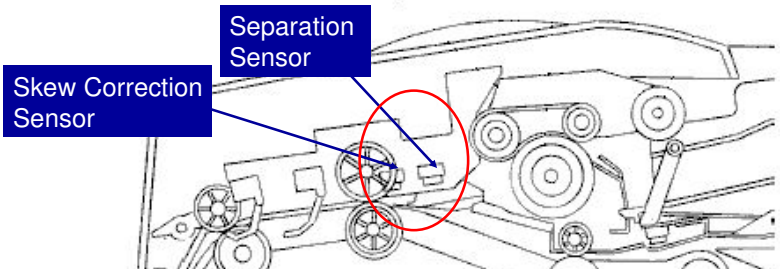
- Skew correction is done at the two circled locations.
  - Skew correction sensor/grip roller: When the sensor detects the leading edge of the original, the roller stops for a short time. This buckles the original and corrects the skew.
  - Interval sensor/scanning entrance roller: The actual method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

    For single-sided scans larger than A5/HLT, the scanning entrance roller turns more slowly, and the feed roller turns more quickly. This corrects skew, because the feed roller feeds the paper against the scanning entrance roller.

    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 scanning entrance roller stops. (Small sizes skew more easily.) All duplex scans are stopped at this roller, for the best possible skew correction.
- 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.
  - Grip roller: Driven by the feed motor
  - Feed roller (1st transport roller): Also driven by the feed motor
  - Scanning entrance roller: Driven by the ARDF 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 grip roller
  - 6006 006: Corrects the amount of buckle at the pre-scanning roller

Slippage Detection



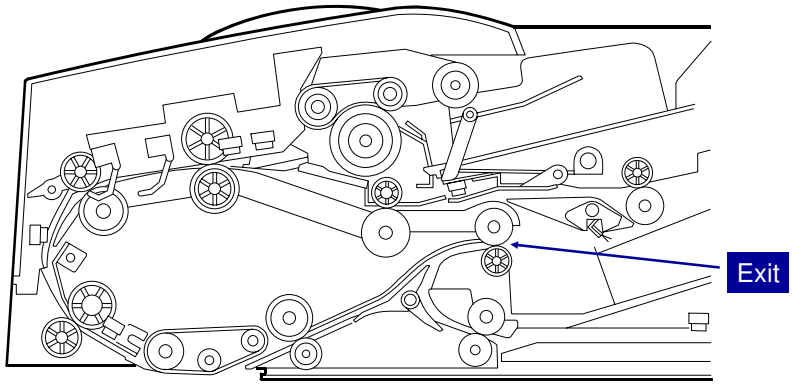
- If the original does not get to the separation sensor at the correct time after Start is pushed, then slippage is measured.
- To measure slippage, the machine checks the interval of time to feed the original between the separation sensor and the skew correction sensor.
- If slippage is detected, the machine adjusts the time that the grip roller is turned off for skew correction, to make sure that the original is fed at the correct time after skew correction.

Slide 10

B132 series Service manual, page 6-24

- This mechanism only corrects for slippage at the ARDF entrance. It makes sure that skew is corrected before the original is fed into the scanner. If there is no slippage correction, original feed starts again before the skew is corrected fully.

Original Transport and Feed-out Single-sided

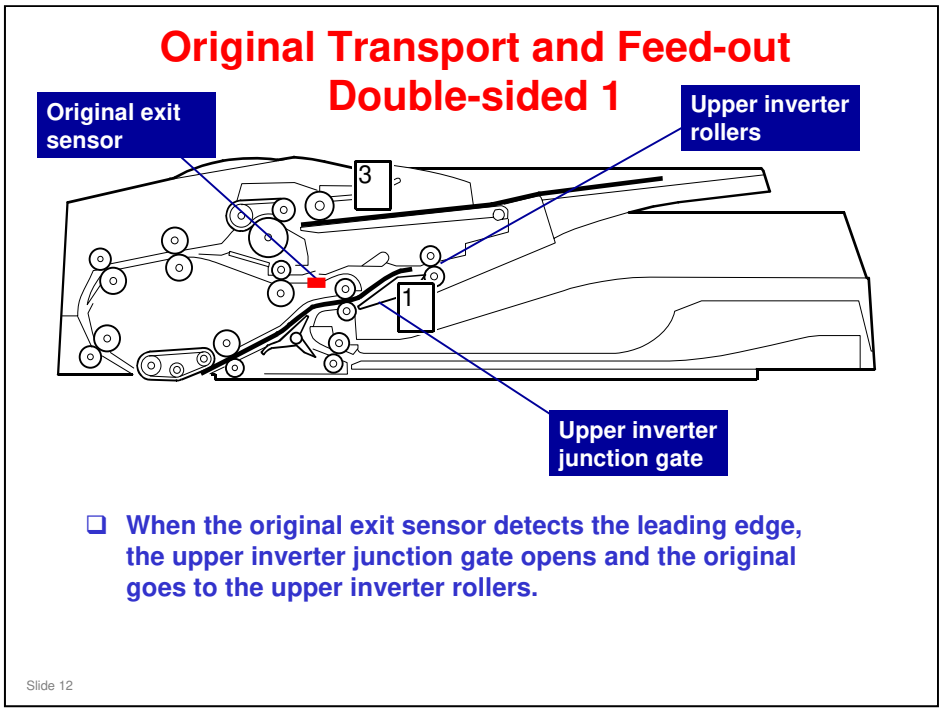


- Transport motor: Feeds the original through the scanner
- Motor speed depends on the reproduction ratio

Slide 11

B132 series Service manual, page 6-25

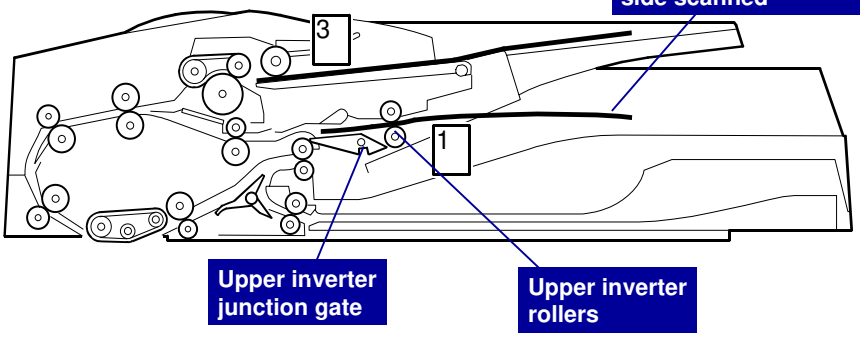
- Study the path of paper through the ADF.
- The machine scans the original through the DF exposure glass.
- The original stops at the registration sensor. The purpose of stopping here is for timing, so that the original can be fed in at the correct time to synchronize with the rest of the copy process.



B132 series Service manual, pages 6-26 and 6-27

- To control this mechanism, there are four motors.
  - ARDF transport motor: Controls the transport rollers in the ARDF
  - Upper inverter motor: Controls the upper inverter rollers
  - Lower inverter motor: Controls the lower inverter rollers
  - Exit motor: Controls the exit rollers

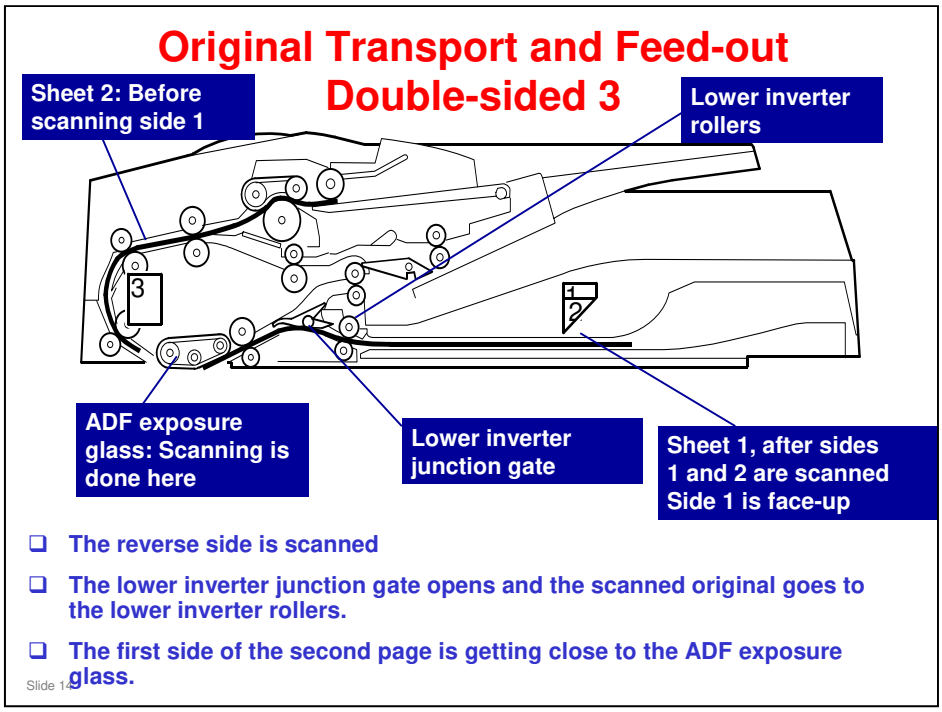
Original Transport and Feed-out
Double-sided 2



- The paper goes to the upper inverter table and the trailing edge is held by the upper inverter rollers.
- When the trailing edge is past the exit sensor, the upper inverter junction gate closes.
- The upper inverter motor reverses and the upper inverter rollers feed the original back into the ARDF.

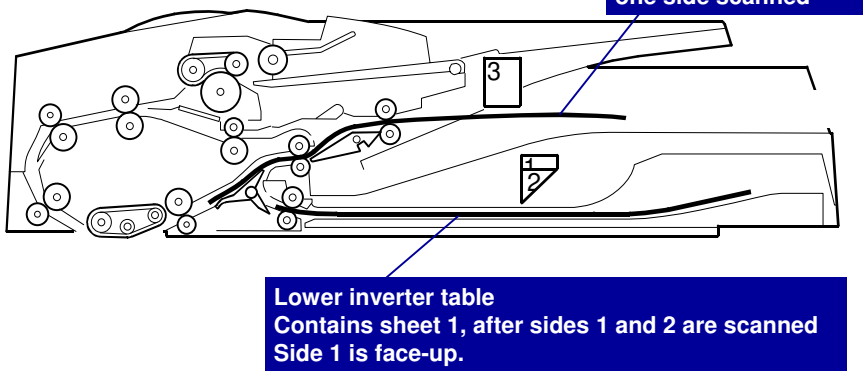
Slide 13

No additional notes



No additional notes

Original Transport and Feed-out
Double-sided 4

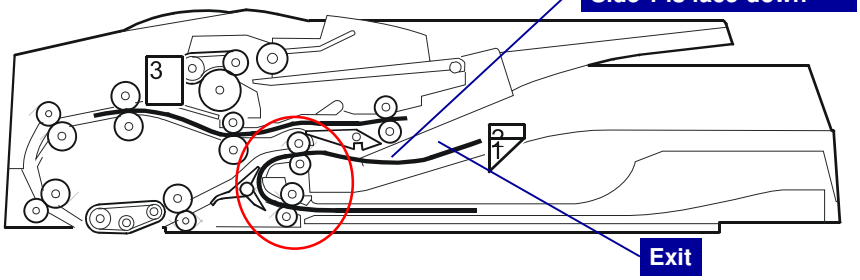


- The first side of the second page is scanned.
- The first page waits in the lower inverter table until after the second page is in the upper inverter table.
  - The lower inverter rollers hold the trailing edge of the first page.

Slide 15

No additional notes

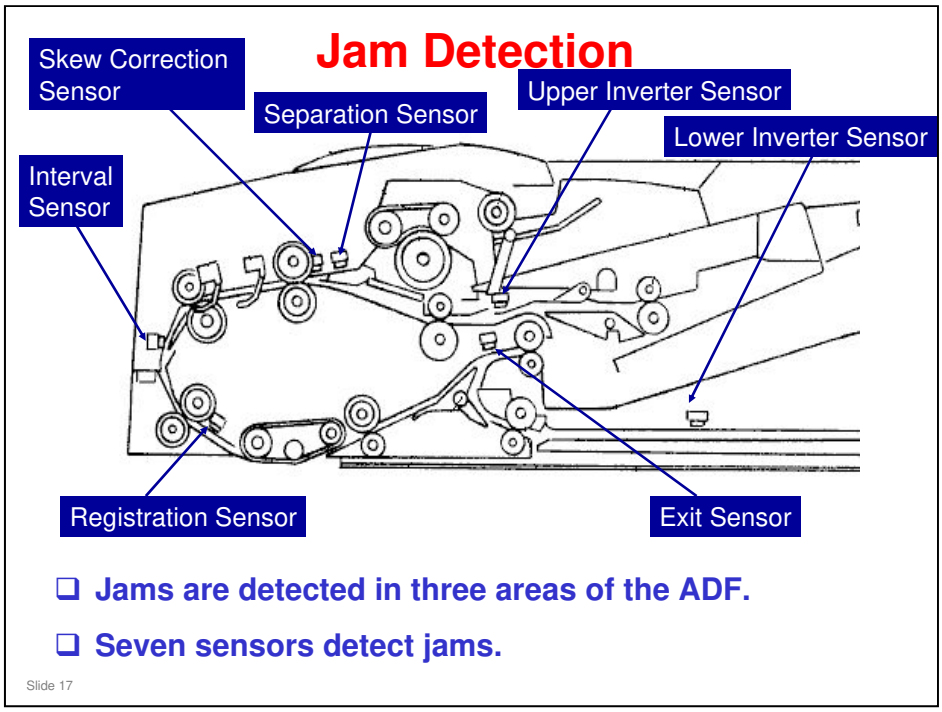
Original Transport and Feed-out
Double-sided 5



- The second page goes from the upper inverter table back into the machine.
- The lower inverter rollers feed the first page back into the ADF, and out to the exit. Side 1 is face-down
  - The paper goes through the path in the red circle, not over the exposure glass. This increases throughput for large paper sizes, because scanning can continue during feed-out.
  - This mechanism stacks the pages of the original face-down in the correct order.

Slide 16

No additional notes



B132 series Service manual, pages 6-28 and 6-29

❒ The service manual describes jam detection.

Replacement

- Do the procedures in section 3-18 of the service manual.
- The ARDF is heavy. Remove it carefully.

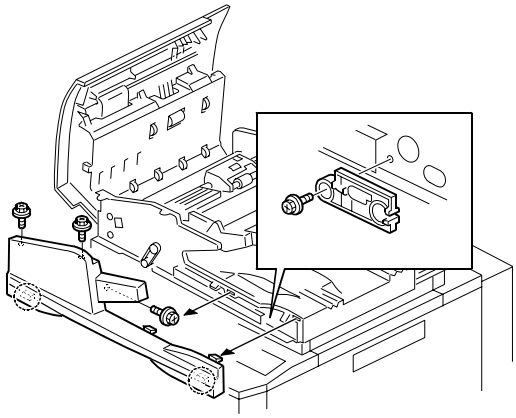
Slide 18

REPLACEMENT

B132 series Service manual, section 3-18 (starts at page 3-153)

- Have the trainees do the procedures.
- Remind them to obey all notes and cautions in the manual.

Special Tools



- This tool is attached to the front side plate of the ARDF.
- It is used to adjust the belt tension when you install an ARDF transport belt.

Slide 19

No additional notes