

SILVER TRAINING INSTRUCTOR'S GUIDE

Issued By: Priport Service Planning Section Ricoh Co., Ltd August 1st, 1998

HOW TO USE THIS MANUAL

This Instructor's Guide will help you train service technicians for the Silver.

There are three ways that this guide can be used.

- As a check list to make sure you have covered all important points
- As a set of ordered notes taken from the service manual, operation manual, and other sources. Sometimes, the ideas from the manuals have been reworded.
- □ As a source of information that is not included in any of the manuals. This may include technical details of the machine's hardware or software, or background knowledge of technologies used in the machine. This information can be taught to the trainees if you feel that they will benefit from it, but some of it may be too technical for routine field use. This information may also help you answer questions from the class.

A set of presentations are also provided. They were made with Microsoft Power Point from the Office 97 suite for Windows 95. We suggest that you use a personal computer during training and project the presentations directly.

The text is laid out as a bulleted list, with a picture of the current presentation slide above the text.

Boxed notes contain information not included in the manuals, or important information from the manuals that must be stressed in the class.

Do NOT give out copies of this instructor's guide to anyone other than instructors and management personnel, In particular, do not give copies to technicians, trainees, or dealers. The guide contains proprietary information that should not be revealed to competitors. (However, any handouts included in the guide can be copied and given out.)

PREPARATION CHECK LISTS

TRAINING MATERIALS TO BE PREPARED

Key: N.O.T.: Prepare for the Number of Trainees N.O.G.: Prepare for the Number of Groups

Description	Quantity	Remarks
TECHNICAL DOCUMENTS		
Silver Training Manual	N.O.T.	Give copies to trainees.
Parts Catalogs	N.O.T.	Give copies to trainees.
Operation Manual	N.O.T.	Give copies to trainees.
Instructor's Guide Service Plan SUPPLEMENTARY AIDS	1 1	Instructor only Instructor only
Power Point Presentation Enlarged Diagrams Training Schedule SUPPLIES	1 set 1 set N.O.T	Instructor only Instructor only Give copies to trainees.
Ink Master rolls Copy paper SPECIAL TOOLS	N.O.G. N.O.G.	
None required		

ORIENTATION

Provide the trainees with information about the training course procedures, facilities, objectives, and rules.

INTRODUCTION OF INSTRUCTORS

□ Introduce yourself to the class, and any other instructors who will be taking part. Tell them who to see if they have any problems.

INTRODUCTION OF TRAINEES

- □ Distribute a list of those attending the course.
- Try to generate a friendly and relaxed atmosphere, and encourage the class to get to know each other.
- □ If it will help, have the trainees introduce themselves (name, company, work experience).

EXPLANATION OF CURRICULUM

- □ Pass out copies of the training schedule.
- □ Impress the importance of getting to the class on time.

EXPLANATION OF TRAINING CENTRE RULES

- Explain the general rules of your training centre (smoking, breaks, use of facilities, etc).
- □ Explain the tools and equipment available at the facility.
- □ Impress on the trainees that they should not touch the machines until the instructor says so, and that they are responsible for replacing tools and keeping the classroom in order.

COURSE OVERVIEW

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The course is broken up into several modules. This section outlines these modules.

There are some similarities with older products. Important similarities and differences will be indicated in boxes like this.

COURSE OVERVIEW	COURSE OVERVIEW
 Product Outline Specifications Installation Operation Machine Overview Scanning Image Processing 	 Master Ejection Master Feed Drum Paper Feed Paper Delivery Maintenance Troubleshooting

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.**

SPECIFICATIONS

☐ The main specifications will be given. Significant items will be stressed.

INSTALLATION

- □ The class will install their machines.
- □ Installation of the options will be covered fully.

OPERATION

□ This part of the course will deal with general operation and copying.

MACHINE OVERVIEW

- □ The components will be discussed briefly.
- □ The printing process will be outlined.
- Service mode will be introduced.

SCANNING

- □ The built in scanner mechanism will be covered.
- □ The optional ADF will also be discussed in this section.

IMAGE PROCESSING

□ This section describes how the machine scans an original and processes the data in preparation for making a new master.

MASTER EJECT

□ This section explains how the used master is removed from the drum before the new master is wrapped around the drum.

MASTER FEED

□ This section explains how the new master is wrapped around the drum.

DRUM

This section describes drum drive, ink supply, and the detection of masters on the drum.

PAPER FEED

□ This section describes the paper feed, printing pressure, and paper table mechanisms.

PAPER DELIVERY

□ This section explains how the printed page is fed out of the machine.

MAINTENANCE

D PM is described briefly.

TROUBLESHOOTING

Basic points concerning service codes and other troubleshooting tools will be covered.

PRODUCT OUTLINE

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SILVER TRAINING

PRODUCT OUTLINE

PRODUCT CONCEPT

Taken from Preliminary Product Launch Information, except where stated otherwise

Overview

PRODUCT CONCEPT



□ This is a new model for the low segment.

However, it supplies the same level of features as the Gold (a mid-range machine).

Replacement for N810-II.

Development Concept

□ Uses the same scanner as the LS0 fax machine.

D Compact new printing engine and mainframe

Markets

Traditional stencil printer markets (schools, churches, government offices, etc.)

System Components

OPTIONS
30-sheet Document Feeder Colour Drum PC Controller Tape Marker Key Counter

□ Introduce the range of available options.

- > The document feeder is the same as used with the Gold.
- The PC controller is the same type as used with previous models. It is also used with the other new model, Pearl. However, for the Silver, an interface kit must also be installed to connect it to a PC controller.
- > The tape marker is the same type as used with previous models.
- > Key counter

SALES POINTS



Easy Operation

□ Newly-designed operation panel

- LCD and indicators are in the centre
- The most frequently used function keys are at the front. Others are under a cover at the left side of the operation panel.
- **G** Simpler master roll replacement
 - The user does not have to cut off the leading edge of the master, because the new rolls have a flat leading edge that does not have to be cut off.
 - However, the user has to place the leading edge of the new roll in the correct position before closing the cover.

Improved Paper Feed and Delivery

- □ Increased paper stacking capacity
- □ The paper delivery unit has an independent motor to control the output speed

Advanced Features for a Low-end Model

- **D**rum change for colour printing
 - > With the Silver, this feature becomes available even for low-end models
- **G** Fine mode master making
 - Standard resolution: 300 x 300 dpi
 - > Fine mode: 300 x 400 dpi (finer resolution down the page)

Versatility

Different models available for different parts of the world, based on drum size

- > A4 drum model: Europe
- LG drum model: N. America
- > B4 drum model: Europe, Latin America, Asia, Taiwan, China
- □ The range of available features is more typical of a mid-range model (like the Gold) than a low-end model.

SUPPLY YIELD TARGETS

SUPPLY YIELD TARGETS

Masters
 A4 drum: 300 masters/roll
LG drum: 260 masters/roll
 B4 drum: 260 masters/roll
 2,000 prints/master
= ink
600 ml/cartridge

New ink and master roll types have been developed for Silver. These should not be used with other current models.

Masters

□ Number of masters/roll

- > A4 drum: 300 masters/roll
- LG drum: 260 masters/roll
- B4 drum: 260 masters/roll
- □ 2,000 prints/master

Ink

G00 ml/cartridge

The number of copies per cartridge is obviously a more practical value.

Ink consumption is directly related to the following:

Printing speed (more ink is consumed at low speeds) Temperature (more ink is consumed at high temperatures) Image area (more ink is consumed with larger images) Paper absorbency (more ink is consumed with more absorbent paper) Copies per original (more ink is consumed if this is low) Drum size (more ink is consumed for larger drums)

The number of copies per cartridge can be estimated using the following formula.

$$X = \frac{A \times Y}{B + (Y \times Z)}$$

X: Copies per cartridge

A: Amount of ink in the cartridge

Y: Average number of copies per original

Z: Ink consumed per copy

B: Ink consumed per ejected master

A: Amount of ink per cartridge

For the Silver, this is 575 g

The cartridge capacity is 600 ml. However, there is some empty space.

Z: Ink consumed per copy

Consumption (black ink, B4 original, grams per 100 copies, 13.5% image area, 100 copies per minute)

Low temperatures: 5.6 (normal printing), 4.7 (economy mode) Normal temperatures: 6.8 (normal printing), 5.2 (economy mode) High temperatures: 7.7 (normal printing), 6.7 (economy mode)

B: Ink consumed per ejected master

The amount of ink discarded with the ejected master is a major factor in the ink consumption.

For the Silver, the consumption is as follows (B4 master, 13.5% image area, 100 copies per minute).

Low temperatures: 3.7 grams/master Normal temperatures: 4.1 grams/master High temperatures: 4.4 grams/master

Sample Ink Yield Calculation Results (normal temperatures, normal printing)

30 copies per original: 2,809

50 copies per original: 3,833

100 copies per original: 5,275

200 copies per original: 6,497

RELIABILITY TARGETS

RELIABILITY TARGETS

 Monthly Print Volume
Average: 50k
Maximum: 100k
Estimated Unit Life
 3,000k prints, 30k masters, or 5 years
PM Cycle
• 300k
MCBC
• 120k

Monthly Print Volume

- Average: 50k
- Maximum: 100k
- Average prints/master: 100

Estimated Unit Life

□ 3000k prints, 30k masters, or 5 years

PM Cycle

300k prints or 6 months

MCBC

🗖 120k

SERVICEABILITY TARGETS

SERVICABILITY TARGETS



Maintenance Time (Mainframe)

- G-months PM: 20 minutes
- □ 12-months PM: 50 minutes
- **D** EM: 40 minutes

Installation Time (Mainframe)

D 20 minutes

SPECIFICATIONS RICCH SILVER TRAINING SPECIFICATIONS

Go through the machine's specifications. Emphasize the points listed on the slides.



ADF Capacity

☐ The ADF is an option.

Image Modes

□ Tint mode is a new feature designed to meet requirements from the Japanese market.

□ It changes all the black parts of an original to a shade of grey.

Some aspects of Japanese culture (such as funerals) require printing in grey.

□ Tint mode can be combined with the other modes (letter, letter/photo, etc).

Paper Feed Table Capacity

□ This is improved over the N810, as a result of a new mechanism.

Master Type

□ The surface finishing of the master has been modified for better image reproduction. The corrosive substances were for reducing the effects of static electricity. As a result, the master feed mechanism had to be changed to prevent master wrapping jams caused by static electricity.

Ink Type

□ The ink cartridge is a new type, and not compatible with older models.

INSTALLATION

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Install at least one machine with all options as a complete system.

PRELIMINARIES

Installation Requirements

Go over the environment, machine level, minimum space, and power requirements of the machine before proceeding with installation.

SERVICE PROGRAM MODE

□ Make sure that the class understands the following.

- How to enter service program mode (SP mode). This is now the same as for copiers.
- ➢ How to select a program number.
- ➢ How to change an SP mode setting.
- > How to exit service mode.

MAIN BODY



□ Have the trainees install the machine, following the procedure in the manual.

- □ After installing, supply ink to the drum.
 - > Press the "Economy Mode" key while holding down the "0" key.

Silver Service Manual, p 3-1 to 3-2

Silver Service Manual, p 4-8 to 4-10

Silver Service Manual, p 3-3 to 3-8

OPTIONS

OPTIONS
■ ADF
 SP Mode 2 - Set to 1
Tape Marker
 Procedure for C231, plus Common Steps
 SP Mode 5 - Set to 1
Colour Drum
Interface Board
 No SP mode (the machine detects the board automatically)
Key Counter
 SP Mode 3 - Set to 1

Make sure that the power cord is unplugged before installing any of these options.

ADF

- Step 4: Make sure that the ADF switch works properly after mounting the ADF and installing the lower rear cover.
- □ After installing the ADF, set SP mode 2 to '1'.

Tape Marker

- □ Use the procedure for C231.
- □ After installing the tape marker, set SP mode 5 to '1'.
 - > The customer can access this setting.

Colour Drum

□ There are three colour drums: B4, A4, Legal. Use the correct one for your machine.

Interface Board

- This is for connecting to the PC controller. It is a new type, not compatible with older models. It is also used in Pearl.
- ☐ The PC controller is the same as used in previous models.
- □ The machine detects the interface board automatically. There is no SP mode to adjust.

Key Counter

After installing the key counter, set SP mode 3 to '1'.

Silver Service Manual, p 3-9 to 3-13

Silver Service Manual, p 3-14, 3-15, 3-19

Silver Service Manual, p 3-20

Silver Service Manual, p 3-21

Not in the Service Manual

OPERATION

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This part of the course will deal with general operation and copying.

Teach and demonstrate procedures from the operation manuals. Select the items to be taught in the class in accordance with the experience level of the trainees.

Have the class follow this part of the course using the operation manual. Page numbers are not quoted in the Instructor's Guide, as the author has no control over operation manual layout. However, the description follows the order of sections in an almost completed draft copy.

Let the trainees practice operating the machine in all copy modes and using all optional peripherals for copying.

COMPONENT GUIDE

Operation Manual Guide to Components

Exterior



Go over the major components of the machine from the user's point of view.

Be sure that the class understand the following components

- Original table release lever: Opens the original table when installing a new master roll.
- Feed roller pressure lever: Adjusts the feed roller contact pressure on the paper stack – There are also technician adjustments for feed and separation roller pressure.
- Side table fine adjustment dial: Moves the paper feed table sideways, to move the image sideways on the paper

Interior



Go over this briefly.

> The document feeder is an option.

OPERATION PANEL



- □ Make sure that the class are familiar with the operation panel keys.
- □ There may be some keys that are not be familiar to photocopier technicians. These keys are used to access the various features of this machine. The features will be mentioned later in this section
- □ Three of the buttons do not have callouts. These are:
 - Slide 1, left side, top row, first button on the left: This is used for Combine Two Originals, if this feature is enabled with SP 17 (the user can access this one). This feature is not available for the China market.
 - Slide 1, left side, bottom row, second button on the left: This is for the Overlay feature (only available if the PC controller has been installed).
 - Slide 2, top left: This is the On Line key for computer printing.

Indicators



BASIC OPERATION

Operation Manual, Operation

Printing Paper

□ Note the recommended sizes and types of paper.

Originals

□ Note that there are limitations on the sizes of originals.

- □ For a paste-up original, use Paste Shadow Erase. This compensates for the fact that contact image sensors of the type used in this machine tend to reproduce shadows of pasted up parts.
- Originals should not have dark areas or bold characters right at the leading edge, or the prints may have dirty edges.
- □ Note that there is a 5mm margin at the leading edge of the original which will not be copied, even if the original is positioned correctly.

Preparing to Print



- □ Note the correct way to stack curled paper on the paper tray.
- $\hfill\square$ Set up the delivery table end and side plates to fit the printing paper size.

Printing

PRINTING PROCEDURE

Start key
 Makes the master and a trial print
The trial print primes the ink supply
Proof key
 Makes a test print
Allows image position adjustment
Print key
 Starts printing

□ Note the various stages of the printing process.

Press the Start key to make the master.

- > A trial print is made. Use this to check the condition of the master.
- > The trial print also serves to prime the ink supply mechanism, so that the first print will have enough ink.

Press the Proof key to make a test print.

This can be used to check the image position and adjust if necessary. The trial print is not suitable for this.

D Press the Print key to start printing.

Adjusting the Image Position



There are two ways.

□ Shifting forward or backward: Image Position keys

- > This changes the registration motor timing.
- □ Shifting from left to right: Side table adjustment dial
 - > This moves the paper feed table to the left or right.

Adjusting the Image Density

□ This can be done before or after making a master.

- > Before: Image Density key
- > After: Change the printing speed.

After Making a Master

Tint Mode

Before Making a Master



□ This converts all black areas of the original to grey.

This is a requirement for the Japanese market, for cultural reasons (certain events, such as funerals, require the use of grey instead of black).

Fine Mode



□ This improves the resolution of prints in the sub scan direction only.

- > Normal resolution: 300 x 300 dpi
- > Fine: 300 x 400 dpi

Printing Speed

ADJUSTING THE PRINTING SPEE
 80, 100, or 120 sheets/minute Default: 100

□ Note the three possible speeds.

- □ The default is 100 sheets/minute
- □ A lower speed applies more ink to the paper.
 - > It also stops prints from being thrown over the end of the delivery table.

Preset Reduce/Enlarge

PRESET REDU	ICE/ENLARGE
§→ §	
 Reduction: 4 settings Enlargement: 3 settings 	

□ Note the fixed reproduction ratios available for this machine.

- > There is no way to customize this with alternative ratios.
- □ The centre and leading edge do not shift (see the top right drawing on the slide).
- □ Note that 93% is a good setting to use if the original has dark borders. This will prevent dirty edges on prints.

Erase Centre/Border



- □ Erasing the centre and border is useful when tidying up copies of book originals.
- □ The default margins can be adjusted using user tools.
- □ The Centre/Edge Erase key has to be pressed twice to use this feature.
 - > To erase the edge only, press the Centre/Edge Erase key once only.

Paste Shadow Erase

	SHADOW ERASE
Era	ses shadows from images of paste-up

Use this for paste-up originals.

□ The strength of the erase feature can be adjusted with SP mode 28.

Printing on Thin or Thick Paper



- □ Thick paper: The lever should be at the thick paper position (up)
- □ Normal paper: The lever should be at the standard position (down)
- ☐ Thin paper: The lever should be at the standard position (down), and the friction pads should be installed on the side fences (these are in the accessories)

Original Type



- □ Note the three possible modes.
- □ Fine and tint modes can be combined with any of these.

Economy Mode

_
ECONOMY MODE
Reduced thermal head energy
Makes smaller holes in the master, so less ink is used

□ This uses less ink, so the prints will be lighter.

□ The thermal head energy is reduced.

Auto Cycle



- □ This allows faster copying of a series of originals.
- □ With the optional ADF, each page is scanned and copied automatically without any operator intervention needed.
- □ Proof copies cannot be made with the Proof key in this mode.
- □ If the tape marker is installed, a strip of tape will be placed between each stack of prints.

Class Mode



- □ This allows you to make several stacks of copies of the same page.
- □ The stacks will all contain the same number of copies of the page.
- **Up** to 20 stacks can be made.
- □ Each stack is separated with a piece of tape if the tape marker is installed.

Memory Mode



- This allows you to make stacks of copies of different pages (one stack for each page)
- Each stack can contain different numbers of copies.
 - If the number of copies in each stack is the same, use Auto Cycle mode instead, especially if the optional ADF is installed.
- **Up** to 20 stacks can be made.

□ Each stack is separated with a piece of tape if the tape marker is installed.

Combine Two Originals



- □ This feature has to be enabled with SP 17 (the user can access this one).
 - > This feature is not available for the China version.
- **T**wo originals can be combined and printed on one page.
- \Box The image settings for the 1st and 2nd originals can be different.
- □ Note that there are some restrictions on master length and image margins.
- □ Note that SP 25 and 84 affect how this feature works. Have the class check the effects.
 - > SP 84 is a bit like Double Copies, a familiar copier feature.

Skip Feed



Use this if ink is making the back sides of prints dirty.

☐ The drum will rotate one or more extra times between pages, giving the user the chance to remove the prints one by one (a larger number of drum rotations also allows the ink to dry).

□ The number of drum rotations can be adjusted at the operation panel.

> The default is two rotations. This default can be changed with a user tool.

Programs



Up to 9 programs can be stored.

□ Up to 9 programs of frequently used settings can be stored.

Security Mode



□ This prevents others from making prints using the master that you left on the drum.

Normally, the user can walk up to the machine and make prints of the master that happens to be on the drum. Security mode prevents this.

□ The Security key has to be held down for 5 seconds to access this feature.

OPTIONS

Operation Manual, Optional Functions

Using The ADF Exterior View



- **D** Point out the main components.
- □ Note the ADF opening lever.

General Advice

- Up to 30 originals can be placed in the feeder.
- Use the Auto Cycle feature to make sets of copies of more than one page. Otherwise, you will have to press the Print key for every original.

Colour Drum

- □ A range of coloured inks are available.
- □ You need a separate drum for each colour.



Several colours of ink are available.

To make multicoloured copies, you have to prepare a separate original for each colour

Operation Manual, Service Program Mode

User Codes

USER CODES

20 fixed codes Allocate one to each authorized user.

Enable user code mode with SP120. The user can access this SP mode.

- The user can access this S
 Auto reset time: SP120
 - After this timer runs out, a user code must be input.
 - Until the timer runs out, the machine can be used again, under the previous user code.
- used again, under the previous user code.
- Describe these codes briefly if the class is not familiar with them.
- □ There are 20 fixed codes. Allocate one to each user.
 - The codes are listed in the manual. Anyone who is serious about this feature will have to black out that part of the manual so that unauthorized people cannot use the machine by inputting one of the codes written in the manual.
- Enable user code mode with SP 120 (the user can access this).
 - If user code mode is enabled, a user code must be entered before the machine can be used.
- Program an Auto Reset Time with SP 120.
 - After a job is finished, the next job can be made with the same user code, if it is started within the Auto Reset Time. If the Auto Reset Time runs out, a user code must be entered to use the machine.
- There are counters for each user code, so that the supervisor can see the number of copies made by each user.

Combination Chart

Make sure that the trainees are familiar with this chart.

TROUBLESHOOTING

Operation Manual, What to do if ...

Operation Manual,

Remarks

- Have the trainees look through this section of the operation manual.
- □ They must be familiar with all the covers and levers etc that are used to replenish supplies, clear jams, and so on.

SERVICE MODES THAT AFFECT OPERATION

Operation Manual, Service Program Mode

SP Modes



Many of these tools change the default settings of the user features described above. Go through them in as much detail as you consider necessary.

They are also accessed using the user tools (they have asterisks against them in the SP mode table in the service manual).

Have the class try out various settings to see the effects.

SP 81 - Quality Start Mode

- □ The default is 0, which means that no idle rotations are made before printing. If this is changed to 1, 2, or 3, the drum rotates 1, 2, or 3 times before printing, to ensure that enough ink has been supplied in time for the first print.
- □ This feature is known as 'Quality Start'.

SP 170, 171, 172

□ These allow the user to have some custom original sizes for use with the Margin Erase feature.

MACHINE OVERVIEW

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PRINTING PROCESS

Silver Service Manual, p 1-10



Outline the printing process. Point out the following:

- First, the used master still wrapped round the drum is ejected and fed into the eject box.
- A xenon lamp illuminates the original, and reflected light passes to a contact image sensor.
- □ The image sensor output is digitally processed and sent to the thermal head to make the new master.
- □ Ink transfers from the drum to the paper.
- □ The paper is removed from the drum with pawls and an air knife, and fed out to the delivery table.

MECHANICAL COMPONENT LAYOUT

Same slide as Printing Process

- **D** Point out the major units.
- Demonstrate the original, master, and paper feed paths.

Silver Service Manual, p 1-11

ELECTRICAL COMPONENTS

No slide

Silver Service Manual, p 1-12 to 1-16 Waterproof Foldouts

Introduce the point-to-point and electrical component layout diagrams.

Go through the electrical component list in the service manual. Have the trainees locate the electrical components on the machines and on the p-to-p diagram.

Have the trainees remove the covers and locate the major components of the copier main body.

Point out as many of the components on the list as you think necessary. At least, draw attention to the following components:

Major Components

- Contact image sensor: Contains an image sensor and a xenon lamp
- □ Master making unit
- **D** Thermal head
- 🗖 Drum
- □ Master eject box

PCBs

- Main processing unit (MPU): Controls the machine and carries out image processing; also contains the ink detection circuits
- D Power supply unit

Switches

- Scanner unit, Master making unit cover, Door safety switches
- □ Test switch always return this to the default position after use

Silver Service Manual, p 1-17





Demonstrate the major drive paths in the machine.

□ Main motor – Drum, paper feed unit

- The paper feed clutch transfers drive from the main motor to the paper feed mechanism.
- □ Master feed motor Master making unit
- Clamper motor Master clamper
- □ Paper transport motor Transport belts
- □ Registration motor Registration roller

SCANNING RICCH SILVER TRAINING SCANNING

The document feeder is an optional peripheral. However, it will be described in this section of the course.

OVERVIEW

The book mode scanner and ADF mechanisms are the same as used in the Gold.



Silver Service Manual, p 2-1

- □ The scanner motor moves the scanner along the length of the original on the exposure glass.
- □ The scanner home position sensor detects when the scanner is at home position.
- □ The platen cover switch detects when the platen cover is closed.
- ☐ The scanner contains a contact image sensor.
- **The contact image sensor has a built in xenon lamp to illuminate the original.**

Silver Service Manual, p 2-2



□ The ADF feeds the top page of the stack.

□ In ADF mode, the scanner moves under the ADF exposure glass and stays there while the original is fed past it.



Silver Service Manual, p 2-3

□ The document sensor detects when an original has been placed in the ADF.

CONTACT IMAGE SENSOR



Silver Service Manual, p 2-4

- Go over the components of the contact image sensor assembly.
- □ If the original goes out of the CIS focal range, the image darkens.
 - > A spring pushes the CIS against the exposure glass.

Describe the purpose of paste shadow erase mode.

Mention how it can be adjusted with SP mode 28.

DRIVE

Silver Service Manual, p 2-5

Scanner



Describe the mechanism.

In this machine, a wire is used instead of a timing belt. Wires are more difficult to replace, but copy quality is better (less jitter).

ADF



Describe the mechanism.





Silver Service Manual, p 2-6

Silver Service Manual, page 2-7

SEPARATION



Silver Service Manual, p 2-8

□ This is a standard feed and reverse roller mechanism.

ERROR DETECTION

Go over this with the class if necessary.

PRACTICAL WORK

Maintenance

- Go over the maintenance for the scanner and the ADF, using the table in the service manual.
 - > The ADF is at the end of the table.

Silver Service Manual, page 2-9

Silver Service Manual, section 5

Silver Service Manual, starting at p 4-11

SP Modes

SP MODES 2

- 37: Side-to-side registration, ADF mode
- 38: Leading edge registration, ADF mode
- 95: Scanner free run
- 96: ADF free run
- 146: ADF cover switch enable/disable
- 147: Platen cover sensor enable/disable

10

SP MODES 1

26: Leading edge registration

28: Paste Shadow Erase level

27: ADF motor current reduction

30: Sub-scan magnification, platen mode

31: Side-to-side registration, platen mode

32: Image sensor position, ADF mode
33: Leading edge blank margin
36: Sub-scan magnification, ADF mode

- 26: Feed timing adjustment
 - This adjusts leading edge registration on prints.
- 27: ADF motor current reduction
 - Set this to 1 to reduce the current if there is noise coming from the ADF motor.
- □ 28: Paste Shadow Erase level
 - Adjust this to a lighter setting if the shadows from paste-up originals are too dark.
- **3**0: Sub-scan magnification, platen mode
 - > This changes the speed that the scanner moves

- **31**: Centre of copies, platen mode
 - > This nudges the image to the left or right (at right angles to paper feed).
 - The effects of this SP mode are described in the Image Processing section of the service manual (Image Position Adjustment in the Main Scan Direction).
- **32**: Image sensor position, ADF mode
 - This adjusts the position that the image sensor moves to for ADF mode. If no image is produced in ADF mode, try adjusting this.
 - > After changing SP32, do SP 38.
- **3**3: Leading edge blank margin
- □ 36: Sub-scan magnification, ADF mode
 - > This changes the speed at which the original is fed past the scanner.
- **3**7: Centre of copies, ADF mode
 - > This nudges the image to the left or right (at right angles to paper feed).
 - > Same as SP 31.

Note that there is also a mechanical side-to-side shift mechanism, using a dial on the paper table. This moves the paper stack on the paper feed table to the side. This will be described in the Paper Feed section of the course.

- **38**: Scan start position, ADF mode
 - This adjusts the leading edge registration on prints in ADF mode. Use only after the adjustment with SP 26 in platen mode is satisfactory.
 - This changes the original feed timing, whereas SP26 changes the registration motor start timing.

Note that the user also has an image position adjustment at the operation panel, to move the image closer to or further away from the leading edge.

- **9**5: Scanner free run
 - > The free run can be made with the lamp on or off.
- **D** 96: ADF free run
- **146:** ADF cover switch enable/disable
- **1**47: Platen cover sensor enable/disable

Refer to Removals and Replacements - Copy Image Adjustments for how to use SP 26, 30, 31, 33, 36, 37, and 38.

Replacement and Adjustment

Replacements

Silver Service Manual, pages 6-11 to 6-16

REPLACEMENT
ADF roller assembly
Pick-up roller
Feed roller
Separation roller
ADF motor
R0, R1, and R2 rollers
Document sensor
Scan line sensor
Cover sensors

Have the trainees remove and replace the parts indicated in the slide.

Copy Image Adjustments

ADJUSTMENT



Silver Service Manual, page 6-6 to 6-9

Do the Copy Image Adjustments after replacing the MPU (Main Processing Unit). (This is not necessary if you install the RAM from the old board on the new one.)

IMAGE PROCESSING

RICCH



This section gives a brief outline of image processing.

There are very few adjustments for the technician in this model. Because of this, detailed questions from the class should not be encouraged; a detailed description of image processing techniques will not be provided in this instructors guide.

The thermal head will also be described briefly.

OVERVIEW

Main Processing Unit (MPU)	
	laif Tone Processor
	Data Selection Image Chargement/ Reduction
l	

Silver Service Manual, page 2-10

Image processing is done by three chips on the MPU (main processing unit) board.

- The halftone processor uses 64 greyscales and error diffusion to reproduce photo images.
- > One gate array handles image positioning.
- > Another gate array drives the thermal head.

Silver Service Manual, pages 2-11 and 2-12

A/D CONVERSION

A/D CONVERSION

- Corrects distortions in the image sensor output
 Original Background Correction
- Makes the maximum white level the same as
- the original's background
- Stores the maximum white level

Shading Distortion Correction

Overview

□ The A/D conversion circuits convert the analog input from the CIS (contact image sensor) into 6-bit digital data.

Shading Distortion Correction

□ This process compensates for:

- > Loss of brightness towards the ends of the exposure lamp
- > Variations in sensitivity among elements of the image sensor
- Distortions in the light path

Original Background Correction

- □ To convert the analog data to digital, a scale of 64 levels is made based on the whitest detected level on the original.
- □ The maximum white level becomes the same as the original's background.
- □ As a result, the white level is different for each scanned original.
- □ If this feature is disabled, the greyscale is based on the whitest detected level from the white plate (measured during Shading Distortion Correction).
 - > Original Background Correction can be disabled for photo mode using SP 29.

Peak Hold

- The peak hold circuit holds the white peak level voltage that is used during the A/D conversion.
 - > Before scanning: Peak voltage from the white plate
 - > During scanning: Peak voltage from the original background
- □ If insufficient voltage is detected, a fixed value is used, to prevent a faint copy.

BINARY PROCESSING

DIGITAL PROCESSING 1

Overview Input from A/D converter: 6-bit

- · Output to thermal head: 1-bit
- Data Compensation
- The selected gamma curve depends on user settings
- MTF Correction
- Used in letter mode and letter areas in letter/photo mode
- · Sharpens the contrast

DIGITAL PROCESSING 2

- Error Diffusion
- Used in photo mode and photo areas in letter/photo mode

· Reduces the contrast

- Threshold Level
- Determines whether each pixel is black or white
- · Threshold depends on user settings · No technician adjustment

DIGITAL PROCESSING 3

- Main Scan Magnification · Algorithm built into the MPU board
- Image Positioning
- Moves the image across the master
- Adjusted with SP 31 (book) or 37 (ADF)
- Paste Shadow Erase Mode

Silver Service Manual,

- Removes shadows on images of paste-up originals
- Adjusted with SP 28

page 2-13

Overview

- Binary processing converts the 6-bit data into one-bit (black and white) data.
- □ In letter/photo mode, the machine detects letter and photo areas.
- □ In letter mode or for letter areas, MTF is used.
- □ In photo mode or for photo areas, error diffusion is used.

Data Compensation Processing

- □ The machine uses gamma correction to compensate the digital signal to account for the characteristics of the scanner.
- The machine contains several gamma curves. The curve that is used depends on the image density setting selected by the user.

MTF Correction

Silver	Service	Manual,
page 2-	-14	

Silver Service Manual,

page 2-15

- MTF counteracts reductions to the original's contrast that occur during scanning.
- This is used in letter mode to sharpen up the image.
- After MTF processing, the data is converted to black and white depending on whether the pixel level is above or below a threshold.
- The threshold level used depends on the user's image density setting. The levels for each setting are not adjustable.

Error Diffusion

- **I** Error diffusion reduces the contrast between light and dark areas of halftone images.
- Each pixel is determined to be black or white, depending on whether it falls above or below a fixed threshold level.

Letter/Photo Area Separation

- In letter/photo mode, each pixel is compared with adjacent pixels as shown in the service manual, to determine whether it is in a letter or photo area.
 - Letter areas are treated with MTF as described earlier.
 - Photo areas are treated with error diffusion as described earlier.

Main Scan Magnification

Magnification in the sub scan direction is controlled by the ADF motor (ADF mode) or scanner motor (scanner mode).

Magnification in the main scan direction is controlled by an algorithm built into a chip on the MPU board.

Image Positioning (Main Scan Direction)

- □ If SP 31 (book mode) or SP 37 (ADF mode) is adjusted, the data is altered to move the image across the page.
 - For example, to move the image to the left, blank pixels will be removed at the start of each line.

Paste Shadow Erase Mode

- One problem with a CIS is that shadows appear on copies of paste-up originals.
- □ If the user selects this feature, the black/white threshold is lowered.
- □ This feature can be adjusted with SP 28.

THERMAL HEAD

THERMAL HEAD

Can be damaged if used when humidity is bigh

- The processed image data is printed by the thermal head, to produce a master.
- This machine uses a 300 dpi thermal head.
- A thermistor protects the thermal head from overheating.
 - Cut off temperature: 54 °C
- □ The resistance of the elements in the thermal head varies for each thermal head. Because of this, the thermal head voltage must be adjusted whenever a new thermal head or power supply board is installed.
- □ Note that the thermal head can be damaged if it is used when humidity is high.

Silver	Service	Manual,
page 2-	-16	

Silver Service Manual, page 2-17

Silver Service Manual, page 2-18 and 2-19



Silver Service Manual,



PRACTICAL WORK

SP Modes

SP modes with an asterisk against them can also be accessed by the user.

SP MODES
28: Paste Shadow Erase level
 29: Original background correction in photo mode, enabled/disabled
 31: Centre of copies, platen mode
37: Centre of copies, ADF mode

28: Paste Shadow Erase level

- Adjust this to a lighter setting if the shadows from paste-up originals are too dark.
- 29 *: Determines whether or not image background correction is done in photo mode
- □ 31: Side-to-side registration, platen mode
 - > This nudges the image to the left or right (at right angles to paper feed).
- □ 37: Side-to-side registration, ADF mode
 - > This nudges the image to the left or right (at right angles to paper feed).

Note that there is also a mechanical side-to-side shift mechanism, using a dial on the paper table. This will be described in the Paper Feed section of the course.

SP 31 and 37 were discussed in more detail in the Scanner section of the course.

Replacements

REPLACEMENT	
■ MPU Board	

After replacing the MPU, make sure to do the adjustments listed in the manual.

Silver Service Manual, page 6-10

☐ If the old RAM is used on the new board, only the ink detection and master end sensor adjustments are needed.

MASTER EJECT

RICCH



The master ejection mechanism is similar to the N810. There have been improvements aimed at preventing the master from wrapping around the eject rollers, and the pressure plate movement is different.



Silver Service Manual, p 2-20

- After printing, the used master remains on the drum to prevent ink drying on the drum.
- □ The drum master sensor checks whether there is a master on the drum.
 - For a new machine, there is no master on the drum. The eject process is skipped.
- □ The master clamper opens and the master eject rollers pick up the leading edge.
- □ The drum turns and the eject rollers feed the used master into the eject box.
- After one and a half drum rotations, the pressure plate compresses the used master into the box.

Silver Service Manual, p 2-21

MASTER CLAMPER OPENING



☐ This is similar to the N810, except that there are now two sensors: clamper open, and clamper closed

Opening the Clamp

Describe the mechanism. The main points are on the slide.

Locking the Drum

- At the same time as the clamper opens, the drum guide engages the pin at the rear of the drum.
- □ The clamper closes again when the eject rollers have grabbed the leading edge of the old master.
- □ When the clamper closes, the drum guide releases the pin and the drum can turn again.

The N810 also had a pin at the master making position. Engaging the pin at the master making position moved the leading edge by 1 mm, so this pin was removed from the Silver.

MASTER EJECT ROLLERS



Silver Service Manual, p 2-22

□ An independent motor drives these rollers.

□ The shape of the rollers was changed from those used in the N810, to prevent ejected masters from wrapping around them.

- Go over the sequence.
 - Clamper motor: Opens the clamper

- > Master eject motor: Picks up the leading edge, then stops
- Clamper motor: Closes the clamper
- Master eject motor: Feeds the master into the eject box while the drum turns slowly
- After one drum turn: Master eject motor stops, but the drum turns to the master feed position.

PRESSURE PLATE





- Go over the mechanism. The main points are on the slide.
- □ The pressure plate returns to home position after master making and cutting.
- Explain how the machine uses the pressure plate limit sensor to detect that the master box is full.

JAM DETECTION JAM DETECTION

Silver Service Manual, p 2-47

□ Make sure that the class is aware of how the machine detects eject jams.

PRACTICAL WORK

Maintenance

Silver Service Manual, section 5

Go over the maintenance for the master eject rollers and drum master sensor, using the maintenance table in the manual.

SP Modes

SP MODES



Silver Service Manual, starting at p 4-11

These SP modes are both intended to eliminate possible causes of master eject jams.

52: Compression before master making, enable/disable

- > SP 52 adds to the master processing time, so is disabled by default.
- □ 85: Full master eject box detection and compression at power up, enable/disable

Replacement

REPLACEMENT
Master eject unit

Silver Service Manual, p 6-24

□ Have the class remove and replace the parts on the slide.

MASTER FEED

RICCH



This is different from the N810 and older models in that the user does not have to trim the leading edge of the new roll manually. The roll is cut automatically when the cover is closed.



Silver Service Manual,



The drum stops at the master feed position, and the clamper opens.

- > The clamper mechanism was described in the Master Eject section.
- **The master is fed into the open clamper.**
 - > The master buckles upwards. This prevents shocks caused when the clamper is closed from travelling back to the thermal head area.

- □ The clamper closes, then the drum turns slowly.
- Drum rotation turns on and off to keep a buckle in the master.
- The tension roller keeps the master tight while it is being wrapped around the drum.

MASTER CLAMPER AND TENSION ROLLER



Silver Service Manual, p 2-26

□ The master clamper mechanism was described eariler.

- When the clamper opens, the tension roller in the master feed unit is pushed out of the way.
 - The tension roller is normally pushing against the guide plate, to keep the master tight while it is being wrapped around the drum.
 - However, this roller has to be moved out of the way to feed the master into the clamper.

CUTTER



Silver Service Manual, p 2-27

- Describe the cutter briefly. The main points are on the slide.
- □ When the master has been made, it is fed to the drum.
- □ When the master feed motor stops, the cutter cuts the master.
- □ After cutting, the drum continues turning to wrap the rest of the master.
- □ The leading edge of the master roll remains at the cutting position, ready to make the next master.

When a new roll is placed in the machine, there is no automatic feeding to the standby position. Therefore, the user must always put the leading edge in the correct position at installation. Also,, the machine does not cut off the leading edge of the new roll.

Silver Service Manual, p 2-48



There are no sensors in the master feed path.

□ The drum master sensor checks for a master feed jam after master making.

PRACTICAL WORK

 The drum master sensor checks for a jam when the drum is at the master eject position.

Service Remarks

SERVICE REMARKS



Go over the service remarks for the thermal head

Maintenance

- Go over the maintenance for the thermal head and platen roller, using the maintenance table in the manual.
- ☐ The thermal head should be cleaned every EM.

Silver Service Manual, p 2-19

Silver Service Manual, section 5

Silver Service Manual, starting at p 4-11

SP Modes

SP MODES

34: Thermal head energy (normal mode)
35: Thermal head energy (economy mode)

90: Thermal head test

34: Thermal head energy (normal mode)

- **3**5: Thermal head energy (economy mode)
- 90: Thermal head test
- □ 135: Master end sensor adjustment
 - > This is explained in the Replacement and Adjustment section below.
- □ 142: Master end detection, enable/disable
 - For test purposes only

Replacement and Adjustment

Silver Service Manual, p 6-17 to 6-23



Thermal Head

□ Installation is a bit tricky. Make sure that the class can install the thermal head correctly.

Thermal Head Voltage Adjustment

□ This must be done every time the thermal head or power supply board is replaced.

Use the outer two terminals of the connector as shown in the diagram. If the two test probes touch each other, the board will be damaged.

Turn RV2 slowly. If too much voltage is applied suddenly, the board will be damaged.

Master End Sensor Adjustment

D Do this every time the MPU has been changed.

This adjustment must be done even if the old RAM is placed on the new board.

DRUM RICCH SILVER TRAINING DRUM

This section describes the drum, including ink supply.



Go over the basic points on the slide.

DRUM DRIVE



□ The drum only turns clockwise.

- Main motor speed and drum stop positions are monitored by the encoder on the motor.
 - > Pulses are counted from feed start timing sensor actuation.
- □ There are only two stopping positions: master eject, master feed
 - > Master eject position: Detected also by the master eject position sensor
- Paper exit timing sensor, 2nd feed timing sensor: These tell the cpu when to check for paper jams

Silver Service Manual, p 2-28

Silver Service Manual, p 2-29



Describe the mechanism. The main points are on the slide.

- □ The ink roller only touches the screens when the press roller moves up to press the paper against the drum.
- □ The drum never reverses, but the user may reverse it by hand. The ink roller drive gear prevents the ink roller from turning at that time. If the ink roller reverses, ink will spill out from between the ink and doctor rollers, and make a mess inside the drum.



res even ink thickness on the ink rol

ctor roller ensu

The ink roller drive gear prevents the ink roller from being reversed manually.
The pressure roller presses the master against the ink roller.
Ink goes through the holes in the drum and master to the paper.

Silver	Service	Manual,
p 2-32		

- Describe the mechanism. The main points are on the slide.
- □ Note the ink supply mode, which is useful when installing a new drum.
 - This turns the drum 40 times, to supply ink to the new drum to prepare it for printing.

MASTER DETECTION ON THE DRUM

Silver Service Manual, p 2-33



Describe this briefly. The main points are on the slide.

PRACTICAL WORK

Service Remarks

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SERVICE REMARKS

Make sure that the main motor pulley is put back in the correct position.
Do not adjust the doctor roller gap.
Make sure the drum master clamper springs are put back properly.
Do not get ink on the inner surface of the clamping plate.
Clean the clamping plate with a soft cloth and water only.
Do not disassemble the ink roller unit.
Adjust the plunger position after replacing the ink pump.

Silver Service Manual, p 4-2

Go over the service remarks for the drum mechanisms.

Maintenance

Go over the maintenance for the drum and ink supply mechanisms, using the table in the manual.

☐ The main drive timing belt tension must be adjusted every 2 years.

SP Modes

□ 140: Ink detection enable/disable

Silver Service Manual, starting from p 4-11

Silver Service Manual,

section 5

Testing only. Also used to remove ink from inside the drum. If ink detection is disabled, ink is not supplied if ink runs out inside the ink roller.

Silver Service Manual, p 6-33 to 6-40

Replacement

REPLACEMENT • Drum cloth screen • Drum master clamper • Drum metal screen • Ink roller unit

Have the class remove and replace the parts on the slide.

Drum Screens/Drum Master Clamper

- □ It is best not to put the drum upside down. However, it is more convenient for removing the screens. But ink must be removed first.
 - > Use SP 140 and feed paper until there is no more ink.
 - > Don't forget to enable ink detection again afterwards.

Ink Roller Unit

Do not disassemble this unit.

Adjustments

Silver Service Manual, p 6-41 to 6-48

ADJUSTMENT
Ink detection
Ink pump plunger position
Main drive timing belt tension
 Main motor pulley position

Have the class try the adjustments on the slide.

Doctor Roller Gap

□ There is a procedure in the manual. However, do not try it in the field.

Ink Detection

This must be done when a new MPU is installed.

The adjustment value is not kept in the RAM, so putting the old RAM on the new board will not restore the old setting.

Ink Pump Plunger Position

D bo this after replacing the ink pump.

Main Motor Timing Belt Tension

☐ This must be adjusted whenever the timing belt is removed.

Main Motor Pulley Position

□ This must be adjusted whenever the pulley is removed.

PAPER FEED RICCH SILVER TRAINING PAPER FEED

This section explains how paper is fed to the drum and how printing pressure is applied.

OVERVIEW



Silver Service Manual, p 2-34

- □ The feed roller and friction pad only allow one sheet to pass into the machine.
- □ The registration roller feeds the paper to the drum. It synchronizes the leading edge of the paper with that of the master on the drum.

PAPER FEED



Silver	Service	Manual,
p 2-35		

 $\hfill\square$ Describe the mechanism. The main points are on the slide.

Silver Service Manual, p 2-36

FEED AND SEPARATION PRESSURE ADJUSTMENT



Describe these adjustments. The main points are on the slide.

□ If there are paper feed problems, adjust the feed roller pressure first. If that does not work, try the separation roller pressure.

□ The default positions are:

- Feed roller lever: Lower position
- Friction pad screw: Lower position

REGISTRATION ROLLER

Drive



Silver Service Manual, p 2-37

Describe this briefly. The main points are on the slide.

Roller Lifting/Lowering



Silver Service Manual, p 2-38

Describe this briefly. The main points are on the slide.





Describe the mechanism. The main points are as follows.

- **U** When the machine is not printing:
 - > The solenoid is off, and the press roller is locked in place away from the drum.
- **U** When the first sheet is fed:
 - > The solenoids turn on, but the roller is still locked in place.
- □ When the clamper reaches the press roller position:
 - The cam follower is at the high point of the cam on the drum flange (there is one cam at the front and one at the rear of the drum)
 - > The press roller is released from the stoppers
- □ When the clamper turns past the press roller position:
 - The press roller moves up into contact with the drum, as the high points of the cams on the drum flanges move away from the cam followers.
 - > The press roller presses the paper against the drum.
- □ If the registration sensor fails to detect paper:
 - The solenoids do not turn on.

Silver Service Manual, p 2-40



Lifting and Lowering

- Describe how the paper table motor and paper height sensor keep the top of the stack at the correct height for paper feed.
- □ The table lower limit sensor detects when the table has reached its lowest position.

Paper End

□ Point out the paper end sensor, under the paper table.

Side Fences

Silver Service Manual, p 2-41



- Describe the side fences and the lock lever.
- Describe the side-to-side shift mechanism (paper table shift dial).

Silver Service Manual, p 2-42

Side Fence Friction Pads



Describe this briefly.

It is normally used only for very thin paper. For normal types of paper, adjusting the feed and separation pressures should solve most feed problems. However, if the user is having problems with thin paper, ask them to install these pads.

JAM DETECTION



Silver Service Manual, p 2-49

- Describe how jams are detected.
- Use the timing chart if you wish to explain in detail about how feed and wrapping jams are detected.

PRACTICAL WORK

Service Remarks

SERVICE REMARKS

- Make sure that the friction pad base is put in the correct way around.
- Make sure that the paper feed and separation rollers are installed the correct way around.
- Do not touch the surfaces of the rollers with bare hands.
- After replacing the registration roller, do the registration roller clearance adjustment.

Silver Service Manual, р 4-1

Maintenance

Go over the maintenance for the paper feed components, using the table in the manual.

Silver Service Manual, section 5

Silver Service Manual, starting at p 4-11

SP Modes

SP MODES

SP MODES	
26: Registration motor on timing adjustment	

D 26: Registration motor on timing adjustment

- > Adjust this if paper registration is inaccurate.
- □ 141: Paper end detection, enable/disable
 - For testing only

Replacement

REPLACEMENT

Paper feed roller
Pick-up roller
Friction pad
Press roller

Silver Service Manual, p 6-25, 6-29

 $\hfill\square$ Have the class remove and replace the parts on the slide.

Rollers and Friction Pad

□ Make sure to install these parts the correct way around.

Press Roller

Be careful not to get hurt by the sudden upward movement of the press roller when the arm is disengaged.

Adjustment

Si	lver	Ser	rvice	Manual	L,	
р	6-26	to	6-28,	6-30	to	6-32

ADJUSTMENT

Separation pressure
Feed pressure
 Registration clearance
Press roller lock lever
Printing pressure

Have the class do the adjustments on the slide.

Feed and Separation Pressure

These adjustments are commonly used for products using the friction pad separation method.

They look very easy, but it is not easy to get them right. They are delicate adjustments, and they both affect each other. Because of this, it is not easy to get good results. So please stress to the class that they should not touch them normally.

However, the following explanation gives a broad outline of how to adjust them if it becomes necessary.

General Comment

Basically, adjust the feed pressure first. If that does not work, try the separation pressure.

Feed Pressure

- □ For non-feed problems, increase the feed pressure.
- □ For multi-feed problems, decrease the feed pressure.

Separation Pressure

- **□** For non-feed problems, decrease the separation pressure.
- □ For multi-feed problems, increase the separation pressure.

Registration Clearance

- Adjust this when paper is getting folded or wrinkled, or if jams occur at the registration roller.
- □ Also adjust after replacing the registration roller.

Press Roller Lock Lever

- Adjust this if the press roller is not contacting the drum properly, leading to insufficient transfer of ink, even though there is ink in the cartridge.
- This adjustment is needed when the lock levers at front and rear cannot be released by the solenoids at the same time.

The N810 only had one solenoid. The Silver has two, to make the adjustment more easy. In the N810, maintaining the correct gap was not easy, because the lock at the rear was operated by a link, and this delayed the operation for the lock at the rear, causing a difference in the gap from front to rear at the start of printing. Also, adjustment of the gap at the lock operated by the link was difficult.

Printing Pressure Adjustment

- □ The purpose of this is to improve the image density especially in solid fill areas.
- Normally, this is not done in the field for this model. With the latest inks, changing printing pressure does not affect image density very much, unlike with the inks used in older models.
- Therefore, this adjustment does not have to be covered in the class.

PAPER DELIVERY

RICCH



This section explains how paper is fed out of the machine to the delivery table.



Silver Service Manual,

p 2-43

Describe this briefly. The main points are on the slide.

DRIVE



Silver Service Manual, p 2-44

Describe this briefly. The main points are on the slide.

SEPARATION

Overview



4



U When printing starts:

- The pawl moves near the drum when the printing pressure is applied (the pawl shaft is moved by press roller lifting mechanism, discussed earlier).
- **D** During printing:
 - > The exit pawl is close to the drum to prevent paper wrapping jams.
 - > The tension from the spring keeps the pawl up against the drum.
- However, when the clamper approaches, the pawl must be moved away. This is done as follows:
 - The exit pawl shaft has cam followers at each end. These ride on the drum flanges.
 - When the clamper approaches, the high point of the cam approaches the cam follower, and the exit pawl moves away from the drum.

U When printing is finished:

The printing pressure release arm holds the exit pawl shaft down, so the pawl stays down even though the high point of the cam has moved away.

The drum flange also moves the press roller, as described in Paper Feed. Point out the press roller cam follower at this time.

Silver Service Manual, p 2-45

PRACTICAL WORK

Service Remarks

SERVICE REMARKS

 The exit pawl clearance must be adjusted before the drive timing.

Replacements

Silver Service Manual, p 4-2

Silver Service Manual, p 6-49 to 6-51

REPLACEMENT

Vacuum unit	
 Delivery belt 	
 Paper exit sensor 	
 Vacuum motor 	

□ Have the class remove and replace the parts listed on the slide.

Adjustments

ADJUSTMENT	
Exit pawl clearance	
Exit pawl drive timing	

□ Have the class try these adjustments.

They must be done in the order as shown on the slide.

Do these adjustments if:

- > There are paper wrap jams because the pawls are too far away
- > If the pawls are damaging the drum, because they are too close
- > If the pawls are being damaged by the master clamper

Silver Service Manual, p 6-52 to 6-54

MAINTENANCE

RICCH



ΡM

Silver Service Manual, section 5



- **D** Draw the attention of the class to the maintenance table.
- □ There are two types of PM interval, as shown on the slide.
- You might wish to have the trainees do a maintenance procedure on their machines

MAINTENANCE BY THE USER

- □ Note the items of user maintenance.
 - Exposure glass
 - Platen cover
 - > ADF separation roller

CHANGING THE SOFTWARE

This is done by replacing ROMs. There is no download procedure for this machine.

Operation Manual, Remarks

TROUBLESHOOTING

RICCH



This section goes over the troubleshooting tools built into the machine.

In the field, technicians will have to think for themselves and draw on their own experiences. However, the procedures in the manual will give some ideas for where to start to look when a particular problem occurs.

RESET PROCEDURES
■ SP 60
 Resets all SP modes to the defaults
■ SP 61
 Resets all SP modes to the defaults, except for adjustments

RESET PROCEDURES

□ Note the two different reset procedures.

TABLES

SC Codes

□ Make sure that the class is aware of this table.

Test Points/Dip Switches/LEDs

- **D** Draw the attention of the class to these tables.
- Many of these have already been mentioned in the various adjustment procedures in previous sections.

Silver Service Manual, page 4-14

> Silver Service Manual, section 4-3

Silver Service Manual, section 4-2

PRACTICAL WORK

Symptom Troubleshooting

- For image problems, also note that the Test pattern Image Mode can help to narrow down the location of the problem.
- □ Note the procedures in the operation manual for the following symptoms:
 - Dirt on the back of the paper
 - Dirt on the front of the paper
 - White or incomplete prints

SP Modes Related to Troubleshooting *Tests*

SP MODES - TESTS 90: Thermal head test 91: Image sensor test 95: Scanner free run 96: ADF test 130: Input tests 131: Output tests 135: Master end sensor output 132: Operation panel test

- **9**0: Thermal head test
- 91: Contact image sensor test
- **9**5: Scanner free run
- 96: ADF test
- **1**30: Input tests
- □ 131: Output tests
 - > 135: Master end sensor output
- □ 132: Operation panel test

Silver Service Manual, section 4-5

Operation Manual, What to do if ...

Counters



70 to 75: Jam counters

> 76: Clear these counters

Others

SP MODES - OTHERS

151: Machine serial number
152: Service telephone and fax numbers
153: Last service code

- **1**51: Machine serial number
- □ 152: Service telephone and fax numbers
- □ 153: Last service code

Practice

- Prepare samples of problem images and have the trainees determine what the problems are.
- Create some typical problems on the machines and have the trainees troubleshoot them. (For example, disconnect an electrical component or two.) This will give them practice troubleshooting problems that they know nothing about.