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# H558 Service Training

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# **Course Contents**

- **1. Product Outline**
- 2. Specifications
- 3. Installation
- 4. Machine Overview
- 5. Maintenance
- 6. Machine Functions
- 7. Replacement and Adjustment
- 8. Troubleshooting
- 9. Environmental Conservation

#### - A note to the training supervisor -

# This course was written assuming the following requirements. Modify as necessary depending on your situation.

- Preparation
  - Prior to starting this course, prepare the following items. -
    - > Training machine H558 (Model HL-F1) in the shipping box
    - A set of service tools
    - > The H558 (Model HL-F1) Field Service Manual
    - > The H558 (Model HL-F1) User's Manuals
- □ Requirements for trainees
  - Prior to starting this course, the following training or equivalent should be completed.

Fax basics course

Copier basics course

- The trainee should also be familiar with the Core Technology Manual and be able to reference it during training.
- □ Time required to complete this course: Less than 3 hours.

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**1. Product Overview** 



For the EU/Oceania version, an external telephone or external telephone answering device (TAD) can be attached to the EXT plug on the rear side.



□ Refer to the operating instructions for more details.





- □ There are slight differences in operation panels for different markets. Versions for the US and Asia/Oceania and for the EU are shown above.
- □ Refer to the Quick Start Guide for descriptions of the key functions.

# **Operation Panel 2**

#### **China Version**



- □ There are slight differences in operation panels for different markets. Version for China is shown above.
- □ Refer to the Quick Start Guide for descriptions of the key functions.





□ Toner yield: Approximately 2,500 sheets

Drum yield: Approximately 12,000 sheets

• The above yields based on A4 sheets with 5% coverage.

**Expected product life: 5 years or 50,000 prints** 

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2. Specifications

# **General Specifications**

**Resolution:** 

- Copy scan: 200 x 300 dpi
- Fax scan: Standard, Fine, Super fine, and Photo
- Print: 600 dpi
- □ Print speed: 14 ppm (A4), 15 ppm (8<sup>1</sup>/<sub>2</sub>" x 11")
- □ Fax speed: 2 s (approx., ITU-T #1, JBIG)
- □ First copy time: Less than 12 s
- □ Maximum Original Size: A4/8<sup>1</sup>/<sub>2</sub>" x 11"
- □ Paper tray capacity: 250 sheets
- **By-pass tray capacity: 1 sheet**
- □ ADF capacity: 20 sheets
- □ This slide shows the basic specifications.
- □ For more detailed specifications, see the field service manual.

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#### 3. Installation

#### **Overview**

- Generally, the user installs this machine.
   However, in addition to your maintenance duties, you may also have to install the machine when you are in the field.
- □ The full installation procedure is in the Setting Up the Machine section of the Quick Setup Guide.

#### □ Before you start installation:

- Check the accessories.
- Confirm the location to install the machine.

# **Install the Machine**

#### □ The following are the main steps to installation. Refer to the Quick Setup Guide (QSG) for details.

- Attach the ADF document output support.
- Install the drum unit.
- Load paper in the paper tray.
- Connect the power cord.
- Connect the phone line.
- Do the initial setup
  - » Set the country.
  - » Set the language (if different from the country).
  - » Set the date and time.
  - » Set the station ID (name and fax number to be printed on all fax pages sent).
  - » Set the receive mode.

□ In addition to the above, the user may ask you to set up their computer for printing. (Refer to the QSG.)

□ The *User's Guide* contains a lot more information about machine setup options. Familiarize yourself with it in case the user requests your help.

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4. Machine Overview



#### □ Main print engine components viewed in cross-section. (The name table is in the notes. Use Notes Page view.)

1. Eject roller assembly	16. Feed roller
2. Halogen heater	17. Lift arm
3. Corona wire	18. Registration rear actuator
4. Polygon mirror motor	19. Toner supply roller
5. Metering blade	20. Development roller
6. Laser unit	21. Transfer roller
7. Pinch roller	22. Drum
8. Drum/toner assembly	23. Cleaning brush
9. Paper feed roller	24. Paper
10. Registration front actuator	25. Paper tray
11. Pinch roller	26. Pressure roller
12. Separation roller	27. Paper eject actuator
13. Trail edge actuator	28. Heat roller
14. Pressure roller	29. Fixing unit
15. Separation pad	30. Back cover

□ Familiarize yourself with the main components.

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□ For the document path see the *ADF Component Layout* slide.

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**5. Service Maintenance** (Maintenance Mode, Cleaning)

# **Maintenance Mode Start**

- When you enter Maintenance Mode, the machine beeps for approx. one second and displays "MAINTENANCE" on the LCD. (This is the initial stage of the Maintenance Mode.)
- Enter the proper 2-digit function code to select a Maintenance Mode function. (See the "List of Maintenance Mode Functions".)

#### Notes:

- To exit from the maintenance mode and switch to standby, press the 9 key twice in the initial stage of the maintenance mode.
- Pressing the "Stop/Exit" key after entering only one digit restores the machine to the initial stage of the maintenance mode.
- If an invalid function code is entered, the machine resumes the initial stage of the maintenance mode.

List of	Maintenance	Mode	<b>Functions</b>

	Function Code	Function	Reference Pag
	01	EEPROM Parameter Initialization	p.131
User accessible functions	05	Printout of Scanning Compensation Data	p.132
	08	ADF Performance Test	p.133
	09	Test Pattern	p.133
	10	Firmware Switch Setting	p.133
	11	Printout of Firmware Switch Data	p.137
	12	Operational Check of LCD	p.137
	13	Operational Check of Control Panel PCB	p.138
	16	Adjustment of Handset Volume	p.139
	32	Sensor Operational Check	p.140

- **□** Function code numbers that are bold can be accessed by users.
- Go to the machine and practice using the Maintenance Mode functions.
  - Refer the the "Detailed Description of Maintenance-Mode Functions" section in the FSM for details of each function.
- □ Refer to "User-Access to The Maintenance Mode" in the FSM for details about user access procedures.



- □ Refer to the FSM for all details about the firmware update procedure.
- □ To confirm the firmware version, press the \* and # keys while in standby. The firmware version will display in the LCD.

# **Setting the Machine ID Code**



# **Customizing Local Codes**

- □ Local setting codes for language, function settings, and firmware switches are held in EEPROM.
- If the main board is replaced, these codes must be set for the local conditions using Maintenance Mode function 74.
- □ Follow the procedure in the FSM (EEPROM Customizing Codes).



# Cleaning

- This machine designed for user maintenance; so, it does not have a periodic maintenance schedule.
- As a preventive maintenance measure, you may need to clean machine components during service calls.
- Go to the machine and practice cleaning procedures.
  - Pay particular attention to cleaning the drum.
  - Refer to the User's Guide for the cleaning procedures.
  - Pay particular attention to important notes and cautions.

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6. Machine Functions



- □ The document feeding mechanism components are not in a separate unit. (There is no separate ADF as a unit.)
  - The upper guide, feed rollers, pressure plate, and exit rollers are built into the under side of the operation panel.
  - The pick-up roller, pinch rollers and CIS are built into the top of the main unit.
  - Actuator F actuates the document front sensor when documents are inserted.
  - > Actuator R actuates the document rear sensor (for misfeed detection).
- □ There is a separate scanner motor to feed documents.
- □ The feed system is functionally equivalent to the *Friction Pad* feed mechanism with the separation rubber acting as the friction pad (see the Core Technology Manual).

#### **Scanning** □ A pressure plate holds the document against the CIS (contact image sensor) as the document passes. Pressure plate □ The CIS scans the document and sends image data to the main PCB. □ The CIS consists of: An LED array which illuminates documents, • A self-focusing optic array which collects the reflected light, • A PCB with photosensitive elements which converts the light to electrical signals and outputs picture element data to the main CIS unit board.

See the Core Technology Manual for more details about Contact Image Sensor (CIS) operation.



- The registration front actuator actuates the registration front sensor when paper is fed. The trailing edge actuator actuates the trailing edge sensor when the trailing edge of the paper being fed passes. Both are used for misfeed/jam detection.
- This is a typical friction pad feed system. (In this machine the friction pad is called a separation pad.) For a general discussion of the *friction pad* feed system, see the Core Technology Manual.
- Due to the manufacturing source, part names in this product differ slightly from some previous products. The following are name equivalencies.
   Feed roller = Pick-up roller
   Separation roller = Feed roller
   Separation pad = Friction pad
   Paper feed roller = Registration roller



- In the idle condition the stopper holds the separation roller gear with the "no cog" section facing the drive gear so that drive is not transmitted to the separation roller gear.
- □ The feed solenoid turns on to initiate the feed sequence.
  - > The solenoid pulls down the stopper, releasing the separation roller gear.
  - The spring rotates the separation roller gear so that it engages the drive gear.
  - > The feed roller and separation roller then rotate, feeding a sheet of paper.
- □ After one turn the stopper engages the separation roller gear again and paper feed drive stops.



- □ The lift plate is down when the paper tray is inserted into the machine. After the tray is inserted, the paper is lifted as follows.
  - 1. Main motor drive goes from the lift drive gear assembly through a series of gears to the lift arm gear. The lift arm gear rotates the lift arm to raise the lift plate.
  - 2. As the lift plate moves up, the paper contacts and pushes up the pick-up roller assembly (feed roller + separation roller).
  - 3. The end of the link lever attached to the pick-up roller assembly moves up and the opposite end of the link lever moves down.
  - 4. The link lever pushes down pawl B.
  - 5. Pawl B releases the sector cam.
  - 6. The sector cam rotates approximately three quarters.
  - 7. Pawl C stops cam rotation.
  - 8. At that position Pawl A is lifted by the sector cam.
  - 9. This releases the ratchet of the lift drive gear assembly (which had been fixed by pawl A).
  - 10. When the ratchet is released, the outer gear of the lift drive gear assembly stops rotating and paper lift stops.
  - (Note: The lift drive gear assembly has three parts an inner gear, an outer gear, and the ratchet. When the ratchet is held by pawl A, the outer gear turns; when it is released, the inner gear turns.)

# Paper Transport & Image Registration

- Skew correction is done by the paper feed rollers.
- After skew correction, the paper feed rollers start turning and advance the paper.
- The registration rear actuator sets the timing for writing the image to the to the exposure drum. (i.e.: image and paper registration)
- The image is transferred to the paper as it passes between the transfer roller and the exposure drum.









Refer to the Core Technology Manual for more information about laser printing systems.

#### **Print Processes 3 – Development & Transfer**



- **Gamma** Supply roller applies toner to the development roller.
- Metering blade controls the thickness of the layer of toner on the development roller.
- **U** Toner is attracted to the latent image areas, thereby developing the image.
- Negatively charged transfer roller attracts the positively charged toner from the drum to the paper.
- Toner is non-magnetic. It gets a triboelectric positive charge from the rotation of the supply roller and development roller.
- □ The electrostatic potential between the development roller and the OPC drum causes the toner to be attracted to the latent image areas on the drum surface.
- □ Transfer roller cleaning:
  - If the toner is not transferred onto the paper perfectly it is possible that there may be residual toner on the drum which will adhere to the transfer roller. The transfer roller voltage changes to a positive voltage during nonprinting rotation of the drum. This causes positively charged toner particles on the transfer roller to return to the drum – thereby cleaning the transfer roller.

# **Print Processes 4 – Image Fixing**



Due to the manufacturing source, part names in this product differ slightly from most previous products. The following are name equivalencies.
 Heat roller = Hot roller
 Fixing unit = Fusing unit
 Halogen heater = Fusing lamp

# <image><complex-block><list-item><list-item><list-item>

□ See the next slide for development bias control.



- □ When the new toner sensor detects a new toner cartridge, the development bias is set to +450V.
- Over time the toner particles lose some capacity to hold charge; so, the development bias is stepped down according to the number of prints.
- □ You can do a forced reset as follows:
  - 1. Open the front cover.
  - 2. Press the Options key.
  - 3. Press \*, 1, 1.
  - 4. Close the front cover.

# RICOH H558 Service Training 7. Replacement and Adjustment

Before You Start	
Received Fax Data	
<ul> <li>If the machine is unplugged from the wall socket, received fax data in the machine will be lost.</li> <li>Transfer received fax data to another machine before unplugging the power cord.</li> <li>Follow the Transferring Received Fax Data procedure in the FSM.</li> </ul>	
Safety Precautions	
<ul> <li>It is important to observe the all safety precautions during maintenance work.</li> <li>Refer to the list of safety precautions in the service manual (Before you do -&gt; Safety Precautions).</li> <li>Additionally, pay attention to all notes and cautions related to specific procedures elsewhere in the FSM.</li> </ul>	









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8. Troubleshooting

# **Troubleshooting Overview**

The H558 fax machine, the FSM, and the User's Guide provide multiple resources to help you troubleshoot problems.

#### □ Three types of LCD errors displayed

- Error messages (guidance in normal language) documented in the FSM and User's Guide.
- Error codes ("MACHNINE ERROR XX") documented in the FSM.
- Communication errors documented in the FSM

#### Troubleshooting Procedures

 The FSM and the User's Guide provide detailed troubleshooting procedures for the most common problems.

□ The above items will be covered in the following slides.

#### **Error Messages**

- Upon detecting an error, the machine gives an alarm (continuous beeping) for about 4 seconds and displays a message giving guidance in normal language.
- The user should be able to clear most of these conditions. However, you must also be prepared to deal with them.
- □ See the FSM Appendix or the User's Guide for a list of the error messages.
  - The User's Guide may have messages related to local telephone conditions/regulations that are not in the FSM.

#### □ Practice:

- Study the error message table in the FSM appendix and User's Guide.
- Simulate some of the error conditions on the machine.



#### **Communication Error Codes**



□ The training supervisor is responsible for setting up an environment to allow error condition simulations.





□ You should familiarize yourself with the troubleshooting section of the User's Guide in addition to the troubleshooting information in the FSM.



□ This section explains the technology used in this machine for environmental conservation, and the default settings of related functions.



Description - Reduction of warm-up time (Energy saving) - Reduction of CO <sub>2</sub> emissions	H558
- Reduction of warm-up time (Energy saving) - Reduction of CO <sub>2</sub> emissions	
Allows documentation to be managed digitally, cutting down on paper consumption.     Improves machine productivity when printing out duplex (double-sided) images.	
- Improves machine productivity when printing out duplex (double-sided) images	
Low ozone emissions     Energy saving     Conservation of materials/resources (reduced toner     consumption)	*
- Low noise	*
- Minimization of harmful substances	*
- Conservation of materials/resources	
	Improves machine productivity when printing out     duplex (double-sided) images.     Improves machine productivity when printing out     duplex (double-sided) images     Low ozone emissions     Energy saving     Conservation of materials/resources (reduced toner     consumption)     Low noise     Minimization of harmful substances     Conservation of materials/resources

□ This slide explains what technologies are used for conserving the environment in this product.

# Descriptions of the Technologies 1.QSU (Quick Start-up) This technology reduces both the amount of energy consumed while in Standby mode (the Ready condition) is reduced, as well as the time it takes for the machine to warm up to the Ready condition. This is made possible through the utilization of dual fusing lamp heating, low fusing point toner, a pressure roller with a "sponge" surface layer, and a thin surface layer hot roller.

#### **2. Hybrid QSU**

• This technology adds an additional circuit to conventional QSU Technology, which allows the benefits of reduced energy consumption and reduced warm-up time described above to be extended to high-speed machines.

#### **Brief Descriptions of the Technologies**

#### **3. IH QSU**

 This technology incorporates IH (Inductance Heating) technology into conventional QSU technology, which allows the benefits of reduced energy consumption and reduced warm-up time to be extended to color machines.

#### □ 4. Paper-saving features

1) The duplex (double-sided) and Combine features reduce paper consumption.
2) The Document Server and other electronic document management features reduce paper consumption by offering an electronic method for storing and managing important documents.

#### **Brief Descriptions of the Technologies**

#### □ 5. High-speed duplex output

- 1) Enables high-speed duplex printing through the utilization of the Duplex Interleaf and highspeed Inverter Transport features.
- 2) Enables quick printing of duplex jobs through the use of Duplex Scanning.

#### **G** 6. Ozone reduction design

- Greatly reduces the machine's ozone emissions to near-zero levels by utilizing:
  - 1) A charge roller/belt instead of a corona wire
  - 2) An image transfer roller/belt instead of a
  - corona wire-based transfer system

#### **Brief Descriptions of the Technologies**

#### □ 7. PxP (polymerized) toner

- "PxP toner" is a fine-particle, polyester resin based toner, manufactured using a Ricoh-original polymerization method instead of the conventional pulverization method.
- This allows the toner to fuse at a lower temperature, which reduces the impact on the environment and contributes to achieving even higher image quality than before.
- PxP toner also has other benefits, including a reduction in the amount of toner needed to develop the image, as well as an approximate 35% reduction in CO<sub>2</sub> emissions during the toner manufacturing process.

#### **Brief Descriptions of the Technologies**

#### **8.** Noise reduction design

- 1) The machine and its components are designed to minimize the overall noise generated by the machine. As a result, all noise levels conform to the local laws and regulations as well as user requirements in each market in which the products are sold.
- 2) Reduces the noise generated by the polygon mirror motor.

#### **9.** Minimization of harmful substances

- 1) Products sold in the EU conform to the RoHS Directive.
- 2) Products sold in China conform to China's version of the RoHS Directive.
- 3) In addition, Ricoh imposes strict internal standards for limiting the presence of harmful substances.

#### **Brief Descriptions of the Technologies**

#### **10. Environmentally-friendly toner bottle**

- A changeover from PS/PP/HDP to PET plastics allows approximately 40 percent by weight of the toner bottle to be recycled, and also reduces CO<sub>2</sub> emissions that occur during the toner bottle manufacturing process.
- □ 11. Toner recycling
  - Enables effective use of resources by recycling (reusing) the toner left over on the drum surface after image transfer.

#### □ 12. Recycle-friendly design

- To maximize the recycling ratio of machine and component materials, as well as the ease of performing the recycling in the field, machine sections and components are designed so that the recyclable parts can be separated out easily.
- In addition, components are designed so that they can be reused for as long as possible after the machine has reached its operational lifetime.



- When the machine is not being used, the machine enters energy saver mode to reduce the power consumption by turning off the LCD of the operation panel and lowering the fusing temperature.
- □ The area shaded green in this diagram represents the amount of energy that is saved when the timers are at the default settings. If the timers are changed, then the energy saved will be different. For example, if the timers are all set to 240 minutes, the green area will disappear, and no energy is saved before 240 minutes expires.
- Power consumption during warm-up may be much higher than shown in this diagram.



- The user can set these timers with User Tools MFP/ Priport: User Tools > System settings > Timer Setting Printer : User Tools > System settings > Energy Saver Timer
- □ Normally, Panel Off timer < Energy Saver timer < Auto Off timer.
- But, for example, if Auto Off timer < or = Panel Off timer and Energy Saver timer, the machine goes immediately to Off mode when the Auto Off timer expires. It skips the Panel Off and Energy Saver modes.
- Example
  - > Panel off: 1 minutem Low power: 15 minutes, Auto Off: 1 minute
  - The machine goes to Off mode after 1 minute. Panel Off and Low Power modes are not used.
- □ We recommend that the default settings should be kept.
  - If the customer requests that these settings should be changed, please explain that their energy costs could increase, and that they should consider the effects on the environment of extra energy use.
  - If it is necessary to change the settings, please try to make sure that the Auto Off timer is not too long. Try with a shorter setting first, such as 30 minutes, then go to a longer one (such as 60 minutes) if the customer is not satisfied.
  - If the timers are all set to the maximum value, the machine will not begin saving energy until 240 minutes has expired after the last job. This means that after the customer has finished using the machine for the day, energy will be consumed that could otherwise be saved.
  - If you change the settings, the energy consumed can be measured using SP8941, as explained later in this presentation.
- Power consumption during warm-up may be much higher than shown in this diagram.



- □ This timing chart shows what happens if the operation switch is pressed while the machine in off mode.
- □ Power consumption during warm-up may be much higher than shown in this diagram.

