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scamaster4500



User Guide



Imaging that makes a difference.™

scamaster4500



User Guide

Part Number HTM092
Revision D



Imaging that makes a difference.™

Declaration of Conformity

We,

Howtek, Inc.
21 Park Avenue
Hudson, NH 03051

declare under our sole responsibility that the product:


**D4000 & D4000-02 Scanners
including Scanmaster 4500**

to which this declaration relates, is in conformity with the following standards or other normative documents:

Product Safety: EN60950

EMC: EN55022, Class A
EN50082-1: 1992

Following the provisions of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.

Signature: 

Name: M. Russell Leonard

Title: Chief Operating Officer

Date: November 22, 1995

Place: Hudson, New Hampshire (USA)

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Scanmaster 4500 User Guide
Howtek part number: HTM092
Produced in the United States of America

Howtek Inc.
21 Park Ave.
Hudson, NH 03051

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Preface

Congratulations on the purchase of your new Scanmaster 4500 from Howtek, Inc.! We at Howtek are committed to helping you start scanning as quickly as possible. This document is designed to prepare and inform you of the system and site requirements for using your scanner.

This document contains information on:

- ◆ Installing, configuring, and setting up your Scanmaster 4500.
- ◆ Using the Scanmaster 4500 control panel and mounting originals on the drum.
- ◆ Maintaining your scanner and troubleshooting in the event of a problem.

Please read the installation instructions carefully. Proper installation and configuration will ensure safe and efficient operation of your Scanmaster 4500. If you have any questions, please contact your local dealer.

Guide Conventions

The following typographical conventions are used throughout this guide:

- ◆ Control panel messages and buttons are indicated in all capital letters, e.g.: OFFLINE, ENTER, etc.

Note: Provides useful information about the current topic.

CAUTION: Provides information for the prevention of damage to the hardware.



WARNING! Provides information to prevent injury to the scanner operator.

Related Documentation

This guide provides details on using the Scanmaster 4500. However, you may need additional information contained in other documents. Your computer's installation guide provides detailed instructions for installing the interface card in the computer and cabling the scanner. The user guide for your software application contains instructions for controlling the scanner from the computer and processing the resulting images.

1



Installation and Setup

Installation Requirements

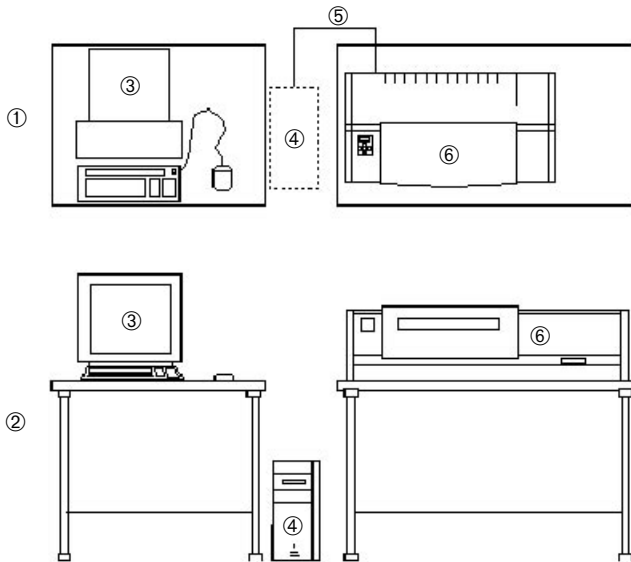
Before installing your Howtek Scanmaster 4500, make sure the following installation requirements are met.

Physical Requirements

A rigid and sturdy table must be installed in the scanner room (it must be able to support at least 135 lbs (61 kg) and be free of vibrations). Allow for sufficient clearance (at least 1.5 feet [45 cm]) around the scanner and its furniture for cables, ventilation, and access by operating personnel. See Figure 1-1.

Figure 1-1
Recommended
system layout.

- ①—Overhead view.
- ②—Front view.
- ③—Monitor.
- ④—CPU.
- ⑤—SCSI cable (2 m).
- ⑥—Scanmaster 4500.



If you have purchased the optional Drum Mounting Station, you will need a separate table large enough to accommodate it. The dimensions of the Drum Mounting Station are: 15" W x 16" L x 6" H (38 cm x 41 cm x 15 cm).

Electrical Specifications

The specified operating range for the Scanmaster 4500 is as follows:

110 Volt Systems (North America)

- ◆ Low operating range: 90–132 VAC (47–63 Hz).
- ◆ At a minimum, use a 10 amp circuit (the scanner draws up to 6 amps peak).

220 Volt Systems

- ◆ High operating range: 180–264 VAC (47–63 Hz).
- ◆ At a minimum, use a 5 amp circuit (the scanner draws up to 3 amps peak).

The Scanmaster 4500 is equipped with an autoranging power supply and requires a 3-prong grounded receptacle and common ground potential.

Note: It is recommended that your entire system be connected to an Uninterruptible Power Supply (UPS) or, at a minimum, plugged directly into surge-protected power strips.

Host System Configuration

The host computer system must meet the following minimum requirements:

Macintosh

- ◆ Quadra series with Floating Point Coprocessor installed (Power Macintosh™ recommended).
- ◆ 64 MB of RAM.
- ◆ 24-bit color display adapter.
- ◆ 17" or larger high-resolution monitor (1024 x 768 dpi).
- ◆ 1 GB hard drive.
- ◆ System 7.1 or higher.
- ◆ SCSI cable – 25-pin to 50-pin Apple system cable*.

** Please refer to Page 1-15.*

Note: Your system must have an active SCSI terminator plugged into one of the two 50-pin SCSI ports on the back of the Scanmaster 4500. One active terminator is shipped with your scanner.

PC/Windows

- ◆ PC 486DX – 66 Mhz with 1 available EISA or VESA local bus slot for one of the SCSI boards listed below (Pentium processor recommended).
- ◆ 64 MB of RAM.
- ◆ 24-bit color display adapter*.
- ◆ 17" or larger high-resolution monitor (1024 x 768 dpi).
- ◆ 1 GB hard drive.
- ◆ Adaptec SCSI board – AHA-1742, AHA-2740/42 or AHA-2842**.
- ◆ SCSI cable.
- ◆ Windows 3.1 with a graphics display application, e.g. Adobe Photoshop.

* Please refer to Howtek Document HTB111 Rev. C.

** Please refer to Howtek Document HTB109.

Note: Your system must have an active SCSI terminator plugged into one of the two 50-pin SCSI ports on the back of the Scanmaster 4500. One active terminator is shipped with your scanner.

Installing the Scanmaster 4500

Follow the procedures below to unpack and install your Scanmaster 4500.

Receiving the Scanmaster 4500

Your facility must have a suitable location for receiving and unpacking the Scanmaster 4500 (e.g. a loading dock). For the physical specifications and weights of the pallet and the scanner, see Chapter 7.

Make sure there is free access to the scanner's proposed location. A forklift or pallet jack is helpful, but not required, to off-load the palletized scanner from the truck and move it to its location. If the Scanmaster 4500 is to be installed on an upper floor, an elevator large enough to hold the scanner and pallet should be used, if available.

Note: The scanner itself weighs 135 lbs (61 kg). If necessary, it can be carried by 2–4 people, although this is not recommended.

Moving the Scanmaster 4500 to the Scanner Location

Move the Scanmaster 4500 strapped to the pallet to the scanner location before unpacking. Avoid jarring or bumping the scanner while transporting it.

Unpacking and Setup



WARNING! Follow the instructions below carefully to unpack your scanner. Failure to do so could result in damage to the scanner or personal injury.

Carefully unpack each carton. Report any damage to your dealer immediately.

The Scanmaster 4500, Drum and Accessories Kit, and optional Drum Mounting Station are shipped in readily-identifiable cartons.

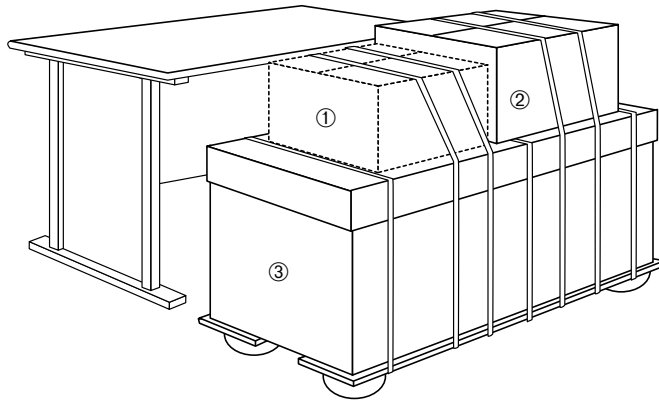
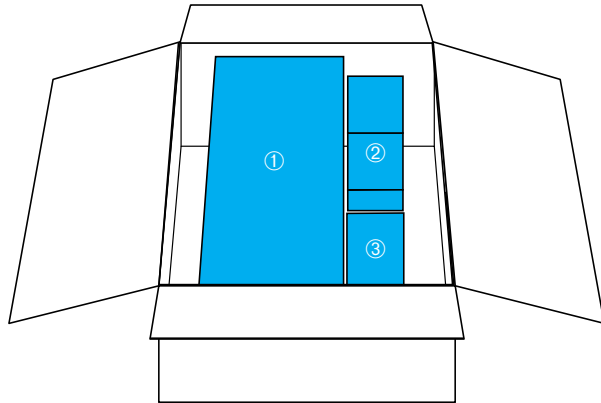


Figure 1-2
Shipping cartons.
①-Drum Mounting
Station (optional).
②-Drum and Acces-
sories Kit.
③-Scanmaster 4500.

Unpacking the Drum and Accessories Kit (small carton)

Unpack the carton labeled “Drum and Accessories Kit” first since you will need the 3/16" ball driver, contained in the large plastic bag with the power cord, to unbolt the scanner mechanism. Cut the bands securing the boxes to the pallet.

Figure 1-3
Drum and
Accessories Kit.
①-Drum.
②-Software Kit.
③-Scanner Kit.



Please take a minute to verify the contents of the Drum and Accessories Kit:

- ◆ 3/16" ball driver.
- ◆ Mounting kit (cleaning and image mounting materials).
- ◆ Spare drive belt.
- ◆ Power cord.
- ◆ Imaging drum.
- ◆ Active SCSI terminator.
- ◆ Leadscrew lubricant (3 grams).
- ◆ Software kit (3.5" diskettes).

Report any missing items to your Howtek dealer immediately.

To unpack the scanner (large carton), follow these steps:

1. Cut the two packing straps and lift the cardboard cover and box off the pallet. Remove the foam supports and poly bag from the scanner.

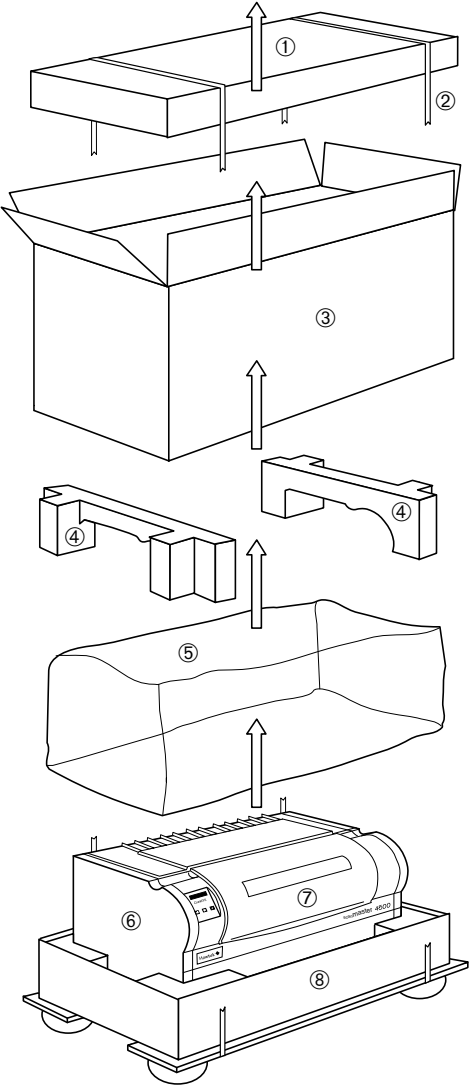
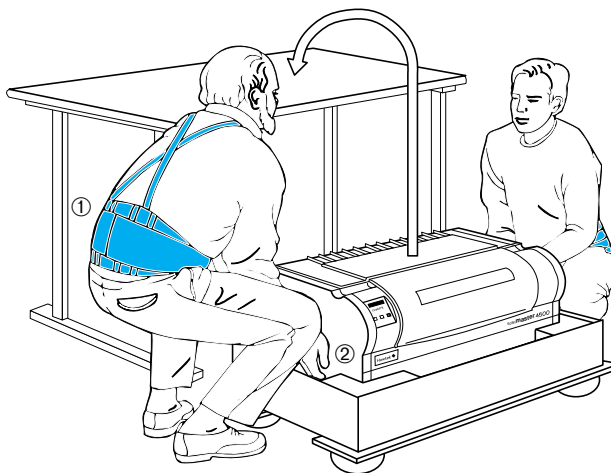


Figure 1-4
Unpacking
the Scanmaster 4500.
①-Cardboard cover.
②-Packing straps.
③-Cardboard box.
④-Foam supports.
⑤-Poly bag.
⑥-Scanmaster 4500.
⑦-Drum access door.
⑧-Pallet.

2. Stand facing your helper with the scanner between you. Bend your knees, keeping your back straight. Slide your hands into the hand holds at the end of the scanner, lift with your legs to protect your back, and carefully place the scanner on a stable surface.

Figure 1-5
Lifting the
Scanmaster 4500.
①-Back brace (highly
recommended).
②-Hand holds.



WARNING! When moving the Scanmaster 4500, always lift it, do not slide it.

3. Remove the white tape securing the drum access door and stick the tape to the inside of the resealable bag that contains the power cord (for safekeeping).

4. Open the drum access door. Using the 3/16" ball driver from the Drum and Accessories Kit, remove the two shipping bolts with yellow tops.

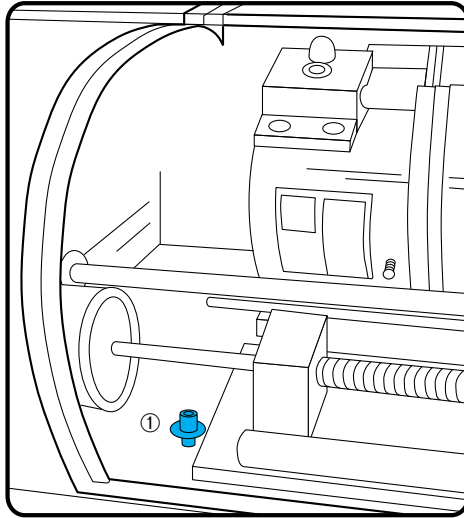
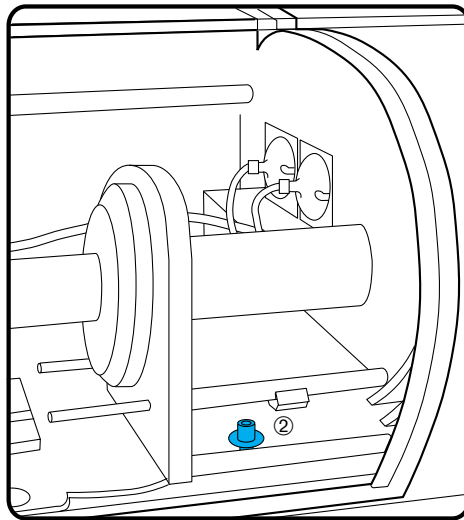


Figure 1-6
Shipping bolts.

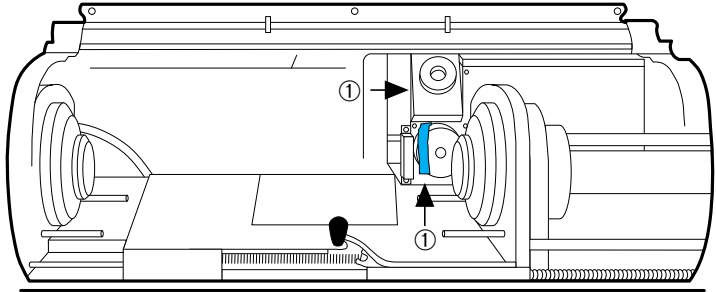
①-Left.

②-Right.



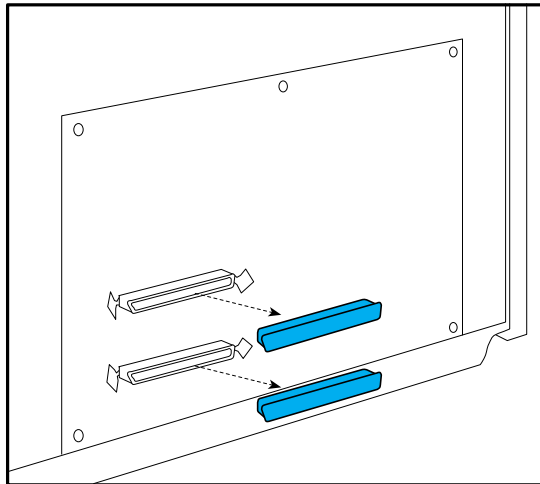
5. Remove the white tape from both the Fiber Optic Reflective Illuminator (FORI) and the flip mirror and stick the tape to the inside of the large resealable bag containing the power cord.

Figure 1-7
Tape removal.
①-Tape (white).



6. Remove the two white plastic covers on the SCSI ports, located on the right rear of the scanner and place them in the large resealable bag containing the power cord.

Figure 1-8
SCSI cover removal



7. Close the drum access door by lifting the door slightly and pulling the support lever at the lower left side of the door toward you, then lower the door.
8. Store all packing materials, including the pallet, in a secure, dry area for later use in transporting the scanner, should it become necessary. Place the following items in the large resealable bag that contained the power cord:
 - ◆ 3/16" ball driver.
 - ◆ Two shipping bolts and washers.
 - ◆ Two white plastic covers from the SCSI ports.
 - ◆ Tape from the drum access door and the FORI.

Connecting the Scanmaster 4500

This section outlines steps to connect the power and interface cables to the scanner.

Connecting Power

1. The power switch is located on the left rear of the scanner. Make sure the power switch is in the OFF position (press the **O** side of the switch).
2. Plug one end of the power cord into the power cord receptacle located below the power switch.
3. Plug the other end of the power cord into a grounded AC outlet.



WARNING! Always plug the scanner into a grounded AC outlet. Have an electrician verify that your outlets are correctly grounded. Protect against power line surges by using a surge suppressor.

Connecting the SCSI Cable

The Scanmaster 4500 uses the Small Computer System Interface (SCSI). The SCSI port permits high-speed communication between the scanner and the computer. Up to seven SCSI peripheral devices (such as scanners, hard disk drives, tape backup drives, CD-ROM drives, and printers) may be attached to your computer at the same time.

Only one SCSI device is cabled directly to the computer. The other SCSI devices are cabled to each other to form a so-called “daisy chain.” The combined length of cables in the daisy chain may not exceed 19 feet (5.8 m). The SCSI devices’ priority in communicating with the computer is determined not by their arrangement in the chain, but by their SCSI ID numbers.

CAUTION: Each SCSI device must have a unique SCSI ID number. Failure to follow this precaution could result in damage to your equipment.

To ensure accurate transmission of data between the computer and the SCSI devices connected to it, a special connector called an **active SCSI terminator** must be placed at each end of the SCSI chain. Some computers and some devices have an internal terminator. The Scanmaster 4500 is NOT internally terminated.

Macintosh SCSI Connections

To connect your scanner to a Macintosh computer using the SCSI port, follow these steps:

1. Turn off power to the computer and to all attached devices. The computer and all devices should remain plugged into grounded outlets.

2. Make sure you have the proper SCSI cables for your needs:

SCSI system cable: Use this cable if the Scanmaster 4500 is the only SCSI device connected to your Macintosh. Refer to Figure 1-9.

SCSI peripheral interface cable: Connect this cable to the last device in the SCSI chain if more than one SCSI device is connected to your Macintosh. Refer to Figure 1-9.

Cables from the following two manufacturers have been tested by Howtek and found to function properly:

- ◆ Apple SCSI system cables 1.64 feet (0.5 m), P/N M0206.
- ◆ Apple SCSI peripheral cables 3.28 feet (1 m), P/N M0207.
- ◆ Apple SCSI extender cables 3.28 feet (1 m), P/N M0208.
- ◆ Belden SCSI peripheral cables 6.56 feet (2 m), P/N 49801.

Active SCSI terminator: supplied in the Drum and Accessories Kit.

3. Connect the SCSI cables as outlined below, depending on your configuration.

If the Scanmaster 4500 is the only SCSI device attached to the SCSI port of your Macintosh:

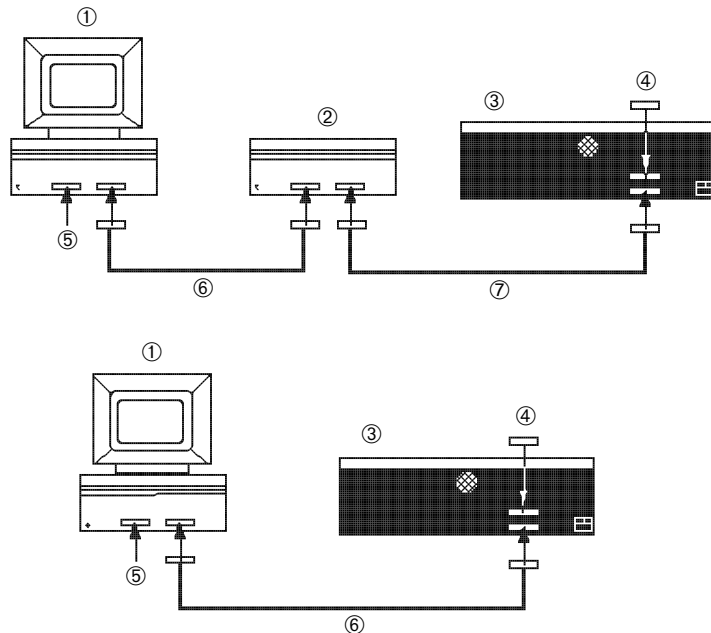
- ◆ Connect one end of the SCSI system cable to your Macintosh and the other end to the scanner.
- ◆ Attach the active terminator to the unused SCSI port on the Scanmaster 4500.

If there is more than one SCSI device attached to your Macintosh:

- ◆ Locate the last device in the chain and disconnect its terminator (if present).
- ◆ Connect one end of the SCSI peripheral interface cable to the open port on the last SCSI device and the other end to one of the SCSI ports on the Scanmaster 4500.
- ◆ Attach the active terminator to the unused SCSI port on the scanner.

Figure 1-9
Macintosh SCSI
connections.

- ①-Macintosh.
- ②-SCSI device.
- ③-Scanmaster 4500.
- ④-Active SCSI terminator.
- ⑤-Internal termination.
- ⑥-SCSI system cable.
- ⑦-SCSI peripheral interface cable.



PCs and Compatibles

Note: For proper operation, your scanner's SCSI interface should only be driven with the recommended SCSI controller and terminator. Howtek can only guarantee correct operation if the Scanmaster 4500 is the only device on the SCSI bus. Refer to the guidelines below for a list of recommended SCSI adapters.

Adaptec SCSI boards:

EISA Bus AHA-1740/42AT*

EISA Bus AHA-2740/42AT Kit**

VESA Bus AHA-2842VL

** The AHA-1740/42AT board has 2 connections but it has only 1 SCSI bus.*

*** The AHA-2740/42AT board has 2 true SCSI buses on it, Channel A and B. This board can have both a Howtek scanner (Channel B) and the main system hard drive (Channel A) connected to it.*

To connect your scanner to a PC or compatible computer using the SCSI port:

1. Turn off power to the computer and to all attached devices. The computer and all devices should remain plugged into grounded outlets.
2. Verify the card configuration against the documentation in the SCSI interface adapter kit. Install the SCSI interface card in your PC following the instructions in the SCSI interface kit and in your computer's documentation.
3. Connect one end of the SCSI cable to the SCSI interface card and the other end to either SCSI port at the rear of the Scanmaster 4500. Attach the SCSI terminator to the unused SCSI port on your scanner.

Powering Up

Like all SCSI devices, the Howtek Scanmaster 4500 must be powered up before the host system. Turn the scanner on by pressing the I side of the power switch. The power switch is located at the left rear of the scanner (see Figure 1-10).

While the scanner is powered up, the display window on the control panel is illuminated.

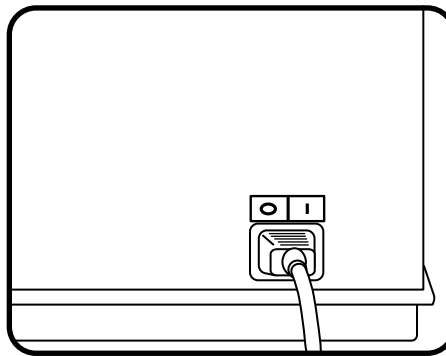


Figure 1-10
Power switch

During power-up the Scanmaster 4500 performs extensive internal diagnostics prior to going on-line. Once the scanner reaches on-line status the control panel displays the message READY TO SCAN. It takes approximately five minutes for the scanner to warm up and stabilize, but the scanner can be used as soon as the message READY TO SCAN appears on the control panel.

Note: The accuracy of color scans may be compromised if the scanner is used before the recommended five-minute warm-up/diagnostic period.

Selecting the SCSI ID

The IO PORT SETUP function allows you to set the SCSI identification number of the Scanmaster 4500. The factory default setting is 4. If this value conflicts with another SCSI device, the scanner's ID number must be changed.

CAUTION: If two or more SCSI devices are set to the same address, your computer may act erratically and your equipment may become damaged. Make sure the scanner's SCSI address is unique.

To change the scanner's SCSI ID number:

1. Place the scanner OFFLINE by pressing the ENTER (■) button.
2. Press ◀ or ▶ until the display window reads IO PORT SETUP.
3. Press ENTER (■). The window now displays SELECT SCSI ID #.
4. The current SCSI ID number appears in the lower left corner. To change the value, use the arrow buttons. Press ENTER (■) to confirm the new ID number and return to the previous menu level.

Once you have installed the scanner and selected the SCSI ID, power up all remaining SCSI devices and boot your computer.



**Operating the
Scanmaster 4500**

The majority of the scanner's functions are controlled through the software on your computer. This chapter outlines the basic operations that are performed on the Scanmaster 4500 control panel.

Setting the Scanner On/Off-Line

The ENTER (■) button toggles the scanner between the READY TO SCAN state (on-line) and OFFLINE.

The scanner must be OFFLINE to access the various control panel functions, and online to perform a scan.

CAUTION: If you press the ENTER (■) button while a scan is in progress, scanning will stop and the host software may lock up or generate an error message.

Installing the Drum

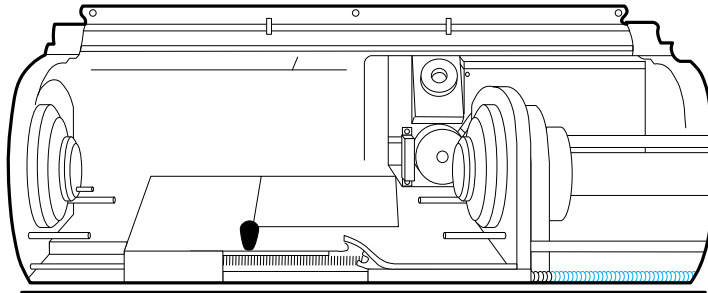
It is recommended that you mount your original on the drum before installing the drum into the scanner. For instructions on mounting originals, refer to Chapter 3.

To install the drum, follow these steps:

1. Lift the drum access door at the front of the scanner.

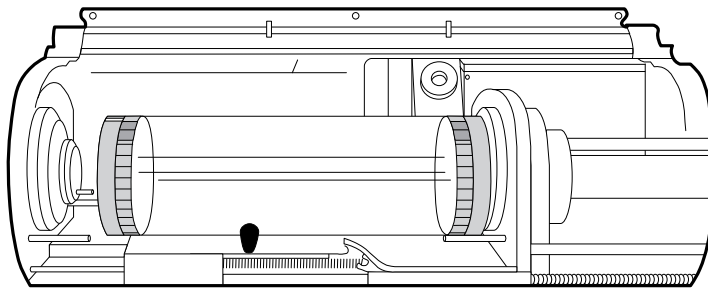
2. Move the drum mounting lever to the open position:

*Figure 2-1
Moving the lever for
drum insertion*



3. Set the drum into the scanner cavity.
4. Align the white index mark on the spindle with the mark on the top of the drum's endcap:

*Figure 2-2
Index marks*

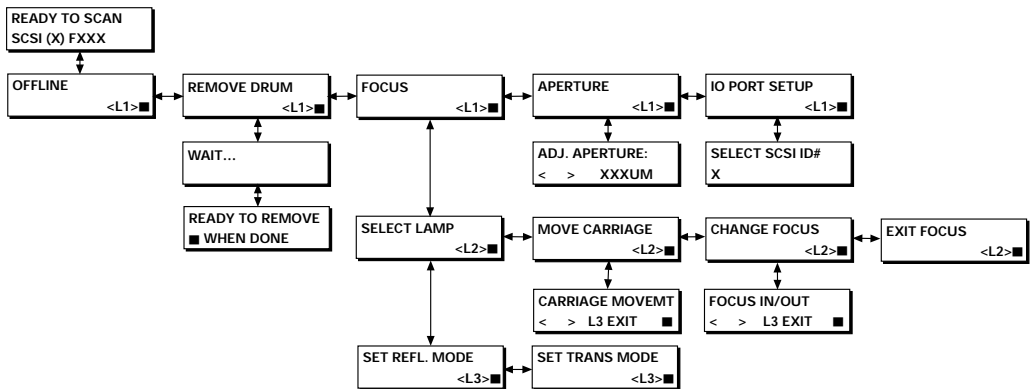


5. Move the drum mounting lever to the closed position and make sure the alignment pin has engaged the drum endcap.
6. Close the drum access door.

Using the Control Panel

This section describes the various menu functions on the Scanmaster 4500 control panel. The LCD display window indicates the currently selected menu option and also shows error/status messages that provide information or recommend corrective action.

Below is a flow chart outlining the menu structure of the control panel:



READY TO SCAN

After the scanner is turned on and has finished its internal diagnostics, READY TO SCAN appears on the top line of the display window. The bottom line indicates the SCSI ID number and the current FLASH software revision.

OFFLINE

When READY TO SCAN is displayed, press ENTER (■) to take the scanner OFFLINE. The off-line state allows you to control the scanner manually from the control panel. From <L1>, press the arrow keys to step through the various menu items.

To return the Scanmaster 4500 to the on-line state when you are ready to scan, press ENTER (■). Placing the scanner on-line will also allow you to perform many scanner functions from the host software.

REMOVE DRUM

The function REMOVE DRUM allows you to remove the drum to mount or remove originals or to clean the drum surface.

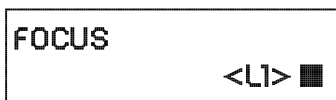
From the main menu <L1>, press ► to advance to the REMOVE DRUM. Then use the option as follows:

1. Press ENTER (■) before removing the drum.
2. Remove the drum.
3. Press ENTER (■) after you have replaced the drum.

FOCUS

To focus the Scanmaster 4500 manually, follow this procedure:

1. Take the scanner OFFLINE.
2. Locate the FOCUS submenu by pressing ◀ or ▶ on the control panel until FOCUS is displayed in the LCD display window:

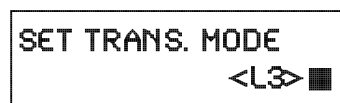
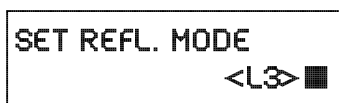


3. Select the proper lamp for the media to be used in the next scan:
 - ◆ Press ENTER (■) to enter the SELECT LAMP submenu:



If you do not wish to change the lamp selection, press ◀ for EXIT FOCUS or ▶ for MOVE CARRIAGE. Skip to step 4.

- ◆ Press ENTER (■) to enter the SET REFL. MODE submenu <L3>.
- ◆ Press ◀ or ▶ to toggle between SET REFL. MODE and SET TRANS. MODE:



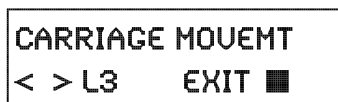
- ◆ Press ENTER (■) when the selected lamp is turned on.

4. Press ► to proceed to the MOVE CARRIAGE menu:



5. Move the carriage to the desired position:

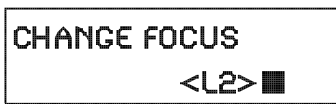
- ◆ Press ENTER (■) to enter the CARRIAGE MOVEMENT sub-menu <L3>:



If you do not wish to change the carriage position, press ◀ for SELECT LAMP or ▶ for CHANGE FOCUS. Skip to Step 6.

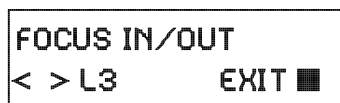
- ◆ To see where you are positioning the image in the eyepiece, pull the view port lever (located on the left side of the analyzer lens) forward.
- ◆ Press ◀ to move the carriage left and ▶ to move the carriage right. Pressing an arrow key briefly moves the carriage in small increments. Holding down the arrow key will move the carriage faster. The drum can be rotated by hand in either direction.
- ◆ Press ENTER (■) when you have reached the desired carriage position.

6. Press ► to move to the CHANGE FOCUS menu:



7. Set the focus:

- ◆ Press ENTER (■) to enter the FOCUS IN/OUT submenu <L3>:

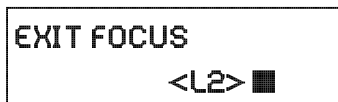


If you do not wish to change the focus, press ◀ for MOVE CARRIAGE or ▶ for EXIT FOCUS. Skip to Step 8.

- ◆ Press ◀ or ▶ to change the focus position (0-180).
- ◆ View the image through the view port.
- ◆ Press ENTER (■) when the desired focus is attained.
- ◆ When finished, push the lever on the left side of the analyzer lens away from you so the image is no longer visible in the ground glass.

Note: Failure to return the view port lever to the scanning position will cause the scanner to display ERROR F719 RGB when you attempt to scan.

- ◆ Press ► to move to the EXIT FOCUS function:



8. Press ENTER (■) to exit from the FOCUS submenu and return to the main menu.

If you wish to use other control panel functions, press the arrow keys to move to the desired submenu.

9. Close the drum access door.
10. Return the scanner to the on-line state (READY TO SCAN).

APERTURE

This menu allows you to set the aperture opening of the scanner manually. If your host software application changes the aperture, the scanner's manual setting will be overridden.

To change the aperture manually, follow these steps:

1. From READY TO SCAN, press ENTER (■) to take the scanner off-line.
2. Press ◀ or ▶ until APERTURE appears in the display window.
3. Press ENTER (■) to open the APERTURE submenu <L2>.
4. Press ◀ to decrease or ▶ to increase the aperture.
5. When the desired aperture value appears in the display window, press ENTER (■).
6. Return the scanner to the on-line state.

Soft Restart

To perform a “soft” restart of the scanner and return all settings to their default values, simultaneously press all three buttons on the control panel:





Using the Drum

This chapter outlines the procedures for dry and oil mounting originals onto the drum using the optional Drum Mounting Station.

One 4" (100 mm) drum is included with your scanner. The drum permits scanning originals up to 11.0" x 11.8" (279 x 300 mm) with a maximum resolution of 4000 dpi.

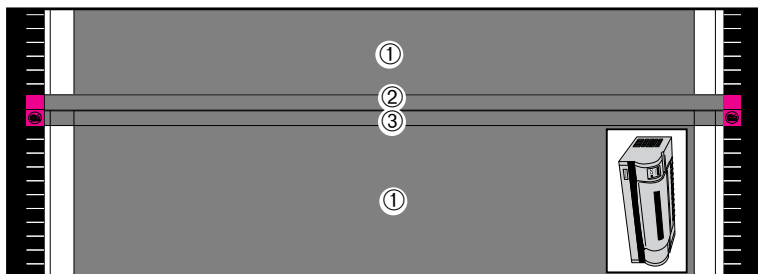
Dry Mounting Reflective Media

Note: All images to be scanned and all mounting materials (tape, mylar, etc.) must be located within the striped regions illustrated in Figure 3-1. Do not cover the white calibration strip or the adjacent transparent calibration area. Anything in this region will interfere with the calibration and affect the quality of the scanned image.

The portion of the image to be scanned must be located between the two circumferential scribe lines. However, mounting materials may extend the full length of the drum, from one index ruler to the other.

Originals can be positioned in any orientation within the mounting area. For the final scanned image to appear perfectly upright, align the top edge of the original image with the right side of the drum (as installed), parallel to the circumferential scribe lines:

Figure 3-1
Drum surface.
①-Mounting area.
②-White calibration strip.
③-Transparent calibration area.



The Howtek Scanmaster 4500 is designed to maximize the speed of the scan, based on size, position on the drum, and selected magnification of the mounted original. Typically, best performance is achieved when the image is located nearest the upper righthand side of the drum (as installed) with the long edge of the original parallel to the circumferential scribe lines.

Transparencies may either be mounted dry or oiled, but reflective originals should be dry mounted only. Transparencies and reflective originals may be dry mounted on the drum at the same time. However, do not mix oil mounted transparencies with reflective artwork.

Make sure the drum and originals are clean and free of dust, oil, and debris before mounting. Clean the drum frequently with drum cleaner. Use only drum cleaner of the type provided in the Drum and Accessories Kit.

CAUTION: Do not use film cleaner on the drum.

To dry mount reflective media, follow this procedure:

1. Install the drum in the Drum Mounting Station.
2. Position the original on the mounting table with the top of the original to the right side (open end) of the drum:

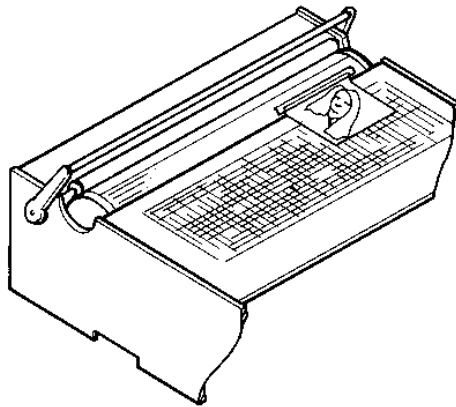


Figure 3-2
Placing artwork on
the drum

3. Place tape along the edge of the original that is in contact with the drum.

Note: Using any tape other than the type supplied may leave a residue on the drum.

4. Rotate the drum away from you until the original is fully over the drum:

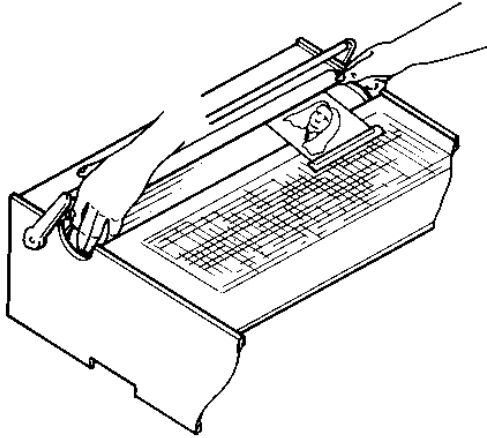


Figure 3-3
Rotating the drum

5. With slight pressure applied to the handle, tape the lower edge of the original to the drum.
6. Rotate the drum away from you until the padded roller fully presses the original against the drum.
7. Tape the circumferential edges of the original.
8. Remove the drum with the mounted original from the Drum Mounting Station.

Dry Mounting Transparent Media

Transparencies can be mounted directly on the drum. Make sure they are clean and always mounted with the emulsion side down against the surface of the drum. Secure them with clear cellophane tape. Sample tape is included in the scanner mounting kit.

A common problem when scanning transparencies are Newton's Rings, irregular shaped patterns (rainbows) which appear in the separations. Newton's Rings are caused by the prismatic action of two surfaces coming into contact with each other.

Newton's Rings can appear when the drum and a transparency are pressed together. The anti-Newton's Ring spray provided with the Scanmaster 4500 consists of a very fine powder that clings to the transparency, slightly separating it from the drum. Anti-Newton's Ring spray should not be used on images that are to be enlarged more than 300% since the granules of powder from the spray may be visible in the final separations. For enlargements of more than 300% oil mounting is recommended.

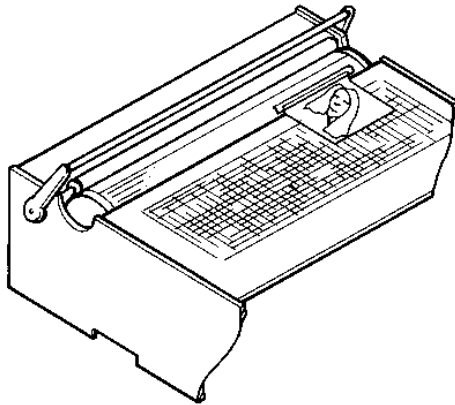
Follow the directions for mounting reflective media. Before a transparent original is taped to the drum, anti-Newton's Ring spray may be applied to the original by spraying a short burst of powder into the air and waving the transparency back and forth through the airborne powder.

CAUTION: Spraying the powder directly onto the transparency at a close distance will leave a residue on the transparency. Never spray anti-Newton's Ring spray directly onto the drum, as this may cause the drum to become fogged.

Oil or Gel Mounting Transparent Media

When scanning transparencies at a high resolution or enlarging a scanned image, optimal results can be achieved by mounting the transparencies with oil. Follow this procedure:

1. Place the drum into the Drum Mounting Station.
2. Tape the top edge of the transparency to the drum as shown below. Be sure to leave room on all sides of the film for the mylar sheet overlay that will cover it:



*Figure 3-4
Positioning
transparent art*

3. Place a sheet of mylar over the image. Use a piece of mylar that extends at least $1/2$ " (12 mm) past the transparency on all sides.

4. Tape the top edge of the mylar sheet to the drum 1/2" to 3/4" (15-20 mm) above the transparency:

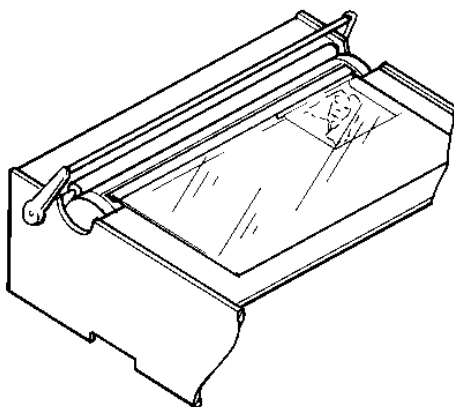


Figure 3-5
Taping top of mylar

5. Move the padded roller forward to contact the drum.
6. Rotate the drum away from you until the mylar sheet makes contact with the padded roller. Apply a bead of oil or gel along the taped edge of the transparency to the emulsion (drum) and non-emulsion (mylar) sides of the transparency:

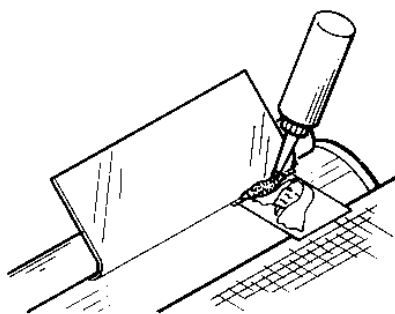
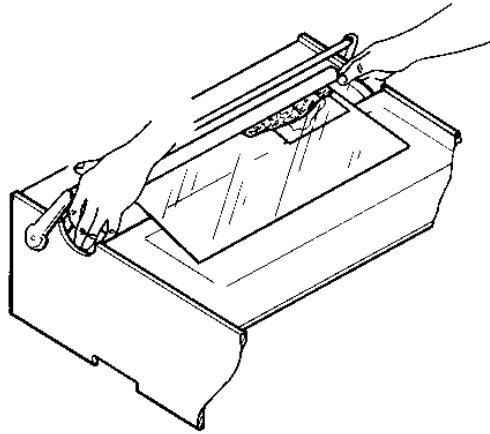


Figure 3-6
Applying oil or gel

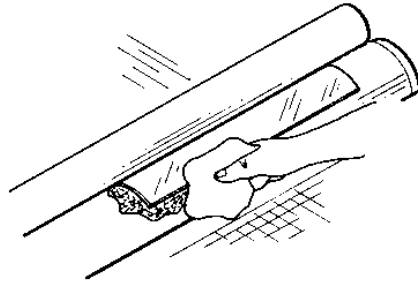
7. Grasp the ends of the drum and turn to the edge of the transparency to press out all the air and any excess oil:

Figure 3-7
Spreading oil or gel



8. Wipe away any excess oil, using a soft cloth and drum cleaner. This will ensure that the tape sticks to the drum:

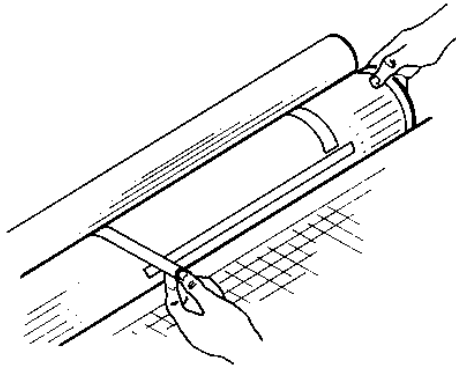
Figure 3-8
Wiping away excess
oil or gel



9. Tape the bottom of the mylar sheet to the drum.
10. Move the padded roller back.

11. Tape the sides of the mylar, overlapping the top and bottom tape with the tape on the sides of the image:

Figure 3-9
Taping all sides of
mylar



CAUTION: The mylar must be completely taped down. Otherwise, the centrifugal forces of scanning may cause the mylar to detach or oil to leak out of the sides and spray into the scanner cavity.

12. Remove the drum with the mounted original from the Drum Mounting Station.
13. Hold the drum up to a light and look through the film to check for air bubbles. If you see any, rub a soft cloth firmly over the mylar to squeeze them out.
14. Make sure the tape is securely holding the mylar and that the mylar is holding the transparency flat against the drum.
15. Install the drum in the scanner.

When you are finished scanning, remove all mounting materials from the drum and remove the oil from the drum with the cleaning solution included with your scanner. This should be done even if you are going to scan additional transparencies with oil. Be sure to clean the transparency itself with film cleaner.

Do NOT clean the drum with the film cleaner. To avoid damage to the transparency, never leave it mounted in oil for more than a few hours.



**Maintaining the
Scanmaster 4500**

Regular maintenance of your Howtek Scanmaster 4500 consists of periodic cleaning, replacement of the lamps, drum drive belt, and drum calibration strip when necessary, and lubrication of the leadscrew. How often the scanner requires cleaning depends on how much scanning you do, how frequently you mount transparencies with oil, how much excess oil remains on the drum, and the cleanliness of the room in general.



WARNING! To prevent personal injury, always turn the power switch off and unplug the power cord from the outlet before cleaning or performing any maintenance on the scanner.

Cleaning

CAUTION: Do not use ammonia-based cleaning products on the scanner. Do not disassemble the scanner or lubricate any parts other than those specifically indicated in this chapter.

Cleaning the Scanner Cabinet Exterior

1. Turn the power switch off.
2. Unplug the power cord from the outlet.
3. Clean the exterior of the scanner with a soft, lint-free damp cloth and wipe dry.

CAUTION: Do not use paper materials such as facial tissue or paper towels. You may use a mild cleaning solution if the cabinet has become so soiled that a damp cloth does not remove the stain. If you have questions about a particular cleaning solution, contact your dealer.

Cleaning the Scanner Cavity

For optimum performance, the scanning cavity must be kept free of dust and oil. Follow this procedure:

1. Turn the power switch off.
2. Unplug the power cord from the outlet.
3. Clean the cavity with a soft, lint-free cloth moistened with a non-volatile degreasing solution. You may use the recommended drum cleaner included in the Drum and Accessories Kit that comes with the scanner. You may also use an aerosol can of compressed air to remove dust.

CAUTION: Do not spray cleaning solution directly onto surfaces inside the scanner. Use only a lightly moistened cloth. Do not use paper materials such as facial tissue or paper towels. If you have questions about a particular cleaning solution, contact your dealer.

Cleaning the Analyzer Lens

If you frequently scan oil mounted transparencies, the analyzer lens may become contaminated with oil. Oil or foreign matter on the lens may cause distortions in your scans.

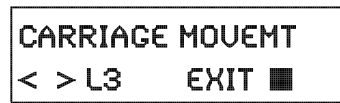
To clean the analyzer lens follow this procedure:

1. Remove the drum from the scanner.
2. Using the scanner's control panel, access the MOVE CARRIAGE submenu:



MOVE CARRIAGE
<L2> ■

3. Press ENTER (■):



CARRIAGE MOUEMT
< > L3 EXIT ■

4. Press the ► button to move the carriage far enough to the right to freely access the FORI.

5. Remove the FORI:

- ◆ Insert the long end of the Allen wrench (located in the front of this user guide) into the small hole on the left side of the FORI and turn counterclockwise one revolution:

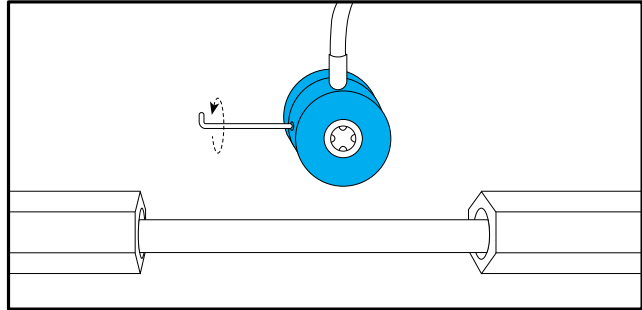


Figure 4-1
Loosening the FORI's
Allen screw

- ◆ Gently pull the FORI assembly off and place it into the scanner cavity.
6. Using only lens tissue and lens cleaner, wipe the surface of the lens. Use a can of clean compressed air to blow any remaining particles off the lens.
7. Reinstall the FORI:
- ◆ Place the FORI over the lens with the attached cable slightly to the left of top center.
 - ◆ Tighten the Allen screw by turning it clockwise one revolution. Do not over-tighten.
8. Return the scanner to the on-line state (READY TO SCAN).

Replacing the Lamps

The scanner includes two identical tungsten halogen reflector lamps, one lamp for the reflective mode and one for the transparency mode. Each lamp is mounted in a mechanical assembly that ensures proper alignment when installed:

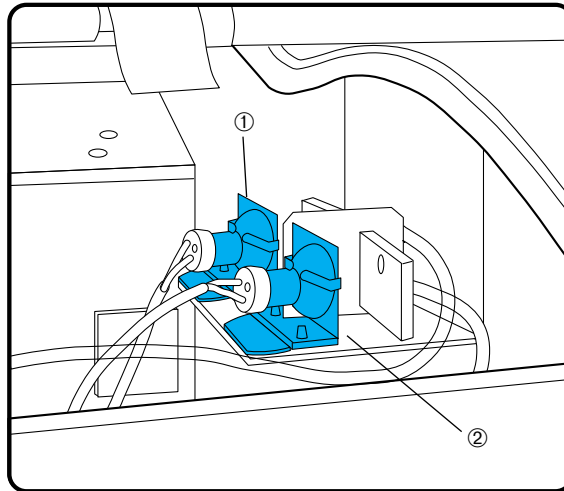


Figure 4-2
Lamp compartment.
①-Reflective lamp.
②-Transparency lamp.



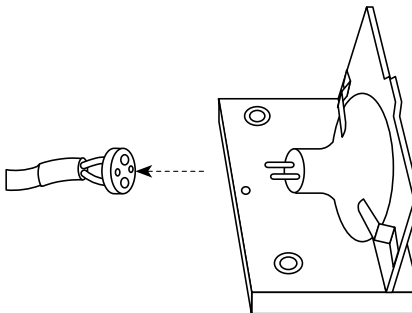
WARNING! The lamps are hot during scanning. Wait at least five minutes after the lamps have been turned off before replacing them.

To replace a lamp assembly, follow these steps:

1. Turn the power switch off.
2. Unplug the power cord from the outlet.

3. Open the drum access door.
4. Locate the desired lamp assembly.
5. Gently unplug the lamp connector from behind the bulb:

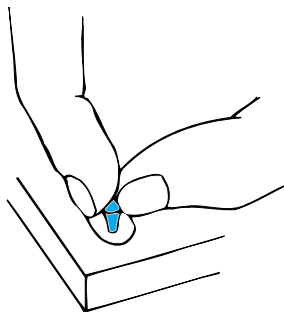
Figure 4-3
Unplugging a lamp



Note: The reflective and transparency lamp assemblies are interchangeable; the connectors, however, are not.

6. Pull up on the two locking pins that hold the lamp assembly in place:

Figure 4-4
Lamp locking pin



7. Lift the lamp mount with bulb up and out of the scanner cavity.

8. Grasp the new lamp assembly by the base plate (DO NOT TOUCH THE LAMP WITH YOUR FINGERS) and place into position. When the assembly is in position, the alignment pins on the bottom of the base plate will click into place.
9. Press down on the two locking pins. Make sure the lamp assembly is securely in place.
10. Connect the lamp assembly to the proper electrical connector and close the drum access door.

Replacing the Drum Drive Belt

The drum drive belt connects the motor with the headstock spindle. The belt should be replaced if it appears chipped or cracked or if you find pieces of rubber on the bottom of the scanner cavity.

To replace a belt, follow this procedure:

1. Remove the drum from the scanner.
2. Pull the old belt off with your fingers.
3. Put the new belt on. No tools or tension adjustments are required.

Replacing the Drum Calibration Strip

The calibration strip should be replaced if it becomes scratched or visibly damaged. A damaged calibration strip can result in horizontal light or dark streaks across the scanned image. If the strip becomes dirty, it can be cleaned with drum cleaner.

CAUTION: The drum surface is fragile; be careful not to scratch it. Do not use hard instruments to remove the calibration strip or adhesive. Do not use any unauthorized cleaning materials.

To replace the calibration strip, follow this procedure:

1. Remove the drum from the scanner.
2. Peel off the old strip.
3. Remove any adhesive residue with drum cleaner.
4. Clean the entire area where the new strip will be mounted. Let the drum dry thoroughly. Make sure your hands are clean and dry before proceeding.
5. Mount the drum into the scanner.
6. Peel the adhesive backing off the new strip.
7. Align the strip between the two red areas.

8. Press the edge of the strip against the axial scribe line.
9. Roll the strip onto the drum. Smooth out the strip with your fingers, making sure to remove any bubbles or wrinkles.

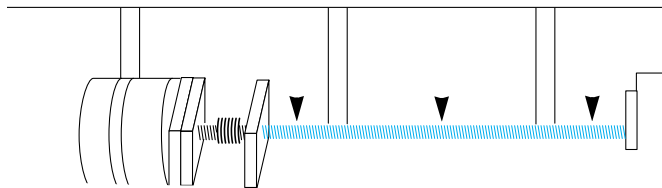
Lubricating the Leadscrew

The leadscrew drives the drum carriage and is located beneath it. Apply the lubricating gel to both ends of the screw every 18 months or at the first sign of any unusual noise during operation.

To lubricate the leadscrew, follow these steps:

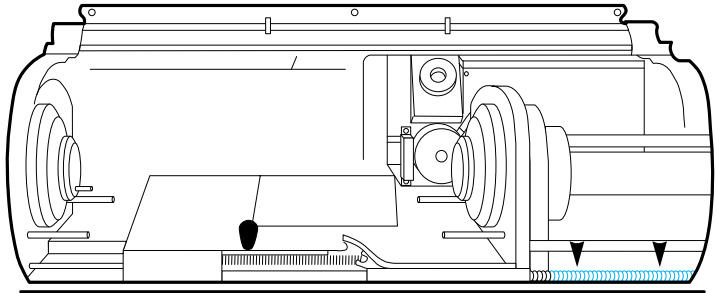
1. Power on the scanner.
2. Open the drum access door and remove the drum.
3. Press ENTER (■) to return to the REMOVE DRUM option.
4. Press ◀ or ▶ until the display reads MOVE CARRIAGE.
5. Using the MOVE CARRIAGE function move the carriage completely to the right until it stops.
6. Tear open the top of the lubricant pack and squeeze a dab of the lubricant on three equidistant points along the length of the screw (about every 3–4" [75–100 mm]):

Figure 4-5
Lubrication points
on the left side of
the leadscrew



7. Press the three buttons on the scanner's control panel simultaneously to perform a soft restart and return to the READY TO SCAN state. The carriage will return to the home position.
8. Squeeze a dab of the lubricant on two equidistant points along the length of the right side of the screw:

*Figure 4-6
Lubrication points
on the right side
of the leadscrew*



9. Discard the remaining gel.
10. Reinstall the drum and close the drum access door.



Troubleshooting

The Howtek Scanmaster 4500 is designed to be highly reliable. However, problems may occasionally arise during operation. This chapter describes some of the most common problems and the recommended corrective actions.

Technical Support

If you are unable to correct a problem using the information provided on the following pages, contact your local dealer or sales representative. Make sure you have the following available:

- ◆ Your scanner's serial number (located on the scanner's rear panel).
- ◆ The FLASH revision number (indicated on the control panel).
- ◆ The type of computer system you are using, including amount of RAM, operating system version, and revision level of your scanner software.
- ◆ A telephone located near the scanner.

Problem	Cause	Solution
The control panel display does not light up.	The scanner is not plugged in.	<i>Make sure the power cord is securely plugged into both the scanner and the AC power outlet.</i>
	The scanner is not turned on.	<i>Make sure the on/off switch is in the ON position (the I is pushed in).</i>
	The AC power outlet is not "live".	<i>Verify proper operation of the outlet by plugging in a desk lamp.</i>
The control panel display is lit, but the scanning application cannot locate the scanner.	The scanner is OFFLINE.	<i>Return the scanner to the on-line state. See Chapter 2 for more information.</i>
	The SCSI cable is loose or not connected.	<i>Make sure all the SCSI connections in the chain are secure.</i>
	The SCSI chain is not properly terminated.	<i>Refer to Chapter 1.</i>
	Two or more devices are set to the same SCSI address.	<i>Check the device addresses in the chain for duplicate ID numbers. (Refer to Chapter 1 for more information.)</i>
	The SCSI devices have not been powered on in the correct sequence.	<i>Make sure the devices in the SCSI chain are turned on before or at the same time as the host computer.</i>
	Defective SCSI cable.	<i>Replace the cable.</i>

Problem	Cause	Solution
<p>The scanned image is marred by specks or horizontal lines.</p>	<p>The original to be scanned is dirty.</p>	<p><i>Clean the original.</i></p>
	<p>There is tape or media in the calibration areas of the drum.</p>	<p><i>Remove any tape or media that is obscuring the calibration areas on the drum; clean the areas if they are dirty.</i></p>
	<p>The white calibration strip is damaged.</p>	<p><i>Replace the calibration strip. Refer to Chapter 4.</i></p>
<p>The scanned image is marred by vertical bands.</p>	<p>The drum is dirty.</p>	<p><i>Clean the drum with drum cleaner.</i></p>
	<p>The drum is not mounted securely.</p>	<p><i>Reinstall the drum, making sure that the pulley and drum are aligned with the index marks. (Refer to page 2-1 for further information.)</i></p>
	<p>The scanner table is vibrating.</p>	<p><i>Secure the table or move the scanner to a stable surface.</i></p>
	<p>Hardware failure</p>	<p><i>Contact your dealer for assistance.</i></p>
<p>The scanned image is too light (overexposed).</p>	<p>There is tape in the calibration areas of drum.</p>	<p><i>Remove tape and clean drum surface.</i></p>
	<p>The media is too thick.</p>	<p><i>Replace with thinner original.</i></p>
	<p>The drum is damaged.</p>	<p><i>Replace drum.</i></p>

Problem	Cause	Solution
The scanned image is too dark.	The wrong lamp is selected.	<p><i>Make sure the reflective lamp has been selected if you are scanning a print or line art.</i></p> <p><i>Make sure the transmissive lamp has been selected if you are scanning a transparency.</i></p>
The scanned image is out of focus.	The scanner is not in the autofocus mode.	<p><i>Make sure autofocus has been selected, or refocus interactively (using Aurora software).</i></p>
The scanned image is out of focus.	The analyzer lens is dirty.	<p><i>Clean the lens with rubbing alcohol and lens tissue (see Chapter 4).</i></p>
The scanned image is marred by Newton's Rings.	There are bands of interference caused by thin layer of air between the drum and the mounted transparency.	<p><i>Oil mount the transparency or apply anti-Newton's Ring spray.</i></p>



**Transporting
the Scanmaster 4500**

Your Scanmaster 4500 may be shipped safely by following the simple preparations and procedures indicated in this chapter.

CAUTION: Use care when repacking your equipment. Your scanner is a delicate instrument. If it is dropped or otherwise jarred, it can be severely damaged.

Packing the Scanmaster 4500

To pack up your scanner use the original shipping cartons, pallet, Allen wrench, shipping bolts, and packing materials. If you no longer have the original cartons, replacements can be ordered from Howtek.

To pack up the Scanmaster 4500 for shipping, follow these steps:

1. Turn the scanner off by pressing the **O** side of the on/off switch.
2. Unplug the power cord from the AC outlet and disconnect it from the scanner.

3. Open the drum access door. Tape down the analyzer lens and the view port lever:

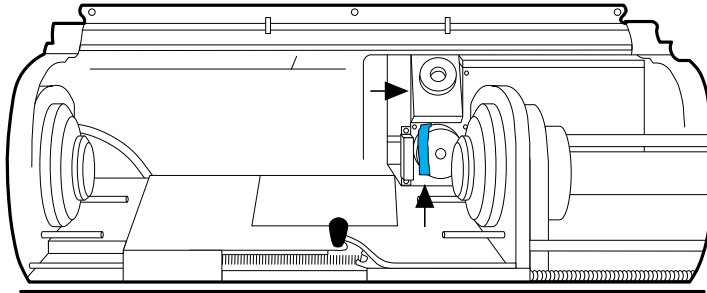


Figure 6-1
Tape locations

4. Secure the scanner's drum drive mechanism to prevent shifting during transport:
 - ◆ Place the supplied shipping bolts (with yellow tops) into the holes in the base of the scanner cavity:

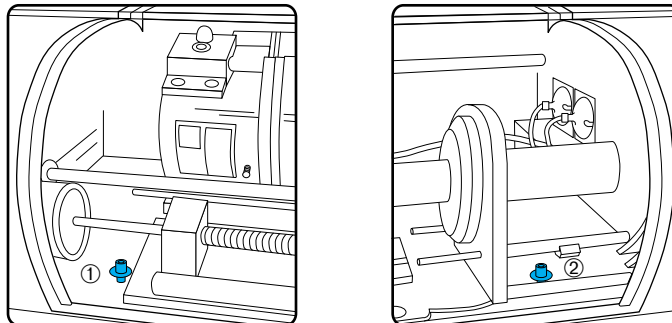
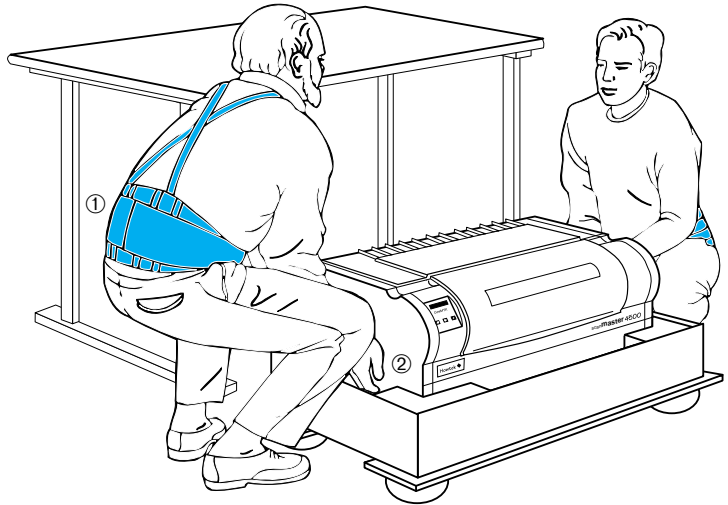


Figure 6-2
Shipping bolts.
①-Left.
②-Right.

- ◆ Using the supplied 3/16" ball driver, tighten the bolts until you feel significant resistance and the lock washers start to flatten.

5. Close the drum access door and tape it closed.
6. Stand facing your helper with the scanner between you. Bending your knees to protect your back, carefully lift the scanner and place it in the pallet:

Figure 6-3
Placing the scanner
into the pallet.
①-Back brace (highly
recommended).
②-Hand holds.



7. Cover the scanner with the poly bag and foam supports.

8. Place the cardboard box and cover over the scanner and strap the carton securely to the pallet:

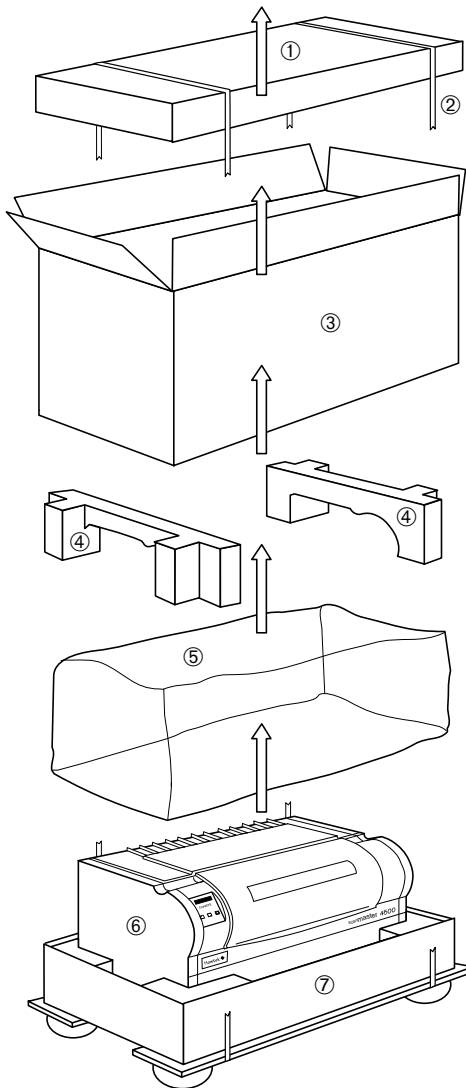


Figure 6-4
Packing the 4500.
①-Cardboard cover.
②-Packing straps.
③-Cardboard box.
④-Foam supports.
⑤-Poly bag.
⑥-Scanmaster 4500.
⑦-Pallet.



Technical Information

Physical Characteristics

Dimensions and Weight

	Scanner (without pallet)	Scanner (with pallet)
Width:	38.0" (96.5 cm)	46.0" (116.8 cm)
Height:	13.5" (34.3 cm)	24.0" (60.9 cm)
Depth:	20.5" (52.1 cm)	28.0" (71.1 cm)
Weight (max.):	135 lbs (61.2 kg)	190 lbs (86.4 kg)

Scanner Type

Interchangeable drum, photomultiplier tubes (PMT): RGB, CMYK, grayscale, and black and white scanning system.

Light Source

Two tungsten halogen reflector lamps.

Color Separation

Three PMT sensors (red, green, blue) with dichroic beam splitters and interference filters.

Focus Control

Automatic and manual controls.

Interface

SCSI-2.

Electrical Characteristics

Power Supply

90–132 VAC (47–63 Hz).

180–264 VAC (47–63 Hz).

Power Consumption

Maximum: 300 W (3 A).

Standby: 150 W.

Environmental Requirements

Temperature

Operation: 65 to 75°F (18 to 24°C).

Shipping or storage: -30 to 160°F (-34 to 71°C).

Relative Humidity

Operation: 40–60%.

Shipping or Storage: 10–95%.

Scanning Characteristics

Spatial Resolution

User selectable from 31 to 4000 dpi.

A/D Conversion

12 bits per color; 4096 levels of gray.

Data Conversion

Linear and logarithmic.

Drum Speed

300 to 1200 rpm.

Effective Scanning Area

11.0" x 11.8" (279 x 300 mm).

Image Types

Reflective and transparent copy (positive and negative).

Scanning Modes

Color or grayscale (8 or 12 valid bits per pixel, giving 256 or 4096 colors or levels of gray) and binary (for line art or halftones).

Field Stops (Aperture)

Twelve.

Approvals

Safety

UL: 1950.

CSA: C22.2 No. 950.

TÜV: EN60950.

Emissions

FCC part 15 Class A.

CISPR 22 (EN55022) Class A.

European Community

CE Marking



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