

Eagle Scanner Operations Guide

February, 1999

Foreword

This document covers the Eagle 3640, 4240, 4080, and 6250 scanners. ANAtech believes the information in this document is accurate as of its publication date. Software and hardware features, specifications, and upgrades are subject to change.

Document Conventions

The following typographical conventions are used throughout this manual:

Text to be entered via the keyboard appears in a monospaced font as follows:

enter this text

Emphasized text appears in italics:

this is emphasized text

Text that cautions the user about actions that may result in injury, equipment or software damage or malfunction, or may interfere with the proper operation of the scanner is preceded by the word **Warning**.

Text that presents useful information or valuable tips may be preceded by the word **Note**.

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1. Installation and Calibration

This section provides a description of the scanner and explains how to install and calibrate the scanner.

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Scanner Description

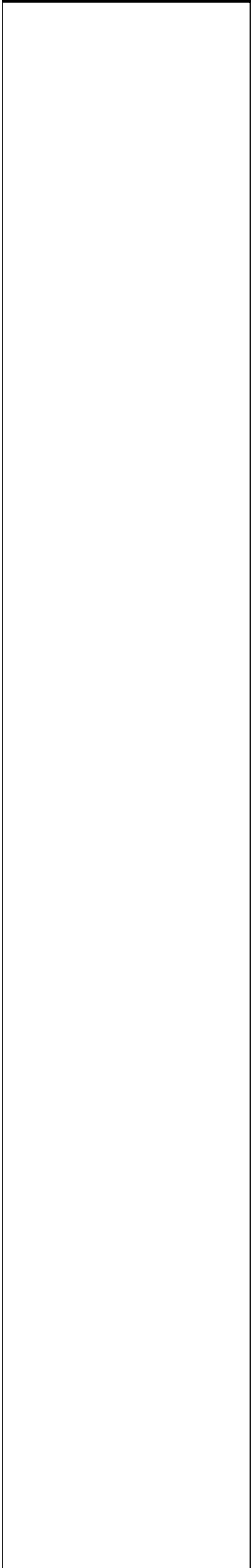
The Eagle large format scanner is a roller type scanner that uses CCDs (charge coupled devices) to capture document data and convert that data into a computer file. Eagle 3640 models have three cameras which are multiplexed to analog-to-digital conversion circuitry, while Eagle 4080 and 6250 models have seven cameras. The Eagle 4240 has four cameras. A CCD is mounted under each camera lens. As a document is fed through the scanner, the CCDs gather data and the scanner electronics convert the data into a selected data format. Captured data is transferred automatically to the hard disk drive of the host computer and conversion of data into its final file format on the hard disk drive occurs simultaneously during the scanning process. Definitions of various types of file formats are listed in Appendix B.

The Eagle scanner accepts any non-rigid document media such as paper, acetate, or vellum. Documents may be hand drawn or machine drawn. Scanner thresholding parameters can be adjusted at the host computer to optimize the quality of captured line art data. The scanner can generate grayscale data in 256 shades of gray. It can generate line art data in a variety of formats. Scanner resolution is shown below:

	<i>Maximum interpolated resolution</i>	<i>Maximum true resolution</i>	<i>Resolution range</i>
<i>Eagle 3640</i>	800 dpi	400 dpi	1-800 dpi
<i>Eagle 4240</i>	800 dpi	400 dpi	1-800 dpi
<i>Eagle 4080</i>	1600 dpi	800 dpi	1-1600 dpi
<i>Eagle 6250</i>	1000 dpi	500 dpi	1-1000 dpi

Controls on the scanner itself include power on/off, a document holder spring release switch, a reset switch, and lamp power on/off. Scanner operation involves inserting a document into the scanner and engaging the spring.

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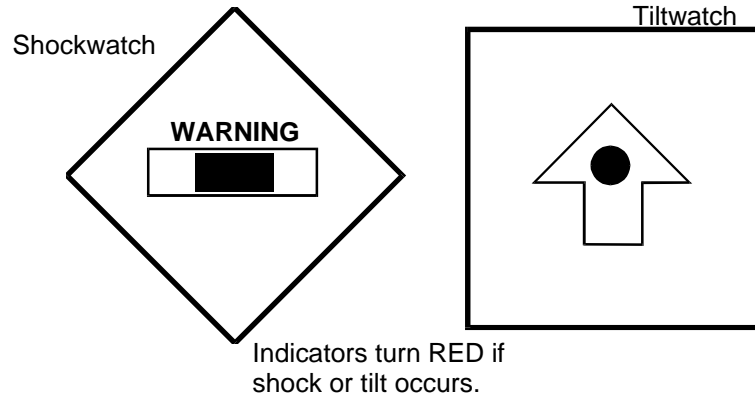


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Unpacking and Inventory

Please read this section completely before unpacking. The scanner is bolted to a pallet for shipping. Some units (air and international shipments) are packed inside a crate. Here is the recommended unpacking procedure:

1. Inspect the Shockwatch and Tiltwatch indicators. The indicators turn red if they have been activated. If any indicator has been activated, make a note on the bill of lading and inspect the scanner for damage. [Shockwatch and Tiltwatch are registered trademarks of Media Recovery, Inc.] Inspect the scanner for any apparent physical damage. If damage is noted, make a note on the bill of lading and request a hidden damage report from the shipper.
Remove the crate cover, if the unit is in a crate.



Shockwatch and Tiltwatch Indicators

2. Remove the four bolts that secure the scanner to the pallet.
3. Attach ramps to the pallet. Carefully roll the scanner from the pallet. The scanner should be positioned on a level surface capable of supporting more than 500 lbs. (227 kg.).

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4. Inventory items shipped with the scanner. Locate the following items:

Test targets

Stitch Target

3640 70315

4080 70316

4240 70425

6250 70446

Distortion Target 10587 (only shipped with Eagle 4080)

Factory information sheet

Document catcher (40453) and mounting hardware

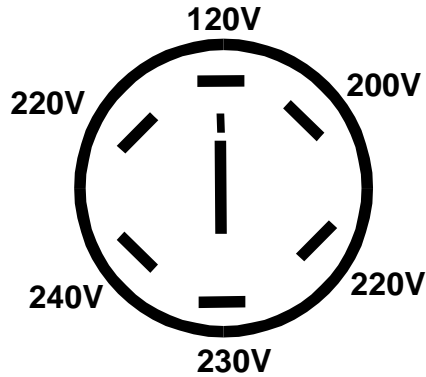
Power cord

Diagnostics cable 30087

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Voltage Setting

The international power switch on the rear panel of the scanner must be set to the proper voltage level. Use a screwdriver or coin to select the power setting for your local voltage.



CAUTION The voltage *MUST* be set to the proper setting before powering on the scanner. Improper settings will damage the scanner electronics.

Power Cable Requirements

For units operating at 100-120V: The power cable is a UL-listed, CSA-certified, 18/3 AWG, type SVT or SJT, cable 15-foot (4.6 meter) maximum. It is terminated on one end by a 125V, 15A grounding-type attachment plug body. It is terminated at the other end by a 125V, 15A parallel blade, grounding-type attachment plug.

For units operating at 200-240V: The power cable is a UL-listed, CSA-certified, 18/3 AWG, type SVT or SJT, cable 15-foot (4.6-meter) maximum. It is terminated on one end by a 250V, 15A grounding-type attachment plug body. It is terminated at the other end by a 250V, 15A tandem blade, grounding-type attachment plug.

The power cable for international units is an 18/3 AWG, type SJT, cable 15-foot (4.6-meter) maximum. It is terminated on one end by a 250V, 15A grounding-type attachment plug body. It is terminated at the other end by a 250V, 15A grounding-type cord connector body. The cord set is marked HAR to signify appropriate safety approvals.

Installation and Connection to Host Computer

1. Position the scanner so that you can access the rear panel.
2. Install the document catcher.
3. Ensure the scanner power switch is in the off position, then connect scanner power.
4. Power up the scanner once before it is connected to the host computer. Ensure that the scanner starts, then power it down.
5. Install the scanner interface. Be sure the host computer is turned off when connecting the interface cable. Refer to interface documentation for software installation instructions.

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Power On Sequence

Power up scanner first.

Press the Reset button.

Then power up computer and complete the bootup procedure.

Important: Follow this sequence to prevent SCSI bus errors and potential hard disk drive data corruption.

Power Off Sequence

When powering down, always shut down the computer first. After the computer is powered down, then power down the scanner. The scanner main power switch is located at the rear of the scanner. Normally, main power to the scanner is left on, and is turned off only when moving the scanner or performing service activities.

It is not necessary to power down the computer or scanner to turn off the scanner lamp. The scanner lamp may be turned off when the scanner is not in use for extended periods (more than several hours). To turn off the scanner lamp, use the lamp power switch in the scanner control panel.

Initial Scanner Calibration

It is performed when a scanner is installed and after certain service activities, such as replacing the illumination bulb. No physical adjustments are involved in scanner calibration. The Eagle Diagnostics program starts whenever you start SCANSMITH SCAN and the scanner is not calibrated. Selecting Calibrate starts the scanner calibration procedure. First, a correction file that compensates for small variations in light intensity is created. This file is called `corrct.dat`. Second, a file that compensates for overlap in the field of view of the scanner's cameras is created. This file is called `stitch.dat`.

Note that once initial calibration is accomplished, no further calibration is necessary for repeated scanning. The calibration remains valid until a change in scanner characteristics makes recalibration necessary. If the calibration files `corrct.dat` or `stitch.dat` are erased or corrupted, these files can be reinstalled from a backup copy, without needing to recalibrate the scanner. Standalone diagnostics are also available by running Eagle Diagnostics in the SCANSMITH SCAN program group.

Follow this procedure to perform Eagle scanner calibration:

- a. Start the scanner.
- b. Remove any documents from the scanner and ensure that the roller is clean.
- c. Ensure that the scanner lamp is ON. Allow the lamp to remain on for at least fifteen minutes before proceeding with this procedure.
- d. Run SCANSMITH SCAN. Select Calibrate. Follow the prompts. This will create the correction and stitch files. Standard calibration is now complete. You may optionally perform the distortion calibration procedure, below.
- e. Create the `scan.par` file. Refer to the following section, "Creating and Configuring `scan.par`."

Optional:

- f. Run Eagle Diagnostics. Select Diagnostics-Create Distortion file. *Follow this procedure for Eagle 3640 and 4080 units. For 4240 and 6250 units, contact Customer Support.*
 - In the Create Distortion Correction dialog, enter the DFACT error factor which is printed on the distortion target. This number will be close to 1, for example 0.999822.
 - Insert the target in the scanner, carefully lining up the horizontal line in the target with the back of the paper feed plate, so the horizontal line is parallel to the roller. Press OK when ready.
 - The distortion correction file is then created automatically.

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— The video for uncorrected data is displayed in the Distortion dialog. The Y axis represents distortion while the X axis represents the specified length of the scanner (36, 40, 42, or 62 inches).

— Each camera's signal appears as a sine wave, with an overall upwards slope. The sine wave is characteristic of all lenses and shows how optical data is stretched around the outer edges of the lens and compressed in the middle portion of the lens. The range for a single sine wave representing a single camera should not be greater than 0.020 inches.

— The overall slope of the graph represents the X axis resolution of the scanner. The graph should have an overall slope upwards from left to right, with a maximum range of 0.040 inches. You can calculate the range by adding the numbers shown in the title bar of the dialog. The upwards slope is caused by "extra" pixels in the scan data. Refer to Chapter 6 for information on how roller and camera shimming affect scanner X axis resolution.

- g. Store the test targets in a safe place.

Creating and Configuring scan.par

The scan.par file is an ASCII text file that records the -sfact parameter, which controls fine adjustment of Y-axis resolution. Create the scan.par file at installation time. The correct -sfact value is printed on a label attached to the rear of the scanner. Most -sfact values are about 1.0.

To create scan.par:

1. Use any ASCII text editor to open a file named scan.par. The file should be located in the SCANSMITH SCAN installation directory.
2. Insert a line for the -sfact parameter. For example:

```
-sfact 1.002
```

Note The **scan.par** file must include the correct -sfact parameter value for proper scanner operation. Do not modify or erase the **scan.par** file unless directed by your Customer Support representative.

2. Operation

How to Scan

1. Follow the power on sequence described in Section 1. Be sure to follow the prescribed power on sequence. Turn on the scanner lamp.
2. Run the scanner interface software, SCANSMITH SCAN.
3. Insert document face down in scanner. Close the scanner spring switch to seat the document in the scanner. Ensure scanner lamp is on. Use the interface software to start the scan. When the scan is complete, open the scanner spring switch before removing the document.
4. When the scanner is not in use for extended periods (more than several hours), turn off the scanner lamp. This makes the fluorescent light last longer. If the scanner needs to be moved, inspected, or requires a change in configuration, follow the power down sequence described in Section 1.

Tips

Use the preview feature to experiment with scan parameters. Adjust the parameters and watch the results on the host computer or workstation screen. Use your own artistic judgement to evaluate the best scanner settings.

If you get a buffer overflow error when scanning graphically dense documents (eg., maps, instrument traces, intricate patterns, or large photographs), use the speed setting to slow the scanner.

Use dynamic sensitivity for documents that have background variations, such as blueprints. When you use dynamic sensitivity, use a small value (less than 50).

When setting scan resolution, consider the resolution of any output device (plotter or laser printer). If you intend to make a high resolution plot, then scan at a high resolution. However, low resolution scans take less time and disk space. Experiment to find appropriate resolution settings for your applications.

When scanning halftones, adjust the threshold to get the best balance between highlight areas (mostly white) and shadow areas (mostly black).

When scanning transparent documents, such as mylar, insert the document with the image surface facing the roller.

If a scanned image appears incorrectly oriented (sideways, upside down, etc.), use the scanline orientation option to reposition the image.

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Scanner Speed

Scan speed is a function of resolution. Higher resolutions require more scan time. Resolution is selected through SCANSMITH SCAN.

Scanning large grayscale documents may create enough data to cause a buffer overflow error. If this occurs when scanning a grayscale document, lower the scanner speed. The tables below show examples of scan speeds.

Eagle Console Type Black and White Scanner Speeds

dpi	3640	4240	4080	6250
100	50.0 *	37.5 *	10.7 *	17.1 *
200	50.0 *	37.5 *	10.7 *	17.1 *
300	33.3 *	25.0 *	10.7 *	14.3 *
400	12.5 / 25.0 *	9.4 / 18.8 *	10.7 *	10.7 *
500	10.0	7.5	8.6 *	4.3 / 8.6 *
600	8.3	6.25	7.1 *	3.6
700	7.1	5.4	6.1 *	3.0
800	6.25	4.7	2.7 / 5.4 *	2.7
900			2.4	2.4
1000			2.1	2.1
1100			2.0	
1200			1.8	
1300			1.7	
1400			1.5	
1500			1.4	
1600			1.3	

All speeds in inches/minute

* Optimize throughput mode

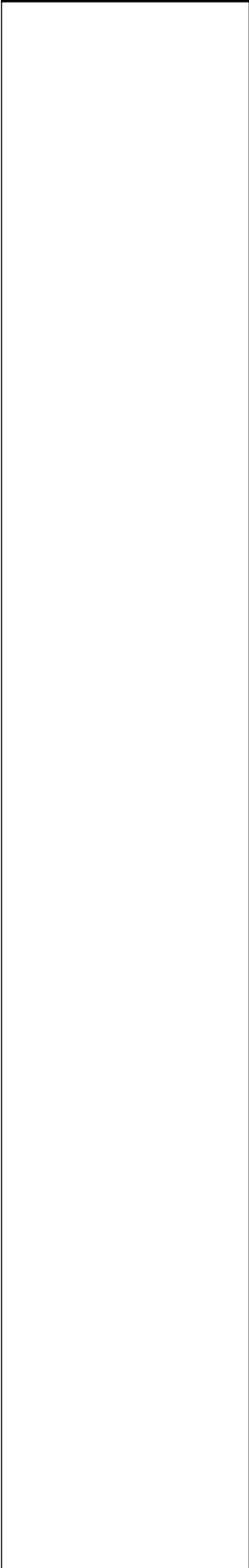
Batch Mode

Batch mode is available when operating the scanner through the SCANSMITH SCAN interface.

To scan in batch mode, include a filename as a startup option on the command line.

SCANSMITH SCAN scans the document immediately, without displaying the dialog. When using batch mode, all parameters necessary to complete the scan should be specified on the command line. Refer to SCANSMITH SCAN documentation.

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3. Maintenance and Troubleshooting

Cleaning Roller

There are no user serviceable components in the Eagle scanner. Routine maintenance consists only of cleaning the roller surface.

Clean the roller whenever it becomes dirty. Note that scanning pencil drawings may cause small flakes of graphite to accumulate on the roller. To clean the roller follow this procedure:

1. Lift the lid that covers the roller. Rest the lid in the open position so the roller is exposed.
2. Clean the roller with a soft, lint-free cloth or towelette and isopropyl alcohol. Do not use any other solvents.
3. Close the lid.
4. Run SCANSMITH SCAN. Start the Preview feature. When you start Preview, the roller turns. When the roller has turned about one-third of the way around, press the Pause (P) button.
5. Lift the lid and continue cleaning the roller. Repeat Steps 3 and 4 until the entire roller is cleaned.

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Troubleshooting

The table below lists simple troubleshooting data. Do not attempt to disassemble or perform any repairs on the scanner. Call your Customer Support representative if any assistance is required.

Problem	Possible Cause	Solution
Nothing happens when the scanner is powered on.	Scanner is not plugged in. No power at source.	Turn scanner off and plug in. Check power sources, circuit breakers, etc.
Host computer does not communicate with scanner.	Problem with interface cable connections.	Reset the scanner. If problem remains, power down host computer and check all connections.
Calibration test fails.	Dirty roller or incorrect target used for test.	Clean roller; use no target for Plot Correction File, insert stitch target for steagle.

Making a Diagnostic Snapshot -- the Plot Correction command

If the scanner is malfunctioning or making poor scans, it may be helpful to use the Eagle Diagnostics command Diagnostics-Plot Correction to make a snapshot of scanner performance. Plot Correction is used by service personnel to analyze scanner illumination and CCD response or to check if your scanner has a lighting problem.

You can save the results of Plot Correction as a file. This file can later be examined by service personnel to help diagnose problems. You can send the file via e-mail to your service representative. To save Plot Correction data to a file, run Plot Correction. Select the Save file option and specify a filename. The Plot Correction data is then displayed on screen and also saved to disk using the filename you select.

Appendix A Specifications

Eagle 3640

Operating Platform

PC

Software/Hardware requirement

SCANSMITH Productivity Suite

General

Document media

Opaque or transparent

Document type

Vellum, paper, acetate, or linen

Document width

40 in (101.6 cm) x roll length

Maximum scan width

36 in (91.4 cm)

Scanning technology

Three 5,000 element CCD cameras

Thresholding techniques

Interactive and dynamic

Illumination

Aperture fluorescent lighting

Scan accuracy

+/- 0.040 in (0.102 cm) over 36 in (91.4 cm)

Paper skew

+/- 0.1 %

Physical characteristics

Scanner design

Roller--document transported over cameras

Dimensions

58 in x 26 in x 40 in

(W x D x H)

(147.3 cm x 66 cm x 101.6 cm)

Weight

485 lbs (220 kg)

Electrical requirements

United States

120 VAC/47-63 Hz/3.0 A/290 W

International

100 VAC/47-63 Hz/3.0 A/290 W

(switch selectable)

200 VAC/47-63 Hz/2.0 A/290 W

220 VAC/47-63 Hz/2.0 A/290 W

230 or 240 VAC/47-63 Hz/2.0 A/290 W

Operating Environment

Heat dissipation

985 BTU/Hr

Temperature range

65 degrees to 85 degrees F (18 degrees to 30 degrees C)

Humidity range

15% to 90% (non-condensing)

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Eagle 4080

Operating Platform

PC

Software/Hardware requirement

SCANSMITH Productivity Suite

General

Document media

Opaque or transparent

Document type

Vellum, paper, acetate, or linen

Document width

42 in (106.7 cm) x roll length

Maximum scan width

40 in (101.6 cm)

Scanning technology

Seven 5,000 element CCD cameras

Thresholding techniques

Interactive and dynamic

Illumination

Aperture fluorescent lighting

Scan accuracy

+/- 0.040 in (0.102 cm) over 36 in (91.4 cm)

Paper skew

+/- 0.1 %

Physical characteristics

Scanner design

Roller--document transported over cameras

Dimensions

58 in x 26 in x 40 in

(W x D x H)

(147.3 cm x 66 cm x 101.6 cm)

Weight

505 lbs (230 kg)

Electrical requirements

United States

120 VAC/47-63 Hz/3.0 A/290 W

International

100 VAC/47-63 Hz/3.0 A/290 W

(switch selectable)

200 VAC/47-63 Hz/2.0 A/290 W

220 VAC/47-63 Hz/2.0 A/290 W

230 or 240 VAC/47-63 Hz/2.0 A/290 W

Operating Environment

Heat dissipation

985 BTU/Hr

Temperature range

65 degrees to 85 degrees F (18 degrees to 30 degrees C)

Humidity range

15% to 90% (non-condensing)

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Eagle 4240

Operating Platform

PC

Software/Hardware requirement

SCANSMITH Productivity Suite

General

Document media

Opaque or transparent

Document type

Vellum, paper, acetate, or linen

Document width

42 in (106.7 cm) x roll length

Maximum scan width

42 in (106.7 cm)

Scanning technology

Four 5,000 element CCD cameras

Thresholding techniques

Interactive and dynamic

Illumination

Aperture fluorescent lighting

Scan accuracy

+/- 0.040 in (0.102 cm) over 36 in (91.4 cm)

Paper skew

+/- 0.1 %

Physical characteristics

Scanner design

Roller--document transported over cameras

Dimensions

58 in x 26 in x 40 in

(W x D x H)

(147.3 cm x 66 cm x 101.6 cm)

Weight

490 lbs (223 kg)

Electrical requirements

United States

120 VAC/47-63 Hz/3.0 A/290 W

International

100 VAC/47-63 Hz/3.0 A/290 W

(switch selectable)

200 VAC/47-63 Hz/2.0 A/290 W

220 VAC/47-63 Hz/2.0 A/290 W

230 or 240 VAC/47-63 Hz/2.0 A/290 W

Operating Environment

Heat dissipation

985 BTU/Hr

Temperature range

65 degrees to 85 degrees F (18 degrees to 30 degrees C)

Humidity range

15% to 90% (non-condensing)

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Eagle 6250

Operating Platform

PC

Software/Hardware requirement

SCANSMITH Productivity Suite

General

Document media

Opaque or transparent

Document type

Vellum, paper, acetate, or linen

Document width

64 in (162.6 cm) x roll length

Maximum scan width

62 in (157.5 cm)

Scanning technology

Seven 5,000 element CCD cameras

Thresholding techniques

Interactive and dynamic

Illumination

Aperture fluorescent lighting

Scan accuracy

+/- 0.040 in (0.102 cm) over 36 in (91.4 cm)

Paper skew

+/- 0.1 %

Physical characteristics

Scanner design

Roller--document transported over cameras

Dimensions

78 in x 26 in x 40 in

(W x D x H)

(198.1 cm x 66 cm x 101.6 cm)

Weight

580 lbs (264 kg)

Electrical requirements

United States

120 VAC/47-63 Hz/3.0 A/290 W

International

100 VAC/47-63 Hz/3.0 A/290 W

(switch selectable)

200 VAC/47-63 Hz/2.0 A/290 W

220 VAC/47-63 Hz/2.0 A/290 W

230 or 240 VAC/47-63 Hz/2.0 A/290 W

Operating Environment

Heat dissipation

985 BTU/Hr

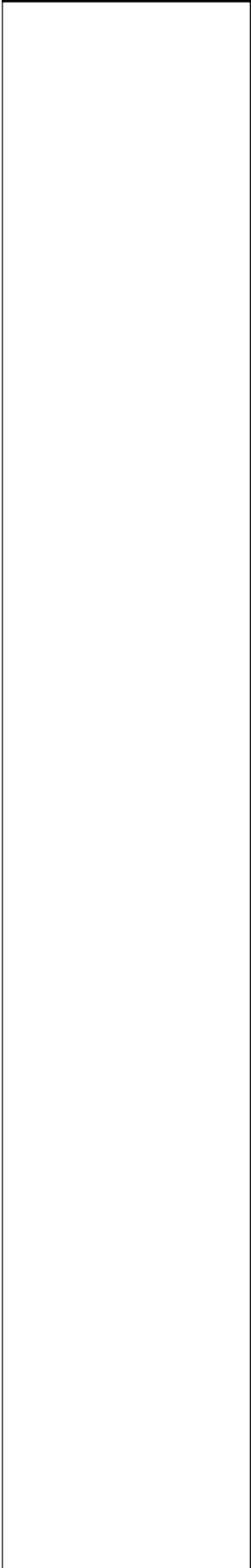
Temperature range

65 degrees to 85 degrees F (18 degrees to 30 degrees C)

Humidity range

15% to 90% (non-condensing)

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