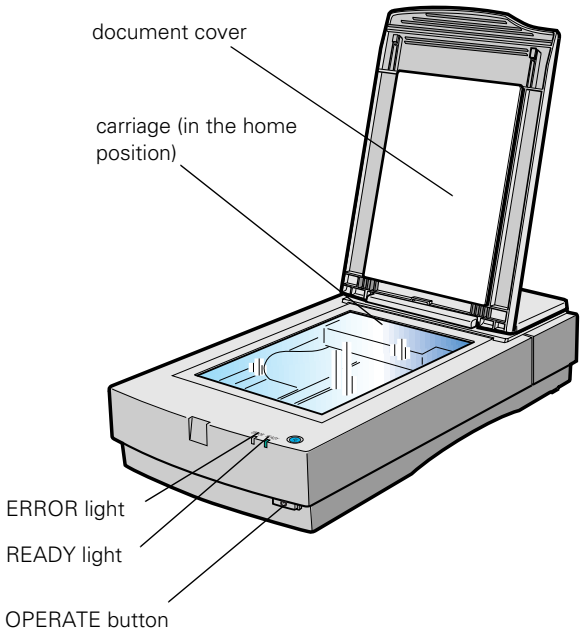
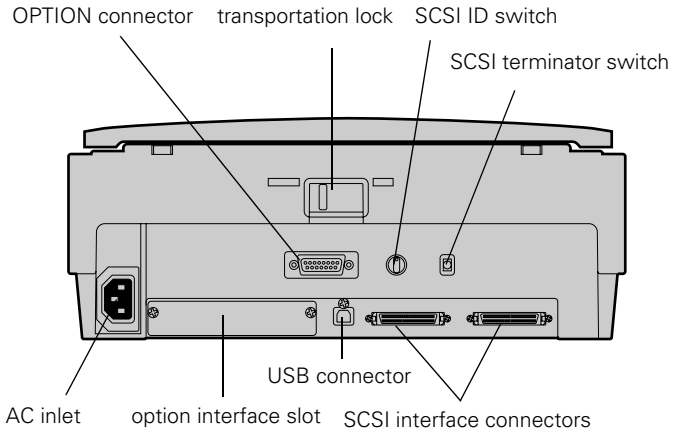
Scanner Parts





Scanner Specifications

The EPSON Expression 1600 is a 36-bit professional graphics scanner designed to deliver superior results for artists, graphics professionals, and business graphics users.

Basic Specifications

Scanner type	Flatbed, color
Photoelectric device	Color CCD line sensor
Effective pixels	13600 × 18720 pixels at 1600 dpi, 100% scaling
Color depth	36-bit internal/36-bit external
Grayscale depth	12-bit internal/12-bit external
Optical density	3.3 Dmax
Maximum document size	US letter size or A4 (8.5 × 11.7 inches [216 × 297 mm]) Up to legal size if using the automatic document feeder (The reading area can be specified from software.)
Optical resolution	1600 dpi
Maximum hardware resolution*	1600 dpi (main scan) × 3200 dpi (sub scan)

* The maximum hardware resolution of 1600 × 3200 dpi is achieved using EPSON's Micro Step™ Drive technology.

Maximum software resolution	12800 × 12800 dpi with interpolation
Speed (1600 dpi, draft mode)	Color: 9.2 ms/line (approx.) Grayscale: 3.1 ms/line (approx.) Line Art: 3.1 ms/line (approx.)
Color separation	RGB color filters on CCD
Command level	ESC/I-B8
Reading sequence	Monochrome: One-pass scanning Color byte sequence: One-pass scanning (R, G, B) Color line sequence: One-pass scanning (R, G, B)
Zoom	50% to 200% in 1% increments
Pixel depth	Color: 12 bits per pixel input, 1 to 12 bits per pixel output Grayscale: 12 bits per pixel input, 12 bits per pixel output (8 bits per pixel output can be selected in TWAIN Pro) Line Art: 1 bit per pixel
Brightness	7 levels
Line art settings	Fixed threshold TET (Text Enhancement Technology, enable/disable selectable)

Digital halftoning	AAS (Auto Area Segmentation, enable/disable selectable) 3 halftoning modes (A, B, and C) and 4 dither patterns (A, B, C, and D) for bi-level and quad-level data 2 user-defined dither patterns (A, B)
Gamma correction	2 types for CRT display 3 types for printer 1 type for user-defined
Color correction	1 type for CRT display 3 types for printer output (available in color byte sequence mode and color line sequence mode) 1 type user-defined (only user-defined color correction is available for EPSON TWAIN Pro
Interfaces	Two SCSI 2 (Micro DB50 connectors) USB (Type B receptacle connector) Optional IEEE 1394 (FireWire)
Light source	White cold cathode fluorescent lamp (Xenon)
Reliability	MCBF 100,000 cycles of carriage movements (main unit)
Dimensions	Width: 13.0 inches (332 mm) Depth: 22.1 inches (562 mm) Height: 5.3 inches (134 mm)
Weight	Approx. 18.7 lb (8.5 kg)

Electrical

Input voltage range	100 to 200 VAC—90 to 132 VAC 220 to 240 VAC—198 to 264 VAC; autoswitching
Rated frequency	50 to 60 Hz
Rated current	100 to 120 VAC—0.8 A 220 to 240 VAC—0.4 A
Power consumption	*Operating* Approximately 30 W (approximately 50 W with TPU or ADF *Standby* Approximately 10 W (without TPU or ADF)

Check the label on the back of the scanner for voltage information.

Environmental

Temperature	*Operating* 41 to 95 °F (5 to 35 °C) *Standby* –13 to 140 °F (–25 to 60 °C)
Humidity (without condensation)	*Operating* 10% to 80% *Standby* 10% to 85%
Operating conditions	Ordinary office or home conditions; avoid dust, direct sunlight, or strong light. Be sure the outlet provides enough power.

Safety Approvals

120 V

Safety standards	UL 1950 with D3 CSA C22.2 No. 950 with D3
EMC	FCC part 15 subpart B class B (USA) CSA C108.8 class B (Canada)

230 V

Safety standards	EN 60950 (VDE)
EMC	EN 55022 (CISPR Pub 22) class B AS/NZS 3548 class B

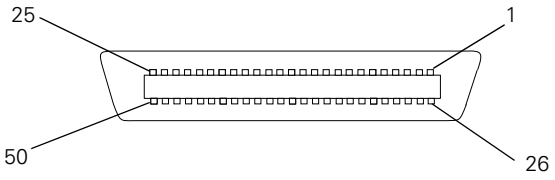
CE marking

Low Voltage Directive 73/23/EEC	EN60950
EMC Directive 89/336/EEC	EN 55022 Class B EN 61000-3-2 EN 61000-3-3 EN 50082-1 IEC 801-2 IEC 801-3 IEC 801-4

SCSI Interface

Interface type	ANSI X3T9.2/375R Revision 10L (SCSI 2)
Functions	BUS FREE phase ARBITRATION phase SELECTION/RESELECTION phase COMMAND phase (the Logical Unit Number is fixed at 0 and the Command Link Function is not supported) DATA phase DATA IN phase DATA OUT phase STATUS phase MESSAGE phase MESSAGE IN phase MESSAGE OUT phase ATTENTION condition RESET condition
Logic level	TTL compatible
Electrical standard	ANSI X3T9.2/375R Revision 10L (SCSI-2)
ID Setting	Selectable from 0 to 7 (factory setting: 2); asterisk (*) setting is only used when transporting scanner
Terminator	Internal terminator selectable (enable/disable)
Connector type	Two Micro DB-50 connectors

Connector pin arrangement



USB Interface

Interface type	Universal Serial Bus Specification Revision 1.0
Electrical standard	Full speed mode (12MB) of Universal Serial Bus Specification Revision 1.0
Connector type	One receptacle (Type B)

Option Interface Connector

Interface type	For use with the optional automatic document feeder (B813162) or transparency unit (B813182)
Output voltage	21.6 to 26.4 VDC 4.75 to 5.25 VDC
Output current	0.6 A (24 V) 0.3 A (5 V)

Initialization methods

SCSI	Scanner is turned on or receives a SCSI Reset signal from the SCSI interface (hardware initialization). Scanner receives a SCSI Bus Device message or an Esc @ command from the software (software initialization)
USB	Scanner is turned on or USB cable is unplugged from the USB port on the scanner (hardware initialization) Scanner receives a Bus Reset from the USB interface, or an Esc @ command from the software (software initialization)

Optional Transparency Unit (B813182)

The transparency unit allows you to scan positive and negative transparent materials—35 mm slides, 35 mm filmstrips, and film or documents up to 8.5 × 11.7 inches in size. In addition to four film guides, it comes with a reflective document mat that allows you to alternate between scanning transparent materials and normal reflective (paper) documents.

General

Dimensions	Width: 12.8 inches (324 mm) Depth: 21.3 inches (540 mm) Height: 3.6 inches (92 mm)
Weight	11 lb (5 kg)
Maximum read area	8.5 × 11.7 inches (216 × 297 mm)
Reliability	MCBF 100,000 cycles

Electrical

Power supply	*S*upplied from the scanner: 21.6 to 26.4 VDC 4.7 to 5.25 VDC
Power consumption	0.6 A 0.1A
Document specifications	Transparencies up to 8.5 × 11.7 inches (negative film, positive film) 35 mm strip film (negative, positive) 35 mm slides (positive) Brownie size strip film

Environmental

Temperatures	*Operating* 41 to 95 °F (5 to 35 °C) *Standby* –4 to 140 °F (–20 to 60 °C)
Humidity (without condensation)	*Operating* 10% to 80% *Standby* 10% to 85%
Operating conditions	Ordinary office or home conditions; avoid extreme dust, operation under direct sunlight, and strong light sources.

Optional Auto Document Feeder (B813162)

The auto document feeder allows you to automatically load multi-page documents into your scanner.

General

Dimensions	Width: 12.2 inches (310 mm) Depth: 20.9 (528 mm) Height: 3.6 inches (92 mm)
Weight	9.9 lb (4.5 kg)
Feeder type	Sheet through, face up loading, face down ejecting, roller friction
Document feeding	Pages are center aligned, fed face up from the top of the stack, ejected face down
Feeder capacity	30 sheets of 21 lb (80 g/m^2) paper; Letter, A4 or smaller
Ejecting capacity	100 sheets
Multiple sizes	Unavailable; all documents in the stack must be the same size
Connector	15-pin DIN male
Reliability	Load/eject: 100,000 sheets (MCBF) Hinge: 30,000 cycles (MCBF)

Electrical

Power supply	Supplied by the scanner: 22.8 to 25.2 VDC 4.75 to 5.25 VDC
Power consumption	Approximately 22 W Insulation resistance: 10 mΩ or more at 500 VDC (between AC line and chassis) Dielectric strength: 1000 VAC per minute (between AC line and chassis)
Resistance to static electric noise:	Casing: 10 kV Metal: 7 kV

Environmental

Temperatures	*Operating* 50 to 89 °F (10 to 32 °C) *Standby* –4 to 140 °F (–20 to 60 °C)
Humidity (without condensation)	*Operating* 20% to 80% *Standby* 95% or less
Operating conditions	Ordinary office or home conditions; avoid extreme dust, direct sunlight, and strong light.

Document Specifications

Size	Letter, Legal, A4, B5, 3 × 6 inch (check-size)
Thickness	0.0028 to 0.0063 inch (0.07 to 0.16 mm)
Weight	99.2 to 242.5 lb (45 to 110 kg)
Paper quality	High-quality bond or thermal paper, ink jet paper (fine and super-fine)
Document type	Documents printed with impact printers, laser printers, or facsimile machines

Note

Don't use the following paper types: transparencies, tracing paper, coated paper (such as photo quality and glossy paper), labels, multipart forms, carbon paper, or paper with staples, holes, rips, curls, or folds.

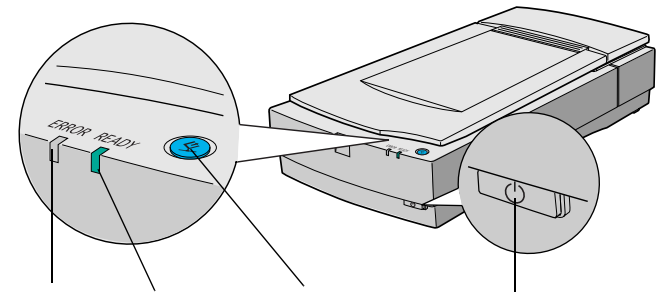
Optional IEEE 1394 FireWire® Scanner Interface Card (B808342)

General

Interface type	IEEE 1394-1995 compatible
Data transfer method	Half-duplex Data/Strobe differential serial
Synchronization method	Clock synchronization with DS-Link
Encoding/ decoding	DS-Link
Logic level	3.3 V
Power class	Power class code 100 No power supply from external sources Fitted with a repeat function with bus power
Compatible connectors	IEEE 1394-1995 compatible

Lights and Buttons

The scanner has two indicator lights and two buttons. Light status and button functions are described in the tables below.



Scanner indicator lights

Light	Light status	Color	Scanner status
READY	○	Green	Ready to scan images
	☼ (flashing)	Green	Scanning in progress
ERROR	○ ☼ (rapidly flashing)	Red	An error has occurred

○ = on, ● = off, ☼ = flashing

Scanner buttons

Button	Function
⏻ Operate	Turns the scanner on and off.
Start	Automatically launches a Start button-compatible application. You must set up your scanner software and a compatible application to use this feature with any application other than Presto! PageManager. If you installed Presto! PageManager, it's automatically assigned to the Start button. You can set up Presto! PageManager to scan your image automatically and send it directly to another application or a peripheral device, such as a printer.

Error conditions

ERROR light	READY light	Error type
○	○	Command error: The scanner has received incorrect commands from the scanning software. Try rescanning.
☼	●	Interface error: Make sure the scanner is securely connected to the computer, and then turn the scanner off and back on again.
☼	☼	Fatal error: Make sure the transportation lock is released, and then turn the scanner off and back on again.
●	●	Option error: There's a problem with the TPU or ADF unit. Make sure the TPU or ADF is flat against the document table. Make sure your option is securely connected to the OPTION connector at the back of the scanner. Finally, make sure the ADF isn't out of paper and doesn't have a paper jam.

○ = on, ● = off, ☼ = flashing

Transporting the Scanner

When you transport the scanner a long distance or store it for an extended time, follow the steps below to secure the carriage:

1. Make sure the transportation lock on the back of the scanner is in the UNLOCK position.
2. Locate the SCSI ID rotary switch on the back of the scanner. Align the dot on the switch with the asterisk (*) setting.
3. If you're using a transparency unit or auto document feeder, remove it and replace the scanner cover.
4. Turn on the scanner and wait until the carriage moves to the home position (toward the back of the scanner). Then turn off the scanner.
5. Slide the transportation lock to the LOCK position.

If the carriage doesn't automatically return to the home position, slowly raise the front of the scanner and hold it up until the carriage comes to rest in the home position. Then slide the transportation lock to the LOCK position.

Transporting the Transparency Unit

After you've removed the transparency unit from the scanner, prepare it for shipping as follows:

1. Slowly raise the front of the transparency unit to allow the lamp assembly to slide to the back of the unit. Wait until the lamp assembly comes to rest.
2. Reinstall the transparency unit's shipping screw in the hole marked CLAMP.

Scanning with EPSON TWAIN Pro

Here is a brief overview of the scanning steps using EPSON TWAIN Pro (or EPSON TWAIN Pro Network). The Macintosh interface is shown; the Windows steps are the same.

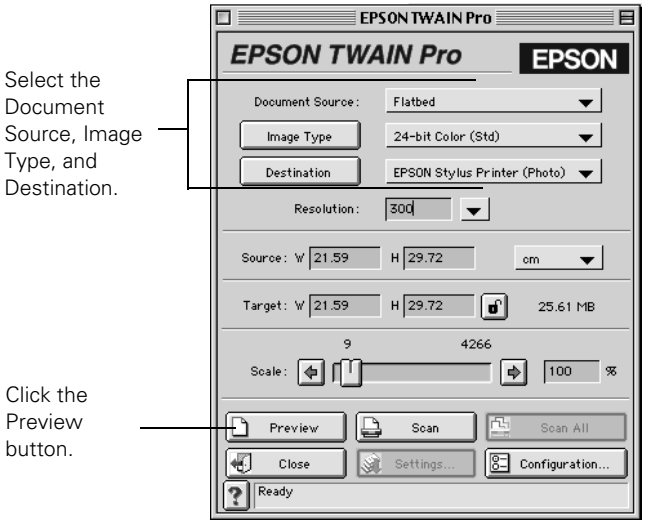
1. Start your host application (for example, Adobe® Photoshop® LE).
2. Select EPSON TWAIN Pro (or EPSON TWAIN Pro Network) as your scanner driver.

   For example, if you're running Windows and using Photoshop LE as your host application, click File, Import, Select TWAIN_32 Source. In the Select Source dialog box, select EPSON TWAIN Pro(32-bit) (or EPSON TWAIN Pro Network). Then click Select.

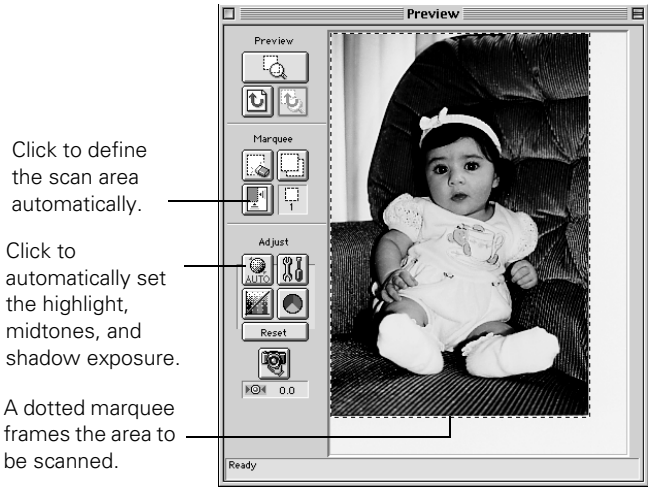
   If you have a Macintosh, click File, Import, Twain Select. In the Select a source dialog box, choose EPSON TWAIN Pro (or EPSON TWAIN Pro Network) and click OK.
3. Start the scanner software. For example, choose Import from Photoshop LE's File menu.

   In Windows, select TWAIN_32. On a Macintosh, select TWAIN_Acquire. The EPSON TWAIN Pro main window appears.
4. Choose the Document Source, Image Type, and Destination.

   For example, if you're scanning a photograph, select Flatbed as your Document Source, 24-bit Color (Std) as your Image Type, and EPSON Stylus Printer (Photo) as the Destination, if you're sending the scanned image to an EPSON inkjet printer. If you're using the optional transparency unit, select TPU for Neg. Film or TPU for Pos. Film as your Document Source. If you're using the optional automatic document feeder, select Auto Document Feeder as your Document Source.



5. Click the Preview button. You see a preview of your scan in the window that opens.



6. Click the Auto Locate button to automatically define the scan area around the edges of your image. Or adjust the scan area by positioning the mouse pointer over any of the eight boxes around the marquee's edge and dragging the box to resize the marquee.
7. Click the Auto Exposure button to automatically set the highlight, midtones, and shadow exposure.
8. When you've finished making adjustments, click the Scan button. Then click Close to close the EPSON TWAIN Pro window and return to your application.

Here are some recommended settings for different types of scans.

Image type	**Recommended application**	**Recommended TWAIN Pro settings***	**Scanning resolution for printing****
Photograph	Photoshop 5.0 LE	Image Type: 36-bit Color (HiFi)***, 24-bit Color (Std), 12-bit Gray (HiFi)***, 8-bit Gray (Std)	300 dpi**
Magazine	Photoshop 5.0 LE	Image Type: 24-bit Color De-screening	300 dpi
Newspaper (text only)	TextBridge® or PageManager™	Image Type: OCR****	300 or 400 dpi*****
Text for OCR	TextBridge or PageManager	Image Type: OCR****	300 or 400 dpi*****
Text with images	TextBridge or PageManager	Image Type: Line Art B/W option: Auto Area Segmentation	300 or 400 dpi *****
Line art	Photoshop 5.0 LE	Image Type: Line Art	300 to 3200 dpi
35 mm film (negative)	Photoshop 5.0 LE	Document Source: TPU for Neg. Film	300 to 3200 dpi
35 mm slide or 4 × 5 transparency (positive)	Photoshop 5.0 LE	Document Source: TPU for Pos. Film	300 to 3200 dpi

* Recommendations for EPSON TWAIN Pro also apply to EPSON TWAIN Pro Network.

** If the final output is for on-screen viewing (for example, on a web page), select 72 dpi for your resolution.

*** This Image Type is available only in certain applications, such as Photoshop.

**** Automatically selects Text Enhancement Technology (TET) as your Black and White option.

***** If you are enlarging your image, you must manually increase the resolution (dpi) proportionally to maintain the resolution of your original.

Scanning Color Images

If the colors in your scanned image don't match those in your original document, try experimenting with the Unsharp Mask setting. Click the Destination button on the EPSON TWAIN Pro main window to display the Destination window, and then select or deselect Unsharp Mask.

To reproduce the most accurate colors, use MonacoEZcolor™ to create color profiles for your scanner, printer, and monitor (MonacoEZcolor is not available with the Special Edition model of the scanner). Then use an ICC-compliant color management application like Adobe Photoshop 5.0 to apply the profiles. (Make sure to turn off color management in your scanner software.)

Using the Dual Focus Mechanism

The Expression 1600's Dual Focus mechanism eliminates the Newton ring effect when you're using the transparency unit. The focus is automatically set to 2.5 when the transparency unit is installed and you select TPU for Neg. Film or TPU for Pos. Film as the Document Source. If you use the film guides, you don't need to change the focus setting. If you set your film directly on the scanner's document table, you should preview your scan and click the  Focus button on the Preview window to set the focus position to 0.0.

Selecting Resolution

As a rule of thumb for most images except line art, use a scanning resolution that is approximately one third of your output resolution. For example, use a scanning resolution of up to 100 dpi with a 300 dpi laser printer, and up to 200 dpi with a 600 dpi laser printer. For 1440 dpi ink jet printers, use a scanning resolution of up to 300 dpi. Try a scanning resolution of 240 dpi for 720 dpi printing.

Keep the following in mind when you choose a resolution:

- ❏ The higher the resolution you select, the larger the resulting image file will be. To keep your file size manageable, select the lowest possible resolution that gives acceptable quality.
- ❏ If you need to scan at a higher resolution, you can reduce the size of the resulting image file by scanning only part of the image.

Using a Network Scanner

Network scanning involves the following steps:

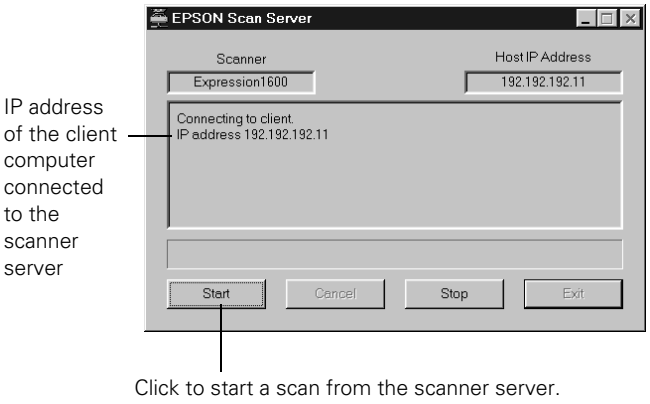
- ❏ The scanner server must be turned on and running EPSON Scan Server (PC only).
- ❏ From the client computer, start the host application, then start EPSON TWAIN Pro Network to establish a connection to the scanner server. Only one client computer at a time can connect to the scanner server.
- ❏ Choose the Image Type, Resolution, and other settings you want for your scan.
- ❏ Place your first image on the document table (or in the automatic document feeder or one of the optional transparency unit's film guides).
- ❏ Start the scan. Although this can be done from EPSON TWAIN Pro Network on the client computer, it may be more convenient to press the scanner's ◇ Start button or to start the scan from the scanner server. Then you can scan several images with a single trip to the scanner.
- ❏ If you want to scan more than one image, place your second image on the document table and press the scanner's ◇ Start button again. Repeat this step for every image you want to scan. (The settings you chose for the first image apply to these images too.)
- ❏ When you return to the client computer, your scanned images appear in the host application's window. Close EPSON TWAIN Pro Network to end your connection to the scanner server and allow other client computers to use the scanner.

Some applications, such as Adobe Photoshop 5.0 LE, automatically close the client computer's connection to the scanner server when you press the ◇ Start button. You can't scan multiple images if you're using these applications.

Starting a Network Scan

You can start a scan on your network scanner in several ways:

- ❏ You can start EPSON TWAIN Pro Network on the client computer, make your scan settings, and click the Scan button on the EPSON TWAIN Pro Network main window.
- ❏ You can press the ◇ Start button on the scanner to send the scanned image to the client computer that is currently connected to the scanner server.
- ❏ You can click the Start button on the EPSON Scan Server dialog box to send the scanned image to the client computer currently connected to the scanner server.



Stopping a Network Scan in Progress

You can stop a scan in progress from either the client computer or the scanner server.

- ❏ To cancel a scan from the client computer, click the Cancel button on the Progress bar.
- ❏ To cancel from the scanner server, click the Cancel button at the bottom of the EPSON Scan Server dialog box.
- ❏ To break the connection between the client computer and the scanner server, click the Stop button at the bottom of the EPSON Scan Server dialog box. This closes EPSON TWAIN Pro Network on the client computer and allows other client computers to connect to the scanner server.

Photoshop 5.0 LE Macintosh Configuration Tips

To avoid memory problems on the Macintosh when using the scanner with Photoshop 5.0 LE, follow these tips:

1. Set Preferred memory in Photoshop 5.0 LE to twice the suggested memory size. (Select the Photoshop 5.0 LE desktop icon, then select **File**, **Get Info**.)
2. Turn Virtual memory OFF. (From the Apple icon, select **Control Panel**, **Memory**.)
3. Assign a scratch disk. (Start Photoshop 5.0 LE, then select **File**, **Preferences**, **Plug-ins & Scratch Disks**.) Then restart your Macintosh.

See the electronic Photoshop 5.0 LE manual on your Photoshop 5.0 LE CD-ROM for detailed information. (The Special Edition model doesn't inlclude Photoshop 5.0 LE.)

Scanner Bundle Kits

The scanner is available in four models:

- ❏ The *Special Edition* model includes the following software: EPSON TWAIN Pro, EPSON Scan Server, EPSON TWAIN Pro Network, and Acrobat Reader 4.0.
- ❏ The *Artist* model includes the following software: EPSON TWAIN Pro, EPSON Scan Server, EPSON TWAIN Pro Network, Acrobat Reader 4.0, Presto! PageManager, TextBridge Classic, Photoshop 5.0 LE, and MonacoEZcolor.
- ❏ The *Professional* model includes a transparency unit. It also includes the following software: EPSON TWAIN Pro, EPSON Scan Server, EPSON TWAIN Pro Network, Acrobat Reader 4.0, Presto! PageManager, TextBridge Classic, Photoshop 5.0 LE, and MonacoEZcolor.
- ❏ The *Professional FireWire* model (available for Macintosh only) includes a transparency unit and a preinstalled IEEE 1394 (FireWire) scanner interface card. It also includes the following software: EPSON TWAIN Pro, EPSON Scan Server (PC only), EPSON TWAIN Pro Network, Acrobat Reader 4.0, Presto! PageManager, TextBridge Classic, Photoshop 5.0 LE, and MonacoEZcolor.

Related Documentation

CPD-9639	EPSON Expression 1600 User's Guide
CPD-9640	EPSON Expression 1600 Artist/Pro Checklist
CPD-9641	EPSON Expression 1600 Professional FireWire Checklist
CPD-9901	EPSON Expression 1600 Special Edition Checklist
	EPSON Expression 1600 Software Reference Guide (html)
TM-EXPR1600	EPSON Expression 1600 Service Manual
PL-EXPR1600	EPSON Expression 1600 Parts Price List