

Desktop Proofing with Adobe, Aurelon, Pixelis, Xitron

THE INTRODUCTION of digital high-end color systems early in the 1980s brought a completely new and radical approach to prepress technology. Images could be scanned and retouched on a computer, pages could be composed and imposed electronically, and films could be output directly from digital data through an imagesetter.

However, there was one fundamental requirement missing from this new digital evolution: the ability to create proofs from the digital data. The only solution at that time was to produce a Cromalin proof from four screened film separations. The disadvantage of this approach was that color correction was a highly skilled task—the operator had to judge required color corrections using the four separations. In addition, a Cromalin proof had a top laminate that created problems for printers when they attempted to match jobs printed on uncoated stock.

At Drupa '90, the first digital proofing systems were announced: Kodak demonstrated its Approval proofing system and 3M showed its Digital Matchprint. Although these proofing systems could reproduce halftone dots, their main drawback was high cost (they were priced at \$250,000 or more), which kept most printers from adopting them.

The next wave of digital proofing systems to hit the market didn't use any halftone dots. Iris Graphics, which initially was independent but was acquired by Scitex in 1990, produced a proofing system that used continuous-flow ink-jet technology to create proofs. 3M also developed a non-halftone digital proofing system, called the Rainbow, that used dye-sublimation-transfer technology. Although the Rainbow proved more popular than the Approval or Digital Matchprint, it couldn't match the popularity of the Iris, which sold more than 10,000 proofing systems worldwide in the 1990s—nearly twice the number of Rainbows sold.

New breed of proofing devices

Today, the market is witnessing another class of proofing systems—drop-on-demand (DOD) ink-jet printers based on tech-



Desktop proofer. The Epson Stylus Pro 5000 opened a new market for proofing when it was introduced more than two years ago, packaged with an EFI Fiery controller for about \$10,000. The 5000 is now available unbundled, which opened the way for many new proofing systems.

nologies invented for the mass-market computer industry. This ink-jet technology falls into three separate categories: thermal (including the "Bubble-Jet" technology created for Canon engines), piezoelectric and solid ink-jet (also referred to as "phase change")¹.

These ink-jet technologies together have seen a higher adoption rate than any other digital printing technology. The growth rate of personal computers and the Internet has led DOD ink-jet printers to be a practical and cost-effective solution to printing in the home or at the office. The resolution and image quality of such printers have rapidly evolved to the point where the quality of DOD ink-jet printing is now high enough for these printers to be used as proofing devices. The upshot is that customers, designers and printers can output digital proofs on their desktops quickly and economically.

A major limitation for digital proofing systems has been the restriction on size. In the past, the only way to produce large-format proofs was to make plates and print the proofs on a press. Today, the number of large-format DOD ink-jet printers is vast, and the many vendors that are trying to establish themselves make this a highly competitive market. These engines typically offer widths

¹ Drop-on-demand refers to a process in which ink drops are fired intermittently onto a substrate (deposited only where they are needed). In a continuous-flow printer, ink flows in a continuous stream within a closed-loop system in which ink drops are either put on the substrate or collected in a gutter and put back in the ink supply. With phase-change technology, solid ink pellets are heated to form a liquid that is fired onto the substrate.

RIPs Covered in This Article

Company	Product	Interpreter	Platform	Proofers driven	Price
Adobe Systems www.adobe.com	Press-Ready	Adobe CPSI	Mac, Windows 95, 98, NT	Canon 8500, Epson 5000, HP Color Pro GA	\$249
Aurelon www.aurelon.com	DeskCheck	Own	Mac, NT	Canon 8500, Epson 5000, HP Color Pro GA	\$1,499
Pixelis www.pixelis-online.com	Proof-Creator	Harlequin	Mac	Canon 8500, Epson 5000, HP Color Pro GA	\$795–\$1,690 (depending on driver)
Xitron www.xitron.com	Navigator XPR	Harlequin	Mac, NT	Epson 5000	\$1,495–\$2,995 (depending on driver)

from 3 feet to more than 16 feet, with arbitrarily long lengths enabled by printing on rolls of media.

It's all in the RIP

All output devices these days, from platesetters to proofing printers, are "slaves." The resolution and color calibration of the printed image are controlled by the RIP that is connected to the output device. We shall distinguish two different types of RIPs:

- "Stand-alone" or "turnkey" RIPs combine hardware and software in a single product. Examples are Splash Technology's G Series (supplied on a Macintosh platform) and EFI's Fiery controllers (supplied on a proprietary Unix platform).
- Software RIPs aren't sold with a CPU; they are merely a software product that can be installed on a workstation or server.

Interpreter options. At the core of any RIP is a PostScript interpreter. Many RIP vendors tailor their products around PostScript interpreters obtained through OEM deals, such as Harlequin's ScriptWorks, Adobe's CPSI and 5D Solutions' Jaws. Some vendors, such as Aurelon and Best Software, have developed their own PostScript interpreters. Developing an independent PostScript interpreter allows the vendor greater flexibility in product design and eliminates the license fee that must be paid to the OEM supplier. But it also has the potential disadvantages of having to achieve absolute compatibility with the industry standard and having to overcome the market's preference for known products.

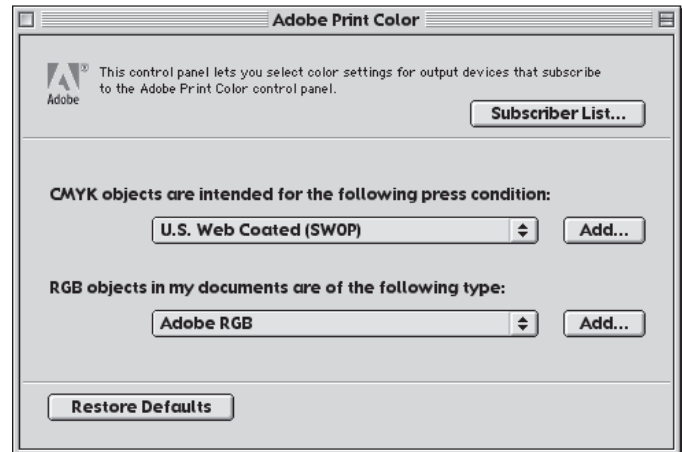
Our focus. There are many RIPs available to drive ink-jet printers today. (We have collected a list of more than 80, which we'll publish in an upcoming issue.) In this study, we chose to focus on a very narrow market niche: desktop ink-jet proofing systems. We wanted the closest "apples to apples" comparison of features, functions and color management capabilities we could find.

To allow the most direct comparisons, we further restricted the study to RIPs that drive the Epson Stylus Pro 5000 printer, which has become popular as a proofer. From that list, we selected four products:

- Adobe PressReady, an entry-level RIP primarily targeted at graphic design firms supporting the Mac and PC platforms.
- Aurelon DeskCheck, a new RIP that uses a unique non-ICC approach to color management and runs on both the Macintosh and PC.
- Pixelis ProofCreator, a Harlequin ScriptWorks RIP for the Macintosh.
- Xitron Navigator XPR, a Harlequin ScriptWorks RIP for the Mac and PC.

We wanted to include a fifth RIP, Best Software's BestColor, but Best was at an awkward moment between software versions. The new version wasn't quite ready, but Best didn't want to be represented by its old and soon-to-be-obsolete version. Readers who want our opinion of BestColor are referred to the results of the Seybold Digital Color Proofing Shootout, published early in March (see *Vol. 29, No 9*), and posted as a Special Report at our Web site.

PressReady profile selection. The Adobe Print Color control panel allows ICC profile selection for the target device. Users can select predefined profiles from drop-down menus, or add their own ICC profiles.



Adobe PressReady

With the knowledge that 44 percent of its application users own ink-jet printers, yet fewer than 4 percent have PostScript RIPs, Adobe decided to create a low-cost RIP for this market. It launched PressReady at Seybold Seminars Boston in March 1999, and began delivering it last September. Primarily targeted at the graphic design market, PressReady is a simple and affordable RIP that lets designers generate in-house color composite prints on the desktop.

PressReady supports both the Macintosh and PC, and drives the major printers used for desktop proofing—the Canon BJC-8500, the Epson Color Stylus Pro and the HP DesignJet Color Pro GA—among other devices.

Simplicity

Adobe has minimized the number of features in its RIP to ensure that the product is easy to understand and use. It has two fundamental components: the Adobe Print Color control panel and the RIP itself.

The Print Color control panel allows the user to select ICC profiles for color management—the CMYK output profile and the RGB input profile. A number of generic profiles are supplied with the product, including CMYK profiles for Euroscale coated and uncoated papers, Japan Standard and SWOP. Supplied RGB profiles include Adobe RGB (*i.e.*, the native Photoshop color space), Apple RGB and sRGB. More ICC profiles can be added to both the RGB and CMYK menus.

Printing

PressReady isn't designed to run as a print server. It isn't possible to create spool folders or publish network queues; the product is

intended solely to run on a local machine. Even if you have a network printer that is accessible from a number of different workstations, a separate copy of PressReady is required for each workstation.

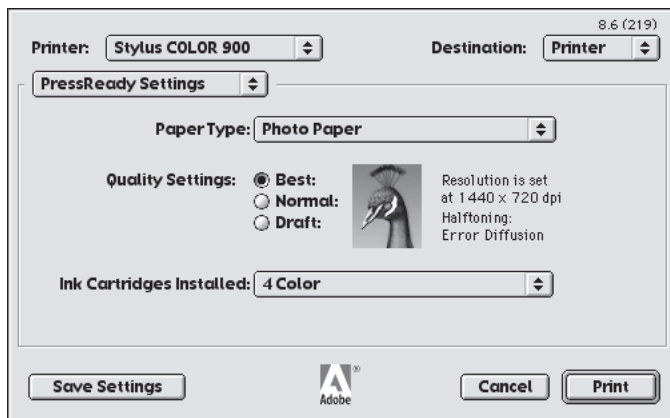
The RIP queue is selected by choosing the PressReady print driver in the Chooser (for the Mac) or from the print menu (for the PC). When the user chooses to print a document, the print dialog box offers selectable PressReady settings. The first setting, the paper type, offers a number of choices, which will vary depending on the type of printer used. Next, a quality setting is selected to control the printer's resolution. In addition, the user can select four or six ink cartridges (if the chosen printer has six cartridges).

Based on the paper type, quality setting and number of ink cartridges, PressReady selects the output ICC profile to use. The process is intended to be foolproof, yet the disadvantages of this simplistic approach are that it isn't possible to opt for an alternative ICC profile; a paper type that isn't on the list can't be used; and the operator can't customize an ICC profile to fingerprint an individual printer.

Straight to PDF

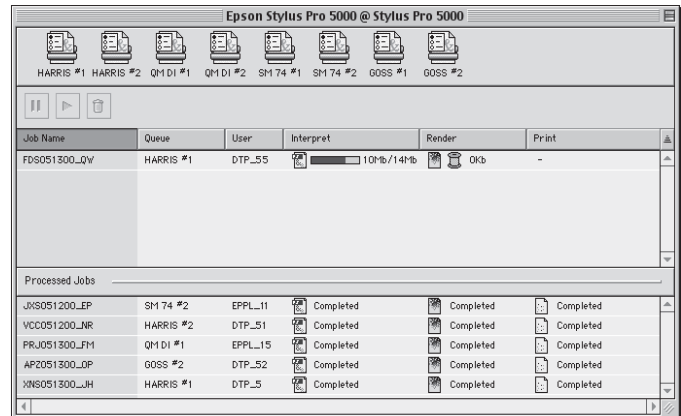
In addition to the ability to create and save PostScript files from the RIP, PressReady enables PDF files to be generated directly from the print dialog. The RIP has an integrated "Headless Distiller" function that allows a user to select Create Adobe PDF from the print menu, choose various job options, and then save a PDF file directly from the print menu.

The PDF print menu offers the usual press-, print- and screen-optimized default job options. If the user has created (via Acrobat Distiller) a customized job-option file, this also can be added to the menu. In addition, the Create Adobe PDF option can be configured to launch an application automatically upon completion of the PDF creation. Selectable launch options are Adobe Circulate, Acrobat and Acrobat Reader.



Paper implies profile. The PressReady print dialog offers simple settings to select the paper type and print quality for the ink-jet printer.

Managing the proofs. Aurelon DeskCheck supports up to eight individual queues for each printer.



Our take

PressReady provides a single user with a simple, affordable and effective RIP solution. With the simplistic approach come restrictions in color management capabilities. It isn't possible to use an output profile created for an individual printer. Nor is it possible to select the rendering intent to be used. However, for a graphic designer or customer who requires a proof to assess visually how the printed job will be reproduced when the color gamut limitations of a specific press condition are accounted for, PressReady is the perfect solution.

Aurelon DeskCheck

Aurelon, a new company based in Eindhoven, the Netherlands, announced a new range of products at Seybold Seminars in February. The range includes three fundamental products:

- DeskCheck RIP: a PostScript RIP that is available in several configurations (a studio edition, a large-format edition, a production server and a complete system). DeskCheck supports both the Mac and PC.
- DeskCheck Calibrator: profile creation software that uses non-ICC profiles to emulate the color range of presses and ink-jet printers.
- ScreenCheck: a soft proofing tool that preflights jobs and detects file output problems. ScreenCheck is bundled with DeskCheck software.

Out of the box

DeskCheck is an "out-of-the-box" RIP that uses simple menus and wizard-based interfaces to ensure that minimal training and knowledge of color management are required to use the product.

DeskCheck can be configured to use up to ten printers, with up to eight individual queues for each printer. DeskCheck publishes these queues directly to an AppleTalk network, thus allow-

The profile creation method for DeskCheck is very straightforward and easier to use than many ICC-based profile creation applications.

ing other workstations to print across the network to the RIP. Alternatively, a queue can be assigned to monitor a hot folder located either on the local machine running DeskCheck or on a remote server. When a PostScript file is sent to a hot folder, DeskCheck refers to a preferences file located in a related folder to determine the parameters for interpreting the file. (DeskCheck version 1.0 supports only PostScript Level 1 and Level 2 files. The next revision, we're told, will add support for PDF and DCS2 input, and will have a full PostScript 3 interpreter.)

A number of configurable options are available for each queue. Press and printer profiles created through Aurelon Calibrator are assigned to the individual queue; dot sizes and screening patterns can be selected; and ICC profiles can be applied to RGB and CMYK images that do not have any source or destination profiles tagged to them.

Non-ICC color management

Although ICC profiles can be applied to untagged RGB and CMYK images in a document, DeskCheck doesn't use ICC profiles for the target output device (a press) and proofing device (the ink-jet printer). Instead, DeskCheck Calibrator is used to create proprietary device fingerprint files. Then DeskCheck uses the fingerprints from the Calibrator application to apply color management to the input PostScript file using Aurelon's nColor Engine technology—a linear algorithm-based color management system.

The DeskCheck Calibrator interface is simple and straightforward to use. There are three profile options:

- The Calibrate function allows a user to take a generic profile (supplied by Aurelon) for a specific ink-jet printer and fine-tune it by printing a 72-patch target and reading the values using a spectrophotometer. This process provides a simple and fast method of creating a desktop fingerprint for an ink-jet printer.
- The Create Press Fingerprint function creates a profile for the target device. The user is required to print a supplied 72-patch



Just three buttons. The Aurelon DeskCheck Calibrator application uses a simple user interface to create device profiles with ease.

page on the target printing press; the page is then measured by a spectrophotometer through the Calibrator application.

- The Create Desktop Fingerprint function is similar to that of the Calibrate function, but instead of refining a generic profile, the feature allows a new profile to be created. It requires printing and measuring a rather larger number of patches, although it is still far fewer than most competing color profiling products. This function is useful if the customer has chosen a different brand of ink cartridges.

Our take

The profile creation method for DeskCheck is very straightforward and easier to use than many ICC-based profile creation applications. DeskCheck uses a small number of color patches for profile creation, which results in a simple and fast approach to creating profiles. However, a profile creation and color management tool is worthless unless it produces accurate results.

We conducted extensive tests on DeskCheck, creating press fingerprints to match two (very different) devices. We printed out an IT8.7/3 target and an ISO 300 image on the two target devices and on an Epson Stylus Pro 5000 using Aurelon's DeskCheck System. The results were very impressive; the color patches on the printed IT8.7/3 targets held a very close delta E tolerance to those from the target devices. On a visual inspection of the ISO 300 image, the output from the ink-jet printer provided a very acceptable, close match to the images printed on the target devices.

The tests illustrated that by using this unique approach to color management, the DeskCheck system can provide a fast, effective alternative to that of an ICC-based color management system.

Pixelis ProofCreator

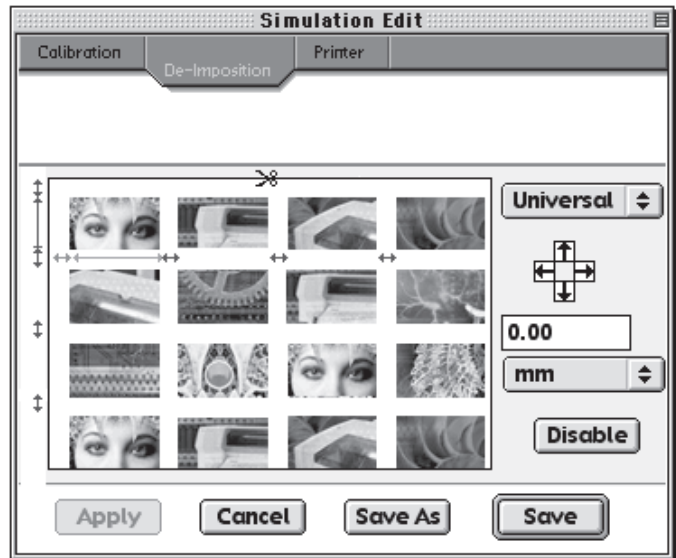
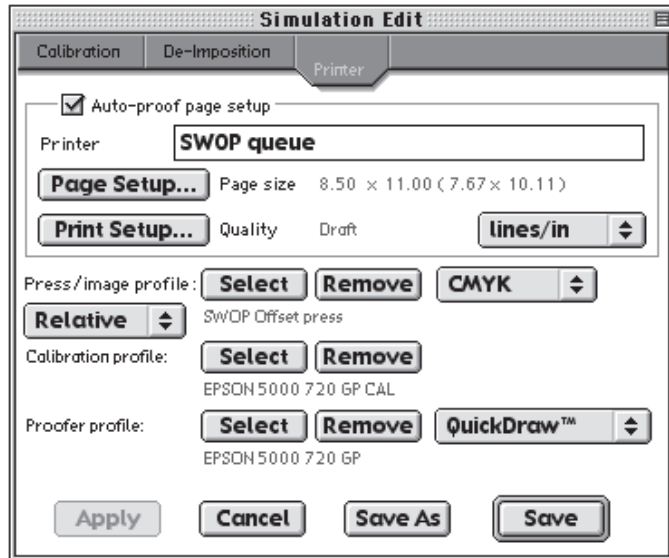
Pixelis was founded in 1999 by a group of industry refugees from Crosfield Electronics. Having developed products such as the Studio 9500, MagnaRip and scanner control software for the Celsis scanners, the group members decided to break free and dedicate themselves to delivering affordable software to address common digital prepress problems.

Pixelis currently offers two RIP products. **ProofROOM** drives a host of proofing devices directly with data generated from different RIPs, in a ROOM (RIP once, output many times) workflow. **ProofCreator** employs three individual software modules to drive ink-jet printers:

- The Harlequin ScriptWorks 5 RIP interprets PostScript and PDF files.
- The Color Engine processes the color information in the RIP'ed files and paints the data to the selected printing device.
- The Scheduler polls the RIP for files and delivers them to the ProofCreator Color Engine for output.

Pixelis setup. The ProofCreator Color Engine allows the user to create press simulations applicable to specific devices and papers using ICC profiles.

Optimizing media. The “De-Imposition” window in ProofCreator allows pages to be specially imposed for proofing, using custom page layouts and margins, in order to maximize media usage for printing.



ScriptWorks

The ScriptWorks RIP publishes printer queues across the network, linking predefined job preferences to specific queues. Different job preferences can be assigned to different queues, thus allowing the user to define individual preferences for different job workflows. There are a number of configurable options for job preferences, including separations, resolution, scaling and page layout. When a PostScript or PDF file is sent to a specific printer queue, the queue uses the job preferences to interpret the file. No calibration or color management is applied to the input file at this stage.

The RIP then saves the file as a TIFF element. The job isn't printed from the RIP; instead the file is saved to a designated folder for further processing by the Color Engine.

Color Engine

After the TIFF file has been created by the RIP, the Scheduler polls designated folders for RIP'ed files, and then passes them to the Color Engine. The Color Engine also assigns predefined preferences to specified input folders, thus allowing further automation in the proofing workflow. When a TIFF file is processed through the Color Engine, a color bar and a “Pixie Mark” (a small image of a pixie) can automatically be added to the file. The color bar can be imposed in a number of different locations on the page. The Pixie Mark indicates that the proof was created with the ProofCreator RIP.

The next step in file processing is color management. ICC profiles are selected and assigned to an individual job simulation. The Color Engine uses the ColorSync color management module to process the file and perform a profile-to-profile conversion through ColorSync's profile connection space.

In addition to applying color management to the input TIFF, the Color Engine has a number of other features. One is the

ability to preview the TIFF on screen and crop the image if required. Another is the ability to adjust the calibration of the output device. By printing a set of tint patches with known values on an ink-jet printer, and then measuring the dot area of such values, the user can input these measured values into specified fields and create dot-gain compensation to adjust for the nonlinearity of the printer. This enhances the reproduction match in the printed proof.

A function called “De-Imposition” is also built into the Color Engine. In “De-Imposition,” individual pages are automatically assigned to predefined page layouts. The user can select the number of tiles required (e.g., 2-up horizontal, 2-up vertical, 4-up, etc.), and then set the image and gutter widths. This maximizes media usage for printing, saving time and cost in consumables.

Remote proofing

The advantage of using a common file format (TIFF) throughout the proofing workflow is that the same file can be repurposed for other output devices, either locally or remotely. For local proofing, ProofCreator simply uses the standard print driver supplied by the vendor to print the file to a selected printer from the Chooser menu.

As an alternative to local printing, the file can be saved for remote distribution. On saving the file, the operator has a number of options to choose. First is the proofer's resolution, which ensures that the file is optimized for the specific remote proofing device. Proofer profiling can also be selected when saving a file, which applies color management to the file. The file can be saved in TIFF (Mac or PC) or EPS format. The advantage of EPS is that the file can then be distilled through Acrobat Distiller to create a PDF version, which is well suited for remote proofing applications, where a minimal file size and cross-platform compatibility are required.

Queue options. The New Page Setup window in Xitron's Navigator XPR allows the user to configure different preferences for individual printer queues.

Our take

One advantage of Pixelis's three-module approach (PostScript interpretation, queue polling and color management) is that the product provides an affordable and competitively priced Harlequin-based RIP. Because the Pixelis implementation integrates ScriptWorks in the RIP module, Pixelis is not required to honor a per-copy license fee to Harlequin for additional RIP modules; therefore, the product is priced lower than many other Harlequin-based RIPs.

However, the modular approach presents two problems. First, files may take longer to process than with some alternative Harlequin RIPs, since the file is processed through individual stages rather than an "on-the-fly" approach.

Second, ProofCreator can have only one printer selected at a time—the RIP can't drive more than one printer without manual reconfiguration.

Xitron Navigator XPR

Xitron, owned by Autologic Information International, has been developing RIPs since 1986. It manufactures and distributes a number of different RIPs and workflow solutions to the graphic arts industry. Its RIPs fall into two categories: those that use the Harlequin ScriptWorks interpreter and those that use the Adobe CPSI PostScript 3 interpreter.

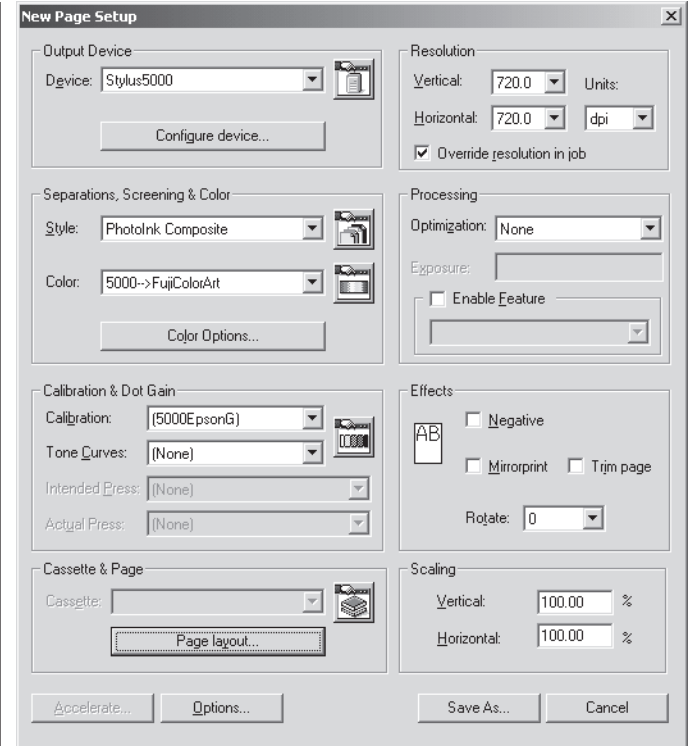
The Navigator XPR, which is the RIP we tested, uses ScriptWorks. It is designed to drive color ink-jet printers with a maximum resolution of 1,440 dpi. Currently, it supports the Epson Stylus Color 1520, Stylus Color 3000, Stylus Pro 5000 and the Stylus Pro 9000 printer models. It runs on a Mac or a PC under NT or Windows 2000.

Features

The Navigator XPR uses the familiar ScriptWorks interface with its version 5 toolbar buttons. These standard ScriptWorks buttons include:

- Print Calibration, which allows the user to print various calibration targets for calibrating output devices (including printing presses).
- Start Inputs and Stop Inputs, which start and stop spool folder monitoring and network printer publishing.
- Media Manager, which sets up automatic media management.
- Status Area, which allows the user to view the status of the input system, interpreter and output system.

In addition to the standard ScriptWorks features, the XPR RIP supports Harlequin's "modular" extra features, which can be licensed at extra cost. These modular features include various screening options, different input formats (PostScript, PDF and TIFF/IT) and additional printer drivers.



Configuration

The ScriptWorks RIP allows the user to configure different preferences for various printers. The RIP can be used to drive an unlimited number of output devices, each of which can be configured with multiple preferences. This allows separate queues to be created for different printer configurations and output applications.

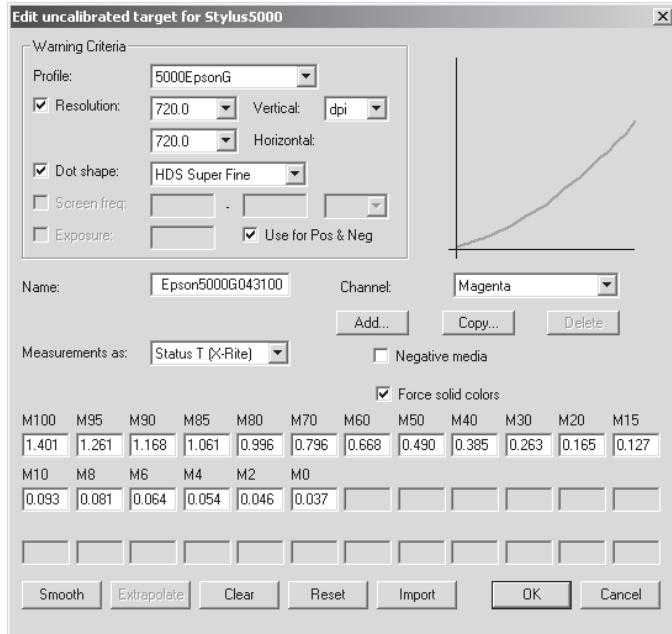
A number of configurable menu options can be assigned to individual printer queues.

Configuring a printer. One menu allows configuring a selected ink-jet printer. In this menu, a compression mode is offered that tells the RIP to perform lossless compression on image data. In addition, this menu offers two quality settings for the printers: "better" and "faster." Selecting "faster" activates a coarse micro-weaving pattern that prints 50 percent faster than the "better" setting. This option is useful in applications where contract quality is not required, such as concept or imposition proofs.

Separations, screening and color. A second menu allows separations, screening and color preferences to be specified for a queue. The user can select the type of screening method to be used and choose which ink cartridges will be used in printing. An additional feature in this menu is the ability to recombine pre-separated jobs—a separated file can be sent to the XPR RIP without the need for altering the separation setup in the original application.

The menu also offers an option to generate extra gray levels for the output device through interpolation. ICC profiles are ap-

Tone curve tweaks. Printer linearization can be adjusted in Xitron's Navigator XPR by reading density values from a printed target and applying tone transfer curves for the required ink-jet printer.



plied to the printer preferences by a simple color setup menu that allows the user to select previously created ICC profiles for CMYK input, RGB input and printer output. The color setup menu also has an option to override any color management specs within a job, ensuring that the output color matching intent from the RIP is honored.

Linearization. In a third menu, the ink-jet printer can be linearized to ensure correct tonal transfer. By use of additional "Genlin" software, a color swatch can be printed on an ink-jet printer and the density values can then be automatically input to the required fields using an X-Rite strip reader, or they can be entered manually. This produces a simulated tone transfer curve for the printer that enhances tonal matching capabilities for the printer.

Conserving media. A processing menu is also featured within the device configuration. This was developed for the imagesetter version of the RIP (Navigator NT), but it is particularly useful in conserving media for ink-jet prints. A "fill film" option can be selected to allow files to be held in a queue until sufficient pages or images have been spooled to the RIP to fill the entire paper size.

Input management

Two print input plug-ins are supplied with the RIP, each providing the ability to submit jobs. The first input source is AppleTalk. Selected printer queues with preconfigured job preferences can be published across the AppleTalk network so that they appear in the Chooser on each local Macintosh.

The second input source is by using designated spool folders, placed either on a network file server or on the local machine. The

spool folder configuration can be linked to designated printer queues and job preferences, and these folders are constantly monitored by the RIP for new file input. Navigator XPR supports PostScript, EPS, PDF, TIFF 6.0, TIFF/IT-P1, JPEG and JFIF input file formats, which allows flexibility between different workflows.

Our take

One key advantage of Navigator XPR is its ability to publish and print to an unlimited number of ink-jet printers from a single RIP. From the tests that we conducted, Navigator XPR handled multiple spooling and printing of queues almost seamlessly. Such scalability of output devices provides an effective RIP solution to environments that use multiple ink-jet printers in the proofing workflow.

Conclusion

Each RIP in this survey possesses individual features, functionality, capabilities and advantages. No generic RIP will suit every end-user's situation perfectly. Although each of the four RIPs in our survey worked well, they are really aimed at different target markets:

- For individual graphic designers and SOHO users who want color-consistent, accurate proofs without the expense of a server-based RIP, a product such as Adobe PressReady would be well suited.
- For small to medium-size workflow environments, where several printer queues are required with specified job options and color accuracy is a necessity, RIPs such as Aurelon DeskCheck or Pixelis ProofCreator would provide such a solution.
- For large workflows that require a server-based RIP to drive a number of different ink-jet printers, with many different queues and color management profiles, Xitron's Navigator XPR would be well suited.

Today's ink-jet printers are inexpensive, reliable and offer more-than-adequate color gamut for graphic arts proofing. With the continuing improvement in ink-jet technology, the RIP market for ink-jet printers will continue to grow as the industry shifts to drop-on-demand ink-jet printing as a cost-effective, viable solution to proofing.

Eliot Harper

About the Author

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