New HP Photosmart Pro B8850 Photo Printer delivers key high-end printing technology at an affordable price for the advanced amateur photographer

Technology Summary

The HP Photosmart Pro B8850 Photo Printer, HP's new photo printer with high capacity Individual Vivera pigment ink cartridges, produces durable, professional-quality photos and prints on a variety of media up to 13"x19" (B+/A3+). Superior color management and controls deliver color consistency—print after print.

What Is It?

The HP Photosmart Pro B8850 delivers consistent, long-lasting colors with HP Vivera pigment inks. An ideal solution for advanced amateur photographers looking for professional quality printing at an affordable price, the HP Photosmart Pro B8850 produces high-quality color and black-and-white photos and fine art prints on a wide range of media types, thicknesses and sizes up to B+/A3+ (13x19-inch).

HP Vivera pigment inks, part of the HP Professional ink family, offer superior display permanence on a variety of media—more than 200 years[1] on HP Advanced Photo Paper and HP Digital Fine Art papers. Professional printing controls, from HP's built-in densitometric color calibration system to an exclusive HP print plug-in for Adobe Photoshop®, make it easy to achieve consistent, predictable color quality.

How Does It Benefit Customers?

The HP Photosmart Pro B8850 Photo Printer brings leading innovations in pigment ink photo printing in a product ideal for the advanced amateur photographer. Key technology advantages include:

• **Professional-quality, durable photos with pigment inks**— Archival, pigment-based HP Vivera inks are specially formulated for beautiful, life-like portraits and landscapes, truly neutral black-and-white prints, and other professional photos and custom fine art prints.

• **Precise color management, print after print**—HP color controls, including densitometric closed-loop color calibration, full integration with Adobe Photoshop® CS3, HP Photosmart Pro print plug-in for Adobe Photoshop® CS2 and HP Color Center for adding and managing ICC profiles make it easy to get predictable, reliable results.

[1] Based on preliminary display-permanence testing under glass by Wilhelm Imaging Research. For details, visit http://hp.com/go/printpermanence.

• **Impressive performance on paper, canvas and more**—The HP Photosmart Pro B8850 prints on a wide range of photo and Digital Fine Art media up to 0.7mm thick. Unrivaled print speeds — up to 13 x 19-inch photos in 90 seconds — save customers valuable time when printing proofs, trimming checks and other "check points" prior to final printing.

How Does It Work?

The HP Photosmart Pro B8850 combines innovations in ink formulation, HP Scalable Printing Technology (SPT), advanced color reproduction capabilities, and exclusive color calibration and color controls to deliver the image quality, consistency, performance and media flexibility that advanced amateur photographers demand.

Professional-Quality, Durable Photos

HP Vivera pigment inks

The HP Photosmart Pro B8850 uses eight, individual HP Vivera pigment inks, including matte black and photo black inks, a neutral gray ink, and color inks in cyan, light cyan, magenta, light magenta and yellow. HP Vivera pigment inks, specifically designed for use with HP printing systems, offer superior display permanence on a variety of media—more than 200 years on HP Advanced Photo paper and other HP Digital Fine Art papers (see Note 1, page 1).

HP Vivera pigment inks are carefully formulated to provide increased durability and water-resistance. When printing on instant-dry HP Advanced Photo Paper, prints can be handled immediately from the printer out-tray.

HP Vivera pigment inks allow the HP Photosmart Pro B8850 to produce an extensive palette of brilliant, life-like colors, deep, rich blacks and true, neutral grays for professional portraits, landscapes, portfolio prints, and other photo and graphics printing assignments.

These inks are also formulated with an HP exclusive pigment dispersion technology — Electrosteric Encapsulation Technology (EET) — to deliver excellent gloss uniformity across a range of colors and consistent, reliable performance on a variety of media types. The key to delivering a reliable, consistent ink with good gloss properties is to ensure that pigment particles do not stick together and form larger particles. HP's unique EET technology incorporates two types of pigment dispersion within the encapsulation layer to provide 'electrosteric' stabilization of the pigment dispersion and maintain particle separation. EET, in combination with HP's proprietary ink vehicle design, results in inks that form a smooth film without the bumps or irregularities that can result from pigment inks that are not appropriately designed for photo printing.

By carefully optimizing the pigment chemistry, particle size and polymer composition, and electrostatic charge within the encapsulation layer, HP delivers professional image quality and the best photo permanence on the market (see Note 1, page 1).   Photo black inks produce exceptionally dark, glossy blacks on fast drying paper for professional studio-quality photos that customers can proudly sell, exhibit or showcase. The capability to produce deep, dark blacks on quick drying media, a feature which is difficult

to achieve with pigment based inks, is a result of HP's careful co-design of the ink and paper, including the formulation of the paper coating.

The printer carriage accommodates both matte and photo black ink, optimized for Digital Fine Art papers with a matte finish, and photo papers with a glossy finish, respectively. This eliminates the need to stop and change ink cartridges when printing on different media types, as well as the potential for possible cross-contamination or mixing of inks when changing from fine art paper to photo media. When printing on Digital Fine Art media such as canvas and watercolor papers, the HP Photosmart Pro B8850 uses a combination of both the matte and photo black inks for eight-ink printing. When printing on photo papers, the printer uses the photo black ink for seven-ink printing. Customers simply install all eight ink cartridges during initial printer setup and replace individual ink colors as needed when a cartridge is empty. HP Sure Supply online ordering technology provides customers with the ability to conveniently and easily reorder ink cartridges for their HP inkjet printers via the Internet.

HP's third-generation gray ink printing technology delivers true, neutral grays across a broad range of media for artistic black-and-white photos and fine art prints (see examples below). HP pigment-based gray ink is optimized for a wide variety of paper types and finishes.
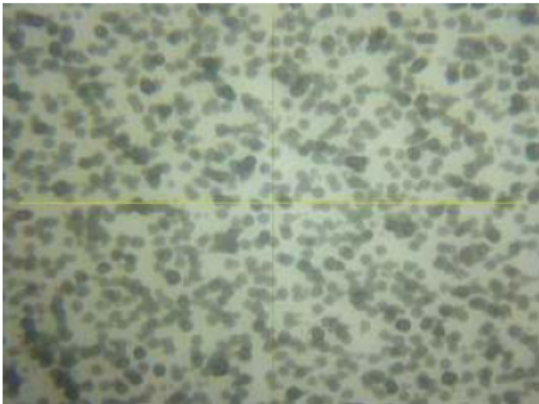
The HP Photosmart Pro B9180 uses HP Vivera gray ink to produce true, neutral grays.

Even competitive printers that use gray ink add composite inks, which produce less neutral grays.

Exclusive HP Vivera pigment inks work with other elements of the printing system to deliver exceptional color accuracy for realistic, life-like output. The new pigment-based inks are carefully co-developed with HP printhead design to deliver highly accurate, precise drop placement even at high print speeds. The HP Photosmart Pro B8850 uses HP Vivera gray ink to produce true, neutral grays. Competitive printers that use gray ink will often add composite inks, which produce less neutral grays.

Consistent color reproduction
HP professional color reproduction technologies allow the HP Photosmart Pro B8850 to deliver predictable, reliable color output for prints that match the customer's intent. Professional printing profiles, specifically developed for the HP Photosmart Pro Series and HP Vivera pigment inks, are optimized for precise display-to-print color matching. HP goes to great lengths to deliver this high level of accuracy, from advanced colorimetry and analysis to the use of carefully calibrated equipment and strict adherence to viewing

environment standards. By using calibrated displays and a constantly controlled D50$_2$ illuminant viewing environment, HP develops color profiles that preserve hue accuracy. With printer profiles specially designed to provide an extensive 'real world' gamut of colors, the HP Photosmart Pro B8850 allows customers to produce prints that truly match the colors they see on their computer monitor.

This robust approach to ink separation simultaneously controls color transitions and ink volumes to deliver colorimetrically smooth, uniform output. Ink transitions are intelligently combined for different areas of the color space, for each ink color. Some transitions are computed perceptually, while other transitions are computed for ink volume constancy. This sophisticated approach to controlling ink volume and color transitions gives customers the smooth transitions, subtle gradations, and gloss uniformity essential for high-quality photo printing.

HP Scalable Printing Technology
The HP Photosmart Pro B8850 features a professional photo implementation of HP Scalable Printing Technology (SPT) tailored to meet the needs of photographers and creative professionals. SPT, which represents a $1.4 billion commitment in HP thermal inkjet printing technology, combines virtually every aspect of the printing solution, from robust, high performance printhead design to innovations in ink formulation, ink delivery and writing.

The HP Photosmart Pro B8850 uses four SPT printheads. Each printhead contains two ink colors and 1,056 nozzles per color. SPT allows the nozzles to be spaced closely together on the printhead (1200 per inch). The high nozzle count (8,448) and tightly compacted nozzles are major contributors to the HP Photosmart Pro B8850's impressive performance. A 13 x 19-inch photo prints in as fast as 90 seconds in draft mode. A 4 x 6-inch photo prints in as fast as 10 seconds. The entire SPT printhead is built on a single silicon wafer using photolithography to maintain exceptional accuracy and alignment throughout the entire structure. Closely integrated components enable precise, accurate drop placement for consistent, professional image quality and high performance printing. Other innovations in SPT help ensure reliable operation of the long-life printheads by preventing particles and bubbles from entering the printhead.

The ink delivery system in the HP Photosmart Pro features an off-axis design with tubes that connect the printheads to eight individual ink cartridges. The off-axis design and separate ink cartridges further enhance printing reliability, efficiency and ease-of-use.

Electrostatic Drop Detection
HP's Electrostatic Drop Detection (EDD) printhead management system closely monitors all 8,448 print nozzles to ensure optimal, high-quality printing and consistent, reliable results over the life of the product. If a print nozzle is out, the system detects the specific nozzle and automatically compensates by placing ink from another nozzle in the exact location on the page. This ensures that customers will not experience any degradation in image quality as a result of a failed nozzle. The ability to closely monitor all nozzles for each printhead also helps minimize ink waste.

Here's how electrostatic drop detection works:
The printhead is positioned over the EDD sensor. As the printhead fires ink drops, a charge plate at the top of the sensor assembly induces an electrostatic charge in the drops, just before the drops break free from the printhead. The electrostatically charged drops fly past a capacitive sense plate and induce an electrical charge on the sensor. The sensor amplifies the signal literally billions of times. This amplified signal, which corresponds to the charge of the ink drops, is used to determine the condition of the print nozzles—healthy

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2 ISO (International Standards Organization) 3664 specifies D50 as the standard illuminant for the graphics arts industry.

or missing. Highly sensitive electrostatic drop detection assesses the condition of each print nozzle and compensates for failing nozzles by automatically prompting the writing system to fire ink from a neighboring print nozzle to deliver consistent image quality.

Electrostatic drop detection also helps extend the life of the printhead and the printer by predicting when print quality may be unacceptable and attempting to recover missing nozzles. If the system determines that the condition of a nozzle is such that it cannot be recovered with cleaning cycles or, that the number of missing nozzles is too many for the system to adequately compensate, the printer will notify the user to replace the printhead. Unlike some competitive printing systems, HP replaceable printheads are quickly and easily replaced by the user, so there's no need to send the printer out for printhead maintenance or replacement. With SPT long-life printheads and HP's exclusive electrostatic drop detect printhead management system, professionals can focus on the creative aspects of their work without having to stop and attend to their printer.
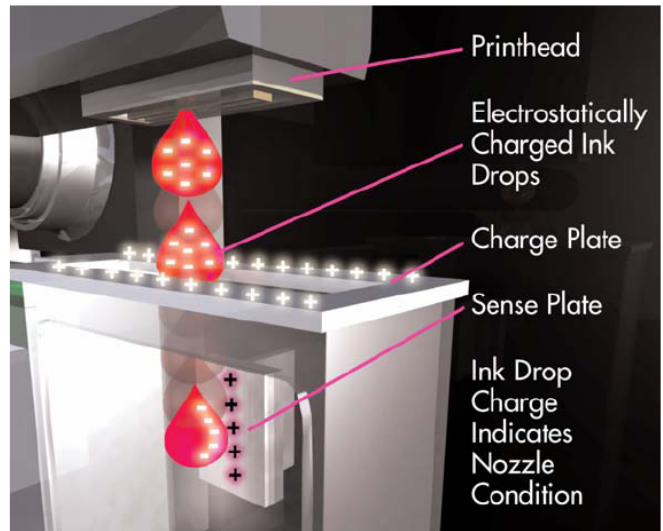

Color Consistency
HP Closed-Loop Color Calibration
The HP Photosmart Pro B8850 features HP's closed-loop color calibration system to ensure consistent color reproduction print after print.

Here's how it works:
• A sensor in the printer undergoes calibration during the manufacturing process.
• During initial printer setup, or whenever the customer desires to calibrate their printer, the HP Photosmart Pro B8850 prints a target page with individual color blocks and automatically feeds the page back into the printer. The sensor 'reads' each color block on the target page, measures the color density, and compares it with factory calibration settings, resident in the printer.
• If the sensor detects any variation from factory settings, closed loop color calibration adjusts colors as necessary to deliver the precise amount of ink to the page to ensure consistent color.

The densitometric sensor moves with the printer carriage, similar to a scanning device, to shine light onto the page from any of four color LEDs. The sensor measures the color density on the page by measuring the reflection of each color and compares it to the target color density. Closed-loop color calibration compensates for too much or too little ink by making adjustments as necessary to ensure consistent output. Sensors also detect the presence of media in the paper tray(s), the width of
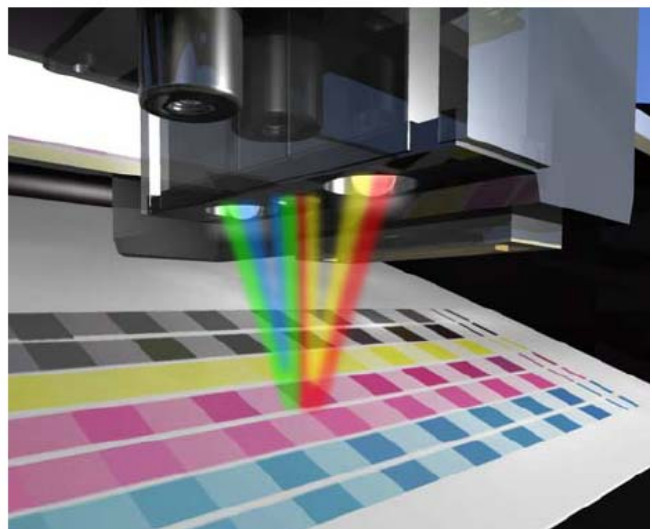
the media, and automatically adjust skew if media is not properly aligned in the tray.

The sensor is first calibrated during the manufacturing process and remains operational throughout the life of the printer. The HP Photosmart Pro B8850 performs color calibration during printer setup to ensure consistent color from print to print. Customers can use the system to calibrate their printer at any time. The feature is accessible from the Printer Toolbox.

Full Integration with Adobe Photoshop® CS3

The HP Photosmart Pro B8850 provides an advanced level of integration with Adobe Photoshop® CS3 providing easy control of print settings from within Photoshop®. Color Management for example, no longer needs to be set in the application and the print driver separately – when the "Color Handling" selector is set within Photoshop® CS3 it is automatically synchronized to the same setting in print driver. This eliminates the key printing frustration and the wasted prints from "double color management" or no color management.

With the advanced integration of the HP Photosmart Pro B8850, Adobe Photoshop® CS3 customers can also select the Printing Toolbox and monitor printer calibration status from the Photoshop "Print" screen. This represents HP's design approach of working closely with leading application providers to design print controls to work easily within the workflows of photo applications and not requiring users to use separate printing software.

HP Photosmart Pro print plug-in for Adobe Photoshop®

An included HP Photosmart Pro printer software print plug-in streamlines the digital workflow for Adobe Photoshop® users with a unified print screen for color management and other print settings. The print plug-in combines settings from the print driver and Photoshop "Print with Preview" settings on one screen to significantly reduce the number of steps to print — one print screen versus up to seven screens when printing with Photoshop.

The HP Photosmart Pro print plug-in for Adobe Photoshop® automatically installs with the printer software. To launch the plug-in from Photoshop, users simply select "File," "Automate," and "Photosmart Pro print." From the Photosmart Pro print screen, customers select their desired print settings, then select "Print." The plug-in scales accurately to the printed page (position on the page, for example, centered, full-bleed, etc.) and remembers the image's print settings. A preview area on the Photosmart Pro print screen reflects changes. Options on the plug-in screen include: "Printer Settings" (Printer, Paper Size, Source and Type, and Print Quality), "Color Management" (Color Handling, Print Profile and Rendering Intent), "Page" (Portrait, Landscape, Borderless, and Border), and "Size & Position" (Image Size, Position, Units in inches, etc., and Number of Copies). The Photosmart Pro print plug-in saves customers time by allowing them to view key color management settings on a single screen and saves setup time by retaining print image settings. The plug-in automatically synchronizes Photoshop color management with the printer driver and allows customers to attain predictable, accurate color output in fewer steps.

HP Color Center

The HP Color Center, included with the HP Photosmart Pro printer software, simplifies management of ICC (International Color Consortium) profiles with easy, one-button access to tools, tips and tutorials. Customers can manage or add new or external ICC profiles for non-HP fine art, watercolor, textured and canvas papers. HP Color Center is accessible from the HP Solution Center screen (Windows) and the HP Printer Utility screen (Macintosh).

HP Color Center includes an "Add Custom Paper" feature that allows users to add and manage new and custom papers. A button on the screen launches the HP Printing Knowledge Center, a web-based resource that offers helpful color tips and tutorials. For those who want to make their own ICC profiles, the online

knowledge center guides users through color management and printing with easy, step-by-step instructions. A "Calibrate Display" feature includes tips and methods for monitor calibration, an essential element in maintaining color accuracy. HP Color Center also provides information on HP's Advanced Profiling Solution, available at authorized HP resellers.

Animated Quick Start Tutorial – Set-up Wizard
The HP Photosmart software CD contains a detailed and animated Quick Start Tutorial. The animated Quick Start Tutorial on the CD provides instructions for setting up the printer and installing the software. The CD also contains the printer driver and other essential software needed to operate the printer.

The Quick Start Tutorial Set-up Wizard provides on-screen visual step-by-step instructions for setting up the printer – including installing the print-heads and print cartridges, automatic priming of the print system and initial color calibration.

Onscreen Help
The onscreen "Help" tab provides detailed instructions on using all of the features of the HP Photosmart Pro B8850, providing complete printer specifications and troubleshooting information.