

KODAK Adaptive Picture Exchange (APEX)

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Abstract

The KODAK Adaptive Picture Exchange (APEX) system is a modular, scalable, integrated solution that is being positioned for use by an entire on-site retail photo department. The system is affordable, easy to use, and delivers a low total cost of operation and a positive environmental impact while enabling the production of premium, high-margin consumer photo products. APEX software centralizes production of local and remote digital and film orders behind the counter and offers a clean, eco-friendly alternative to today's wet AgX minilabs. This paper will describe the details and features of the new system and show how it has been designed to integrate operations of an entire photo department in a way that is easy and efficient for the retail environment.

Introduction

Since the millennium, the rapid adoption of digital capture has revolutionized the photofinishing environment. Fulfilling the customer's need for photographic prints has opened the window for retailers to adopt new technologies that are more efficient and flexible than traditional silver halide (AgX) photofinishing systems. Kodak, already a world leader in digital fulfillment with its thermal kiosks, has developed the KODAK Adaptive Picture Exchange (APEX) system to take advantage of opportunities that the digital environment enables.

What is the APEX system?

The KODAK Adaptive Picture Exchange (APEX) system is a modular, scalable, integrated solution that can increase profit potential for the on-site retail photo department. This affordable, easy-to-use system delivers a low total cost of ownership while enabling premium, high-margin consumer photo products. APEX software centralizes production of local and remote digital and film orders behind the counter. The printing system is a clean, eco-friendly alternative to today's wet AgX minilabs.

The APEX system offers numerous advantages for both the retailer and consumer.

Adaptability: The APEX system is extremely scalable with the ability to easily add small format, wide format, and duplex output capacity as business grows. The modular cabinets fit almost any store installation, enabling flexibility for the retailer.

Efficiency: Retailers can offer consumers a choice of products from one media SKU with no incremental cost or inventory overhead. Kodak's Dual Finish printing technology provides both glossy and satin finish prints in sizes of 4" × 6", 6" × 8", and bordered 5" × 7" - all from the same media SKU. The APEX system can produce multiple orders and product types

simultaneously with minimal labor. The APEX system moves process-intensive jobs behind the counter, freeing up the order station for the next customer.

Simplicity: The system is easy to learn and operate with almost no maintenance, keeping operators focused on customers, not the equipment. Compared to AgX minilabs APEX reduces consumable SKUs from dozens to only a few and the proven, multiple printer architecture provides inherent reliability.

Eco-Friendly: APEX consumes 70%–90% less energy than comparable AgX minilabs. The dry system eliminates water, chemicals, effluents, and associated waste haul-away costs compared to AgX processing.

Proven Products: Kodak's complete line of winning, market-tested consumer photo products go to work immediately for the retailer.

Profitability: APEX scalability offers low capital investment options that still drive increased revenue and profit potential through high-value consumer premium products, as well as price differentiated consumer service levels. The low operational costs of operating labor, maintenance, and service, plus significant energy savings when compared to AgX minilabs further increases profitability.

Recent System Enhancements

Since the January 2008 PMA Show, Kodak has made many new advances in technology across the whole system for a new KODAK Adaptive Picture Exchange or APEX V2.0 System, which offers:

- The new KODAK 7010 Photo Printer that enables back printing on 6" wide prints.
- The new KODAK 7015 Photo Printer that enables back printing on borderless 5" × 7" prints.
- New 5" KODAK XTRALIFE II Paper, with lamination modulation technology, enabling satin and gloss finish capability from a single media SKU.
- New Back printer Media Kit for up to 10,000 prints.
- Direct input from the KODAK Rapid Print Scanner. This allows for behind-the-counter batch scanning, along with making KODAK Picture CDs, high-quality prints, photo books, calendars, and poster collages.
- A new KODAK Adaptive Picture Exchange 30 system (APEX 30), which replaces the 31" cabinet from 2008. This system allows for more printing in less space by allowing up to three thermal printers in a small footprint.
- New KODAK Adaptive Picture Exchange 40 system (APEX 40) that reduces the overall cabinet size to 40" while still allowing for a two-printer cabinet with sorters.
- New KODAK Adaptive Picture Exchange 70 system that combines the APEX 40 and APEX 30 systems to create a versatile production system that allows up to four 70XX

printers plus the Kodak Photo Printer 8800 in a reduced footprint.

- New APEX software updates that provide enhanced workflow and imaging capabilities, including connectivity to networked drives for image input and output workflows as well as calculated estimates of order completion times based on current system workload and order content. Additional imaging capabilities include enhanced satin finish, new output sizes, updated auto-red eye functionality, and black & white, sepia, and white border affects.
- Film strip densitometry control function through the F-135 Plus Film Scanner and APEX workstation to support film-processing calibration.

From a technology standpoint, we will look at several new key components in the new APEX V2.0 System and outline their advancements.

Thermal Printing Technology

The KODAK 7000 Photo Printer was announced at the 2008 PMA Show and was the latest in a series of the thermal printers that Kodak has developed for retail printing solutions.

There are tremendous benefits of using the thermal printing process in a system which combines hardware, firmware and media. The complete printing process takes only seconds until delivery of a completely dry, handle-able print. The resulting prints look and feel like traditional photographs. With vibrant color, smooth continuous tones, great shadow, highlight details, as well as lifetime image stability. Image stability measures the change in the way the print originally looked compared to how it will look when subjected to use or storage conditions. The goal is to have very little change over time. Kodak uses photographic prints to benchmark image stability because of their high image quality, print appearance, feel, and image permanence. Various factors influence photographic print image stability, for example:

- Temperature
- Relative humidity
- Exposure to light
- Ozone

The best way to determine print image stability is to conduct long-term testing under normal conditions. To shorten this process, Kodak accelerates the testing under controlled illumination, temperature and humidity conditions. Thermal dye transfer technology rivals traditional photography for print image quality and appearance, especially when the thermal dye transfer print is laminated. Kodak's thermal media produces thermal prints with excellent image stability -- suitable for indoor display at normal illumination levels. Prints made with Kodak's thermal media displayed in a typical home or business setting has image stability comparable to silver-halide color prints. In addition, the thermal printing process is a totally clean, dry process that has no liquid phase that can create spills. The in-printer lamination process minimizes time delays, hassles and cost of a post-lamination process.

The KODAK 7000 Photo Printer is still offered as an option on the APEX V2.0 System, having larger media capacity, increasing from 750 4" x 6" prints to 1000 4" x 6" prints, a 25% increase in capacity. Larger capacity means the retailer has to

replenish the media less often, reducing the retailer's labor requirement.

From a Human Factors standpoint, the KODAK 7000 Photo Printer incorporated the familiar, easy media loading style based on the KODAK Picture Kiosk stations.

This printer is also capable of printing 4" x 6" prints in 8 seconds for faster throughput of the print order, reducing the customer's wait time. The KODAK 7000 Photo Printer, similar to the KODAK Photo Printer 6800 and KODAK Photo Printer 6850, also offers several print sizes, including borderless 4" x 6" prints, bordered 5" x 7" prints, and borderless 6" x 8" prints.

The KODAK 7000 Photo Printer uses patented ribbon optimization technology that reduces waste and ensures the retailer gets the most for their money while maintaining printer reliability.

The KODAK 7000 Photo Printer also incorporates patented laminate modulation technology, which permits offering the customer two different surface finishes to choose from, the standard glossy finish or a satin finish, while still using a single media SKU.

In addition, this printer uses patent pending Clear Caption technology, which allows the retailer to choose front face text printing in the laminate layer. For example, using Clear Caption to print the order number on the face side of the print can eliminate the need for back printing mechanisms. This printer also uses KODAK PERFECT TOUCH technology.

A few areas that are noticeably different from the standard Kodak kiosks are the addition of print exit rollers and a new RS422 port on the front of the printer. The print exit rollers are driven at different speeds based on the print size to assure proper stacking when the prints are to be delivered to the APEX cabinet's print sorter. The means of communication between the APEX workstation, the printer, the post printing accessory controller (PPAC) and APEX sorter is through the RS422 port.

Because this is the fifth generation of Kodak's thermal printing technology, it delivers consistent results, high reliability, and proven support.

The KODAK 7010 Photo Printer is a 6" wide printer, leveraged directly from the KODAK 7000 Photo Printer; however, a new internal dot matrix printer has been developed to print on the back surface of the KODAK XTRALIFE II Paper. The internal dot matrix printer has a replaceable cartridge that allows for 10,000 prints with up to 2 lines of 40 characters.

The KODAK 7015 Photo Printer is a 5" wide printer that produces borderless 5" x 7" prints. It is also leveraged directly from the KODAK 7000 Photo Printer, with a new internal dot matrix printer developed to print on the back surface of the KODAK XTRALIFE II Paper. The internal dot matrix printer has a replaceable cartridge that allows for 10,000 prints with up to 2 lines of 40 characters. This printer uses the new KODAK 7015 Print Kit 5R.

Electro Photographic Printing Technology

The KODAK DL2100 Duplex Printer is an on-site electro photographic page printer, optimized for use in both the APEX system and KODAK Picture Kiosks, which allows retailers to participate in the \$16B greeting card and photo book categories to significantly grow their business. The DL2100 printer provides the option for photo gifts in-store while the customer waits or for

pickup at a later time. The DL2100 printer can print up to 13 duplex pages per minute, while allowing for Kodak paper and card stock between 148 gsm to 216 gsm. The DL2100 printer uses light-emitting diode (LED) technology with an LED print head as a light source within the imaging device. Unlike laser systems, the LED print head is solid state and has no complicated rotating mirrors. The DL2100 printer uses a four- (4) color toner set. The DL2100 printer also uses KODAK PERFECT TOUCH technology.

Scanning Technology

The KODAK Rapid Print Scanner is an option that allows consumers to quickly and easily scan their collections of treasured photos to either digitally archive them or bring them to life in premium products such as photo books, collages, KODAK Picture Movie DVDs, or more. The KODAK Rapid Print Scanner is capable of fast, high-quality scanning of up to 30 4" × 6" prints per minute at 300 pixels/inch at 24 bits/pixel. The scanner accepts print sizes from wallet size to 8" × 12" prints.

Cabinetry

For the APEX 30, the top section holds a print scanner, the middle section holds any combination of one or two 7000, 7010, or 7015 printers or a single 8" printer. The bottom section holds a single 8" printer. The APEX 30 has a rated productivity of up to 900 4" × 6" prints per hour when using two 70xx printers. For additional output, the following output devices can be connected: a KODAK DL2100 Duplex Printer, an Epson 7880 Poster Printer, and a KODAK Picture Kiosk DVD/CD Writer/Dispenser. For Kiosk connectivity, the APEX 30 can be connected to the G3, G4, and G4x KODAK Picture Kiosk Stations and Order Stations running KODAK Picture Kiosk Software Version 2.0 or later. The APEX 30 is 42.5" in height, 29" in width, and 36" in depth.

The APEX 40 holds either two 7015 printers, or two 7000 or 7010 printers, or one 7000/7010 printer and a 7015 printer. The APEX 40 has a rated productivity of up to 900 4" × 6" prints per hour. For additional output, the following output devices can be connected: a KODAK DL2100 Duplex Printer, an Epson 7880 Poster Printer, and a KODAK Picture Kiosk DVD/CD Writer/Dispenser. For Kiosk connectivity, the APEX 40 can be connected to the G3, G4, and G4x KODAK Picture Kiosks and Order Stations running KODAK Picture Kiosk Software Version 2.0 or later. The APEX 40 is 42.5" in height, 40" in width, and 26" in depth.

The extensive modularity and scalability of the KODAK Adaptive Picture Exchange enables an extremely wide variety of system configurations, meeting the needs of almost any store environment. For example, the APEX 30 and 40 cabinets can be combined to form the APEX 70, which can hold one (1), two (2),

three (3) or four (4) KODAK 70XX printers, along with one (1) 8" printer, for a rated productivity of up to 1800 4"x6" prints per hour with four 7000 or 7010 printers. The APEX 70 has a rated productivity of up to 1350 4" × 6" prints per hour with three 7000/7010 printers. For applications with high demand for 8" printing, an APEX 70 could be configured with two (2) 8" printers and two (2) 5" or 6" printers (70xx). For additional output, the following output devices can be connected: a KODAK DL2100 Duplex Printer, an Epson 7880 Poster Printer, and a KODAK Picture Kiosk DVD/CD Writer/Dispenser. For Kiosk connectivity, the APEX 30 can be connected to the G3, G4, and G4x KODAK Picture Maker Print Stations and KODAK Picture Kiosk Order Stations running KODAK Picture Kiosk Software Version 2.0 or later. The APEX 70 is 42.5" in height, 69" in width, and 36" in depth.

Summary

As we have demonstrated, the KODAK Adaptive Picture Exchange has many strengths and advantages. The APEX system utilizes proven technology for printing at retail sites offering high quality consumer accepted thermal prints and gifting products like posters, calendars, greeting cards, and KODAK Picture Movie DVD. The APEX delivers high reliability and uptime based on Kodak's proven history in thermal printing technology. For the retailer, there is a total low cost of ownership due to low capital investment for start-up and low operating costs, while still offering additional optional capabilities such as back printing. The APEX system has modularity, which allows for easy scale up as necessary. Additional thermal printers can increase the retailers' capability while equipment costs are comparatively low. The built-in redundancy of print engines provides increased uptime. Eastman Kodak Company has a proven consumer product portfolio, with best-in-class consumer experience for kiosks. Kodak offers a large assortment of premium products to drive profitability, and allows for connectivity to Kodak order stations plus online fulfillment opportunities. The KODAK Adaptive Picture Exchange is truly adaptable, profitable, efficient, easy, eco-friendly and proven.

Biography

Robert Mindler is a graduate of Monroe Community College (A.S. in Business Management Marketing) and Rochester Institute of Technology (B.S. in Business Management Marketing and A.S. in Mechanical Technology). He has been employed at Eastman Kodak Company for 27 years, 22 years in Thermal Printing Development and Commercialization. He has attained Kodak 6 Sigma Black Belt Certification and holds 30 US Patents. He has also developed and successfully commercialized over 12 consumer products, most recently the KODAK 7000 Photo Printer and the APEX System.