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Apple Releases Macintosh Easy Open

A common vision for the future of Macintosh computing is that, one day, a user will double-click an icon for a document and—no matter what application created the file or whether the application is installed on the computer—the user's computer will open the document.

Macintosh Easy Open, a new product announced by Apple at the January San Francisco Macworld Expo, takes a large step toward the realization of that vision. Once Macintosh Easy Open is fully implemented, users will rarely, if ever, encounter the message "The document xyz could not be opened, because the application program that created it could not be found." Instead, users will be offered a consistent, intuitive interface for opening documents created by any application or on any computer platform.

Macintosh Easy Open is primarily a tool for developers to help them write easier-to-use translation systems—software that lets an application manipulate data created by another application. And the good news is that, with the exception of translation developers, most need do little or nothing to implement the product. Easy Open will help make application developers'—and users'—lives easier without their having to do or know much more than they do today.

THE TRANSLATION MANAGER

The essence of the new product is the Translation Manager, an extension to Macintosh system software that provides a standard translation application programming interface (API). Before, developers had to write translation functions into their applications; now, this new manager encourages the development of separate translation systems that exist separately from applications.

With Macintosh Easy Open, applications and translators can work together without knowing anything about each other. Applications do not have to be changed to take advantage of translation systems written to the Translation Manager API; existing applications work "as is" with Macintosh Easy Open.

Developer benefits. The API can benefit developers in a number of ways. First, application developers don't have to think about translation code and can focus their efforts on product features and new development.

Developers can potentially ship (and maintain) smaller applications, because they don't have to include embedded code to invoke and manage external translators. And they don't have to rewrite any code for their applications to work with Easy Open.

Also, because Macintosh Easy Open allows special translation extensions to exist separately from applications, and because of the new, standard API, there will be many opportunities for translation system developers. By releasing the API, Apple is encouraging developers to enter the translation market with new, attractive products that can be licensed by application developers or sold on their own.

With ability to manage the translation of data from one Macintosh application to many others and across different platforms, Easy Open enhances the image of the Macintosh as the easy-to-use, powerful, and versatile platform that it is, further distinguishing it in the marketplace and, we hope, building the Macintosh market share.

WHAT IT DOES

Formerly, most translators were incorporated inside applications by means of import routines. This added to development time and application size. Also, if a user purchased, say, a word-processing application that didn't include a translator for files created by a previous word processor, the user would be unable to exchange data between the two applications. When trying to open a file without the application that created it, the user would receive the dreaded "application could not be found" message (see Figure 1 below).

Macintosh Easy Open changes all that. On a computer installed with a translation system or stand-alone translator written to the new API, when a user double clicks on a file created in an application not on that computer, Macintosh Easy Open scans the system for available applications and translation options and displays a list of them (see Figure 2 below). The user clicks the Preferred button and Macintosh Easy Open transparently takes care of translating and displaying the file.

Other features. Macintosh Easy Open offers users a couple of other useful features. A document converter tool lets users translate files from one format to another without opening any applications. Users can simply drag file icons to a

preset document converter icon, and the system creates a translated copy of the file.

Further, if application developers include resources of type 'kind' and 'open' in their products' resource file, Macintosh Easy Open provides a specific description of the application that created a document, even if the application that created it is not on the computer.

A BOON FOR TRANSLATION DEVELOPMENT

Apple developed Macintosh Easy Open to make translation a more seamless, consistent function of the Macintosh, thereby making it easier for users to open documents regardless of the applications installed on their systems.

Among our goals in releasing the product to developers is to separate translation systems from applications by providing a single, well-defined interface for translation development.

Every translator written to the Translation Manager API will have the same external interface design. If translation developers adhere to the API, translation will become a vastly more intuitive operation for users. When users have Macintosh Easy Open installed on their Macintosh computers, any translator designed to the new API automatically works with all the currently installed applications. Every time the user tries to open a document without its application, Easy Open lists every available translation option in the dialog box shown in Figure 2.

Larger Translation Business. This clearly opens the door for a much larger translation system business. The introduction of Macintosh Easy Open encourages efforts by developers to design every conceivable translation system, from program-to-program translators (for example, WordPerfect to MacWrite®) to platform-to-platform translators (say, DOS to Macintosh).

Similarly, application developers are urged to take translation code out of applications, making their products more streamlined. Instead, application developers can license Macintosh Easy Open-aware translators.

Among the developers currently shipping or working on translation systems that will use the Translation Manager are DataVis, which released its MacLinkPlus system for Macintosh Easy Open at the January Macworld, Macintosh MasterSoft, Equilibrium Technologies, Kandu Software, and Inspace Systems.

SOME DEVELOPMENT CONSIDERATIONS

Macintosh Easy Open is currently available only to developers through APDA. It is not yet shipping with the Macintosh Operating System. This means that users will encounter Macintosh Easy Open software only if they purchase a separate translation system or an application that ships with a Macintosh Easy Open–aware translator.

The new extension will not be part of users' systems until they install one of those products. Developers thus need to describe how to use Easy Open in their own documentation. To help, Apple includes sample user documentation—both on paper and on disk—in the Macintosh Easy Open Developers Kit.

Also, because Macintosh Easy Open is designed to make document translation transparent to the user, developers who license Macintosh Easy Open will want to consider rewriting application installer scripts to automatically place their translators and the Macintosh Easy Open extension in the System Folder. This will save end-users from having to install it themselves, and it will make translation systems appear to be “just another” great Macintosh feature instead of yet another addition to users' already-complex systems.

APDA Kit and License Information. The Macintosh Easy Open Developers Kit includes the software necessary for beginning Macintosh Easy Open–aware translation development as well as a sample translation system with sample code for testing purposes and documentation. If you want to ship the Macintosh Easy Open software with your program, you must first file a special license with Apple. For more information on how to do this, contact Software Licensing through AppleLink at SW.LICENSE. ◆

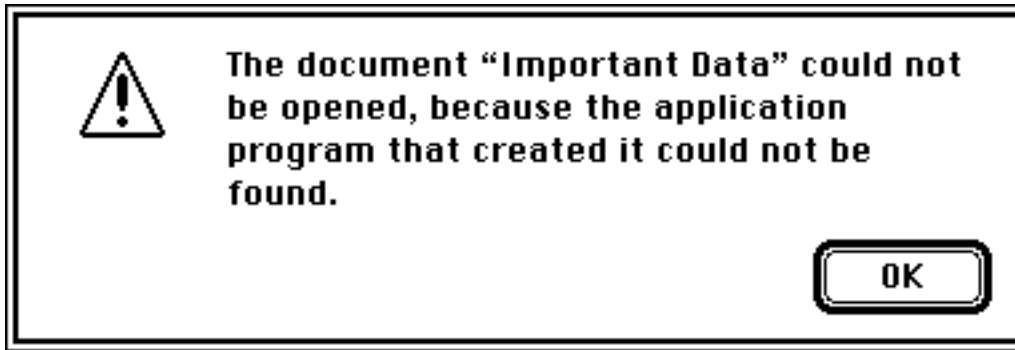


Figure 1: A "document could not be opened" alert.

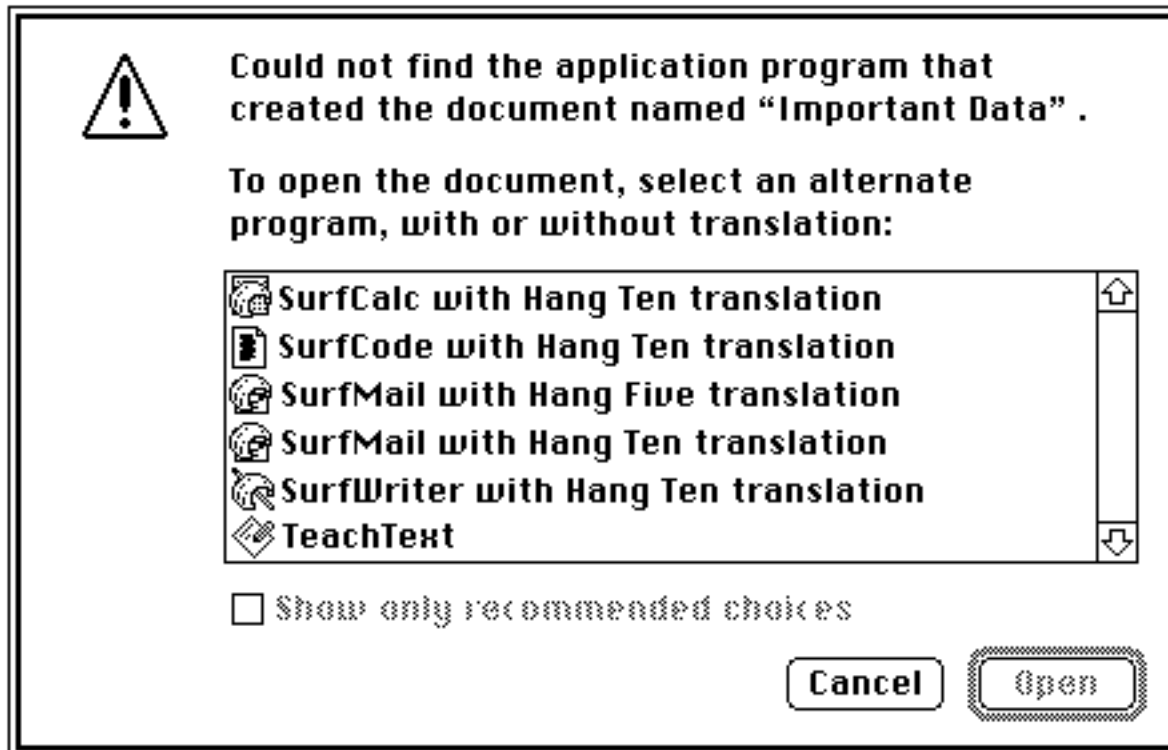


Figure 2: Macintosh Easy Open replaces the alert shown in Figure 1 with a list of translation options.

TECHNOLOGY

ColorSync: A Tuning Fork for Color

By Gregg Williams

Why color matching? Because we need it. In the next few years, Macintosh users will be putting more color into their documents—and today it's difficult to ensure that the color on your screen is the same as the color of the photograph you just scanned in, or that either is the same color as the color image you just printed out. Without a convenient, reliable way of maximizing color fidelity, color adds an extra layer of things to worry about—so most people don't even try to use it.

Why ColorSync? Because we need color matching to be standardized. Several companies sell color-matching software for the Macintosh, but no one system has gained universal acceptance. On January 6, 1993, at Macworld Expo San Francisco, Apple showcased ColorSync as an open-ended architecture for color matching on the Macintosh platform and introduced the first two products to use it, the Apple Color OneScanner and the Apple Color Printer.

Apple is evangelizing ColorSync as the standard framework that vendors of color input and output devices and color-matching software should use. ColorSync is necessary for Apple to fulfill its goal of bringing color into the mainstream of Macintosh computing, thus giving the Macintosh another visible advantage over its competitors. (Apple has no plans to move ColorSync to competing platforms.) Most people will find ColorSync easy to use.

ColorSync is invisible to most applications, so today's applications don't have to be modified just to run without error on a system where ColorSync is present. However, if your program draws color on the monitor (and whose doesn't?), Apple wants you to modify your program so that it draws ColorSync-accurate color. (It's not hard to do so; see the section "A ColorSync-Savvy Application," later in this article.)

What Is ColorSync? ColorSync depends on two things: *profiles* and *color-matching methods*. A profile is a description of what the ColorSync device (such as a color scanner, video monitor, or printer) is and the range of colors with which the device can interact (called the device's *gamut*). A color-matching

method is an algorithm that translates a color from one device to another using each device's profile.

ColorSync uses devices' profiles and color-matching methods to compensate for each device's limitations and produce the same color through the monitor and the color printer that was scanned in through a color scanner or generated internally in a Macintosh application.

This means that if, for example, a color printer prints an image slightly redder than the original, that bias is noted in the printer's profile, and ColorSync automatically compensates for it. Without ColorSync, the printed image of a lemon scanned into a Macintosh and printed with this color printer might have an orange tinge. With ColorSync (and a ColorSync-savvy color scanner and printer), the printed image comes out as close to the original yellow as the scanner and printer are capable of.

Of course, a problem occurs when two devices' gamuts aren't identical—when, for example, the scanner correctly scans in a dark purple that incorrectly prints out as black. The color-matching method's job is to then select the best color that the color printer *can* print to approximate the dark purple. (Of course, "best" is a relative term, and multiple color-matching methods exist because one may do a better job than the others in a given situation.)

Profiles, XYZ, and Components. A profile is simply a collection of data; it can exist in its own file or be added to the image of a document (in PICT format). One of the major components of a device profile is its description of the device's gamut—the colors it can sense (for an input device) or produce (for an output device).

ColorSync defines colors, as well as profiles, in terms of a color model called XYZ, which was created in 1931 by an international standards group called the Commission International de l'Eclairage (CIE). The XYZ model differs from other models in that it is device-independent and is based on human perception of colors, as opposed to colors measured by some electronic means. One color model that you're most likely to be familiar with is the RGB (red-green-blue) additive model, which is associated with video monitors. Another is the CMYK (cyan-magenta-yellow-black) subtractive model, which is associated with color printing.

Since all color devices can define their colors in terms of the XYZ model, you can translate colors between two devices by translating the first value into its

XYZ value, then translating that XYZ value into the second value. The beauty of the XYZ model is that, in the way just described, you can equate any two color devices without either device requiring knowledge of the other.

ColorSync implements color matching methods as standard Macintosh components, and the ColorSync Utilities use the Component Manager to manipulate them; these factors contribute to ColorSync's extensibility and open-ended nature. A given ColorSync-savvy device must also have a *profile responder*, which is also implemented as a component. A profile responder communicates the device's color information to any code that requests it.

The ColorSync system also includes a default system profile, a default color matching method, and a ColorSync control panel that allows the user to choose which profile to use as the system profile.

HOW COLORSYNC WORKS

The best way to understand ColorSync and what it means for you is to “walk through” how it works. (This article does not go into some of the details about and features of ColorSync. For more information, see the document *The ColorSync Utilities*, which is on this month's Developer CD.) See Figure 1 below.

ColorSync-Savvy Input. The driver software for a ColorSync-aware input device—in this case, let's say a scanner—includes its profile (in the form of PICT comments) in the document it creates. (This document is a file of type 'PICT' and is represented as a sequence of QuickDraw commands. QuickDraw ignores all PICT comments—including the ones that define the scanner's profile—but ColorSync knows to look for them and uses the information they contain.)

A ColorSync-Unaware Application. We'll get to how a ColorSync-savvy application works later. This section covers how the existing Macintosh programs (which we will call *ColorSync-unaware*) work.

A Macintosh application normally uses numerous QuickDraw calls when generating the image for the video monitor. Since the application knows nothing of ColorSync, it uses the input the scanner gave it, so the image on the display is *not* color-matched—and it “passes on” whatever built-in biases the scanner *and* the monitor have.

Depending on how the application was written, it will pass either some or all the benefits of ColorSync to the output process. If the application is well-behaved, it hands the PICT comments, including those it doesn't recognize, along with the rest of the PICT image to the printer, and the user can then get *all* of the benefits of ColorSync. If it does not, ColorSync helps the printing process with the imperfect information it has (as explained in the next paragraphs).

ColorSync-Savvy Output. As with displaying to the screen, any application will use the DrawPicture routine to draw the content of a document. Since ColorSync is implemented primarily in each device's driver software, the ColorSync printer's device driver has the responsibility for doing color matching.

If the application has passed the PICT comments along, the printer driver has the scanner's profile information available. By combining this information with its own profile and the appropriate color-matching method, the printer driver can compensate for both its own and the scanner's built-in biases, and the resulting printout is as good as it can be for that scanner and that printer. *By passing all the PICT comments on, an application maximizes the effect of ColorSync in the output process. We'll call such an application ColorSync-aware. A ColorSync-savvy application makes additional use of ColorSync.*

If the application doesn't pass the PICT comments along, ColorSync is still useful. If the ColorSync printer driver receives no input- or display-device profile, it uses the default system profile (which is essentially the profile of the common 13-inch AppleColor High-Resolution RGB and the newer 14-inch Apple Color Display). In this way, the ColorSync printer driver makes a reasonable correction for the *printer's* biases, though it cannot take into account the scanner's biases.

A ColorSync-Savvy Application. You must modify your program to make it ColorSync-savvy. One way you can do this is to use a new routine called DrawMatchedPicture. This routine uses the color scanner's profile (embedded in the document's file), the monitor's profile, and the appropriate color-matching method to provide the best possible matched image on the monitor.

If you prefer, you can use the routines CWMatchColors and CWMatchPixMap (and the two profiles) to convert a theoretical color to the actual color needed to produce the desired (theoretical) color on the display. Once you have the actual

color (also called the *matched color*), you can then use color-drawing QuickDraw commands to create a color-matched image on the monitor.

There are various ways you can use ColorSync to enhance the visual fidelity of color input, display, and output; see *The ColorSync Utilities*, the document mentioned earlier, for more details. One example might be enhancing a printer-preview dialog box by either showing the parts of the image that the output device can't print or by simulating what the image will look like when printed.

More on ColorSync Output. Remember how we said earlier that ColorSync puts the burden of color matching on the device driver? That means that if a printer driver is not ColorSync-savvy, the printer simply won't do any color matching.

Although the new Apple Color Printer introduced this month is ColorSync-savvy, Macintosh color printers from other companies currently are not. Since Apple is promoting ColorSync as a standard for the entire Macintosh world, we hope that other color printer vendors will update their printer drivers to support ColorSync.

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ColorSync is important because it promises a standard way for *everything* in every area of the Macintosh platform—applications, scanners, film recorders, printers—to work with color.

Apple believes that people won't use color until it becomes simple and good enough that they don't have to worry about it. With ColorSync, Apple integrates reliable, easy-to-use color into Macintosh applications and peripherals. Color *is* going to happen on the Macintosh, and with a little work, you can be a part of it.



Executive Summary for ColorSync

Until now, scanning, working with, and printing color documents has been tedious and inconvenient. For one thing, different peripherals—for example, a color scanner, video monitor, and printer—respond to different ranges of colors and introduce errors in the color image being manipulated.

Apple's ColorSync technology is an extensible, open architecture that provides color matching on the Macintosh. ColorSync *profiles* describe a color device's characteristics and limitations. *Color-matching methods* use devices' profiles to compensate for a color device's biases.

Most of the work implementing ColorSync occurs in a color device's driver, so most Macintosh applications don't need major revisions to work with ColorSync.

In fact, any ColorSync-unaware application can work with ColorSync input and output devices and gain some of the benefits of ColorSync color matching. However, Apple wants you to modify your application to get it to display a color-matched image on the monitor.

PROGRAMMER ALERT: Here are some things that you may need to change about your application. (See the main body of this article for more details.)

- If your application discards unrecognized PICT comments when it prints, change it to send *all* PICT comments to the output device; ColorSync embeds its information in a document's PICT comments.
- If you sell a color input or output device, write a device driver that adds ColorSync capabilities to it.
- If your application creates color documents, add the profile of the color input device into the document itself. When you draw information on the monitor, be sure to use DrawMatchedPicture instead of DrawPicture.
- There are several things you can do to make your application ColorSync-savvy. One such thing is to enhance a printer-preview dialog box by either showing the parts of the image that the current output device can't print or by simulating the image as it will print.
- For more details on ColorSync, read *The ColorSync Utilities*, a document you can find on this month's Developer CD. ♦

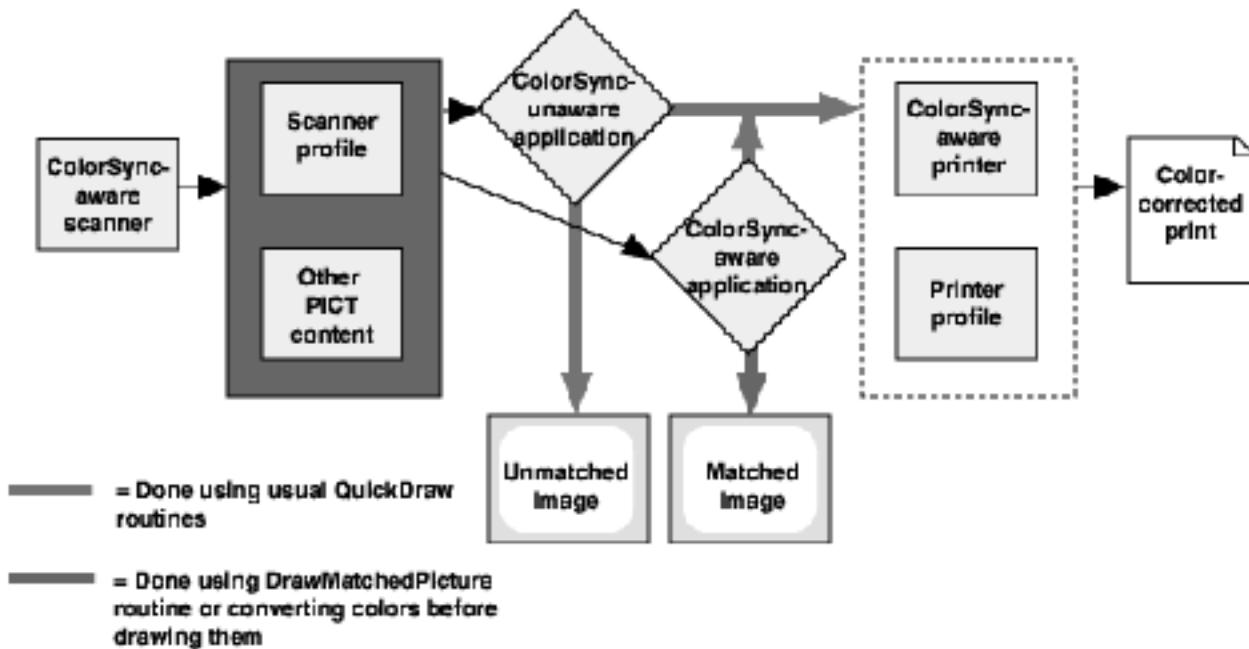


Figure 1: Using ColorSync. When the color scanner creates the color document (in PICT form), it adds the scanner's profile to the document. A ColorSync-aware printer then uses the scanner's and its own profile to create a color-corrected print. Note that any application, as is, can handle ColorSync input and output. However, you must modify your application to ensure that it draws a color-corrected image to the monitor.

Multimedia Conference to Teach QuickTime Techniques

The International QuickTime and Multimedia Conference will be held March 1 and 2 in San Francisco, California. Sponsored by Apple Computer along with Sumeria, Inc., the event will teach developers and video/film producers how to use QuickTime technology to increase the appeal and effectiveness of their products.

The conference is part of the Apple Multimedia Program, a newly announced program that supports multimedia developers and producers with a variety of services, including conferences, specialized publications, market research studies, a multimedia AppleLink area, and discounts on software, hardware, and training. For more information on the program, see the November/December *Apple Direct*.

Sessions will focus on both the technology and business of multimedia development. Technology sessions will cover how to make QuickTime movies, compression technology, interactive games, animation, 3-D, special effects, and a variety of other subjects. Business topics covered will include an introduction to the Apple Multimedia Program as well as a Macintosh market overview, channels for multimedia products, and cross-platform development issues.

The conference, which runs concurrently with the QuickTime International Film Festival, will also feature more than 35 exhibits. The day before the conference, February 28, three two-hour QuickTime tutorials will be offered.

To enroll or obtain additional information, contact Sandy Butler, Sumeria, Inc., 329 Bryant Street, Suite 3D, San Francisco, CA 94107; phone: (415) 904-0808; fax: (415) 904-0888. ◆

STRATEGY

Apple's New Imaging Products

Affordable Color WYSIWYG, and More

By Gregg Williams

Apple Direct Staff

They're not paperless yet—neither the office nor the world, that is. No matter how useful computers are, printers are still indispensable when it comes to sharing our ideas with the rest of the world.

On January 6, 1993, at the Macworld Expo in San Francisco, Apple announced five new products and showcased two new technologies, all of which relate to *imaging*—that is, the capture, manipulation, and output of images. The Color OneScanner and Apple Color Printer make the daily use of color practical and more affordable. The StyleWriter II prints faster than its predecessor—and for less money—while the LaserWriter Pro 600 and 630 printers give users PostScript™ Level 2 printing at very affordable prices. Apple's new ColorSync color-matching technology helps make WYSIWYG (“what you see is what you get”) color input and output possible on the Macintosh platform. Finally, Apple's GrayShare printer-driver technology adds grayscale printing and printer sharing to direct-connect, QuickDraw printers (both black-and-white *and* color).

This article attempts to explain Apple's strategy in creating these new products. For a more in-depth look at the ColorSync and GrayShare technologies, see the Technology articles. The four Fact Sheets below summarize the new imaging products.

BRINGING COLOR INTO THE MARKETPLACE

True, color scanners and printers have been available for the Macintosh for many years. But, aside from color video monitors, color is nowhere near commonplace on the Macintosh platform. (In fact, Apple estimates that color products have penetrated only about 2 percent of the potential market.)

Until recently, color printers cost over \$10,000 and were far too expensive to be part of a personal computing system. But even though the price of entry-level

color printers has dropped within the reach of many people, color input and output are still not commonplace on the Macintosh platform.

Why? Until now, no one has delivered a general, easy-to-use technology for color WYSIWYG. Sure, you can get color on the printed page today, but it's rather crude, and getting the same color out that you put in is tedious and either time-consuming, expensive, or simply impossible.

With these two new products and the ColorSync color-matching technology, Apple believes that it's offering a workable implementation of color WYSIWYG that extends from the time a color image is scanned in (by the Color OneScanner) to the time a color page is printed out (by the Apple Color Printer). Apple feels that it's providing four very important benefits that must be present to make the everyday use of color possible:

- predictable color
- ease of use
- a universal standard for the Macintosh platform
- products at affordable prices

COLORSYNC

ColorSync is an open-ended, comprehensive architecture for maximizing color consistency across Macintosh scanners, displays, printers and other color-based peripherals. It implements color matching with essentially two pieces, *profiles* and *color-matching methods*. (For more information, see the Technology article on ColorSync.) To summarize, a profile is a description of all the colors that a device can recognize or produce, and a color matching method is an algorithm that translates a color as represented by one device to its equivalent for another device or to the best approximation when an exact match is not possible.

To be successful (and not just a high-end add-on that works with a few programs), color matching must be implemented as a system resource. Apple engineers designed ColorSync to be integrated with QuickDraw; and ColorSync color matching is implemented as part of a color device's device driver. Because of this, two important things are true. First, most applications don't "see" ColorSync, so they work "as is" with it. (However, Apple strongly recommends that you *do* modify your product to take advantage of ColorSync.) Second, any program can benefit from printing its documents to a ColorSync-savvy color printer. (See the Technology article on ColorSync for more details).

Apple wants to make ColorSync the standard for color matching on the Macintosh platform. Apple is licensing ColorSync to Macintosh vendors, and is strongly encouraging developers of color products to support ColorSync in their device drivers and other software. Apple will also preinstall the profiles of Apple color products on Macintosh computers along with Macintosh system software. We expect to see developers writing better device drivers and color-matching systems for other companies' hardware.

APPLE COLOR ONE SCANNER AND OFOTO 2.0

Apple plans to repeat the great success of the original OneScanner/Ofoto product by doing the same thing again—only this time, in color. The Apple Color OneScanner and Ofoto 2.0 provide both professional quality and one-button simplicity in a color scanner. Because the scanner/software combination works with ColorSync, the Color OneScanner (along with the Apple Color Printer, covered later in this article) helps deliver predictable, easy-to-use color. See Table 1 for an overview of the Color OneScanner and Ofoto 2.0.

Audience. Any Macintosh user can benefit from using the Color OneScanner and Ofoto 2.0, but Apple expects the following groups to be particularly interested in these products:

- publishing professionals
- people in small- to medium-size businesses
- educators and students

Ofoto 2.0. One of the most electrifying features of the original OneScanner/Ofoto combination was that you could put a document into the OneScanner, click one button in Ofoto, and get a high-quality scan as a result. (And if your document was placed crooked in the OneScanner, Ofoto would even rotate the final image to make it straight!)

Ofoto 2.0 is an extrapolation of the original, black-and-white Ofoto into the realm of color. You still get one-button scanning; Ofoto 2.0 automatically manages all the black-and-white parameters of Ofoto *plus* new color parameters. The Ofoto 2.0 interface is very easy to use because it builds on the original Ofoto's highly regarded user interface and incorporates recent feedback from current Ofoto users.

Another stunning feature of the original Ofoto was its system of *adaptive calibration*, by which Ofoto could optimize the scanner's output to the final output device. (Ofoto would, for example, take a document meant to be faxed and print it differently from one that would take advantage of the LaserWriter IIg's PhotoGrade image enhancement. Ofoto accomplished this adaptive calibration very elegantly, by having the user print a test page and then scan the final output back into Ofoto.) Ofoto 2.0 does its adaptive calibration similarly, only this time with a color test page.

Hardware. Much of the Color OneScanner's quality and performance come from the hardware itself. Two hardware features work to maximize the Color OneScanner's color fidelity: a special color-correction ASIC (application-specific integrated circuit) and the design of the optical subsystem.

A CCD (charge-coupled device) is the element that senses the color being scanned. The Color OneScanner's CCD has three elements, one each with a red, green, and blue filter; this allows the Color OneScanner to scan a document in one pass.

There are several benefits to this method. Since all three colors are scanned in one pass, the Color OneScanner eliminates the imperfect color registration that comes from scanning three times. (A scanner has moving parts that may vibrate and cause the document or the CCD to shift between scans.)

Programs like Ofoto 2.0 can benefit from the Color OneScanner's one-pass scanning by showing the image while it is being scanned. (With a three-pass scanner, the user can't see the image until the scanner finishes three separate scans). One-pass scanning—with immediate feedback—keeps users informed about how the scan is going; it also gives them the option of stopping the scan early.

The Color OneScanner has several features of interest to developers (see "Programmer Alert for the Color OneScanner" on this page). Because Apple engineers designed these features into the hardware itself, the Color OneScanner is much faster than other scanners that use software to achieve the same effects.

APPLE COLOR PRINTER

Paired with the Color OneScanner, the Apple Color Printer makes easy-to-use, WYSIWYG color imaging possible on the Macintosh. (The hardware itself is an

Apple-labeled version of a Canon color printer, but Apple adds lots of extra value with its ColorSync color-matching technology.) With a U.S. suggested retail price of \$2599, the Apple Color Printer also makes color printing affordable for many users. Better yet, this printer can handle transparencies and paper up to 11 x 17 inches (27.9 x 43.2 cm)—equivalent to a two-page magazine spread. See Table 2, below, for an overview of the Apple Color Printer's features.

System-Wide Color WYSIWYG. Accurate color-matched printing has been possible—though expensive—on the Macintosh for several years, but it has been tied to proprietary color-matching systems. Because the printer driver of the Apple Color Printer uses Apple's ColorSync color-matching technology, this printer can improve the color fidelity of its output regardless of the application being used, with more improvement possible if the document contains ColorSync information and if the application is at least ColorSync-aware. (See the ColorSync article for more details.)

Audience. Who doesn't want to be able to print color? Still, Apple sees four groups of people who will be particularly interested in the Apple Color Printer:

- marketing and sales people (who will use it for printing presentations and reports and who will appreciate the 25 new headline and display fonts included with the Apple Color Printer)
- graphic artists (who will use it for making low-cost color proofs of whatever they're working on)
- engineers and scientists (who will love having both color and a large page size for things like graphs and CAD drawings)
- educators (who will use it to make color transparencies for overhead projectors)

GrayShare. The Apple Color Printer's print driver is based on Apple's new, proprietary GrayShare architecture. Apple engineers fine-tuned this driver to produce the best color output possible on this printer. Also, the GrayShare architecture makes it possible for other printers on the network to print on one user's Apple Color Printer—*without* having to use a separate Macintosh computer as a file server. (For more information on GrayShare and some of its programming implications, see the article on page 1.)

STYLEWRITER II

When the original StyleWriter printer came out in early 1991, many people were amazed at its ability to do 360-dpi, laser-quality ink jet printing for only \$599 (U.S. suggested retail price). Now, less than two years later, Apple has managed to make the sequel even better than the original: The StyleWriter II prints twice as fast and holds twice as much paper—and costs a little over half as much (\$359, U.S. suggested retail price)! See Table 3 for an overview of the StyleWriter II's features.

Audience. Because of its affordable price, compact size, and high print quality, the StyleWriter II will appeal to the following groups of people:

- first-time Macintosh owners (who are just starting out and don't have a lot of money to spend)
- businesspeople, educators, or students, including those using a Macintosh computer at home for work they take home
- networked groups (at work or in schools) who have modest printing needs and who need to share a printer.

Noteworthy Features. Many of the improved features of the StyleWriter II result from its new, more capable print engine, the Canon A130 Bubble Jet print engine. The StyleWriter II can deliver much higher print quality than the original StyleWriter because of the A130 engine's better design. The stepper motors that advance the paper in the A130 engine have double the accuracy of the engine in the StyleWriter. The A130 print head can emit up to 6,200 bursts of ink per second, which is more than twice the 3,000-bps rate of the StyleWriter print head.

The A130 engine can handle up to 100 sheets of paper (the StyleWriter holds up to 50 sheets). In addition, the StyleWriter II can print at a speed of up to 1.5 pages per minute, more than twice as fast as the StyleWriter. (It's important to note that, because both StyleWriter printers are driven by the Macintosh itself, each will print faster when connected to a faster Macintosh model.)

Customers and dealers wanted three improvements over the original StyleWriter design. Printing speed was one of them. A second desired feature, especially from educators and dealers, was the ability to share the printer across an AppleTalk network. The StyleWriter II provides this feature with the

help of the Apple GrayShare printer driver technology. GrayShare makes it possible for a Macintosh user with a StyleWriter II printer to make the printer available to any other Macintosh on the network—*without* requiring a separate Macintosh computer to be used as a dedicated file server. (GrayShare also allows a 68000-based Macintosh computer connected to a QuickDraw printer to print shades of gray, something it could not otherwise do.)

The third improvement that customers wanted was a more solid industrial design. Apple accomplished this by integrating the power supply and the sheet feeder (both of which were separate on the StyleWriter) into the main unit of the StyleWriter II. In addition, the StyleWriter II is more reliable than its predecessor because the Canon A130 printer engine has fewer moving parts.

LASERWRITER PRO 600 AND 630

The LaserWriter Pro 600 and 630 were designed as mainstream LaserWriter printers, meant to be used in Macintosh, Microsoft Windows, and mixed workgroup environments. These two printers replace the LaserWriter IIx and IIg, while at the same time providing more performance for less money. See Table 4 for an overview of both products' features. The LaserWriter Pro 600 is a more affordable version of the LaserWriter Pro 630, and users can upgrade the former to include some or all of the features of the latter.

Audience. We expect several groups to be attracted to the LaserWriter Pro 600 and 630:

- the installed base of LaserWriter owners
- business users, especially those who make heavy use of graphics
- users in a networked Macintosh/Windows environment
- technically proficient users (who want high performance and state-of-the-art features)

Higher Print Quality. The LaserWriter Pro 600 and 630 have several features that give these printers better output than any other LaserWriter printers to date:

- *600 dots-per-inch (dpi) printing.* The LaserWriter Pro 600 and 630 use the new Canon EX printer engine, which can print in either 300-dpi or 600-dpi mode. The 600-dpi mode is best for text-only documents that contain small (under 10-point) type.

- *Improvements in PhotoGrade.* PhotoGrade is Apple's proprietary printing technology that increases a printer's performance by making skillful use of variable-width printed pixels. (Strictly speaking, PhotoGrade is not a feature of the LaserWriter Pro 600, but the user can add PhotoGrade to a LaserWriter Pro 600 by adding more memory to it.) This implementation of PhotoGrade works in 300-dpi mode only.

The previous implementation of PhotoGrade (in the LaserWriter IIg) prints 67 levels of gray, but the current implementation in the LaserWriter Pro 630 prints 91 levels of gray. It is interesting to note that 91 gray levels is almost three times as many levels of gray as an unenhanced 600-dpi printer can produce (33 gray levels). Because of PhotoGrade, LaserWriter Pro 630 users will usually want to print in the 300-dpi mode, even though an unenhanced 600-dpi mode is available. (As stated earlier, the 600-dpi mode is best for printing text at small font sizes.)

- *PostScript Level 2.* The LaserWriter Pro 600 and 630 are the first printers from Apple that include PostScript Level 2 firmware from Adobe™. Today, PostScript Level 2 fixes a number of bugs found in PostScript Level 1 printers, and it helps these printers print faster than PostScript Level 1 printers.

Unfortunately, many PostScript Level 2 features are not readily accessible until Apple's new LaserWriter printer driver becomes available. Apple is working very closely with Adobe in the creation of this new printer driver and estimates that it will be available in the second quarter of calendar year 1993. *Apple Direct* readers who receive the monthly Developer CD will probably see a beta version of the driver sometime before the final version is released to the public.

Support for Windows. By adding a parallel port, Apple has made the LaserWriter Pro 600 and 630 well suited to run with a PC running either DOS or Microsoft Windows 3.x. Because of the "all-ports-active" feature (which allows print jobs to come in from multiple ports without manual switching between input ports), these printers also work well in mixed Macintosh/ Windows workgroups. For DOS users with certain older programs that need it, these printers emulate Hewlett-Packard's PCL 4+ printer-control language.

Boxed with each LaserWriter Pro 600 and 630 is a Windows Driver Disk, which includes a more powerful printer driver than the one Microsoft includes with Windows 3.x, as well as a Windows-based Installer program that makes

installing the printer driver easier. Each LaserWriter Pro 600 and 630 also comes with a new version of the LaserWriter Utility program (version 7.4). This program allows the user to set the many options associated with these two printers.

Support for Multiple Paper Sources. The LaserWriter Pro 600 and 630 can have up to four sources for the paper it uses (two are standard with each printer). Finally Apple is making it possible for any software to print the first page from one paper source and the rest of the document from another. The LaserWriter Pro 600/630 printer driver does this via the Print dialog box; it's a simple feature, one that many business users will deeply appreciate.

CONCLUSIONS

This is, of course, only the beginning. Apple has new black-and-white and color printers on the drawing board. We will continue to give users more printer for the money, and we will present you with more development opportunities. Stay tuned to *Apple Direct* for details. ◆

Programmer Alert for the Color OneScanner

By writing code that interfaces with the Color OneScanner's device driver, you can greatly influence how the scanner works. Here are brief descriptions of several of these features:

- When the Color OneScanner scans a point, the CCD sensing elements return a triad of numbers, one each representing the red, green, and blue components of what the scanner sees. You can give the Color OneScanner a 3 x 3 matrix of integers that it then uses to transform the raw values of the CCD to another, more useful triad of values. You can use this transformation matrix to do many things, from factoring out the built-in biases of the CCD to doing weird and wonderful transformations of the original image. Since the Color OneScanner does this transformation in hardware, you can use this feature without degrading the scanner's performance.

- Traditionally, a user manipulates the brightness control of scanning software to change the thresholds at which black is sensed as dark gray and white as light gray, while maintaining the range of values that lie between black and white. Similarly, a user can manipulate a contrast control to enlarge or narrow the range of values between black and white. Users understand these traditional controls, but they often use each control multiple times to get the desired final result. The Color OneScanner driver software allows you to set two values called V_{RB} and V_{RT} directly. (RB and RT stand for *reflectance bottom* and *reflectance top*, respectively.) By designing a good human interface on top of these parameters, you may be able to give your scanning program a new, more effective way of controlling the dynamic range of a scanned image.

- The CCD elements behind the red, green, and blue filters attain peak values at different parts of the visual spectrum, and the human eye's response to these colors is somewhat different from those of the CCDs. Most color scanners implement a grayscale scan of an image by using the data returned by the green CCD. (The green component of a scanned color image approximates the response of the human eye to levels of gray. It's interesting to note that black-and-white televisions give an acceptable picture in the same way—by using the green component of the color signal.) By using a preset 3 x 3 transformation matrix, the Color OneScanner creates a grayscale image that is more accurate than that of other scanners.

- Most scanners scan an image at lower resolutions by reading every N th pixel. For example, if a scanner has a resolution of 300 dots per inch (dpi), the scanning software might create a 150-dpi image by retaining every other pixel (both horizontally and vertically), or a 75-dpi image by retaining every fourth pixel. This results in a faster scan but can result in false color fringes. The Color OneScanner, on the other hand, samples every pixel and averages square groups of pixels (2 x 2 groups for 150 dpi, 4 x 4 groups for 75 dpi) to create the lower-resolution image. This produces better scanned images with significantly fewer color fringes.

For more information about interfacing to the Color OneScanner and other Apple scanners, see the *Programmer's Guide to Apple Scanners*, which is available through APDA. This manual gives detailed information on how to interface with the device drivers of the OneScanner, the Color OneScanner, and future Apple scanners. (All Apple scanners are guaranteed to have a

certain number of standard capabilities that are the same for every Apple scanner, plus advanced capabilities that are specific to only one scanner model. By using standard functions, you can write applications that is highly compatible with current and future Apple scanners.) ♦

**Table 1:
Apple Color OneScanner/Ofoto 2.0 Fact Sheet**

HARDWARE:

Scanner type	Flatbed; scan area of 8.5 x 14 inches (21.6 x 28.9 cm); one-pass color scanner (allows scanner software to be more interactive)
Scanning sensor	CCD (charge-coupled device) scanning sensor has 3 elements, one each with red, green, and blue filters (maximizes color registration); CCD resolution is 300 dots per inch (dpi)
Color-matching technology	Contains built-in color-correction ASIC (application-specific integrated circuit); works with Apple ColorSync color-matching system; optical subsystem designed to minimize color shifts
Hardware interface	SCSI (Small Computer Systems Interface)
Electrical requirements	(US and Canada) 108 to 132 V AC, 58 to 62 Hz; (universal version) 100/120/200/220/240 V AC, 48 to 62 Hz

Size and weight	4.3 x 13.4 x 21.5 inches (11.0 x 34.0 x 54.5 cm); 23.0 lbs (10.5 kg)
System requirements	Requires System 7.0 or later; HyperScan 2.0.1 requires HyperCard 2.0
Developer-accessible features	Developer code can change scanner's color-correction matrix, adjust scanner's dynamic range, and do gamma correction to manipulate the output of the scanner hardware
Other components	Ofoto 2.0, from Light Source, Inc. (see below); HyperScan 2.0 (simple scanning using HyperCard interface)
Suggested retail price	\$1499 in US (will vary in other countries)

OFOTO 2.0 SOFTWARE

One-button autoscan feature	Ofoto 2.0 automatically scans the image, adjusts parameters (including those for color), and straightens image
Resolution	75 to 600 dpi in 1 dpi increments (600 dpi scan done through interpolation)
Adaptive calibration	Delivers best possible image for a given printer or output method
Virtual imaging system	Allows creation of large image files by swapping parts of image to hard disk
File formats supported	PICT, TIFF, and EPS

Other features

Supports Apple ColorSync color-matching system; uses QuickTime image compression to decrease size of image files; automatic exposure and color-cast correction; will run without scanner attached

**Table 2:
Apple Color Printer Fact Sheet**

Marking engine	Canon P691 Color InkJet engine
Printer speed	Up to 2 minutes per page
Print quality	360 dots per inch (dpi)
Apple GrayShare technology	Uses Apple GrayShare printer driver technology to get dithered colors and high-quality grayscale printing; GrayShare also allows other users on the same network to use the printer, with optional password protection and job logging
Color matching technology	ColorSync integrated into printer driver
Inks	Uses four sealed ink cartridges: cyan, magenta, yellow, black (CMYK); separate black ink cartridge ensures true black in output, less waste of colored inks
Required configuration	System Software 7.0 or later; hard disk; at least 4 MB of memory
Type technology	Prints bitmapped fonts and TrueType outline fonts

Fonts	64 TrueType fonts (includes 25 display and headline fonts—useful for presentations, titles); supports Adobe Level 1 fonts when Adobe Type Manager is present
Interface	SCSI port
Paper capacities	100 sheets of US Letter or A4 paper; 50 sheets of A3, 11 x 17 inch (27.9 x 43.2 cm)
Paper sizes	Handles up to 11 x 17 inch (27.9 x 43.2 cm)
Size and weight	20.5 x 6.7 x 16 inches (52.1 x 17.0 x 40.6 cm); Weight: 22 lbs (48.4 kg)
Power requirements	120 V AC, 60 Hz
Power consumption	30 W maximum
Other	Print head is permanent, self-cleaning; use coated papers for best results
Suggested retail price	\$2599 in US (will vary in other countries)

**Table 3:
Apple StyleWriter II Fact Sheet**

Marking engine	Canon A130 thermal inkjet, using replaceable printing cartridges (not compatible with StyleWriter ink cartridge)
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Printer speed	Best mode: up to 1.5 pages per minute (ppm); Normal and Draft: up to two pages per minute
Print quality	Best and Normal modes: 360 dots per inch (dpi); Draft mode: 180 dpi
Apple GrayShare technology	Uses Apple GrayShare printer driver technology to get higher-quality grayscale printing; GrayShare allows other users on the same network to use the printer, with optional password protection and job logging; user can scale printout from 5 to 993 percent in 1-percent increments
Required configuration	Any Macintosh computer with a hard disk, at least 1 MB of memory, and System Software 6.0.7
Recommended configuration	Any Macintosh computer with a hard disk, at least 4 MB of memory, and System Software 7.0 or later
Type technology	Prints bitmapped fonts and TrueType outline fonts
Memory	128 K bytes (including 64 K used for buffer)
Fonts	39 TrueType fonts in 15 font families (including Helvetica, Palatino, Times, and ITC Zapf Dingbats); supports Adobe Level I fonts when Adobe Type Manager is present
Interface	High-speed RS-422 serial port

Paper capacities	One multipurpose tray that holds up to 100 sheets of paper or 15 envelopes
Paper sizes	US Letter, US Legal, A4, B5; several envelope sizes
Size and weight	(With output tray closed) 7 x 13.6 x 7.9 inches (18 x 34.5 x 7.9 cm); Weight: 6.6 lbs (3 kg)
Power requirements	US and Japan: 100 to 120 V AC, 48 to 62 Hz (cycles per second); Europe and Australia: 220 to 240 V AC, 48 to 62 Hz
Power consumption	19 .5 watts maximum at 120 V AC; 18 watts maximum
Suggested retail price	\$359 in US only (will vary in other countries)

**Table 4:
Apple LaserWriter Pro 600 and 630 Fact Sheet**

	LaserWriter Pro 600	LaserWriter Pro 630
Marking engine	Cannon EX engine	Same as LaserWriter Pro 600
Controller	25 MHz 68030, ASICs (application specific integrated circuits), and I/O processors	Same
Memory	4 megabytes of memory, expandable to 8, 16, or 32 megabytes; 4 megabytes of ROM	8 megabytes of memory, expandable to 16 or 32 megabytes; 4 megabytes of ROM

Print quality	300 dots per inch (dpi) plus FinePrint (print) enhancements; can also run in 600 dpi mode and PhotoGrade in 300 dpi mode with addition of 4 MB of memory (supplied by Apple as the LaserWriter Pro 600 PhotoGrade Upgrade Kit)	<ul style="list-style-type: none"> • Same as LaserWriter Pro 600; can also run in 600 dpi mode (for highest-quality type in 10-point and smaller type) • New version of PhotoGrade can display 91 levels of gray (versus 67 levels of gray on LaserWriter IIg)
PostScript version	PostScript Level 2, by Adobe; faster, fixes minor bugs; more Level 2 features will become available when new LaserWriter driver is released (first half of calendar year 1993—beta version is on Developer CD)	Same
Fonts	64 fonts, 35 in ROM, others on disks as TrueType fonts; supports any TrueType or PostScript fonts	Same
Font support	Built-in ROM routines rasterize (convert from outline to bitmap) both TrueType and Type 1 fonts	Same
Speed	Eight pages per minute maximum	Same
Interfaces	Simultaneous connection to LocalTalk, RS-422 (serial), and parallel ports	Same as LaserWriter Pro 600, plus EtherTalk port; SCSI port for font storage on an external hard disk for font storage
Recommended duty cycle	Toner cartridge: 6,000 pages at 4% density Printer: minimum 450,000 pages	Same

Paper capacities	Can hold two kinds of paper simultaneously: one 100-sheet universal tray (supports A4, letter, legal, and A5 sizes); one 250-sheet cartridge (letter sheet cartridge supplied in US; A4 cartridge supplied in Europe); envelope feeder and 500-sheet universal cartridge available from Apple	Same
DOS/Windows compatibility	IBM PC-compatible computer can drive this printer (usually done with parallel port)	Same
Operating systems required	Macintosh: System 6.0.7; System 7.0 or later DOS: DOS 3.1 and later Windows: Windows 3.0 and 3.1	Same
Size and weight	Height: 12.1 in. (30.7 cm) Width: 16.8 in. (42.7 cm) Depth: 16.9 in. (42.9 cm) Weight: 39 lb. (17.7 kg)	Same
Power requirements	US: 90 to 110 V AC, 58 to 62 Hz Japan: 103.5 to 126 V AC, 58 to 62 Hz Europe/Australia: 194 to 264 V AC, 48 to 52 Hz	Same
Upgrades available	LaserWriter Pro 600 PhotoGrade Upgrade Kit; also, a motherboard upgrade to make the LaserWriter Pro 600 into a LaserWriter Pro 630	Not needed

Other

- Emulates Hewlett-Packard's PCL 4 printer-control language (used by HP LaserJet II printer; PCL 4 needed by some older DOS programs)
- New LaserWriter Utility 7.4 program used to set default behaviors, including whether the printer stops or uses other paper source when one bin runs out of paper
- Finer toner powder contributes to higher resolution of printer

Same

Suggested retail price

\$1,999 in US (will vary in other countries)

\$2,499 in US (will vary in other countries)

TECHNOLOGY

GrayShare: A New Printer Technology

GrayShare Is for Color Printers, Too!

By Gregg Williams

GrayShare—it's a simple name created to describe a not-so-simple technology. Each half of the word points to one of the two main features of this printer technology. The *Gray* in GrayShare refers to its ability to deliver high-quality gray shading while printing on Apple-labeled, QuickDraw-based, direct-connect printers. (As you'll see later, GrayShare makes a significant contribution to color printers, too. Apple just couldn't fit the word *color* into the product name.) The second half of its name, *Share*, stands for the ability of GrayShare to allow the direct-connect printer to share its printing abilities with other Macintosh computers on the same network.

Several factors influenced the creation of GrayShare, a new printer driver architecture that Apple will be using to add value to new, Apple-labeled printers. First, Apple has aggressive future plans for delivering new printers to the marketplace, and it currently takes too much time to modify an existing printer driver to make it work with a new printer. Second, developers of high-end desktop publishing applications have been putting more and more printing-related code into their products to get the best output they could—and they've had to write separate code for each printer their application supports. With GrayShare, Apple saw an opportunity to “raise the bar” on the printers it provides.

A FIRST LOOK AT GRAYSHARE

GrayShare is a modular printer driver architecture that Apple can modify to support current and future direct-connect, QuickDraw printers (that is, raster-based, non-PostScript printers that connect directly to one Macintosh through a serial or SCSI connection). The first two products that incorporate it into their printer drivers are the new StyleWriter II (a black-and-white printer) and the Apple Color Printer; others will follow. To make GrayShare as modular and

flexible as possible, Apple engineers wrote it in the C++ programming language; it's the first time Apple has done so.

GrayShare provides two major benefits. First, it gives built-in support that "knows" how to print an image in the best possible way for that printer. Apple engineers can now fine-tune any particular print engine to get the best possible output from that engine. Because of this, application developers don't have to write "special case" code for each printer they want to support. (Because Apple has provided a default, standard way to print images, an application no longer has to provide special code to do so; this leaves developers free to spend their time on more creative additions to their applications.)

Second, GrayShare provides a way for all the users on the network to share an Apple GrayShare printer. This is particularly important in situations where, for example, multiple users want to print in color but can't afford more than one Apple Color Printer. Essentially, users on the network send their print jobs to the Macintosh that is connected to the GrayShare printer, and that Macintosh takes the responsibility for printing the documents (optionally notifying the remote user when the printing is completed).

GrayShare works with system software version 6.0.7 or System 7. Users who want to print to shared printers can do so if they have at least a Macintosh Plus with 1 MB of memory.

An Improved Printer Driver. Not only does GrayShare make it easy for Apple to create high-quality drivers for the printers it sells, it also gives users high-quality printing services that are consistent across applications. GrayShare requires only that an application send it the most complete, accurate representation of the image to be printed—then GrayShare takes care of the printing itself. (Currently, some applications take, say, a 24-bit image and reduce it to a 1-bit image by dithering—that is, creating pixel patterns that appear to the eye as intermediate colors. Applications do this to make up for shades that they lose in reducing the image to 1-bit pixels.) With GrayShare, applications need only hand over the untouched 24-bit image, and GrayShare does whatever is needed to produce the best possible printed image for the printer being used.

GrayShare can (depending on the printer) automatically handle a number of printing features. For example, it can automatically scale anything you want to print. (The user sets the scaling factor in the Page Setup dialog box.) It can also

handle color and grayscale printing (including the selection and use of the most appropriate halftone pattern), gamma correction (which helps the final image look more like the original), and undercover removal (an optimization often made when you print a color image). With GrayShare and Apple's ColorSync extension, both the image on the screen and the final printed image appear as close as possible to each other and to the original image.

Another interesting aspect of GrayShare is that existing applications can benefit from it without changing a line of code. GrayShare simply implements QuickDraw commands better than before. Because of this, existing applications produce better printed output even though they are sending the exact same data to be printed.

GrayShare does, however, require application developers to follow the rules Apple has defined for printing over the years. Once again, applications that don't follow the rules and insist on making assumptions about the printer they're printing on will not achieve the best output on Apple GrayShare printers. For instance, if a developer assumes that because the application is printing to a QuickDraw printer the driver must not be able to scale the output, the application may end up disabling that feature for the user, or, worse yet, it may end up giving limited data to the driver and not produce what the user expects to see.

A Modular Printer Driver. As Figure 1 (below) shows, GrayShare consists of three separate modules: a user interface module; a general-purpose imaging library, which implements a standardized set of features; and an engine control module, which implements the specialized set of features for a given printer.

The general-purpose imaging library will essentially stay the same across all the printer drivers that use GrayShare technology because the library has the ability to render images at any bit depth or resolution, thus enabling the engine control module to dictate what level of information is best suited to the printing engine. The engine control module will change for each printer, along with the user interface module, which will probably change to reflect a new printer's features. But it's possible that the user interface module need not change completely—for example, both the StyleWriter II and the Apple Color Printer use parts of the same user interface module.

Gray Levels. Because GrayShare achieves a large number of gray levels through halftoning (that is, through using patterns of black pixels to approximate shades of gray), it's best if applications give the highest resolution image to the printer driver. The driver has the ability to sample the incoming image and use the best resolution for the device, but the driver can't do this if it's not given the chance to make the proper decision. Leave the decision to the printer driver and it will do the best it can with that image.

Printer Sharing. Both at home and in the office, people are connecting their Macintosh computers into networks so that they can share work and resources. Until now, the only way that users could share a printer was to buy an AppleTalk printer and connect it to their network; they couldn't access a printer that connects directly to one Macintosh through a serial or SCSI interface.

With GrayShare, a Macintosh user can volunteer his or her Macintosh to act as a print spooler for other Macintosh computers on the same network. You can think of GrayShare printer sharing as being to printing what System 7 file sharing is to sharing files—both offer convenience without requiring a separate Macintosh computer to be a dedicated file server. (Of course, the Macintosh connected to the GrayShare printer is being used as a file server—but the owner of that Macintosh can continue to do work.) GrayShare printer sharing works with any form of AppleTalk—LocalTalk, TokenTalk, EtherTalk, or even AppleTalk Remote Access. If EtherTalk is present, GrayShare can take advantage of EtherTalk's added speed.

GrayShare printer sharing works as follows. Let's say that the user of Macintosh A wants to print on an Apple GrayShare printer connected to Macintosh B, elsewhere on the network. Both the GrayShare printer driver on Macintosh A (call this GrayShare A) and the one on Macintosh B (call it GrayShare B) have a part in printer sharing. Also involved are two copies of a faceless background application named PrinterShare—one copy on each Macintosh.

The application on Macintosh A begins the printing process by spooling the document to disk (that is, it temporarily saves the image in a disk file). The application then hands the spooled document to PrinterShare A, which transmits it across the network to PrinterShare B. When PrinterShare B receives the spooled document, it stores it in the Print Monitor Documents folder, which Macintosh B uses to store spooled documents. At this point, Macintosh B "sees"

just another document to be printed in the background, and it uses the GrayShare B printer driver to do so.

Information isn't, however, flowing just from Macintosh A to Macintosh B. A reverse stream of data (called the *back channel*) may flow back from Macintosh B to Macintosh A. Macintosh B uses PrinterShare B to send the data across the network; PrinterShare A receives the data and hands it to Macintosh A. If Macintosh B has a printing error—if, for example, the printer jams or runs out of paper—Macintosh B uses the back channel to tell Macintosh A, which then alerts user A. Similarly, user A can request that Macintosh B notify it through the back channel when Macintosh B finishes printing the document.

Printer Sharing Options. GrayShare allows anyone to choose another person's directly connected GrayShare printer as if the printer were just another shared printer on the network. Since a person must connect to a printer by using the Chooser desk accessory, that person must have the version of the Chooser that Apple supplies with the GrayShare printer.

GrayShare enhances the Chooser desk accessory to give users additional information about the Apple GrayShare printer they have chosen. Users can find out the model of the Macintosh connected to the GrayShare printer (they may want to know this, because faster Macintosh models print faster). Users can also get a list of the fonts their computers have that the remote Macintosh does not. (With this feature, users can speed up printing by minimizing the number of fonts that must be transmitted with a given document.)

Since the printing of documents in the background may slow some Macintosh models, users may limit access to the GrayShare printer they're connected to by adding a password that remote users must supply before they can use the printer (see Figure 2 below).

Users can also track the use of their GrayShare printers by telling their Macintosh computers (through a Setup button in the Chooser) to keep a log of who has printed documents on their GrayShare printers. A teacher, for example, might track students' use of a GrayShare printer, or an office worker might use the printer log to bill other users for the number of color documents (which are substantially more expensive than black-and-white documents) they have printed.

DEVELOPMENT ISSUES

Apple understands that the way you, today, implement printing was influenced by what you *had* to do to make your software print in the best way possible. If you are a developer who wants your applications to work with Apple GrayShare printers, Apple has immensely simplified life for you.

The general rule when printing to an Apple GrayShare printer is simply to give the printer the best version of the page that you can—*don't* preprocess the page before sending it to the printer. Here's what you do: When you call PrOpenDoc, system software hands you back a color grafPort (a structure of type CGrafPort) instead of an ordinary grafPort. You should then use Color QuickDraw commands to draw into the color grafPort at the maximum pixel depth that you're capable of. (At Apple, slang for this step is "sending the printer 'deep data.'")

Here are the main things you need to check to ensure that your drawing routines work properly with GrayShare printer drivers:

- The GrayShare printer driver uses its own A5 world, and your application should not assume its own A5 world is active during printing. In particular, when you write your GrowZoneProc routine, you should save the current A5 world before you do your work, then restore it at the end.
- If you convert your page to a 1-bit halftone before sending it to the printer, you'll get an inferior printout of that page when printing to a GrayShare printer. Send the printer "deep data" and let the GrayShare printer driver do the halftoning—it will get better results than you can do on your own.
- Be sure you know the size of the page you're printing into; don't assume it's a certain value. (In general, "Don't assume . . ." is good advice when programming the Macintosh.) Look at the rPage value in the printer information data structure (the TPrInfo record in the print record).
- If you are printing a pixmap, be sure to set the hRes and vRes fields, which specify the resolution of your pixmap in pixels per inch. The GrayShare printer driver looks at these values and does any scaling that might be necessary to print your pixmap at the correct size.
- Because GrayShare printer drivers are working with more data, they need a little extra memory than previous printer drivers. So you should free up as much memory as possible before printing. This is always a good idea—the more memory that's free, the faster printing occurs.

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GrayShare is important because it means better results for you (and users) with, at the same time, less work. As time passes, more Apple-labeled printers will use GrayShare technology. Who knows? Maybe someday, writing code for printing to a specific printer will be a thing of the past.◆

Executive Summary for GrayShare

GrayShare is a new, modular printer driver architecture for Apple's QuickDraw-based, direct-connect color and black-and-white printers. GrayShare printer drivers are customized to do the best possible printing for the printer engines they are written for. This makes your job as a developer easier because you don't have to write extra code in your program to handle different printers, nor do you have to preprocess an image before you send it to the printer.

Programmer alert: When printing to an Apple GrayShare printer, your program should send it the fullest, most detailed image it can produce and let the GrayShare printer driver figure out how best to render the image. For more technical information, see the "Development Issues" section of this article.◆

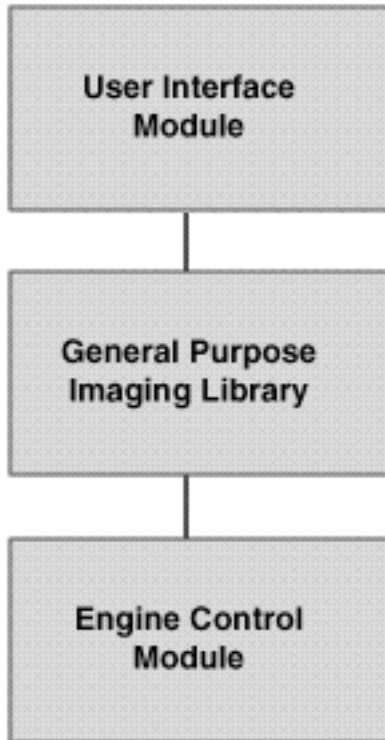


Figure 1: The architecture of an Apple GrayShare printer driver.

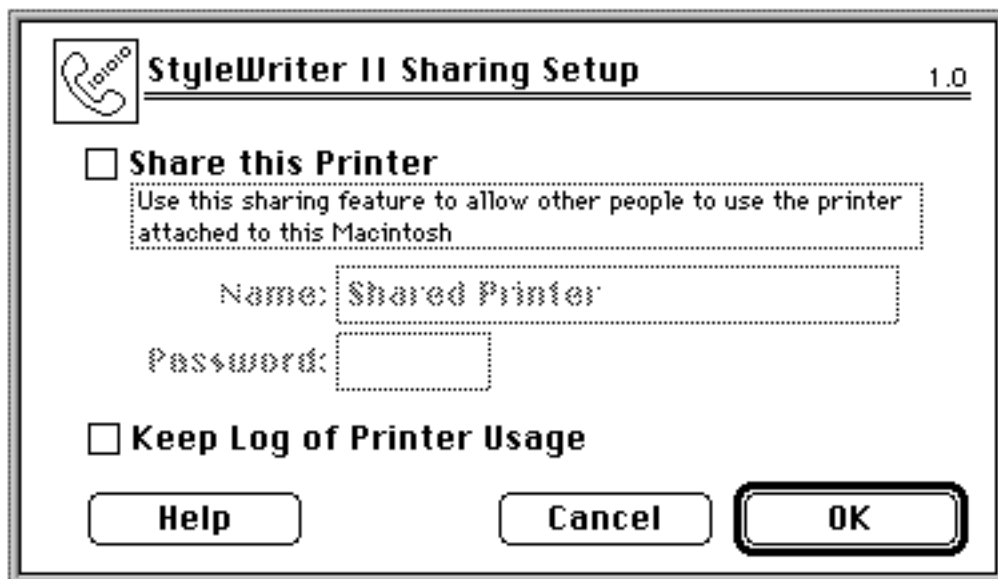


Figure 2: Printer sharing and usage logging in Apple GrayShare printers. This dialog box appears when the user selects StyleWriter II in the Chooser window and clicks the Setup button that subsequently appears

CD Highlights

We welcome you at last to the real *New Hack City*, the February issue of the Developer CD Series. You probably noticed that we also (mistakenly) welcomed you to *New Hack City* in last month's "CD Highlights" column. That column actually covered the contents of the January 1993 CD, *The Postman Always Clicks Twice*. Apologies for any confusion we created for you, and thanks for sticking with us.

Included on the real *New Hack City* are several new tools.

HyperCard Player: The HyperCard® Player software enables you to run stacks created with Claris® HyperCard.

ESD (Enterprise System Division) Technical Notes: We also have an updated version of the ESD Technical Notes, which contain the latest bugs, tips, and tricks that folks developing software for AppleTalk Remote Access, DAL, and SNA•ps should be aware of.

Macintosh Technical Notes: Yes, there are also updated Tech Notes, including a feast of new Q&As. Be sure to take a look.

A/ROSE 1.1.9: Here is the latest release of the Apple Real-Time Operating System, A/ROSE Version 1.1.9. This version implements a fix for compatibility with the Macintosh IIvx system.

CD-ROM Setup 4.2: This new version of the CD installer disk works with QuickTime 1.5, runs with the new Apple CD 300 drives, and gives you Photo CD capability.

ColorSync 1.0: Here is the golden master version of Apple's new color-matching architecture for the Macintosh computer. This system extension provides consistent color across the Macintosh platform.

Network Software Installer 1.3: This is the updated Network Software Installer for AppleTalk Version 58.0. It features updated TokenTalk Version 2.5

and EtherTalk Version 2.5, includes updates to all Ethernet driver software for Apple Ethernet products, and adds support (instrumentation) for SNMP. It also includes continuing support for Apple's Router. The Network control panel has an improved user interface to make the selection of zones on extended networks easier. The control panel displays the version of AppleTalk and the connection that is in use.

SimpleApp: SimpleApp is a general utility for handling TEXT, PICT, and movie editing. Its purpose is to demonstrate the human interface features with QuickTime and hold the basic functions of text editing and PICT viewing.

IF YOU'RE NEW TO THE DEVELOPER CD . . .

Now for those of you who are unfamiliar with the Developer CD, I'd like to give a quick overview of the standard information included on this disc. At the top level there are nine folders arranged alphabetically (for the most part). Here is what is included in each folder.

Developer CD License: Yes, Apple's Law Department asks us to put this right up front so that it's the first thing you see. Nobody enjoys reading legalese, but please do take the time to read through this license.

What's new on this CD?: Developers tell us this is their favorite place to begin reviewing a new disc. This folder is a simple navigation tool that allows you to quickly browse all the new and updated packages on each month's CD. It includes aliases to all of the new materials. Aliases are arranged by the top-level folder where the files to which they correspond can be found.

Also included in this folder are the aliases to the new material on the two previous discs. Developers who only get the disc once a quarter can use these aliases to quickly see what has been added since their last disc.

Start Here: The Start Here folder contains several important tools. First, it contains the Contents Catalog, which is a simple HyperCard file of all the packages available on the disc. Each card includes a title, pathname, and brief description of the contents of the package.

Next is the Developer Info Assistant (DIA), a HyperCard search tool for the CD and our survey. Please take the opportunity to fill in the survey and tell us how you liked the disc and how we can improve it; you can return it to us by AppleLink at DEV.CD. For a more detailed discussion of the DIA, see "Search Tools on the Developer CD" in the January 1993 *Apple Direct*.

Apple Information Resources: This folder is designed to give you Apple-related information. Included in this folder are developer forms such as the change of address form, NuBus™ registration, and C/F registration. You will also find the latest version of Apple Bug Reporter, a tool that assists you in sending your support questions to the Developer Support Center. The Developer University catalog is also included in this folder, so look here for the Q1 '93 class list.

Development Platforms: This folder includes tools and utilities for a variety of development environments such as Apple II, C++, HyperCard, Lisp, and MPW. Also see the new CSMP Digests, an archive of article threads from the internet newsgroup comp.sys.mac.programmer.

Marketing: The Marketing folder is geared specifically toward technical marketing issues. Here you will find the Antipiracy Toolkit, a list of Apple contacts in Europe, a dozen or so international market guides, a guide for localization for Japan, and a U.S. distribution guide for non-U.S. developers. Also included here are several product training demos from Developer University.

Periodicals: The Periodicals folder contains an archive of *develop* magazine as well as *Apple Direct*. *develop* is our premier technical journal for Macintosh developers. Not only is the latest issue of *develop* included, but also the text and code for previous issues, which is kept scrupulously up-to-date.

Apple Direct, as you know, is designed to bring you the latest information on new Apple products and development issues. This archive extends from the current issue back to October '91. Also included is a special collection of articles on developing products for the global marketplace.

System Software: The current Developer CD includes U.S. system software versions 6.0.8, 7.0.1, 7.1 and 7.0.1/7.1P. (The latter is designed for the Performa products; read the special installation instructions before installing!) Also included is a smattering of non-U.S. software that we hope to expand on in the next few months. QuickTime 1.5 can also be found here, as well as aliases to the latest versions of Disk Copy and MountImage.

Technical Documentation: This folder is loaded with valuable documentation. Included here is the new *Apple CD-ROM Handbook*, a guide to planning and producing your own CD-ROM.

The Developer Notes collection provides descriptions of new hardware and software features, comparisons with existing CPUs, and expansion card design information. Two electronic versions of *Inside Macintosh* can also be found here. The first is a HyperCard stack of the original version, and the second includes chapters of new *Inside Macintosh* in Apple DocViewer format as they become available.

Also find the *Macintosh Electronic Reference*, the latest MPW 411 files (a developer favorite), the *Road Map to A/UX*, *PowerBook Modem Guide*, and of course the Macintosh Technical Notes in both text and Apple DocViewer format, as well as our recently updated and expanded collection of sample code.

Tools & Apps: This folder contains several hundred utilities and applications designed to support your development effort. The vast majority of these are developed internally by Apple engineers to help them in their own work. These tools and applications are organized into several subfolders:

- **Devices & Hardware:** In this folder you will find material on A/ROSE, Apple Desktop Bus, CD-ROM, display and video hardware, drivers, NuBus/Slot Manager, scanners, and SCSI devices.
- **Graphics & Imaging:** This folder includes ColorSync, the Macintosh Graphics Primer, PostScript utilities, and printer drivers.
- **Inits/cdevs/DAs:** Here's where you'll find a number of helpful hacks, such as Animation *f*, Backlight Control *f*, LockVol 1.3, and Programmer's Key 1.4.2.

- **Localization:** This folder includes materials to help you localize your product for distribution worldwide. Here you will find AppleGlot 2.0b11, HyperCard Stack Localization Navigator, SCM Verifier 1.0a12, and Show Dialog Boxes 1.1.
- **Misc Utilities:** This contains a number of reliable and useful items such as TeachText, Disk First Aid, MountImage, Disk Copy 4.2, Blessor 1.1, and System Picker. Installer 3.4 is also included here, as well as Disinfectant 2.9. (Thanks to John Norstad for giving us permission to distribute this on our CD).
- **Networking & Communications:** Look here for AppleTalk tools and libraries, AppleLink and AppleLink Offline, the Network Software Installer, MacTCP-related materials, and so on.
- **OS/Toolbox:** This folder contains QuickTime, QuickDraw, and Apple events tools. It also includes the System 7 Icon Interfaces and Menu Def Info, DAM demos, and tools such as Clipboard Magician, Extensions Manager 1.6, kcapApp, and WindowPicker.
- **Testing and Debugging:** Here's where you'll find MacsBug, Discipline, Sad Mac Error codes, EvenBetterBusErr, and MiniLauncher, to name just a few. This folder also contains a number of tools that work together with Virtual User, such as the Virtual User Libraries, Tutorials, and Scripts. This folder is jam-packed with useful tools, so don't miss it. Last but not least, Tools & Apps is also the place to find the latest version of ResEdit.

As you can see, there is a wide variety of material available on this disc. If you need anything that you don't see here, let us know by sending an AppleLink message to DEV.CD. We take pride in supporting your development needs.

Sharon Flowers
Developer CD Project Manager

Editor's Note: Odds & Ends

I suppose there's always a lot going on at Apple; as we head further in to 1993, that seems to be especially true. As you'll see from this issue, we're releasing a host of new imaging products—new printers and software to drive them—as well as Macintosh Easy Open, a new system extension. In the next couple of months, you'll read about many more new products, from a variety of impressive hardware offerings to the long-awaited final versions of some pretty exciting software.

With this fireworks display of new products, it's easy to forget about some less dazzling but (for some) equally interesting Apple news, so here are a few items that didn't quite make it into full-blown stories.

First off, an unabashed plug for the Associates and Partners programs, Apple's support programs for qualifying commercial developers. Last month's *Apple Direct* included a story about the AppleScript Beta CD that we made a part of the monthly developer mailing. Some of you didn't get the AppleScript CD; that's because you weren't an Associate or Partner. These programs provide a variety of support services for developers, including information, training, prerelease software, and an invitation to the yearly Worldwide Developers Conference. If this sounds appealing to you, you might want to consider joining; for more information, contact DSC, 20525 Mariani Avenue, MS 75-3T, Cupertino, CA 95014; phone: (408) 974-4897; AppleLink: DEVSUPPORT.

Next, amid all the hubbub of Apple VP Roger Heinen leaving to work for Microsoft there's been another significant departure from Apple: Apple USA took the Apple IIGS off its price list because our efforts to sell low-cost Macintosh computers to the education market has been so successful. For the past year, sales of the IIGS have dropped sharply as customers have moved to the more powerful Macintosh, which in its Classic II and LC II iterations is actually less expensive than a fully-configured IIGS.

It's hard to say goodbye to a venerable, popular performer. So, for now, the Apple IIe remains on the list and we'll continue to support and service the IIGS. But it's nice to now that the Macintosh strategy we announced a year ago is working, working so well that in 1991 more than 80 percent of all computers

sold into the K-12 marketplace were Macintoshes, and that that figure is expected to rise to more than 90 percent in fiscal year 1992.

One last tidbit: Speaking of a strategy working well, the Macintosh Quadra 950 was recently selected by *Byte* magazine from among eight competitive offerings (including those from Sun, DEC, Apollo, and Next) as the “ultimate workstation.” Writing in the November issue, a *Byte* reviewer said: “Despite our preconception that the sweetest workstation was going to be a UNIX system, we chose the Quadra 950 as our favorite. The Quadra is the winner not only because of its performance on our DTP tests, but also because there is more software that is better supported and easier to install, manage, and use than for any of the UNIX workstations.”

Stay tuned for many more exciting developments. . . .

Paul Dreyfus
Editor

New European Developer Training Facility Opens

As part of its initiative to increase support for European developers, Apple Computer has opened its new developer training facility in London. The facility, Stockley Park 2, is located next to the original Apple UK building in the Stockley Park industrial complex near London's Heathrow Airport.

The new facility provides many rooms equipped with state-of-the-art presentation systems as well as high-end and multimedia workstations for students. Workstations also offer connectivity into major non-Macintosh environments (such as IBM, DEC™, and UNIX®) for training in systems integration and client/ server technologies.

The 1993 course offerings for the new site provide developers with a wide selection of educational options, including the pace, price, and technical content of their training. Developers may choose between traditional instructor-led classroom courses and self-paced facilitated courses in which students proceed at their own pace under the guidance of a tutor. Students can optionally purchase any self-paced materials they use during a course.

Apple Europe works closely with Developer University to design the curriculum for the training site. Some of the courses, such as the one on human interface, have originated with the European training program. Some developer courses are also offered from time to time at a regional level.

The table below provides a schedule of classes offered at the European developer training facility in the first half of 1993. Check the AppleLink developer folder for your region for additional course information. To register or obtain additional information, contact the training administrator, Mary Edwards, at Apple Computer Europe, 6 Roundwood Avenue, Stockley Park, Uxbridge, Middlesex, UB11 1BB, England; phone: 44 81 730 2501; fax: 44 81 730 2510; AppleLink: EDWARDS5. ◆

Apple Europe Training Schedule

Course Title	Jan	Feb	Mar	Apr	May
Programming Fundamentals	8-12	22-26	26-30		

MPW Introduction		16-17	25-26	4-5
Human Interface Design	12-13		2-3	13-14
MacApp	25-29		1-5	26-30
AppleScript	18-22		8-12	19-23
Debugging			16-17	15-16
				20-21
A.O.C.E. Fundamentals			18-19	25-26
Data Access Language		3-5		13-15
QuickDraw GX			29-31	26-28
Device Drivers				5-7

COOL.APP AppleLink Address Closes

COOL.APP, an AppleLink address sponsored by the Apple Developer Group (ADG) for miscellaneous developer inquiries, has been closed.

COOL.APP was a catch-all address for developer feedback about a number of ADG initiatives. To ensure that developer inquiries reach the right people as quickly as possible, we have established several new AppleLink addresses for developer questions and feedback.

Developers should now send AppleLink messages to the new addresses set up for inquiries about specific ADG projects and Apple technologies—for example, APPLESCRIPT for AppleScript, OCE for Apple Open Collaborative Environment, and NEWTON.DEVS for Newton.

If you're not sure which address to use, or if you have general inquiries, send AppleLink messages to the Developer Support Center (DEVSUPPORT). For feedback about the Developer Support Center, write to DEV.FEEDBACK. ◆

AppleLink to Incorporate America Online Technology

Future versions of AppleLink will use America Online technology as the result of a recent agreement between Apple Computer and America Online, Inc. Apple Online Services (AOS) will also use the technologies for other, as-yet-unannounced on-line services, and the two companies will work together to enhance the America Online services platform.

Under the agreement, America Online has granted Apple a nonexclusive license to use the America Online services platform to provide Apple-branded online services. America Online will receive a royalty based on usage.

AOS, the information services business unit in the Apple Personal Interactive Electronics (PIE) Division, is chartered with building an Apple-branded information services business. AOS will use America Online technology in combination with proprietary Apple technologies (such as Open Collaboration Environment and Newton) to expand Apple's information services.

AOS services currently comprise AppleLink and the newly created AppleLink CD, a quarterly CD available on a subscription basis that contains a broad sampling of material from AppleLink. As AOS introduces new offerings, its customers, who currently number 50,000 in 50 countries, will be provided upgrade paths to the new services.

Editor's note: The AppleLink CD currently does not contain any information from the AppleLink Developer Support area. It does include a variety of AppleLink resources often used by developers, however, such as the Tech Info Library. Apple Direct will provide more details about the AppleLink CD in an upcoming issue. ◆

Global Developer Resources: Quarterly Listing

Apple provides a great many resources for the global developer community. If you're developing for markets beyond the United States, these resources can help you plan, design, and market your products. Most are print-based; many are available electronically on AppleLink or the Developer CD Series.

This quarterly listing currently contains only Apple resources. If you can recommend non-Apple resources, including books, periodicals, product guides, on-line services, courses, or other global development resources, we'll include them in future listings. To let us know about other pertinent resources, send an AppleLink message to APPLE.DIRECT.

GENERAL RESOURCES

Apple Direct Articles. *Apple Direct* has published a range of articles about the technical and marketing aspects of developing for global markets. See the table on page 7 for a list of *Apple Direct* global articles, from most recent to oldest. Electronic copies of the articles can be found on the latest issue of the Developer CD Series, *New Hack City*, and on AppleLink (path—Developer Support:Developer Services:Periodicals:Apple Direct:International Articles).

Localization Guidelines. The *Guide to Macintosh Software Localization* presents Apple's official guidelines for modifying a product for sale in more than 50 markets, telling you how to give an application the most appropriate look and feel for each market. The 330-page book, published by Addison-Wesley, is available through your local bookseller or through APDA (order #R0422LL/B). (For APDA ordering information, see "Now Available From Apple.")

Worldwide Market Opportunity Guides. These electronic guides provide information about the personal computing market, Apple contacts, and distribution and localization within the countries, as well as lists of main third-party distributors, localization companies, user groups, trade shows, major magazines and publications, and other helpful information.

Apple publishes guides for Australia, Belgium, the Far East, France, Germany, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom.

The guides are located on the Developer CD and on Apple-Link (path—Developer Support: Developer Services:Marketing Information & Services:Market Information: Worldwide Market Opportunities).

Other Helpful Information. A brochure called *Macintosh Development* gives developers interested in the Macintosh platform information about business opportunities, new technologies, and developer support. The business opportunities section provides basic information about the installed base and sales of software applications for the Macintosh.

New technologies pages tell developers about recent and upcoming technical advances, such as QuickTime, WorldScript, Apple events, and Apple's participation with IBM on RISC technology.

The support section lists resources, programs, and tools Apple offers developers to help make them successful. Developers can obtain a copy from the Developer Support Center, Apple Computer, Inc., 20525 Mariani Avenue, M/S 75-3T, Cupertino, CA 95014, USA; phone: (408) 974-4897; AppleLink: DEVSUPPORT.

Apple also provides a bulletin board on AppleLink called "Selling Into Europe" (path—Developer Support:Selling Into Europe), which, among other things, lists distributors and localization companies and provides developers an opportunity to post pertinent information.

Developers with specific questions for Apple can find the right person to call by consulting the list of International Distribution & Developer Services Contacts, which contains Apple's development and distribution contacts in each local geographical market. The list is also posted on AppleLink (path—Developer Support:Developer Services:Apple Information Resources:Whom Should I Contact at Apple?: International Contacts).

GEOGRAPHICAL RESOURCES

Apple's local offices in the various geographical markets offer area-specific publications and other resources. The following is a partial list. Unless otherwise indicated, the publications may be obtained from the contacts listed for each geography.

Australia. *A Guide to Successful Distribution:* Australian hardware and software market statistics, distribution channel options, pricing structures, gray market information.

Australian Apple Macintosh Product Reference Guide: Catalog of Macintosh products available in Australia. (Paper; also available as FileMaker® Pro, HyperCard, and 4D databases.)

Miscellaneous: Breakout publications based on the *Australian Apple Macintosh Product Reference Guide* on market segments, such as graphics, multimedia, technical solutions, and networking and communications.

Contact: Third-Party Marketing Manager, Apple Computer Australia Pty. Ltd., 16 Rodborough Road, Frenchs Forest, NSW 2086, Australia; phone: 61-2-452-8000; fax: 61-2-452-8160; AppleLink: AUST3PP.

Belgium. *Apple, Belgium, and You:* Guide to distribution in Belgium.

Apple Macintosh Product Guide: Catalog of Macintosh products available in Belgium. (Found in Apple Belgium electronic publication *The Source*, available on AppleLink [path—Europe:Belgium:Products:Source Item Tracer:The S.I.T.]; also available on CD.)

Contact: S.A. Apple Computer N.V., Rue Colonel Bourgstraat 103, 1040 Brussels, Belgium; phone: 32-2-741 22 11; FAX: 32-2-735 76 19; AppleLink: MERGAERTS.B.

Far East. *Macintosh Solutions for the Far East Markets:* Catalog of products created by Far East developers.

Far East Market Guidebook: Information about 13 countries in the Far East, distributor lists, information on the Apple Singapore factory, and Asian economic data.

Contact: Apple Computer International Ltd., 14/F Exchange; Square Tower 3, Central, Hong Kong; phone: 852-844-2400; FAX: 852-910-0073; AppleLink: YANG.MEI.

France. *Lettre des Développeurs Apple (LDA):* French developer magazine with source code, new tools, debugging information, descriptions of new Macintosh technologies, news from APDA, distribution-related information, and listings of developer programs, events, and courses.

APDAlog France: Translation of the U.S. APDA catalog.

To subscribe to either *LDA* or *APDAlog France*, write APDA France, 36, Rue des Etats Généraux, 78000 Versailles, France; phone: (33) 1 39-02-33-44; AppleLink: APDA.TECH.

Miscellaneous: Catalog and CD-ROM describing third-party Macintosh products; Macintosh guides for such vertical markets as CAD/CAM, DTP, education, scientific, and management and accounting; a networking and communications guide.

Contact: Apple Computer SARL, 12 avenue d'Océanie, Z.A. de Courtaboeuf, 91956 Les Ulis Cedex, France; phone: 33-1-69 86 34 00; fax: 33-1-69 28 74 32; AppleLink: GARNIER.J.

Germany. *Market Opportunities in Germany:* Information about markets and distribution, major German trade shows, Macintosh and other personal computer publications, distributors, and market research resources.

Miscellaneous: Catalog of Macintosh products; paper version and CD available through German Apple dealers, paper version only in bookstores and kiosks.

Contact: Apple Computer GmbH, Gutenberg Str. 1, 8045 Ismaning, West Germany; phone: 0049-89-99 640-0; fax: 49-89-99 64 01 80; AppleLink: GER.3RDPARTY.

Italy. *A Guide to Italy for Macintosh Developers:* Information about markets, distribution, and working with Apple Italy. Also lists major Italian trade shows, Macintosh and other personal computer publications, distributors, and market research resources.

Miscellaneous: HyperCard-based catalog of Macintosh-compatible products distributed in Italy.

Contact: Apple Computer S.p.A., Via Milano 150, 20093 Cologno Monzese, Milano, Italy; phone: 39-2-273 26 1; fax: 39-2-273 26 555; AppleLink: VERGANI.R.

Japan. *Localization for Japan:* Describes changes necessary to make a Macintosh application work in Japanese. (Available from APDA.)

A Guide to Japan for Macintosh Developers: Introductory booklet about Japanese Macintosh development, Macintosh products, contacts at Apple and major Japanese distributors, and information sources. (Paper; also available on

AppleLink [path—Developer Support:Developer Services:Marketing Information and Services:Market Information:Worldwide Market Opportunities:Japan Market Opportunities].)

Soft Landing in Japan Version 2.0: Sponsored by Apple Japan and published by the American Electronics Association; describes setting up a software company in Japan, including costs, contact names, legal requirements, and staffing information. (Available from Apple Japan and Apple Pacific or from American Electronics Association, 5201 Great America Parkway, Santa Clara, CA 95051, USA; phone (800) 873-1177 or (408) 987-4200.)

Miscellaneous: Monthly mailing with a CD; Apple Japan icon on Applelink available to those registered in Japan (path—Developer Support:Developer Services:Marketing Information and Services:Market Information: Worldwide Market Opportunities:Japan Market Opportunities); Japanese translations of most developer information (such as *Inside Macintosh*).

Contacts: Apple Pacific, Apple Computer, Inc., 20525 Mariani Avenue, M/S 36-3P, Cupertino, CA, 95014, USA; phone: (408) 974-5078; AppleLink: TSUNEKAWA1; or Apple Computer Japan, 1-14-1 Sendagay, Shibuya-ku, Tokyo, Japan 151; phone: 81-3-5411-8730; fax: 81-3-5411-8777; AppleLink: SPRAGUE1.

Nordic Region (Sweden, Denmark, Norway, and Finland). Miscellaneous: CD with Apple and third-party product information and demonstrations; information for Nordic Region partners, including dealer lists, price lists, information on new system software releases, ideas for increasing sales, and listings of trade shows, sales campaigns, and special events.

Contact: Apple Computer AB, Box 31, S-16493 Kista, Stockholm, Sweden; phone: 46-8-703 3000; fax: 46-8-703 3051; AppleLink: LANDERSTEN1.

Spain. Miscellaneous: Catalog of third-party Macintosh products.

Contact: Apple Computer Espana S.A., Paseo de la Castellana 95, Piso 26, 28046 Madrid, Spain; phone: 34-1-597 47 50; fax: 34-1-556 95 54; AppleLink: MISTOU.

Switzerland. Miscellaneous: Catalog of third-party Macintosh products including addresses and telephone numbers of Swiss distributors.

Contact: Apple Computer Division, Industrade AG, Hertistrasse 31, CH-8304 Wallisellen, Switzerland; phone: 41-1-832-81 11; fax: 41-1-830-63 06; AppleLink: IT0006.

United Kingdom. *MacINDEX*: Listing of over 2000 developers, dealers, consultants, applications, and other Macintosh development and distribution services in the United Kingdom. (Available from MacINDEX, 11-12 Acton Hill Mews, 310-328 Uxbridge Road, London W3 9BR, UK; phone: 44 81 752 0752; AppleLink: TPD.)

The Edge: Apple UK newsletter with information about Apple products and services for developers, distributors, and other third parties.

Available from Editor, The Edge, 1/1 Harbour Yard, Chelsea Harbour, London SW10 0XD England.

Contact: Apple Computer UK Limited, 6 Roundwood Avenue, Stockley Park, Uxbridge, Middlesex UB11, 1BB, England; phone: 44-81-569 11 99; fax: 44-81-569 29 57; AppleLink: UK.DEVSERV. ◆

Table 1

Apple Direct Global Articles

January 1993:	“Apple Increases Support for European Developers,” pp. 1, 3
October 1992:	“Technology: System 7.1,” pp. 1, 12-13 “KanjiTalk 7 Opens Door for Japanese Development,” pp. 14-15
August 1992:	“International Success Stories,” pp. 9, 12-16 “Apple International Distribution and Developer Services Contacts,” p. 13
May 1992:	“World-Ready System 7,” p. 6 “The Global Macintosh Installed Base,” pp. 13-15

- April 1992:** “Japan Macworld Highlights Opportunities,” pp 1, 3
“Apple/DEC European Distribution Agreement,” pp. 1-2
“European Developers Discuss Piracy Issues,” p. 2
- March 1992:** “The Ways and Means to Fight Piracy,” pp. 1, 4-6 (includes a list of worldwide antipiracy associations and contacts)
- July 1991:** “Setting Up a Subsidiary,” pp. 23-24, 27
- May 1991:** “Pacific Market Opportunities,” pp. 16-20
“Avoiding Cultural Mishaps: Cultural Identity is Crucial to Successful Localization,” pp. 21-24, 30
- April 1991:** “Charting Your Course: The Business Basics of Going International,” pp. 8-16, 27
“The Global Product Launch: Pragmatic Approaches to Worldwide Product Introductions,” pp. 17-20, 26
“Negotiating International Distribution Agreements,” pp. 21-22, 26
- February 1991:** “Plan It For the Planet: Planning Can Ease the Translation of Your Software To Other Languages,” pp. 6-16 (includes partial list of localization companies)
- November 1990:** “Distributing Your Software In Japan,” pp. 17-18, 20

May 1990:

“The Gray Market Blues,” pp. 23-24, 27

Spotlight On...

Tools for commercial developers

December

THE PROGRAMMER'S EXTENDER GT (MASTERS PUBLISHING)

Bowers Development

The Programmer's Extender GT is a comprehensive set of routines that provide a higher level of access to the User Interface and Macintosh ROM Toolbox routines. It allows easy customization of a program's interface and internal code without having to create elements from scratch. Extender GT routines can also be combined with previously written code to save development time.

System Requirements: This programming library does not require anything beyond the requirements of your development environment.

Product Contents: Two Macintosh disks and one manual.

APDA Product Number: T1492LL/A \$495.00 (U.S.)

New version! METROWERKS MODULA-2 PSE PROFESSIONAL STANDALONE EDITION VERSION 4.0.1

Metrowerks

A completely integrated programming environment that includes full 68020/30 and 68881/82 support and the ability to generate 32-bit clean stand-alone applications. It also features full Macintosh Operating System, Toolbox, and SANE support.

System Requirements: A Macintosh Plus computer or later with 1 MB of RAM and system software version 5.0 or later; a hard disk is recommended.

Product Contents: Two Macintosh disks and one manual.

APDA Product Number: T0207LL/D \$79.00 (U.S.)

Source code: PRDEC1

Now Available From Apple

The following list shows APDA products that have become available to developers within the last several weeks. To get a full listing of all APDA products, check the current *APDA Tools Catalog*. For new product announcements and the most up-to-date price lists, check AppleLink (path—Developer Support:Developer Services:Apple Information Resources:APDA—Tools for Developers).

Apple Products

Books

MacApp Reference

R0195LL/A

\$30.00

Inside Macintosh Toolbox Essentials

R0360LL/A

\$34.95

Inside Macintosh Overview

R0359LL/A

\$22.95

Technical Resources

Macintosh Developer Note #1: Macintosh IIvx, Macintosh PowerBook 160 and PowerBook 180, Macintosh PowerBook 145, Macintosh Quadra 950, Macintosh LC II

R0451LL/A

\$25.00

Macintosh Developer Note #2: Macintosh Duo System

R0457LL/A

\$30.00

Tools

Macintosh Easy Open

R0442LL/A

\$150.00

Making It Macintosh: The Macintosh Human Interface Guidelines Companion

(CD-ROM)

R0450LL/A

\$39.95

ToolServer Version1.0

R0449LL/A

\$110.00

Third-party Products

C Programmer's Toolbox MPW Version 3.0

T0376LL/C

\$295.00

p1Modula-2 Version 5.0

T0377LL/D

\$395.00

SCSI View

T0562LL/A

\$165.00

Think Reference 2.0

T0467LL/B

\$100.00

PRJAN1

Ordering Information

To place an APDA order from within the United States, contact APDA at (800) 282-2732; in Canada, call (800) 637-0029. For those who need to call the U.S. APDA office from abroad, the number is (716) 871-6555. You can also reach us via AppleLink; the address is APDA. If you're outside the United States, you may prefer to work with you local APDA contact. For a list of non-U.S. APDA contacts, see the "International APDA Programs" page in the *APDA Tools Catalog*.

It Shipped!

Through the It Shipped! program, you can announce new and revised third-party products in *Apple Direct*. It Shipped! listings are also made available on the 3rd Party Connection AppleLink bulletin board. You can obtain an It Shipped! application by downloading it from the AppleLink network (AppleLink path—Developer Support:Developer Services:Apple Information Resources:Developer Program Information:It Shipped! @ Program). Or call Todd Luchette at (408) 974-1241 (voice) or (408) 974-3770 (fax).

Once you've completed the application, send it to Engineering Support, Apple Computer, Inc., 20525 Mariani Ave., M/S 42-ES, Cupertino, CA 95014, Attn: It Shipped! Program. Or send it by AppleLink to IT.SHIPPED.

The following products shipped in December 1992.

Publisher

Product (version)

UNITEDSTATES

Autologic, Inc.

APS-SoftPIP

Chancery Software Ltd.

Mac School - Student
Information Systems (3.2)

Changeling Software, Inc.

Pax Imperia (1.0)

Coconut Info

Mac'sInvoice (1.0)

Cordillera Press, Inc.

The October Athlete (1.0)

Follett Software Company

MacSearch Plus Station (1.0)

FTG Data Systems

MACLightPen (1.0)

Heizer Software

CompileIt! (2.5)

Image Club Graphics, Inc.

ArtRoom (5.2)

Immedia Telematics Inc.

QuickMail WAN
for QuickMail (1.1)

Insignia Solutions

Rapidtrack (1.0)

Interactive Records

So You Want To Be a Rock and
Roll Star (1.1)

ISIS International, Inc.

ISIS Notes (1.0)

**Keech Computer Software
Language Systems Corp.**

Lupin Software

Nisus Software, Inc.

Onyx Computing, Inc.

Ray Sauers Associates, Inc.

SanSoft

Seven Hills Software

Sunseed

Timebox Inc.

Type Solutions, Inc.

VideoFusion Ltd.

Vineyard Software

MacDatabus (1.1.1)

Debugging Toolkit (3.0)

SoftPolish (1.1)

Let'er RIP! (1.1)

QUED/M (2.5)

Tree (1.0)

DragInstall (1.5)

Couch Potato Handbook (1.1)

DiscMinder (1.1)

Ham Radio Station

Logbook (1.2)

Drive Cleaner (1.0)

Heaven & Earth (1.0)

SpaceTime (1.0)

Incubator Pro (2.0)

VideoFusion (1.0)

CompService for Mac (3.0)

FreePan Color Curve

Library (1.0)

Inventory M&R for Mac (3.0)

MedService for Mac (3.0)

ServiceCommand

for Mac (3.0)

ZIMBABWE

MediaTechnology (Pvt) Ltd

Svinga, a multimedia journey
through Zimbabwe (1.0)

Rules for Breaking the Rules

by Peter Bickford

When last we checked in with our friend Bob, he was waiting tables in North Hollywood, where he earned the wrath of customers with his constant interruptions (*Apple Direct*, November/ December 1992). After being fired from job after job, he eventually decided a career change was in order. Thus it was that Bob the exwaiter founded BobCo, “Creators of fine software for today’s active waitperson.”

Finally, it seemed, Bob had found his calling. The successful initial release of BobWare 1.0 led to the even more successful BobWare 1.0.1, BobWare 1.1.1, and, inevitably, BobWare II. Bob was not one to rest on his laurels, and had already begun work on the eagerly anticipated BobWare Professional. This was to be Bob’s defining work, and he knew it had to be something truly special if he was to fight off the encroaching competition of MadgeSoft with its MadgeVision XL line of waitperson solutions.

Bob thought about it for a while and eventually decided that the real problem in creating such a revolutionary piece of software was that the Macintosh interface was not sufficiently attuned to the needs of his clientele. For one thing, the question mark icon in the System 7 Help menu would really be much more appropriate if it were replaced by a waitperson icon (after all, what’s more helpful than a waiter?).

And another thing: Wasn’t it ridiculous that the standard Macintosh interface used “windows” to show information? In BobWare Professional, he thought it would be much more natural if all information was conveyed by two new user-interface elements: the BobChalkboard for special information and updates and the BobMenu for regular information. As an added bonus, users could select information from a BobMenu window merely by pointing to it with a “hand” cursor.

I’ll spare you the details of what happened next, the customers who refused to upgrade, the tortured tech support calls of those who did. Let’s just say that, in the end, BobWare Professional was MadgeSoft’s best weapon in gaining market share.

GOING BEYOND THE GUIDELINES

Is all this just another story of the downfall of someone whose interface didn't follow the guidelines? To some degree, yes. But the point I'd like to make is that if you're going to break the rules, you've got to know how to get away with it.

(Before going any further, I just wanted to say that what follows does not have any official Apple "seal of approval." Like all my writing, it's my own opinion.)

That being said, let the heresy begin: There are times when you need to go beyond Apple's human interface guidelines. In fact, sometimes I think it's even allright to create entirely new interface elements. I'm about to hit you with a long list of conditions and cautions, but the basic truth is that the Macintosh human interface was not finished in 1984. Or when Apple introduced pop-up menus. Or movable-modeless dialog boxes. Or even those funny animated triangle things in System 7. The fact is, the Macintosh human interface, like the Macintosh itself, continues to change to meet the needs of its users.

On the other hand, try not to blame people when they break into a cold sweat at the idea of programmers rolling their own interface items. Creating new interface elements is dangerous stuff. If done badly, or for the wrong reasons, it's a recipe for interface anarchy, user confusion, and lost sales.

It's in all our best interests to keep the Macintosh user experience intuitive, friendly, and seamless from one application to the next. So, if you feel you need to "break the rules" by going beyond the interface guidelines, it's absolutely, critically important that you go about it in the proper way.

Here are a few rules to consider when bending or breaking the human interface guidelines:

(BREAKING THE) RULE #1

If at All Possible, Use the Standard Interface. Despite what the popular press tends to think, computer programming is a very personal and creative activity. Unfortunately, that makes it very tempting to put your own mark on the interface. Thus we see the creation of double-headed scroll bars, 3-D menus, and, of course, the BobChalkboard.

The problem is that when you move beyond the standard Macintosh interface, you force your users to learn new skills and deal with "one more thing to remember." Furthermore, you're forsaking the advantages of a set of consistent, well-tested, and well-known interface elements. So no matter how great your new interface element is, it starts out with several strikes against it.

Before you incorporate that new design innovation, make sure there isn't a reasonable way to do it with the existing interface elements. Don't even use your new element if you think it's a little better than the more standard alternative; unless you know your new element is a lot better, you're probably better off in the end sticking to the standard interface.

(BREAKING THE) RULE #2

Make It Look Different. Users learn how to use the Macintosh by figuring out what each interface element does, then applying that knowledge again and again, from application to application. For instance, once they know what a checkbox is, they'll expect that checkbox to act the same way, whether it's in MegaWrite Pro or UltraCAD III.

Macintosh users depend on this sort of consistency so much that if you take a standard element, such as a button, and make it look different, they will think of it as a new element, and try their darndest to figure out what it does differently. Failing that, users will make up stories to explain the hidden differences between the two. The real reason—say you just got tired of the standard appearance—might escape them.

You can turn all this to your advantage, however, when you have a new interface element to introduce. Simply make your new element look noticeably different from any existing element in the interface. Since users tend to explore the behaviors of things that look different, they'll notice your new element, learn its behavior, and be able to use that knowledge the next time they see it.

(BREAKING THE) RULE #3

Try To Inherit Behaviors. In some ways, this is the converse of the last rule. While the new element has to look noticeably different in order to be learned, you can also shape their expectations of what the element does by making it look a bit like something they're already familiar with.

For instance, users have certain expectations of what file folders and trash cans do in the noncomputer world. When they see objects that look like file folders or trash cans in the Macintosh world, they expect them to have many of the same behaviors. This is the principle known as "Metaphors from the real world."

But we can also draw "Metaphors from the Macintosh world." If you give your new element a solid outline, users will probably think of it as "buttonlike" and,

therefore, something to click. If you give it a drop-shadow, they'll expect it to act like a pop-up menu. In general, users will expect your new element to behave like the standard element it looks like. Because your users are already familiar with these elements in the Macintosh interface, they'll be more able to guess what your new element does when it uses the same features.

(BREAKING THE) RULE #4

Test New Interface Elements to Death. User-testing is needed for any user-interface element, but quadruply so for new user-interface elements.

Remember, you're exploring uncharted territory here, and it's crucial that your users are able to follow along. Users need to be able to quickly intuit that the interface element is new, what it does, how to use it, and what the limits of its new behavior are. If they can't do this, revise the element and retest. Do this as many times as necessary to make it work.

Creating new interface elements that work is a decidedly tricky business, and merely following the above rules is no guarantee that your new element will work. Take the case of the previously mentioned "funny animated triangle," the triangle that appears next to the names of folders in System 7 when you view the contents of volumes by names, dates, and so forth. The triangle's creators first had to choose from countless alternative appearances, including filled and unfilled circles (used by many outliner programs) and the "latch" (used in the Alarm Clock desk accessory).

Even when they decided on the triangle (which inherited portions of the behaviors from both pop-up and hierarchical menus), the triangle's creators found that users still had difficulty telling whether a folder was expanded or not. Finally, they added a small "turning" animation which made all the difference. It was this testing, revision, and retesting that turned what could have been an interface failure into one of the most popular features of System 7.

'Til next time,

—Doc

The "***" indicates the trade shows/events at which Apple Computer, Inc. is scheduled to exhibit as of press time. This list may be incomplete. If you have information about a show that you want listed here, contact Developer Technical Communications, 20525 Mariani Avenue, M/S 75-3B, Cupertino, CA 95014. For further information check the Events folder on AppleLink (path—3rd Party Connection:Events).

February 24 through 27

**** NABE**

National Association of Bilingual Educators

Houston, TX

Contact: Javier Villalobos

AppleLink: VILLALOBOS1

(408) 862-6426

February 24 through 27

**** NAIS**

National Association of Independent Schools

New York, NY

Contact: Martha Rolley

AppleLink: ROLLEY.M

(408) 862-7663

March 17 through 20

**** CSUN**

International Disability Conference

Los Angeles, CA

Contact: Caren Normandin

AppleLink: NORMANDIN

(408) 974-8583

March 27 through 29

**** ASCD**

Washington, DC

Contact: Glenn Fisher

AppleLink: GFISHER

(408) 974-8505

ASCD is (703) 549-9110

March 30 through April 1

**** Intermedia**

San Jose, CA

Contact: Dave Billmaier

AppleLink: BILLMAIER1

(408) 974-6553

March 31 through April 3

**** NCTM**

National Council of Teachers of Mathematics

Seattle, WA

Contact: Lori Deuchar-Yum

AppleLink: DEUCHAR

(408) 974-8626

NCTM is (703) 620-9840

April 1 through 4

**** NSTA**

National Science Teachers Association

Kansas City, MO

Contact: Kenyon Scott

AppleLink: SCOTT.K

(408) 862-7677

NSTA (202) 328-5800 x31 & 51

April 12 through 15

**** FOSE**

Federal Office Systems Exposition

Washington, DC

Contact: Patty Nation

AppleLink: NATION1
(408) 974-8910

April 12 through 15

**** NCEA**

National Catholic Educators Association

New Orleans, LA

Contact: Martha Rolley

AppleLink: ROLLEY.M

(408) 862-7663

NCEA (202) 337-6232

April 13 through 17

**** TESOL**

Teachers of English to Speakers of Other Languages

Atlanta, GA

Contact: Javier Villalobos

AppleLink: VILLALOBOS1

(408) 862-6426

TESOL (404) 636-9711

April 14 through 16

**** Seybold**

Boston, MA

Contact: Tara Vincent

AppleLink: TARA

(408) 974-4464

April 26 through 30

**** IRA**

International Reading Association

San Antonio, TX

Contact: Pam Anderson

AppleLink: AP.ANDERSON

(408) 974-8587

IRA (302) 731-1057

May 4 through 6

**** DB Expo**

San Francisco, CA

Contact: Russ Havard

AppleLink: HAVARD1

(408) 974-4371

June 5 through 8

**** CES**

Consumer Electronics Show

Chicago, IL

Contact: Dave Billmaier

AppleLink: BILLMAIER1

(408) 974-6553

How We Use AppleLink as a Marketing and Support Tool

*By Liz Brooking,
Radius, Inc.*

As global networks become more pervasive, a new breed of marketing and support tool is evolving: on-line services. To companies that, like ours, need cost-effective customer contact and support alternatives, on-line services offer a way to augment more traditional customer communication efforts. Specifically, we participate in the AppleLink Third-Party Publishing Program.

This program allows developers to publish bulletin boards, called “icons,” on the AppleLink network. Because AppleLink is a crucial tool Apple uses to communicate with its enormous worldwide base of resellers, distributors, third parties, and a variety of customers—currently there are upward of 28,000 U.S. and 10,000 international subscribers— it offers developers a way to more easily reach their own subset of this customer community. Resellers and distributors are the primary customer group of Radius (a graphics systems company), making AppleLink an excellent choice for us.

BENEFITS OF PUBLISHING AN APPLELINK ICON

Because AppleLink reaches our key customers, there are several tangible benefits of publishing an icon on the network:

- *It extends our customer service reach.* The AppleLink icon is a tremendous asset to us because it offers resellers and developers what we previously couldn't

provide—Radius product information 24 hours a day, seven days a week, from virtually anywhere in the world. Instead of forcing customers with questions or problems to rely solely on telephone communication with Radius, we give them access to much of the information they need via the AppleLink network.

Furthermore, sometimes it's faster for customers to find information on AppleLink than to phone us, especially if they need to do so during a peak calling hour of the business day.

Customers also are no longer constrained by the need to reach Radius during our normal business hours; 24-hour access to AppleLink helps overcome the

problems posed by time zones and holiday and weekend schedules, which is especially important for international customers.

While many questions and problems can't be totally addressed via an on-line service—and there's no substitute for direct customer contact—overall, publishing a bulletin board helps give resellers and developers the impression that Radius is there for them all day every day. It therefore improves customer satisfaction, which we all know is worth its weight in gold.

- *It improves technical support.* The AppleLink publishing program makes our technical support effort easier, reduces the manpower needed to solve customer or developer problems, and often reduces related out-of-pocket costs, such as for postage.

For example, a key part of our bulletin board is the Current Radius Software folder, which contains the most current versions of our system software. Often, a customer must install a more recent software version before our service representative can diagnose a problem. Instead of waiting for a postal service to deliver the software, the customer can download the software directly from our bulletin board in minutes. Then our support person's troubleshooting job is easier and quicker. (Sometimes, just having the most recent software version solves the customer's problem.)

Many older Radius products are still in the channel, and resellers can get technical information about them from our bulletin board. For instance, some of our early products (pre-NuBus) designed for use with the Macintosh Plus and SE models require a more complex installation process with which resellers occasionally require assistance. We've therefore posted HyperCard stacks that help guide resellers through the process.

- *It enhances user satisfaction.* Improving the quality and speed of service we give resellers thereby increases the level of service resellers can offer users. If a reseller can solve a customer problem more quickly and easily, everyone wins.

- *The program is cost-effective.* Using an on-line service such as AppleLink is a cost-effective way to distribute information, software, and tools, and in essence it gives your constituents 24-hour service. Because you control the amount of time and resources dedicated to creating and maintaining the bulletin board, you can tailor your efforts to accommodate your pocketbook.

Since there no longer are startup or maintenance fees for participating in this program, the only out-of-pocket costs for us are the usual charges for the connect time needed for posting items to the bulletin board. (If you publish a

read-write area, there is also connect time for retrieving customer inquiries and comments.)

On the average we spend a total of 50 hours of access time per month. Specifically, our customer service area usually spends about 32 hours per month, developer services 8 hours, and marketing approximately 10 hours. However, in our experience most of the cost involved is invested in the manpower needed for publishing the Radius board, rather than in connect time.

In our opinion, the required investment is a small price to pay to give customers increased service and access to Radius. And when you consider the price tag on distributing this information by alternative methods such as brochures, disks, or telemarketing, the cost of AppleLink is inconsequential—and the convenience superior.

SHOULD YOU PUBLISH AN ICON?

Is using an on-line service such as AppleLink right for your company? To answer that question you must first decide whether you could benefit from AppleLink, given your particular circumstances.

Does AppleLink reach an audience that is important to you? Is reaching this audience more effectively an important goal? Are you willing to devote the resources and effort needed to make your board successful? Are you willing to make a firm commitment to this program?

In our case, the answer to each question was “yes.” The audience that AppleLink reaches is very important to us, and we are committed to augmenting our marketing and support efforts for this important group of customers.

However, we chose a more limited level of participation because our resources are limited; we don't take advantage of every capability offered by the program.

For example, we don't currently publish a read-write area, such as a discussion folder. While this activity could be valuable, managing it would consume more time and manpower than we can afford: Someone must be assigned to make sure that customer questions posted to a read-write area are downloaded, forwarded to the appropriate people internally, and answered in a timely fashion. Likewise, to stay within our budget we rarely take advantage of options such as the Third-Party Connection, the Multimedia Forum, or the Publishers' Forum.

However, so far this doesn't seem to have hurt the amount of traffic on our board, and we seem to be on par with similar publishers. For example, in a typical month (such as October 1992) our icon was accessed 4,200 times, 5,300 documents were read, and 1,600 image files were downloaded.

DETERMINING CONTENT

Once you've decided to take the plunge, you must decide what information to publish. Our marketing and marketing communications staff are responsible for establishing this, and they have issued a clear policy about *exactly* what should be posted to our board. Getting agreement to this policy from everyone with authority to post information to your board is critical.

To decide what to publish, we asked ourselves: Who is the audience? What is our overall objective in using an on-line service? What kind of information do we need to communicate to this audience? What information do *they* need? What existing material can we use?

We also took cues from other icons. In fact, I highly recommend this tack to new publishers: Examine the range of information other companies post, and emulate what appears to be successful. In particular, scrutinize competitors' boards and, where appropriate, offer similar information.

Radius' resulting three general content categories are customer service, developer support, and marketing. To organize that information, first we configured the top level of folders under our icon (see Figure 1 below); then we decided what items each folder would contain and solicited agreement from key individuals in each respective area of the company.

There has been minimal work to *create* content because most items are reformatted versions of existing materials such as press releases, data sheets, reports, and so forth.

Examples of our customer service folders are Dealer Training, Current Radius Software, Technical Support, Service, Parts Pricing, and Information folders. Developer information can be found in the Developer Services Folder. The marketing folders include such items as the Domestic SRP, Demonstration Files, Product Information, Reseller Programs, Events, Press Releases, and Marketing Bulletins folders. The New Information folder contains pointers to all new items that are posted on our board.

Once you decide what kinds of items to post, you may want to create a prototype of your board. Visualizing it will help you find mistakes, determine if

your material is organized efficiently from a user's point of view, spot any obvious omissions, and solve any other problems.

Who Has Access? AppleLink allows you to restrict folder access as needed, so you must also determine which AppleLink subscribers will be granted access to each folder. With a few exceptions, most information on our board is available to all AppleLink customers.

Sometimes we post items that only our developers should have access to, so we restrict the use of those folders to developers only. Also, discount information and incentive program details are appropriate for resellers and not developers, so we also restrict access to that information.

There are also some international business considerations that may require you to restrict folder access. For more information, see Mistake #5 in "Five Mistakes to Avoid When Publishing a Bulletin Board" on page 15.

HEAVY TRAFFIC AREAS

While marketing-oriented information is well used by customers, our customer service-oriented folders are the most accessed; customer access of the Current Radius Software folder alone makes up 51 percent of our total monthly usage. The items in this folder ensure that resellers, developers, and users have the most current and compatible Radius software for their products.

We think that part of the reason our customer service folders are used so often is that service technicians may be the people in reseller organizations who use AppleLink the most. Because this kind of information has a more immediate and tangible benefit to these people, it is accessed more often. Service technicians may not see a pressing need to review other kinds of information, so they are more likely to postpone reading items in other folders until something, such as an AppleLink Extra! announcement, calls their attention to them.

Attracting Attention to Information. There are several ways to call attention to the information you post under your icon. The AppleLink Extra! is an excellent way to direct attention to specific areas of the bulletin board. It is a custom "splash" screen AppleLink subscribers see the first time they access the network on any given day. Usually, it refers to a file or folder under your icon and gives the reader the path to the file.

These screens use text and simple graphics, but there are size and content limitations. (For example, you can't mention a product's suggested retail price.) An Extra! costs \$500 for a half screen (although you can receive a discount for buying more than one at a time). Since only one or two are published each day, you should reserve your space well in advance.

Using an AppleLink Extra! announcement definitely increases the readership of items that we feature in it. For example, we use it to augment new product announcements by highlighting either the related press release or data sheet. We also created an AppleLink Extra! to inform resellers about our board, in addition to sending them a notification letter and putting a notice in our monthly reseller newsletter.

Whenever we publish an Extra! we get a spike of approximately several hundred accesses per day, even in a part of the bulletin board that normally is accessed less often.

Another effective way to draw attention to your icon is to publish AppleLink path information in all your communications vehicles (such as channel announcements). These "pointers" constantly remind resellers that they can get additional information from your bulletin board.

BOARD MAINTENANCE

How you manage your board will depend on the level of support and resources you can devote to it and your priorities. Because AppleLink is an important communications component of our customer service, developer service, and marketing functions, our icon is managed by three people, one person from each function. Those people, called sysops, are responsible for maintaining their respective areas of the bulletin board. While no single person is devoted full-time to this activity, AppleLink responsibilities are a well-defined, important priority in each sysop's job description.

Our sysops are responsible for collecting information to be posted; formatting and disinfecting documents; posting documents, copyright, and patent information; and purging outdated items. Their most time-consuming tasks are disinfecting files and establishing path names.

Along the way we've learned a few "do's and don'ts" about maintaining our board. While some degree of personal preference is involved in how you manage this activity, we all share a lot of the same challenges. For more

information, see “Five Mistakes to Avoid When Publishing A Bulletin Board” below.

BEYOND RESELLERS

AppleLink is already a valuable marketing and support alternative for reaching resellers and developers. However, Apple recently made AppleLink available to everyone; as users begin to subscribe, we’ll be able to greatly extend our use of this tool. Reaching users directly will help ensure that they get an accurate and consistent message from Radius—and AppleLink will take on an even greater significance in our marketing mix. ◆

Liz Brooking is the comarketing manager and has overall responsibility for the AppleLink icon for Radius, a graphics systems company located in San Jose, California, whose major markets include color publishing and digital video.

For more information about the Apple Third-Party Publishing Program or publishing on the Applelink CD (the information resource product that offers users regular editions of valuable product and support information from Apple and third parties for a single annual fee), call the Publishers’ Hotline at (408) 974-1300, send an AppleLink message to THIRD.PTY, or contact the Apple Online Services manager in your local Apple office.

You may also refer to “New AppleLink Program” in the June 1992 issue of *Apple Direct*.

Five Mistakes to Avoid When Publishing a Bulletin Board

Here are some important mistakes we’ve learned to avoid during our two years as an AppleLink information publisher.

Mistake #1: *Posting a lot of disk files.* Our experience suggests that you shouldn’t use disk files (files created by applications other than AppleLink) if you can avoid it. The user must download and expand them—a cumbersome

and time-consuming task at best. To avoid this we prefer posting AppleLink-format text files whenever possible.

However, this requires that you reformat disk files into the AppleLink format. As you reformat files, don't forget that AppleLink doesn't accept tabs, margins, many special characters, and type styles (bold, italics, underlines, and the like). And because readers don't get the usual visual clues that break up text in longer documents (such as boldface headlines), they can easily become lost and your information may lose its impact. Make sure that it's obvious how the text is broken up (by all-cap headlines, subheads, rows of asterisks, and so forth).

A similar mistake is using image files indiscriminately. Although some developers like to use the image file format, we tend to avoid it because it can be cumbersome for users. When I use electronic mail, enclosures or addenda such as disk or image files are usually the last things I want to open because of the effort required. If it's not clear that I need the information in the file, I may put off opening it or may totally ignore it. My experience is that bulletin board readers are no different.

However, if we *must* use such files, we try to give as much information about their content as possible in the cover memo, so that the reader doesn't necessarily have to download the file to understand exactly what it contains.

We learned our lesson the hard way. For example, our Marketing Bulletins folder contains a lot of information that positions our products against the competition; it previously included a variety of graphics and tutorial information in image file formats. While the information was very valuable, customers didn't access it because those files were clumsy and time-consuming to download. Because it would require expending more resources than are available to reformat this information into AppleLink documents, we now put less emphasis on that kind of information on the bulletin board (we instead mail it to customers) and focus on folders that customers access more often.

Mistake #2: *Ignoring board usage patterns.* As an information publisher, you receive usage reports for your icon from the Apple Online Services (AOS) group. Review these carefully to see what is accessed frequently and what isn't, and use this data to tailor your efforts. For instance, if a particular folder isn't often used, try to understand why and use that information to modify or

eliminate it. Or if a particular section of your board is heavily used, you may wish to increase the level of resources you allocate to managing it.

Mistake #3: *Letting your information become outdated.* It's very important to keep your content current, and to constantly assess whether the information in each folder is still of value. You must keep readers' expectations up and give them a reason to browse your board frequently.

If you do nothing with your board for a long period, such as several months, your inactivity will become clear to customers and they'll be less likely to bother accessing your board at all. But if you post information regularly, readers will notice that there's always something new for them and will tend to access your board more often. However, don't post items that aren't useful or germane because they'll notice that too, and it will turn them off.

The publishing program gives you the option to include a New Information folder in your top level. I highly recommend it. When you post new files to the board, the AppleLink network automatically updates your New Information folder with a reference to the new postings. (The system also recognizes any access restrictions you may have put on the folders that new files are posted to.)

This folder is a real plus for users. They don't have to review each folder or subfolder within your icon to find newly posted information, so it reduces their connect time and saves them money.

Mistake #4: *Underestimating the commitment needed to maintain your icon.*

Don't underestimate the resources and commitment needed to make AppleLink a useful communications tool, particularly if you publish a discussion board. If you don't regularly download user questions and comments and respond to them in a timely fashion, users may become annoyed, which undermines the effectiveness of your board.

Mistake #5: *Thinking locally, acting locally.* If your audience is global, be sensitive to international concerns regarding your bulletin board's content. Some of the issues you may encounter include those centered around local advertising practices; for example, in some countries comparison advertising is illegal, so before posting items you should review them for that type of content.

It's equally important to be sensitive to international pricing issues; a product's price typically varies from country to country. Also, if your marketing programs vary between countries, post your material in audience-restricted folders to prevent confusing or offending resellers who are excluded from these programs.

The ideal would be to create localized folders for particular countries, although that probably requires increasing the resources you allocate to your bulletin board. ♦

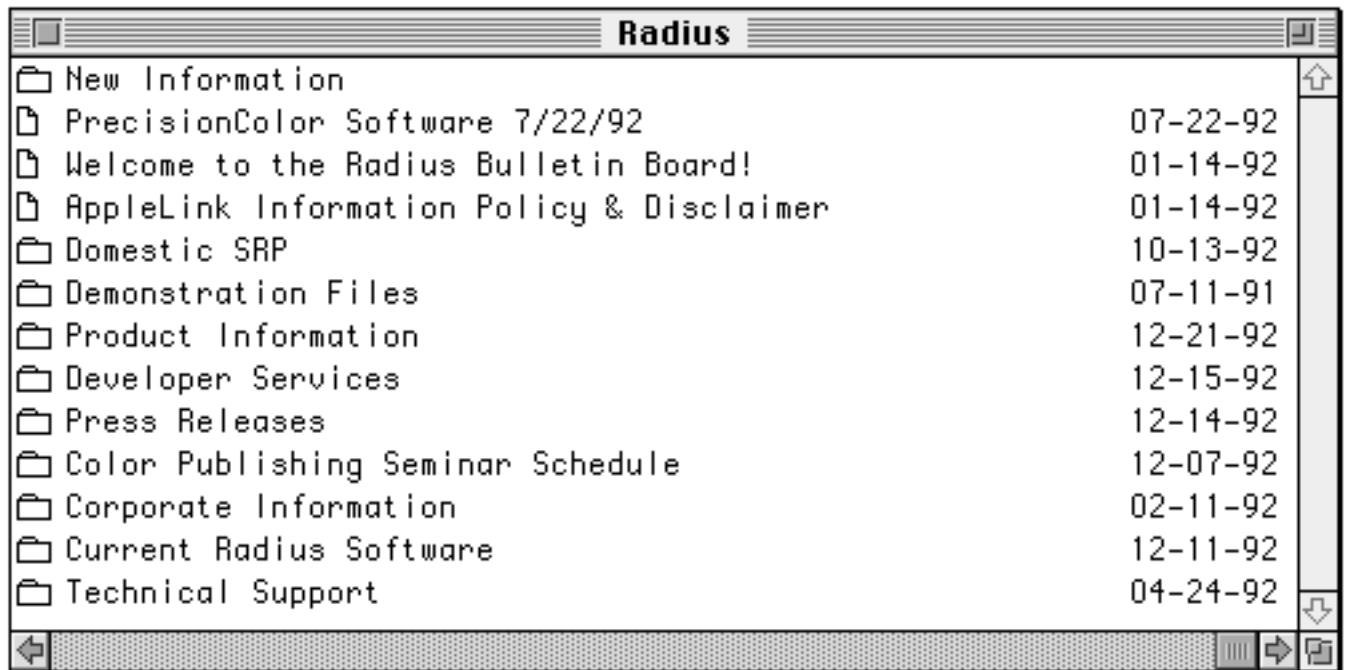


Figure 1: Top-level folders on the Radius bulletin board

The *Right Way to Order develop*

The December 1992 issue of *develop*, the Apple Technical Journal, contains incorrect ordering information for international subscribers and those ordering by fax. If you reside outside the United States and you'd like to receive the printed version of *develop*, the phone number to use is (815) 734-1116. The right fax number to use, wherever you live, is (815) 734-1127. If you live in the United States, the number to call remains (800) 877-5548. You may also order *develop* over AppleLink (DEV.SUBS) or through APDA (for APDA ordering information, see page 11). ◆

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