

With the release of a new version of the operating system on Macintosh\*\* computers, Apple Computer has thrown the PostScript\*\* world into a frenzy of activity. You may be asking yourself what effect the release of System 7 will have on the graphic arts industry. We at Linotype-Hell hope that this document will help you understand the implications of System 7.

Linotype-Hell fully supports System 7. We will do our utmost to solve our customers' problems related to the operating system. At the time this document is being written (January of 1992), there are still software applications which are not fully System 7 compatible.<sup>1</sup> We can only wait for updates by those particular vendors. So while we do support the use of System 7, depending on the software applications that you use, you may prefer to remain with System 6 in a production environment until these upgrades are made available. For the Linotype-Hell Utility, version 5.0 is for use with System 7.

<sup>1</sup>Compatibility and capability have been used to describe applications running under System 7. System 7 compatible means that the application will run under System 7, but may not take advantage of all of the improvements of System 7. System 7 capable means that the application will take advantage of those improvements.

The intent of this document is not to give a complete overview of System 7, but instead to look at this technology development from the point of view of those who will be using it to output on Linotronic\* imagesetters. For more on System 7, you should consider buying *The Little System 7 Book* by Kay Yarborough Nelson. It is available from Peachpit Press (415-527-8555).

## What is System 7?

System 7 is a new version of the operating system of Macintosh computers. An operating system of a computer provides the interface between the hardware in your computer and the software program that you are using. The success of the Macintosh has been due in large part to the friendliness of its user interface (and the operating system plays a large role in this.) There have been many versions of the Macintosh operating system. A new Apple Macintosh operating system is often released to take advantage of the capabilities of a recently introduced Macintosh computer.

Those of you who have worked with Macintosh computers for the past few years will be familiar with these widely distributed versions of the Macintosh system software: System 3.2, System 4.1, System 6.0.x<sup>2</sup> and System 7.

<sup>2</sup>The use of an 'x' as part of the system version number implies that there may be several versions that share the same first numbers, for example: System 6.0.2 and 6.0.3.

To find out which system you are using, use this procedure: when you boot up your Macintosh (before you open any applications) select the Apple icon and choose 'About the Finder'. The resulting box reveals both the System and Finder versions. (The Finder is an application used by the operating system to create the desktop, i.e., the graphical representation of your files and applications that you see when you first turn on your Macintosh.)

## Version numbers

One of the most confusing parts about the Macintosh is the series of version numbers for things that relate to the operating system. For example, System, Finder, LaserWriter\*\*, and Laser Prep all have version numbers. Of the many

System and Finder versions, some are well-suited to particular Macintosh computers. You should check your Apple documentation for the System and Finder versions that are suited to your Macintosh. Although the System and Finder won't have the same number, these items are paired and should not be changed after installation. Similarly, LaserWriter\*\* and Laser Prep\*\* are paired, but these two items do share a common version number.<sup>3</sup>

<sup>3</sup>LaserWriter is a file that allows you to select a LaserWriter or imagesetter with the Chooser. It is included in the system folder in System 6.0x, but is kept in a separate folder, called the extensions folder, under System 7. Laser Prep is PostScript dictionary, i.e., a set of common PostScript commands used by the printer driver.

## System 7 features

One reason for the excitement about System 7 is that it greatly improves the way in which files are handled and accessed. Of particular interest to image-setter users are the following:

- **Multitasking** will allow you to have more than one program open at the same time (if you have enough memory). For example, you could switch back and forth between a page layout and an illustration program without having to close either one. Although multitasking won't be new to those of you who have been using MultiFinder, it will be a permanent part of System 7 (i.e., you won't be able to turn it off).
- **Virtual memory and 32 bit addressing** allow larger files to be handled more efficiently. They also can compliment multitasking by allowing more applications to be kept open. Virtual memory helps when you want to use a lot of programs at once, or to work on an extremely large file. It makes it seem like you have a lot more RAM (Random Access Memory) than you actually do. While this can be useful for many applications, in a publishing environment where large files are frequently used, nothing beats having extra RAM. You can turn virtual memory on and off under System 7, as long as you have a Macintosh that allows it.<sup>4</sup>

<sup>4</sup>Virtual memory will not run on all Macintoshes. For a full list of the System 7 capabilities of different Macintosh computers, refer to the section on the following page.

- A new feature called **Publish and Subscribe** will allow documents to be updated across a network. This allows you to place an illustration, for example, into a page layout program and have it automatically updated when changes are made to the file.

Other areas that have changed include:

- The 'look and feel' of the Finder have been improved, primarily through the use of expanded and collapsed folders which allow you to search for files without having to open a lot of windows.
- Many ease of use things, including: finder shortcuts, balloon help, real find, improved file labeling, and aliases (duplicate icons which allow you to easily access files or applications).
- Font/DA Mover\*\* isn't needed to install desk accessories, sounds, or fonts.
- Much improved networking and file sharing facilities.

## 24 and 32 bit addressing

For a computer, the number of bits that are addressable refers to the area available for the computer to do calculations. Before System 7, the Macintosh operating system could only address 24 bits. Mathematically, this meant that about 16 megabytes (MB) were addressable. (16 MB is the same as 2 to the 24th bits which equals 16,777,216 bits.) And because of various system requirements, only about 8 MB of RAM (Random Access Memory) were supported.

Some software programs, like Photoshop\*\* and ColorStudio\*\*, are able to expand the amount of RAM through the use of virtual memory. But this is done without the help of the operating system.

With the 32 bit addressing in System 7, 4 gigabytes (GB) are addressable. (4 GB is the same as 2 to the 32nd bits which equals 4,294,967,296 bits.) The result is that the maximum amount of RAM available to the user's applications is much greater. The actual limit now depends on the number of RAM slots in the computer motherboard, the amount of RAM that can fit into those slots, and an upper limit of 4 GB. At present, it would be extremely expensive, but possible, to fit a total of 256 MB into a Macintosh Quadra\*\* 900 motherboard.<sup>5</sup>

<sup>5</sup>A Macintosh Quadra 900 has sixteen RAM slots. To fill each of these slots with a 16 MB SIMM (single in-line memory module), when each SIMM could cost as much as \$1,500, would mean a total investment of \$24,000. It is not clear at this point if a Quadra with so many SIMMs would be technically feasible.

Not every Macintosh computer can do 32 bit processing. Those that can are referred to as '32 bit clean'. This means that the ROM (Read Only Memory) chips in that particular Macintosh computer allow 32 bit addressing. Macintosh computers that are 32 bit clean include the IIci, IIsi and the IIfx. Applications can also be '32 bit clean' if they run in a 32 bit environment. However you should be aware that while some applications may be able to run in a 32 bit environment, they still may not take full advantage of System 7's ability to do 32 bit processing.

### The disk cache

System 7 gives you control over the size of the disk cache.<sup>6</sup> Because the computer can access data faster from RAM than from a hard disk, this can help improve overall speed. While having the ability to control the size of the disk cache is helpful, you should be careful about making changes because the larger you make it, the less space the computer has to actually run programs in. Software vendors will supply recommendations of disk cache size.

<sup>6</sup>A cache is an area in a computer that is used to store frequently used information. One type of cache is a font cache. A font cache is the portion of the RAM of a RIP (Raster Image Processor) that is used to store rasterized font data so that it doesn't have to be constantly regenerated. A disk cache refers to the portion of RAM that is used to hold frequently used information from a hard disk.

### System 7 capability

Not all Macintosh computers can take advantage of all that System 7 has to offer. For others, the ability to take advantage of System 7 may depend on upgrades to the existing equipment.

- A** *Runs System 7.* System 7 will run on a Macintosh with a minimum of 2 MB of RAM, although better performance is achieved with 4 MB.
- B** *Virtual memory capable.* Requires a 68030 processor which the SE/30, IIx, IIfx, IIcx, IIsi and the IIci all have. Will also run on a Mac II if it has a 68851 Paged Memory Management Unit (PMMU).
- C** *32 bit clean.* Will support 32 bit addressing when 8 MB of RAM are installed.

| Macintosh version    | Processor | System 7 capability     |
|----------------------|-----------|-------------------------|
| Macintosh (128K)     | 68000     | A - with upgrade kit    |
| Macintosh 512K       | 68000     | A - with upgrade kit    |
| Macintosh 512K Enh.  | 68000     | A - with upgrade kit    |
| Macintosh Classic    | 68000     | A                       |
| Macintosh Plus       | 68000     | A                       |
| Macintosh SE         | 68000     | A                       |
| Macintosh Classic II | 68030     | A - B - C               |
| Macintosh SE/30      | 68030     | A - B -                 |
| Macintosh II         | 68020     | A - B - (requires PMMU) |
| Macintosh IIx        | 68030     | A - B -                 |
| Macintosh IIcx       | 68030     | A - B -                 |
| Macintosh IIci       | 68030     | A - B - C               |
| Macintosh IIfx       | 68030     | A - B - C               |
| Macintosh IIsi       | 68030     | A - B - C               |
| Macintosh LC         | 68020     | A                       |
| Macintosh Quadra 700 | 68040     | A - B - C               |
| Macintosh Quadra 900 | 68040     | A - B - C               |

To take full advantage of System 7 you may need to upgrade your existing equipment. You will have to determine if the advantages of System 7 outweigh the costs.

## Application list

There are several ways to find out if your applications will work with System 7. Once you have bought System 7 you can use Apple's Compatibility Checker to review your system for incompatible applications. Otherwise you will simply have to check with your software vendor or keep an eye on industry publications. You may also find that though an application is compatible, it will not take advantage of all the features of System 7 quite yet. For example, QuarkXPress\*\* 3.0 is minimally compatible with System 7, but won't support Publish and Subscribe until version 3.1.

## Printing issues

Many people are interested in knowing if it will be difficult to print when some Macintoshes on a network are using System 6.0.x and some are using System 7. The key issue is the printer driver. As long as all the Macintoshes on the network are using the System 7 printer drivers, then there should be no problem. Using more than one printer driver (i.e., from different workstations to different printers) will cause the printer to reinitialize before printing.

Apple supplies a way to install System 7 LaserWriter drivers on a System 6.0 machine. An installer entitled 'Printer Update' is on the System 7 printing disk. (Refer to Apple documentation for more information. Apple discourages 'drag installing' of printer drivers.) Under System 7, the LaserWriter driver is in the extensions folder rather than the system folder. See box below for a list of existing printer drivers.

| Driver #    | Description   |
|-------------|---|
| 5.2         | Widely distributed version, B&W PostScript, will not run on RIP 30 or RIP 40. |
| 6.0.1/6.0.2 | Current pre-System 7 version, Color PostScript                                |
| 7.0         | System 7 version, but can be used with earlier versions.                      |

## Recommendations

The best way to start with System 7 is a step-by-step approach. Install System 7 on a single workstation. This is possible even on a network as long as you work with the correct printer driver. As you gain familiarity with System 7 consider expanding to include other workstations. As graphic arts software applications become completely compatible with System 7, Linotype-Hell will encourage the full use of System 7 in a production environment.

## New developments

Keeping up with new System 7 developments is a job in itself. If you would prefer that someone else sort through the reams of articles, press releases and announcements for late-breaking news about System 7, you might be interested in a newsletter called The Mac Software Monitor. The Mac Software Monitor is published by the Mac Software Registry (914-961-8743) and can be had for a subscription fee of \$49 (9 issues per year).

## Comments

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