New Technical Notes

Macintosh

®

OV 21 - System 7.5
Overview

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This Technical Note discusses System 7.5.

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Introduction

This tech note provides the latest information on the components of the System 7.5 System Software release. System 7.5 is a Reference System Software release, incorporating System Update 3.0, as well as other enhancements and updates to System software, several Toolbox managers, and other features. System 7.5 provides a common code base for the System and Finder for both Macintosh 680x0 and PowerPC computers System Reference releases. Because of the scope of System 7.5, this document provides a simplified listing of the contents of System 7.5, with pointers to other sources of information.

AppleScript 1.1 w/ Scriptable Finder

System 7.5 includes the Scriptable Finder, which permits users to automate system tasks with their scripts. Several sample automated tasks are included in the "Automated Tasks" and "More Automated Tasks" folders, together with several new 'osax's.
For Further Reference:
- AppleScript which is documented in: "AppleScript Software Development Toolkit," on the MacOS SDK CD-ROM
- *Inside Macintosh: Interapplication Communication*

- "AppleScript, an Elemental Technology--Why Using It Is No Mystery," Apple Directions, July 93, p. 17
- Apple Events/AppleScript Programming Tutorial on the MacOS SDK CD-ROM

Apple Guide

Apple Guide is Apple's electronic assistant that guides users through procedures one step at a time. You can create Apple Guide files for your applications using the Guide Maker authoring tool; Apple Guide also works with AppleScript to create Guide scripts.
For Further Reference:
- A videotape was prepared for the 1993 World Wide Developers' Conference titled "Agents and Apple Help" (tape #64). To order this tape (or any other tape of the '93 WWDC), contact GT Recording at: 1-800-878-2737 (US only), fax 206-782-3515, or on AppleLink at GTRECORDING.
- The Apple Guide SDK is on the Tool Chest Developer CD, starting in November of 1994.
- *Apple Guide Complete: Designing and Developing Onscreen Assistance*, ISBN 0-201-98598-5.

Display Manager

The Display Manager allows users to dynamically change the arrangement and display modes of the monitors attached to their Macintosh computers. The Display Manager is documented in *Inside Macintosh: Advanced Color Imaging* in the Display Manager chapter. Preliminary copies of this documentation are on the developer CD.

Drag Manager 1.1

Macintosh Drag and Drop permits users to select a block of data and drag it to another location, either on the Desktop or in a file, even in other applications. Macintosh Drag and Drop is integrated into the System 7.5 System file.
For Further Reference:
- "Drag and Drop--Anywhere, Anything," Apple Directions, Nov. 93, p. 9
- "Drag and Drop From the Finder," in the Dec. 93 issue of develop
- Macintosh Drag and Drop Developer's Kit on the MacOS SDK CD-ROM

Control Strip API

The Control Strip originally introduced in the PowerBook 540/520 series has been extended to all Macintosh PowerBook computers.
- Tech Note OS 06 - Control Strip Modules

Power Manager API

The Power Manager gives Macintosh PowerBook users additional control over the power management settings that currently are available in the PowerBook control panel. The application programming interface (API) is documented in the following documents in the Power Manager folder:
- New Power Manager API document, currently in the PowerBook 540/520 Developer Note on the Developer CD.
- Power Manager Dispatch and header file

PowerPC

System 7.5 supports Macintosh computers, whether they use a Motorola 680x0 processor or a PowerPC processor. System 7.5 includes additional PowerPC native interfaces and software, including the Drag Manager, Thread Manager, Macintosh Easy Open, PowerTalk, and QuickDraw GX.

For Further Information:
- "Making the Leap to PowerPC," develop, issue 16 (December 1993).
- "Standalone Code on the PowerPC," develop, issue 17 (March 1994)
- "Debugging on PowerPC," develop, issue 17 (March 1994)
- Also consider the Developer University Boot Camp, a four-day workshop for developers wanting to learn how to port their 680x0 code to Power PC. For more information, contact Developer University by phone at 408-974-4897 or fax at 408-974-0544, or by AppleLink at DEVUNIV.

QuickDraw GX

QuickDraw GX implements more intuitive printing and advanced text and graphic support. QuickDraw GX also provides for "portable digital documents" (PDDs) that do not require the presence of the creating application in order to open the file.

For Further Reference:
- "Tracking QuickDraw GX Messages," develop, issue 17 (March 1994)
- "Rethinking Your Applications for QuickDraw GX," Apple Directions, Oct. 93, p. 9
- "Getting Started With QuickDraw GX," develop, Sept. 93, p. 6
- "Developing QuickDraw GX Printing Extensions," develop, Sept. 93, p. 34
- "QuickDraw GX for PostScript Programmers," develop, Sept. 93, p. 51
- "What is QDGX savvy? PDD," "QDGX Whitepaper PDD," "QDGX Document Portability PDD," and other documents on the Aug. 1993 Developer CD, path name Dev.CD Aug. 93:What's New?:QuickDraw(TM) GX 1.0b1:Ideas, Opportunities, and Info

All of the Inside Macintosh: QuickDraw GX books are available in printed form. Here is a list of the Inside Macintosh: QuickDraw GX books:

- Inside Macintosh: QuickDraw GX Graphics
- Inside Macintosh: QuickDraw GX Objects
- Inside Macintosh: QuickDraw GX Printer Drivers & Extensions
- Inside Macintosh: QuickDraw GX Printing
- Inside Macintosh: QuickDraw GX Typography
- Inside Macintosh: QuickDraw GX Printing
- Inside Macintosh: QuickDraw GX Environment & Utilities
- Inside Macintosh: QuickDraw GX Programmer's Overview

Telephone Manager

The Telephone Manager is part of the Macintosh Telephony Architecture (MTA), which provides a framework for the integration of personal computers and telephones.

For Further Information:
- "Apple Turns Pro," Apple Directions, Nov. 93, p. 1
- Macintosh Developer Note #5: Macintosh Quadra 840AV and Centris 660AV Computers, on the developer CD
- Telephone Manager Developer's Kit, on the MacOS SDK CD-ROM. You need the documentation only if you want to create screen-based telephony applications or programmed telephony applications.

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- "Telephony Apple Events Suite," located on the Dec., 1993 Developer CD.
- Apple Events/AppleScript Programming Tutorial on the MacOS SDK CD-ROM

Thread Manager 2.0

The Thread Manager is a System 7 extension that allows applications to make use of multithreading on Macintosh computers. Thread Manager 2.0 provides support for PowerPC. The Thread Manager is integrated into System 7.5's System file.
For Further Reference:
- "Concurrent Programming With the Thread Manager" develop, issue 17, March, 1994.
- Thread Manager SDK on the MacOS SDK CD-ROM.

Installer 4.0.3

The Installer permits application developers to write scripts that allow users to easily install their applications. An Installer script is written using the MPW (Macintosh Programmer's Workshop) Rez language, and compiled using the MPW Rez tool. The Installer 4.0.3 SDK is included on the developer CD, or on the MacOS SDK CD-ROM.

SCSI Manager 4.3

SCSI Manager 4.3 provides asynchronous SCSI to all Quadra and Centris systems for the first time. In addition to the capabilities of the former SCSI Manager, the SCSI Manager 4.3 additionally:
- supports major SCSI-2 features such as disconnect and reconnect;
- supports services such as fully asynchronous SCSI I/O;
- provides a more hardware-independent API that minimizes the SCSI-specific tasks that a device driver must perform;
- provides full utilization of whatever SCSI hardware is available;
- supports existing SCSI device drivers with minimum or no modifications.

Please read the chapter "SCSI Manager 4.3" in *Inside Macintosh: Devices*. On a Power Macintosh 6100, 7100, 8100, or Quadra 840AV/660AV, the SCSI Manager 4.3 extension is not necessary. On these machines, SCSI Manager 4.3 is in ROM, and the bug fixes to SCSI Manager 4.3 are in the System file.

File System Extensions

File System Extensions is a set of patches to the Finder and HFS which raises the current maximum volume size of 2 GB to 4 GB by treating volume sizes as unsigned values. It affects all Macintosh systems.
• The exact upper limit of a volume's size is 4063 MB. This is due to the fact that the allocation block size must be a multiple of 512 bytes, and is treated as an unsigned short in HFS. (It's stored as a long, and documented as a long, but actually treated as an unsigned short.) This means that the maximum allocation block size is $FE00. The maximum number of allocation blocks is $FFFF. Multiply these together to get 4063 MB.
• The File Manager's routines to extend and truncate files had math problems and would fail if the physical end-of-file was close to the 2 GB file size limit - the math problems were fixed. The bug wasn't seen under System 7.1.x and earlier systems because volumes were always less than 2 GB and files could never get large enough to show the bug because of the disk space used by the Catalog and Extents Overflow files.
• The PBHGetVInfo call was changed to pin the number of allocation blocks and free allocation blocks reported. For example, if the allocation block size is 0xfe00 (the largest possible under System 7.5), the total number of allocation blocks and number of free allocation

blocks is pinned to 0x8102. This change was made because a significant number of programs use signed math to determine the volume size and free space and they didn't work if the real values were returned. The volume's Volume Control Block (VCB) still contains the real number so code that needs the real value can still get to it. See the DTS sample code MoreFiles for a routine that shows how to access the VCB to get the actual number of allocation blocks.
• The Finder's code that calculates volume size and free space was patched to use unsigned math.
• The gestaltFSAttr Gestalt selector has a new bit defined to indicate when the 4 gigabyte changes have been made, gestaltFSSupports4GBVols. Here's a complete list of the gestaltFSAttr bits that are currently defined. Not all are in use at this time (i.e., gestaltFSSupports2TBVols).

```
gestaltFSAttr = 'fs ',           /* file system attributes */
gestaltFullExtFSDispatching = 0, /* all HFSDispatch selectors are passed
                                    through to file systems */
gestaltHasFSSpecCalls = 1,       /* File Manager has FSSpec calls */
gestaltHasFileSystemManager = 2, /* has the File System Manager */
gestaltFSMDoesDynamicLoad = 3,   /* File System Manager supports dynamic
                                    loading */
gestaltFSSupports4GBVols = 4,    /* file system supports 4 gigabyte volumes */
gestaltFSSupports2TBVols = 5,    /* file system supports 2 terabyte volumes */
gestaltHasExtendedDiskInit = 6,  /* has extended Disk Initialization calls */
```

If a greater than 2 gigabyte volume is mounted under System 6, System 7.0.x, or System 7.1.x, nothing bad should happen. Some programs, including the Finder, will not work correctly because of their signed math problems and files that are close to the 2 gigabyte file size limit may not be usable.

The following hints are recommended to writers of device drivers
• Make sure your disk driver always uses ioPosOffset as a unsigned long value. This allows access to 4GB offsets. The File Manager will never use negative offsets.
• When allowing a user to partition a volume 2 gigabytes or larger, put up a informational dialog to make sure they are aware that the volume should be used only with System 7.5 or later.
• Your driver should set the dNeedTime bit in the drvrFlags. The first time your driver receives an accRun Control request, it should call gestalt with the gestaltFSAttr selector and check the gestaltFSSupports4GBVols bit. If 4 gigabyte volumes are not supported, then you should use the Notification Manager to let the user know that this disk should not be used with systems earlier than System 7.5.

Note: Apple's driver and Apple HD Setup do not implement the second and third suggestions above.

System Update 3.0 bug fixes and enhancements

System Update 3.0 is a collection of bug fixes and enhancements delivered as part of the System file. Under System 7.5, it is no longer a separate file. Technical Note "OS 05 - System Update 3.0" describes these bug fixes and enhancements.

SimpleText

The application known as TeachText has been greatly enhanced and renamed SimpleText; it is the integration of many changes made by various engineering groups at Apple.
Integrating existing behavior means that not all behavior has been modified; also, despite some significant improvements SimpleText remains considerably less than a full-fledged word

processor. Its footprint is now 25K smaller, although the recommended RAM size is now 512K.

SimpleText is designed to serve as the standard version of TeachText for users of System 7.5 and beyond.

SimpleText/TeachText Changes
Note that some changes were implemented prior to the name change to SimpleText. With these changes, SimpleText now:

- displays a warning upon opening a file that contains PostScript®, warning you that it may not display properly because of this;
- is integrated with the Sound Manager and Speech Manager.
- has a Print One option (like DocViewer) with or without QuickDraw GX installed;
- supports inline input for Kanji systems when the Text Services Manager text edit extension is installed.

SimpleText also includes the following changes for the System 7.5 release:

- styled text support (multiple font/style/size);
- multiple document support;
- support for QuickTime movies;
- reduced the disk size of SimpleText by 25K;
- support for Text to Speech has been improved;
- RAM size is now 512K Preferred and 192K minimum (from 192K both preferred and minimum);
- Sound recording and playback features from the Performa line are integrated;
- Arrow keys now serve a function in read-only documents;
- Balloon Help now properly says SimpleText for the application icon;
- Optimized support for QuickTime-based PICT files (i.e., Photo-CD) has been enabled;
- Properly supporting the standard core four AppleEvents via the AppleEvent Manager.
- Drag Manager support.

Speed Improvements

System 7.5 includes the following improvements in speed and performance:

Process Manager   The System 7.5 version is a superset of the version that shipped with PowerTalk. Among other improvements, this version of the Process Manager switches context faster than previous process Managers, resulting in a better user experience.

Faster File Copying   A change was made to the buffer size that the Finder uses. Note that this is only for file copying from hard disk to hard disk (files copied to and from floppies or foreign file systems are not affected).

Opening windows   This change is for windows in the Finder that have a large number of files (greater than 100). As the number of files increase this speed-up should be noticeable to the user.

File System Cache   The cache now consolidates contiguous blocks before writing, reducing internally the number of driver calls necessary to flush the cache.

Menu Manager   This is an enhancement to the former MDEF; it now caches menus that have been drawn. The result is that the next time a menu is pulled down,

it is drawn immediately. The results vary according to the speed of the CPU. On slower machines, the effect is quite dramatic.

System Software Components

The following System Software Components are included as part of System 7.5:

- Finder (Scriptable Finder)
There are various scripts included in System 7.5 that can be used to script the Finder. Developers can create additional scripts. See "Scripting the Finder from Your Application" by Greg Anderson, develop magazine, issue 20.

- PC Exchange 2.0.2
PC Exchange permits Macintosh users to mount MS-DOS and Windows diskettes on their desktops.

- Macintosh Easy Open 1.1
Macintosh Easy Open is a System Software Extension that enables users to have the Macintosh OS in conjunction with third party plug-in's to automatically translate documents. The system also allows the user to "route" translated documents to a preferred application and thus bypassing the "The application that created this document cannot be found" dialog box.
Macintosh Easy Open 1.1 is included on the Macintosh OS SDK CD-ROM. In the Macintosh Easy Open folder you can find the following:
    - The latest Macintosh Easy Open System Software Extension
    - User documentation on how to use it
    - Developer documentation on how to program it
    - Interfaces, libraries, and sample code.

- QuickTime 2.0
QuickTime is a Macintosh system software extension that enables users to integrate time-based data, such as video, sound and animation, in Macintosh applications. The QuickTime PowerPlug extension adds PowerPC native support.
For Further Reference:
Inside Macintosh: QuickTime™ .

- Sound Manager 3.0
The Sound Manager is Apple's digital audio software solution that allows any application to play and record sounds using the built-in sound hardware found on Macintosh computers. Sound Manager 3.0 is integrated into System 7.5's System file. Refer to *Inside Macintosh:Sound* for documentation.

- PowerTalk 1.1
PowerTalk 1.1 is Apple's implementation of the Apple Open Collaboration Environment, or AOCE. The AOCE Developer's Kit has been updated, and is available on the MacOS SDK CD-ROM.
For Further Information:
-        "Apple Turns Pro," Apple Directions, Nov. 93, p. 1
-        "A Talk With Gursharan Sidhu, AOCE Architect," Apple Directions, Nov. 93, p. 15
-        "How to Get Started With PowerTalk," Apple Directions, Nov. 93, p. 18

-        "AOCE: Apple's Architecture for Collaborative Computing," Apple Direct, Mar. 93, p. 1

• MacTCP 2.0.4
MacTCP provides TCP/IP protocol support for Macintosh computers. This control panel is not installed by default. You need to use the custom install feature of the installer to install MacTCP.
For Further Information:
-        MacTCP folder on MacOS SDK CD-ROM

• File System Manager
In the past, developing a foreign file system required extensive knowledge of the Macintosh File Manager and how it used both documented and undocumented low-memory global variables and data structures. To solve this problem, Apple has written the File System Manager. To create a new foreign file system, developers no longer need to access undocumented portions of the Macintosh and interface with the Macintosh file system through a 68000 register-based interface. Instead, they provide a foreign file system for a particular file system that works with the File System Manager. The File System Manager provides a systematic way for one or more foreign file systems to interact with the Macintosh file system using high-level language interface.
For Further Information:
-        File System Manager folder on MacOS SDK CD-ROM

• New Disk Initialization package
System 7.5 includes a new disk initialization package. For further details, see the *Inside Macintosh:Files errata* tech note.

New Features- originally included only on Performa systems

These features were originally included only on Performa systems, but now are provided as part of the System 7.5 release for all systems in the new General Controls control panel device.

• Finder Hiding
Allows the user to hide the Desktop (Finder) when in the background.

• Improved Standard File
Provides options for the user to specify a file's default folder when opening or saving a document: either the folder which contains the application that creates the document, the last folder used in the application, or the documents folder.   Setting the Documents option in the General Controls control panel to "folder which contains the Application" provides essentially the same behavior as before System 7.5.

• System Folder Protection
Prevents users from changing, removing or deleting files inside the System folder.

• Application Folder Protection
Prevents users from changing, removing or deleting files inside an application folder.

• General Controls
General Controls- enables or disables various system features

• Incorrect Shut Down Warning

Incorrect Shut Down Warning lets users know if the computer was shut down incorrectly.

In addition, the following two items originally included only on Performa systems are now standard parts of System 7.5.

- Launcher control panel
  Launcher is a separate control panel that permits the user to access commonly used items quickly.

- Shut Down desk accessory
  The Shut Down desk accessory allows users to shut down from Apple Menu.

Print Drivers

System 7.5 includes the optional installation package for QuickDraw GX. System 7.5 provides drivers for both QuickDraw GX and non-GX systems. The Chooser determines which environment is currently active and only displays printers that work in the current environment.
The following print drivers are included with System 7.5:
Non-GX Drivers
- Apple Color Printer 1.2
- ImageWriter 7.0.1
- LaserWriter 7.2, 8.1.1
- LaserWriter 300 1.2
- LQ AppleTalk ImageWriter 7.0.1
- LQ ImageWriter 7.0.1
- Personal LaserWriter SC 7.0.1
- StyleWriter 1.2
QuickDraw GX Drivers
- ImageWriter GX
- ImageWriter LQ GX
- LaserWriter 300 GX
- LaserWriter GX
- LaserWriter IISC GX
- PDD Maker GX
- StyleWriter GX

Utilities/DAs

New Utilities and Desk Accessories are included in System 7.5. They help demonstrate new features available in System 7.5, such as Drag and Drop. The following are included on this CD:

- Apple Menu Options
  Apple Menu Options is a control panel which extends the functionality of the Apple Menu. AMO adds hierarchical menus as well as menus which track recent applications, recent documents, and recent servers.

- Menubar Clock
  Displays the time and date in the menubar. Located in Date & Time control panel.

- WindowShade

Overview

Allows users to hide windows by reducing the window to just the title bar.

- Find File
  Searches for files on a network and/or local volume and puts them in a list that is Drag Manager aware.

- Jigsaw Puzzle
  A new game that replaces the old puzzle.

- Scrapbook
  Completely re-written as an application to be growable and Drag Manager aware; also displays more information about data types.

- Note Pad
  Completely re-written, is now Drag Manager aware, and supports features such as finding text.

- Stickies
  Allows users to put notes on the computer screen.

- Extensions Manager
  Control panel that allows users to manage extensions by allowing them to turn them on and off.

- New Desktop Patterns Application with new patterns
  Desktop patterns are no longer part of the general control panels. You can select a new desktop pattern. You can add new desktop patterns by pasting them in. Hold down the option key to select the background pattern for certain utilities. The resource 'ppat' of id 42 is used as the background pattern for certain utilities such as the Calculator and Find File.

Generic Macintosh Naming

When doing a clean install of System 7.5, the name stored in the System File as 'STR#' -16395 has been changed. (When installing System 7.5 over a previous version of system software, this change does not take place.) Instead of containing the explicit name of a particular CPU, the string contains " Macintosh", " Power Macintosh", or "Macintosh PowerBook". This change shows up in the Finder menu "About This Macintosh" as well as in various other code, such as the AppleTalk "responder" code, MacSNMP system MIB, etc. This change was implemented to allow greater flexibility in creating new Macintosh models for specific markets. The documentation in *Inside Macintosh:Operating System Utilites* on page 1-27 is now incorrect.

Progress bar at boot time

System 7.5 now includes a progress bar during boot time. Certain third party extensions try to put up dialog boxes at boot time. Calling InitWindows during boot time causes the progress bar dialog to disappear, yet the bar itself continues to be drawn. This misbehavior is due to extensions which try to do user interaction at boot time. Apple strongly recommends that you do not use the Window Manager or Dialog Manager until after the machine has completed booting. Use the Notification Manager to inform the user of information from within an extension, or consider rewriting your extension as an application and putting it in the startup items folder.

Apple Menu Options and tracking files

Apple Menu Options adds hierarchical menus to the Apple menu and adds three folders, Recent Applications, Recent Documents, and Recent Servers, to the Apple Menu.

The Recent Applications folder tracks all process launches except:
> Finder
> PrintMonitor
> Desk Accessories
> Processes in files of type 'INIT' or 'appe'
> Background only processes

The Recent Documents folder is implemented by keeping track of basic system activity such as opening files, launching applications, and window manipulation. When one of these operations occurs, Apple Menu Options will try to find a match between an open file and a window title. Matches are only made between files and windows opened by the same process. A file name and window title are considered a match if the file name is substring of the window title either at the beginning of the window title, or at the end of the window title. For example, with an open file named "Document", the window titles "Document", "Document (WP)", or "(WP) Document" are considered matches. When a match is found, it is added to the Recent Documents folder.

When files are opened, a check is made for an existing window with a matching name. If a match is not found, the file is kept in a list of "unattached" files. When a window is opened or its title is changed, a check is made to see if an "unattached" file opened by the same process matches. Files opened by the Finder (except control panels), files opened by background-only applications, files opened by INITs, files opened by DAs, PrintMonitor files, clipboard files, and alias files are not tracked.

This means that if your application really wants to avoid having specific files added to the Recent Documents folder, it can use names for those files which won't be part of the window titles. For example, if your window title is going to be "Thesaurus" then a file name of "US Thesaurus" won't be a match and so it won't be added to the Recent Documents folder.

The Recent Servers folder is implemented by checking each successfully mounted volume to see if it is a server volume. Under System 7.5, only AppleShare volumes are tracked.

8•24 GC card

The acceleration which used to be provided by the 8•24 GC card control panel no longer works with System 7.5. The 8•24 GC card continues to function, but no acceleration is provided.

Loading Macsbug without Loading Extensions

A new feature in System 7.5 allows you to load Macsbug without loading extensions. As previously documented, holding down the shift key during the boot process prevents all extensions (including Macsbug) from loading. Holding down the option and shift keys together during the boot process allows Macsbug to load, but prevents all extensions from loading.

Further Reference:
- *Inside Macintosh*
- Technical Note OS 05 - System Update 3.0
- Technical Note OS 07 - System 7.5 Update