Glossary

24-bit mode
The standard addressing mode of System 6, where only 24 bits are used to designate addresses. Limits address space to 16MB (2 to the 24th power), of which only 8MB is normally available for application memory. This mode is also used under System 7 if 32-bit addressing is turned off.

32-bit mode
An optional addressing mode available in System 7 (or System 6 if OPTIMA is

addressing
installed). Because 32 bits are used to designate address information, up to 128MB of physical RAM or up to 1024MB (one gigabyte) of virtual memory can be used under 32-bit addressing (256MB physical RAM on the Quadra 900). Also called32-bit mode.

32-bit clean
Compatible with 32-bit addressing (see "History of Macintosh Memory").

32-bit mode

An optional addressing mode available in System 7 (or System 6 if OPTIMA is installed). Because 32 bits are used to designate address information, up to 128MB of physical RAM or up to 1024MB (one gigabyte) of virtual memory can be used under 32-bit addressing (256MB physical RAM on the Quadra 900). Also called 32-bit addressing.

4 SIMM Rules
Each SIMM bank must either be completely full or empty. Each SIMM bank must be filled with SIMMs of the same size. If you only fill one bank with SIMMs, use Bank A. You should usually put your largest SIMMs in Bank A. (see "About SIMMs").

68000
A Motorola microprocessor used in early Macintoshes, Mac Plus and SE, plus recent low cost units, Classic, Portable and PowerBook 100. Does not support virtual memory or 32-bit addressing.

68020
A Motorola microprocessor used in the Macintosh II and LC. On the Mac II there is a socket to hold a coprocessor called a PMMU which enables the Mac II to use virtual memory. There is no socket on the LC motherboard, so the processor must be upgraded in order to use virtual memory.

68030
A Motorola microprocessor used in the SE/30, PowerBook 140/145 and 170, and

Modular Macs, except LC, Mac II, Centris, and Quadras. It supports virtual memory without any additional hardware.

68040
A Motorola microprocessor used in the Centris and Quadras. It supports virtual memory without any additional hardware. Has built-in floating point math capabilities (an optional coprocessor on the 68030).

A/UX
An alternate operating system for the Macintosh based on the UNIX operating system. UNIX is a powerful mainstream workstation operating system. A/UX has its own 32-bit addressing mode even on non-32-bit clean Macs like the Mac IIcx. Virtual memory is a standard feature as long as the processors can support it (68020/68851, 68030, or 68040).

accelerator
card
An add-on product that upgrades the CPU of a Macintosh to a higher speed or more powerful generation of processor. Usually a "daughter board" that clips onto the original CPU or is inserted into the socket that held the original CPU. Needed to use virtual memory or enhanced 24-bit addressing on LC, Mac Plus, SE and Classic (see "Reference Guide").

addressing
Refers to the way that the operating system knows where to find a specific piece of information or software in the application memory. Every memory location has an address and the operating system keeps tables of these addresses to keep track of where information is stored.

application memory
Memory which is actually available for use either by an application or the operating system, and which will be recognized by standard operating system calls.

background
application
Under System 7 (or System 6 in Finder mode) several applications can be Open but only one can be in active use. The others are the background applications.

backing store
The file on the hard drive which holds information needed to create the extra application memory provided by virtual memory. Usually this is equal in size to the entire amount of application memory, though with the DiskSaver feature of Connectix Virtual and Compact Virtual this size can be reduced by the amount of physical RAM installed. Also known as a swap file.

bank

A set of SIMM sockets that are logically connected; they must all be filled with the same size RAM, or all be empty.

battery life
On a Portable Macintosh, the amount of time a battery can operate between charges.

boot
To start the computer. A "cold boot" is what happens when you first turn on the power. A "warm boot" is a Restart after the system has already been operating for a while and is not shut down completely.

byte
8 bits, enough information to hold a value between 0 and 255, which is enough to specify one alphanumeric character (letter, number, or symbol).

cache
Memory that holds instructions or data that were used recently (see "RAM Disks, Caches and Cards").

central processor unit
CPU. A chip on the motherboard which does most of the calculations and manages the operating system.

cold start
Starting your Macintosh from a power-off state. As opposed to a warm boot which is done when the power is on and the Restart option is selected from the Special menu (or the Restart programmer key is depressed).

Compact Mac
Mac Plus, SE, Classic, and Classic II. All four are similar in size and shape, but the first three are based on the Motorola 68000 processor and the last one is based on the 68030. Only the 68030-based Classic II can run standard System 7 VM and 32-bit addressing (see "Reference Guide").

Connectix
Producers of Connecitx PowerBook Utilities, Connecitx Desktop Utilities,Virtual, MAXIMA, OPTIMA, MODE32, HAND-Off II, and InfoLog

contiguous
When referring to RAM memory, an unbroken series of available addresses.

Control Panel
A device found under the Apple menu that allows you to adjust various system parameters including the way the screen looks, the way the mouse works, sounds, and, under System 7, memory attributes.

CPU
Central Processor Unit. A chip on the motherboard which does most of the calculations and manages the operating system. Also, Connectix PowerBook Utilities.

document
Data file used by an application, e.g. the spreadsheet or letter being worked on in a spreadsheet program or word processor.

dpi
Dots Per Inch, the resolution of a scanner or printer. Higher dpi means higher resolution and sharper images.

DRAM
Dynamic Random Access Memory, the kind of RAM used in SIMMs. The data stored in Dynamic RAM (as opposed to "Static RAM") fades away over time, so the information has to be refreshed (rewritten) every few thousandths of a second. Although this consumes much more power than the static design, each memory cell can be built from just one transistor instead of the four required for static RAM so higher memory capacities can be built economically.

driver
Software which instructs the operating system how to communicate with a peripheral device like a hard drive.

enhanced 24-bit addressing
A technique to allow Macintoshes using 24-bit addressing to use more
than 8MB of physical RAM. A main feature of MAXIMA and Compact Virtual.

extension
An addition to your System that goes into your extensions folder, e.g. a screen saver or file launch utility. Extensions load into the System at boot time, when the system is initialized, which is why they were known as INITs under System 6.

Finder
The Finder is the part of the system which controls routine file management activity. Finder is the software which is running whenever no application is in the foreground.

Under System 6, Finder (as opposed to "the Finder") confusingly also means the version of the Finder which can only run one application at a time, as opposed to MultiFinder.

foreground
Under System 7 (or System 6 in Finder mode) several applications can be Open but only one can be in active use. This one is the foreground application.

fragmentation
The breaking up of the memory map into small, logically distinct pieces. Memory fragmentation occurs in 24-bit mode and limits the size of the largest single application that can be opened under MultiFinder to less than the amount of free application memory. (see "Memory Fragmentation")

fragmented
Not contiguous; broken into logically and physically separate pieces.

gigabyte
1024 megabytes.

grounding strap
A device worn when handling a static-sensitive component like a PMMU in order to prevent the creation of static shocks (sparks) which could damage the component.

HAND-Off
A Connectix utility that simplifies navigation through folders, files and applications on the Macintosh. (see "Connectix Products.")

high memory
  1. In the main text of this guide, part of the Memory Map below the ROM addresses. On Modular Macs, below 8MB, on Plus, SE and Classic, below 4MB. (SE/30 and Classic II; 8MB.)

2. In the Reference Guide, the memory you can only use if you install SIMMs larger than 1MB. Typically this means memory over 8MB for Modular Macs, over 4MB for Compacts, but there are numerous exceptions (see "Reference Guide").

jumper
A small connector which electrically connects two parts of a circuit. Can be soldered on wire or a simple slide switch.

kilobyte
1024 bytes. Roughly the amount of information in half a typewritten page.

low memory

1. Part of the Memory Map below the ROM addresses. On Modular Macs, below 8MB. On Plus, SE, and Classic, below 4MB. (SE/30 and Classic II; 8MB.)

2. A state where an application is running without enough memory to hold the critical

parts of the application plus the document(s) in use. Can lead to Unexpected Quits (see "Reasons to Add Memory").

mask
The photographic representation of a microprocessor used in the photolithographic method of making chips. Because the Mask determines the design, the Mask number is also used to represent the version number of a chip.

Mask 73
The current design version of the Motorola MC68851 Paged Memory Management Unit (PMMU).

MAXIMA
A Connectix utility that creates enhanced 24-bit addressing and builds a protected, non-volatile RAM Disk (see "Connectix Products").

MB
Megabyte. Loosely, a million bytes. Precisely, 1024 kilobytes.

megabyte
1024 kilobytes (1,048,576 bytes). Enough space to hold about 50 copies of this Guide

memory map
Describes what information or devices may be found at any particular memory address.

MHz
Megahertz, millions of clock cycles per second. Everything that happens in a computer is timed according to a clock which ticks millions of times every second. Higher MHz computers work faster than lower MHz computers, and all the components inside the computer must be able to keep up with the system's clock speed. Slow Macs run at 8MHz, fast ones run at 50 MHz. (MHz is not the only factor in determining processing power.)

MMU
Memory Management Unit. Circuitry in a Motorola 68030 or 68040 processor that performs functions critical to the use of virtual memory. A separate Motorola coprocessor, the 68851 Paged Memory Management Unit has similar circuitry and can be used in conjunction with the 68020 processor to also support virtual memory.

MODE32
A Connectix utility that enables Mac II, IIx, IIcx and SE/30 to use standard System 7 32-bit addressing. Available free of charge to all Macintosh users from Apple by courtesy of a licensing agreement between Connectix and Apple (see "Connectix Products" under the "Contents" heading).

Modular Mac
As used in this manual, Mac II-series, LC, and Quadras. The SE/30 and Classic II are in many respects more like the Modular Macs than the Compacts (see "Reference Guide").

motherboard
The large printed circuit board in your Mac which contains the main processor and most of the other electronic components.

MultiFinder
A version of the Macintosh Operating System that allows several applications to be Open simultaneously but with only one being in active use at any time. Under System 6 this was an option (the alternative was Finder, which runs only one application at a time). Under System 7 it is the only choice.

nanosecond
One billionth of a second. Some Macs can perform simple operations like retrieving a byte of data from RAM in 100 nanoseconds or less.

non-volatile
The ability to retain information without external power applied. Hard drives, floppy diskettes, and ROMs are non-volatile so their contents are preserved when the Mac is off.

NuBus card
An add-on card that fits inside the NuBus slots of a Modular Macintosh. Often used for video cards and modems.

on-board video
built-in video card. A feature of the IIci, IIsi and other Macs that allows them to send images to a monitor without requiring a separate video card.

operating
system
The software that runs the Macintosh. It is mainly what makes a Mac a

Mac. System 6 or System 7 plus the ROM software makes up the entire operating system.

OPTIMA
A Connectix utility that provides 32-bit addressing capability under System 6 to Modular Macs and SE/30 (see "Connectix Products").

PAL
Programmable Array Logic chip. A general purpose semiconductor that can be programmed after leaving the chip factory for a wide variety of uses. (Can be replaced

by a Gate Array, or other logic chips which can perform the same function.)

parity RAM
A type of RAM that has built-in error checking capabilities. Parity RAM has 9 chips instead of the usual 8 and is often used in government applications.

partition
Under MultiFinder, the partition size is the amount of application memory that is allocated to that application (and any documents of that application that are going to be used). The partition size may be altered by using the Get Info box (see "Reasons to Add Memory"). Unfortunately, the partition size does not adjust while you use an application, an important difference between a Mac and more powerful workstations.

peripheral device
A hardware device attached to a computer, such as a hard drive, printer, scanner, or CD-ROM player.

physical RAM
Memory made from SIMMs or other semiconductor RAM, as opposed to application memory created by using virtual memory techniques.

PMMU
Paged Memory Management Unit, a Motorola 68851 coprocessor needed when using the 68020 CPU in order to implement virtual memory. The Mac II has a special socket on the motherboard to hold this part. The Mac LC is also based on the 68020, but has no socket for a PMMU so virtual memory can not be used on a standard LC (must add accelerator; see "Reference Guide") (see "Mask 73" in the Glossary).

Portable
A class of Macintosh computers including the original Macintosh Portable and the PowerBooks.

preferences
Settings which can be assigned to a given application, document, or utility to adjust how it works. In System 7, the Preferences of applications and extensions are organized into a Preferences Folder in the System Folder.

Process Manager
The Finder under System 7. Similar to System 6 MultiFinder.

programmer's
keys
A pair of plastic keys which attach to the Macintosh and allow resetting the computer without turning off the power. Standard on some Macs, optional on some, not available

on others.

RAM
Random Access Memory, meaning any location or address chosen at random can be accessed as quickly as any other. Often contrasted to sequential access memory, where the access time varies according to the location. A tape is sequential access because it is faster to get data from the beginning of a tape than the middle if the tape has just been rewound. SIMMs are a particular design type of RAM.

RAM disk
A logical structure made from semiconductor memory which emulates the functioning of a disk drive as closely as possible. Since most semiconductor memory (RAM) is volatile, most RAM disks are also volatile.

Restart
This usually refers to the selection in the Finder under the "Special" menu of the item which re-boots the computer without an intermediate interruption of power.

ROM

Read Only Memory. A chip inside your Mac containing software which is part of your operating system. Its contents cannot be altered.

SCSI
Small Computer System Interface. The standard interface used to connect peripheral devices like an external hard drive to the Macintosh. A peripheral that connects this way is a "SCSI device," as opposed to something like the keyboard which, being connected through the ADB interface is called an "ADB device." Pronounced "Scuzzy."

segment
A portion of an application which can be loaded into application memory as an independent section, e.g. the spell checker routines of a word processor.

Shutdown
The orderly transition of your Mac to a powered-off state.

SIMM
Single In-line Memory Module. The standard configuration of RAM used on a Mac.

SIMM socket
The connector inside the Macintosh that holds the SIMM and connects it to the rest of the computer electronically.

standard
memory
Memory configurations that can be achieved using SIMMs of 1MB density or smaller.

For Mac Plus, SE, Classic, and LC this means 4MB. For most Modular Macs and SE/30 it means 8MB. For the Quadra 900 it means 16MB. All Portable configurations are in the standard memory class. With the exception of the Quadra 900, standard memory configurations can always be addressed without 32-bit mode or special software

swap file
The file on the hard drive which holds information needed to create the extra application memory provided by virtual memory. Usually this is equal in size to the entire amount of application memory, though with the DiskSaver feature of Connectix Virtual and Compact Virtual this size can be reduced by the amount of physical RAM installed. Also known as a backing store.

TSOP
Thin Small-Outline Package. A type of RAM that is used on the PowerBooks because of its compact size and low power consumption.

Undo buffer
A portion of memory that holds a version of a document before the most recent changes were made. Sometimes needed in order to support an "Undo" feature.

video RAM
Special memory used to support high resolution, fast refresh video on certain Macintosh systems.

VIRTUAL
A Connectix utility which creates virtual memory on the Macintosh. Compact Virtual works with Mac Plus, SE and Classic after a 68030 accelerator board is installed. Virtual works with any 68030 or 68040-based Macintosh, or Mac II with PMMU. Main differences between Virtual and VM are speed, compatibility, and DiskSaver feature (see "Connectix Products").

virtual memory
A memory technology which creates more application memory than the amount of installed physical RAM. Uses hard drive space.

VM
The standard virtual memory manager that is part of the System 7 operating system. One of the two general-purpose implementations of virtual memory on the Mac, the other being Connectix Virtual. Virtual memory is a way to get more application memory than the amount of physical RAM installed by using hard drive space.

volatile
Loses information when power is interrupted (see non-volatile).

warm boot

The way the computer is started when the power is on and the Restart option is selected from the Special menu, or the Restart programmer key is depressed. As opposed to a cold start which is done from a power-off state.

write protected
Designated as having contents that can't be modified. The Mac ROMs are write protected, a floppy drive with the protect tab Open is protected, and portions of internal memory can be protected.

XOR
Exclusive Or. A logical operation on a bit that switches its state. If the bit was a "0," XOR turns it into a "1." If the bit was a "1," XOR turns it into a "0."