

# Macintosh AV General FAQ

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Get the most out of your computer, check out the AV site:  
<ftp://ftp.csua.berkeley.edu/pub/jwang/>  
<http://www.csua.berkeley.edu/pub/jwang/~av.html>

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## INTRODUCTION

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This Frequently Asked Questions list attempts to address the day-to-day needs for users of AV technologies. The primary audio visual aspects, 16-bit CD-quality stereo sound and analog video in/out, may be already familiar to you. However, the AV moniker have come to embody a number of other sophistications, some by accident and some by design. These secondary topics include GeoPort (telephony), PlainTalk (both Speech Recognition and Text-to-Speech), even innovations such as DMA (Direct Memory Access) and SCSI Manager 4.3, for which the first AV models served as a convenient launch pad.

### A word about FTP access

For files available via the File Transfer Protocol (FTP), its site and path is indicated in Uniform Resource Locator (URL) format. URL's are usually pasted into various applications (Anarchie, Fetch, Mosaic) to retrieve the named data. They are also intuitive enough for hard-core FTP users (but remember to use your local mirrors instead).

For Apple software updates, one popular mirror to [ftp.austin.apple.com](ftp://ftp.austin.apple.com) is [ftp.support.apple.com](ftp://ftp.support.apple.com), with the following starting path:

[ftp://ftp.support.apple.com/pub/Apple SW Updates/Macintosh/](ftp://ftp.support.apple.com/pub/Apple%20SW%20Updates/Macintosh/)

This site is kept in sync with AppleLink and eWorld automatically and usually receives new software first. However, directories and files there often contain embedded spaces, for which you must enclose with double quotes when using the standard UNIX ftp client:

```
> cd "Networking & Communications"  
> get "Express Modem (1.5.3).hqx"
```

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# HARDWARE

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## Centris / Quadra / Power Macintosh AV feature set

The original 660av and 840av, introduced on July 29, 1993, ship with 16-bit CD/DAT-quality stereo sound in/out, one GeoPort, PlainTalk, DMA, SCSI Manager 4.3, and NTSC/PAL/SECAM video in/out, all integrated on the motherboard. The first three features (sound, GeoPort, PlainTalk) together make up the "audio" half of AV Technologies, powered by an AT&T DSP3210 co-processor. Now discontinued, the 660av and 840av remain the only true multi-processor machines mass-produced by Apple.

The Power Macintosh, introduced on March 14, 1994, all come standard with 16-bit CD-quality stereo sound, two GeoPorts, PlainTalk capability, DMA, and SCSI Manager 4.3. This time, the "audio" features are driven by the main Power PC processor, and none of the models include a DSP. The Power AV models adds a PDS options card with a separate frame buffer and the analog video I/O subsystem, bundled along with extras such as the PlainTalk microphone and software.

I've adopted the following conventions for the rest of this document, in both discussion context and in subject heading. If the relevance of a particular discussion is limited to only one system, the subject line will be appropriately preceded by **[AV]**, or **[Power AV]**, etc.

- "AV" by itself refers unambiguously to only the 660av and 840av;
- "all AV models" covers the 660av, 840av, and Power Macintosh AV line;
- "Power AV" is short for a Power Macintosh fitted with the AV Options card;
- "Power Mac" includes any Power Macintosh, AV or regular edition.

## AV Technology outreach

The following provide an overview of the extent of AV related technologies. In-depth discussion of these topics, relevant to all affected models, can be found below in the rest of the FAQ under specific section headings.

- 16-bit CD-quality (44.1 kHz) sound:
  - The PowerBook 5xx series also supports stereo sound out at these settings, but apparently only mono sound in.
- Line-level audio (versus microphone level):
  - This has become the standard for all desktop Macs, examples include the LC475, Quadra 605.
- Direct Memory Access (DMA):
  - On AV and Power Macs, serial (including LocalTalk and GeoPort), SCSI, Ethernet, floppy, and audio are all supported with DMA drivers. Limited DMA also available on the IIfx, Quadra 800, 900 and 950, full DMA also available on Workgroup Servers.
- GeoPort:
  - Limited to the AV and Power Macintosh.
- PlainTalk Speech Recognition (SR):
  - Limited to the AV and Power Macintosh.

- PlainTalk Text-to-Speech (TTS):

Can support a Mac Plus running System 6.0.7 and on up.

- SCSI Manager 4.3:

Also supported on any Centris or Quadra (except the 63x) by System 7.5.

- Video input:

The Macintosh TV can be switched to display television input, but this disables and hides the 68030 completely in the background. It does not support video in a window, nor video digitization.

On the other hand, the Quadra 63x series can be added with the Apple TV/Video System, a cable/antenna tuner card in conjunction with a video in-only card (composite and S-video), each in a new specialized and dedicated slot. The new television features are quite fancy and mature, including named channel setup with password lockout, program reminders, closed captioning, bass/treble control, and an infra-red remote control for the TV, CD-ROM, and computer.

It's a shame that the TV/Video System is not compatible with the AV or Power AV. Also unfortunate is the fact that the 63x does not handle 16-bit CD-quality sound processing, although CD and TV sounds play through cleanly and are mixed with the 8-bit 22 kHz audio from the CPU before output. Video in a window is handled somewhat differently on the 63x, using an 1MB DRAM-based frame buffer, so the rest of this FAQ may not all apply.

- Video output:

NTSC/PAL/SECAM formatted output for other Macintosh models must be achieved through an external encoder box, only the AV and Power AV's can display the desktop on a television out of the box.

## Model feature overview matrix

Model	CPU Speed	AV Frame Buffer	Best Audio	Memory Expansion	Free Slots
630	33MHz 040	1MB DRAM	8 bit 22 kHz	1 / 72-pin 80ns, 4-36MB	1 PDS (030 style)
660av	25MHz 040 55MHz DSP	1MB VRAM	16 bit 48 kHz	2 / 72-pin 70ns, 4-68MB	1 PDS, or DAV + 7"NuBus
840av	40MHz 040 66MHz DSP	1MB or 2MB VRAM	16 bit 48 kHz	4 / 72-pin 60ns, 0-128MB	DAV + 3 NuBus (fast)
6100/60av	60MHz 601	2MB VRAM	16 bit 44 kHz	2 / 72-pin 80ns, 8-72MB	none left
7100/66av	66MHz 601	2MB VRAM	16 bit 44 kHz	4 / 72-pin 80ns, 8-136MB	DAV + 3 NuBus (slow)
8100/80av	80MHz 601	2MB VRAM	16 bit 44 kHz	8 / 72-pin 80ns, 8-264MB	DAV + 3 NuBus (fast)

Memory Expansion notes:

The first line indicates the number of available DRAM SIMM slots, and their type (all are 32-bit wide 72-pin units). The second line indicates the slowest SIMM speed that should be used, along with minimum and maximum DRAM configurations. Maximum DRAM size computed using 32MB SIMM's, replacing factory SIMM's, if any. The minimum DRAM size indicate soldered on-board memory.

The 840av may expanded its frame buffer to 2MB via 4 x 256K VRAM SIMM's, rated 80ns or faster.

Quadra DRAM can be expanded one 72-pin SIMM at a time, since each SIMM is 32-bit wide matching the memory bus width. Power Mac DRAM must be expanded in identical pairs to satisfy the 64-bit memory bus.

Do not use composite SIMM's with any of these machines. Composite SIMM's are made of many lower density components along with additional support and/or buffer circuitry. These beasts wreck havoc due to the added electrical load, system noise, and timing overhead.

Brian V. Hughes (hades@coos.dartmouth.edu) adds:

*The only SIMMs that are considered 'composite' [with respect to] the 72-pin SIMM specification are 16MB SIMMs that use 32 4M-bit DRAMs rather than 8 16M-bit DRAMs. 8MB SIMMs that use 16 4M-bit DRAMs are not composite, just like 32MB SIMMs that use 16 16M-bit DRAMs are not composite.*

## [AV] Floppy problems

The NewAge floppy controller is supposed to write data more precisely than before. However, 800K floppy reads can fail consistently under certain circumstances, while 800K writes are fine, as are 1.4MB reads and writes. The official Apple statement blames mass-formatted 800K's whose poor track alignment can no longer be tolerated, some forms of floppy-based copy protection can also render the disk unreadable. Composite SIMM's have also been directly linked with this problem.

If you have a floppy that refuses to be read, first see if changing the Sound Out rate helps, deactivate Speech Recognition, GeoPort Express Modem, and video-in if necessary. If there is another Mac nearby, copy the data to a high density disk or use file sharing. A successful reformat of the disk in question (on the AV) often "fixes" the problem for good. With CopyDoubler or a similar product, you can turn off floppy verification to avoid read failures when copying to the 800K disk in the Finder.

There are also reports of universally slow floppy problems (read, write, and format). This is likely a manifestation of the faulty ROM disk cache routine, which has been addressed by System Update 3.0 and System 7.5 (see the Software section).

## [AV] FPU (floating point unit) bombs

Of crashes attributed to the lack of a FPU, Noah Price (noah@apple.com) has one theory:

*It can be caused by applications that are not fully 68040 cache compatible. To test this theory, use the Cache control panel from your Tidbits disk to turn off the 040 cache and see if things improve.*

If the 040-cache is not the culprit, open the case cover and make sure the CPU is **not** labeled as a 68LC040. Apparently the wrong CPU was used in a very small number of machines, for which a replacement will be provided. However, the problem can also be caused by bad or poorly seated DRAM, remove or re-seat the SIMM's to check.

## [AV] Hardware changes

When Apple dropped the Centris label to avoid market confusion, several models got a CPU speed boost with their Quadra reincarnation. However, the 660av managed to remain identical immediately before and after the label change. None of the hardware changes detailed below are related to the name alternation.

The first 660av and 840av models used a SIMM for their 2MB SuperMario ROM's. Later models surface mounted the ROM chips on the mother board directly. There are, however, intermediary models with soldered ROM chips **and** an empty ROM SIMM slot, located in the center of the mother board, orthogonal to the RAM SIMM slots.

For economic and supply considerations, Apple also decided to switch from the original SuperDrive to a less complicated and cheaper manual-inject variety (though still **auto-eject**). Late AV's can be distinguished by the recessed floppy face plates.

840AV owner Manoel Felciano (mano@panix.com) also reports that all new CD-ROM equipped systems will ship with the AppleCD 300+, a Matsushita tray-based double-speed mechanism replacing the Sony caddy-based CD 300. Clinton Bauder (gecko1@applelink.apple.com) elaborates:

*The CD300+ firmware does a much better job of supporting disconnect/reconnect than did previous Apple CD drives. The 5.0 CD-ROM driver supports SCSI Manager 4.3 and will allow disconnects on an CD300+ but not on older drives.*

*On 4.3 capable machines, I/O to all CD-ROM drives is asynchronous (i.e. the processor gets time back while doing a transfer), But on a CD300+, the SCSI bus itself is free during this time so that it can be used by other devices... I don't know of any shipping products that make much use of this but it will eventually help to improve copies from a CD (including digital audio) and other operations which require using both the CD-ROM drive and another SCSI device at the same time.*

## [AV] Details on expansion

The 660av contains a **single** multi-purpose slot that can be populated by either a Processor Direct Slot (PDS) card via a plain L-angle adapter, or a DAV + NuBus card via a second more complex adapter containing the MUNI NuBus controller and DAV connector. The 840av contains 3 NuBus slots and an inline DAV connector on the motherboard, but **no PDS** for electrical bus loading reasons.

The 660av is only supposed to accommodate a short 7" NuBus card. However, if the CD-ROM drive bay is empty, you may be able to make room for a full-sized card by moving the hard drive (and mounting bracket as well) over to the middle.

The PDS of the 660av **does** support bus arbitration, contrary to what was stated here previously. Tempest system integrator Joseph Palmer writes:

*The arbitration is somewhat different, but [compatible]. A PDS adapter for the 610 can be plugged into the 660av and it will provide all of the signals required for a PDS card.*

In fact, the *Power Macintosh Upgrade Card* for the 040 PDS could have been engineered for the 660av and its unique Application Specific Integrated Circuits (ASIC). However, a decision was made between effort/cost versus the 660av market base. In the end, the card was not to be. To upgrade to a Power Macintosh, original AV owners have to purchase an expensive complete motherboard swap.

There is also the issue of the Houdini/DOS Compatible Card for the 660av. While Apple doesn't support the now discontinued card on anything but the 610, Houdini does work with other 040 PDS systems including the 660av. However, Jim Stockdale (jws@apple.com) offers the following:

*It works, though there is a screen brightness issue when the PC is active. The video output circuitry of the 660av is slightly different than the other Quadras, causing a difference in the operation of the video switching circuitry of the Houdini. The PC video will be brighter than the Mac video, because the PC video is "over-driving" the Mac monitor. There could be some long term reliability issues caused by over-driving the video.*

Under a dual-display setup, where the Mac and PC each has a dedicated monitor, "over-driving" does not occur. However, users still have to contend with periodic startup crashes when the PC is active. Also, due to the conflict between the PC speaker and the 16-bit AV audio system, the Mac sound volume is best left at 0. For those interested in further detail, catch up your reading with the following:

<ftp://sumex-aim.stanford.edu/info-mac/info/hdwr/houdini-faq-101.hqx>

<ftp://ftp.csua.berkeley.edu/pub/jwang/contrib/houdini-660av-sound.txt>

## [Power AV] Details on expansion

Since the AV Options card is PDS-based, the 6100/60av not only has its only expansion slot occupied, it also winds up with an orphaned DAV connector. This will remain the case with the November release of the 6100/66.

The 7100/66 and 7100/66av are plagued by NuBus problems that limit the transfer speed to around 1.5MB/s on its 3 free slots. The impending 7100/80 should be bug-free.

The 8100/80 and 8100/80av do not share the NuBus problems. In fact, their NuBus speeds are second only to that of the 840av.

It is not clear at the present what Apple will offer in terms of upgrades for the first generation Power Macs when November rolls around.

## Clock-chipping an AV or Power Mac

*Clock-chipping* refers to various methods that replace the factory oscillator crystal (which determines the processor speed) with faster ones that still operate within the system safety and timing margin. Several models since the IIsi have been thus boosted to between 120% and 140% of the original speed. The long term consequences of this practice remains to be seen. Reduced system life span and reliability is likely, mission-critical computers should not undertake this risk.

**Warning:** the success rate of these modifications are quoted at around 90%. Your mileage will vary, and remember these modifications do void your warranty. For the electronically adept, Marc Schrier of Output Enablers continue to publish an outline with instructions for a do-it-yourself kit:

<ftp://sumex-aim.stanford.edu/info-mac/info/hdwr/crystal-speedup-history-23.txt>

For the electronic neophyte, two companies currently offer ready-made clip-on kits that accelerate most Centris, Quadra, and Power Macs easily and safely, no soldering required.

**KS Labs:** Alacrity Kit: \$165

- 6326 E. Livingston Avenue, Suite 131, Reynoldsburg, OH 43068

- 800.450.0353/order, 614.374.5665/info, 614.373.0353/fax

**Output Enablers:** various kits: \$50-\$60

- 1678 Shattuck Avenue, Suite 247, Berkeley, CA 94709

- [oenabler@netcom.com](mailto:oenabler@netcom.com), <ftp://ftp.netcom.com/pub/oenabler/>



After acceleration, take care to ensure adequate system cooling. Do not, for example, run with the case cover open as this completely destroys proper air circulation. Along the same lines, prevent circulated (heated) air from being drawn back in. One 660av user placed a foam block between the front intake and the rear exhaust, my own 660av hot-rod is fixed on top of an Apple 16" monitor for the same effect.

If you have the equipment, you can also sand the CPU heatsink for a better contact. If you see evidence of VRAM overheating, where zoom rects start leaving pixel artifacts on the desktop, reduce speed or add extra heatsinks or fan to the VRAM. Before anyone asks again, my 35MHz 660av setup includes a custom heavy duty 68040 CPU heatsink, two half-sized heatsinks on the left and right VRAM bank, and a fan on the left bank.

## Restart and Interrupt

While all other AV and Power Macs sport physical restart and interrupt buttons, the 660av rely on the following two keyboard combinations:

- Command-Power for interrupt, or programmer's key
- Command-Control-Power for restart

Use caution with the restart button or keyboard sequence. AV and Power Macs will perform a lengthy disk integrity checksum on the next reboot if the machine did not shutdown properly. This file system check would begin immediately after the happy Mac icon and before the "Welcome to (Power) Macintosh" banner.

During a keyboard soft power restart, a spurious interrupt can be generated if the Power key is held for too long. This brings up either the mini debugger window with the ">" prompt, or the MacsBug window if you have it installed, type "G" and press Return to resume normal execution.

## Soft power on the 660av and 6100

The 660av and 6100 share the same type of case enclosure and power supply as the original Centris 610. None of these models provide soft power, or the ability to power up and power down the computer with the keyboard. Also, the monitor outlet is not tied to system power, you cannot turn off both the CPU and monitor with the front switch.

Soft power and scheduled power can be provided for these models via a product called the PowerKey from Sophisticated Circuits, for about \$70. Contact: 206.485.7979, 206.485.7172/fax, SophCir@aol.com

# SOFTWARE

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## System software tidbits

The 660av or 840av cannot boot with anything less than System 7.1 **and** a version of System Enabler 088. A Power Mac must minimally use System 7.1.2 and the PowerPC Enabler. System 6 is out of the question, System 7.0 won't cut it either as it does not know how to use System Enablers that contain machine-specific boot code and data.

Also, both the AV and Power Mac architectures are 32-bit only. There was once a post in comp.sys.mac.announce that described a 24-bit AV Enabler. But if you read it carefully, you'll notice it was nothing but a premature April Fool's joke. (flames to L.H.Wood@lut.ac.uk :-)

Lastly, AV and Power Macs cannot run any version of A/UX.

## System software updates

Unless you have updated to System 7.5, which has System Update 3.0 rolled in, adding SU 3.0 to any 7.1 setup is strongly recommended for increased system stability. The System Update 3.0 Read Me states:

- *Updates System Enabler 088 to version 1.2 for use with the Quadra 840AV and 660AV. This update fixes some serial communication problems and delivers improvements to the Resource Manager and other system components that increase system performance.*
- *Updates the PowerPC Enabler to version 1.0.1 for use with the Power Macintosh 6100, 7100, and 8100. This new version fixes a problem with some large monitors connected to the AV video card, improves Energy Star compatibility for certain monitors connected to the built-in video port, updates the Communications Toolbox, fixes an occasional memory manager problem, improves the serial port performance, improves the video quality of the High Performance Video card in certain situations, and preserves the "Playthrough" and "CD Audio In" settings in the Sound Control panel across reboots. The PowerPC Enabler also supersedes the files "!TYC" and "!PowerAV Update" (and the Installer will delete them).*

If you decide to upgrade, download the two 1.44MB installer disk images (the 800K version is for the Mac Plus, SE, and II only) from one of the following Internet sites:

<ftp://ftp.apple.com/dts/mac/sys.soft/7.system.updates/>  
<ftp://ftp.austin.apple.com/Apple.Support.Area/Apple.Software.Updates/Supplemental.System.SW/System.Update.v3.0/>

For Power Mac owners, SU 3.0 installed a faulty PowerPC Enabler 1.0.1 that lost video sync when Video Monitor or FusionRecorder starts up with the monitor set to millions of colors. PowerPC Enabler 1.0.2 replaced the video digitizer in question and also improved Energy Star compatibility.

<ftp://ftp.austin.apple.com/Apple.Support.Area/Apple.Software.Updates/System.Enablers.SW/PowerPC.Enabler.1.0.2/>

Version 5.0.x of the Apple CD-ROM setup software added code to handle the AppleCD 300+ and SCSI Manager 4.3. It also includes a sleek new AppleCD Audio Player (remember to trash the old CD Remote application **and** init).

<ftp://ftp.austin.apple.com/Apple.Support.Area/Apple.Software.Updates/Peripheral.SW/CD.Setup.5.0.1/>

## [AV] ROM patches

Even with System Update 3.0 or System 7.5, be sure to install sAVe the Disk 1.4.2 (thanks to Michael Thies) since it does a more thorough job in fixing the 660av/840av ROM bugs. From the sAVe Read Me:

- 1) *Several Resource Manager operations flush the whole file to disk each time the length of a resource file is changed. This significantly degrades performance if many such changes occur in succession, e.g. while linking programs, using ResEdit or running resource compilers.*
- 2) *The disk cache built into the system writes back more data than necessary when flushed. This does not affect proper operation of the disk cache (nor does it help it :^) but results in superfluous disk activity and thus a slow down of file operations.*
- 3) *Each time a sound channel is allocated (disposed) some information is read from (written to) the file DSP Preferences. Applications which follow Apple's*

*recommendations create and destroy such a channel for each single sound they produce and thus slow down while they torture your hard disk. This problem becomes most obvious with games*

Apple addressed the Resource Manager and disk cache issues with SU 3.0 and improved the cache further with System 7.5. However, sAVe the Disk completely eliminates the sound channel thrash as well. Now you can ignore all of the following outdated extensions:

AV Boost, AV Cache Tuner, AV Resource Manager Tuner, AV Rocket, AV Serial Extension, AV Speedup.

<ftp://sumex-aim.stanford.edu/info-mac/cfg/save-the-disk-142.hqx>

AV Turbo ROM, from Steve Kiene, boosts system performance by copying the ROM to the slightly faster RAM, cutting down access time to the Toolbox. An obvious drawback is that you lose 2MB of valuable RAM. Furthermore, AV Turbo ROM cannot coexist with System 7 virtual memory or Connectix's RAM Doubler, and has been known to disable the Finder Restart command. Also, note the copy ROM to RAM option is stored in the PRAM, you have to turn off Turbo first before you trash the control panel. Otherwise, the only way to reclaim the 2MB is to zap the PRAM.

<ftp://mac.archive.umich.edu/mac/system.extensions/cdev/avturborom1.0.cpt.hqx>

## Application compatibility

One year after introduction, lingering compatibility problems have all but disappeared. The following table contains some aged applications and utilities. The listed version is the earliest version that corrected the problem, though current versions may be several points ahead.

Adobe Premiere	3.0	Adobe	415.961.4400, 800.447.3577
Adobe Type Manager	3.6	Adobe Tech	408.986.6505, 800.642.3623
Disk Doubler Pro	1.1	Symantec	503.465.8440
DPI-on-the-Fly	2.6	NEC	800.366.0476
Easy Open	1.0.4	Vendor specific, do not call Apple	
Empower	(1) n/a	Magna	408.282.0900
FAXstf	(2) 3.01b	STF Tech	800.880.1922, 816.463.7958/fax
FileGuard	2.8	ASD	909.624.2594
GlobalFax	2.08b	Global	800.736.4821, 415.390.8334/bbs
Greg's Buttons	(3) n/a	Greg Landweber (gdl@maths.ox.ac.uk)	
Miracle Piano	(g) 1.4	Soft Tool	800.488.2221
Norton Utilities	2.0.6	Symantec	503.465.8440
OmniPage Pro	(g) n/a	Caere	408.395.7000
PC Exchange	1.0.5	Apple	800.769.2775, ext 6535
RAM Doubler	(4) 1.5.1	Connectix	415.571.5100, 800.950.5880
Ray Dream Designer	3.0.4	Ray Dream	415.960.0767
Retrospect	2.0b	Dantz	510.253.3000
SAM	3.5.9	Symantec	503.465.8420
SoundEdit Pro	1.0.5	Macromedia	415.252.2000, 800.945.4061
Stacker	(5) n/a	Stac	619.431.6712
Suitcase II	2.14p1	Symantec	503.465.8440
Swivel 3D	2.0.4	Macromedia	415.252.2000, 800.945.4061

(1) incompatible with HD SC Setup, works with 3rd-party drivers

(2) must request new modem drivers in addition to updater

(3) "Colored Buttons" are not recognized by PlainTalk Speech Recognition

(4) conflicts with AV DSP Power, disables itself with AV Turbo ROM

(5) update driver with HD SC 7.2.2 or later, "disconnect" Stacker first

(g) incompatible with GeoPort, patch with ASFU Fixer

<ftp://ftp.csua.berkeley.edu/pub/jwang/patches/asfu-fixer.hqx>

<ftp://sumex-aim.stanford.edu/info-mac/cmp/disk-doubler-pro-11-updt.hqx>

<ftp://sumex-aim.stanford.edu/info-mac/app/fax-stf-30-to-301b-updt.hqx>

[ftp://pmail.globalvillag.com/pub/software/TelePort\\_Serial.sea.hqx](ftp://pmail.globalvillag.com/pub/software/TelePort_Serial.sea.hqx)

<ftp://sumex-aim.stanford.edu/info-mac/cfg/ram-doubler-104-updt.hqx>

<ftp://sumex-aim.stanford.edu/info-mac/grf/util/ray-dream-designer-30x-to-304-updt.hqx>

<ftp://sumex-aim.stanford.edu/info-mac/snd/util/soundedit-pro-105-updt.hqx>

<ftp://sumex-aim.stanford.edu/info-mac/gui/suitcase-214p1-updt.hqx>

## Game compatibility

Some games dropped dead because of the strict 32-bit architecture of an AV or Power Mac, while a greater number of them simply became mute. The latter usually happens when programmers write directly to an Apple Sound Chip (ASC) that's no longer used. Again, this situation no longer affects current releases, but as they say, the classics never die.

To check if a specific game is known to be incompatible or problematic, inspect the list maintained by Brian S. Lev ([lev@nssdca.gsfc.nasa.gov](mailto:lev@nssdca.gsfc.nasa.gov)):

<ftp://ftp.csua.berkeley.edu/pub/jwang/broken-games.txt>

## [AV] Software that employs the DSP

The AT&T DSP3210 is a specialized floating point processor that excels at, well, signal processing. While its 20-odd MFLOPS (millions of floating point instructions per second) is not useful for general purpose computing, the DSP is extremely adept at real-time processing and used commonly for the following routines:

- Apple Phone
- GeoPort and Express Modem emulation
- PlainTalk Speech Recognition (SR), but not Text-to-Speech (TTS)
- System sound effects and sound rate conversions

There are a handful of third-party DSP-savvy programs. Note the AV DSP Power accelerator plug-in for PhotoShop is incompatible with all versions of RAM Doubler:

ARTAbrot	1.2.1	George Warner ( <a href="mailto:warnergt@aloft.att.com">warnergt@aloft.att.com</a> )
AV DSP Power	(1) 2.5	Spectral 408.955.0366
Deck II	2.1	OSC 415.252.0460
DigiTrax	1.0	Alaska 800.500.3320
Painter X2	2.0	Fractal 408.688.8800, 800.647.7443
VideoFusion	1.5	VideoFusion 419.891.1090
VUMeters	1.0	Malcolm Slaney ( <a href="mailto:malcolm@apple.com">malcolm@apple.com</a> )

<ftp://mac.archive.umich.edu/mac/graphics/fractal/artabrot1.21.sit.hqx>

<ftp://sumex-aim.stanford.edu/info-mac/grf/util/photoshop-av-dsp-filters.hqx>

<ftp://mac.archive.umich.edu/mac/sound/soundutil/vumeters1.0.sit.hqx>

## [AV] Developing software for the DSP

Apple licensed the official DSP3210 develop kit to the DSP specialists at Spectral Innovations for distribution. The original kit price of \$1000 has been reduced to \$400, but also with little or no technical support.

The official kit did not sell well, at either price. Work has been underway by several enthusiasts to produce a freeware DSP3210 assembler. Version 0.13 is the latest offering before the principal architect, Paul Lalonde was hired for a new full time job (lalonde@infinity.metrowerks.ca, we wish you the best). The results are promising, producing binaries that match byte-for-byte with ones from the official kit.

Paul's advice for potential DSP developers include:

*You will also need the following two documents:*

*1. The AT&T "DSP3210 information manual" which describes the DSP's instruction set. You can get it for free from AT&T by phoning them at 1-800-372-2447.*

*2. The "Centris 660AV & Quadra 840AV" developer note, which describes the DSP operating system (aka ARTA). It's on the more recent Bookmark CDs.*

If you are interested in filling the DSP black hole left behind after the push for native Power PC code, whether you are a veteran of the digital signal processing paradigm or a beginner willing to get your feet wet, check out the DSP dedicated development directory at the AV pit stop. It contains the latest Asm3210 package, source code to two DSP programs, ARTAbrot and VUMeters, plus other development tools and instructions.

<ftp://ftp.csua.berkeley.edu/pub/jwang/develop/>

## SCSI Manager 4.3, introduction

Built-in to AV and Power Macs, and provided by System 7.5 for all other 040 CPU's except for the 63x (030 and older models lack the necessary improved SCSI controller), SCSI Manager 4.3 is designed to break through previous I/O bottlenecks. The major additions include SCSI disconnect/reconnect, fully asynchronous operations, SCSI DMA, better SCSI-2 and multiple SCSI buses support through add-on cards.

While the raw byte transfer rate is not boosted due to hardware limits, system level performance is greatly increased by returning control back to the user immediately after SCSI I/O requests are issued, rather than when they complete. With disconnect/reconnect, multiple requests can execute in parallel on multiple targets, perfect for disk arrays. With the DMA capability found on AV's and Power Macs, the CPU is relieved of even more baby-sitting duties.

To take advantage of what SCSI Manager 4.3 provides, you must update the existing driver and client application. You can still use non-4.3-savvy drivers without fear of data loss, albeit under a compatible mode that's much slower, not to mention the same performance bottlenecks as before.

## SCSI Manager 4.3, the devil is in the details

System 7.5 actually installs a slightly newer version of SCSI Manager 4.3 than what the AV or Power Mac ROM provides. However, RAM Doubler needs to be updated to version 1.5.1 before it can co-exist peacefully with the new extension.

<ftp://sumex-aim.stanford.edu/info-mac/cfg/ram-doubler-151-updt.hqx>

On AV and Power Macs, both the built-in internal hard drive and CD drive should already be SCSI Manager 4.3 ready. Apple HD SC Setup has supported SCSI Manager 4.3 ever since version 7.2, and CD-ROM Setup since 5.0. Both only recognizes Apple's own drives. The following commercial products provide full 4.3 support for speed and efficiency for third-party devices:

Anubis	2.5	CharisMac	916.885.4420, 800.487.4420
APS Power Tools	3.0	APS Tech	800.443.4199
Drive7	3.0	Casa Blanca	415.461.2249
Hard Disk Toolkit	1.6	FWB	415.474.8055
Micronet Utilities	6.0.0	Micronet	714.453.6000, 714.453.6063/BBS
Retrospect	2.1	Dantz	510.253.3000, 800.225.4880
SCSI Director Pro	3.0.7	Transoft	805.565.5200, 800.949.6463
SilverLining	5.6	La Cie	503.520.9000, (unreleased)

## VIDEO INPUT & OUTPUT

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### Graphics and Video independence

An important concept inherent in the AV frame buffer technology is the independence between standard Macintosh **graphics** (windows and desktop) and live **video** input (from either input jacks).

The frame buffer consists of two banks (video and graphics) that equally split the available video memory (1MB or 2MB). Both halves are usually combined to provide the highest possible color depth for graphics alone. When actively displaying video-in, the graphics memory usage must be reduced to fit within its own bank or the video window will be blank with an appropriate error message.

To reduce the graphics memory usage, just lower the number of colors with the Monitors control panel, or via shortcuts like AppleScript, DepthCharge, or heaven-forbid, Speech Recognition. This and any color depth change only affects graphics, video **always** plays through at 16-bit (thousands of) color or 8-bit (256) grayscale.

### Graphics: monitors and resolutions supported

The built-in monitor ports of previous Quadra and Centris models provided synchronization signals on the green output pin. This *sync-on-green* has been removed from all models since then. While this presents no problems for Apple monitors that rely on sync signals on separate pins, various third-party monitors expect or demand sync-on-green, contact the manufacturer for a possible replacement cable or adapter.

The following display table is almost verbatim from the 660av and 840av overview from Noah Price (noah@apple.com), it fully applies to the Power AV card (though not built in DRAM video). The color depth ranges are indicated with bits-per-pixel (bpp) definitions, which include:

- 1 bpp - Black & White
- 2 bpp - 4 colors or grays
- 4 bpp - 16 colors or grays
- 8 bpp - 256 colors or grays (grays only for video-in)
- 16 bpp - Thousands of colors (5 bits each R, G, and B; 1 bit alpha channel)
- 32 bpp - Millions of colors (8 bits each R, G, and B; 8 bits alpha channel)

Entries with an asterisk (\*) are the default resolution for a particular display, reduce the resolution to gain more available colors. On multi-sync monitors, different resolutions occupy the same screen area. On mono-sync monitors, the pixel size is constant and the image area is not. Entries with a pound sign (#) indicate when video-in is available at the highest graphics bit depth.

		1 MByte VRAM - bpp		2 MByte VRAM - bpp	
		=====		=====	
Display	Resolution	Graphics	Video-in	Graphics	Video-in

12" RGB	512x384*	1-32	8-16	1-32	8-16
	560x384	1-32	8-16	1-32	8-16
13" or 14" RGB	512x384	1-32	8-16	1-32	8-16
& 12" Monochrome	640x400	1-32	8-16	1-32	8-16
	640x480*	1-16	8-16	1-32	8-16
15" Portrait	512x384	1-8#	8-16	1-8#	8-16
Full-Page Monochrome	640x480	1-8#	8-16	1-8#	8-16
	640x870*	1-8	8-16	1-8#	8-16
15" Portrait RGB	640x870*	1-8	8-16	1-16	8-16
16" RGB	512x384	1-32	8-16	1-32	8-16
	640x480	1-16	8-16	1-32	8-16
	768x576	1-16	8-16	1-32	8-16
	832x624*	1-16	8-16	1-32	8-16
19" RGB	1024x768*	1-8	8	1-16	8
21" Two-Page Monochrome	512x384	1-8#	8	1-8#	8
	640x480	1-8#	8	1-8#	8
	768x576	1-4#	8	1-4#	8
	1152x870*	1-8	8	1-8#	8
21" Two Page RGB	512x384	1-16	8	1-16	8
	640x480	1-16	8	1-16	8
	768x576	1-4#	8	1-4#	8
	1152x870*	1-8	8	1-16	8
VGA/SVGA Displays	640x480*	1-16	8-16	1-32	8-16
56Hz	800x600	1-16	8-16	1-32	8-16
72Hz	800x600	1-16	8-16	1-32	8-16
60Hz	1024x768	1-8	8	1-16	8
70Hz	1024x768	1-8	8	1-16	8
VIDEO-OUT, NTSC convolved (flicker-free mode)					
Underscan (Safetitle)	512x384	1-8	NA	1-8	NA
Overscan (Fullframe)	640x480*	1-8	NA	1-8	NA
VIDEO-OUT, NTSC non-convolved					
Underscan (Safetitle)	512x384	1-32	8-16	1-32	8-16
Overscan (Fullframe)	640x480*	1-16	8-16	1-32	8-16
VIDEO-OUT, PAL convolved (flicker-free mode)					
Underscan (Safetitle)	640x480	1-8	NA	1-8	NA
Overscan (Fullframe)	768x576*	1-8	NA	1-8	NA
VIDEO-OUT, PAL non-convolved					
Underscan (Safetitle)	640x480	1-16	8-16	1-32	8-16
Overscan (Fullframe)	768x576*	1-16	8-16	1-32	8-16

## Graphics: maximum color depth

With a 1MB frame buffer and video-in disabled, the *Millions of colors* mode simply is not possible on monitor resolutions greater than 640 by 400. Use the *Options* dialog box in the Monitors control panel to reduce the display resolution and video memory usage. Depending on the monitor, choose either the 640x400 or 512x384 setting and 32-bit color will be enabled when the new resolution takes effect.

Similarly, with 2MB of video memory, 32-bit color is only possible at or below the standard 16" resolution of 832x624. With video-in active, kiss Millions of colors good-bye, unless you are using a resolution not greater than 640x400 with a 2MB frame buffer.

## Graphics: switching resolutions on-the-fly

For Apple monitors, the Apple Display Enabler can take advantage of the capabilities of built-in video to switch resolutions on-the-fly (with the *Rearrange On Close* option selected). On multi-sync monitors, the screen will resize to fit to the new resolution dynamically. For mono-sync monitors, the display area is altered along with a change in the width of the surrounding black border. Without the aid of the Display Enabler, a reboot is necessary before resolution changes take effect.

<ftp://ftp.austin.apple.com/Apple.Support.Area/Apple.Software.Updates/Peripheral.SW/Multi.Scan.Display.1.1/>

The MSD Display Enabler software is included if you buy one of the new Apple Multiple Scan monitors. However, the 660av and 840av has trouble with the new sense codes on these monitors and will always boot in 14" mode and re-sync right before the Finder appears, scrambling the desktop icons in the process. The only possible workaround is through the addition of a resolution-hardwired adapter, since monitor-sense occurs long before disk-based patching can take place. If you don't mind working with one fixed resolution on your Multiple Scan, order the MacLiberty Adapter from Enhance Cable Technology at 800.343.2425 or 408.232.0200.

## Video-in: performance, quality, and limits

Video-in on all AV models is handled by a CPU-independent Philips chipset similar to that found on the VideoSpigot. Several other pieces of specialized hardware add to deliver arbitrary size video (up to 640 by 480 NTSC, or 768 by 576 PAL) at full motion (30 fps NTSC, 25 fps PAL). The video controller and scaler chips require no CPU (nor DSP) intervention once the settings are agreed upon, video continues to blast through even in the event of a system hang or freeze.

You must be using the built-in monitor port to access the video digitizer. You will not be able to display or capture live video on monitors driven by a video card. On 16" or smaller monitors, video-in is restricted to either 16-bit color or 8-bit grayscale, though independent of the desktop graphics color depth. On 19" or larger monitors, video-in is limited to 8-bit grayscale only, irrespective of the frame buffer size.

Even with the proper signal (NTSC/PAL/SECAM) and filter (TV/Laser/VCR) settings, you may still find the default 16-bit color video quality inadequate for scientific and image analysis purposes. The analog to digital converters (ADC) are only 8-bit wide. S-Video handles luminance and chrominance data separately with dual ADC's, but still only at 8-bits each. The AV hardware then interpolate the digitized wave forms to 16-bit YUV or 24-bit RGB (when you video capture using the *Component Video - YUV* codec). Therefore, you will never get a true 24-bit color image from the digitizer. Gray-scale, with to similar transformation process, only gets you 176 usable gray-levels out of the 256 possible.



## [AV] Video-in: 1MB frame buffers and more limits

If you have a 660av or 840av equipped with only 1MB of video memory, you might have noticed the line-doubling phenomenon when displaying video at full screen. The effect is easy to spot up close, every other horizontal scan line is duplicated since there isn't enough memory for all 640 x 480 pixels at 16 bits-per-pixel (bpp) color.

If you own a 840av, adding another 1MB of VRAM (4x256K SIMMs) is the best way to eliminate line-doubling. For the budget conscious, one can lower the video memory requirement just by resizing the video window to 496 by 372 or lower, aspect ratio may vary. FusionRecorder can even crop the capture region, handy for digitizing letterboxed movies. Moving video windows partially off screen will also do the trick. However, video capture using this second option is not desirable since the region off screen comes out as garbage.

Another solution exists if you don't mind dealing with grayscale video. With AV Digitizer Options installed, you can voluntarily downgrade the video color space to 8-bit gray instead of 16-bit color. This reduces the video memory usage in half and result in a full 640 by 480 video image that fits inside the 0.5MB video bank. With this extension, you also get control of inverse gamma correction and 8-step video/graphics transparency.

<ftp://sumex-aim.stanford.edu/info-mac/cfg/av-digitizer-options.hqx>

## Video-in: Video Monitor revisited

This basic video playthrough program provided freeze frame capture via the *Copy* command in the *Edit* menu. With full screen video-in, however, such a capture does require a memory allocation of 6MB.

Video Monitor also does not bode well with QuickTime 2.0, live playthrough becomes horribly choppy when other windows clip the video-in window. Luckily, there is no shortage of replacement programs, including Apple Video Player, which was introduced for the 63x TV/Video systems. One disadvantage of AVP is the loss of AV Digitizer Options access and the ability to voluntarily drop down to gray scale video. If this is important to you for line-doubling reasons, there are two other virtual Video Monitor clones:

<ftp://ftp.csua.berkeley.edu/pub/jwang/cool/apple-video-player.hqx>  
<ftp://ftp.hmc.edu/pub/mac/PhotoCapture.sit.hqx>  
<ftp://sumex-aim.stanford.edu/info-mac/grf/util/tv-monitor-101.hqx>

## Video-in: television tuner

The composite and the S-video input ports are designed for flexibility with sources such as a VCR, Laser Disc player, or camcorder. Straight television signals must demodulate through an external tuner or VCR before they are ready for the AV. Although internal tuner cards are available for the Macintosh TV and the 63x TV/Video system, they are not compatible with any of the true AV's.

## Video-in: video conference

One popular AV compatible video conference program for TCP-based Macintosh computers is CU-SeeMe. There are very few AV-specific operational details, so please refer to the CU-SeeMe FAQ and information sites below, references thanks to Don White ([white\\_d@hccs.cc.tx.us](mailto:white_d@hccs.cc.tx.us)):

<ftp://gated.cornell.edu/pub/video/>  
<http://pogo.wright.edu/cuseeme/cuseeme.html>  
<http://www.ludvigsen.dhhalden.no/webdoc/video.html>

## Video-out: starting it up

Before attempting to display the Macintosh desktop on a projector, VCR, or television, attach the device to either the composite or S-Video output jack. At this point, open the Monitor control panel and go to the *Options* dialog box. Choose *Display Video on Television* and acknowledge the subsequent warning. If the selection happens to be disabled, first switch to a television comparable resolution (512x384 or 640x480 NTSC, 640x480 or 768x576 PAL) and then try the above.

Video-out and the RGB monitor port cannot be active simultaneously. The RGB monitor will turn blank after you dismiss the final warning, and if all goes well, you will see the desktop on the video-out device. If something went wrong and you lost the picture, hit Command-S and to save any work in progress and then hit the Power key. This will bring up the shutdown confirmation dialog box, though you can't see it, press Return for the go-ahead and wait for disk activity to cease before restarting. The AV will by default boot on the RGB monitor if it's still attached.

The manual also describes two additional methods to startup video-out, including checking the *Upon Restart Display Video on Television* option and rebooting, or holding down Command-Option-T-V (only for NTSC) during restart and letting go when video appears on the desired device. These two methods require that the RGB monitor be disconnected from the computer, cumbersome as it may be.

## Video-out: flicker reduction

If *Use flicker-free format* is turned off in the Monitors control panel, you will immediately notice the video-out flicker effect. Due to their outdated interlaced display technology, television sets will have the most problems with single pixel wide horizontal lines placed one pixel apart, i.e. window title bars.

The flicker reduction option, also known as *Apple convolution*, time averages the pixel values over multiple cycles for a perfectly stable image, but with a trade off in picture sharpness and small text readability. This option is not available when video-in is active, or if graphics is at higher than 8-bit color. Your presentation strategy with any video-out mode should include using thicker lines, larger or boldfaced fonts, widely spaced objects, etc.

## Video-out: overscan versus underscan

When using video-out, take note of the difference between **overscan** mode (full-frame, NTSC 640x480) and **underscan** mode (safe-title, NTSC 512x384). With overscan, regions of the screen, including the menu bar, will be cropped and off-screen on ordinary television sets. On the other hand, full screen visibility is guaranteed with underscan, except this means using the lowest possible resolution.

If you cannot afford to sacrifice any screen real estate for a particular presentation, use the overscan mode, but you must adjust the layout to fit the particular TV or projector you intend to use.

Lastly, with the Display Enabler installed, turning on flicker reduction complicates switching between the overscan and underscan modes. You will notice no change if you just select a resolution of the opposing mode. The workaround is tedious but simple: first disable flicker reduction and close the *Options* dialog box; now enter it again and choose between the non-convolved settings.

## Video-out: video mirroring

Video mirroring PowerBook style, or displaying the exact same image on both the RGB monitor and a television or projector via video-out, cannot be done on any AV out of the box. If such a setup is absolutely required, you need to acquire a special split cable to drive a VGA-compatible monitor and feed a separate external encoder box.

## Video-in, Video-out: subtitling potential

The on-board video-in does not support genlock, but without the aid of a hardware genlock board, users have experimented with masking graphics and text over video-in, the result of which may be piped through to video-out and displayed on a television or recorded on a VCR. In other words, using both video-in and video-out simultaneously.

When trying this out yourself, just remember to disable the default *Use flicker-free format* option or face the familiar "The Built-In Digitizer cannot display video while in the current number of colors" error message. This is a normal side-effect brought about by the extra timing requirements of frame buffer convolution. Noah Price (noah@apple.com) adds:

*In addition to the technical difficulties, you really don't want convolution on a video-input playthrough window. Ideally we could convolve just the graphics portion, leaving the playthrough window unconvolved, but that would be even more difficult.*

To take advantage of color masking, you are also limited to palette mode graphics, or 256 colors or less. One single color of the graphics palette is always masked out when mixed with video. Place the Monitors control panel spectrum bar over Video Monitor to identify the particular color. Items superimposed over a background of the mask color will appear to float if the graphics is placed over the video window.

MovieTrilogy, from Paul C. H. Ho (paulcho@io.org), promises to simplify this process greatly. Consisting of separate but cooperative programs, this shareware suite allows users to set the mask color, script text and graphics, and coordinate the overlay sequence.

<ftp://sumex-aim.stanford.edu/info-mac/grf/util/desktop-tv-120.hqx>

<ftp://sumex-aim.stanford.edu/info-mac/grf/util/movie-trilogy-111.hqx>

## Video capture: stock performance

Without dedicated compression hardware, stock AV's lack the horsepower to digitize full-motion video at full-screen, or 30 frames per second (fps) at 640 by 480. To squeeze out the best results, observe the following cost-effective tips:

- 1) Optimize your hard drive for a large contiguous block of free space. Fragmentation can cause dropped frames when recording first to disk.
- 2) Load as few extensions as possible, QuickTime and sAVe the Disk are suffice. You can certainly do without Apple CD-ROM, Foreign File Access, Express Modem/Fax, etc. Along the same lines, disable File Sharing and turn off all network connections.
- 3) Run only the Finder and the video capture program, which should be allocated all but 1 or 2MB of your free RAM (for QuickTime scratch). The Disk Cache should be no more than 128K, Virtual Memory off.
- 4) Save the frames uncompressed (check Post Compress or choose None as the compressor under Video Settings). Save to RAM if the recording is relatively short. When dealing with extended footage, consider either saving to disk (if RAM is limited) or compression-on-the-fly (if disk is limited), or both.

Video is a speedy compressor/decompressor (codec) fit for on-the-fly cases. Cinepak packs better and playback is superb, but compression is slow as molasses (taking about one minute per one second of footage), it is only suited for post-production final output. Information on some other codecs can be found on pages 9-10 of the FusionRecorder Read Me, initially in your Apple Extras folder.

- 5) Also within the Compression pop-up, set Frames per second to "Best" which saves as many frames as the digitizer and drive would allow. Change this rate only if the system can keep up and you are trying to conserve space, specifying an artificially high rate will result in useless and wasteful duplicate frames.

The average capture figures below should give folks an idea of what to expect. These numbers are non-authoritative, as they come from separate sources and methods, use them for reference only. Many factors out of the user's control can affect the final outcome, even the image content (i.e. a pitch black screen will compress much faster and smaller than a typical MTV video).

Frame Size	Compressor	Save To	(*)Average Capture Frame Rate (fps)			
			(1)660AV	32MHz	35MHz	840AV(2)
640 x 480 (Full)	Video	disk	1	1	1	1
	Video	memory	1	1	1	1
	None	disk	1	2	2	2
	None	memory	4	4	5	1
320 x 240 (Half)	Video	disk	3	3	4	3
	Video	memory	3	3	4	3
	None	disk	7	8	8	9
	None	memory	20	25	26	27
240 x 180	Video	disk	4	5	6	5
	Video	memory	5	6	6	6
	None	disk	11	13	15	16
	None	memory	26	29	30	29
160 x 120 (Quarter)	Video	disk	10	12	13	13
	Video	memory	10	12	13	14
	None	disk	26	27	28	22
	None	memory	30	30	30	30

- (\*) These results determined with QuickTime 1.6.1, version 2.0 is available offering up to 25% better capture and even better playback performance.
- (1) 660av 16/230/CD at stock and two "clock-chipped" speeds, FusionRecorder (12MB RAM partition) used for capture, Adobe Premiere 3.0 (Movie Analysis tool) used for analysis.
- (2) 840av 16/230/CD at stock speed (40MHz), Premiere 3.0 used for capture and analysis. Many, many thanks to michael\_whitney@qm.claris.com.

## Video capture: professional performance

The necessary data rate for full-screen NTSC video (640 by 480 pixels at 30 frames per second) is 18.43 MB per second. Full-screen PAL video (768 by 576 pixels at 25 frames per second) bumps the requirement to 22.12 MB/s, either of which is far higher than the maximum sustained transfer rate for a fast hard disk, at around 4MB/s.

For professional quality results, add items such as extra RAM, drive arrays and controller cards, or high capacity hard disks such as the Micropolis AV series, which turns off thermal recalibration during disk activity for better sustained transfer performance.

Unless you have the non-expandable 6100av, you may also consider DAV-based compression cards that boast 640 by 480, 30 fps capture and playback. The EyeQ/AV is one such card using Indeo technology, retailing for

\$1895. Contact New Video Corp, 310.449.7000, 310.449.0132/fax. SuperMac/Radius (800.334.3005) is the only other DAV player with SpigotPower AV, with a price tag of under \$1000.

## Video capture: quality is job #1

Here are some miscellaneous AV discussions culled from the Apple Computer Tech Info Library at [gopher://info.hed.apple.com](http://gopher://info.hed.apple.com).

Black band appearing at the bottom of my images

*The black band is most likely the blanking part of the video frame. The AV digitizer expects a certain number of lines and we've have seen this occur on other video digitizers. The signal contains the blanking information and is normally outside the display area of the typical television monitors.*

*Due to the vast amount of history with the NTSC standard, there is some "freedom" about exactly how blanking works. If the number of image lines the AV digitizer is expecting is more than what the source supplies, there will be visible blanking info at the bottom of the image (or at times, on one of the edges).*

*When capturing still frames it is relatively easy to fix these captured images using an application like Photoshop or Painter. Simply use their tools to crop out the unwanted area. While not an ideal solution, it is only one available to eliminate this part of the display. Some video capture applications provide a crop rectangle so that cropping can be specified prior to the capture.*

Extremely bright S-Video images

*Based on what the AV expects in a video signal, it is possible to over saturate the bright areas of an image. Over saturation is easier to introduce with S-video because you have a stronger signal available. Choosing the VCR option (instead of the TV/video disc option) in the video input control panel provides the best setting in such situations. The best way to control the brightness is during the shooting of the video. Keeping the contrast ratio as low as possible will provide the best results.*

Capture at field versus frame resolution

*There are two issues to consider in the area of video resolution versus computer pixels. First, the output of the analog video device does not always map directly to the pixel count of the digital device.*

*Second, concerns the number of pixels that are captured by the AV system. Based on VRAM of 1MB, a true 640x480 image can not be captured. A 640x480 image can be created, but it will use line-doubling from single field to produce the full screen image. To get a full 640x480 image using both fields 2MB of VRAM is required. The 1MB limits the dual field/undoubled line image to 496x372 pixels.*

*Some additional thoughts to consider on single field versus single frame, which uses both fields: If the capture image is 240 or less lines vertical 1 field is dropped to scale the image. Two examples:*

*First case, 1MB VRAM - if the capture image is greater than 240 lines vertical or is equal to/less than 372 lines vertical, then both fields are used. A scalar chip is used to scale the information from the two fields.*

*Second case, 2MB VRAM - if the capture image is greater than 240 lines vertical, up to 480 lines vertical, both fields are used. Again a scalar chip is used to scale both fields to the selected image size.*

## AUDIO INPUT & OUTPUT

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### [AV] Audio-in, Audio-out: hardware specifications

From the 660av and 840av Developer Notes, Power Mac specifications probably differs somewhat:

*Audio In: 8 kilo-ohm impedance, 2 V rms maximum, 22.5 dB gain available.*

*Audio Line Out: 37 ohm impedance, 0.9 V rms maximum, attenuated -22.5 dB (crosstalk degrades from -80 dB to -32 dB when the audio output is connected to 32 ohm headphones).*

*Sound I/O bandwidth is 20 Hz to 20 kHz, plus or minus 2 dB. Total harmonic distortion and noise is less than 0.05% over the bandwidth with a 1 V rms sine wave input. The input signal-to-noise ratio (SNR) is 82 dB and the output SNR is 85 dB, with no audible discrete tones.*

### Audio-in: line level and the PlainTalk microphone

The AV and all subsequent desktop computers handle line-level audio input for greater flexibility. This translates to less hassle with external audio sources such as a stereo or CD player and greater dynamic range, but does present a problem for weakly-powered microphone inputs.

The original Apple omni-directional disc microphone cannot be used. The PlainTalk microphone, with a built-in preamplifier for line-level output, is required by any AV, Power Mac, LC475, or Quadra 605, just to name a few models. Note the 0.75" long PlainTalk microphone plug, which uses an unique all-in-one design to channel +5Vdc power (tip), mono sound (ring), and ground (sleeve).

Do not worry about standard 0.5" stereo mini-plugs. If the signal is line-level (an externally or battery powered mic, for example), the standard plug **will** work. In rare cases, you may need to shave a bit off the plastic ring on the sound-in port for optimal fit. With external line-level audio sources, you will likely require a dual RCA phono plug to stereo mini-plug adapter. Purchase a Radio Shack Y-adapter or equivalent. However, do not use the original Apple Y-adapter for LC's and PowerBooks, which attenuates the signal back down to mic-level.

Written by Malcolm Slaney (malcolm@apple.com), the utility VUMeters is extremely useful when testing audio input and output, its Read Me states:

*This application measures the sound level at the input and output of the DSP sections of the Macintosh AV computers. Use it to verify that you have sound connected to the sound input of the Macintosh AV computers.*

<ftp://mac.archive.umich.edu/mac/sound/soundutil/vumeters1.0.sit.hqx>

### Audio-in: multiple input sources and playthrough

CD-equipped AV's and Power Macs consider the internal CD a separate input source apart from the microphone or external audio port. The *Sound In* pop-up panel of the Sound control panel is supposed to manage between the multiple sources. For example, to hear an audio CD, you should first select the internal CD as source and check playthrough. If you are greeted by a "The sound input device options cannot be accessed at this time"

error message, turn off programs that lock the sound setting, including the Express Modem and Video Monitor, and try again.

However, sound settings do not "stick" between restarts on Power Macs without System Update 3.0. Even then, programs that keep private sound settings, Video Monitor for one, tend to mangle the settings after they finish. To juggle between the input options efficiently and effortlessly, check out my freeware application CD Playthrough.

<ftp://ftp.csua.berkeley.edu/pub/jwang/cd-playthrough-11.hqx>

## Audio-out: sound out rate frequencies

An AV can output sound at 22.050, 24.000, 44.100 (CD standard), and 48.000 (DAT) kHz, while a Power Mac can output at 22.050 and 44.100 kHz. Rate conversions to the higher frequencies are handled by the Real Time Manager, which in turn send the task to the DSP or the Power PC processor. When playing an audio CD, higher sound out rates can make a distinctive difference in quality, especially in the upper tones and ranges. However, for other bandwidth-intensive real-time processes such as the GeoPort Express Modem or PlainTalk Speech Recognition, you are **required** to return the *Sound Out* rate to 24.000 (AV) or 22.050 kHz (Power Mac).

## Audio capture: performance and quality

Recordings from the PlainTalk microphone are not indicative of the sound-in capabilities, since the mic is uni-directional and monaural, optimized for speech recognition. Instead, record with a hi-fi stereo microphone first to a tape or DAT deck and then pipe this recording back in to the computer at line-level.

For extended sound recordings, many of the video capture performance enhancing tips in the previous section also apply..

## Audio capture: CD, DAT, and the digital domain

Versions of QuickTime since 1.6 can digitally convert audio CD data over the SCSI bus, bypassing the lossy A/D conversion stages to retain their original digital accuracy in full. If you have an internal or external version of the AppleCD 300 or 300 Plus:

- 1) start any QuickTime aware application, even SimpleText
- 2) select *Open* from the *File* menu
- 3) navigate to the mounted Audio CD and select a track file
- 4) press *Convert*
- 5) press *Options* to change sampling parameters

Besides obvious copyright considerations, the user should be aware of the following two caveats.

Set the sample depth to 16-bit quality. 8-bit sound lacks enough fidelity to reproduce the native 16-bit quality for audio CD's. You can expect audible hiss during playback of such samples, more so on superior speakers or a pair of headphones. However, 16-bit sounds does take up twice as much space or more, since they are not supported by the venerable Macintosh Audio Compression and Expansion (MACE) routines.

Stereo sampling present a separate problem with QuickTime 1.6.x, where left and right audio channels are swapped at random. Playback becomes especially intolerable through a pair of headphones. QuickTime 2.0 fixed this important bug and also adds audio to AIFF support.

Users can also extract the encapsulated audio with either Movie2Snd (to System 7 sound file) or SoundTrack (to AIFF). For third-party CD-ROM drive mechanisms, there is the commercial program Disc-to-Disk (Optical

Media, 800.347.2664) which can directly convert from audio CD to AIFF, .snd, and even .wav files. For digital I/O with external devices (DAT decks via SPDIF), the only option seems to be the AudioMedia series of NuBus cards from Digidesign (800.333.2137, 415.688.0600, 415.327.0777/fax).

<ftp://mac.archive.umich.edu/mac/sound/soundutil/soundtrack.cpt.hqx>  
<ftp://sumex-aim.stanford.edu/info-mac/snd/util/movie-2-sound-111.hqx>

## Sound editing and manipulation

For very basic sound cutting and pasting, you can simply adopt Fusion Recorder with its video turned off. You will probably have to download the two QT to sound converters mentioned above for practical purposes.

If your needs call for 16-bit sound effects, note that Macromedia has released SoundEdit 16 to supersede SoundEdit Pro 1.0.5, which disabled all but the "backwards" effect with 16-bit sounds.

If you would prefer a shareware program, test drive the Sound Effects 0.9 package. It is still buggy, but shows quite a large promise.

<ftp://sumex-aim.stanford.edu/info-mac/snd/util/sound-effects-09.hqx>

## [AV] Professional quality audio mixing software

Michael Emery (memery@aol.com) once asked on MACAV-L:

*Which 16-bit audio software should I acquire for mixing mono VOs and narration tracks, and stereo music tracks?*

The reply from Craig O'Donnell (dadadata@world.std.com) was:

*Your main requirements are a very large hard disk for your audio (600MB or larger) and, if you're going to back up the source files, a DAT backup (not an audio DAT).*

*As far as your other requirements, DigiTrax is pretty much the simplest thing going for that application. You could also look at Vision AV from Opcode, but Vision and Deck are both biased toward the MIDI musician who needs to sync MIDI music tracks to hard disk based audio tracks, (ie, MIDI instruments with a guitar and vocals overdubbed).*

*For version 1.0, DigiTrax is remarkably robust and although I have some quibbles with the interface, it is far less complex than Deck.*

*-- COD, author of "Cool Mac Sounds"*

Both of these two programs take advantage of the on-board DSP to provide multi-track recording and mixing. Both are also being re-written for the Power Macintosh. For Deck II information, call OSC at 415.252.0460. For DigiTrax, contact Alaska Software at 800.500.3320 or AlaskaSoft@aol.com, a DigiTrax software demo is also available at:

<ftp://sumex-aim.stanford.edu/info-mac/snd/util/digi-trax-10-demo.hqx>



# GEOPORT & TELEPHONY

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## GeoPort: what is it?

By itself, the GeoPort is simply a new high speed serial port architecture, capable of 4 megabit-per-second transmission in theory. GeoPort devices sport mini DIN-9 connectors that are keyed so they cannot be inserted in normal DIN-8 serial ports. The extra 9th pin provides power to the device, which usually supplies its own clock signal to achieve higher transmission rates.

AV's contain one GeoPort, in place of the modem port, Power Macs have two. So far, only two GeoPort devices exist: the GeoPort Telecom Adapter (analog telephone adapter pod) and the QuickTake 100 camera (which also has a regular serial interface), both from Apple. The promised PBX and ISDN interface adapters have yet to surface.

Normal serial devices, such as modems and printers, have no trouble with GeoPorts under most circumstances, though compatibility is an issue. For hardware devices that fail, you need ASFU Fixer, an extension that patch installs the regular serial driver in place of the GeoPort one. ASFU Fixer is a product of GDT Softworks, and has worked for GDT's PowerPrint, Software Toolworks' Miracle Piano, Video Director, and no doubt others as well. Do not use this patch with GeoPort specific devices for obvious reasons.

<ftp://ftp.csua.berkeley.edu/pub/jwang/patches/asfu-fixer.hqx>

## GeoPort Telecom Adapter: know before you buy

The \$125 adapter, which converts analog telephone signals to digital form, consists of A/D converters, relays, and a 16-bit Singer audio codec, among other things. The digitized signal is then sent to the 040-DSP combo or Power PC chip running Express Modem. The entire setup, when active, increases the System RAM usage by more than 500K. It also requires that the Sound Out rate be locked at 24.000 or 20.050 kHz for an AV or Power Mac.

To be fair, the adapter performs well enough on a 660av or 840av thanks to the separate DSP. A 14.4K connection basically sucks up all of the available real-time bandwidth, precluding concurrent Speech Recognition.

The Power Mac reaction to the adapter is less pleasant. More bandwidth is indeed available with a Power PC processor, a 8100/80 was even shown running Speech Recognition with a 2400 modem connection in parallel. However, both would hit the single main processor resulting in a sluggish overall system. Owners of the 6100/60 have reported upwards of a 30% performance hit and sluggish 1200 cps or lower transfer rates no matter what setting they try.

## GeoPort Telecom Adapter: quality control

An alarming number of first generation GeoPort Telecom Adapters do not function reliably, due to a separation of the EMI shielding from the pod chassis. The afflicted adapters would sometimes produce a low buzzing sound when trying to dial, and are liable to cause random system crashes.

If a pod displays such symptoms, ask firmly for a replacement from your dealer or 800.SOS.APPL. The new models either bear an indelible ink dot marked on their printed label or new labels with part number 825-2362-B instead of 825-2362-A.

## GeoPort Telecom Adapter: software updates

The physical adapter itself can be used with any GeoPort-equipped AV or Power Mac, provided that an appropriate GeoPort driver is present. The DSP-powered GeoPort 1.2.2 software is available for the 660av and 840av:

[ftp://ftp.austin.apple.com/Apple.Support.Area/Apple.Software.Updates/Net.and.Comm.SW/Geoport.660AV-840AV.\(1.2.2\)/](ftp://ftp.austin.apple.com/Apple.Support.Area/Apple.Software.Updates/Net.and.Comm.SW/Geoport.660AV-840AV.(1.2.2)/)

For a Power Macintosh, you should upgrade to the System 7.5-compatible GeoPort for Power Mac 1.0.2 package:

<ftp://ftp.austin.apple.com/Apple.Support.Area/Apple.Software.Updates/Net.and.Comm.SW/GeoPort.for.PowerMac.1.0.2/>

## Express Modem: 9600 vs. 14400 vs. 28800

The current pod and software actually can operate reliably at 14400 bps (bits per second), despite the 9600 only specification, which arose from the 9600 Express Fax limitation.

Under normal line conditions, downloads reach 1600 cps (characters per second, 10 bits per character). However, uploading pre-compressed files when modem compression (V.42bis) and error correction (V.42 LAP-M) are both enabled trips up an apparent bug in the modem software and nets anywhere between 800 to 1200 cps. If the phone line is reasonably clean, the init string "AT&Q0" shuts off both modem options and yields a far more respectable ~1400 cps both ways.

An often asked and hotly debated question over in comp.sys.mac.comm is whether the CPU-powered GeoPort and Express Modem combination can be updated, in software alone, to handle V.34 and 28.8K transmission. Apple has been predictably mum on this matter, despite a somewhat boastful introduction in the Express Fax/Modem User's Guide, on page 3:

*With most commercially available modems, if you want to take advantage of improved technology, you must buy new hardware. The advantage of having a software modem is that you can easily upgrade your modem just as you upgrade any other software. With a software modem, you can obtain the latest improvements by upgrading your software from a disk or server.*

With the V.34 protocol finalized and ratification not far behind, Apple, and only Apple, may soon be able to settle the question authoritatively. Until then, speculations, and only speculations, abound on whether a DSP or a PowerPC 601 chip can provide enough real-time processing horsepower.

## Express Modem: compatibility

Several users could not, initially, get terminal emulators (ZTerm being the most frequent example) to acknowledge the Express Modem. Here are some simple tips to try with your program:

- Make sure the GeoPort is selected rather than the Modem port (e.g. hold down the shift key when opening ZTerm).
- Leave the hardware handshaking and other gobbledygook options turned off.
- Select a high modem speed of 57600 or 38400, and step down as necessary.
- Don't forget to turn on and select *Use Express Modem* in the EM control panel, unless an external stand-alone modem happens to be connected.

America Online users experiencing consistent line drops should upgrade their connection program to version 2.1 or later for full 9600 compatibility. Prodigy users should upgrade to 9.67.05 or later.

On the other hand, software that uses the Communication ToolBox (CTB) will have no trouble with the included Express Modem tool. Similarly, SLIP/PPP packages that support standard CCL dialing scripts can use the Express Modem 14400 or any Hayes compatible modem script.

With TIA (The Internet Adapter), you have to dial, connect, and launch TIA all through an InterSLIP gateway script, a working sample is available for you to customize. The standard method of dialing with a terminal program won't work since the Express Modem (a bus modem) goes off-hook every time the connect tool or program is closed, dropping the carrier. This also means there is no way to hold a connection in place between restarts.

<ftp://ftp.netcom.com/pub/billa/tia/>

## Express Modem: software updates

Express Modem version 1.5.3 is the latest hardware-independent fax/modem package. The software supports all AV and Power Macs in addition to PowerBooks, despite a Read Me that states the contrary. Modem transfer rates have improved over the original 1.1.4, especially for uploads of pre-compressed files. Express Fax has been fixed to correct the bug that inverted faxes when the monitor is set to more than 256 colors; also added was V.17 high speed reception.

<ftp://ftp.austin.apple.com/Apple.Support.Area/Apple.Software.Updates/Net.and.Comm.SW/Express.Modem.SW.1.5.3/>

## Telephony: call management between data/fax/voice

Call management between data and fax is available out of the box with the GeoPort Telecom Adapter, check pages 80-83 of your Express Fax/Modem User's Guide. Voice detection does not work with Apple Phone since the program taps the DSP directly and hogs the GeoPort all to itself.

## Telephony: where are the tools?

Apple Phone, the only program that resembles telephony, is now described as only a DSP demo (it will not work on a Power Mac). It is certainly not the digital solution many had hoped for, as the answer machine often hangs up prematurely while the caller is still speaking. On rare occasions, it would continue to record even after the other party has disconnected. Both are signs of a faulty carrier drop detection routine.

Third party developers are trying to create more capable digital telephony tools but have so far met nothing but frustration, their efforts thwarted by the lack of any GeoPort documentation or developer kit from Apple. The situation is summed up by Steve Knight of Northern Telecom ([sdk@cci.com](mailto:sdk@cci.com)):

*Last November, Michael Bayer (the "communications" evangelist, bitch to Bayer1@apple.com) claimed that the GeoPort Telephone Manager Tool development wasn't scheduled. In May at the WWDC, they pronounced the Comm ToolBox as dead (long live Open Transport, may it fare better than the poor Comm ToolBox) and danced away from the idea of giving out the API's for the GeoPort (so we could at least write our own bloody TM tools). The exact question was "when will you be releasing the GeoPort API's?", the answer was a long version of "uhhh, don't know."*

The situation remains unresolved, and Bayer1@apple.com has ceased to remain a valid address. Telephony and DSP-savvy tools remain the darkest aspect of the AV promise.

# PLAINTALK TECHNOLOGIES

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## Terminology and overview

PlainTalk refers to the concept of natural spoken language communication between user and computer, including both Speech Recognition (SR) and Text-to-Speech (TTS).

The SR "engine" consists of the extensions Speech Recognition, SR Monitor, control panel Speech Setup, plus required assistance from AppleScript. SR only works on AV and Power Macs due to the real-time processing power requirements, but it does not work on 68040 Macs with the Power PC PDS upgrade card due to the lack of 16-bit audio input.

The TTS "engine" consists of the extension Speech Manager, with speech synthesizer components MacinTalk 2, MacinTalk 3, and MacinTalk Pro. The requirements of TTS vary greatly depending on the synthesizer you use, from a Mac Plus running System 6.0.7 (minimum MacinTalk 2), to a 68040 running 7.1 (highly recommended for MacinTalk 3). Exact synthesizer requirements are discussed a few headings below.

you can see, there is plenty of room for confusion with a slew of names for concepts, files, and components. Please explicitly use the following names when discussing PlainTalk in the correct context:

- MacinTalk 2 v1.1.1, 1.2.1 (current)
  - low-quality speech synthesizer, v1.1.1 is built-in to Speech Manager 1.1.1, standalone file v1.2.1 is optional with Speech Manager 1.2.1 and 1.3.
- MacinTalk 3 v1.2.1, 1.3 (current)
  - special-effects speech synthesizer, built-in to Speech Manager 1.2.1 and 1.3, this has **never** been a standalone file.
- MacinTalk Pro v1.2.1, 1.3 (current)
  - natural language speech synthesizer, both versions are standalone files optional under Speech Manager 1.2.1 and 1.3.
- PlainTalk Text-to-Speech v1.0 (obsolete)
  - extension found only with PlainTalk 1.0 (660av and 840av); forerunner to Speech Manager with an all-in-one design containing MacinTalk 2 v1.0 and MacinTalk Pro v1.0 plus the Female Compressed voice.
- Speech Manager v1.1.1, 1.2.1, 1.3 (current)
  - basic extension required for TTS, controls voices and synthesizers.
- Speech Recognition v1.0, 1.2.1, 1.3 (current)
  - basic "recognition" extension required for SR.
- SR Monitor v1.0, 1.2.1, 1.3 (current)
  - background-only "listening" application launched as SR activates.

## Speech Recognition: performance, quality, and limits

PlainTalk Speech Recognition is a speaker-independent, connected-speech, environmentally adaptive system. SR can be used to complete dialog boxes, select pronounceable menu items, and execute user-defined aliases and macros. SR does not perform dictation (speech-to-text). For this capability, you should seek out the PowerSecretary program from Articulate Systems.

Realistically, 16MB of physical memory is required to run any modern applications with SR, which reserves 2.5MB without, or up to 5MB with speech feedback. On a DSP-equipped 660av or 840av, active SR imposes

negligible performance penalty to the main CPU, while a Power Mac is slowed down by approximately 10-15%. The recognition rate ranges from mediocre to excellent, depending on the speaker and environment. You will likely find the optimal tolerance setting for the best "hit rate" after a short time of experimentation.

For better SR performance, Jabra (619.622.0764, 800.EAR.2230) offers the Ear PHONE Streamline Power/AV, a combination ear/microphone along with PlainTalk-savvy dialer software that provides hands-free telephone operation. MacWarehouse (800.255.6227) lists it for \$129.95 (INP 0324).

## Speech Recognition: versions and updates

North American editions of the 660av and 840av are pre-installed with PlainTalk 1.0 software. SR 1.0 was written specifically for the DSP, and did not work on Power Macs. PlainTalk 1.2 was introduced later with a Power Mac-only SR 1.2. Only the Power AV systems actually ship with the software and microphone (order M9060Z/A, about US\$25).

The latest PlainTalk 1.3 has been released to take advantage of System 7.5. This version can be used with all 660av, 840av, and Power Macs. A couple of aspects SR 1.3 do **require** System 7.5, including Apple Guide help and new "smart" Speakable Items aliases that query the scriptable 7.5 Finder for their targets. If you install SR 1.3 over Finder 7.1 and try to execute a Speakable Item, it will cause AppleScript time-out errors but no real harm. You can hand-link necessary aliases to the Apple Menu Items folder for now and avoid the Speakable Items folder until 7.5.

<ftp://ftp.austin.apple.com/Apple.Support.Area/Apple.Software.Updates/Supplemental.System.SW/PlainTalk.Software.1.3/>

## Text-to-Speech: synthesizers and requirements

The PlainTalk Text-to-Speech file organization has changed greatly since the AV introduction. The current file layout consists of Speech Manager with the MacinTalk 3 synthesizer built-in, and optionally MacinTalk 2 and MacinTalk Pro. With up to three different synthesizers installed, Speech Manager automatically invokes the one associated with the particular voice chosen.

### MacinTalk 2

- Voices: Marvin (built-in), Brenda et al (all in MacinTalk 2 Voices)
- Only synthesizer that works on a Mac Plus with System 6.0.7 and on up
- Intended for low quality speech, with limited capabilities to convert abbreviations and number strings to text
- Small 150K memory footprint, approximately 30K disk space per voice
- v1.1.1 built into Speech Manager 1.1.1; v1.2.1 optional with 1.2.1 and 1.3

### MacinTalk 3

- Voices: Fred (built-in), Albert et al (separate small voice files)
- 68020 or better, System 7.1 required
- Most CPU-intensive (fancier pitch control), you may experience choppy or stuttering speech on anything less than a 68040
- Provides special effects voices (laughing, sing-song, underwater)
- Built into Speech Manager 1.2.1 and 1.3; not available earlier

### **MacinTalk Pro**

- Voices: Victoria, Bruce, Agnes (large files with distinctive "lips" icons)
- 68020 or better, System 7.0 or better required
- Most resource hungry, 700K-2.6MB RAM, 300K-2MB disk space per voice
- Most human and natural sounding, highly intelligible speech output with extended text processing rules (32 digit long numbers, for example).
- Optional component under Speech Manager 1.2.1 and 1.3

## **Text-to-Speech: versions and updates**

PlainTalk 1.3 installs Speech Manager 1.3, AV and Power Mac owners should see the Speech Recognition section above for upgrade details. For folks not interested or not capable of SR, a functionally equivalent Speech Manager 1.2.1 is available separately. This directory also stores MacinTalk 2 v1.2.1, MacinTalk 2 v1.2.1 voices, MacinTalk Pro v1.2.1, MacinTalk Pro v1.2.1 voices (each in small, normal, and high quality varieties), and the complete set of MacinTalk 3 v1.2.1 voices:

<ftp://ftp.austin.apple.com/Apple.Support.Area/Apple.Software.Updates/Supplemental.System.SW/Text-to-Speech.Software/>

If you are upgrading from PlainTalk 1.0 or Speech Manager 1.1.1, note that voices must now reside in a new Voices folder inside Extensions. Move the following pieces manually to their new location:

MacinTalk Voices 1.1.1 (you can update to 1.2)	-> Trash
PlainTalk Text-to-Speech 1.0	-> Trash
Speech Manager 1.1.1	-> Trash
TTS Female voice 1.0	-> Extensions:Voices or Trash
TTS Male voice 1.0	-> Extensions:Voices or Trash
TTS Male voice, Compressed 1.0	-> Extensions:Voices or Trash

The three Female and Male voices listed at the bottom will work in the new location, the compressed Female voice cannot be salvaged as it was actually embedded in the PlainTalk Text-to-Speech extension. However, you may soon find that even normal flavors of Victoria and Bruce offer more quality **and** use less memory and disk space.

## **Text-to-Speech: miscellaneous tidbits**

Besides TeachText 7.2 and SimpleText, there a number of Speech Manager aware applications. Dr. Joe Campbell ([jpcampb@afterlife.ncsc.mil](mailto:jpcampb@afterlife.ncsc.mil)) used to maintain such a list, the somewhat outdated March 94 edition is at:

<ftp://sumex-aim.stanford.edu/info-mac/info/sft/speech-manager-apps-94-03-28.txt>

To set the default reading voice with applications such as SimpleText, there is Robert Geisler's ([geisler@zappa.mpib-tuebingen.mpg.de](mailto:geisler@zappa.mpib-tuebingen.mpg.de)) freeware:

<ftp://sumex-aim.stanford.edu/info-mac/snd/util/voices-11.hqx>

With MacinTalk Pro voices, you can save spoken speech to disk as System 7 sound files through examples given in the HyperCard stack by Lawrence D'Oliveriro (ldo@waikato.ac.nz):

<ftp://sumex-aim.stanford.edu/info-mac/card/speech-manager-ext.hqx>

For international voices, Darren Giles (mars@netcom.com) writes:

*Telia makes a number of international voices for MacinTalk; they can be reached through britt.grovablebakke@infovox.se.*

## MISCELLANEOUS

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### AV systems world-wide

With the original AV's, localization of the System CD InstallMeFirst varied region by region. European systems do not include the CD, although Australian and New Zealand systems do. Software such as PlainTalk or Apple Phone fall under similar local restrictions.

### Easter eggs

The North American (non-localized) edition of the 660av and 840av CD InstallMeFirst has an invisible QuickTime movie called "Our Gang!" hidden in the Preferences folder. Open your favorite movie player and use the standard File Open dialog to view the file since you cannot detect it on the desktop.

There are also a couple of pictures tucked away in the ROM, which have been extracted and archived for your convenience.

<ftp://sumex-aim.stanford.edu/info-mac/grf/av-rom-images-jpeg.hqx>

Two rather unique hardware error sounds were stashed in AV and Power Mac systems. Restart your Mac and press the interrupt button (or command-power) immediately after you hear the startup chord (the Bong! or Bing!).

The vaunted PlainTalk Speech Recognition (develop code name: Casper) Easter eggs are hidden within the version 1.2 System Speech Rules file, archived along with full instructions at:

<ftp://ftp.csua.berkeley.edu/pub/jwang/plaintalk-easter-eggs.hqx>

### FAQ and file updates

The AV pit stop is the official home for this FAQ and many other related files, located at:

<ftp://ftp.csua.berkeley.edu/pub/jwang/>

Internet users may finger a special service to check for new additions to the AV pit stop, which performs a detailed and recursive directory list of all files available for FTP:

`finger jwang.av-dir@ocf.berkeley.edu | more`

Currently under construction, the HTML version of the FAQ is available for those with Mosaic or another WWW browser:

<http://www.csua.berkeley.edu/~jwang/av.html>

For faster access from Japan or the Pacific Rim, there is a comprehensive ftp service maintained by Hiroyuki Takahashi (hiro@cent.saitama-u.ac.jp), containing an exhaustive collection of AV related documents, patches, and applications, including an on-going translation of the FAQ to Japanese.

<ftp://ftp.cent.saitama-u.ac.jp/pub/mnt5/mac/av/>

For non-Internet surfers, current versions of the FAQ should be mirrored at the following on-line services (let me know if you upload to others):

- America Online, thanks to hiramw@aol.com
- BMUG and affiliates, thanks to Mark Schrier (shrier@garnet.berkeley.edu)
- OneNet (FirstClass), thanks to Tyson B. Boucher
- Ziff/Net, thanks to Craig O'Donnell (dadadata@world.std.com)

## MACAV-L mailing list

Bill Higgins (higgins@fnal.fnal.gov) brought to my attention the MacAV-L mailing list. To subscribe to MacAV-L, send the following in the mail **body** to [LISTSERV@UAFSYSB.UARK.EDU](mailto:LISTSERV@UAFSYSB.UARK.EDU) on BITNET or [LISTSERV@UAFSYSB.UARK.EDU](mailto:LISTSERV@UAFSYSB.UARK.EDU) on the Internet:

SUB MACAV-L your.firstname your.lastname

If you only want the daily digests (one long e-mail message instead of many short ones), send the following command (also in the **body**) to the above [LISTSERV](mailto:LISTSERV@UAFSYSB.UARK.EDU) address at any time:

SET MACAV-L DIGESTS

To unsubscribe, send yet one more command in the **body** to the [LISTSERV](mailto:LISTSERV@UAFSYSB.UARK.EDU) address:

SIGNOFF MACAV-L

## LEGAL DEPARTMENT

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## **Thank you's (in no particular order)**

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