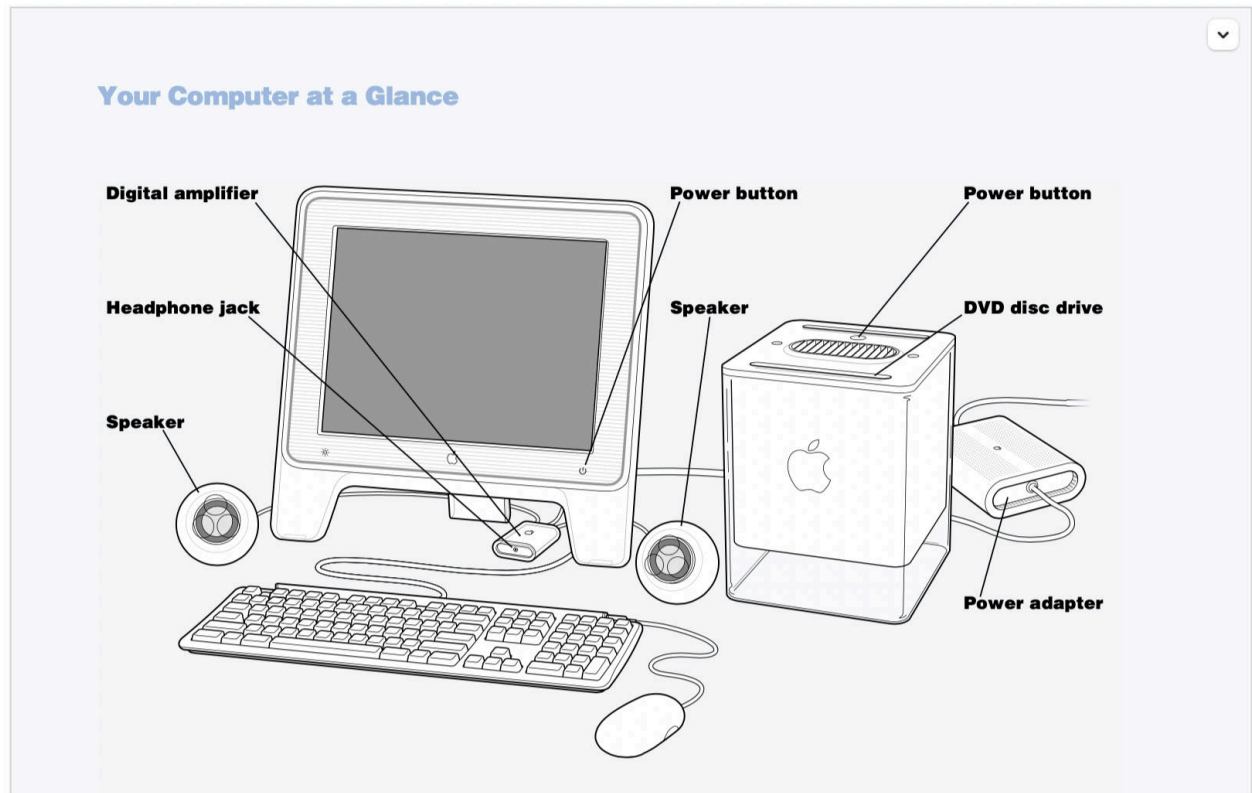


POWER MAC G4 CUBE

UPGRADES

CPU, graphics, RAM, storage, optical drive, cooling, networking and other modifications.

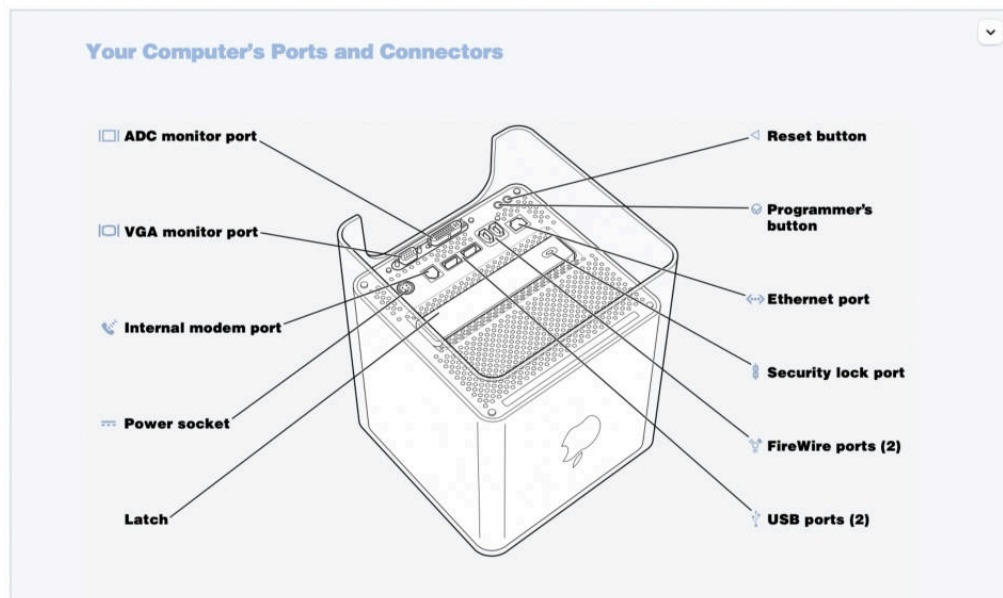


One change at a time.

The original Apple Retro Cube manuscript repeatedly treats upgrading as a process rather than a single event. The strongest working rule is simple: if several changes are planned, perform and test them one at a time.

- Back up important data before changing storage, partitioning a drive or opening the machine.
- Confirm each new device or modification before moving to the next.
- Keep notes on what changed. If a problem appears, return to the last known-good configuration.
- Disconnect power before disassembly. The source material also warns against pulling powered USB, FireWire, display or storage connections.
- Cooling becomes more important as CPU and graphics demands rise.

v4 editorial rule: Useful working material from Guide v3 remains visible, including items originally marked “check this,” question marks or other verification notes.



Processor upgrades.

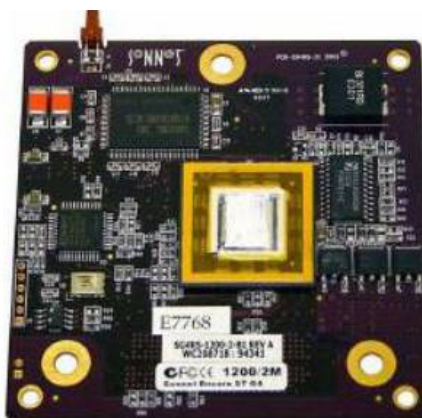
Guide v3 documents several processor paths, including Sonnet upgrade cards and Apple OEM dual-processor experiments. It lists single-CPU Sonnet possibilities at 800 MHz, 1.0 GHz, 1.2 GHz, 1.4 GHz, 1.47 GHz and 1.8 GHz, plus a 1.6 GHz dual-processor Sonnet option. The manuscript also records 450 MHz and 500 MHz dual-processor Apple OEM card modifications.

VERIFY: The model list, electrical requirements, cache figures and exact Cube compatibility were explicitly marked for checking in the source manuscript.

Sonnet preparation recorded in Guide v3

- The manuscript says the Sonnet CPU upgrade path requires Mac OS 9.2.x, with some cards requiring at least 9.2.1.
- It records Boot ROM / firmware version 4.2.8f1 as a prerequisite to be installed from OS 9 before physically installing the Sonnet card.
- It notes that the firmware updater is not run from OS X or Classic, although System Profiler can be used to inspect the Boot ROM version.

Guide v3 names Sonnet Software Package 3.1, the Sonnet Firmware Updater and SonnetCache 1.3.



What is G4 Cube Firmware Update 4.1.9?

The G4 Cube Firmware Update 4.1.9 will run only on G4 Cube models running Mac OS 9.1 or later from a local hard disk. If you are using Mac OS X on your Cube, you must start up from a local Mac OS 9.1 or later writable partition (not a CD or network disk) before following the update instructions.

Firmware Update 4.1.9 is also available for [Power Mac G4 models](#) and iMac computers with slot-loading CD or DVD drives.

Firmware Update 4.1.9 includes improvements to starting up Mac OS X from the local hard disk, FireWire target disk mode, network startup, and system stability. This update also adds support for additional security options that allow the Open Firmware to be password-protected.

Dual-processor fitment.

The original guide contains hands-on notes for adapting 450 MHz and 500 MHz dual-processor hardware to the Cube's physical constraints.

450 MHz dual CPU

One documented approach moves and re-solders a magnetic/inductor coil. The manuscript says this was successful, but Apple Retro was looking for a way to avoid soldering the processor-board components.

500 MHz dual CPU

The Apple Retro working solution recorded in Guide v3 was mechanical: material was removed from the alloy heat sink and part of the handle shaft to make room for the inductor coil. The notes call for approximately 3 mm of clearance so the copper coil cannot contact the heat sink.

REVIEW BEFORE PUBLICATION: *These are workshop notes, not yet a step-by-step public procedure.*



Graphics upgrades.

The Max Mod notes identify ATI 9K Pro cards in 64 MB or 128 MB configurations and a GeForce 6200 with 256 MB as higher-end graphics directions. Elsewhere, Guide v3 documents an ATI Rage 128 Pro 16 MB configuration and its display limitations.

VERIFY: *Exact card models, ROM requirements, ADC/DVI behavior, power draw, physical fit and Cube compatibility need specification-level checking before publication.*

Display notes from the ATI Rage 128 Pro section

- 15-inch Apple Studio Display: manuscript lists a maximum of 1024 x 768.
- 17-inch Apple Cinema Display: manuscript lists a maximum of 1280 x 1024.
- 22-inch Apple Cinema Display: manuscript lists a maximum of 1600 x 1024.

The source specifically connects demanding graphics work with cooling and system stability.



Memory.

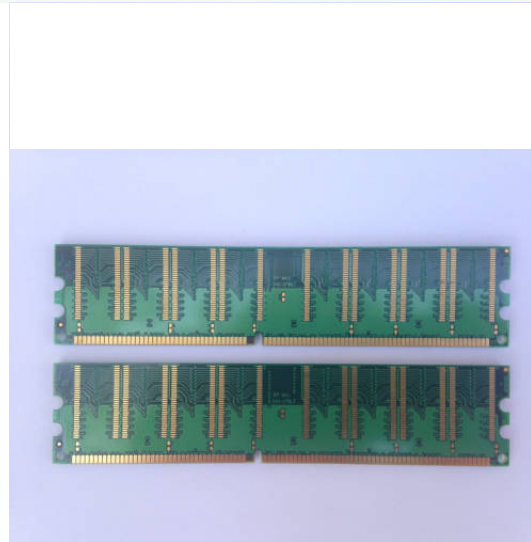
Guide v3's Max Mod material specifies 1.5 GB SDRAM as the working memory target and records Kingston 512 MB modules. The manuscript describes the modules as matching in model and specification, while noting that the actual chip manufacturer can sometimes vary.

- The notes identify PC133 SDRAM and specifically record Kingston 512 MB PC133-222-620 modules.
- The source also describes the Cube logic board as a 100 MHz bus system.
- Its Max Mod summary says the system is compatible with 63 / 100 / 133 MHz SDRAM; that wording should be checked before public release.

A conservative build principle

Use known-good memory, match modules where practical, test the system after installation, and do not introduce several unrelated upgrades at the same time.

VERIFY: Final public text should state supported memory type, slot count, per-slot capacity and total usable maximum from authoritative specifications.



Larger internal storage.

Storage is one of the most developed upgrade subjects in Guide v3. The manuscript records Apple Retro systems using large internal SSDs, including 1.92 TB and 4 TB examples, while the Max Mod list also mentions an 8 TB target.

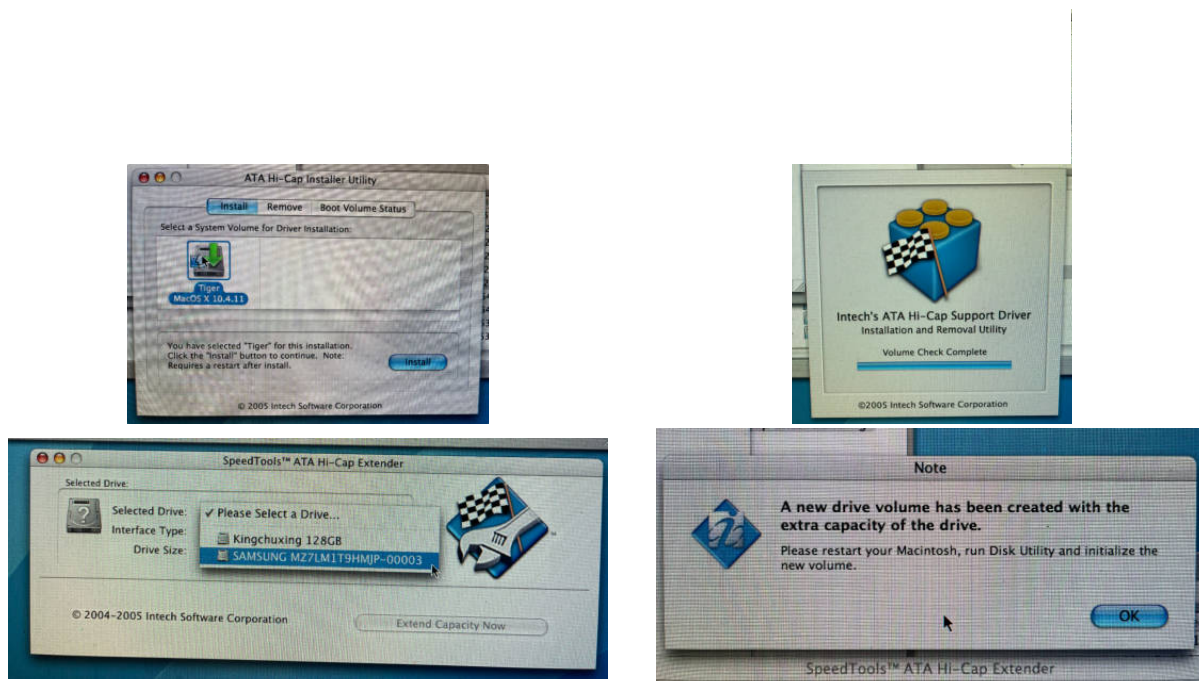
The 128 GB boundary

The working notes describe a classic large-drive problem: when an internal drive exceeds the system's directly addressable range, the manuscript uses Hard Disk SpeedTools (HDST) to expose additional capacity beyond an initial partition of roughly 128 GB.

- Partition the drive first rather than treating the entire large SSD as a single ordinary legacy volume.
- Apple Disk Utility is preferred in the manuscript for initial partitioning and drive setup.
- HDST Extend Utility is then used to “recover remaining capacity” as an additional volume.
- The manuscript warns that the extend operation is not reversible.

Partition map

Guide v3 states that PowerPC boot drives should use Apple Partition Map rather than GUID.



Airflow is an upgrade.

The original manuscript treats cooling as part of the Max Mod rather than an accessory. Its recurring theme is that faster CPU/GPU configurations benefit from deliberate airflow through the Cube.

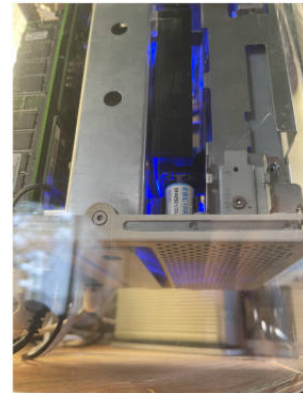
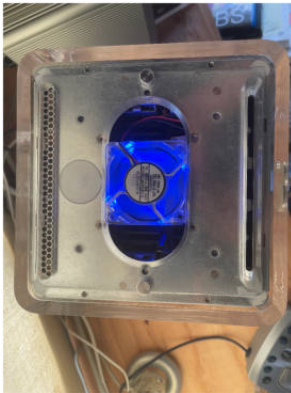
Bottom fan

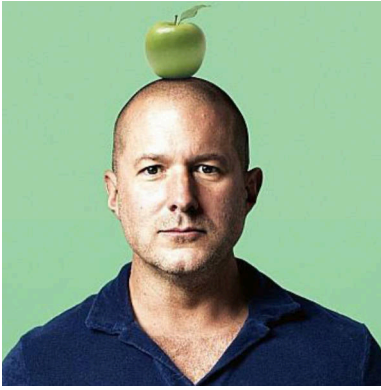
Guide v3 records an internal 80 x 20 mm fan, approximately 0.22 A and around 2200 RPM. Elsewhere it says a replacement bottom fan should provide at least 0.21 A, with 0.24-0.25 A described as the preferred working range.

Top / external fan

The notes also describe an 80 x 25 mm LED fan at approximately 0.22 A and 2200 RPM. In the Apple Retro configuration, both bottom and top fans are used to increase airflow.

- The manuscript says the Cube does not provide a hardware sensor that allows software fan-speed control.
- The notes recommend occasionally confirming that the bottom fan is actually operating.





picture from collectable web article jacobtyler

FUN

Sir Jony Ive

from the original Apple Retro Guide v3 material

QUOTE

“Different” and “new” is relatively easy.
Doing something that’s genuinely better is very hard.
- Sir Jony Ive

TRIVIA

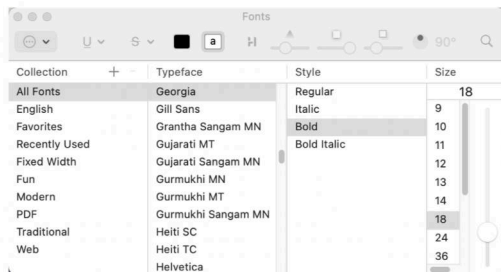
- 1 - Jony was born in Palo Alto, California - True or False? **False**
- 2 - Jony and Steve Jobs share the same middle name - Paul. **True**
- 3 - Jony and Jobs were notorious for their adversarial fallouts. **False**
- 4 - Steve invited Jony to his house to troubleshoot a Bluetooth signal. **True**
- 5 - At MoMA’s G4 Cube display reveal Jony was present to greet the public. **True**
- 6 - Jony’s first design product for Apple was the Newton / iPod / iPhone / G4 Cube. **Newton**

GEM

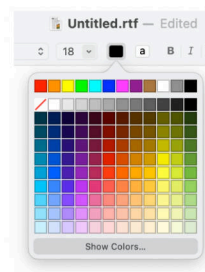
FONTS

Command T (short for Type)
invokes the **TextEdit Fonts** dialog
which provides control type setting choices, such as

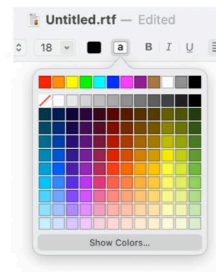
basic type choices and formatting



text Colors



background Colors



Getting the Cube on the network.

Guide v3 lists the internal AirPort card as optional and notes that it may not be present in every Cube. The Max Mod material also explores later external wireless options and Bluetooth.

AirPort

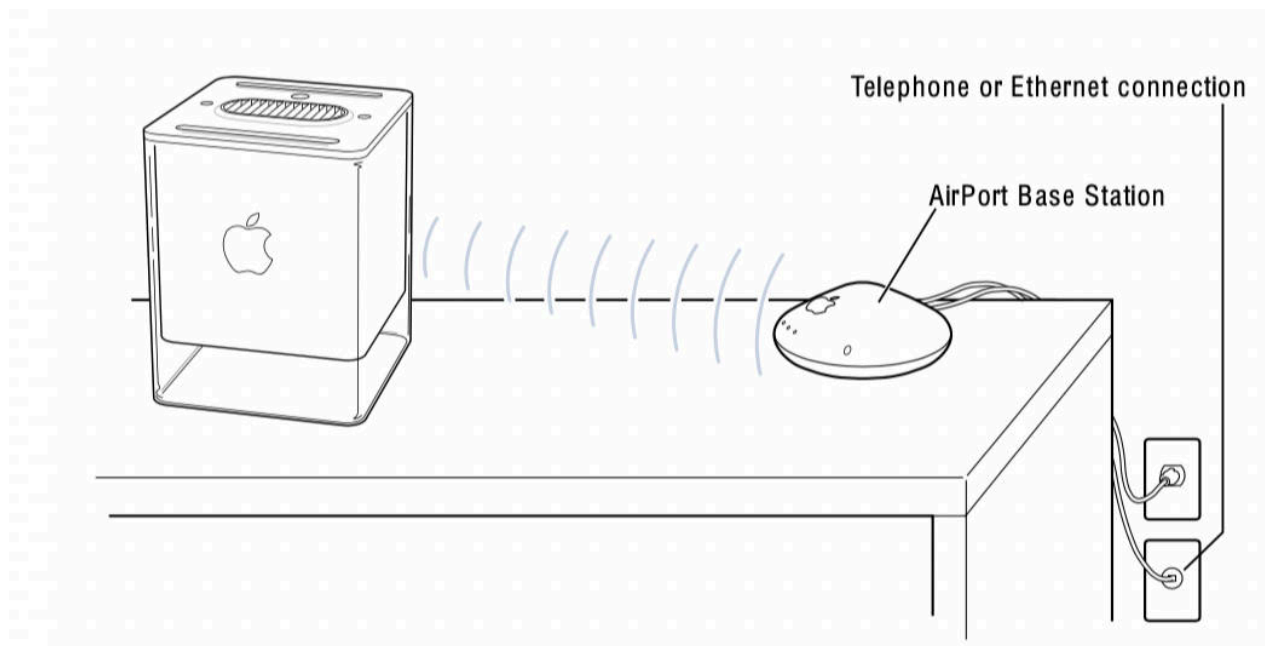
- Internal AirPort is the period-correct wireless path recorded in the source.
- The manuscript's Max Mod notes also mention Wi-Fi b/n using Panda USB adapters, with specific model references left as verification items.

Ethernet

The source records wired networking as part of the preferred data strategy and describes LAN/Ethernet as generally the fastest way to move or separate data.

Bluetooth

Bluetooth appears in the working notes as another possible file-exchange/peripheral path, including a reference to Bluetooth 2.0 with the correct driver. The source itself marks this for checking.



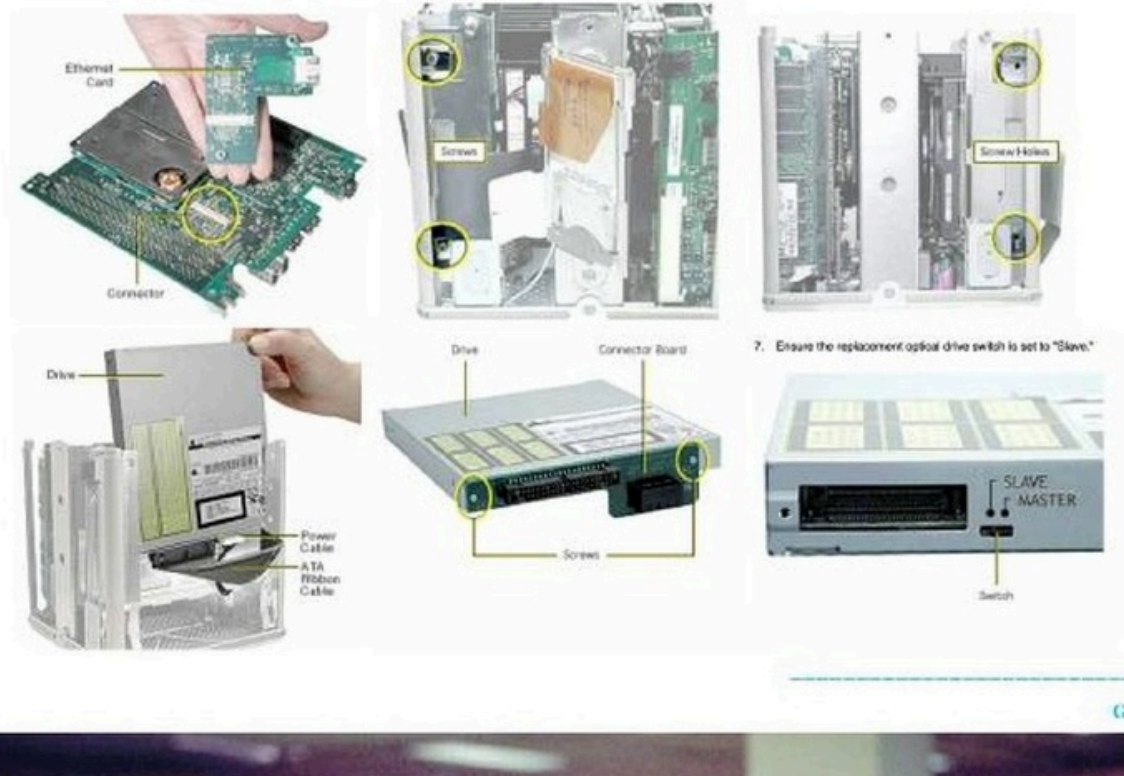
Keep the DVD-ROM - or upgrade it.

Guide v3 spends substantial time on the original Panasonic/Matsushita SR-8186 DVD-ROM family. Its key point is that the stock DVD-ROM is a reader, not a burner. It can read software and data, play or rip audio CDs, play DVDs and support software installation, but it does not provide CD/DVD writing.

Combo and SuperDrive paths

- A Combo drive adds CD burning.
- A SuperDrive adds DVD burning.
- The manuscript says an upgrade requires the appropriate adapter and a mounting solution, including a 3-D printed plastic mount in the documented build.
- A Matsushita UJ-875 is named in the source as one SuperDrive upgrade candidate.

VERIFY: Exact SR-8186 revisions, readable media, UJ-875 compatibility, adapter wiring, mounting dimensions and all claims about protected DVD playback.



› v3 reference images for Ethernet-card and optical-drive removal / replacement.

Supporting upgrades.

Guide v3 contains several smaller modifications that may deserve short sections or sidebars once the core chapters are settled.

PRAM / PMU battery

The manuscript describes installing a fresh battery and checking it with a multimeter. It also suggests verifying retention of time/settings after power has been disconnected.

USB expansion

The Max Mod notes describe using powered USB hubs to expand the Cube's limited USB connectivity.

FireWire storage

FireWire 400 appears throughout the source as a useful external-storage path. The manuscript also mentions FireWire 400-to-800 cabling for later drives.

Displays and television output

Later graphics cards with S-Video appear in the Max Mod notes as a possible television-output path.

Audio

The guide treats external USB audio and the Cube speakers as part of the expanded system.



Source: Macworld, October 2000.

Upgrades chapter review notes

- CPU + Sonnet firmware/software workflow
- Apple OEM dual-processor physical-mod notes
- Graphics-card and display working notes
- 1.5 GB RAM configuration
- Large SSD / partition / HDST workflow
- Bottom + top fan cooling strategy
- AirPort, Ethernet, USB Wi-Fi and Bluetooth directions
- DVD-ROM versus Combo / SuperDrive choices

Research before a public technical edition

The original manuscript contains valuable first-hand notes, but it also openly marks numerous specifications with question marks, “check this” and “verify” reminders. The next pass can continue separating confirmed Apple specifications, confirmed Apple Retro workshop experience, and experiments still needing verification.



Vintage Macs, restored with care.