

# New Technical Notes

Macintosh



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Developer Support

## Processors & General Logic Q&As

Hardware

M.HW.CPU.Q&As

Revised by: Developer Support Center

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This Technical Note contains a collection of Q&As relating to a specific topic—questions you've sent the Developer Support Center (DSC) along with answers from the DSC engineers. While DSC engineers have checked the Q&A content for accuracy, the Q&A Technical Notes don't have the editing and organization of other Technical Notes. The Q&A function is to get new technical information and updates to you quickly, saving the polish for when the information migrates into reference manuals.

Q&As are now included with Technical Notes to make access to technical updates easier for you. If you have comments or suggestions about Q&A content or distribution, please let us know by sending an AppleLink to DEVFEEDBACK. Apple Partners may send technical questions about Q&A content to DEVSUPPORT for resolution.

|New Q&As and Q&As revised this month are marked with a bar in the side margin.

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### 68030/Macintosh LC notes

Written: 11/15/90

Last reviewed: 8/1/92

What do I need to know to replace the 68020 with a 68030 in my Macintosh LC? We know we need to generate the /AVEC but can we ignore the other signals that are not in the Macintosh LC's 68020 direct slot bus, or are they even used in the 020 design? Also, is the LC compatible with the 68030 implementation as per the book with regard to the no-cache instruction fetches mentioned in the Motorola guide?

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A few signals are not in the Macintosh LC's 020 direct slot bus—namely, /1PEND, /AVEC, /ECS, /OCS, /CDIS, and /DBEN. Also, since there is only a 16-bit bus to the LC processor from the main memory, there is some question as to how Apple handled the no-cache instruction fetches.

Pull up all signals other than the /AVEC. The /AVEC signal should be grounded. As long as you don't try to support bursting, you shouldn't have a problem with None Cachable

instruction fetches.

There is one other problem, however, which will affect you. There seems to be a problem with the early test code in the ROM, which does not like the 68030. When you try to run a Macintosh LC with a 68030, you will get the chimes.

Something else which you need to be very careful about is the power budget on the Macintosh LC PDS. The LC power supply is very minimal and will not allow cards to take more than they are allocated. So keep your power budget in mind while you are developing your card.

### **Macintosh LC and MC68030 load limits**

Written: 4/25/91

Last reviewed: 8/1/92

Can you explain the apparent differences between the information contained in the Macintosh LC Developer Notes concerning the MC68030 load limits for A0-31 and D0-31 and page 13-2 of the MC68030 User's Manual?

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The loads listed on page 24 of the Macintosh LC Developer Notes are the total loads allowed on the TTL lines. The table on page 27 listing the lines and their loads has different values because they are the values of each line after considering the loads that are already on these lines. In other words, some of the lines already have loads on them (such as pull-up resistors) and these loads have been subtracted out of the total load allowed and then listed. The load values to follow are those listed on page 27 of the Developer Notes.

### **Identifying a unique system and why Apple doesn't serialize ROMs**

Written: 4/4/91

Last reviewed: 8/1/92

Is there any way to uniquely identify a Macintosh? For example, if we have twenty Macintosh IIfx systems, can we tell which is which? Is the ROM unique?

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The ROMs are all identical. The best you can do with software is to look at some combination of things, like the user name, internal disk name, something like that. 'STR' -16413 (the Macintosh name entered at the Sharing Setup Control Panel) in the system file might be one way to ID a system. Or you could create files in the system folder that had unique serial numbers. Of course, the user could change any of this.

The last Apple machine to have serialized ROMs (in the video PALs on the CPU board) was the Lisa. When the software was installed, it copied the serial number on to the master disks and would only work on that machine. The serialized ROMs caused lots of problems. Making and tracking the ROMs was expensive in manufacturing, and when the user took a machine in for service, if the CPU board got exchanged, the service people had to remember to pull out the old PAL and put it in the new board. If the PAL was the thing that went bad, it got even worse, since only the factory could program them.

## **PowerBook trackball buttons**

Written: 4/7/92

Last reviewed: 8/1/92

Does the PowerBook provide any way to differentiate between a mouse click from the top or bottom button?

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The top and bottom buttons of the PowerBook trackball are wired together, so no differentiation is possible.

### **Where to find list of “sad Macintosh” error codes & descriptions**

Written: 1/10/91

Last reviewed: 8/1/92

Where can I find a list of “sad Macintosh” startup error codes and descriptions?

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A list of the “sad Macintosh” error codes and descriptions is on AppleLink and on the current Developer CD.

### **Macintosh models and product test strategy**

Written: 6/3/92

Last reviewed: 9/15/92

Is there a recommended test strategy that I can follow to guarantee that our software will work on all Macintosh CPUs without having to actually test it on all CPUs?

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There isn't any way to guarantee that your program works on all Macintosh models other than testing it on all models. One of Apple's greatest costs in releasing system software is the amount of time it takes to test it on all machines, back to the Plus. However, if you can't afford the time or money to test everything on everything, there is a smaller set of CPUs which will allow you to get the most “bang for your buck.” You should, at minimum, test on the following CPUs:

- One with a 68000 (Macintosh Plus or SE) and a small screen
- One with a 68020 (Macintosh II or LC)
- One with a 68030 (Macintosh SE/30, IIfx, IIfx, IIfx, IIfx, or IIfx)
- One with a 68040 (Macintosh Quadra 700 or 900)
- One with memory-shared internal video (Macintosh IIfx or IIfx)
- One with VRAM internal video (Macintosh LC or Quadra)
- One with IOPs (Macintosh IIfx or Quadra 900)
- A PowerBook (100, 140, or 170)

If your product interacts with any particular hardware, you should check all the revisions of that hardware. For example, if you're dealing with SCSI, you would want to check on the Macintosh Plus for original SCSI, the Macintosh IIfx for its DMA SCSI, and the Macintosh Quadra for its new SCSI chip, in addition to any machine with a more standard SCSI interface.

As you can see, you'll still need to test on a variety of machines, but you can easily cut down the set of CPUs you test on without totally crippling your strategy. For example, testing on the Macintosh IIX and the IICX would be somewhat redundant; the machines are almost identical except for size, so most products wouldn't see any difference.

### **Macintosh 128K, 512K, & 512Ke analog boards**

Written: 5/18/92

Last reviewed: 9/15/92

Can I take out the power board (the one that stands vertically) from my 128K Macintosh and slam it into the 512K? Are they plug-to-plug compatible? My 512K Macintosh has a problem: I can hear it start up, but there's no video.

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The analog board (video and power supply) in the original Macintosh 128K, 512K, and 512Ke, and Plus are completely plug compatible. Each of these models were logic-board-only upgrades from each other so you can have complete confidence in swapping the analog boards between them.

It sounds like your 512K Macintosh system's flyback transformer has failed. Many third-party Macintosh repair facilities are familiar with this repair and it's usually not very expensive.