Tech Info Library

Macintosh RAM: How Long It's Maintained After Power Loss (2/95)

```
Revised:        2/24/95
Security:       Everyone
```

Macintosh RAM: How Long It's Maintained After Power Loss (2/95)

===

Article Created: 13 October 1992
Article Reviewed/Updated: 24 February 1995

TOPIC ---

I have these questions about the Macintosh Quadra computers:

1) What is the specified time period after removing power that volatile
component memory loses data?

2) Where is non-volatile memory located, and is memory field addressable?

DISCUSSION --

1) This varies from vendor to vendor and from board to board.

According to Apple's Component Engineering group, static RAM loses data seconds
after power down.

Dynamic RAM and Video RAM (DRAM and VRAM) are the same in that they both have
refresh cycles. There are tiny capacitors internal to these devices that hold a
charge. These capacitors are recharged, specified by the manufacturer, every n
nanoseconds to preserve the data that has been written to them. Due to these
capacitors and the capacitance of the logic board itself, the data will remain
for a short time longer than the individual device.

The opinion of Apple's Component Engineering group, based on what has been seen,
is DRAM will lose data within 5 minutes after power down.

To ensure that absolutely zero data is stored on DRAM or VRAM devices, allow 30
minutes with power removed from the system.

In addition, the Motorola MC68040 processor has DRAM for cache built in.
Motorola doesn't specify how long it takes for the MC68040 to lose its data.
However, Motorola feels comfortable with the 30 minute power down time.

2) The only Apple products that contain non-volatile memory are Macintosh systems and LaserWriter printers; mouse devices, keyboards, scanners, tape drives, CD-ROM drives, disk drives, and display systems don't have non-volatile memory. Here are the details:

The Macintosh 128K, Macintosh 512K, and Macintosh 512Ke contain 20 bytes of Parameter RAM (PRAM). These 20 bytes of PRAM are documented on pages II-369 to II-371 of Inside Macintosh Volume II.

The rest of the computers in the Macintosh family have 256 bytes of PRAM -- except for the Macintosh Portable, which has 128 bytes. PRAM only contains configuration information, not user data.

Not all of PRAM is cleared and reset to default values when using the "hold down the Command, Shift, and Option keys while opening the Control Panel" method of System 6, or the Command, Option, P, R keys with System 7. The original 20 bytes of PRAM documented on pages II-369 to II-371 of Inside Macintosh Volume II aren't cleared. Only the other 236 bytes that are considered confidential. This should be sufficient for your needs. Note: The Command, Option, P, R method in System 7 clears all of PRAM and resets it to default values.

The same is true for the non-volatile memory in the Apple LaserWriter printers. Only configuration information like page count, baud rate, emulation mode, and port to use are stored. The printer memory, like a computer's memory, is erased, after a certain amount of time when the power is turned off.

Article Change History:
24 Feb 1995 - Reviewed for technical accuracy, revised formatting.

Support Information Services

Tech Info Library Article Number:10795