# Tech Info Library

## Macintosh Portable: Details About the Idle and Sleep States 9/95

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TOPIC -----------------------------------------------------------

How much of the Macintosh Portable gets turned off at Shutdown, and how
much gets shut down when you sleep?  I am particularly interested in RAM
disks.

DISCUSSION ------------------------------------------------------

The Macintosh Portable has two power saving states: Idle (or Rest) and
Sleep. Shutdown uses the same amount of energy as Sleep except when going
into or coming out of a Shutdown state, when it requires more energy than
Sleep for closing and saving files, and for bringing up the system and
reloading the operating system when restarting. But while it is IN the
Shutdown or Sleep state, the Portable will draw the same amount of
electricity.

The Portable is considered idle after 15 seconds without any activity of
any kind. The Portable is not considered to be idle if any of the
following occurs:

- Any ADB routine other than routine monitoring of the bus
- Any I/O call to firmware (Read, Write, Control, Format, Status)
- Any change in the cursor (for example, the rotation of a hand in the
  clock icon)
- Any post-event call (for example, a call resulting from insertion of a
  disk)
- Any communication through the serial port

When the BatteryMonitor routine determines that the Portable is idle, it
causes the CPU to insert 64 wait states into RAM and ROM accesses; this
lowers the effective clock rate to approximately 1MHz.  Interrupts
continue to be processed at the full speed of the CPU.

After the Portable has been idle for the amount of time selected by the user, the BatteryMonitor routine puts the machine into the sleep state. When the Macintosh Portable goes into the sleep state, the Portable maintains full power to system RAM, video RAM, and the Power Manager IC.

The Power Manager IC stops the clocks to the SCC, the SWIM, and the ASC. By stopping the clocks to these devices, their power consumption is reduced to almost zero without requiring that they be reset, as would be necessary if all power were switched off. The Power Manager IC switches off power to the serial drivers, ROM, the flat-panel display, the ASC, the Sony sound ICs, the SCSI, and to a variety of pullup resistors and other components. The Power Manager IC sends a signal to the internal modem (if one is installed) that causes the modem to shut itself down.

After putting the rest of the system in the sleep state, the Power Manager IC does no processing except to monitor the 60HZ interrupt signal. Each time the 60HZ interrupt occurs, the Power Manager IC performs the following functions:

- It updates the real-time clock.
- It checks the wake-up timer to see if it matches the real-time clock.
- It checks the events that should return the machine to the operating state, such as a keystroke or a Ring Detect signal from the modem (when the modem feature has been enabled by the user).

The periodic functions take approximately 200 microseconds out of the 16.7 milliseconds between interrupts, so the Power Manager IC is inactive most of the time that the Portable is in the sleep state.

When the Power Manager IC determines that the wake-up timer matches the real-time clock or detects an event, it asserts the /RESET signal to the CPU, restores the clocks and power to other devices in the system, and then raises (deasserts) the /RESET signal.


Article Change History:
08 Sep 1995 - Reviewed for technical accuracy, corrected minor typo.

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