About the Power Manager

The **Power Manager**, provided only in the firmware of the Macintosh Portable computer, controls power to the internal hardware devices of the Macintosh Portable in order to conserve power whenever the computer is not in use. The Macintosh Portable operates only with System 6.0.4 and later versions.

The Macintosh Portable computer operates from a built-in battery that can be charged from a voltage converter plugged into an electric socket. The Macintosh Portable has no power switch; instead, it contains firmware and hardware that can put the computer into two low-power-consumption states, the idle state and the sleep state.

In the idle state, the **Power Manager** firmware slows the computer from its normal 16-megahertz (MHz) clock speed to a 1 MHz clock speed. The **Power Manager** puts the Macintosh Portable in the idle state when the system has been inactive for 15 seconds. When the Macintosh Portable has been inactive for an additional period of time (the user can set the length of this period), the **Power Manager** and the various device drivers shut off power or remove clocks from the computer's various subsystems, including the CPU, RAM, ROM, and I/O ports. This condition is known as the sleep state.

No data is lost from RAM when the Macintosh Portable is in the sleep state. Most applications can be interrupted by the idle and sleep states without any adverse effects. When the user resumes use of the computer (by pressing a key, for example), most of the applications that were running before the Macintosh Portable entered the sleep state are still loaded in memory and resume running as if nothing had happened. If your application cannot tolerate the sleep state, you can add an entry to an operating-system queue called the sleep queue. The **Power Manager** calls every sleep queue routine before the computer goes into the sleep state.

The user can also use the Battery desk accessory or either of two Finder menu items to cause the Macintosh Portable to go into the sleep state immediately. If the user chooses Sleep from the Battery desk accessory or from the Special menu in the Finder, the **Power Manager** checks to see if any network communications will be interrupted by going into the sleep state. If network communications will be affected, a built-in sleep queue routine displays a dialog box giving the user the option of canceling the Sleep command. If the user chooses Shut Down from the Special menu in the Finder, the **Power Manager** puts the Macintosh Portable in the sleep state regardless of whether any network communication routines are running at the time.

The **Power Manager** is the firmware that provides an interface to the 50753 microprocessor (the **Power Manager** Integrated Circuit or **Power Manager IC**) in the Macintosh Portable computer. The **Power Manager** firmware also provides some services unique to the Macintosh Portable-such as reading the current clock speed-that are not directly related to power control. The power management circuits and the microcode in the on-chip ROM of the **Power Manager** are described in the Guide to the Macintosh Family Hardware, second edition. The **Power Manager** provides routines that your program can use to enable and disable the idle state, to control power to some of the subsystems of the Macintosh Portable computer, and to ensure that your program is not adversely affected when the **Power Manager** puts the Macintosh Portable into the sleep

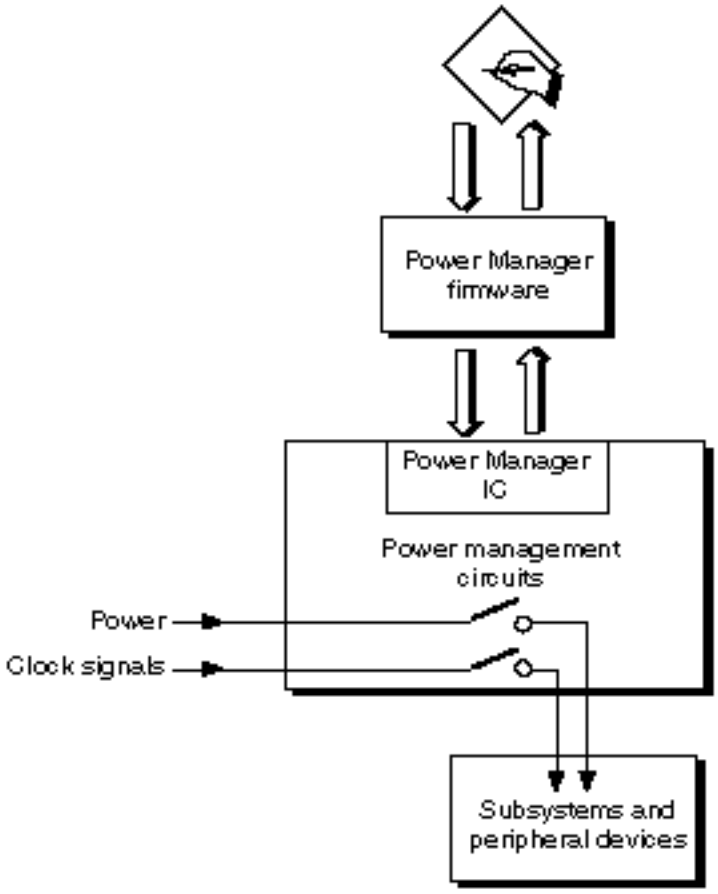
state.

The Idle State and **The Sleep State** describes the idle and sleep states and explains how your program can use **Power Manager** routines. You need this information only if you are writing a program-such as a device driver-that must control power to a subsystem of the Macintosh Portable computer, or if you are writing a program that might be affected by the idle or sleep state.

Because the **Power Manager** saves the contents of all of the CPU's registers, including the stack pointer, before putting the Macintosh Portable in the sleep state, and because the contents of RAM are preserved while the Macintosh Portable is in the sleep state, most applications are not adversely affected by the sleep state. Because the Macintosh Portable does not enter the idle state when almost any sort of activity is going on or even when the watch cursor is being displayed, few programs are adversely affected by the idle state. Therefore, it is probable that your application will not have to make calls to the **Power Manager**.

The power management circuits in the Macintosh Portable computer include a battery-voltage monitor, a voltage regulator and battery-charging circuit, and the **Power Manager**. The **Power Manager** controls the clocks and power lines to the various internal components and external ports of the Macintosh Portable computer. The microcode in the **Power Manager** implements many of the Macintosh Portable computer's power management features, such as power and clock control and the wakeup timer. A user or an application can set the wakeup timer to return the computer from the sleep state to the operating state at a specific time.

The following figure illustrates the relationships among your application, the **Power Manager** firmware, the **Power Manager**, the power management circuits, and the other subsystems of the Macintosh Portable computer. The **Power Manager** firmware in the ROM of the Macintosh Portable provides an interface that allows your application to control some of the functions of the **Power Manager**. Under control of the microcode in the **Power Manager**, the power management hardware charges the battery, provides the voltages needed by the system, and automatically shuts down all power and clocks to the system if the battery voltage falls below 5.65 volts. The automatic shutdown function helps to prevent possible damage to the battery resulting from low voltage.



Relationship of an application to the **Power Manager**

You can use the routines of the **Power Manager** to

- enable, disable, or delay the idle feature
- read the current clock speed
- set or disable the wakeup timer and read its current setting
- place an entry in the sleep queue so that the **Power Manager** calls your routine before putting the Macintosh Portable into the sleep state or returning it to the operating state
- remove an entry from the sleep queue
- control power to the internal modem and serial ports
- read the status of the internal modem
- read the state of the battery charge and the status of the battery charger