

## Operating on Battery Power

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The computer operates on AC or battery power. This chapter contains the information you need to know to operate the computer on battery power. It also includes information on how your computer manages and saves power.

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## 2.1 Battery Pack

The computer uses a battery pack that gives you long use between charges.



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**Note:** When using a battery pack for the first time, fully recharge the battery, then disconnect the adapter to use up the battery before recharging again. You only need to do this once with a new battery or with a battery that's been stored without being used for a long time.

If the computer is to be stored for more than two weeks, we suggest that you remove the battery pack. Battery power (from a fully charged battery pack) depletes in roughly ten hours with the computer in standby mode. When power is off, battery power depletes in one month.

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### 2.1.1 Battery Pack Characteristics

The battery pack has the following characteristics:

- *Employs Current Battery Technology Standards* The computer uses a Nickel Metal-Hydride (NiMH) battery pack. This battery type does not have the memory effect problem of Nickel Cadmium (NiCd). NiMH consistently provide the longest battery life and is the most suitable for road warriors.

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- ❑ *Battery-low Warning* When the battery charge level becomes low, the computer gives off warning beeps and the status indicator flashes at regular intervals. This tells the user that the battery power is critically low. You can correct this situation by recharging the battery pack.

Whenever possible, use the AC adapter. The battery will come in handy when you travel or during a power failure. It is advisable to have an extra fully-charged battery pack available as backup.



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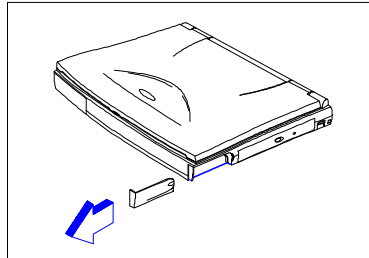
**Warning: Do not expose battery packs to temperatures below 0°C (32°F) or above 60°C (140°F). This may adversely affect the battery pack.**


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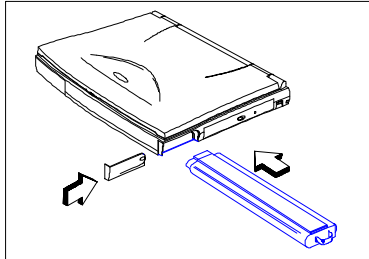
### 2.1.2 Installing and Removing the Battery Pack

Before removing the battery pack, make sure that you have an AC adapter connected to the computer; otherwise turn off the computer. The following figures illustrate how to install the battery pack.

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Press the battery compartment cover release button  and slide out the cover.



Insert the battery pack into the battery compartment (connector side-down).

To remove the battery pack, remove the battery compartment cover; then pull out the battery pack using the pull loop at the end.

### 2.1.3 Charging the Battery

To charge the battery, place the battery pack inside the battery compartment and plug the AC adapter into the computer and an electrical outlet.

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## Charging Modes

The adapter has three charging modes:

- ☐ Rapid mode

The computer uses rapid charging when power is turned off and a powered AC adapter is connected to it. In rapid mode, a fully depleted battery gets fully charged in approximately two hours.

- ☐ Charge-in-use mode

When the computer is in use with the AC adapter plugged in, the computer also charges the battery pack if installed. This mode will take longer to fully charge a battery than rapid mode. In charge-in-use mode, a fully depleted battery gets fully charged in approximately six to eight hours.

- ☐ Trickle mode

When the battery is fully charged, the adapter changes to trickle mode to maintain the battery charge level. This prevents the battery from draining while the computer is in use.



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**Note:** We suggest that you charge the battery pack before retiring for the day, letting it charge overnight before traveling. This ensures a fully charged battery for use the next day.

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### 2.1.4 Checking the Battery Level

The computer features battery-low warning signals that are both audible and visible. When the battery pack is low, the computer emits warning beeps and the battery indicator flashes at regular intervals. Also, you can check the battery charge level using the onscreen battery gauge.

#### Using the Onscreen Battery Gauge



To access the onscreen battery gauge, press **Fn-F4**. The battery level icon displays onscreen.

The onscreen battery gauge indicates the present battery level.

### 2.1.5 Optimizing Battery Life

This section helps you get the most out of battery operation. Optimizing battery life prolongs the charge/recharge cycle and improves recharge efficiency. Follow these suggestions to optimize and maximize battery power:

- ☐ Purchase an extra battery pack.
- ☐ Use the Sleep Manager utility to reserve hard disk space for the hibernation function. See section 5.1.

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- ❑ Use the AC adapter whenever possible so that the battery is reserved for on-the-go computing.
- ❑ Keep the battery pack in the computer powered by the AC adapter. The constant trickle charge maintains the battery level to eliminate the battery self-discharge effect. The charge-in-use function also charges the battery pack.
- ❑ Disable the parallel and serial ports if no devices are connected to these ports. You can do this through the Setup Utility. See section 5.3.3.
- ❑ Eject the PC card from the card slot when not in use, since the PC card draws extra power.
- ❑ Store the battery pack in a cool, dry place. The recommended storage temperature for battery packs ranges from 10 to 30 degrees C. The higher the storage temperature, the faster the battery pack self-discharges.
- ❑ The batteries can be recharged about 500 times when used as directed. Excess recharging decreases battery life.
- ❑ Take care of your battery pack and AC adapter. See the notices section found in the front part of the user's guide.

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## 2.1.6 Battery-low Warning

You never have to worry about battery power as long as you are using the AC adapter. However, when you operate the computer on battery power, pay extra attention to the warning beeps and the indicator light on the display panel. The indicator flashes when the battery power is low.

The following signals indicate a battery-low condition:

- ☐ The buzzer generates four short beeps every minute, if you enabled the Battery-low Warning Beep parameter in Setup
- ☐ The status indicator flashes at regular intervals until battery power is depleted

When you receive a battery-low warning, you have around two minutes to save your work. If you do not connect the AC adapter within this period, the computer enters hibernation mode if the Sleep Upon Battery-low parameter in Setup is enabled and the following conditions exist:

- ☐ The hibernation file created by Sleep Manager is present and valid. See section 5.1.
- ☐ There is enough battery power left to save system information onto the hard disk.

Otherwise, the computer enters standby mode.



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**Warning: Connect the AC adapter to the computer as soon as possible. Data is lost when computer power is cut off during standby mode.**

The following table shows the recommended course of action to take when you encounter a battery-low condition.

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Situation	Recommended Action
AC adapter and power outlet available	<ol style="list-style-type: none"><li>1. Connect the AC adapter to the computer.</li><li>2. Save all necessary files.</li><li>3. Resume work.</li></ol> <p>Power off the computer if you wish to recharge the battery rapidly.</p>
An extra fully-charged battery pack available	<ol style="list-style-type: none"><li>1. Save all necessary files.</li><li>2. Exit the application.</li><li>3. Power off the computer.</li><li>4. Replace the battery pack.</li><li>5. Power on the computer and resume work.</li></ol> <p>or</p> <ol style="list-style-type: none"><li>1. Save all necessary files.</li><li>2. Enter hibernation mode.</li><li>3. Install the extra battery pack.</li><li>4. Resume from hibernation mode.</li></ol>
AC adapter or power outlet not available	<ol style="list-style-type: none"><li>1. Save all necessary files.</li><li>2. Exit the application.</li><li>3. Power off the computer.</li></ol> <p>or</p> <ol style="list-style-type: none"><li>1. Save all necessary files.</li><li>2. Enter hibernation mode.</li></ol>

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## 2.2 Power Management

This computer has a built-in power management unit that monitors system activity. System activity refers to any activity involving one or more of the following devices: keyboard, mouse, floppy drive, hard disk, peripherals connected to the serial and parallel ports, and video memory. If no activity is detected for a period of time (called an inactivity time-out), the computer stops some or all of these devices in order to conserve energy.

This computer employs an innovative power management technique called Heuristic Power Management or HPM. HPM allows the computer to provide maximum power conservation and maximum performance at the same time.

Power management methods used by most computers are timer-based. You set inactivity time-out values for the display, hard disk, and other devices. The computer then sleeps when these time-outs elapse. The problem with this is that no two users are alike. Each of us has his or her own habits when using the computer, which makes timer-based power management ineffective.

With HPM, your computer manages its power according to the way you use your computer. This means the computer delivers maximum power when you need it, and saves power when you don't need the maximum—all without your intervention. There are no timers to set, because the HPM system figures out everything for you.

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**Note:** We recommend you enable heuristic power management to prolong your battery life.

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### 2.2.1 Power Management Modes

#### Display Standby Mode

Screen activity is determined by the keyboard, the built-in touchpad, and an external PS/2 pointing device. If these devices are idle for the period determined by the computer's HPM unit, the display shuts off until you press a key or move the touchpad or external mouse.

#### Automatic Dim Feature

The computer has a unique automatic dim power saving feature. When the computer is using AC power and you disconnect the AC adapter from the computer, it automatically dims the LCD backlight to save power. If you reconnect AC power to the computer, it automatically adjusts the LCD backlight to a brighter level.

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## Hard Disk Standby Mode

The hard disk enters standby mode or light green mode when there are no disk read/write operations within the period of time determined by the computer's HPM unit. In this state, the power supplied to the hard disk is reduced to a minimum. The hard disk returns to normal once the computer accesses it.

## Hibernation Mode

In hibernation mode, all power shuts off (the computer does not consume any power). The computer saves all system information onto the hard disk before it enters hibernation mode. Once you turn on the power, the computer restores this information and resumes where you left off upon leaving hibernation mode.

There are two necessary conditions for the computer to enter hibernation mode:

- ☐ The hibernation file created by Sleep Manager must be present and valid. See section 5.1.
- ☐ Heuristic Power Management Mode must be set to [ENABLED].

In this situation, there are four ways to enter hibernation mode:

- ☐ Pressing the sleep hot key **Fn-F7 (Z<sup>1</sup>)**

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- ❑ If the waiting time determined by the computer's HPM unit elapses without any system activity, the computer goes into hibernation mode.
- ❑ If a battery low condition takes place, the computer enters hibernation mode in about two minutes. The Sleep Upon Battery-low parameter in Setup must be set to [ENABLED].
- ❑ Invoked by the operating system power saving modes



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**Note:** If the computer beeps but does not enter hibernation mode after pressing the sleep hot key, it means the operating system will not allow the computer to enter the power saving mode.

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To exit hibernation mode, press the power switch . The computer also resumes from hibernation mode if the resume timer is set and matched.



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**Warning: Do not change any devices (such as add memory or swap hard disks) when the computer is in hibernation mode.**

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**Important:** If the computer detects a PC I/O card installed in the PC card slots, it will not enter hibernation mode. Instead it will enter light green mode. Light green mode is similar to standby mode. It consumes very low power while

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maintaining your communication connections.

## Standby Mode

The computer consumes very low power in standby mode. Data remains intact in the system memory until the battery is drained.

There is one necessary condition for the computer to enter standby mode:

- ☐ Heuristic Power Management Mode must be set to [ENABLED].

There are five ways to enter standby mode:

- ☐ Pressing the sleep hot key **Fn-F7 (Z<sup>2</sup>)**
- ☐ If the waiting time determined by the computer's HPM unit elapses without any system activity, the computer goes into standby mode.
- ☐ Closing the display cover
- ☐ If the computer is about to enter hibernation mode, but the hibernation file is invalid or not present.
- ☐ Invoked by the operating system power saving modes



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**Note:** If the computer beeps but does not enter standby mode after pressing the sleep hot key, it means the operating system will not allow the

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computer to enter the power saving mode.

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The following signals indicate that the computer is in standby mode:

- ☐ The buzzer beeps
- ☐ The standby indicator flashes



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**Warning: Unstored data is lost when you turn off the computer power in standby mode or when the battery is drained.**

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To leave standby mode and return to normal mode:

- ☐ Press any key
- ☐ Move the active pointing device (internal or external, PS/2 or serial)
- ☐ Open the display cover
- ☐ If the Resume Timer is set and matched, the computer returns to normal mode
- ☐ If an incoming modem event occurs and the Modem Ring Resume On Indicator is enabled, the computer returns to normal mode



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**Important:** If the computer detects a PC I/O card installed in the PC card slots, the computer will not enter standby mode. Instead it will enter light green mode. Light green mode is similar to standby mode. It consumes very low power while



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maintaining your communication connections.

## Light Green Mode

This mode applies if your computer detects a PC I/O card installed in the PC card slots. The computer consumes low power to maintain your communication connection. Data remain intact in the system until the battery is drained.

To enter light green mode:

- ☐ Heuristic Power Management Mode must be set to [ENABLED]
- ☐ The PC I/O card should be configured and one of the following conditions met:
  - ☐ The waiting time determined by the computer's HPM unit has elapsed without any system activity
  - ☐ The display cover is closed

The following signals indicate that the computer is in light green mode:

- ☐ The buzzer beeps



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**Warning: Unstored data is lost when you turn off the computer power in light green mode or when the battery is drained.**

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To leave light green mode and return to normal mode:

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- ☐ Press any key
- ☐ Move the active pointing device (internal or external, PS/2 or serial)
- ☐ Open the display cover
- ☐ If the Resume Timer is set and matched, the computer returns to normal mode
- ☐ If an incoming modem event occurs and the Modem Ring Resume On Indicator is enabled, the computer returns to normal mode

### 2.2.2 Advanced Power Management

This computer supports the APM standard designed to further reduce power consumption. APM is a power-management approach defined jointly by Microsoft and Intel. More and more software packages support APM to take advantage of its power saving features and allow greater system availability without degrading performance.

For more information about APM under Windows 95, refer to your Windows 95 user s manual.

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**Notes:**

If you enable heuristic power management in Setup without APM installed and enabled, the system time and date do not display the correct settings after the computer returns to normal operation from standby or hibernation mode. To update the time and date, reboot the computer. APM should be enabled to avoid this problem.

Advanced Power Management greatly prolongs battery life. Use APM whenever possible.

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