

MyBattery 2.1.1

by

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Table of Contents

Introduction.....	3
MyBattery and MyBattery Lite.....	3
MyBattery vs MyBattery Lite comparison	3
Displays.....	4
Bar graph display.....	4
Column graph display (registered copies only)	
.....	4
“Gas gauge” display.....	5
Histogram display (registered copies only)	6
Text only display.....	7
Moving the displays.....	8
Features.....	8
The MyBattery menu (MyBattery)....	8

The MyBattery menu (MyBattery Lite)	9
Charger status.....	10
Current CPU speed (MyBattery only)	11
Current AppleTalk Status (MyBattery only)	11
.....	11
Menu bar displays (registered copies of MyBattery only).....	11
Multiple Batteries (registered copies of MyBattery only).....	12
Preferences Dialog (registered copies of MyBattery only).....	12
Estimate of time remaining & elapsed time	13
.....	13
Sleep shortcut.....	13
Installing MyBattery.....	13
Running on startup under System 6.0.x	14
Running on startup under System 7.x	14
How the estimate works.....	14
How accurate is it?.....	14
Estimation problems.....	15
External Battery Packs.....	15
Registration.....	16
How to register.....	16
Addresses.....	16
Known Problems and Conflicts.....	17

Registration and disk compactors.....	17
CursorBeacon CDEV.....	17
Menu bar conflicts.....	17
HP PaintWriter Drivers.....	17

Troubleshooting.....	18
Application interference.....	18
INIT/CDEV/Extension interference. .	18
Upgrading System 6 to System 7.....	18
Acknowledgments.....	18
Compatibility.....	19
Technical information and references	19
References.....	19
Development environment.....	19
Low Battery Warnings.....	20
Apple NiCad battery capacities.....	20
Apple Battery Chargers.....	20
Version History.....	20
Disclaimer.....	22

Introduction

MyBattery is a utility program designed specifically for portable Macintosh computers. MyBattery provides you with information about the internal battery pack on a Macintosh Portable, Macintosh PowerBook, or Macintosh Duo. It offers the following features:

- Displays current battery voltage in both numeric and graphical format,
- User-selectable displays, including gas gauge, bar graph, or histogram,
- Estimate of useful battery time remaining, using a historical estimation technique to “learn” your battery usage patterns,
- Support for multiple batteries, to accommodate estimates for batteries of different age and capacity,
- Menu bar displays, for easy viewing of battery status,
- Current CPU speed display,
- Battery charger status.

MyBattery's most popular feature is its ability to estimate how much battery time you have left. Using a historical estimation technique, MyBattery monitors your PowerBook usage, and updates its estimates accordingly.

MyBattery and MyBattery Lite

This package contains two versions of MyBattery, **MyBattery** and **MyBattery Lite**. Both programs have the same basic features. The MyBattery program, however, has advanced features like color support, menu bar displays, multiple battery support, and several user-selectable preferences. The MyBattery Lite program doesn't have these “bells and whistles”, so it requires less memory. MyBattery Lite is for PowerBook

users who are memory-conscious, or who don't need the additional features of MyBattery.

MyBattery vs MyBattery Lite comparison

The table below shows the feature comparison between MyBattery and MyBattery Lite.

Feature	MyBattery	MyBattery Lite
Memory requirements	75k	55k
Gas gauge display	√	√
Bar graph display	√	√
Column graph display†	√	√
Histogram display†	√	√
Text only display	√	√
Battery charger status icon	√	√
Automatic PowerBook calibration	√	√
Estimate of remaining battery time	√	√
Hide MyBattery when charging option†	√	
Color and grayscale support	√	
Selectable menu bar displays†	√	
Multiple battery support†	√	
CPU speed display	√	
AppleTalk status display	√	
Histogram display options†	√	
Sleep shortcut	√	√
External battery packs†	√	

†Available for registered MyBattery users only.

Displays

MyBattery has five different window displays. The user can select one from the MyBattery menu. Each display is designed to present you with lots of information, in just a little space.

Each window display has a “normal” and “condensed” view. You can switch between them by clicking in the “zoom box”.

Please note that the displays shown are the MyBattery Lite displays. The MyBattery displays may show more information (such as AppleTalk status).

Bar graph display

The bar graph display shows the battery voltage using a bar. The MyBattery Lite display is shown below.

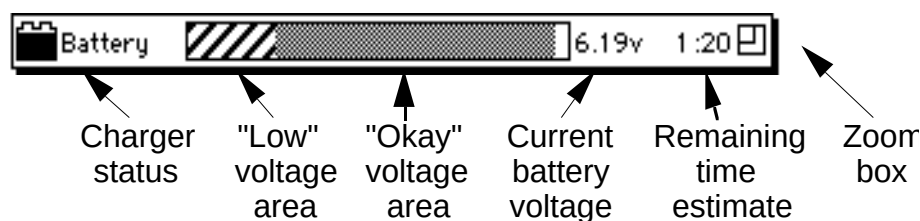


Figure 1. The bar graph display shows the battery voltage using a two-color bar graph.

Item	Description
Charger status	Shows how the PowerBook is being powered. See the “charger status” section below for more information.
“Low” voltage area	The lower part of the bar graph is striped. This region reflects a low battery voltage, below the first “low battery” warning.

"Okay" voltage area	The upper part of the bar graph is filled with a solid pattern. This region reflects a battery voltage above the low voltage threshold. The pattern of this area changes depending on your charger status.
Current battery voltage	This is the battery voltage returned from the Power Manager, with a granularity of 0.01 volts.
Remaining time estimate	This display is an estimate of how much useful time you have left before your first low voltage warning. Refer to the "How the estimate works" section for more information.
Zoom box	Allows you to toggle between large and condensed versions of the bar graph display. The condensed version takes up less screen space, and doesn't show the numeric voltage reading.

Column graph display (registered copies only)

The column graph display is similar to the bar graph display, except that the display runs vertically,. The MyBattery Lite display is shown below.

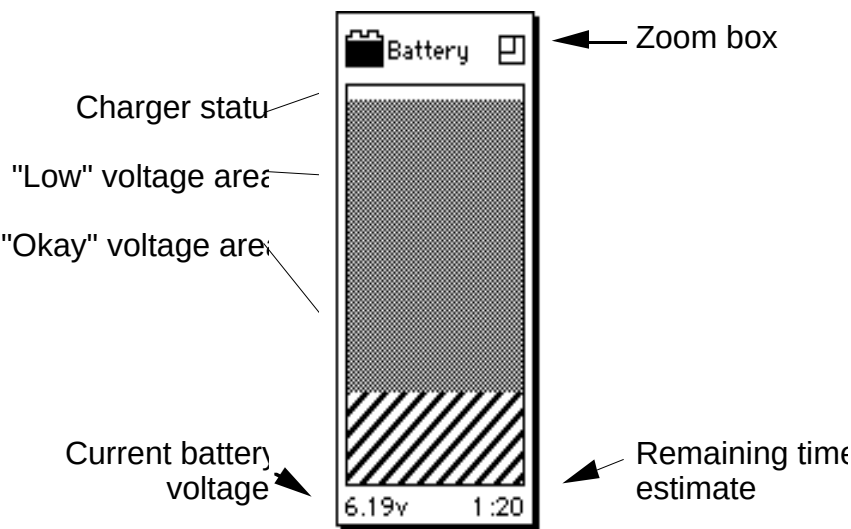


Figure 2. The column graph display shows the battery voltage in a vertical fashion.

Item	Description
Charger status	Shows how the PowerBook is being powered. See the “charger status” section below for more information.
“Low” voltage area	The lower part of the bar graph is striped. This region reflects a low battery voltage, below the first “low battery” warning.
“Okay” voltage area	The upper part of the bar graph is filled with a solid pattern. This region reflects a battery voltage above the low voltage threshold. The pattern of this area changes depending on your charger status.
Current battery voltage	This is the battery voltage returned from the Power Manager, with a granularity of 0.01 volts.
Remaining time estimate	This display is an estimate of how much useful time you have left before your first low voltage warning. Refer to the “How the estimate works” section for more information.
Zoom box	Allows you to toggle between large and condensed versions of the column graph display. The condensed version takes up less screen space, and doesn’t show the numeric voltage reading.

“Gas gauge” display

The gas gauge display shows much of the same information as the bar graph display. However, it uses a gauge display, with a needle that moves from empty to full, depending on your battery voltage.

The “Empty” and “Full” points are automatically calibrated for your type of PowerBook. The “Empty” point coincides with the point where you’ll receive your first “low battery” warning. The “Full” point coincides with the voltage your battery should register, with a full charge.

Like the bar graph display, the “zoom box” toggles the gas gauge display between large and condensed displays.

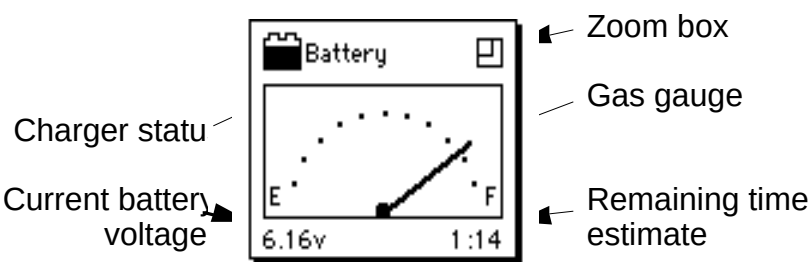


Figure 3. The “gas” gauge display shows the battery voltage between “full” and “empty.”

Item	Description
Charger status	Shows how the PowerBook is being powered. See the “charger status” section below for more information.
Gas gauge	The voltage is shown using a gas gauge display. The “Empty” point represents a empty battery, while the “Full” point represents a fully charged battery. As your battery drains, the gauge will move from Full to Empty.
Current battery voltage	This is the battery voltage returned from the Power Manager, with a granularity of 0.01 volts.
Remaining time estimate	This display is an estimate of how much useful time you have left before your first low voltage warning. Refer to the “How the estimate works” section for more information.
Zoom box	Allows you to toggle between large and condensed versions of the gas gauge display.

Histogram display (registered copies only)

The histogram displays shows, graphically, the battery voltage drop over time. As shown in the illustration below, the display measures the voltage once every minute, and plots it out on the chart.

Different patterns or colors are used to illustrate what was happening when the system was being charged.

This histogram clearly illustrates the non linearity of the voltage drop in a PowerBook battery. For example, the “peaks” in the example were generated by various PowerBook functions conserving power, like the hard drive sleeping.

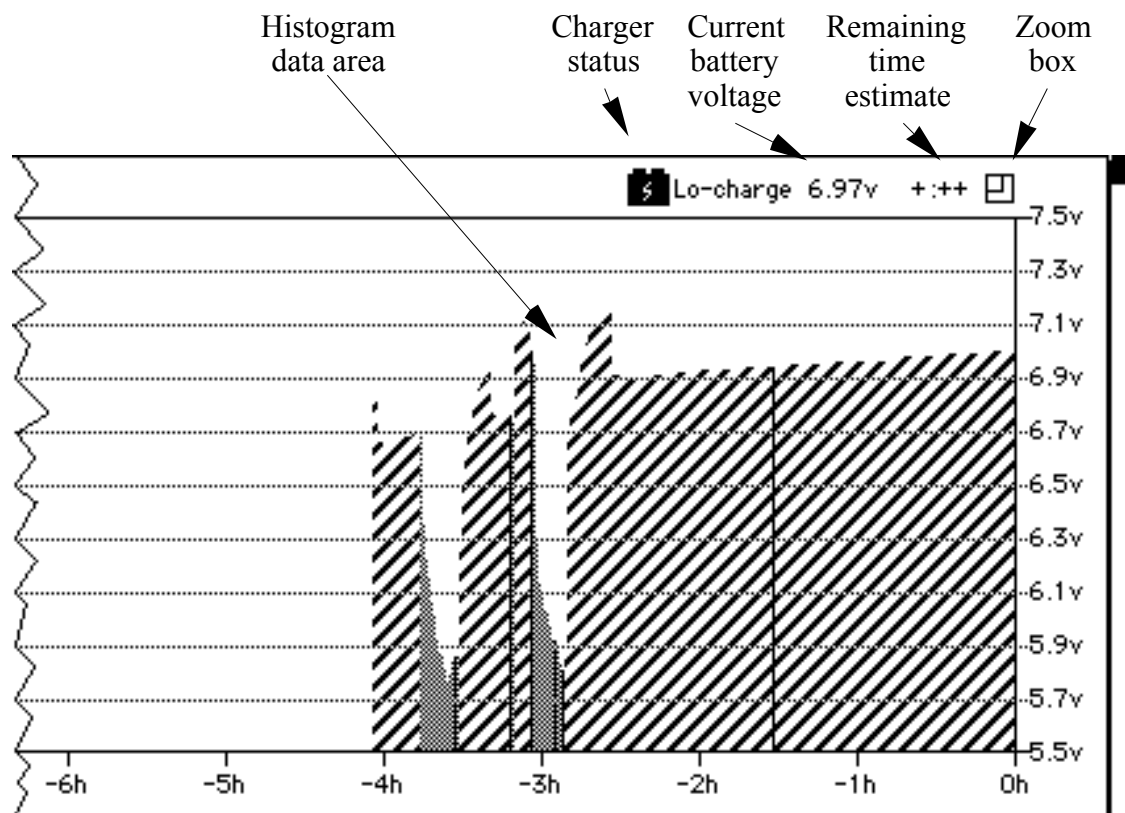


Figure 4. The histogram display shows battery voltage versus time.

Item	Description
Charger status	Shows how the PowerBook is being powered. See the “charger status” section below for more information.
Histogram data area	<p>This area shows the measurement results. Up to four hours of measurements can be displayed. The following patterns are used:</p> <p>Black line - represents a “sleep” period - when the PowerBook went to sleep, or was shut down.</p> <p>Striped line (Blue on a color PowerBook) represents when the PowerBook was recharging.</p> <p>Gray line (Green on a color PowerBook) represents when the PowerBook was running off the internal battery.</p>
Current battery voltage	This is the battery voltage returned from the Power Manager, with a granularity of 0.01 volts.
Remaining time estimate	This display is an estimate of how much useful time you have left before your first low voltage warning. Refer to the “How the estimate works” section for more information.
Zoom box	Allows you to toggle between large and condensed versions of the bar graph display. The condensed version takes up less screen space, but doesn’t show the numeric voltage reading.

Text only display

These displays are the smallest displays, suitable for sticking on a visible corner of the screen. They only show the battery charger icon, current battery voltage, and estimate of battery life remaining.

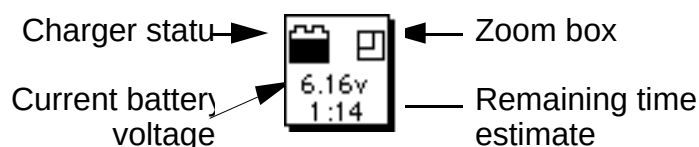


Figure 5. The text display shows battery voltage and time estimate in a small display.

Item	Description
Charger status	Shows how the PowerBook is being powered. See the “charger status” section below for more information.
Current battery voltage	This is the battery voltage returned from the Power Manager, with a granularity of 0.01 volts.
Remaining time estimate	This display is an estimate of how much useful time you have left before your first low voltage warning. Refer to the “How the estimate works” section for more information.
Zoom box	Allows you to toggle between a square display, and a horizontal display.

Moving the displays

Any of the window displays can be dragged to a screen location that you desire. For example, you can drag the bar graph display to the bottom left corner of the screen, so you can see it under the windows of other applications.

To drag a window, move the mouse pointer over the window. Click down on the mouse button, and with the mouse button still pressed down, drag the window wherever you want it. MyBattery will remember where you left it and will bring the window up in the same position the next time you run MyBattery.

Features

The MyBattery menu (MyBattery)

In addition to the **File** and **Edit** menus, MyBattery has a special **MyBattery** menu. This menu, as shown below, has several options for the displays.

MyBattery	
Bar graph	⌘B
✓ Column graph	⌘L
Gas gauge	⌘G
Histogram	⌘H
Text only	⌘Y
<hr/>	
Display elapsed time	⌘T
<hr/>	
Reset elapsed time	⌘R
Reset histogram	⌘A
<hr/>	
✓ Battery No. 1	⌘1
Battery No. 2	⌘2
Battery No. 3	⌘3
<hr/>	
Preferences...	⌘P

*Figure 6. The **MyBattery** menu lets you select different display options.*

Menu item	Description
Bar graph	Selects the bar graph display window.
Column graph†	Selects the column graph display window.
Gas gauge	Selects the gas gauge display window.
Histogram†	Selects the histogram display window.
Text only	Selects the text only display window.
Display elapsed time	Toggles the display between displaying the estimate of remaining battery time, and the elapsed battery time.
Reset elapsed time	Resets the elapsed time counter.
Reset histogram	Clears out all histogram data.
Battery No. 1†	Begins storing estimate data and generating estimates for battery number 1.
Battery No. 2†	Begins storing estimate data and generating estimates for battery number 2.
Battery No. 3†	Begins storing estimate data and generating estimates for battery number 3.
Preferences...†	Brings up preferences dialog box.

† Available only on registered copies.

The MyBattery menu (MyBattery Lite)

In addition to the **File** and **Edit** menus, MyBattery Lite has a special **MyBattery** menu. This menu, as shown below, has several options for the displays.

MyBattery	
Bar graph	⌘B
✓ Column graph	⌘L
Gas gauge	⌘G
Histogram	⌘H
Text only	⌘Y
<hr/>	
Display elapsed time	⌘T
<hr/>	
Reset elapsed time	⌘R
Reset histogram	⌘A

*Figure 7. The **MyBattery** menu lets you select different display options.*

Menu item	Description
Bar graph	Selects the bar graph display window.
Column graph†	Selects the column graph display window.
Gas gauge	Selects the gas gauge display window.
Histogram†	Selects the histogram display window.
Text only	Selects the text only display window.
Display elapsed time	Toggles the display between displaying the estimate of remaining battery time, and the elapsed battery time.
Reset elapsed time	Resets the elapsed time counter.
Reset histogram	Clears out all histogram data.

† Available only on registered copies.

Charger status

Status of the battery charger and internal battery is shown using a small battery icon. The icon will show one of the states below:




	"hi-charge" status. Charger is attached, and battery is being charged at a high rate.
	"lo-charge" status. Charger is attached, and battery is being trickle charged to maintain full charge.
	Internal battery status. No charger is attached, and PowerBook is running off internal battery. MyBattery will optionally display battery number, superimposed over battery icon.

Figure 8. The charger status is shown using a small battery icon.

When you first attach the charger to your PowerBook, it will go into the “hi-charge” mode. This mode charges the battery very quickly. After some time, the charger will switch to the “lo-charge” mode. This mode tops off the battery, and keeps it fully charged.

Note: There is one little peculiarity about the battery charger on older PowerBooks. The PowerBooks use a physical switch to determine if a charger is attached. Therefore, if the battery charger is plugged into the PowerBook, but the other end isn't plugged into a wall outlet, the PowerBook incorrectly thinks that the battery is charging!

Current CPU speed (MyBattery only)

In order to conserve battery power, PowerBooks have the ability to run the microprocessor at a reduced speed. MyBattery can display the current CPU speed, using a small icon.

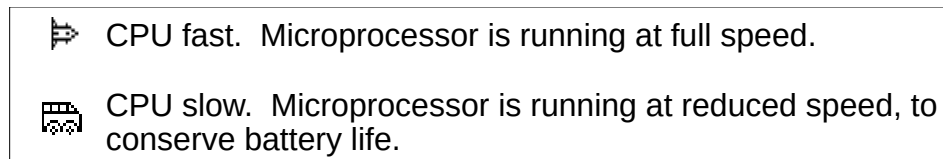


Figure 9. The CPU speed is shown using a small icon.

Current AppleTalk Status (MyBattery only)

AppleTalk, when active, can help eat up battery juice. It prevents your PowerBook from sleeping, and may prevent CPU speed cycling. MyBattery will display the current AppleTalk status, using a small icon.

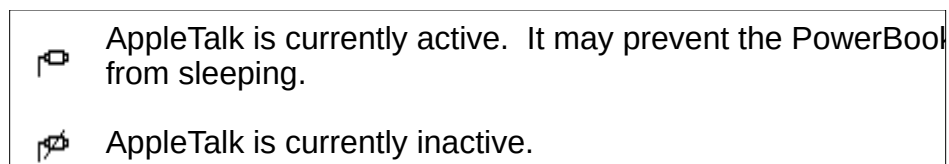


Figure 10. The status of AppleTalk is shown with a small icon.

Menu bar displays (registered copies of MyBattery only)

MyBattery has the ability to place small displays in either the left or right corners of the menu bar. For either corner, you can select one of the following displays:

- Nothing No display at all.
- Time estimate Estimate of remaining time left, on the current battery. The time is shown in minutes and hours.
- Battery icon Displays the battery charger icon.
- CPU speed Displays the icon showing current CPU speed.
- AppleTalk Displays an icon showing AppleTalk loaded or unloaded.

The displays were chosen to be as unobtrusive as possible, while presenting useful information. Unfortunately, the menu bars are very popular places to display information, and there are many other programs that vie for this space. For example, AppleTalk uses the space on the left side of the menu bar to indicate when data is being transferred. Any suggestions on alternate spots will be appreciate!

Multiple Batteries (registered copies of MyBattery only)

MyBattery can support up to three unique batteries. This allows you to use batteries with different capacities, and identify these batteries to MyBattery, so it can make accurate and unique estimates for each battery.

For example, a user might have two batteries - the standard battery provided by Apple with the PowerBook, and a third-party battery with a larger capacity (for longer PowerBook usage). MyBattery can store and make unique estimates for each battery.

However, there is one small catch. There is no way for MyBattery to reliably identify which battery is attached. Therefore, whenever you swap batteries, you must inform MyBattery which battery you are currently using. This is performed by choosing the appropriate battery number off the MyBattery menu.

Preparing your batteries

Before you hit the road, you should label each battery. I've found that Avery sticky labels work fine, or even masking tape works well. Whatever you use should be thin and flat, so it won't interfere with inserting or removing the battery. You should place it somewhere on the battery where it will be easily visible when you remove the battery, and won't cover the metal battery contacts.

When you swap batteries

When you are ready to swap batteries, following this simple procedure. It will ensure that MyBattery accurately updates the stored historical data for each battery.

- 1) When you are ready to swap batteries, bring MyBattery to the

foreground. Select the new battery number from the MyBattery menu. This will force MyBattery to update its historical information for the current battery, and begin recording historical estimates for the new battery.

- 2) Put your PowerBook to sleep, and swap batteries.
- 3) Wake your PowerBook up.
- 4) That's all! MyBattery will now present you with estimates for the new battery, and store historical estimation data for the new battery.

External batteries

You can define each of the three batteries as either an internal or external battery (one that plugs into the battery charger port). See the section "External Battery Packs" for more information.

Preferences Dialog (registered copies of MyBattery only)

The preferences dialog is only available in MyBattery (not in MyBattery Lite). You can choose from the selections below, to customize MyBattery to your liking.

Dialog item	Description
Battery Configuration	Lets you select the type of battery you are using. MyBattery supports up to three batteries; each battery can be defined as either an external or internal battery.
Menu bar displays	Lets you select the type of indicator displayed in the menu bar. You can select a display for either the left or right side of the menu bar. The left indicator will appear to the left of the Apple menu, while the right indicator appears to the right of the application menu.
Histogram display	Allows you to customize the histogram display. <u>Reset histogram when charger unplugged</u> - Clears all histogram data whenever the battery charger is unplugged. <u>Display charging measurements</u> - Displays any measurements taken while the charger was plugged in.

	<u>Display sleep period marker</u> - Displays markers when the PowerBook went to sleep.
Charging Preferences	Selects MyBattery's operation when a charger is plugged in. <u>Close MyBattery window when charging</u> - Hides the MyBattery display whenever the charger is plugged in.
Battery status icon	Selects whether or not additional information should be displayed with the battery status icon. <u>Display battery number and "bolts"</u> - Displays battery number (1, 2 or 3), and lightning "bolts" when charger is plugged in.

Estimate of time remaining & elapsed time

On the larger displays, either the estimate of time remaining or the elapsed battery time is displayed.

The estimate of time remaining is shown in normal text. It shows, in hours and minutes, how much useful time is left in your battery. For more information on how this estimate is derived, read the “How the estimate works” section of this manual.

The elapsed time display is shown in italics. It shows, in hours and minutes, the amount of time you have been running off the internal battery. The elapsed timer is reset automatically when the battery charger is plugged in, or can be manually reset. Note that when you swap batteries, the elapsed timer will not reset.

Sleep shortcut

MyBattery also contains a shortcut for putting your PowerBook to sleep, instead of having to return to the Finder and choose the “Sleep” menu item from the “Special” menu.

To put the PowerBook to sleep using MyBattery, hold down the shift key while clicking the mouse button anywhere in the MyBattery window. You may have to click on the window twice if MyBattery is in the background (the first click will bring it to the foreground, and the second click will put it to sleep).

Installing MyBattery

MyBattery and MyBattery Lite are stand-alone applications. They are designed to run all the time, normally in the background.

To install MyBattery or MyBattery Lite, simply copy the application to where you want it - your “Utilities” folder or wherever. The first time you run either program, it will create a “MyBattery Preferences” and “MyBattery Data” file in your “System” Folder (or in the “Preferences” folder if you are running System 7).

Running on startup under System 6.0.x

If you want MyBattery or MyBattery Lite to run whenever you turn on or restart your Macintosh, perform the following steps:

- 1) Locate your copy of MyBattery or MyBattery Lite.
- 2) Click on the application icon *once* to select it.
- 3) From the **Special** menu, choose “Set Startup...”.
- 4) Under the sentence that says “Upon startup, automatically open”, click on the radio button for “MyBattery”.
- 5) Restart! MyBattery should start running automatically.

Running on startup under System 7.x

- 1) Locate your copy of MyBattery or MyBattery Lite.
- 2) Click on the application icon *once* to select it.
- 3) From the **File** menu under the Finder, choose “Create Alias”.
- 4) Drag the alias to the “Startup Items” folder, inside your “System Folder”.
- 5) Restart! MyBattery should start running automatically.

Or, if you desire, you can place the MyBattery or MyBattery Lite application itself in your “Startup Items” folder, which will save a little disk space.

How the estimate works

MyBattery uses a historical estimation technique to estimate the remaining useful time on your battery.

What does this mean? As you use your PowerBook, MyBattery monitors the battery voltage. As the battery voltage drops, MyBattery measures the amount of time it took, and stores this information away. MyBattery then uses this information to make the estimates.

When you first run MyBattery, it initializes the estimates with some default data. As you use your PowerBook with MyBattery, however, it will start basing its estimates on the data it has collected about your computer. Therefore, the accuracy of the estimates will increase the more you use your computer.

How accurate is it?

Well, there is no foolproof way of estimating the remaining time left on a battery. There are too many factors that can affect your battery life - temperature, disk accesses, screen brightness, initial battery charge, and so on. But once MyBattery has collected a reasonable collection of measurements, the estimate should be pretty accurate, and tailored specifically to your computer.

One advantage of the historical technique is that it allows MyBattery to handle any type or vintage of battery. For example, as your battery ages, its useful charge life slowly decreases. MyBattery will continue to update its estimates to reflect this change.

Estimation problems

MyBattery assumes that your battery usage doesn't vary much from session to session. There are, however, two situations that can cause MyBattery to give poor estimations:

- 1) Inconsistent battery charging. If you sometimes charge your battery fully, and other times only charge it for an hour or two, MyBattery's estimate will lose some accuracy. On general principles, it's always a good idea to fully charge your battery between uses.
- 2) Swapping between batteries with vastly different characteristics. If you had two batteries - the standard Apple battery that lasts 2 hours and a suitcase-sized battery pack that lasted 15 hours - and swapped back and forth between them, MyBattery would be quite confused. Its estimates would fall somewhere in between. MyBattery (not MyBattery Lite) supports multiple batteries, which allows you to avoid this problem.

External Battery Packs

A new phenomenon in the PowerBook world is the external, long-life battery, like the VST ThinPack or the Technöggin PowerPlate. These external batteries last several times longer than the internal battery pack, and plug into your PowerBook's battery charger port.

The Power Manager, which is the part of the Apple Macintosh OS that manages the battery, has no provisions to support external batteries. This makes it virtually impossible for MyBattery to differentiate between a battery charger or an external battery. While MyBattery will attempt to guess when an external battery is attached, most of the burden falls on you, the user, to inform MyBattery when you are using an external battery.

MyBattery can record information for as many as three batteries. Through the "Preferences" dialog, you can identify each of these as being either an internal or external battery. If you identify a battery as external, and that battery is currently selected, MyBattery will ignore what the Power Manager is telling it, and treat any charger information as an external battery.

To prepare MyBattery for an external battery:

- 1) Bring MyBattery to the foreground, if it isn't already.
- 2) Choose "Preferences..." from the "MyBattery" menu.
- 3) Define one of the three batteries as being an external. Typically, battery #1 is your default internal battery, so it's best to define battery #2 or battery #3 as an external battery.

When you are about to use an external battery:

- 1) Plug in your external battery.
- 2) Bring MyBattery to the foreground.
- 3) From the "MyBattery" menu, choose the battery that you've defined as an external battery.
- 4) MyBattery will now begin monitoring the voltage of your external battery, and present you with estimates of your remaining battery life.

When you are done with your external battery, or starting to charge it:

- 1) Bring MyBattery to the foreground.
- 2) From the "MyBattery" menu, choose a non-external battery.
- 3) MyBattery will revert to monitoring your internal battery.

NOTE: The first several times you use MyBattery with your external battery, the remaining time estimate will be very conservative. After several discharge cycles, however, MyBattery will have collected enough data to present accurate estimates.

Registration

When you receive MyBattery, it comes unregistered. When MyBattery isn't registered, a "†" symbol appears next to the current voltage display.

What does registering your copy do?

- 1) It activates the historical estimation technique that MyBattery uses to estimate the amount of time remaining, and allows you to access the additional displays. In unregistered copies, MyBattery makes its estimate based on stored, default values. When the historical estimation technique is activated by registering your copy, MyBattery will "learn" your battery consumption and will use this information to make more accurate estimates.
- 2) Several advanced display options will become available, like the histogram display.
- 3) With MyBattery, multiple battery support and the preferences dialog will be activated.
- 4) You'll be notified of future upgrades.

How to register

Included in the MyBattery package is a TeachText registration form. Print out the form, fill it in, and send it in with your \$10 registration fee. If you are sending a check or money order, it must be in U.S. dollars, and drawn on a U.S. bank (foreign postal money orders are fine). Also, please make it payable to Jeremy Kezer.

Once your registration fee has been received, I will send you a letter with the registration password, and directions on how to use the password to register your copy. Once you are registered, you are registered for life! The password will work on all future copies of MyBattery. Please give me your electronic mail address, so I can send you notices of future upgrades.

Due to the vagaries of the U.S. Post Office and my schedule (I occasionally travel for work), it may take a week or two for you to receive your registration letter.

Addresses

If the registration form isn't present, please send the check to the following:

Jeremy Kezer
143 Songbird Lane
Farmington, CT 06032-3433
USA

I can also be reached through various EMail systems:

America Online: JBKezer
Internet: jbkezer@aol.com

Known Problems and Conflicts

Registration and disk compactors

Several users have reported that disk compression utilities can prevent proper registration. If you are using an automatic disk compression utility, you should exclude MyBattery from compression until after you have registered it. For example, if you are using AutoDoubler to compress your hard drive, you should expand MyBattery before attempting to register your copy. This problem does not appear with “drive-level” compression utilities, such as TimesTwo and Stacker.

CursorBeacon CDEV

Bill Monk's CursorBeacon is a freeware control panel that lets you find your cursor on PowerBook or large displays. Several users have reported that if you activate the CursorBeacon with MyBattery in the foreground, MyBattery will unexpectedly quit.

Apparently, CursorBeacon “steals” free memory from the current application. MyBattery has just enough memory allocated for its own use; this conflict can be easily fixed by allocating more memory to MyBattery.

- 1) Quit MyBattery, if it is currently running.
- 2) Locate your copy of MyBattery.
- 3) Click on the application icon *once* to select it.
- 4) From the **File** menu, choose “Get Info”.

- 5) Move the cursor to the "Suggested Size" text field, and increase the current number by 10k.
- 6) Close the window.

The next time you run MyBattery, it will consume a little more memory, but the conflict with CursorBeacon will be fixed.

Menu bar conflicts

The menu bar is the one constant among all Macintosh applications. Many software programs use it to display additional information. These applications sometimes try to use the same space as MyBattery, which can cause menu bar display conflicts. For example, Apple's AppleShare uses the left side of the menu bar to indicate if information is being transmitted or received by your PowerBook over the AppleTalk network, which can interfere with MyBattery's left menu display.

There is no simple solution, other than turning off menu bar displays, which isn't much of a solution at all...

HP PaintWriter Drivers

One MyBattery user has reported a conflict with the Hewlett Packard PaintWriter driver software. He noticed an unusual problem with the MyBattery Preferences dialog. When he upgraded the drivers to a new version, the problem went away. Therefore, if you are noticing a black box being drawn in the

lower right corner of the “Preferences” dialog, covering the “OK” and “Cancel” buttons, you should upgrade your PaintWriter drivers to 3.0.7b. Thank you, Mike!

Troubleshooting

While I have attempted to test MyBattery as thoroughly as possible, there is no way of testing all the possible configurations. If MyBattery is operating erratically, it's possible that some piece of software is interfering with it.

Occasionally, it's possible that the “MyBattery Data” and “MyBattery Preferences” files can become corrupted, if your Macintosh crashes while these files are open (MyBattery periodically updates these files). If you are getting internal MyBattery errors, try deleting these files from your “System” folder (or “Preferences” folder under System 7). The errors should disappear.

Application interference

If MyBattery is operating erratically with other applications running, note the other applications that are running. Next, restart your computer and try running MyBattery by itself. If the problem does not appear, try running the same applications, one by one. When you isolate the problem application, drop me a note and let me know what it is!

INIT/CDEV/Extension interference

If MyBattery continues to operate erratically, an INIT, CDEV or system Extension (collectively known as extensions) may be interfering. First,

restart your machine while holding down the SHIFT key. A message will come up stating “Extensions off”. Try MyBattery; if the problem doesn't appear, it is most likely an extension causing the problem.

Isolating the offending extension can be tedious, especially if you have lots of extensions loaded. Start out by removing half of your extensions. Restart and try MyBattery. If the problem occurs, remove half of the extensions that were loaded, and try again. If the problem did not occur, swap the extensions you loaded with the ones you didn't, and try again.

Continue this process until you isolate the offending extension. Drop me a line and let me know what extension was causing the problem.

Upgrading System 6 to System 7

When MyBattery is running under System 6.0.x, it creates a “MyBattery preferences” file and a “MyBattery data” file in your “System” folder. If you upgrade to System 7 and want to preserve your preferences and estimation data, copy these files to the “Preferences” folder in your “System” folder. Otherwise, MyBattery will create new files in your “Preferences” folder using default values.

Acknowledgments

Not being wealthy, every time Apple introduces new PowerBooks, I must rely on the kindness of others to provide me with the information I need to support the new machines. To all of you who have helped, thanks!

Thanks also to those who have enthusiastically responded with criticisms and suggestions for new features. MyBattery continues to mature, with your guidance.

I'd particularly like to thank Rich Wolfson for providing me with the low voltage tables and other information, and Marcus Wallgren of Apple for contributing much knowledge on the Duo power manager.

Compatibility

MyBattery requires System 6.0.8 or later. It is fully compatible with System 7.0.x and System 7.1.

MyBattery has been tested on all current flavors of PowerBooks. It should work on any portable Macintosh that supports the Power Manager (part of Apple's Macintosh system software).

MyBattery was designed as a stand-alone application for two reasons - to minimize the possibility of conflicts with other programs (with CDEV's or INIT's, there's always a risk), and to allow you maximum flexibility with free RAM. If you need more memory, simply quit MyBattery (with a CDEV or INIT, you'll have to reboot, wasting time and battery power).

Technical information and references

References

The information used to write MyBattery and this manual has been culled from various sources, including:

- *Inside Macintosh, Volume VI* (Apple, published by Addison

Wesley). This volume contains a discussion of the Power Manager software.

- *Macintosh PowerBook Family Developer Notes* (Apple). Discusses technical side of PowerBook hardware and firmware.
- *The PowerBook Companion* (Richard Wolfson, Addison Wesley). A great book with loads of tips for PowerBook users (did you know that when Apple prepares your PowerBook hard drive, megabytes of hard drive space are unused? Buy the book and find out how to get it back!).

Development environment

MyBattery has been developed using:

- Apple PowerBook 100, with 8 megabytes of RAM and a 40 megabyte hard drive (color prototyped using a Centris 610).
- Apple's ResEdit, version 2.1.
- Symantec THINK C.5.0. This is one of the best C development environments I've seen - it only lacks a configuration management system of similar quality.
- Symantec THINK C Reference. I use this so much my printed copies of "Inside Macintosh" are getting dusty. A truly useful tool if you're doing any sort of Macintosh programming - the code examples alone are worth the price!
- Apple's "Inside Macintosh", volumes I-VI.

Low Battery Warnings

Some of the following values have been compiled from user's measurements and other sources; your voltages may differ.

	Typical "fresh" battery	First warning message	Second warning message	10 second dialog	Forced shutdown
Macintosh Portable	≈6.20v	5.90v	5.81v	5.78v	5.74v
PowerBook 100	≈6.20v	5.90v	5.81v	5.78v	5.74v
PowerBook 140	≈6.70v	5.90v	5.75v	5.65v	5.55v
PowerBook 145	≈6.70v	5.90v	5.75v	5.65v	5.55v
PowerBook 145B	≈6.70v	5.90v	5.75v	5.65v	5.55v
PowerBook 160	≈6.70v	5.90v	5.75v	5.65v	5.55v
PowerBook 165c	≈6.70v	5.90v	5.75v	5.65v	5.55v
PowerBook 170	≈6.70v	5.90v	5.75v	5.65v	5.55v
PowerBook 180	≈6.70v	5.90v	5.75v	5.65v	5.55v
PowerBook 180c	≈6.70v	5.90v	5.75v	5.65v	5.55v

	Typical "fresh" battery	First warning message	Second warning message	10 second dialog	Forced shutdown
Duo 210	≈12.30v	11.80v	11.40v	11.00v	10.60v
Duo 230	≈12.30v	11.80v	11.40v	11.00v	10.60v

Apple NiCad battery capacities

As Apple has introduced new PowerBooks, they have also been increasing the charge capacity of their accompanying NiCad batteries. The list below illustrates the current models of the NiCad batteries Apple has provided. Apple has made no upgrades to the lead-acid battery used in the PowerBook 100.

	Rating	Apple part #
PowerBook 140, 145, 170	2.5 amp-hours	M5417
PowerBook 160, 180	2.8 amp-hours	M5653
PowerBook 165c, 180c	2.9 amp-hours	M5654

Apple Battery Chargers

Apple has also been busy upgrading the battery chargers. Note that while all chargers work with all PowerBooks, charging a newer PowerBook on an older charger may take longer.

	Rating	Apple part #
PowerBook 100-170	15 watts output	M5140
PowerBook 160, 180	17 watts output	M5651
PowerBook 165c, 180c	24 watts output	M5652

Version History

2.1.1 25 October 1993	<ul style="list-style-type: none"> Added longer period to estimation technique, for more accurate estimates with large external battery packs. Added support for PowerBook 165, Duo 250 and Duo 270c.
2.1.0 5 September 1993	<ul style="list-style-type: none"> Changed to Apple version numbering scheme. Updates displays if color depth changes. Support for external batteries. Histogram display enlarged to show more data. Updated preferences dialog to support external battery selections. Updated default estimates for color PowerBooks (original estimates were too optimistic). Fixed menu bar blanking problem - only blanks when icons drawn.
2.01 11 July 1993	<ul style="list-style-type: none"> Fixed "disappearing" zoom box problem. Registration password is once again case-insensitive. Fixed bug that would prevent historical data collection under specific circumstances. Fixed CPU speed display on PowerBook 160's.
2.00 21 June 1993	<ul style="list-style-type: none"> Color and grayscale support added (MyBattery only). Menu bar displays added (MyBattery only). Support for multiple batteries (MyBattery only). Preferences dialog added (MyBattery only). Lots of tables added to manual! Faster startup. Battery status icon revamped to display charge rate. Histogram display options added (MyBattery only). Option to hide display when charging (MyBattery only). Sleep shortcut added. Optimized to minimize disk accesses, to conserve power.
1.31	<ul style="list-style-type: none"> Histogram now displays last four hours of time, and is reset

22 April 1993	<ul style="list-style-type: none"> manually. Added support for insertion of unformatted floppy while MyBattery is in foreground. Description of CursorBeacon conflict, with work-around.
1.30 10 March 1993	<ul style="list-style-type: none"> Added column displays. Added text-only displays. Added text-only displays. Display estimated time remaining on collapsed displays (makes 'em smaller). Updated calculation of PowerBook Duo voltages. Enhancements to estimate of battery time left. Support for PowerBook 165c, 180c added. Internal changes to make adding new PowerBooks easier. Improved error recovery with corrupted estimation data files. "Time left" display averaged to give a "steadier" display.
1.22 12 January 1993	<ul style="list-style-type: none"> Added histogram display. Enhancements to long-term estimate technique.
1.21 24 November 1992	<ul style="list-style-type: none"> Added support for PowerBook 145, 160, 180, Duo 210 and 230. Decreased memory requirements. Enhanced estimate for non-registered users. Elapsed time now saved between sessions. Optimization problems with Think C fixed by Symantec, so turned optimization back on.
1.20 7 October 1993	<ul style="list-style-type: none"> Password registration. Historical estimating technique. Auto-configure for different PowerBook types. Handling for system sleep.
1.10 23 August 1993	<ul style="list-style-type: none"> Estimate limited to 4 hours. Display --h --m fix for bar graph display. Add elapsed battery time display. Improved estimations of remaining battery time. Improved error checking. "Full" is now 6.20 volts on gas gauge. Turned off compiler optimization to fix PowerBook 140/170 problems.
1.00 17 August 1992	<ul style="list-style-type: none"> Displays two-color bar graph. Added separate icon for low battery condition. Gas gauge display. "condensed displays".
0.90 4 August 1993	<ul style="list-style-type: none"> First release.

Disclaimer

While I have attempted to test MyBattery as fully as possible, I cannot guarantee proper operation on other computer systems. I am not liable for any direct or indirect damage caused by MyBattery. The individual using the software bears all risk as to the quality and performance of the software.

If you have registered your copy of MyBattery, and are not satisfied with its operation, your registration fee shall be returned to you. You are then obligated, however, to delete all registered copies.