MyBattery 1.31
by
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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 computers:

- The current battery voltage in numeric form,
- The current battery voltage in graphical form, using a variety of graphical displays,
- An estimate of the remaining useful time on your battery,
- Battery charger status.

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 a variety of portable Macintoshes, including the PowerBook 100, 140, 145, 160, 170, 180, Duo 210 and 230, and the Macintosh Portable. MyBattery 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 battery power!).

Features

MyBattery is designed to help you make the most of your rechargeable battery. It gives you information about the battery charger, battery voltage, and estimates of remaining battery time.

MyBattery has several selectable displays. Each display provides you with battery information in both graphical and numeric form. Each type of display is discussed below.

Bar graph display

The bar graph display shows the battery voltage using a bar, as illustrated below.
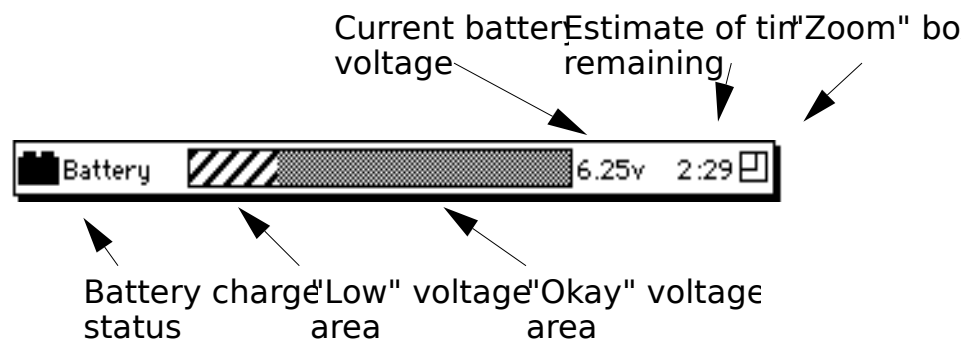

Figure 1. The bar graph display shows the battery voltage using a two-color bar graph.

Battery charger status   Shows you whether the battery is charging or not. 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; if you are running off the internal battery, it is shaded grey. If you are running off the battery charger, it's shaded black.

Current battery voltage This is the battery voltage returned from the Power Manager, with a granularity of 0.01 volts.

Estimate of time remaining 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.

Column graph display (registered copies only)

The column graph display is similar to the bar graph display, except that the display runs vertically, as shown below.
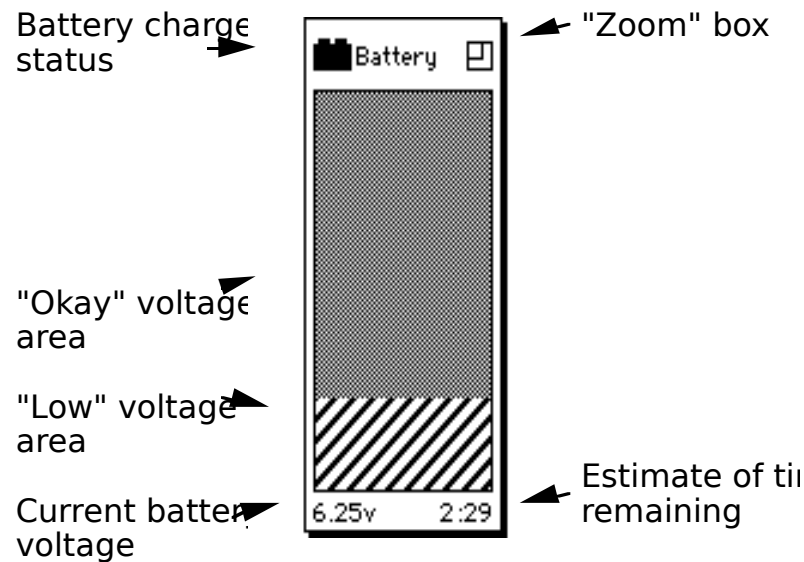
Battery charge status   "Zoom" box

Battery

"Okay" voltage area

"Low" voltage area

Current battery voltage   6.25v   2:29   Estimate of time remaining

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

Battery charger status   Shows you whether the battery is charging or not. 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; if you are running off the internal battery, it is shaded grey. If you are running off the battery charger, it's shaded black.

Current battery voltage   This is the battery voltage returned from the Power Manager, with a granularity of 0.01 volts.

Estimate of time remaining   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, but 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 you 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.
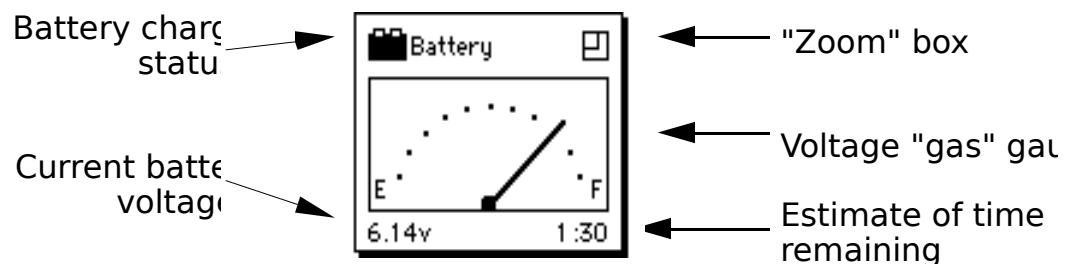
Battery charg   →   "Zoom" box
status

Current batte   →   Voltage "gas" gau
voltage

6.14v   1:30   ←   Estimate of time
remaining

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

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.

Grey areas are measurements taken when the PowerBook was running off internal battery, and black areas are measurements taken when the PowerBook was running off the battery charger. Note that the time is "alive" time - any time the PowerBook was asleep is ignored. The display will show up to four hours of measurements (if your battery lasts longer than four hours, you must be living a very clean and wholesome life!). You can reset the histogram via the MyBattery menu.

This histogram clearly illustrates the non linearity of the voltage drop in a PowerBook battery. For example, the "peaks" in the illustration below came whenever the PowerBook was idle, and the hard drive would sleep.
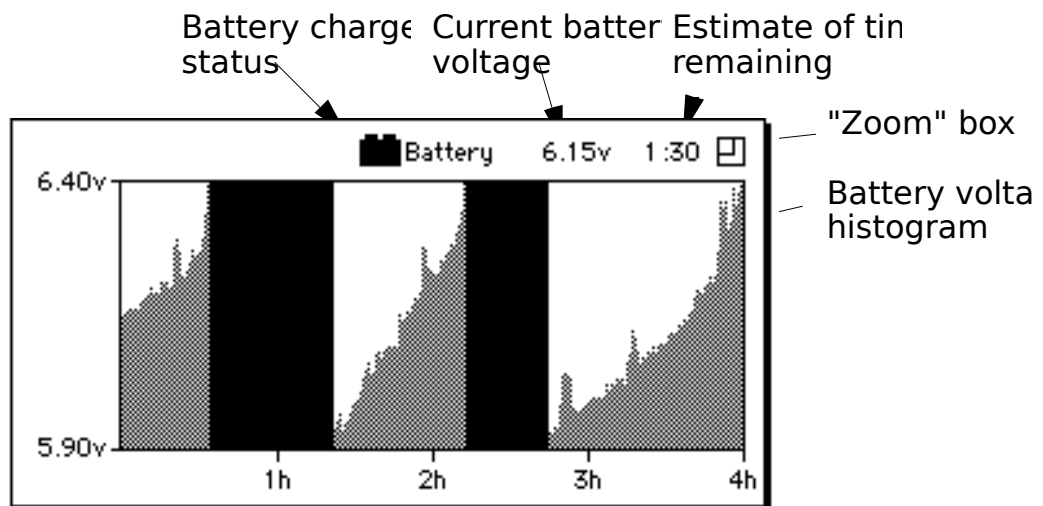

Figure 4. The histogram display shows battery voltage versus time.

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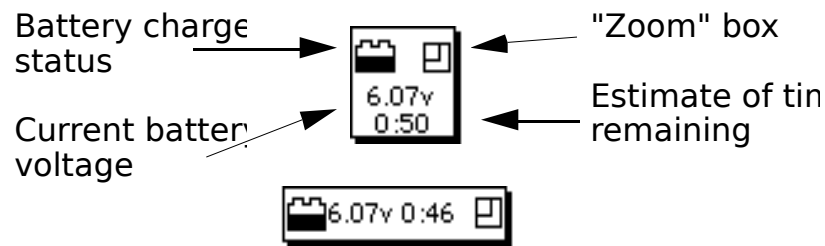
Figure 5. The text display shows battery voltage and time estimate in a small display.

Charger status

The charger status shows one of four possible states:

Figure 6. The charger status is shown using one of four displays.

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. 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!

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 if you swap batteries, the elapsed timer will not reset.

The MyBattery menu

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   │
│ ............................ │
│   Display elapsed time ⌘T   │
│ ............................ │
│   Reset elapsed time   ⌘R   │
│   Reset histogram      ⌘A   │
└─────────────────────────────┘
```

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

Bar graph   Selects the bar graph display.

Column graph   Selects the column graph display.

Gas gauge   Selects the gas gauge display

Histogram   Selects the histogram display.

Display elapsed time Toggles between displaying the estimate of battery time remaining, and displaying the elapsed battery time.

Reset elapsed time   Resets the elapsed time counter.

Reset histogram Resets the data displayed in the histogram 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 your run MyBattery.

Installing MyBattery

MyBattery is a stand-alone application, designed to run all the time. Because MyBattery takes up little memory (less than 50k), you'll hardly notice that it's there!

To install MyBattery, simply copy the application to where you want it - your "Utilities" folder or wherever. The first time you run MyBattery, 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 to run whenever you turn on or restart your Macintosh, perform the following steps:

1) Locate your copy of MyBattery.
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 1.31".

5) Restart! MyBattery should start running automatically.

Running on startup under System 7.x

1) Locate your copy of MyBattery.
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.

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 - for your computer!

One advantage of the historical technique is that it allows MyBattery to handle different types and ages of batteries. As your battery gets older, its useful life slowly decreases. MyBattery will continue to update its estimates to reflect this change.

There are also several third-party battery options that last longer than Apple's standard batteries. MyBattery's estimates will adjust itself to the characteristics of these batteries.

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.

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? 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.

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 a check or money order for $10. Please, the check or money order must be in U.S. dollars, drawn on a U.S. bank. 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.

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

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.

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 it's 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.

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

In the "PowerBook blitz of October '92", little technical information was available from Apple about the new PowerBooks. Many thanks to all the proud owners of new PowerBooks who helped me with testing and information on their new machines. 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 Marcus Wallgren of Apple for contributing much knowledge on the Duo power manager.

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 application icons done using a Macintosh LC II).
- 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 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; your voltages may differ.

	PowerBook 100	PowerBook 140/145/170
Typical "fresh" battery	≈6.20v	≈6.70v
First warning message	@5.90v	@5.90v
Second warning message	@5.81v	@5.75v
10 second dialog	@5.78v	@5.65v
Forced shutdown	@5.74v	@5.55v

	PowerBook 160/180	PowerBook Duo 210/230
Typical "fresh" battery	≈6.70	≈12.30v
First warning message	@5.90v	@11.80v
Second warning message	@5.75v	@11.40v
10 second dialog	@5.65v	@11.00v
Forced shutdown	@5.55v	@10.60v

	Macintosh Portable	PowerBook 165c
Typical "fresh" battery	≈6.20v	≈6.70v
First warning message	@5.90v	@5.90v
Second warning message	@5.81v	@5.75v
10 second dialog	@5.78v	@5.65v
Forced shutdown	@5.74v	@5.55v

Version History

1.31 - 22 April 1993
- Histogram now displays last four hours of time, and is reset manually.
- Added support for insertion of unformatted floppy while MyBattery is in foreground
- Description of CursorBeacon conflict, with resolution.

1.30 - 10 March 1993
- Added column 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 added
- Internal changes to make adding new PowerBooks easier
- Improved error recovery with corrupted estimation data files
- "Time left" display now more steady

1.22 - 12 January 1993
- Added histogram display
- Enhancements to long-term estimate technique

1.21 - 24 November 1992
- 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

1.20 - 7 October 1992
- Password registration
- Historical estimating technique
- Auto-configure for different PowerBook types
- Handling for system sleep

1.10 - 23 August 1992
- 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
- Displays two-color bar graph
- Added separate icon for low battery condition
- Gas gauge display
- "condensed displays"

0.90 - 4 August 1992
- 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.