# OPENUPS
## 6-30V Intelligent Uninterruptible Power Supply
2012 (c) www.mini-box.com

# Software manual

**WARNING:** This manual is a software manual only, for OpenUPS wiring please read the "Installation Guide".

| Version | Comment |
|---------|---------|
| V1.0.0.0 | Initial version |
| v1.0.0.1 | OpenUPS Mode updated text |
| v1.0.0.2 | Firmware 1.3 support (new variables)<br>Win7 support |
| v1.0.0.3 | Firmware 1.4 support (new variables) |
| v1.0.0.4 | UPS_CONFIG made public<br>Device close bug fixed |

**Introduction**

The software support for OpenUPS contains four modules:
1. Windows OS built-in driver support
2. Windows Configuration software (OpenUPS Configuration)
3. Windows System monitor (OpenUPS Tray Monitor)
4. Windows Monitor API + Visual Studio project

**1. Windows OS built-in support**

The OpenUPS implements two generic USB classes, therefore most of the operating systems are recognizing it without any additional driver installation. This two classes are:

a.) "HID UPS Battery" for OS built-in communication.

Microsoft Windows versions are recognizing this class automatically and the device should appear in device manager at Batteries as a "Hid ups battery", together with all settings and power plan possibilities provided by the OS for any battery.

b.) "HID" for communication and configuration

This endpoint is a generic HID and it is used by our configuration and monitor softwares to read/write voltages and other important parameters of the OpenUPS

## 2. Windows Configuration software

The configuration software provides interface for OpenUPS monitoring, logging and setup.

It's recommended to be used by users with deeper understanding of the OpenUPS hardware since permits setting voltages, currents and other parameters which can be dangerous if they are set without precaution. Mini-box.com recommends using this software only together with the "Installation guide" which explains the wiring and the parameters of the OpenUPS.

The configuration software has two main screens (Status and Settings) and a header with the important voltage/current values.

The first main screen is the "Status". Example of this screen is shown in the next image (fig1.)
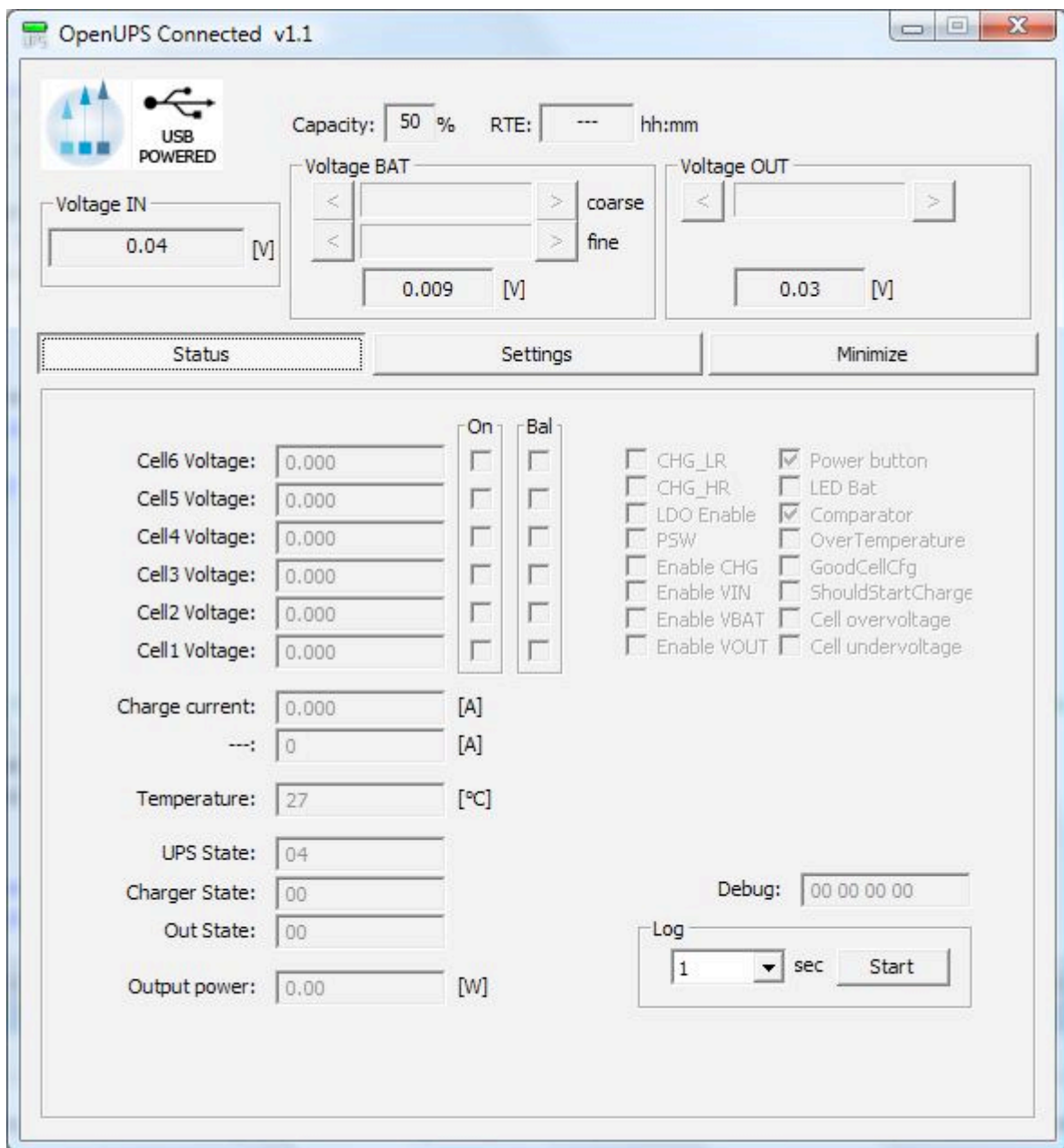


fig 1. Status screen

Since both screens are containing the header and the title bar first those will be explained.

Title bar: shows the connection status, the firmware version and the mode of the OpenUPS.

Screen header contains more elements:
- Status icons: The first icon is the mini-box.com icon which does not change during the process. The second icon shows the power state of the OpenUPS, in our case the "USB powered". This icon can have two other statuses ("Line powered" and "Battery powered") and the current icon shows the power state of the OpenUPS (powered from USB, Vin or Vbattery)
- Capacity: remaining capacity of the battery
- RTE: "Run time to empty" of the battery
- Voltage IN: Voltage at Vin header of the OpenUPS (J1 header)
- Voltage Bat: main battery voltage (J4 header)
- Voltage Out: voltage at the output (J3 header)
Setting the voltages directly from here is not permitted – You can set them from the Settings panel parameters.

The "Status" screen contains extended information about the current state of the OpenUPS like battery voltages, charge/discharge currents, temperature of the PCB, different states and the output power.
The user also have the possibility to log the current state into a *.csv file. This is mainly for debug and support purposes.

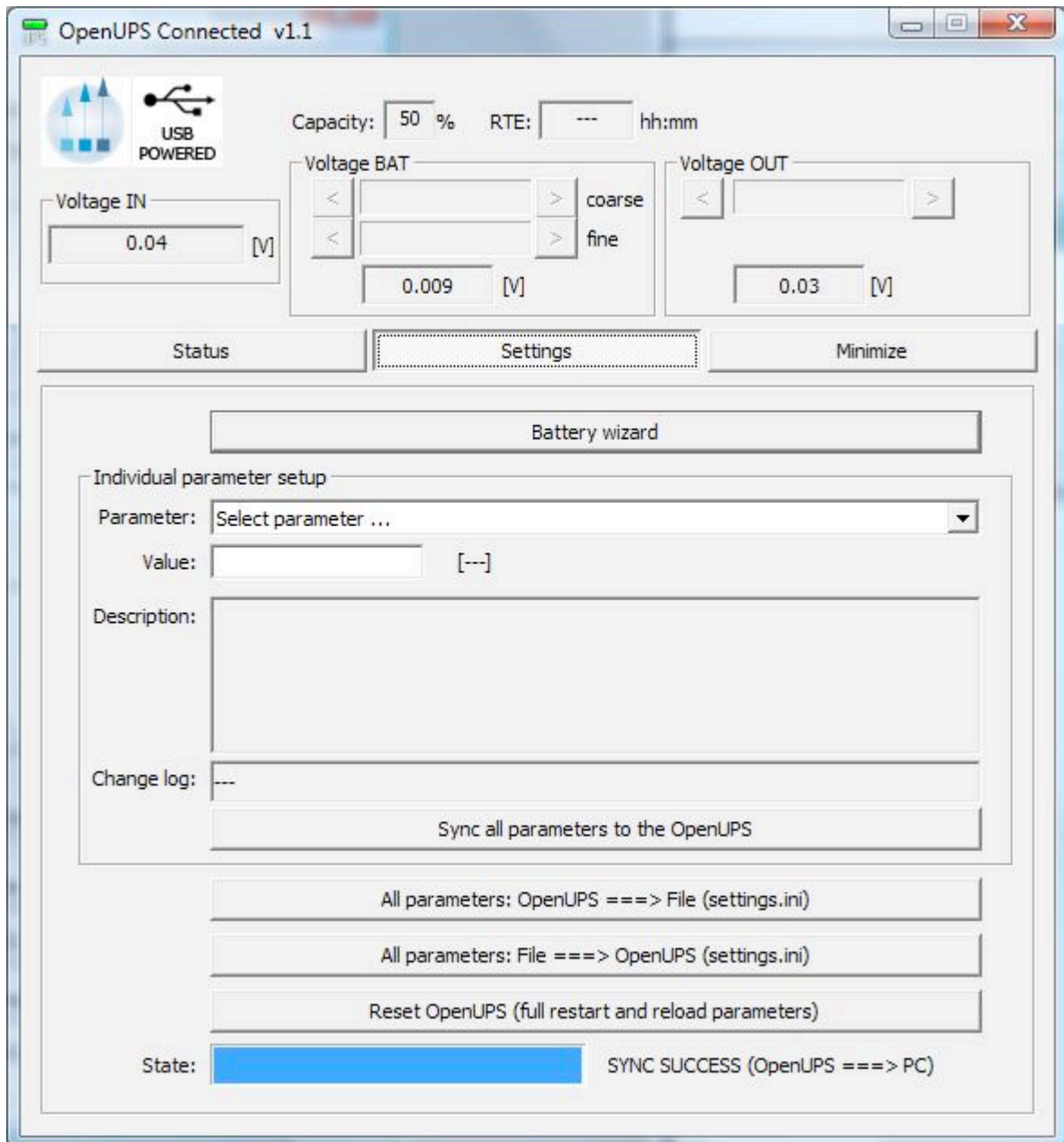The next screen is the "Settings" one (fig 2.)



fig 2. Settings screen

This screen contains three main sections: the battery wizard, the individual parameter setup for experienced users and the parameter save/load into/from file section.

IMPORTANT: any parameter setting or battery wizard data is taken into account by the OpenUPS only after a full restart either with power cut from all sources (usb, battery, vin), either by the "Reset OpenUPS" button. Do this with precaution, check the parameters and wires before doing it !

The battery wizard permits setting up the OpenUPS for most of the basic cases. Example is shown on fig.3
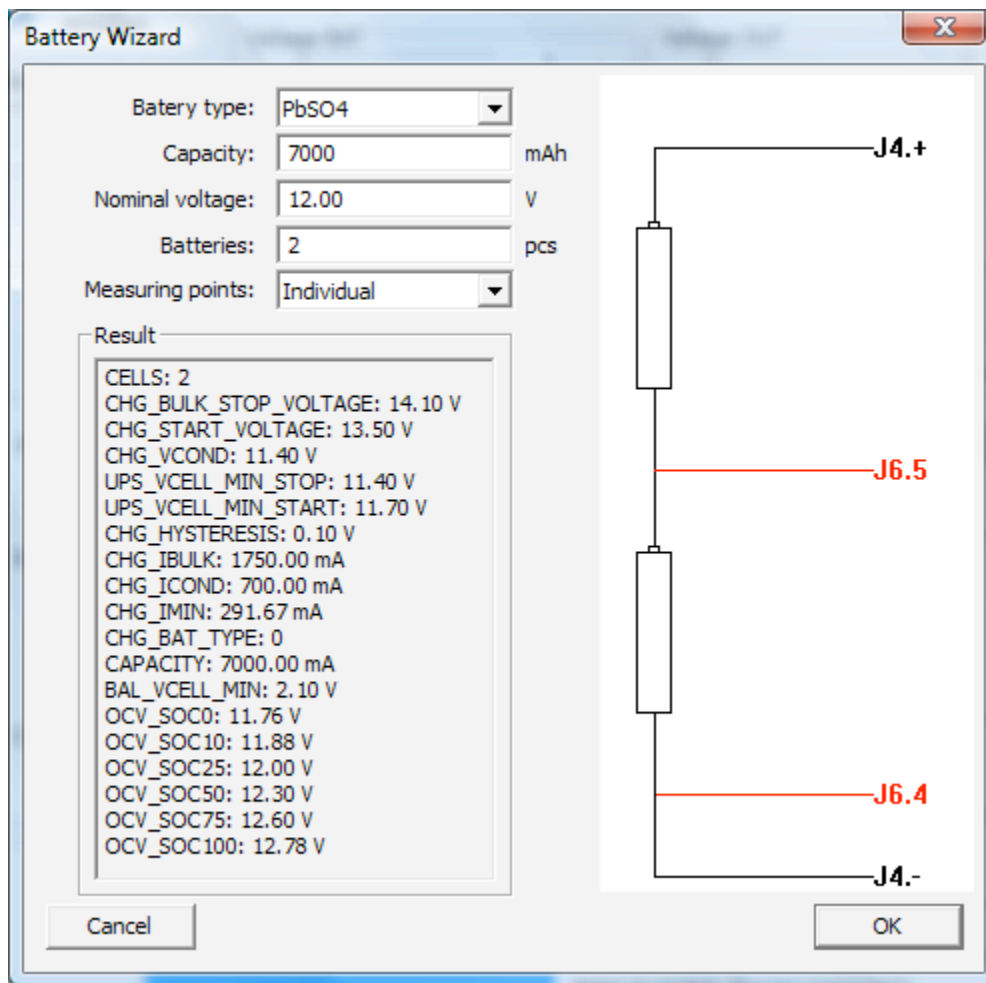
Fig. 3. Battery wizard

The battery wizard needs five generic parameters to be introduced: battery type, capacity, nominal voltage, number of batteries and measuring point type. Any change affects the "Result" and the image on the right shows the connection types what should be done on J4 and J6 headers for Your setup (see header descriptions in the Installation guide).

The result screen contains the individual parameters resulting from the setup. Don't get confused for the "CELLS=1" for Batteries:2-N. This happens for Global measuring point – the OpenUPS treats those two batteries as one, having no individual measuring point.

IMPORTANT: pay attention to the invidual voltage if the Result output contains this: "WARNING: Nominal voltage is not multiple of ...". OpenUPS needs voltages which are multiple of one cell's voltage for a selected battery type (example: 2V for PbSO4, 3.2V for LiFePo4 and 3.7V for LiPo batteries). You can choose to select other nominal voltages as well but this might end in wrong voltages for charge.

The second section of the "Settings" screen is the individual parameter settings. This is recommended to be done only by experienced users. Any parameter of the OpenUPS can be set from here.
Changing one parameter is simple:
        - select the desired parameter from the "Parameters" drop down menu. The current value is displayed in the "Value" field together with the unit ([V], [mA] etc.).

- introduce the new value

- the introduced value is checked whenever you change the current selection for the "Parameters" or choose to sync with "Sync all parameters to the OpenUPS". If the result of the check is correct, the resulting value is shown in the "Change log" field, otherwise error message might be popped up and the parameters selector jumps back to the wrong value.

- after You have done with all parameter setting press the "Sync all parameters to the OpenUPS" button to send all values to the OpenUPS. IMPORTANT: without this step the new values will be lost, nothing is sent to the OpenUPS.

For users who need to setup more devices with the same OpenUPS settings, it is recommended to use the next section of the "Settings screen": the save/load parameters.

The "All parameters: OpenUPS ===> File (settings.ini)" button loads a full configuration from the OpenUPS and saves it to the settings.ini file. You can disconnect the current OpenUPS from the USB and insert a new one, than press the "All parameters: File ===> OpenUPS (settings.ini)" button to send the last saved configuration into the new OpenUPS.

Every save/load/sync operation on the "Settings" screen affects the progress bar and the status bar on the bottom of the screen (labelled with "State:"). In rare cases You might get error here with "try again" message. This happens in case of one parameter byte get's corrupted or timeout occurs during USB communication and/or OpenUPS flashing operation. Please try again and contact our support team only if the device gives this error 4-5 times in a row.

## 3. Windows System monitor

The system monitor is a tray bar software which shows the current state on the tray bar icon and a semi transparent "always on top" capable small window.

The popup window can be moved anywhere on the screen and can be customised – our current setup has two skins but any combination is possible playing with the "skin*.mbs" files installed together with this application. The current skin can be selected right clicking on the try icon.

The "skin*.mbs" files are simple text ones editable with any text editor (notepad for example). Adding a new skin is pretty simple – make a skin2.mbs (use the existing skin0.mbs or skin1.mbs for starting content) and start playing with the values from the new file.

The values are self explanatory – skin name, background image files, font descriptions and label/value pair coordinates for all the important OpenUPS values.

The size of the popup is defined by the background image – transparent parts can be defined as well (see for example: "bubble1.bmp").


## 4. Windows Monitor API + Visual Studio project

Mini-box.com provides one OpenUPS API in a DLL and a small "Microsoft C++ Visual Studio" project for using this API. Basic C++ knowledge is needed to use this API.

This API is installed together with the rest of the OpenUPS software.

If You want to compile the small console aplication You will need "Visual Studio C++ 2005" or higher installed on your computer. IMPORTANT: the API supports only one OpenUPS connected to the computer.

Usage: open OpenUPSLibTest.sln from the package, run it and see OpenUPSLibTest.cpp for usage details.