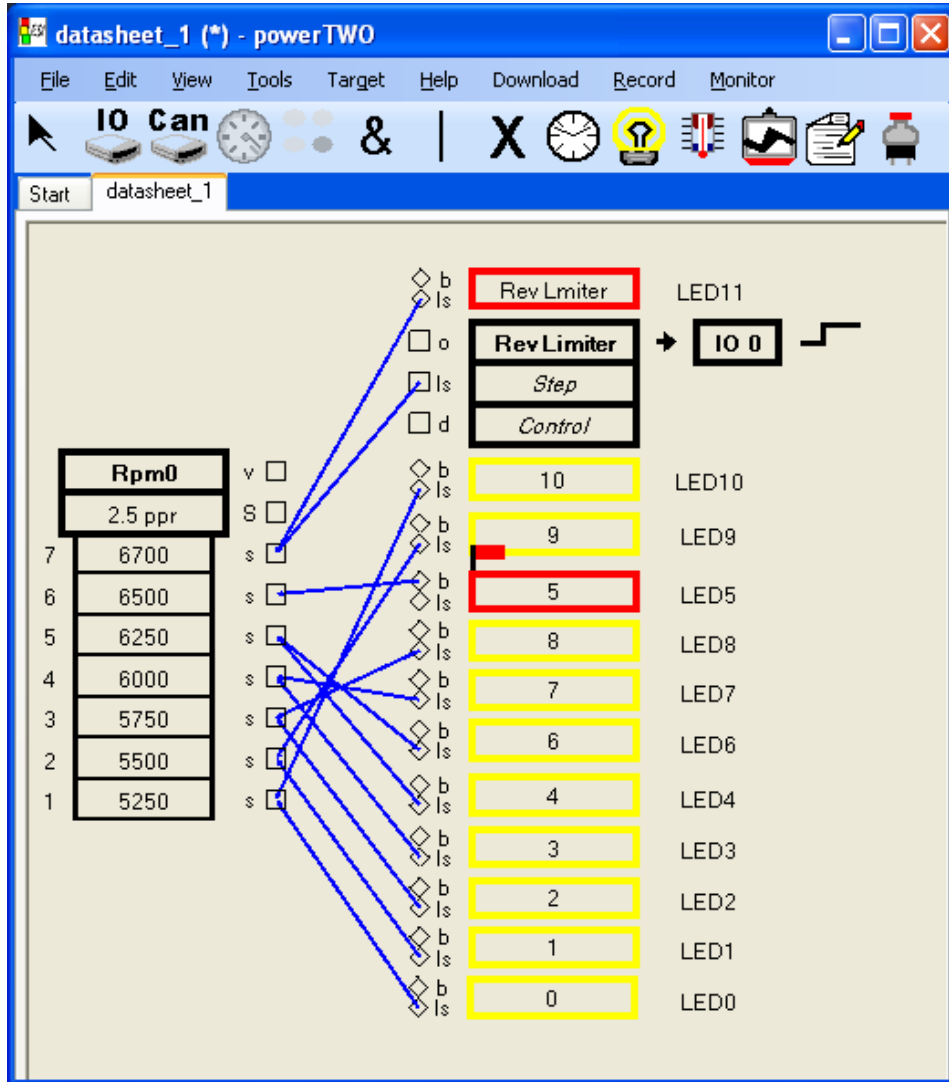


Technical Documentation



powerTWO
Quickstart Manual

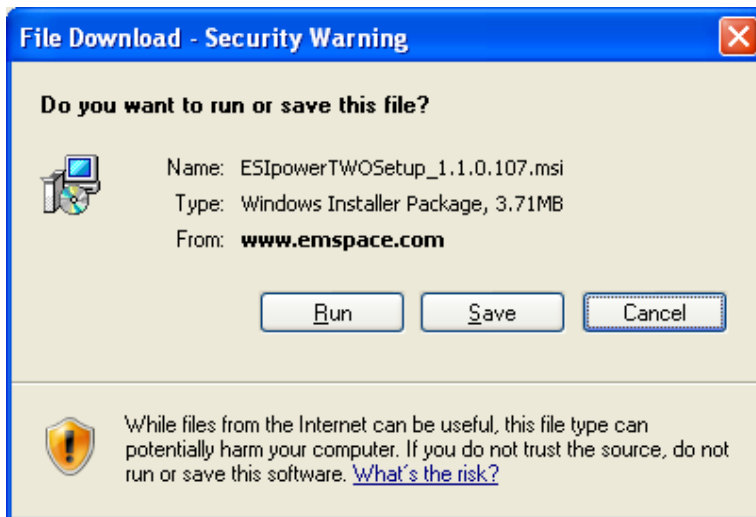
This document covers:

- Downloading and installing a copy of powerTWO
- Picking up updates
- Starting a new design
- Importing an existing design
- Editing a design
- Saving and testing (downloading) a design
- Updating the powerONE bios

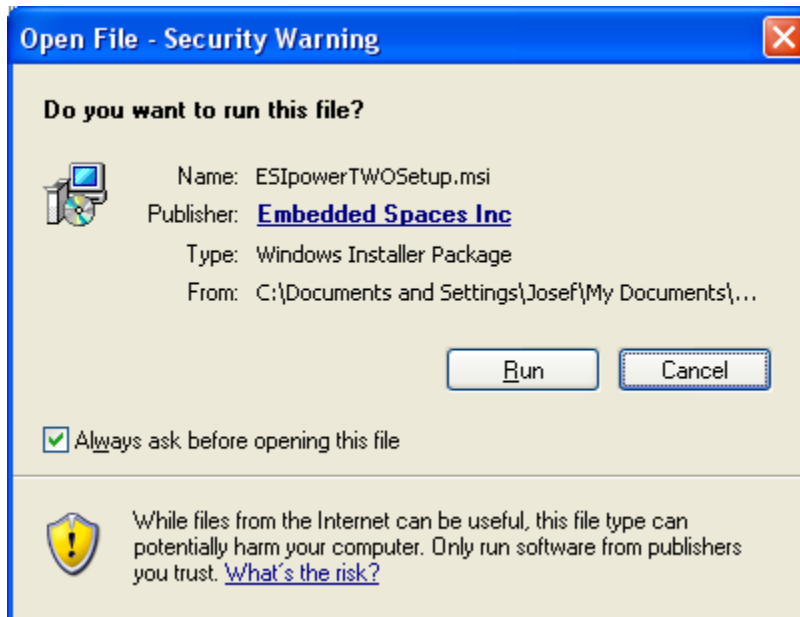
Downloading and installing a copy of powerTWO

powerTWO has been qualified to run under Windows XP, Windows Vista and Windows 7. If you don't have any of those available, it's time to acquire one or pack up the unit. The following are the Windows XP interactions.

Visit <http://www.emspace.com>, select QuickStart and download powerTWO. You will then see:

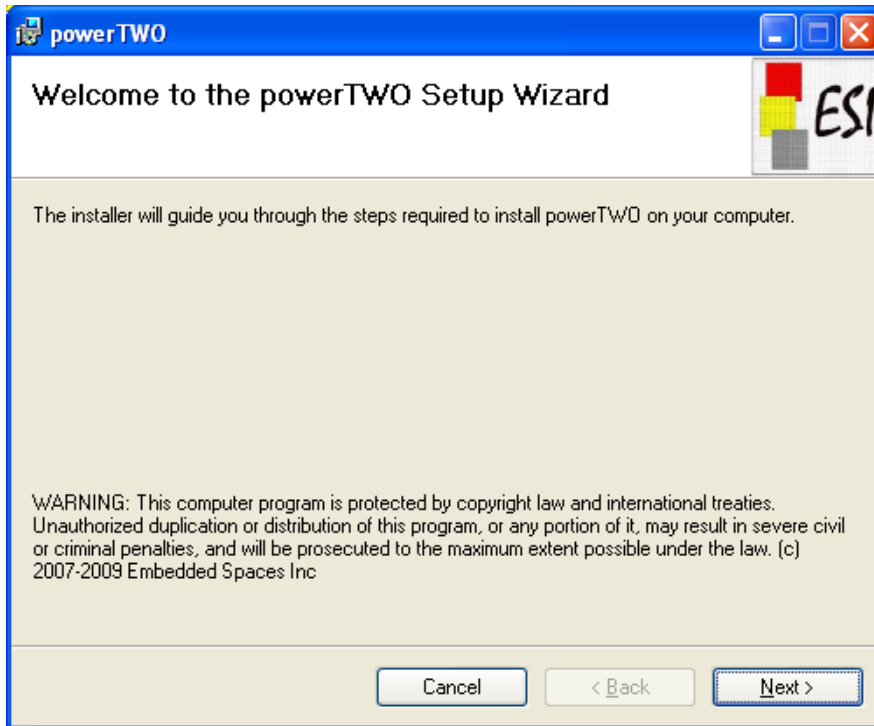


Click Run.

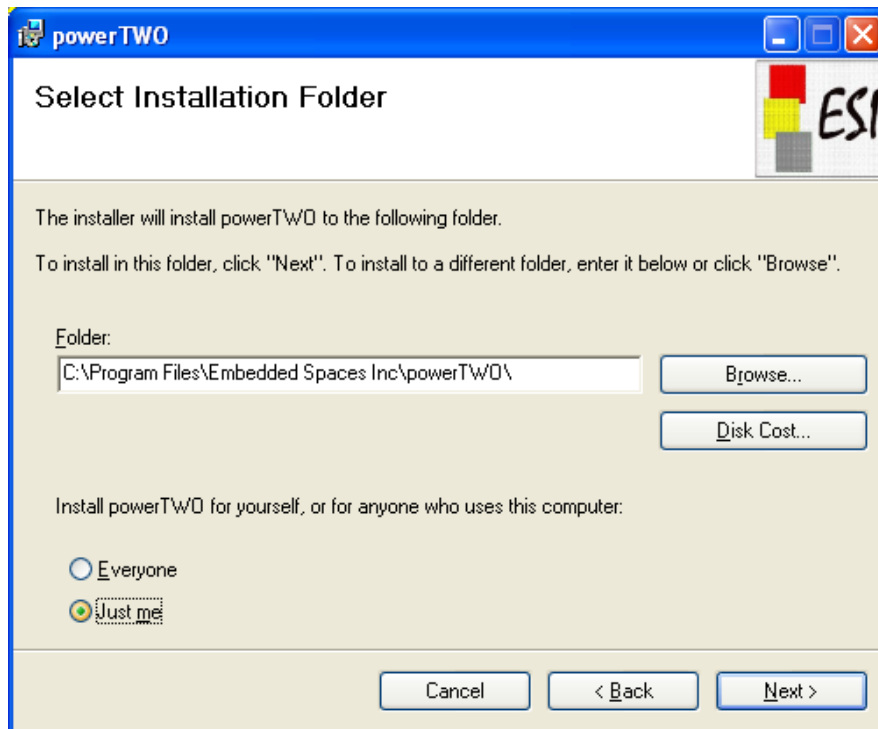


Click Run again.

This will start the powerTWO Setup Wizard.



Click Next.



Click Next and Next at the next two windows. This will place powerTWO in *C:\Program Files\Embedded Spaces Inc\powerTWO*, and it will create an application data directory to store powerONE device descriptions.

For Win7 the top directory will be Program Files (X86).

Create a directory for your designs, for instance a folder in your laptop called P2_pox, and copy any design files (.pox) you have, into it. Ask customer support for some relevant samples if you have none.

Now start up powerTWO. It will locate the latest version of powerTWO and suggest that you load it. “*powerTWO update is available*”. Select it to start the update manager, close powerTWO and follow the instructions. After the download and install completes, start powerTWO. It may request a windows restart. Sorry, but that shouldn’t happen too often.

Now connect the USB cable to your computer and to the mini USB plug on the **front** of the powerONE (there is another plug at rear, but that one is ODBII). You don’t need a +12 (Vbatt) source yet. powerONE is happy on USB power.

Win7 may just register the powerONE as an unspecified device. In that case go to; *Control Panel > Devices and Printers* and you’ll see it as “*Unspecified*”.

Right click on it and select Install from that menu and it will bring up this wizard.

XP and Vista will go directly to the wizard.



Now, the last steps in the installation:

- Windows will now go through the install wizard for USB devices
- Select No, not this time
- Select Install from a list

- Select Search from the best driver in these locations and browse to *C:\program files\Embedded Spaces Inc\powerTWO*.
- On Windows 7, use *C:\Program Files (x86)\...* instead
- It will install the powerONE as a com port
- The next time you attempt to use the powerONE, powerTWO will tell you if it needs to download any information for the powerONE device to your host PC
- Select the *Tools> Options* pulldown
 - Select the *Design* tab and choose degrees *F* or *C*.
 - Select the *General* tab and *Re-open last files at Startup*; this option ensures that any designs you last had open are opened again whenever powerTWO starts.
 - Change anything else to taste but leave *Search* and *Events* alone unless directed there by Customer Service.

Picking up updates

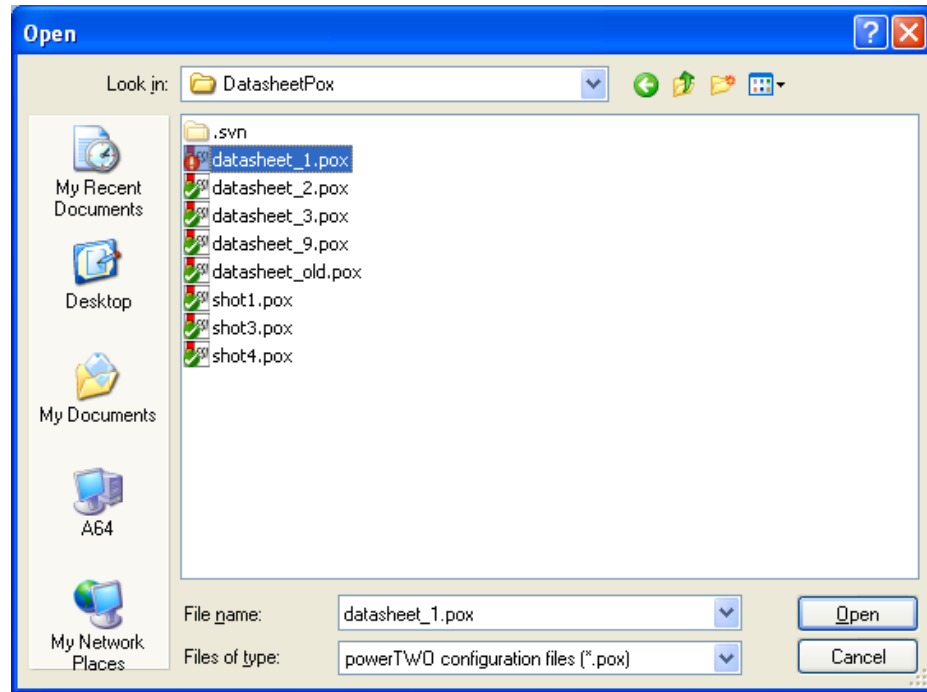
Whenever a new update is available, powerTWO will find it and request permission to install it, just as above.

Starting a new design

This is unusual. There is always some sample that's worth renaming and editing, but just pull down *File>New* and you have a new, untitled design. *File>SaveAs* will get you to the standard Windows dialogue to name and place your new *.pox* file.

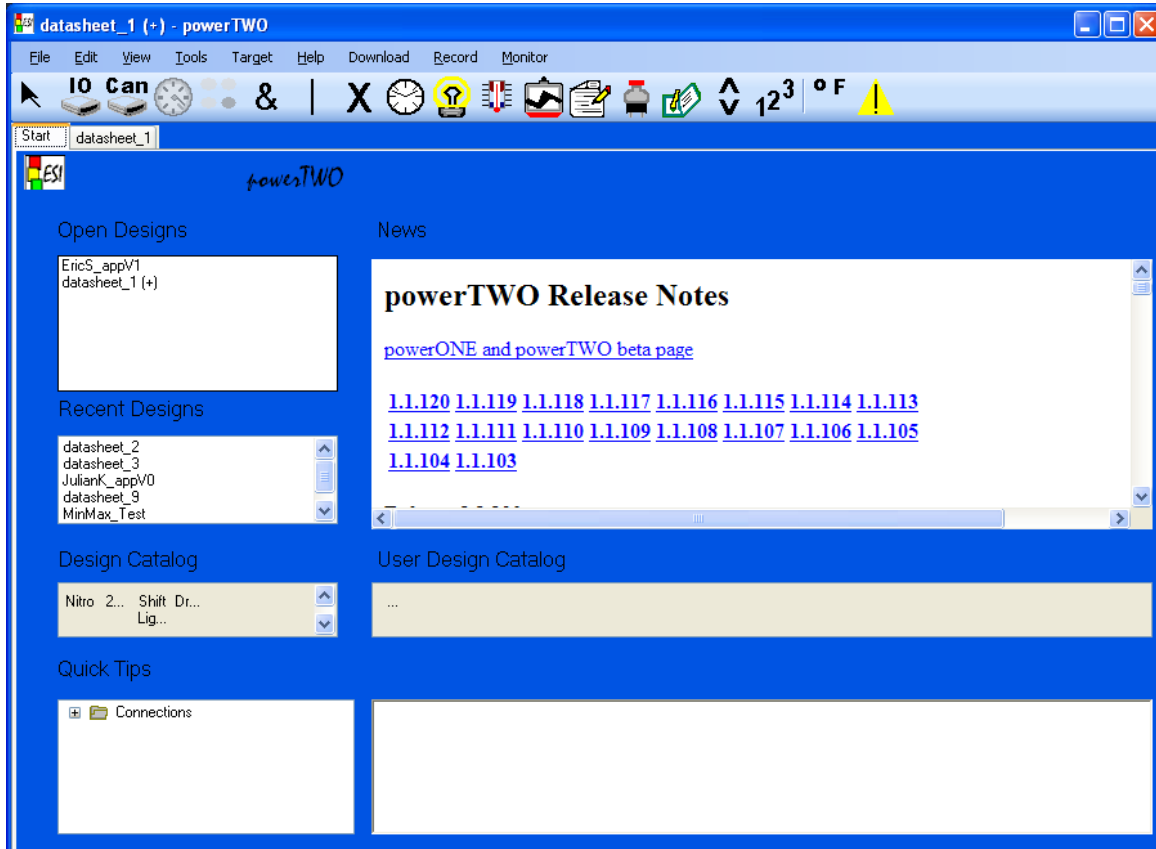
Importing an existing design

File>Open will take you to the Windows open procedure. Just browse to your .pox directory.





Editing a design

The *Start* tab takes you to a list of the presently *Open Designs*. This is like a *Windows* list. It also has a list of the *Recent Designs* for quick access to your other work-in-progress.





A displayed design, like the one on the cover, is ready to edit. If the window size needed to hold the design is getting out-of-hand, use the *View* pulldown to scale it, or put up with window scrolling.

The object-creation tools are displayed on the standard toolbar and are grayed-out when that class of objects has been used-up. They are also presented at a right mouse-click. A cursor-hover (just let the mouse-cursor sit over the tool icon for a couple of seconds) identifies each tool. There is only one each of the CAN (OBDII) and RPM inputs, 8 IOs and 12 LEDs.

-  The RPM input is configured to the number of steps you want to measure and the number of pulses that will be seen at the input for each engine revolution. An ECU will put out 1 pulse. The ignition primary of 4-cycle engine will put out the (cylinder count ÷ 2) pulses.
- **User**  Users can be
 - Inputs
 - Analog
Measures the input voltage. Used mainly for gauge values.
 - Frequency
Much like RPM but measuring Hz (cycles/sec). Several types of modern sensors put out a frequency instead of a voltage.
 - Interval
Very like frequency input, but for slow things that require timing.
 - Sense
These are logic levels. In a 12V system they will default to > 8V for a High and < 4 V for a low. You always have them at Vbatt or ground anyway.
 - Outputs
 - Control
Same as the sense input, but used to drive relays. A low output will pull current through a relay and a high won't.
 - PWM entry
This switches a Pulsewidth Modulated (PWM) output waveform on and off. A weird example would be a buzzer tone on and off.
 - PWM table
This varies a PWM output according to an input or computed value to control the speed of a DC motor. Water pumps, fans and wiper controls are all normal uses.

The rest are:

- Logic-handling blocks **&** AND, **|** OR and **X** XOR
-  Switches which allow any internal inputs to be set High or Low. (equivalent to IOs seeing +12 or ground)
-  Timers, configurable as
 - Delay which just passes the input state to the output after the period expires
 - One-shot which goes true when triggered and false after the period expire

- Retriggerable which is similar to one-shot but its period is set each time a trigger is input, so the on-time is prolonged.
- Complex functions like
 - MinMax which can store the high or low of an input or internal value
 - Count which can be used to keep track of gear selection or a rotary-knob input and to select logic according to the present value.

Objects may be explored with mouse-hover and may be reconfigured by double-click on the object.

Object configuration faults are marked by a red flag and the configuration fault is revealed by a mouse-hover. A yellow flag on the RPM object means that the powerONE will simulate a sweeping rpm input if it detects zero rpm at the real input.

Objects are interconnected by drawing a line between connection points with the pointer tool. powerTWO will refuse connections of non-matching types, but an output may be connected to an unlimited number of matching inputs. Inputs are generally singular, but the exception is the logic blocks which will accept up to 8 inputs.

Value outputs (marked v) connect only to value inputs (also marked v), which is reasonable.

Step Value outputs (marked s) connect to StepValue or Preset Inputs (also marked s)

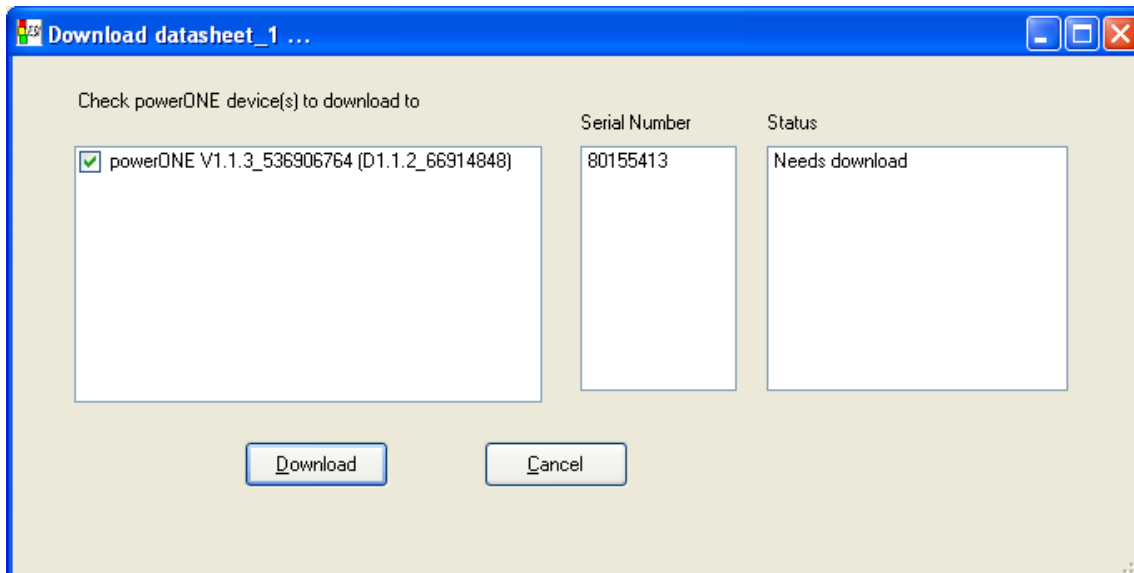
Logic (marked l) outputs connect to:

- Logic inputs (marked l)
- Led inputs (marked l)
- Led blink inputs (marked b)
- Override inputs (marked o)
- Disable inputs (marked d)
- Clear inputs (marked c)
- Enable inputs (marked e)
- Count up inputs (marked +)
- Count down inputs (marked -)

Saving and testing (downloading) a design

A design is saved with the normal *File > Save, Save As, or Save All* pull-downs.

If any objects are marked with a red-flag, they must be corrected before test. Reconnect the powerONE and select download from the top toolbar.

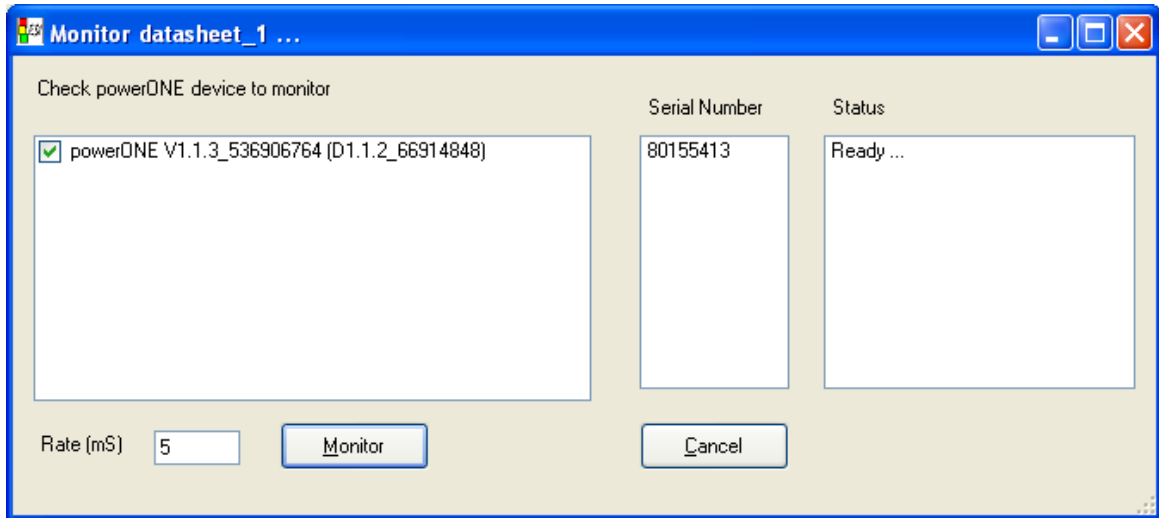


If there are no powerONES registered on the download window:

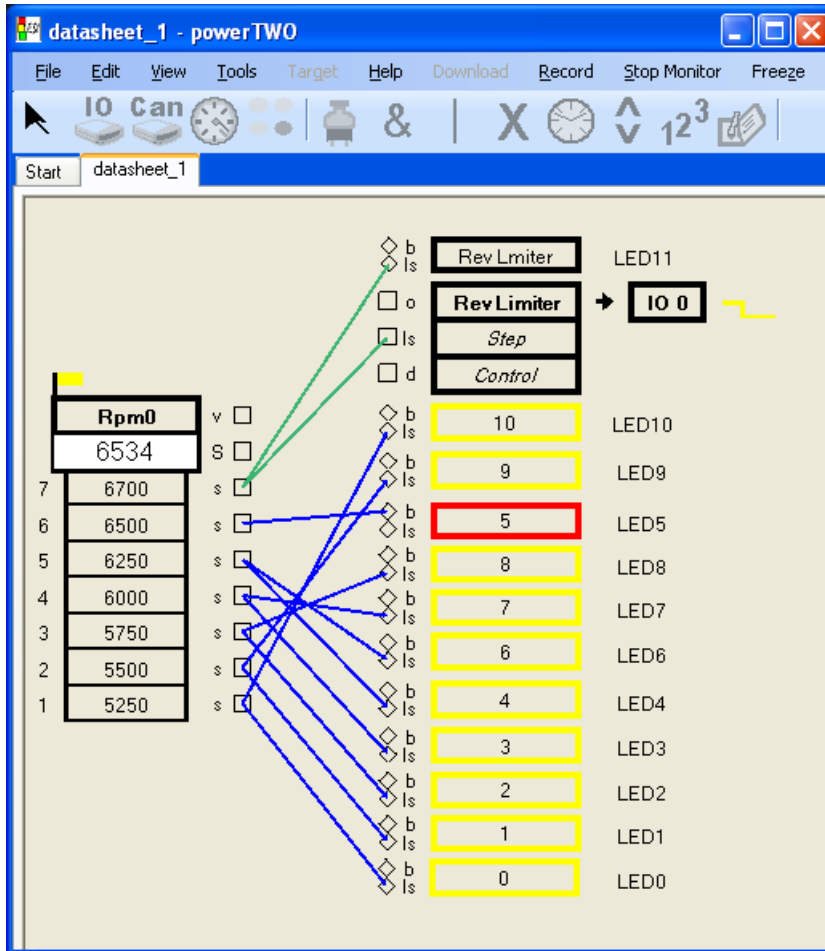
- Check that the USB connection is good. The powerONE should show a small, blinking-green led about an inch behind the front panel at the right-hand side. Windows should make the Windows noises when you disconnect and reconnect the cable. Close and re-open the download window to see if the powerONE was found after reconnecting the cable.
 - If you see the “Found New Hardware Wizard”, go back to the bottom of the “Download and Install ...” section.
 - If you still have no registered powerONE when you reconnect, contact product support
<http://www.emspace.com> -> Contact -> Support
or Skype [embedded spaces](#)
- Select download. powerTWO will build powerONE configuration and download it. If powerTWO detects a configuration problem it will decline the download and direct you to the misconfigured element.
- Your powerONE is now running the program. You can just make your connections and go. But we recommend:
 - Use the target monitor. It’s quick and saves a lot of measuring
 - Make a test setup if you have any fragile equipment to connect
 - Don’t let any input states go untested.
Use some kind of voltage source to simulate over-temperatures and under-

pressures. Use a frequency source, like an audio output from your PC to simulate over-revs.

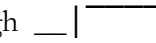
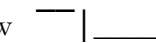
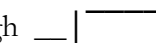

- Start the target monitor from the top toolbar.



You may select an update rate between 5 and 100 ms but your eyes can only register about 30 ms. An elderly PC may prefer the slowest (100 ms) setting, which is workable, it just misses some quick, transient events.



The monitored states are:

- Input Sense
 - High 
 - Low 
- Value
 - Any object internal value is indicated in a value box (see RPM here)
- Connection
 - True – blue
 - False – black
- LED
 - On – LED colour [yellow or red]
 - Off – black
- Output Control
 - High  (yellow)
 - Low  (yellow)
 - Unmonitored (black)

Updating the powerONE bios

If you receive notice from product support to update the powerONE flash, they will provide the update as a .csum file. Pull down */Tools > Advanced > Flash/* from the tools menu, browse to the place you stored the file, select the *powerONE on COM xx* and then *Flash*.

