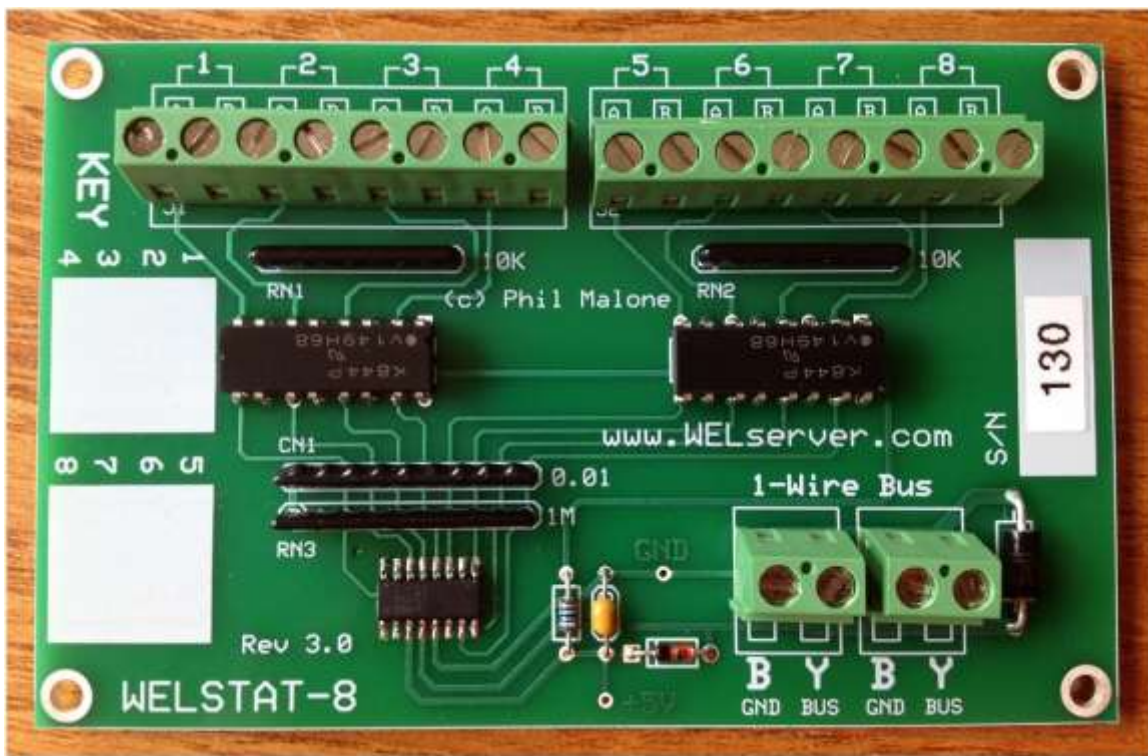


WELSTAT-8.

User Guide. Rev 1.0 - 7/24/12

On occasion, WEL users would like to be able to know WHY their HVAC system is running when it does, rather than just watching passively, and trying to guess the cause. In these cases, the real need is to be able to monitor the various “calls” being made by thermostats and other system inputs. These calls are commonly made by switching 24VAC control circuits, so the WEL needed a way to sense when 24VAC is present on a pair of wires. Since 24VAC is not compatible with the WEL or the 1-Wire bus, a special input module was needed.

The WELSTAT-8 module enables a WEL system to monitor up to 8 “Thermostat Style” control signals from a single 1-wire connection point. The WELSTAT-8 has 8 optically isolated inputs which can each sense the presence of a 9-28V AC or DC signal. Each input is electrically isolated from the 1-wire bus, and all other inputs on the module.



The WELSTAT-8 is powered from the 1-wire bus, so it does not require any additional power supply voltage. So, it only has Ground and Bus connections for the 1-wire Bus. Two sets of 1-Wire terminals are provided to allow pass-through of the 1-wire bus. These terminals are simply wired in parallel.

To attach to the 1-wire bus, simply wire the black and yellow bus wires into one pair of screw terminals.

Thermostat Sensor hookup

Each Thermostat input requires a pair of wires to be connected to the module. 8 Pairs of input terminals are provided in two sets of four along the long edge of the board. Each channel has an A and B terminal, but these are interchangeable.

Typically the inputs will be wired in **parallel** with (across) the thermostat wires (eg: bridging C and Y1). This will allow the module to read the same voltage being applied to the equipment being controlled. In a 24V system this will cause only 2.4mA of current to flow through the Sensing circuit. Since this is not enough to activate a relay, it will usually NOT have any impact on the normal operation of the HVAC system.

*Note: In some digital systems, the current drawn by the sensing LED is enough to activate an HVAC function. In this case, the two Inputs terminals should be wired in **series** with the thermostat control signal. This will require breaking the control path at some point and wiring it in and out of the Combo Module input. This is NOT typical, and should only be used if absolutely necessary.*

Thermostat Sensor software setup

Once the WELSTAT-8 Module is attached to the 1-Wire bus, it will be “found” next time the WEL performs a bus scan. This will happen automatically the next time the WEL reboots, or it can be performed manually for several of the WEL’s web pages. Just click the Scan Bus button.

When the WEL discovers the WELSTAT-8 module, it adds them to the device list as a block of 8 devices. The first device will be type 41 and the rest will be type 14. The 8 devices correspond to input channels 1 to 8. With the default scaling, the resulting value for each input will be either 0 (no voltage sensed) or 1 (voltage is sensed).

The following screen capture is an example of how the Thermostat inputs might appear on your device list. In this example, four inputs are active with names.

Dev	Address	Type	Name	Scale	Offset	F	Raw	Scaled
8	29479200000000E7	41	Stage1_Y1	1.000000	0.000000	Y	0.000000	0.000000
9	29479200000000E7	14	Stage2_Y2	1.000000	0.000000	Y	0.000000	0.000000
10	29479200000000E7	14	Fan_G	1.000000	0.000000	Y	0.000000	0.000000
11	29479200000000E7	14		1.000000	0.000000	Y	0.000000	0.000000
12	29479200000000E7	14	ExHeat	-1.000000	1.000000	Y	0.000000	1.000000
13	29479200000000E7	14		1.000000	0.000000	Y	0.000000	0.000000
14	29479200000000E7	14		1.000000	0.000000	Y	0.000000	0.000000
15	29479200000000E7	14		1.000000	0.000000	Y	0.000000	0.000000

One final consideration is whether or not the On/Off state of the thermostat signal needs to be reversed (flipped). Depending on how your HVAC controller is wired, it's quite possible that there will be 24VAC present if the thermostat is NOT calling for an action, and then this voltage will go to 0V when the call is active.

This simply means that you need to configure the WEL to reverse the on/off indication. This can be done by re-calibrating this input. If you go to the WEL's Calibrate page and locate the input channel in question, simply set the Scale to -1.0 and the offset to 1.0 . This will have the effect of converting a 0 to a 1, and a 1 to a 0.

In the example above, ExHeat is set to "invert" the on/off condition of the input.

Tips:

- Although all of the WELSTAT-8 inputs are electrically isolated, you do not HAVE TO run independent pairs of wires to each input. If you are monitoring 4 signals from a single HVAC unit, you can run a single common wire to the WELSTAT-8 module, and then daisy chain it to the A terminals of all 4 inputs. Then you just need to run individual wires from the HVAC unit for the B terminals.
- Two "white" areas have been provided on the module to help document which signals are connected to which inputs. Use a fine tipped sharpie to label each input's function to make future debugging easier.
- Once you've finished making all your connections, give each wire a tug to ensure that it's gripped firmly by the screw terminals.

