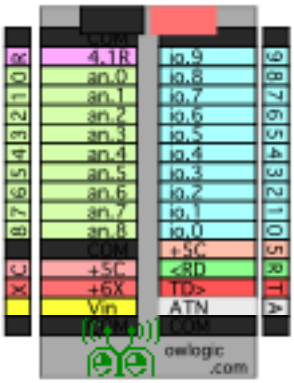
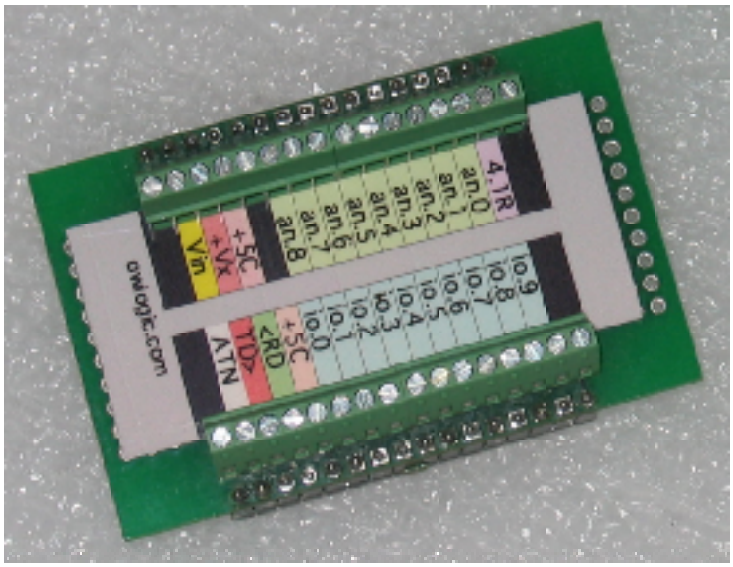
Top breakout board model TB1032

This top board is designed to bring out all 9 analog inputs as well as 10 digital I/o and the power supplies. The 10 digital i/o are direct access to pins p0 to p9 on the BASIC Stamp module, and have all the input and output capabilities that provides. The board also provides additional protection against ESD and miswiring to both the analog and digital signal lines in the form of a “crowbar” network.



Input power from 5.5 to 15 volts DC comes in on the terminal "Vin", The operating current is up to 17 milliamps to operate the OWL itself, plus whatever current is required by external circuitry. In sleep mode, the current consumption drops to less than 100 microamps.

Switched power of 5.5 volts at up to 125 ma is available on the terminals labeled "+Vx". Or, as an option, Vx may be set at any value from 3.75 to 12 volts DC. Constant power of 5 volts at up to 100 ma is available from the terminal labeled +5C. The 4.096 volt reference power is available to drive ratiometric sensors on the terminal labeled "4.1R". This pin has an output resistance of 200 ohms, and a current maximum of 10 milliamps, and it can be switched on and off by the OWL2pe.

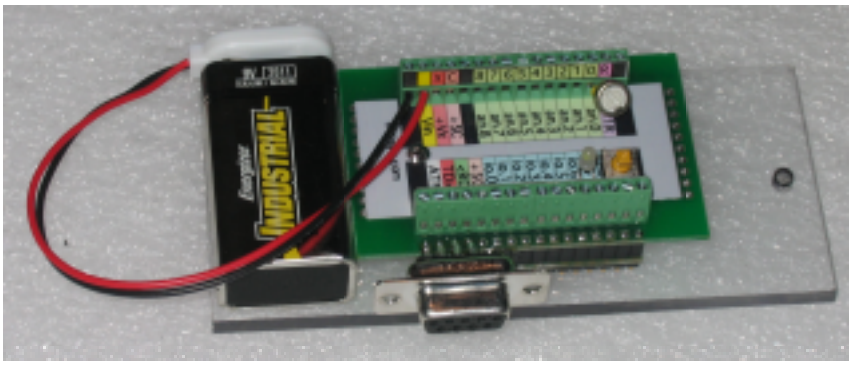


This topboard design has high quality green Phoenix terminals on 0.1" spacing, for connection of wires up to 20 gage. There is a small prototyping area at each end of the board, where special circuitry, or more terminals with access to OWL signals p10 to p15 and x0 to x3 or the power supplies can be mounted (special order for factory installation). The prototyping areas can be trimmed off of the circuit board, and when trimmed it will fit along with the OWL2pe in our standard small NEMA enclosure. The topboard also

has mounting holes for #4-40 screws, aligned with the mounting holes in the OWL2pe module.

The serial port connections come into the 4 pins at the corner:

common
white ATN connects to PC DTR line, reset signal from PC to OWL./
red TXD connects to PC TXD line, data from PC to OWL
green RXD connects to PC RXD line, data from OWL to PC



A TB11032 and OWL2pe, set up as a demo. It is mounted on a polycarbonate plate, and the demo setup includes a battery, a DB9S connector, an led, and a potentiometer as analog input and a switch as digital input.

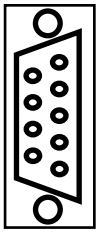
An OWL2pe and a TB11032, trimmed to fit in a small polycarbonate enclosure. Includes an external LED indicator and an socket header for data offload.

Notes on operation of the OWL2pe with the TB11032

There is not a “reset” button on the OWL2pe circut board, however, reset can be accomplished with a button attached from +5 volts to the white ATN input.

The serial port connection to a standard DB9 connector is as follows. This matches the standard connection for Parallax BASIC Stamp carrier boards.

DB9S, view from front



5 - (black) common
4 - (white) connects PC dtr to OWL2pe atn/reset
3 - (red) connects PC txd to OWL2pe data input
2 - (green) connects PC rxd to OWL2pe data output

The TB11032 does not have a DB9 connector built in, however we do sometimes ship it as a demo with a DB9S connector tack-soldered onto the pins at the edge of the circuit board. This can be removed or included as desired. Alternatively the comms connections can be made to the green terminals.

When joining the TB11032 with the OWL2pe, please observe the orientation carefully. The top board plugs into the side of the OWL2pe that has most of the surface mount chips, not the side that has the black plastic ribs and the lithium coin cell. Also, the lithium coin cell on the bottom of the OWL2pe should be at the end under the RS232 and power supply connections.

When separating the TB11032 from the OWL2pe, use a blunt stick with leverage between the two board, to pry up gradually at the four corners, and take care not to bend the pins.

The Phoenix screw-down terminals require a 2.5mm slot head screwdriver.

- **Vin** -- connect to (+) side of power supply or battery, (-) side to neighboring common (black). The voltage from Vin is applied to voltage regulators on the OWL2pe which supplies both the 5 volts constant power and the Vx switched power. Vin should be at least one volt greater than the desired Vx voltage, but no greater than 15 volts.

- **Vx** -- switched voltage. Factory set, 3.75 to 12 volts, 125 ma. 5.5 volts is the default. On the version 1.5 OWL2pe, this is a potentiometer adjustment. On earlier OWL2pe versions, it is a factory set option.

- **5C** -- 5 volt regulated, 100 ma. Be careful with this as it is the main processor power.

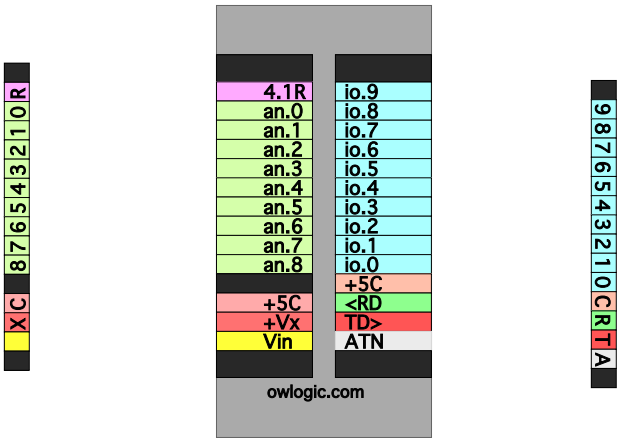
- **4.1R** -- reference voltage output, 4.096 volts, 200 Ω output resistance. Protected with 200 ohms and active clamp.

- **A.0–A.8**-- analog inputs, 0 to 4.096 12 bits, 1 mV per bit, high impedance inputs Protected with 530 ohms and active clamp.

- **io0 to io9** -- analog inputs or digital inputs or outputs, PBASIC capable pins (see text) Protected with 530 ohms and active clamp.

- **common** -- (black, 5 places) common or ground for signals and power

- **comms --**
  white connects PC dtr to OWL2pe ATN reset
  red connects PC txd to OWL2pe comms input
  green connects PC rxd to WOL2pe comms output



This diagram can help to plan and document sensor wiring to the top board TB11032

TB11032 schematic diagram.

The OWL2pe analog and digital signal lines feed through to the green Phoenix terminals, via 200 ohm resistors and protected by SP720 active clamp circuits. Fault currents both below ground and above 5 volts are diverted to ground. This protection is in addition to the 330 ohm resistors that are in series with each signal line on the OWL2pe itself.

The reference voltage of 4.096 volts is buffered by a precision LT1782 op amp, which is fed to a green terminal through the protection network.

The power supplies are fed directly to and from the OWL2pe, and are provided with supplemental filter capacitors. Also, the RS232 connections are fed directly though to terminals.

The prototyping area is not shown on the schematic, but it has holes that align with the end terminals on the OWL2pe, so that an additional 10 signals (p10 to p15 and x0 to x3) can be made accessible on the breakout board. Note that these signals would not have the extra protection.