1. Connecting power
The power connector is a three pin connector on the back. The left-most pin is -5V, the right-most +5V and the center is ground. The power connector from the supply should be inserted so that the small triangular teeth are on the upper side of the board. (When in the box, the upper side of the board is the side from which you can look in and see components.) If you have any doubts about correct configuration, plug in the supply and check with a multimeter before inserting connector. When the connector is correctly inserted and the power supply is plugged in, the two power LEDs to the left of the connector (when viewed from the back) should be on. If it doesn’t come on, unplug the connector and check voltages again without the board. The voltage should be within $\pm 500$ mV of 5 Volts.

2. Connecting serial cable
The serial cable (9-wire gray ribbon cable with blue connectors) should be connected to the serial connector at the back of the board and to the second (or “B”, to the right on our computers) serial port of the computer.

3. Connecting signal cables from counters
The signal cables plug into the four “lemo” connectors on the front of the board. They should “click” when installed. Be careful not to put too much strain on these connectors as they could potentially be pulled off the board (or pull the light board onto the floor.)
4. **A note about grounding**
   The grounding scheme for the boards relies on a patch made to the board after manufacture, and the fix is not the most robust feature of the board. If you see garbage (non-alphanumeric) characters being transmitted on the serial port, this is likely the cause (see point below about “simpleDaq” program for seeing the raw output of the board). If you suspect grounding problems, you should make sure the following condition is true: at least one counter is plugged in to the board **AND** that counter has its low (or high) voltage connection completed. (The base or high voltage supply need not be on.)

5. **Is the board alive and talking to my computer?**
   The best way to tell is to use the “simpleDaq” program. Invoke this by going to the quarknet home area (“cd ~”) and typing
   ```
   ./simpleDaq.
   ```
   Then press the reset button (on the back of the board, near the power LEDs. After about 1 second, the message “QuarkNet Scintillator Card” should appear on the screen.

   - If nothing happens, check the power to the board, check cabling to the computer. In extreme cases, you might also try rebooting the computer (type ctrl-alt-delete simultaneously from the keyboard; *don’t* just turn off the computer).
   - If you see garbage characters, see the note on grounding above.
   - If it works, and you want to test further, type “DS” and hit return. You should see four 8-digit hex numbers appear on the screen (all zeros if you just turned on the board).

   To exit “simpleDaq”, type “quit”.

---

*PARTICLE at the University of Rochester*
6. Adjusting thresholds

Each of the four inputs has an independently adjustable threshold. Like the scope trigger, the threshold represents a value below which the negative signal pulse must go in order to be counted as a “hit”. For counters which cannot produce 50 mV pulses even at the maximum safe voltage, you might try reducing this threshold from the 30 mV default. (Doing so will increase the number of noise hits you see, however.) The thresholds are set by four variable resistors, which look like little boxes near the input connectors.

To adjust the threshold, remove the box cover and then power the power. Near each variable resistor is a test point, which looks like a small hole in the board with a metal collar. (There are other test points nearby, the right ones are the ones closest to the variable resistors and are labelled “TPVTH” and a digit indicating which channel. The other test points are labelled “TPDSC”.) Carefully, touch one multimeter probe to the test point, and one to an input connector. Have a helper adjust the screw on the variable resistor with a jeweler’s screwdriver to change the value of the threshold. Be careful not to touch any exposed pins on the board or you could short out a component. You will read a value which is $10 \times$ the actual threshold level. So the default threshold, 30 mV, will be indicated by a 300 mV level on the test point. The useful range for us is probably 15-50 mV threshold.