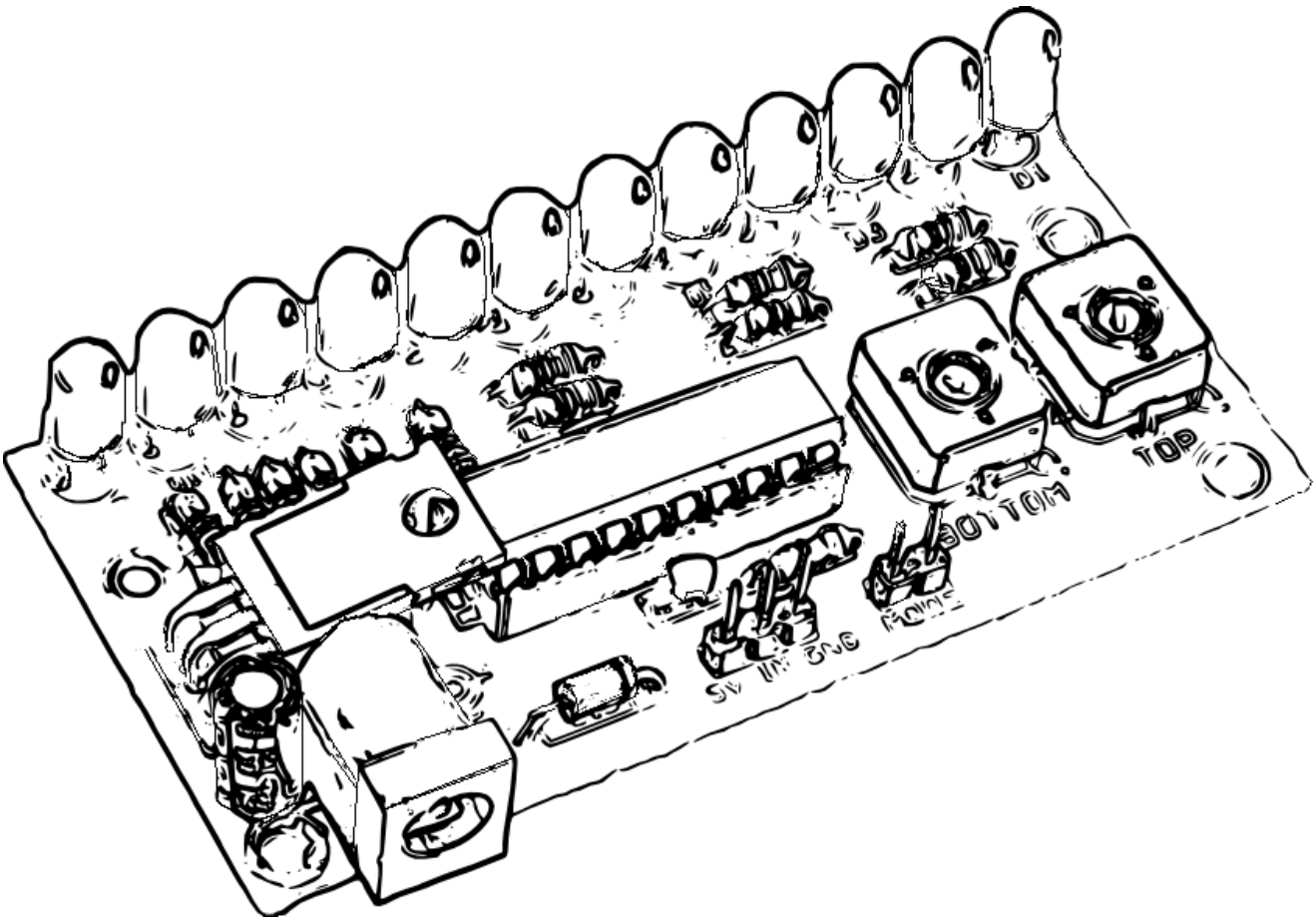
Linear bargraph LED scale module KIT A01 *2008*



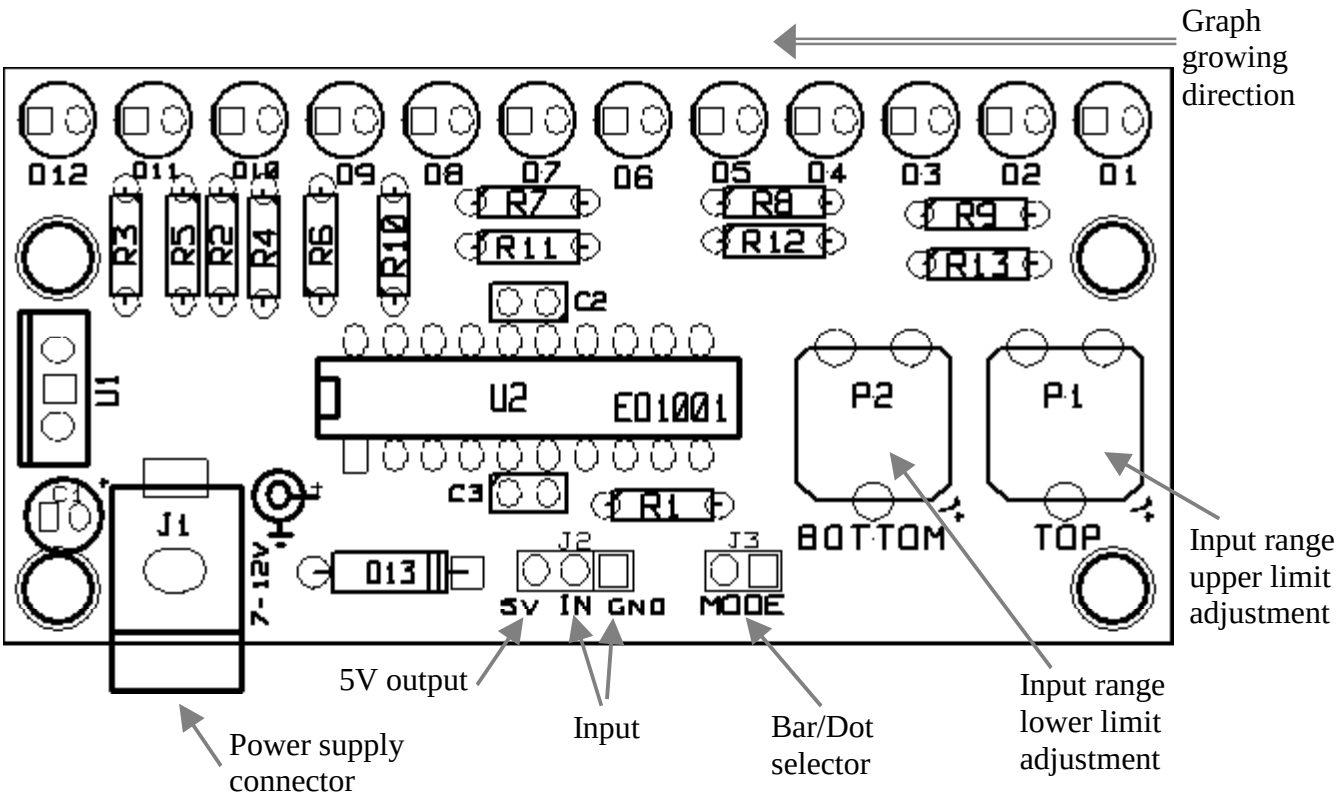
Introduction

This module is capable of measuring a voltage between 0 and 5V, and displaying it in a 12 LED row. Two selectable display modes are available: *dot* and *bar*. The lower and upper limits of the input range are adjustable in the module, allowing measurement of narrow ranges such as 1V to 1,25V. Applications: temperature display, linear sound graph, light monitor, many others.

IMPORTANT: You are the sole responsible for the assembly, so, be sure you feel you can assemble this KIT. We only provide you the components. If you don't have any prior experience assembling electronics circuits, ask for a experienced friend's help or practice soldering and de-soldering components in a piece of old PCB before attempting to assemble the KIT.

Connections

Supply power through the DC power connector, for which most *wall power supplies* have a plug. An input signal should be connected to J2's center pin and its ground to the rightmost pin. The leftmost pin is a low power 5V output that can be used to power any device (like sensors) you may want to connect to the module, thus eliminating the need to have an extra power supply.



By default the module is in *bar mode*; to enable *dot mode*, insert the provided jumper into J3.

U1 can get quite **hot**, especially in *bar mode* with the higher supply voltages. **This causes no module working problems but there's an injury risk if you use this module without a box and you let it touch your skin.** So be warned!

The LEDs can be bended to the side 90º, in order to use the module's lateral side for viewing instead of the top.

For a quick module test you can connect a 10K to 100K potentiometer (not included in the KIT) to J2. The potentiometer's center pin should be connected to J2's center pin and the other 2 pins can be connected in any order. With P2 fully rotated to the right and P1 fully rotated to the left, rotating your test potentiometer will make the LEDs light up in sequence depending on the potentiometer's position.

Usage

Let's say you want to display the output of a sensor that is a voltage in the range 1V to 1,8V. You need a multimeter and a supply voltage for the module. First you need to adjust the lower limit by turning on the power for the module and adjust the BOTTOM variable resistor (*trimpot*) with a screwdriver until you can read 1V at the *trimpot*'s pin near the "BOTTOM" word on the PCB (measure using the red probe; the black probe should be on J2's pin "GND"). Then you repeat a similar procedure for the upper limit, until 1,8V is read on the pin near the word "TOP". After this

adjustment, the 12 LED graph will display the range 1V to 1,8V on the signal input pin (“IN”) with respect to GND.

Components

R1 – Resistor, 3.9K 1/4W 5% tolerance (colors: **Orange**, **White**, **Red**, **Gold**)
R2 to R13 – Resistor, 270 1/4W 5% tolerance (colors: **Red**, **Violet**, **Brown**, **Gold**)
C1 – Capacitor, electrolytic, 22uF
C2, C3 – Capacitor, ceramic, 100nF
D1 to D12 – LED, red
D13 – Diode, 1N4007
P1, P2 – Variable resistor, 10K
U1 – Integrated Circuit, Voltage Regulator, LM7805
U2 – Integrated Circuit, ED1001
IS – 20 pins IC socket for U2
J1 – Connector, DC Power
J2 – Connector, Male header of 3 pins
J3 – Connector, Male header of 2 pins
JP1 – Jumper
PCB – Printed Circuit Board

Pay attention to C1. The negative side is marked and the positive side is unmarked. You should match this unmarked side with the “+” drawing on the PCB, since it is indeed the capacitor’s positive side.

Datasheet

Supply voltage: 8V to 12V
Recommended supply voltage: 8V to 9V
Protection against supply voltage polarity reversal: yes
Max. power consumption (9V supply): 0.2W in dot mode / 1.4W in bar mode *(all LEDs lit)*
Input voltage range: 0V to 5V
Max. voltage tolerated at the input: 9V
Input impedance: >10K
Max. current on J2’s 5V output: 10mA

If you are curious about the ED1001 chip, its datasheet can be found on our site, where it is also sold individually.

General Assembly Hints

Active components (transistors, diodes, integrated circuits) are more sensitive to heat than passive components (resistors, capacitors, variable resistors, terminals, jumpers) and therefore should be soldered last.
Use the following order when assembling the board:

1. Wires, jumpers, terminals and connectors
2. Integrated circuit supports
3. Resistors
4. Capacitors
5. Variable resistors and variable capacitors
6. Active components

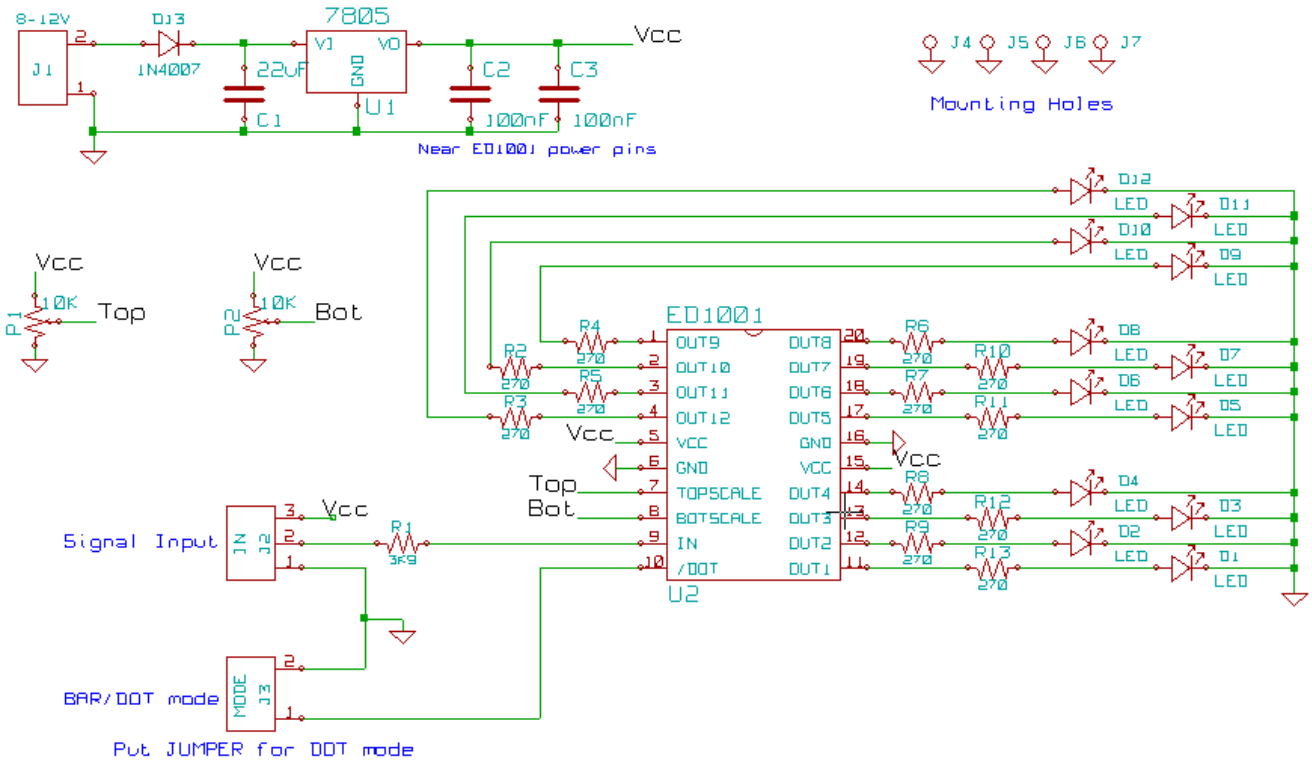
Resistors, and capacitors without “+” nor “-“ marks, have no special mounting orientation. They can be mounted in either both ways. The PCB (*Printed Circuit Board*, also known as “*the board*”) drawings will help you set the correct orientation for polarized capacitors (by having a “+” or “-“ mark), as well as for devices like transistors and integrated circuits.

Some Integrated Circuits are provided with sockets. Consider this socket a “connector” and solder it in step 1. of the list above. Fit the IC only in the end, after all other components are soldered in place. There is a mark on the side of the IC, like a small cut, and another on the socket; these 2 marks indicate the correct position for the IC in the socket, when they are near which other facing the same side.

Do **not** allow the soldering wire to stay in contact with a component or PCB for more than 5 or 6 seconds. If in one attempt you were not able to perform the soldering in this amount of time, stop and let the component and PCB cool down; and then try again. If you keep the soldering iron on the components for more than the recommended amount of time you will degrade or completely ruin the component and/or the PCB.

Cut the excess wire from the soldered components before putting the device into use.

Circuit Schematics



Document Updates

2011/11/21 – Added tracing 3D image at the beginning. Updated schematics to show mounting holes connected to ground.