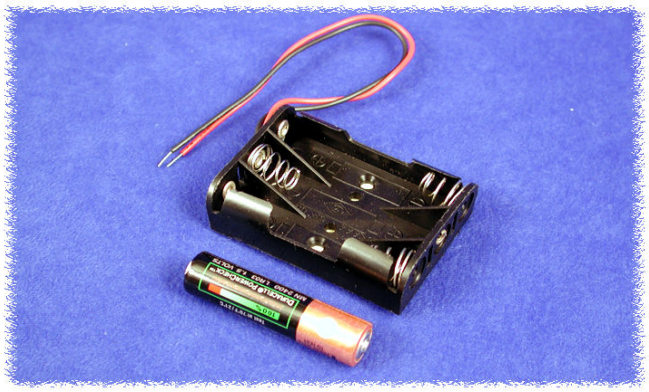
MEDICAL INSTRUMENTATION PROJECT

ALTERNATIVE POWER SUPPLY

There is an alternative to using Laboratory supplies and it is simple to construct.
The project circuits will operate the same with supply voltages of +/-4.5 volts.

The +4.5 volts will come from 3 AAA batteries. These batteries have enough current capability to run the positive analog supply as well as the digital logic and LED bar graph.



To fabricate this, the terminals of the battery are connected to the positive and negative strips on the breadboard. The battery holders are in supply through the parts repository of the Lab. The ground strips of the breadboard are connected to the negative side of the batteries.

It is recommended that polarized capacitors of 10 microfarads are connected from ground to both the +4.5 volt strip and the –4.5 volt strip. **Be careful to observe the polarity when connecting these capacitors.**

The negative supply requires little current capability because it is used only for the negative analog supply for the operational amplifiers. A switched capacitor negative charge pump inverter integrated circuit produces a mirror image of the positive supply as a negative voltage.

The charge pump part is a TC 1044S negative charge pump inverter manufactured by MicroChip Devices. Its data sheet is available at the following URL.

http://ww1.microchip.com/downloads/en/DeviceDoc/21348a.pdf

The data sheet documentation for the device should be reviewed to understand the operation of the negative charge pump inverter.

The following illustration is the schematic to produce a negative supply voltage.

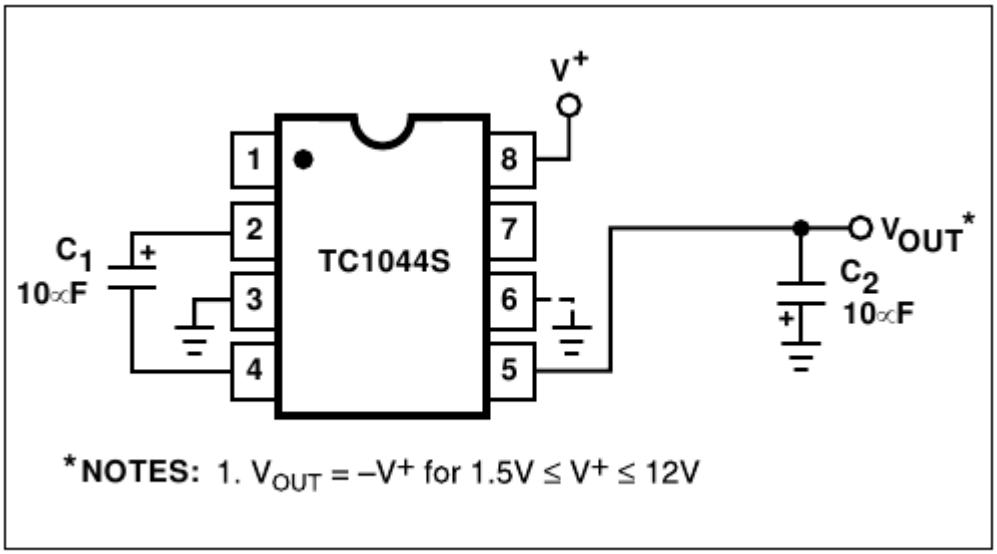


Figure 3. Simple Negative Converter

Figure 3 shows typical connections to provide a negative supply where a positive supply is available. A similar scheme may be employed for supply voltages anywhere in the operating range of +1.5V to +12V, keeping in mind that pin 6 (LV) is tied to the supply negative (GND) only for supply voltages below 3.5V.

When using polarized capacitors in the inverting mode, the + terminal of C1 must be connected to pin 2 of the TC1044S and the + terminal of C2 must be connected to GND.