A Simple Guide for adding an EL backlight to an LCD

By: Stuart Kurtz 2003

Before we get going, this is not for the FAINT of heart! You CAN DESTROY your LCD. Please follow the instructions EXACTLY.

Electroluminescent foils require high voltage. The inverter output can be DANGEROUS. Observe the appropriate precautions.

If you have no experience with high voltage, do not do this project.

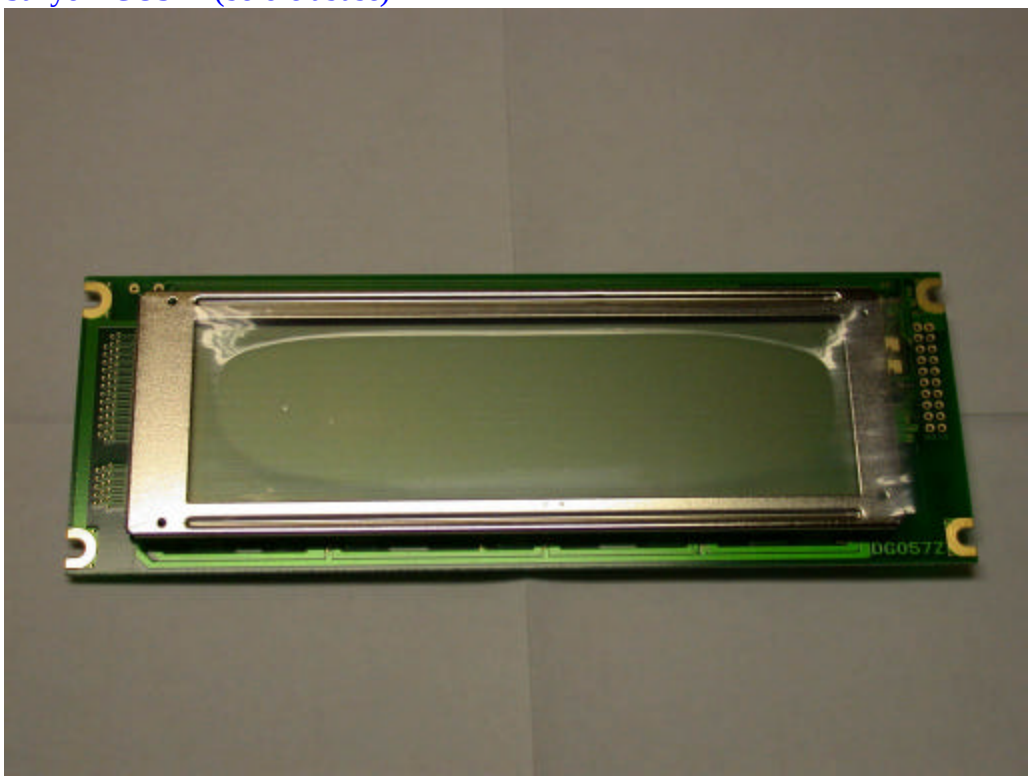
Intro

Many hobbyists' purchase LCD's from surplus sources, due to the extravagant cost of buying them retail.

Most surplus LCD's are non-backlit. I've selected a Sanyo DGO57Z 240x64 graphic LCD with an onboard T6963c controller. These are readily available from many vendors. The technique described below is similar for many LCD's.

Almost all LCD's have mounting pads for an EL backlight as circuit boards are used in common across several models. There is always enough space for an EL foil to fit behind the LCD.

Sanyo DGO57Z (before abuse)



Adding an EL foil to your LCD is fun and easy using these few simple steps:

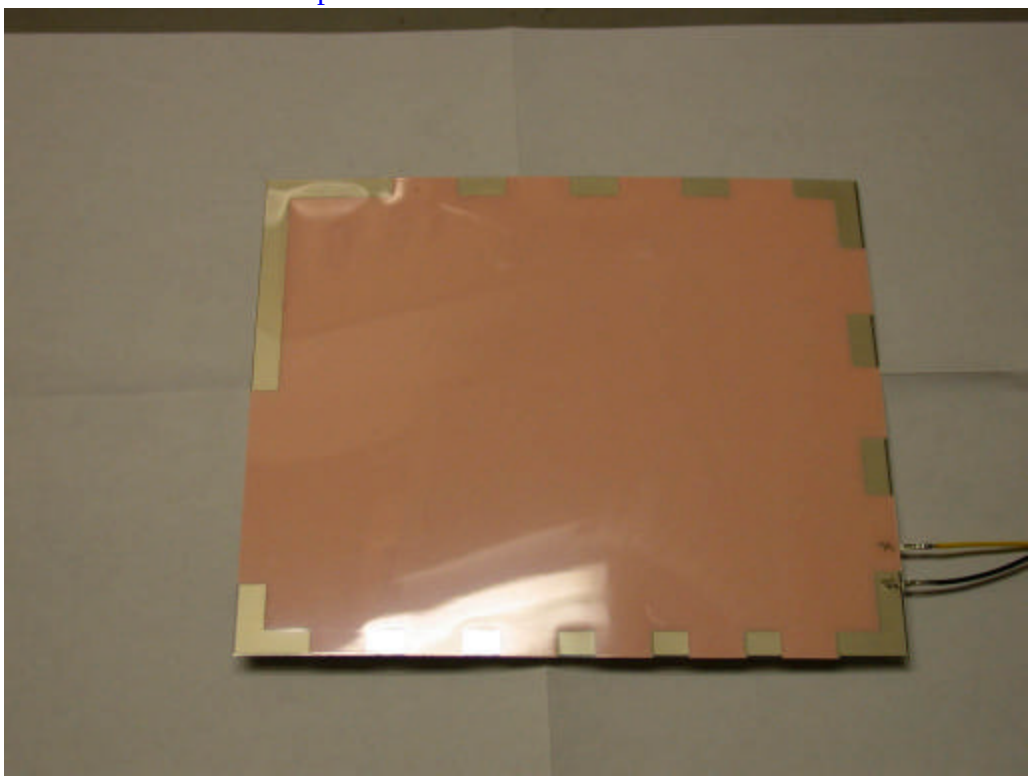
Step 1: Buy the foil!

The best deal I've found for EL foil is from Cooltronix.com. They are slightly cheaper at their Ebay store.

http://www.cooltronix.com/Shop/index.html?target=EL_Electroluminescent_Foil.html

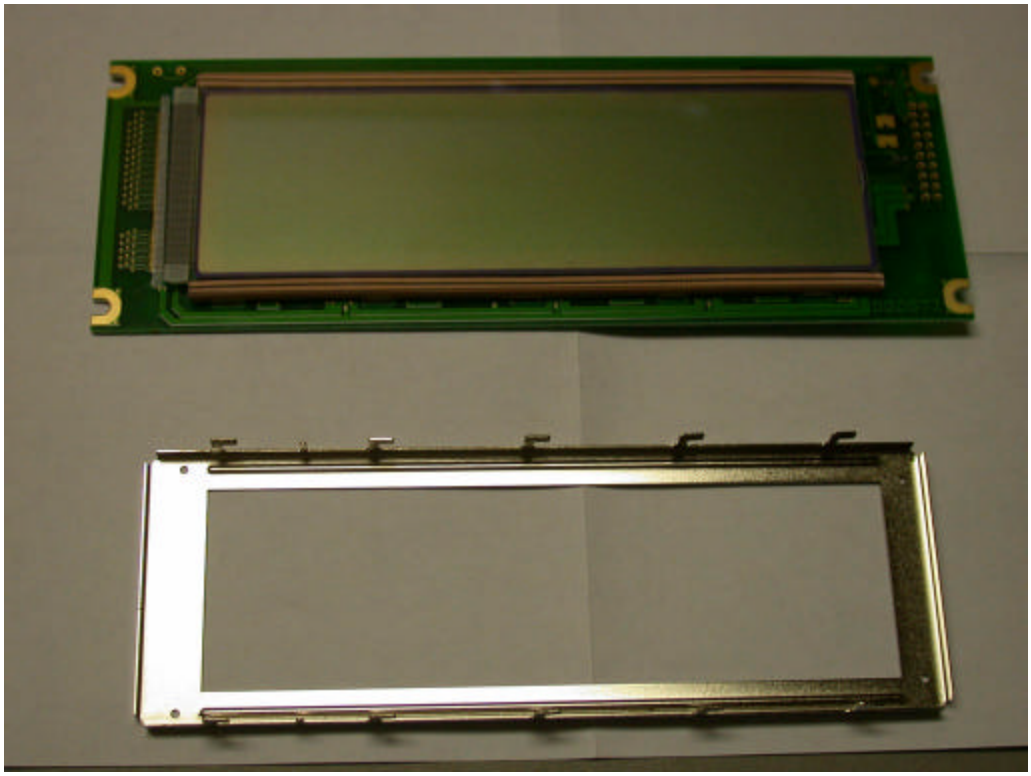
El foil is interesting stuff. You can cut it to any shape as long as cathode and anode pads remain in your design. You add the supplied pins to the pads, connect the inverter which comes with the kit and you're ready to go!

El Foil before cutout with pins inserted



Step 2: Remove the LCD Frame

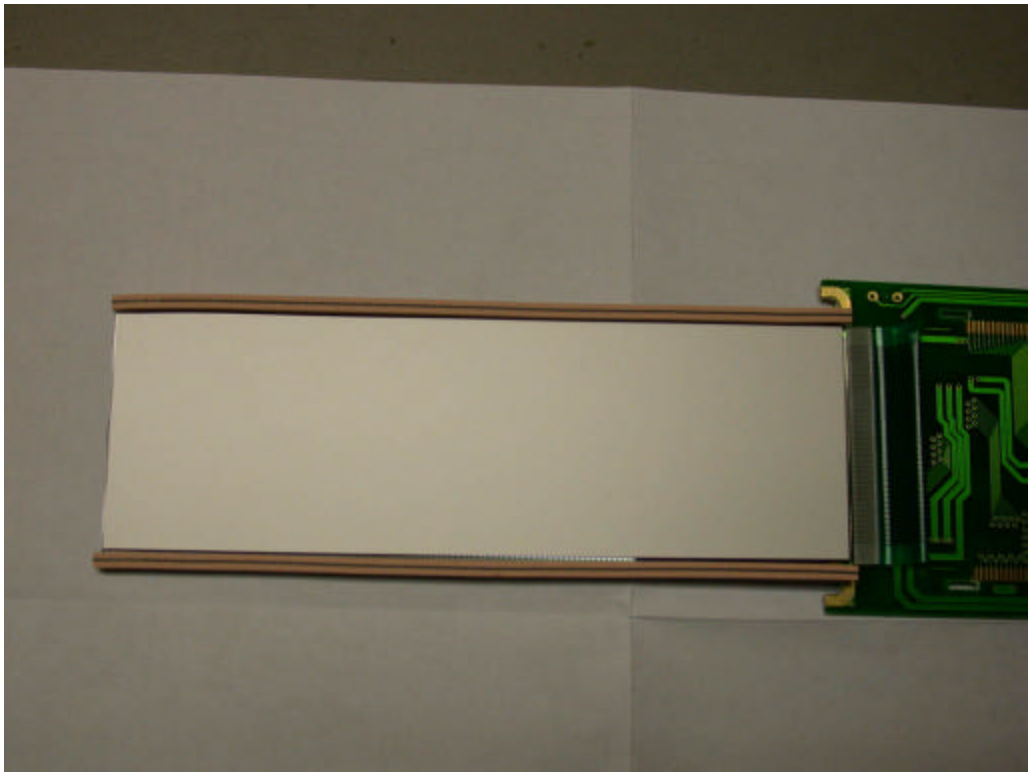
Use a pair of pliers, and bend all the frame crimps and gently ease the frame off.



Step 3: Flip the LCD off the Board

Gently insert a screw driver between the LCD and the board and pop the LCD off the board. There is often a little suction on the rubber conductive pathways. Try to leave the rubber pathways on the glass.

There is a connecter still holding the glass to the circuit board. Please do not put any traction on it. If you tear it off, this LCD is toast.



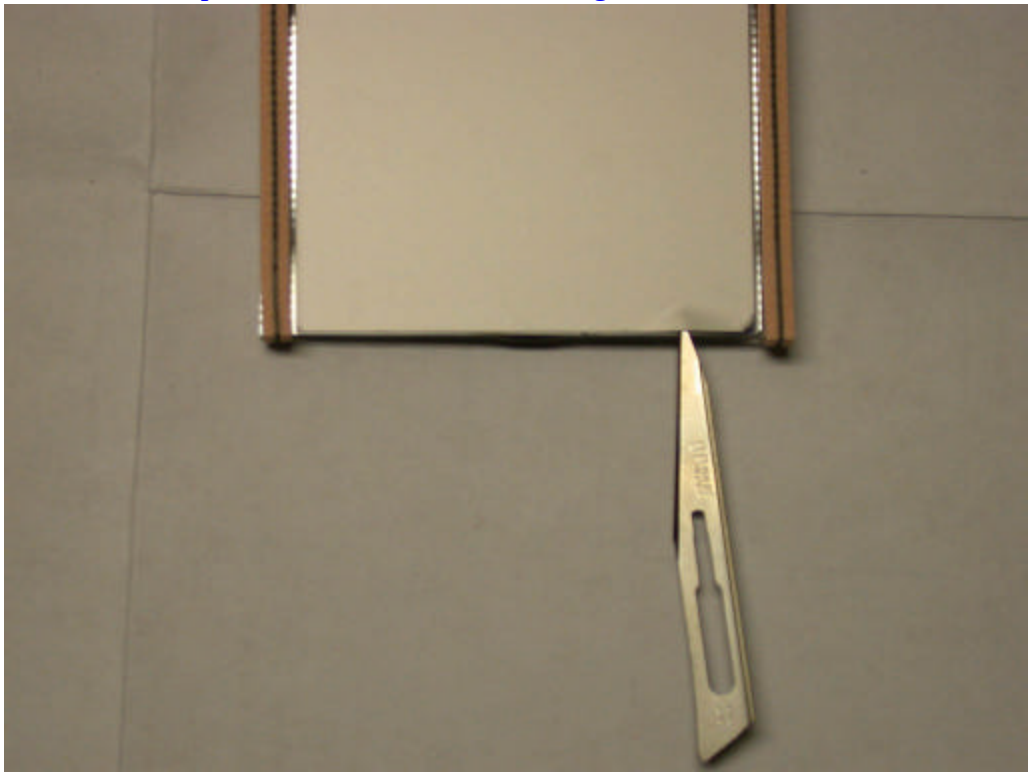
Step 4: Remove to Reflective Backing

This is the hardest part of the whole exercise. You must remove the reflective backing and not the polarizer film. The reflective backing and the polarizer film are held together by an adhesive. This combination is then adhered to the LCD.

If you remove the polarizer film from the glass the LCD WILL NOT WORK! (Well actually it will work, but you will barely be able to see the image)

Work a number 11 scalpel blade or Xacto blade between the reflective backing and the polarizer film.

Number 11 Scalpel blade under reflective backing



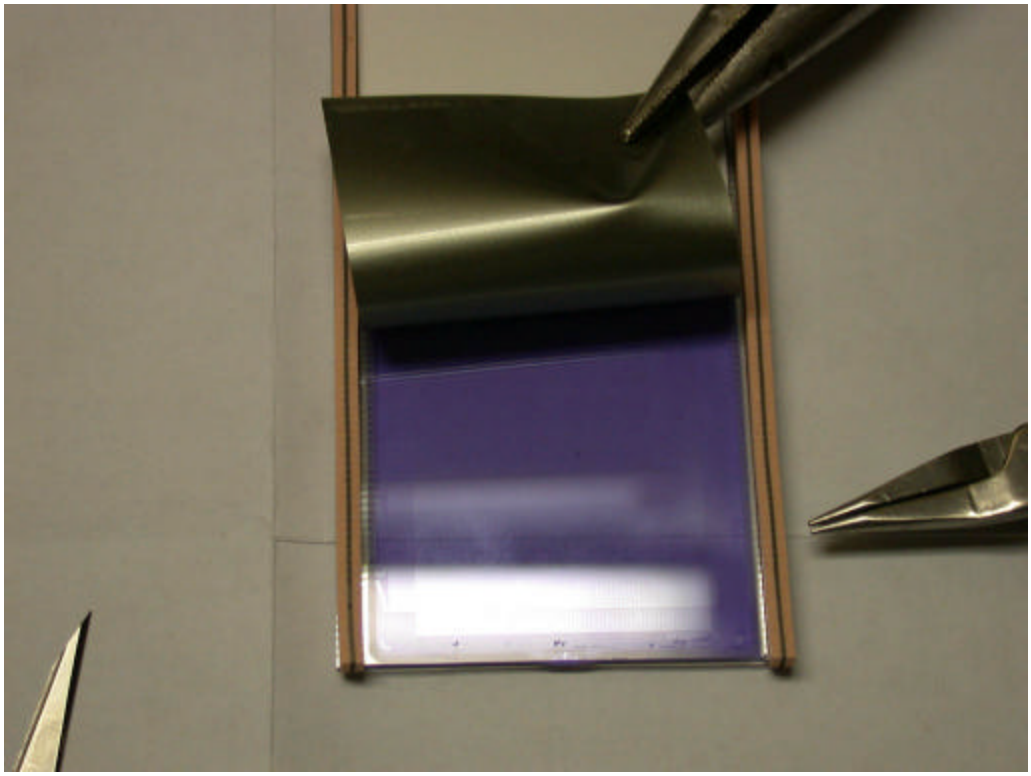
Step 5: Peel the Reflective Backing off the Glass

How do you explain to someone how to have a gentle touch with a scalpel blade?
I can't, so now's the time to learn!
Create an edge, use a fine pair of pliers and peel it slowly. Apply pressure to the LCD glass through the polarizer film to hold it steady. You will find that the assembly peels easily once started.
Don't touch the polarizer film directly. You will leave smudges of skin oil. Wear latex gloves or hold it with a Kleenex.

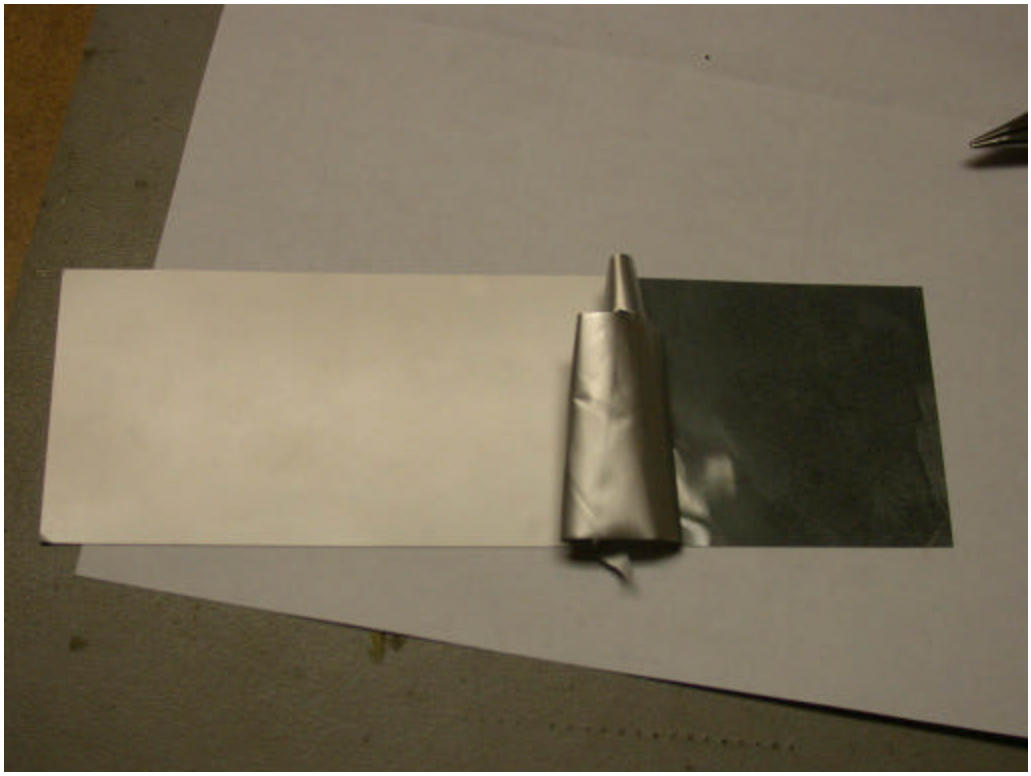
If you peel the polarizer film instead of the reflective backing it will look like this:

STOP NOW, THIS IS THE WRONG WAY!!!

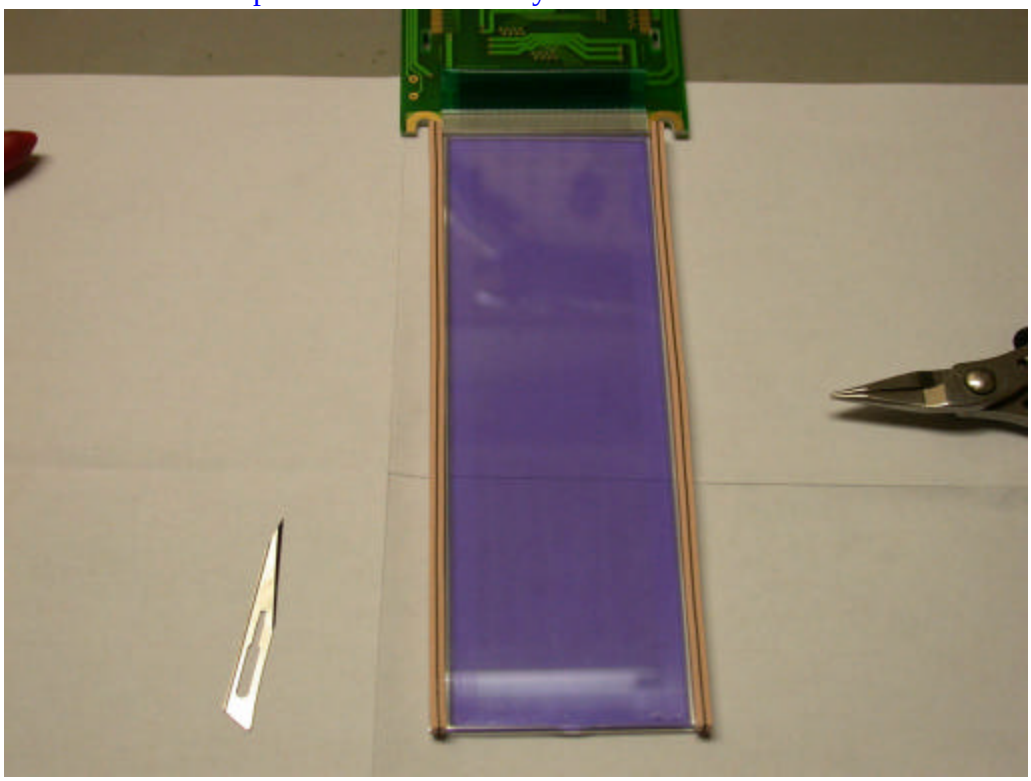
As you can imagine, I ruined this LCD. If you see this, place the polarizer film back on the glass and try again



If you are unfortunate enough to remove the reflective backing and the polarizer film it will look like this:
You may still be able to salvage your LCD if you replace the polarizer film, but it will be difficult and you may have a degraded image quality.



RUINED LCD with polarizer film mistakenly removed



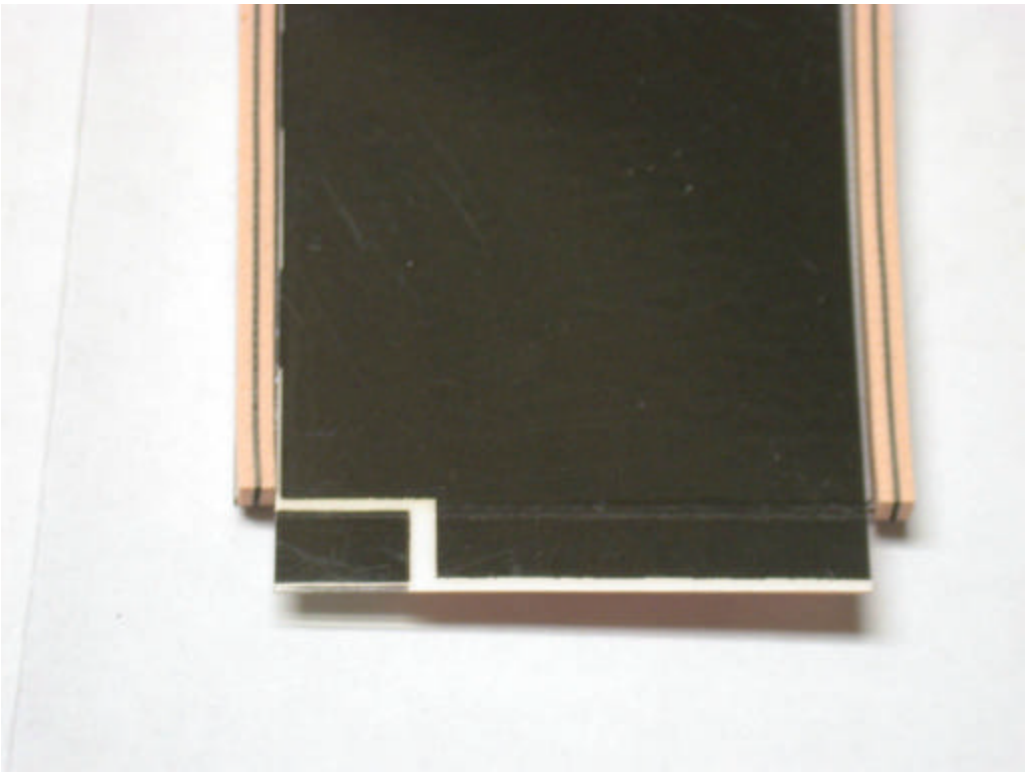
Step 6: Place the EL Foil on the LCD

As simple as it sounds. measure it, cut it and place it.

Well actually measure it, measure it, measure it then cut it and place it.

Try to cut it so that your EL foil pins will align with the LCD EL connector pads.

Make certain that the glowing side or the EL Foil is against the polarizer film and not the circuit board.

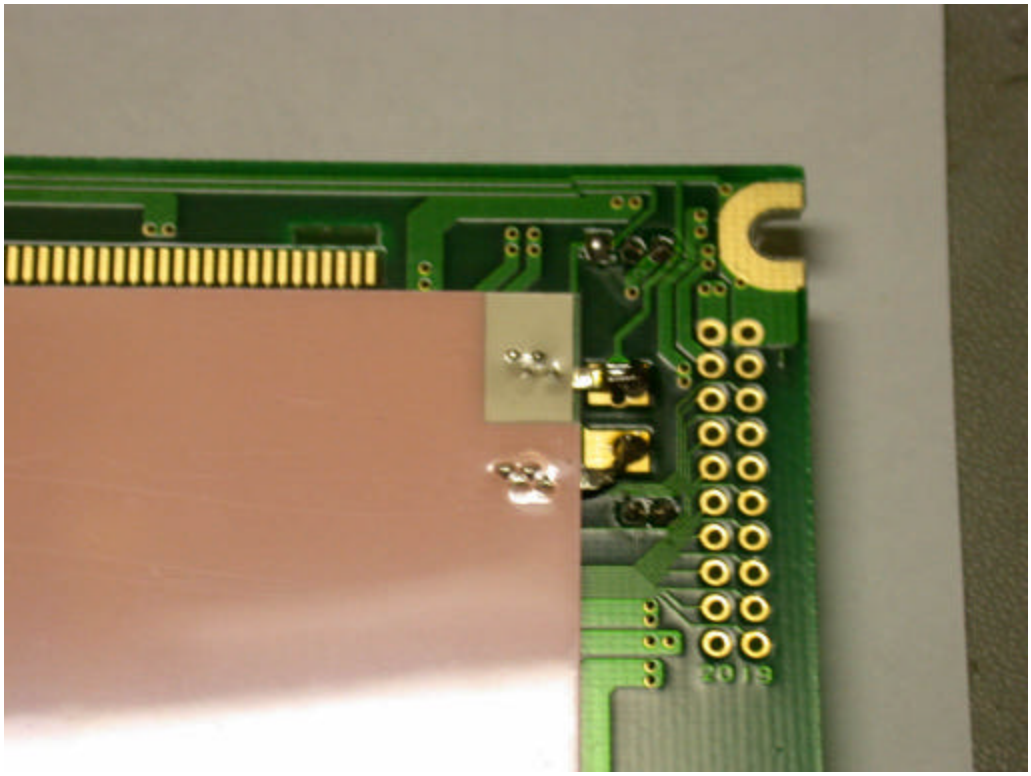


Step 7: Solder EL Strip to the Board

Now that it fits, pick the EL foil up and solder it to the circuit board.

You will have to put a dab of solder on another circuit pad to bridge a connection, to use the LCD's native EL connecter on the other side of the board. IF in doubt just follow the traces. You can see the dab of solder on the upper right hand corner of the picture below.

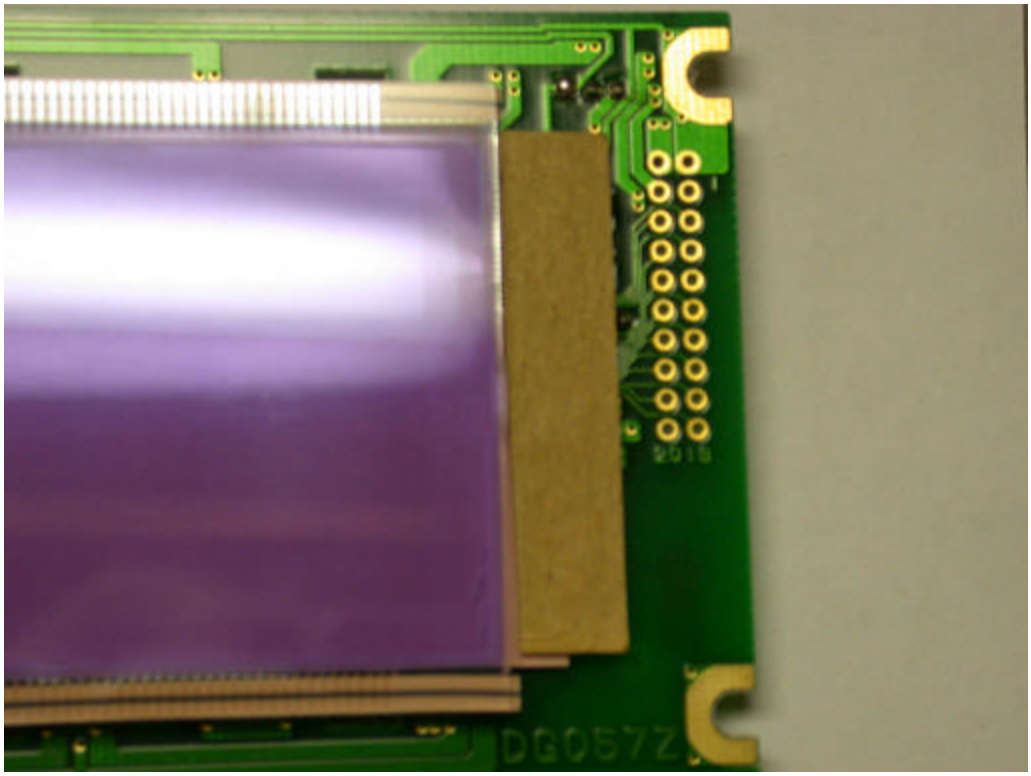
Follow it down right here. |



Step 8: Flip the LCD Back onto the Board

Be gentle!

Put a piece of cardboard over the EL connections to insulate it from the metal frame. (or bad things will happen)



Step 9: Replace the Frame

Now this is trickier then you would think. You have to make sure that all those myriad pins on the LCD glass match up with the pins on the circuit board.

If you don't match them accurately, you will smoke your module!

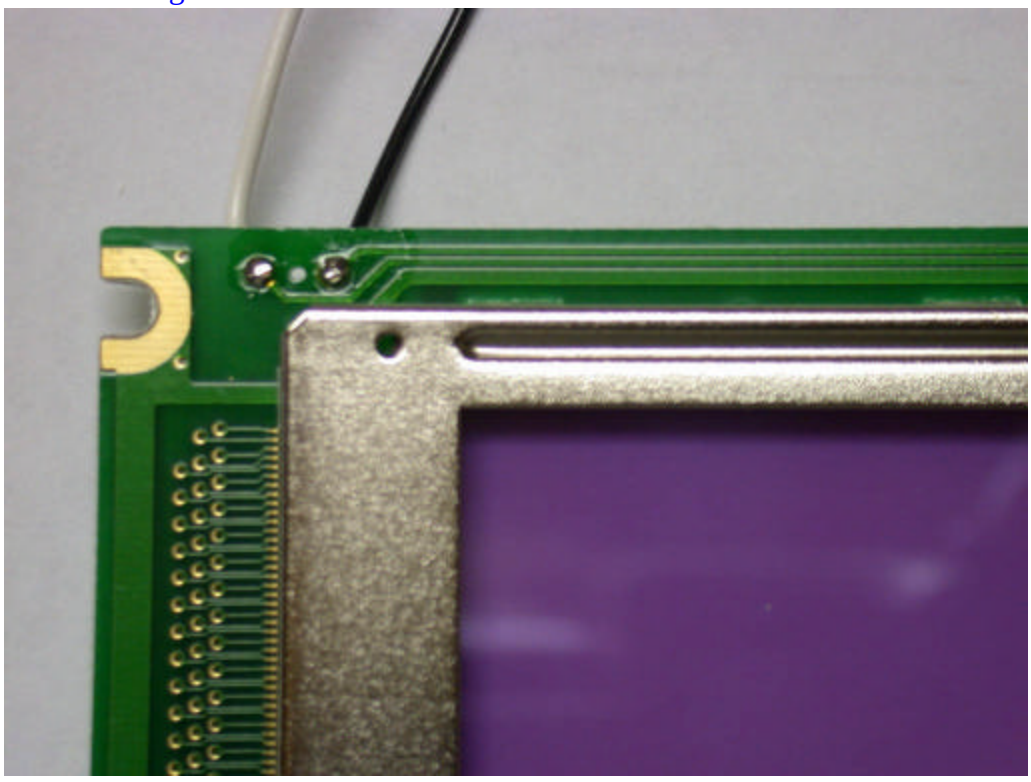
Match it, apply firm pressure and bend the frame pins back into place.

Step 10: Solder the EL Connections

Almost there! If you use a 5 volt inverter then you only need one connection as the EL strip shares a common ground with the LCD.

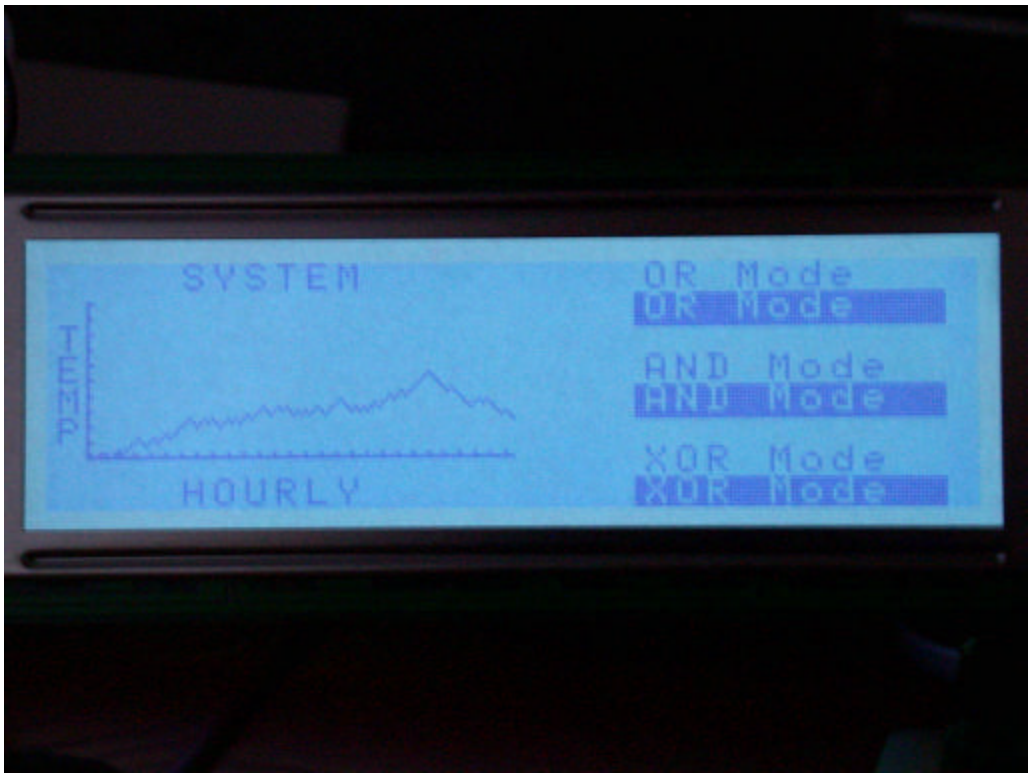
The Cooltronix Inverter is 9 volts and two connections are required.

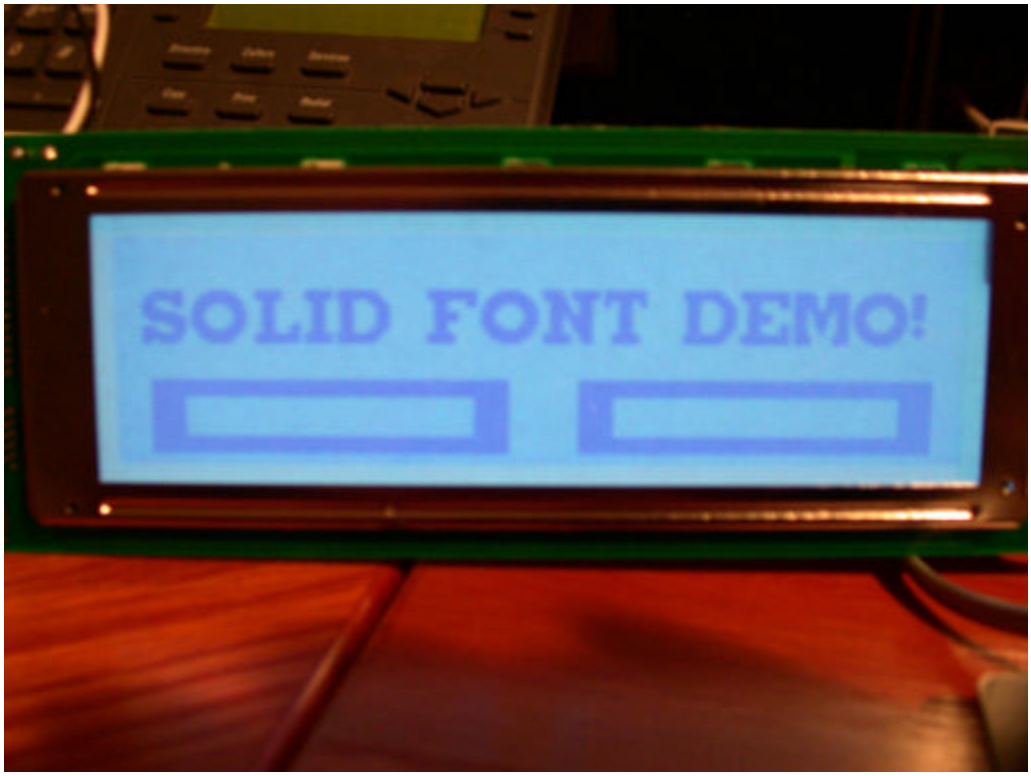
Black wire is ground.



Step 11: Enjoy!

Excuse the poor photography. It was hard to capture good images. The real life view is much nicer.

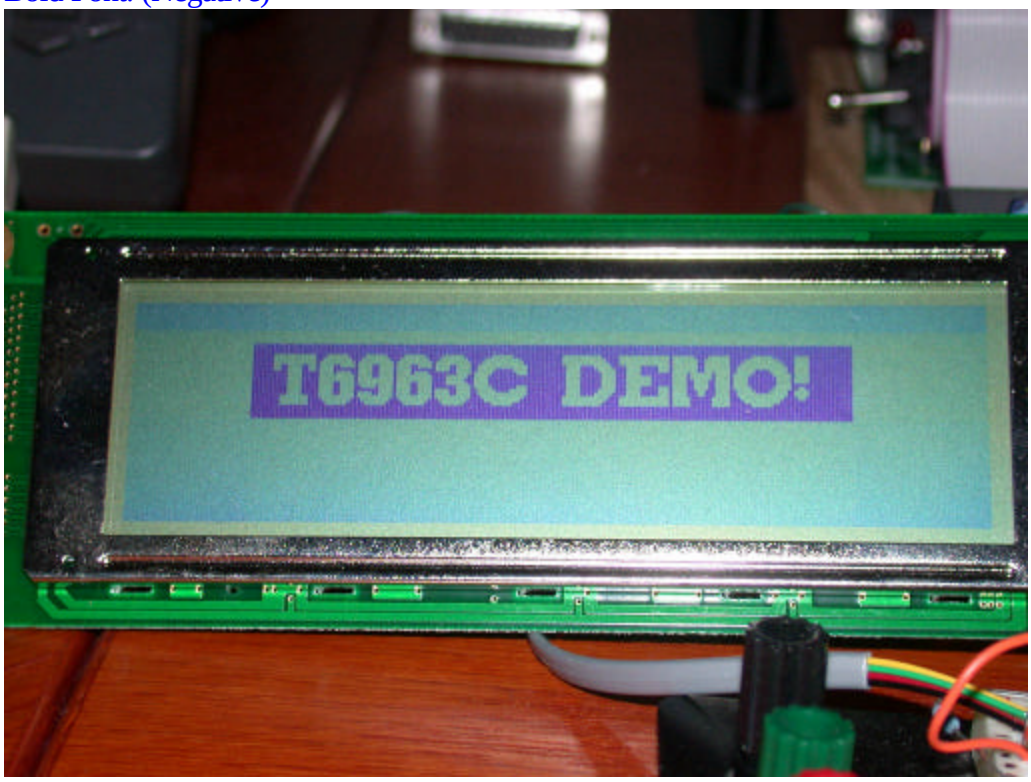



SOLID FONT DEMO!

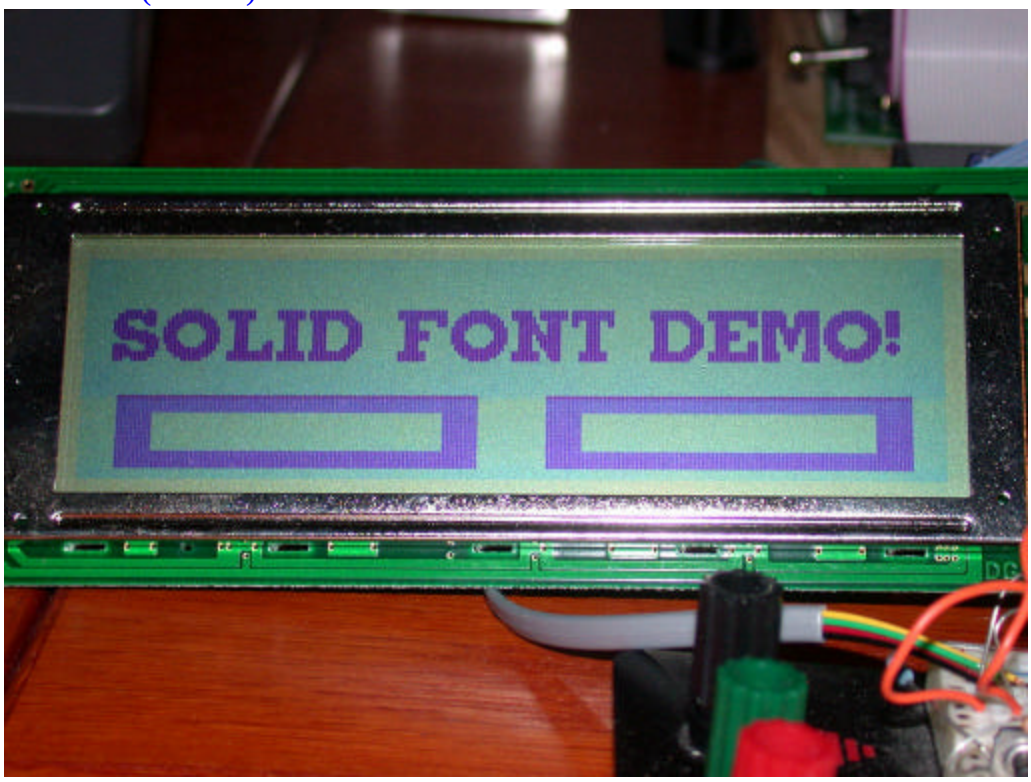

T6963C DEMO!

New T6963c Demo (Not Backlit)

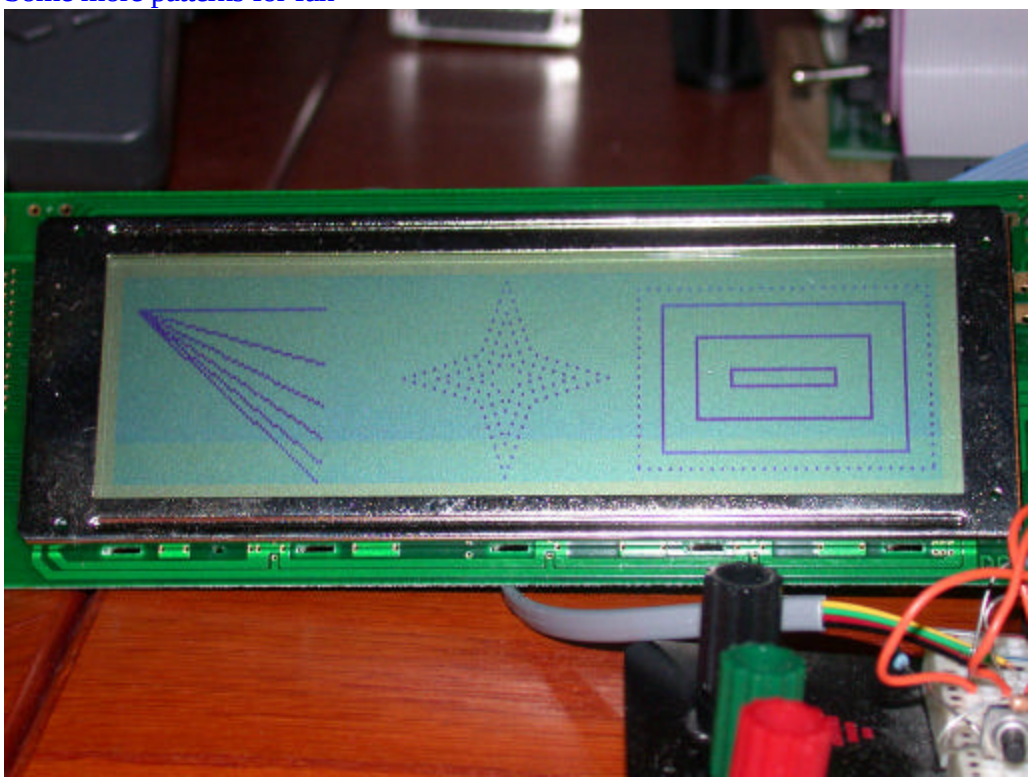
Bold Font. (Negative)



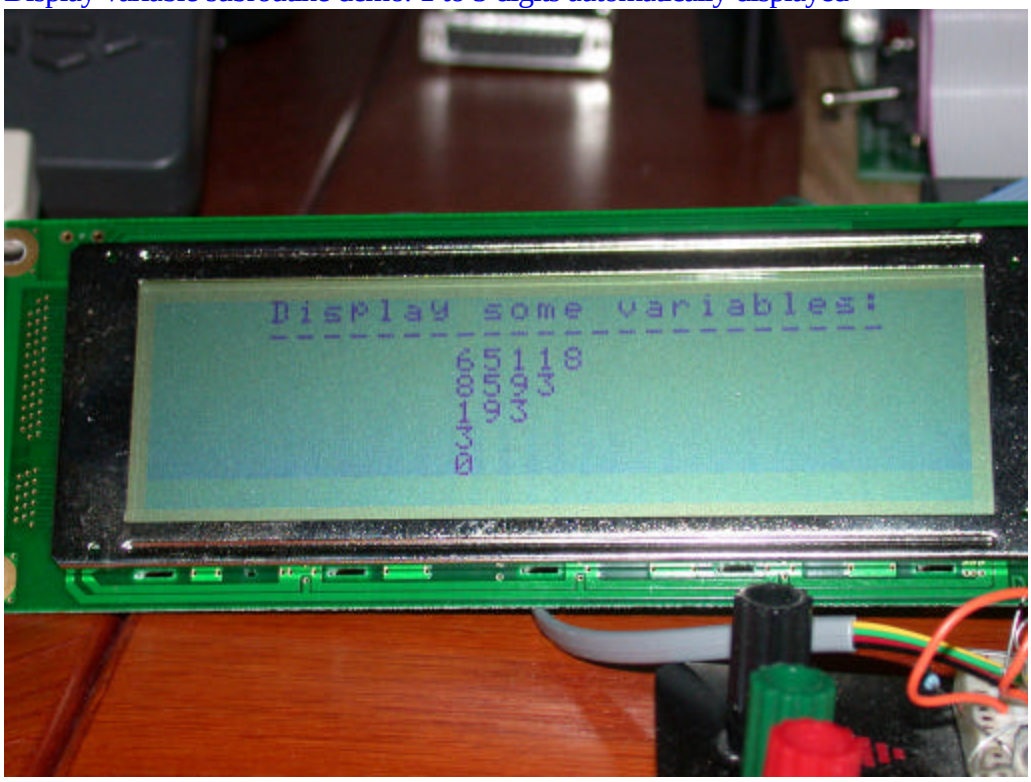
Bold Font. (Positive)



Some more patterns for fun



Display variable subroutine demo. 1 to 5 digits automatically displayed



Display text scaling and erase functions.