

# Proto Board Development

Suggestions and Examples of Laying Out a  
Development Board for the 8051

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1

## Drill Sizes

- To mount a TO-220 style heat sink to the board, use a #6 machine screw.
- To mount an RS-232 connector to the board, use #4 machine screws.
- The corner standoffs have a 6-32 (#6) thread.
- To mount the power jack, use a 5/16" drill bit.
- There are two styles of power switches in the lab kits.  
If you have the power switch with the flat lever, use a 1/4" drill bit.  
If you have the power switch with the round lever, use a 15/64" drill bit.
- If mounting the LCD with machine screws, use #2 screws (3/32")

Screw Size	Drill Diameter
#2	3/32"
#4	1/8"
#6	9/64"

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2

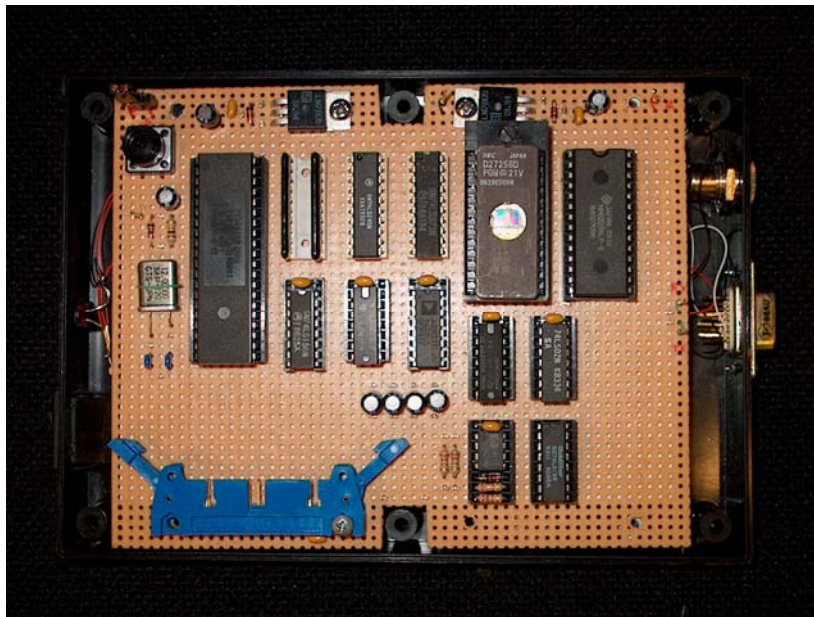
# Connecting an LCD



- You have many options for connecting the LCD to the perf board. You can attach it directly, or you can use some type of cable interface. Consider whether you would like to be able to remove the LCD or whether it is acceptable to have it permanently attached to your board. You need to connect the power/signal pins as well as connect the four corner mounting holes to the board. Many LCDs will utilize a 14-pin connector. LCDs with an LED backlight may require 16 pins.
- To mount the LCD directly to the board, use wire wrap wire or 22 AWG solid core wire to connect (twist tie) each corner of the LCD to the perf board. This is the easiest way.
- Alternately, use #2 machine screws to mount the LCD. If you use long screws with standoffs, you may be able to fit additional circuitry on your board underneath the LCD. However, you must plan carefully, if you want the 14 signal holes in the LCD board to line up with the holes in the perf board. Note that the 14 signal holes at the top of the LCD are in a straight line with the two mounting holes at the top of the LCD board. Therefore, when you drill the mounting holes for the LCD, make sure the top two holes are in line with a row of holes on your perf board. The center of the top left mounting hole on the LCD is exactly 0.3" from the center of the signal hole labeled '1' on the LCD, so your mounting hole for the top left corner of the LCD should be centered in one of the holes in the perf board. The other three corner holes on the LCD are not aligned with holes on the perf board. Be careful not to tighten the mounting screws for the LCD too hard. Make sure the LCD board is not flexed.
- One suggestion is to use a 14-pin (or 16-pin, if needed) SIP wire wrap connector. You can solder this into the LCD board and then wire wrap to the long SIP pins extending through the perf board.
- Another idea is to use a flat insulation displacement cable with a DIP connector which can be plugged into a wire wrap socket on your board.

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3

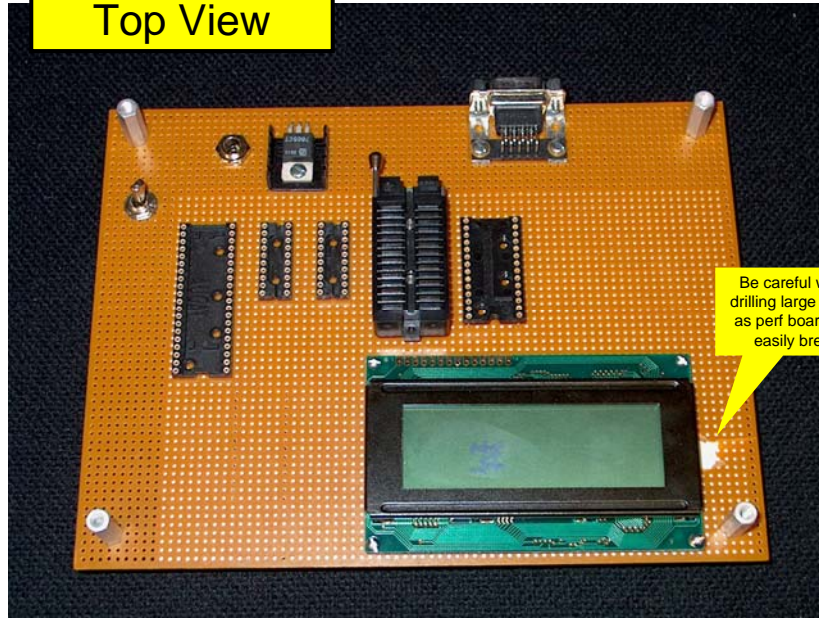


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4



## Top View

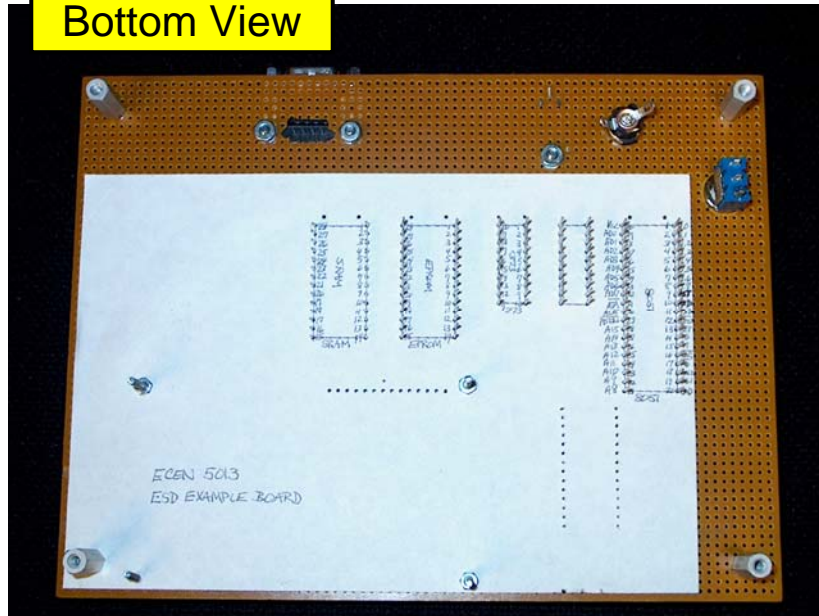


Be careful when drilling large holes, as perf board can easily break

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7

## Bottom View

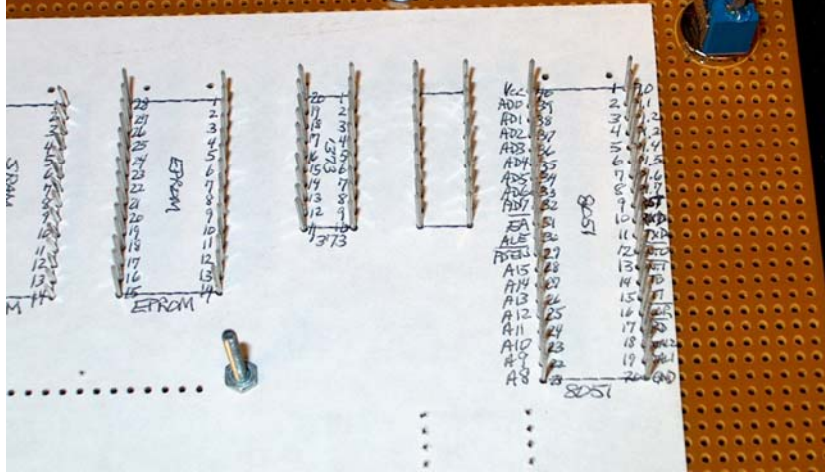


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8



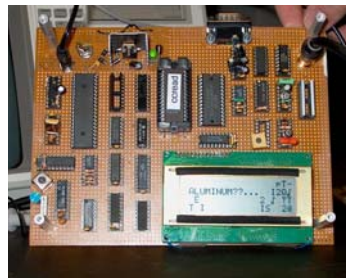
## Pin Numbers and Signal Names



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9

## Examples of 8051 Designs



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10