

# LED Cube, 5/12/2013

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## Problem Definition

- To design an LED cube to mimic 3d images.
- **Schedule**
- Proposal 2013
- Parts gathered 5/15/2013
- Beginning prototype 5/25/2013
- Working prototype 5/30/2013
- **Resources**
- Engineering program/Clark College
- Intel engineers/programmers

## Future Improvement/Ideas

- To build a cube that is twice as large to improve image quality and visibility.
- Design the program to mimic sine and cosine waves.
- Design a program to run continuously with no repeating images.

## Proposed Solution

We have decided to design a 8x8x8 LED cube. This cube will contain 512 LED's that are soldered together in 8 layers. The cathode of every LED in a layer are soldered together. The anodes in each 8 high column are soldered together. Each of the 64 columns are connected to the controller by a individual wire, also each layer has a dedicated wire to the controller. This cube will be a digital circuit that is controlled by a microcontroller. This controller must have 6 inputs and 74 outputs to fully control the cube. The power supply must be able to handle the current that 512 LEDs will draw and at this time we are still testing to determine. The LED's themselves must be diffused rather than clear so all the light is not projected straight up rather than all around.

## Potential Applications

- 3D advertisement
- Novelty decoration piece
- Teaching tool to better display signals to classes.



<b>From futurlec:</b>	<b>Price</b>	<b>Units</b>	<b>Sum</b>
64x resistors. (see separate step for ohm value)	0.02	70	1.40
1x or 2x large prototype PCBs.(copper eyes)	2.90	2	5.80
1x ATmega32 microcontroller	6.90	1	6.90
3x status LEDs. You choose color and size.	0.08	3	0.24
3x resistors for the status LEDs.	0.02	10	0.20
8x 74HC574 ICs	0.60	8	4.80
16x PN2222 transistors	0.10	16	1.60
16x 1k resistors	0.02	20	0.40
1x 74HC138 IC	0.35	1	0.35
1x Maxim MAX232 IC	1.60	1	1.60
1x 14.7456 MHz crystal	0.75	1	0.75
2x 22pF ceramic capacitors	0.05	2	0.10
16x 0.1uF ceramic capacitors	0.10	16	1.60
3x 1000uF electrolytic capacitor	0.18	3	0.54
3x 10uF electrolytic capacitor	0.05	3	0.15
1x 100uF electrolytic capacitors	0.10	1	0.10
8x 20 pin IC sockets	0.09	8	0.72
1x 40 pin IC socket	0.15	1	0.15
2x 16 pin IC socket	0.07	2	0.14
1x 2-pin screw terminal	0.40	1	0.40
2x polarized plug for pwr cable	0.15	2	0.30
4x inserts for plugs	0.06	10	0.60
9x 8-pin terminal pins	0.07	10	0.70
1x 4-pin terminal pins, right angle	0.25	1	0.25
2x 16-pin ribbon cable connector	0.25	2	0.50
1x 10-pin ribbon cable connector	0.25	1	0.25
Ribbon cable	0.45	8	3.60
2x pushbuttons	0.25	2	0.50
2x ribbon cable plugs	0.25	2	0.50
9x 8-pin female header plugs	0.18	9	1.62
4 pin header for serial cable	0.15	1	0.15
Inserts for header plugs	0.06	80	4.80
8x optional pull-up resistors for layers	0.02	10	0.20
Sum components from Futurlec:			41.91
1000 LEDs from eBay:			25.00
<b>Total build cost:</b>		<b>USD</b>	<b>66.91</b>

Not included: Power supply (use an old ATX PSU), piece of wood