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LED Cube 4x4x4

by chr on March 24, 2008

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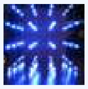


Author:chr
I like microcontrollers and LEDs :D

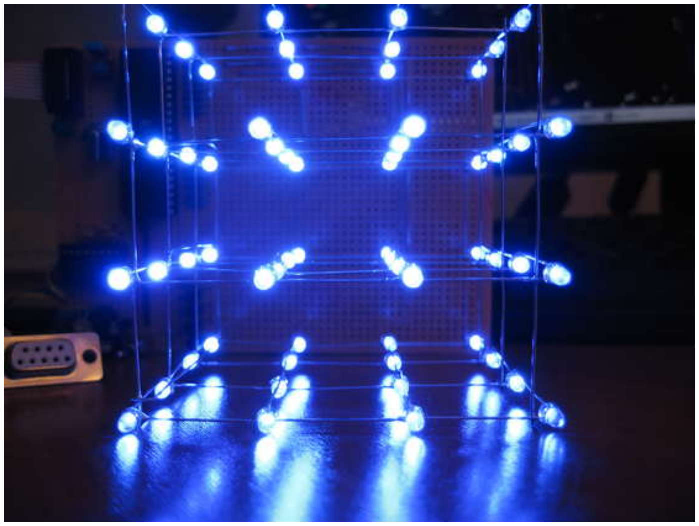
Intro: LED Cube 4x4x4

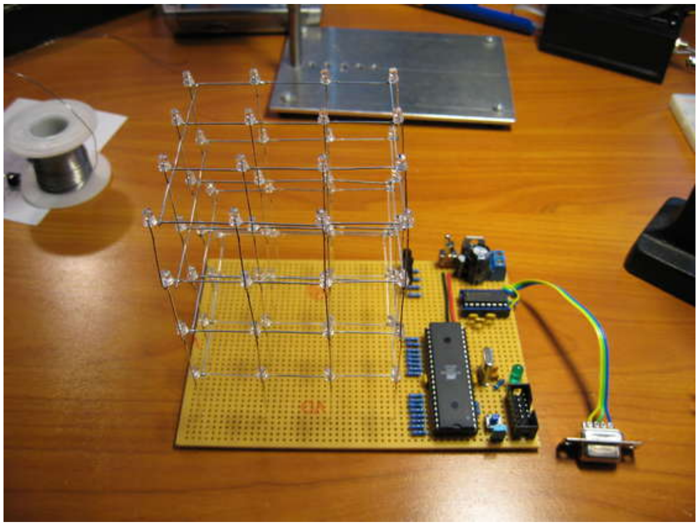
Amazing 3 dimensional LED display.

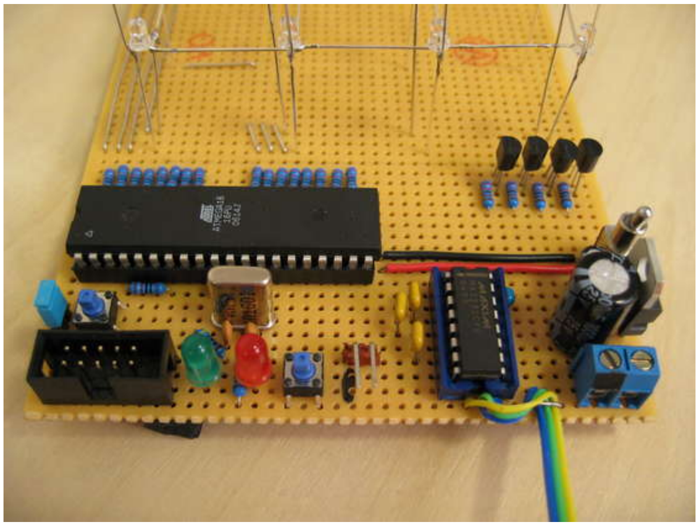
64 LEDs makes up this 4 by 4 by 4 cube, controlled by an Atmel Atmega16 microcontroller.
Each LED can be addressed individually in software, enabling it to display amazing 3d animations!

8x8x8 LED cube now available, by popular demand:

http://www.instructables.com/id/Led-Cube-8x8x8/







Step 1: What you need

First of all, you need quite a bit of time to solder together 64 leds ;)

Knowledge list:

- Basic electronics and soldering skills
- Know how to program an AVR microcontroller - I will not cover that in this instructable.

Component list:

- Protoboard. The type with copper circles.
- Atmel AVR Atmega16 microcontroller
- Programmer to program the Atmega16
- 64 Leds
- 2 status leds. I used red and green. (optional)

- Max232 rs-232 chip, or equivalent.
- 16 resistors for leds. (100-400ohms) will get back to this.
- 2x resistor 470 ohm. for status leds
- 1x resistor 10k
- 4x resistor 2.2k
- 4x NPN transistor BC338 (or other transistor capable of switching 250-ish mA)
- 1x 10uF capacitor
- 1x 1000uF capacitor
- 6x 0.1uF ceramic capacitor
- 2x 22pF ceramic capacitor
- 1x crystal 14.7456 MHz
- 2x tactile button
- optional pwr switch
- connector for 12v power
- optional connector for 5v power

Image Notes
1. A lot of leds!

Step 2: Multiplexing

How to control 64 LEDs without using 64 individual wires? Multiplexing!

Running a wire to the anode of each led would obviously be impractical, and would look really bad.
One way to get around this, is to split the cube into 4 layers of 16x16 LEDs.

All the LEDs aligned in a vertical column share a common anode (+).
All the LEDs on a horizontal layer share a common cathode (-).

Now if i want to light up the LED in the upper left corner in the back (0,0,3), I just supply GND (-) to the upper layer, and VCC (+) to the column in the left corner.

If i only want to light up one led at a time, or only light up more than one layer at the same time.. this works fine.

However, if I also want to light up the bottom right corner in the front (3,3,0), I run into problems. When I supply GND to the lower layer and VCC to the front left column, I also light up the upper right led in the front (3,3,3), and the lower left LED in the back (0,0,0). This ghosting effect is impossible to workaround without adding 64 individual wires.

The way to work around it is to only light up one layer at a time, but do it so fast that the eye doesn't recognize that only one layer is lit at any time. This relies on a phenomenon called Persistence of vision .

Each layer is a 4x4 (16) image.
If we flash 4 16 led images one at a time, really fast, we get a 4x4x4 3d image!

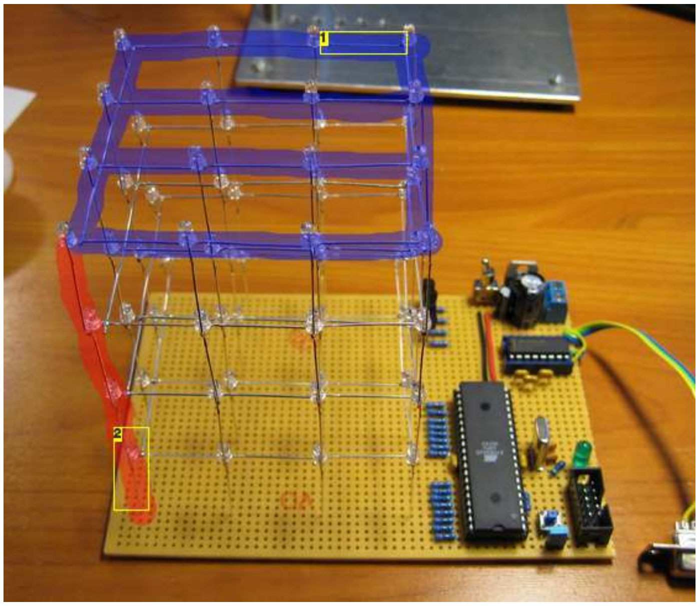


Image Notes
1. All the LEDs on this layer share cathodes (-)
2. All the LEDs in this column share anodes (+)

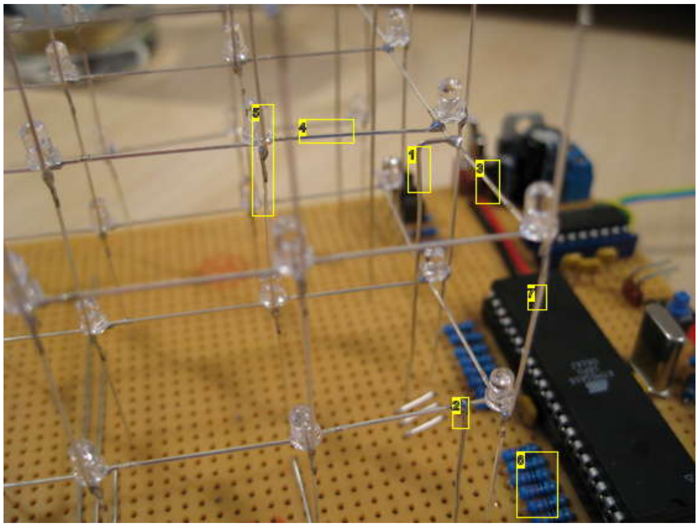


Image Notes
1. This wire supplies GND (-) to layer 1 of the cube.
2. This wire supplies GND (-) to layer 0 of the cube.
3. All the leds in a layer have their cathodes connected together
4. All the cathodes connected together
5. All the leds alligned directly above each other have their anodes connected together
6. Each of the 16 vertical columns have a resistor to avoid frying the LEDS and the microcontroller
7. This wire supplies VCC to all the leds in this corner...

Step 3: Making the cube, template

Soldering grids of 4x4 LEDs freehand would look terrible!
To get 4 perfect 4x4 grids of LEDs, we use a template to hold the them in place.

I wanted to make the cube as easy as possible to make, so I chose to use the LEDs own legs as much as possible. The distance between the lines in the grid was decided by the length of the LED legs. I found that 25mm (about an inch) was the optimal distance between each led (between the center of each led that is!) to enable soldering without adding or cutting wire.

- Find a piece of wood large enough to make a 4x4 grid of 2,5cm on.
- Draw up a 4x4 grid of lines.
- Make dents in all the intersects with a center punch.
- Find a drill bit that makes holes small enough so that the led will stay firmly in place, and big enough so that the led can easily be pulled out (without bending the wires..).
- Drill the 16 holes.
- Your ledcube template is done.

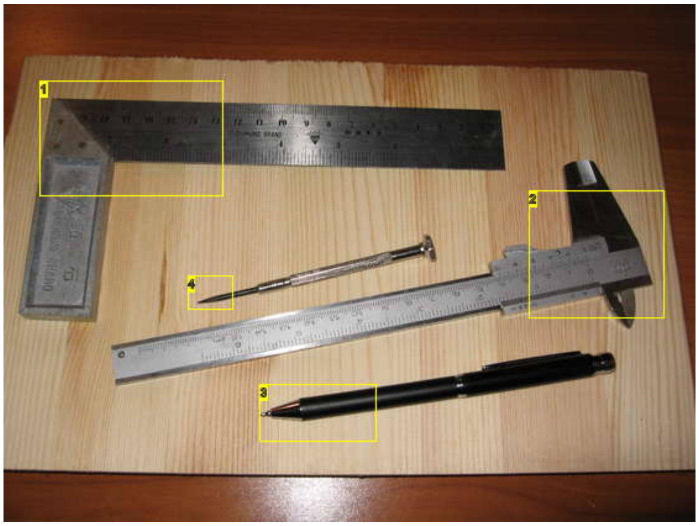


Image Notes
1. You want 90 degree angles!
2. Acurate measurements
3. Draw up the grid
4. Punch holes so the drill doesnt travel sideways when you start drilling out the holes

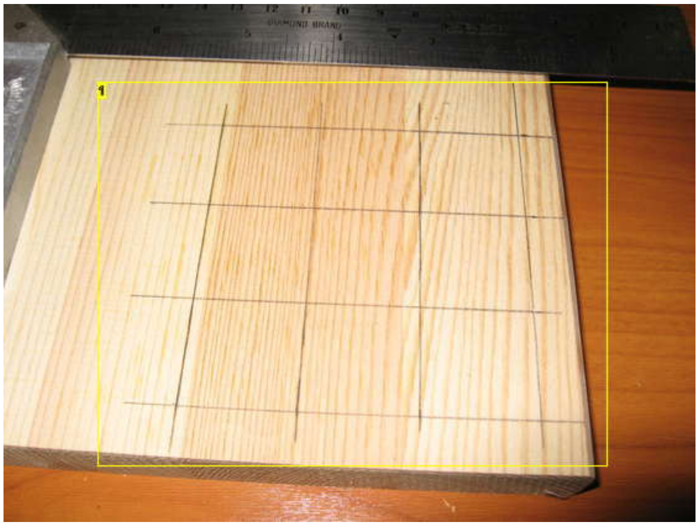


Image Notes
1. Nice and square

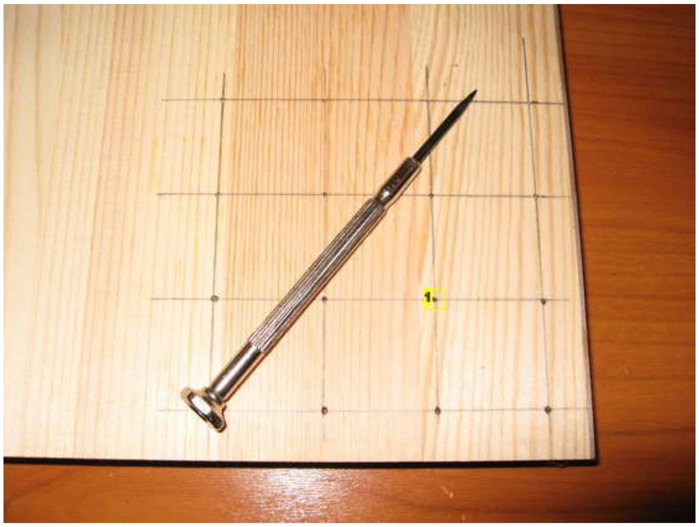


Image Notes
1. Holes punched out

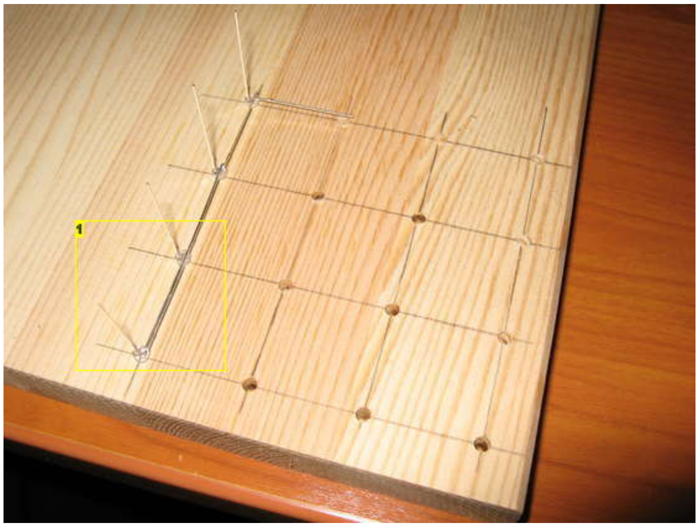


Image Notes
1. LEDs fits nicely

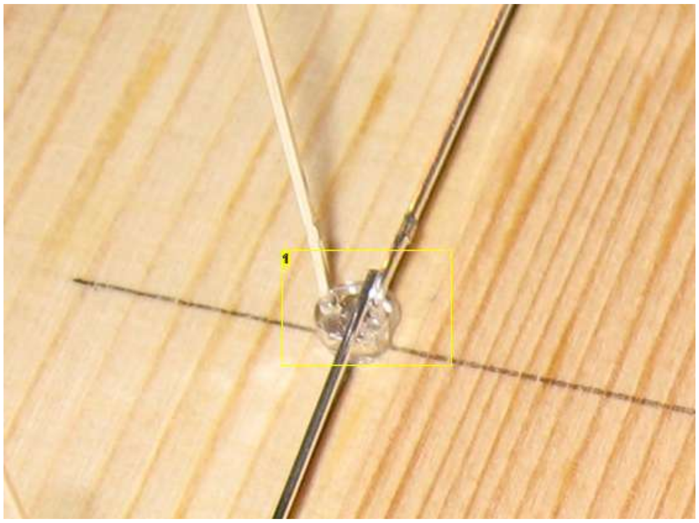


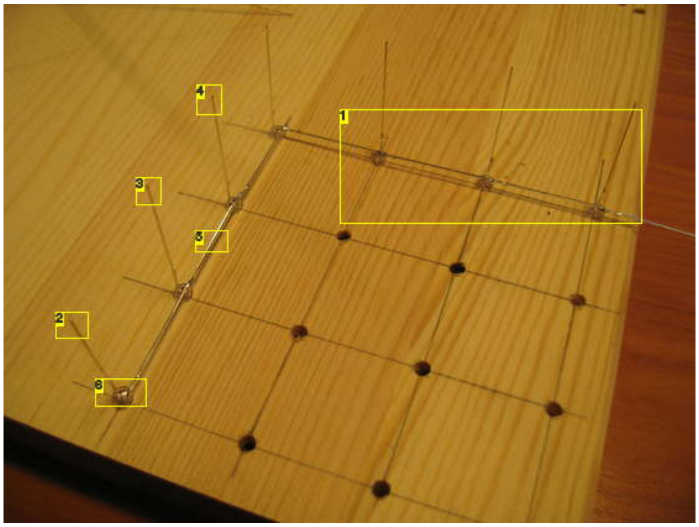
Image Notes
1. The distance of 25mm between the center of each hole, enable the pins to just barely overlap. just perfect for soldering.

Step 4: Making the cube, solder the layers

We make the cube in 4 layers of 4x4 leds, then solder them together.

Create a layer:

- Put in the LEDs along the back and along one side, and solder them together
- Insert another row of LEDs and solder them together. Do one row at a time to leave place for the soldering iron!
- Repeat the above step 2 more times.
- add cross bracing in the front where the led rows are not connected.
- Repeat 4 times.



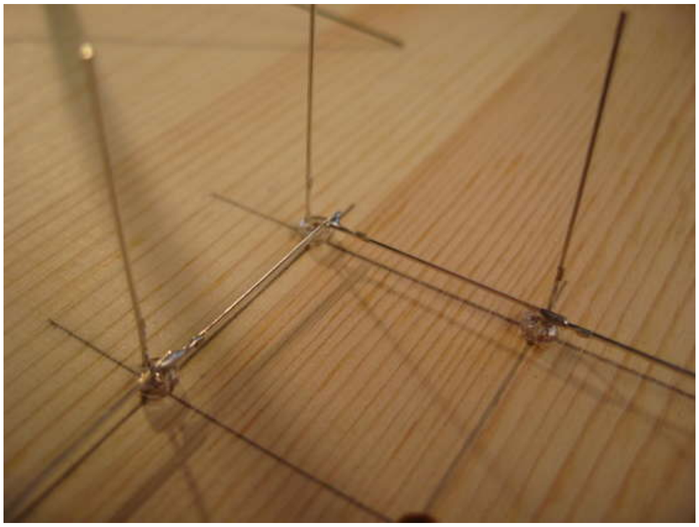


Image Notes
1. Start by aligning and soldering the outer edges
2. anode
3. anode
4. anode
5. cathode
6. Bend the cathode leg (the short one) of the LED 90 degrees to one side.

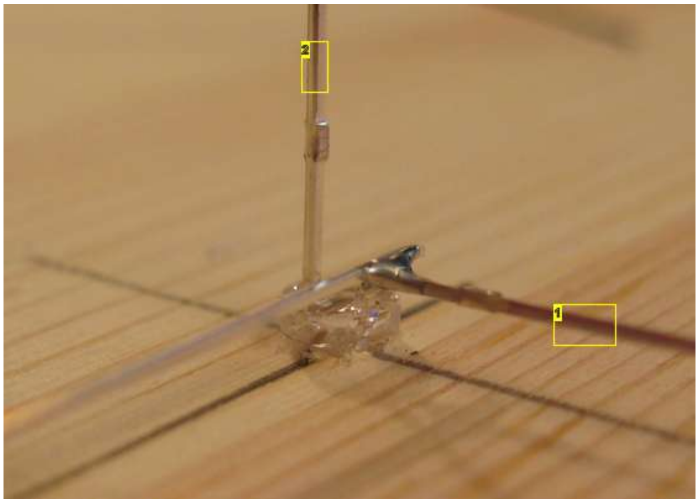


Image Notes
1. cathode
2. anode

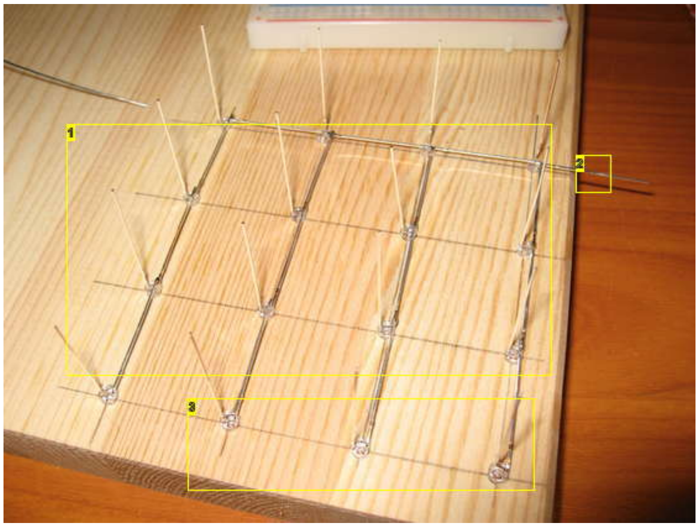


Image Notes
1. All the cathodes (minuses) have been soldered together.
2. Since we bent all the cathodes in the same direction, there will be one sticking out to the side. just leave it for now.
3. The layer is pretty flimsy in this end, and would be bent out of shape if removed from the template like this. See the next image..

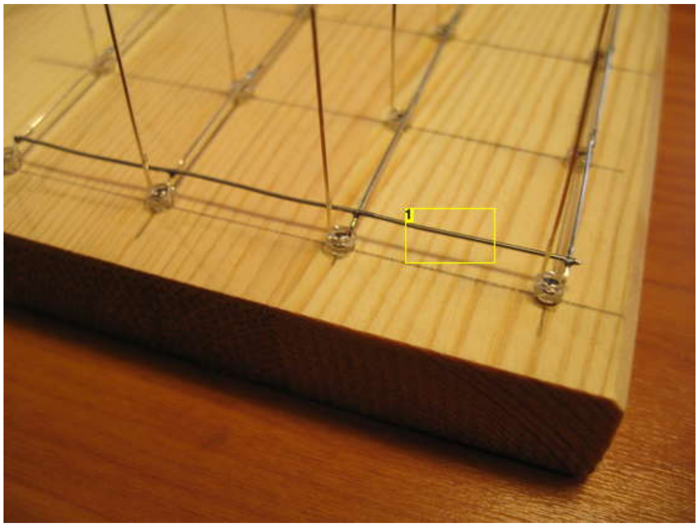


Image Notes
1. Add a barcing to this side to make the layer more robust. Take a straight piece of wire and solder it to all 4 cathodes.

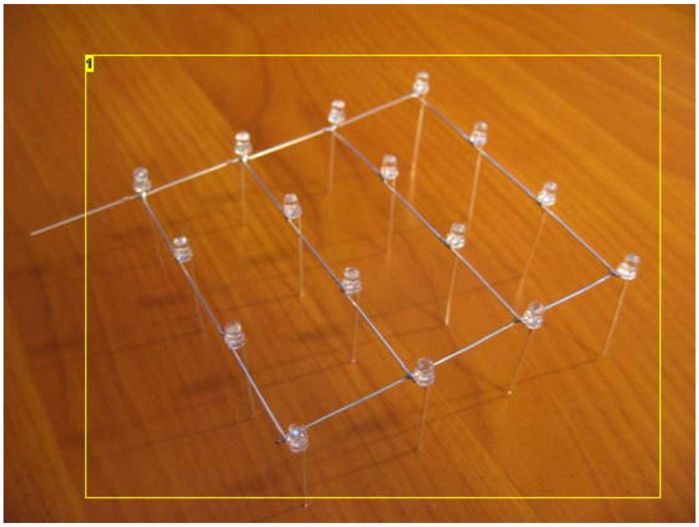
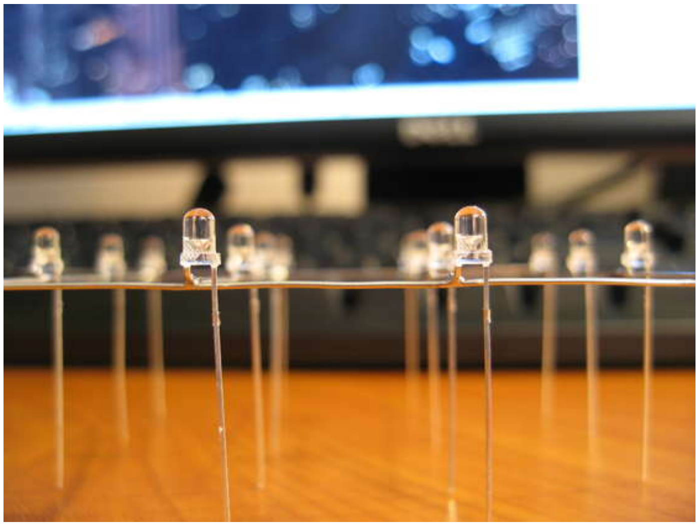
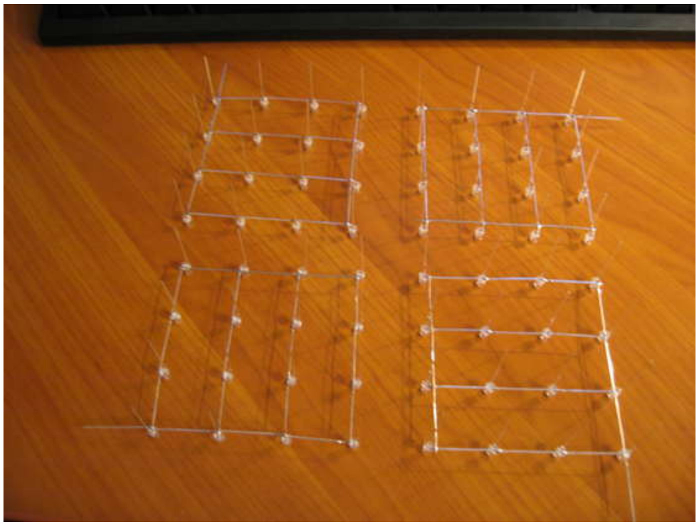


Image Notes
1. The finished product





Step 5: Making the cube, connecting the layers

Now that we have those 4 layers, all we have to do is to solder them together.

Put one layer back in the template. This will be the top layer, so choose the prettiest one :)

Put another layer on top, and align one of the corners exactly 25mm (or whatever distance you used in your grid) above the first layer. This is the distance between the cathode wires.
Hold the corner in place with a helping hand and solder the corner anode of the first layer to the corner anode of the second layer. Do this for all the corners.

Check if the layers are perfectly aligned in all dimensions. If not bend a little to adjust. Or re-solder of it's the height distance that's off. When they are perfectly aligned, solder the remaining 12 anodes together.

Repeat 3 times.

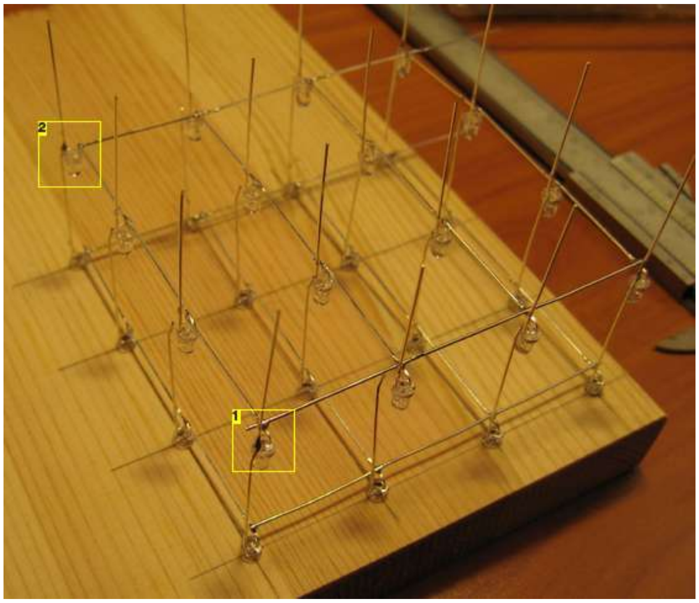


Image Notes
1. Start with the corners
2. Start in the corners

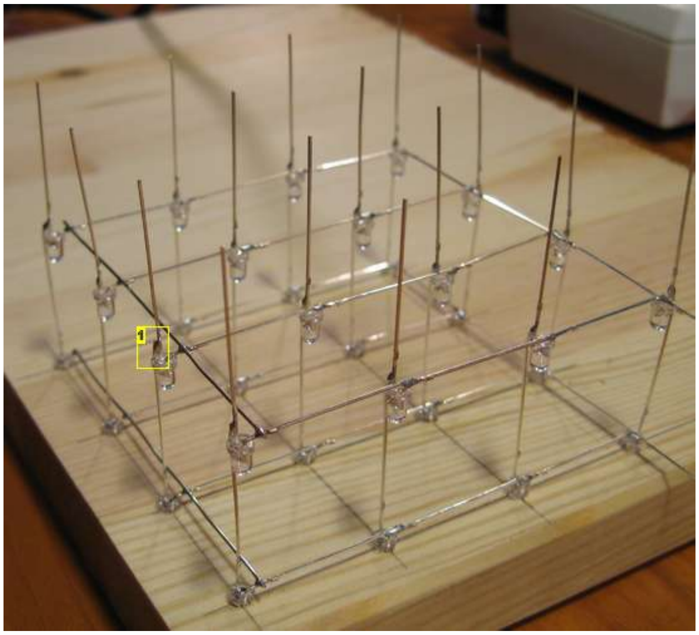


Image Notes
1. then solder the rest.

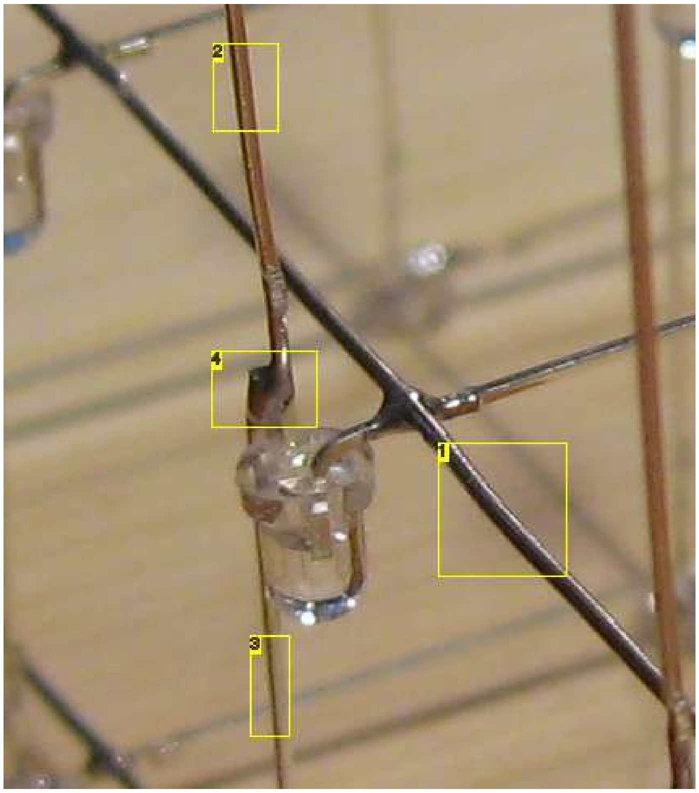


Image Notes
1. cathodes connected to layer
2. Anode
3. Same anode wire connects to the led directly above..
4. Again, be carefull with the soldering iron when soldering this close to the LED. Be fast. If you make a mistake. Let the led cool down before applying heat again.

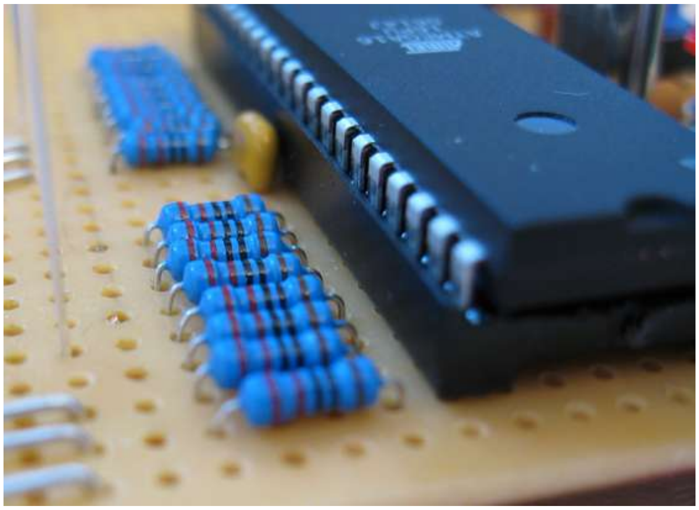
Step 6: Choosing resistor values

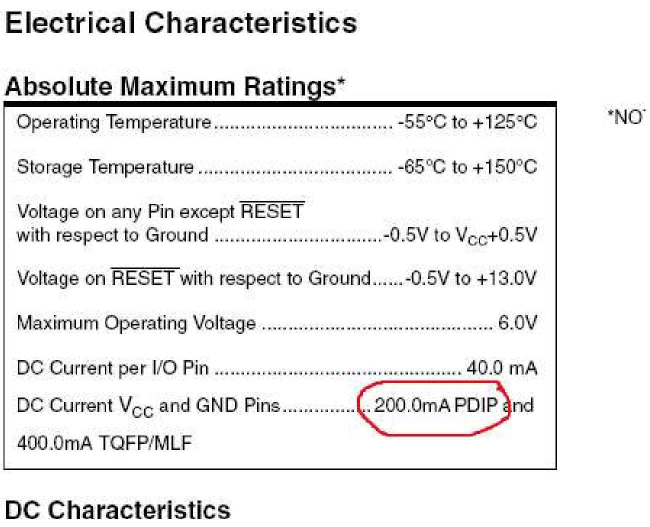
There are two things to keep in mind when choosing a resistor value for your leds.
1) The LEDs
2) The AVR

The AVR has a maximum combined current rating of 200 mA.
This gives us 12mA to work with per LED.

You also don't want to exceed the maximum current your leds are rated to.

I used 220 ohm resistors on my cube. This gave me about 12mA per led.





Electrical Characteristics

Absolute Maximum Ratings*

Operating Temperature	-55°C to +125°C
Storage Temperature	-65°C to +150°C
Voltage on any Pin except $\overline{\text{RESET}}$ with respect to Ground	-0.5V to V_{CC}+0.5V
Voltage on $\overline{\text{RESET}}$ with respect to Ground	-0.5V to +13.0V
Maximum Operating Voltage	6.0V
DC Current per I/O Pin	40.0 mA
DC Current V_{CC} and GND Pins	200.0mA PDIP and 400.0mA TQFP/MLF

*NO

DC Characteristics

Step 7: The controller

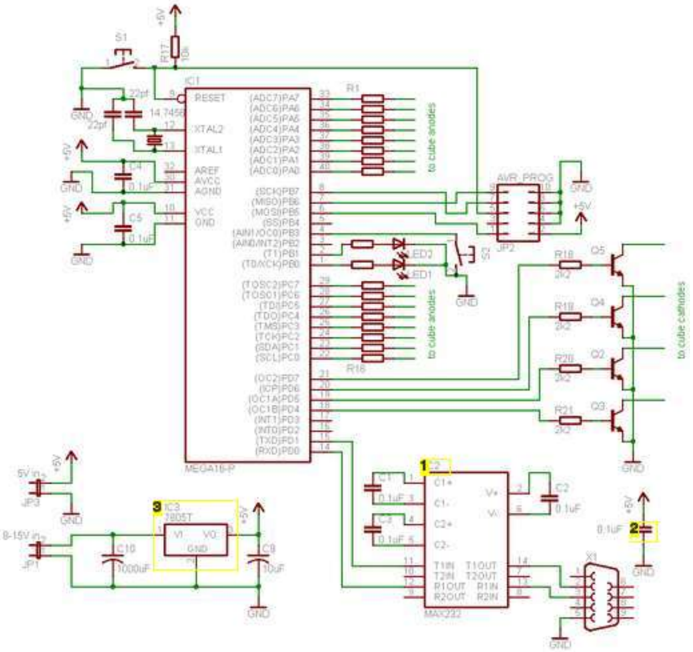
The circuits controlling the led cube is described in the attached schematic image.

The RS-232 interface is optional. and can be omitted. That is IC2 and all the components connected to it. Future firmwares will enable PC communication..

Start by laying out all the components on you circuit board in a layout that enable all the components to connect with a minimal amount of wires. If everything fits, solder the circuit.

I won't give any more instructions on this, as the circuit probably will look very different from cube to cube, depending on the size of the circuit board etc..

Information on how to wire the cube to the controller circuit is in the next step.



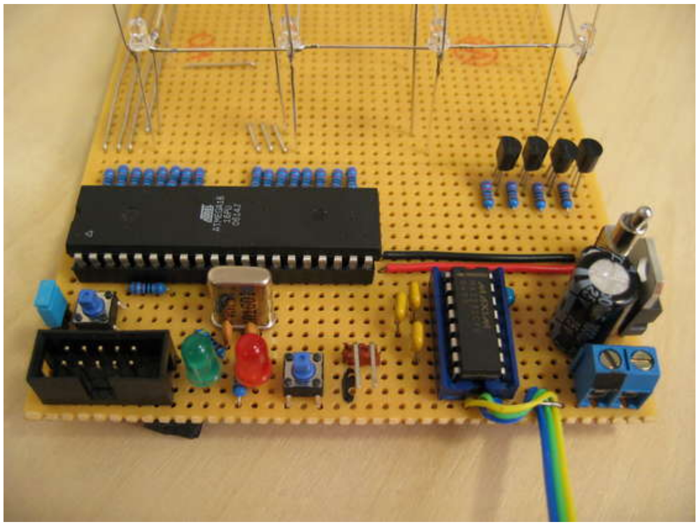
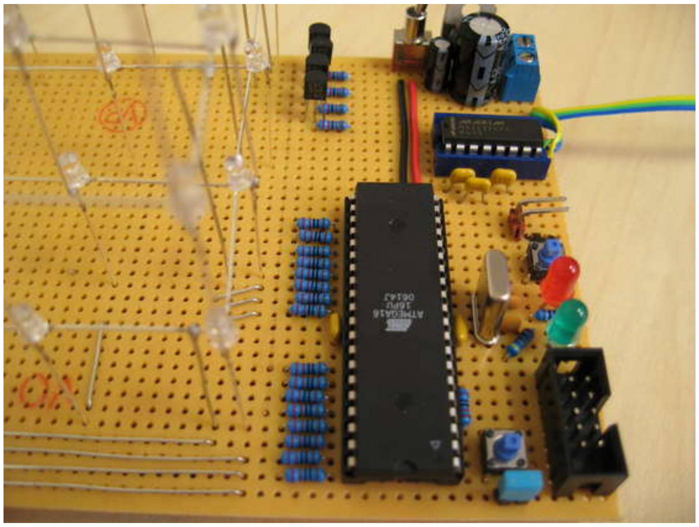
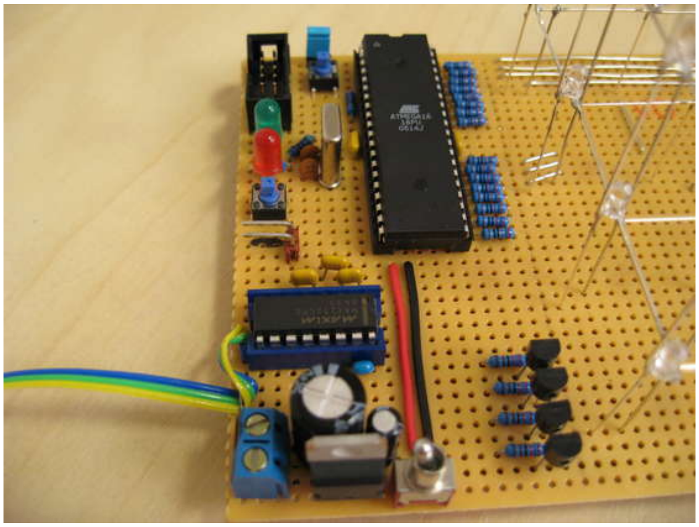
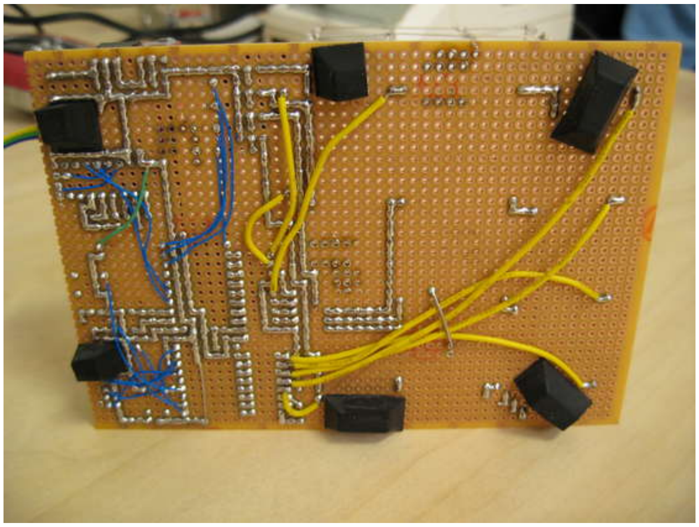


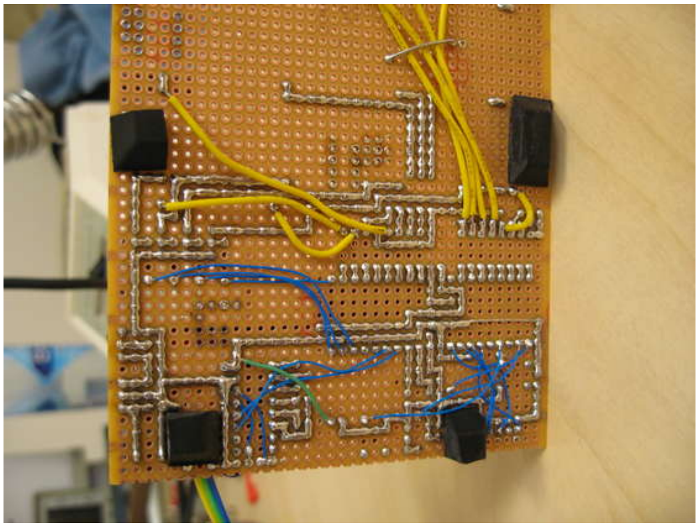
Image Notes
1. Pins 15 and 16 on the MAX232 are used for power. Pin 15: GND, pin 16: VCC.

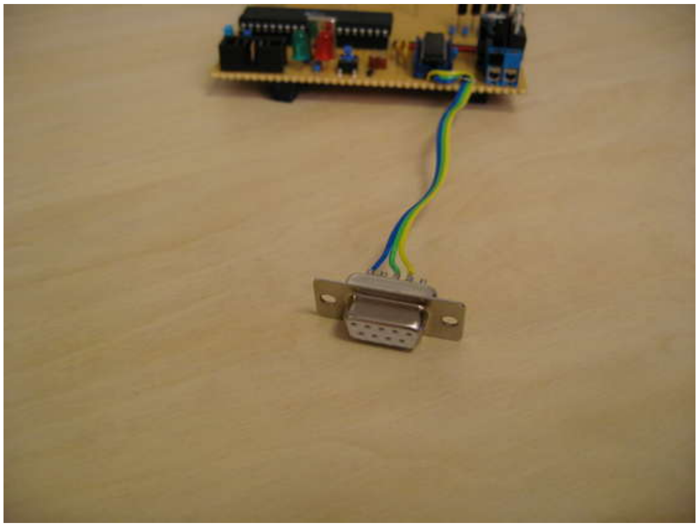
2. This capacitor should be placed as close to the GND and VCC of IC2 as possible. It's job is to stabilize power to that ic.
3. 5V voltage regulator

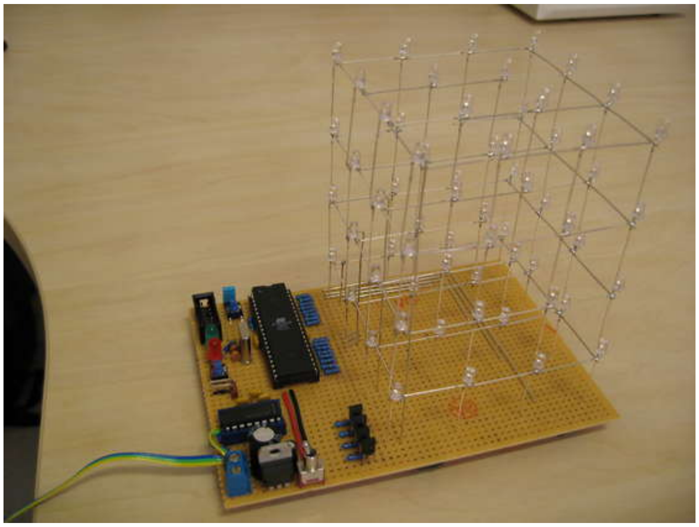












Step 8: Wire up the cube

Pictures explain this better than words. Please see the pictures.

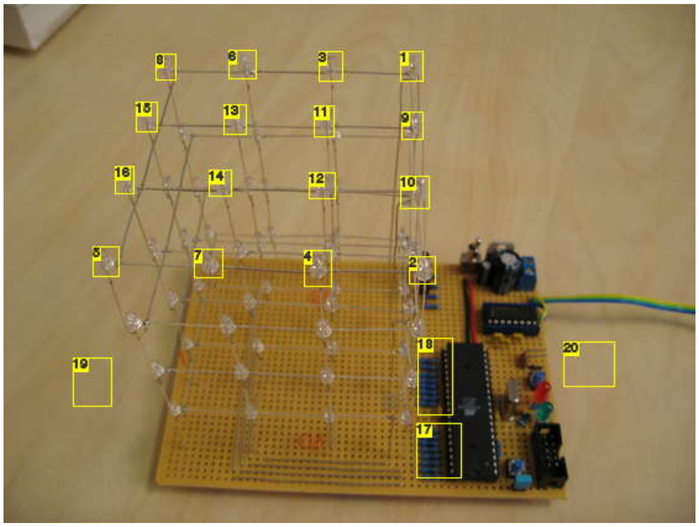


Image Notes
1. C0
2. C3
3. C4
4. C7
5. A7
6. A0
7. A3
8. A4
9. C1
10. C2
11. C5
12. C6
13. A1
14. A2
15. A5
16. A6
17. Port A
18. Port C
19. Front
20. Back

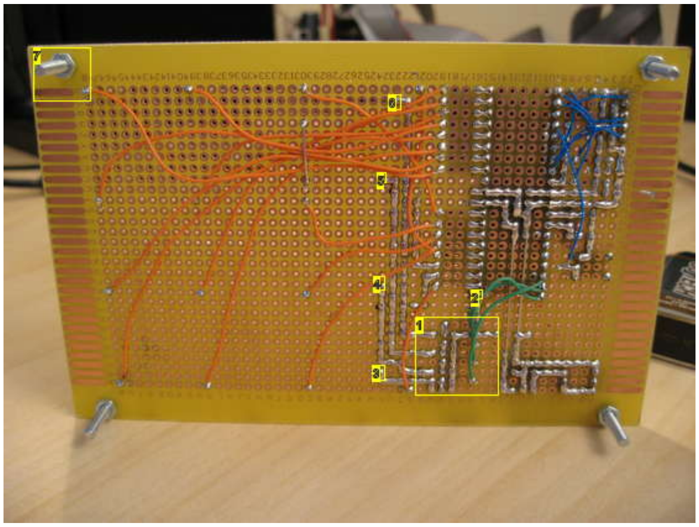


Image Notes
1. Transistor array for ground wires
2. Port D bit 7 controls layer 0
3. Layer 3
4. Layer 2
5. Layer 1
6. Layer 0
7. Yes this is a picture of another cube. I didn't have the original available when writing this.

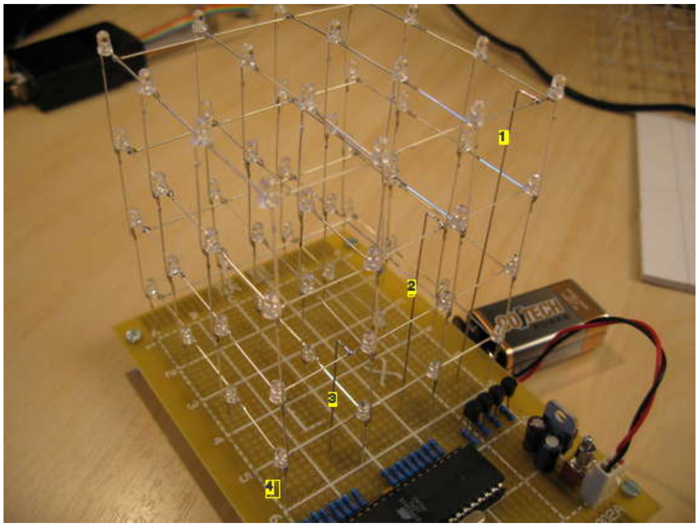


Image Notes
1. Ground for level 3
2. Ground for level 2
3. Ground for level 1
4. Ground for level 0

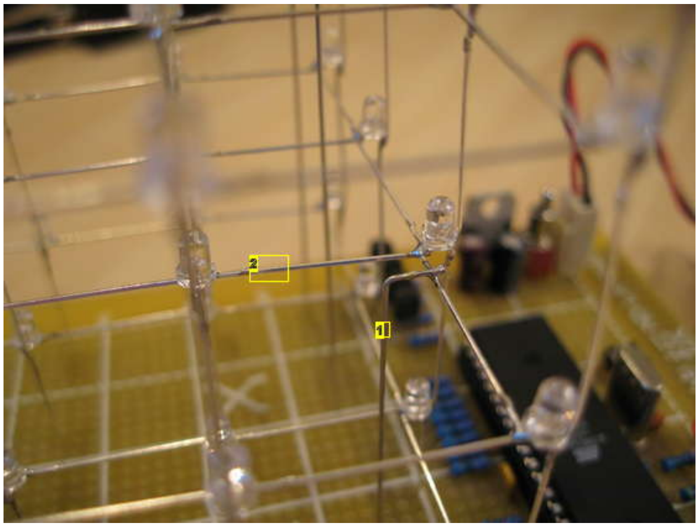


Image Notes
1. Ground wire for level 1
2. All the cathodes on this layer are connected together

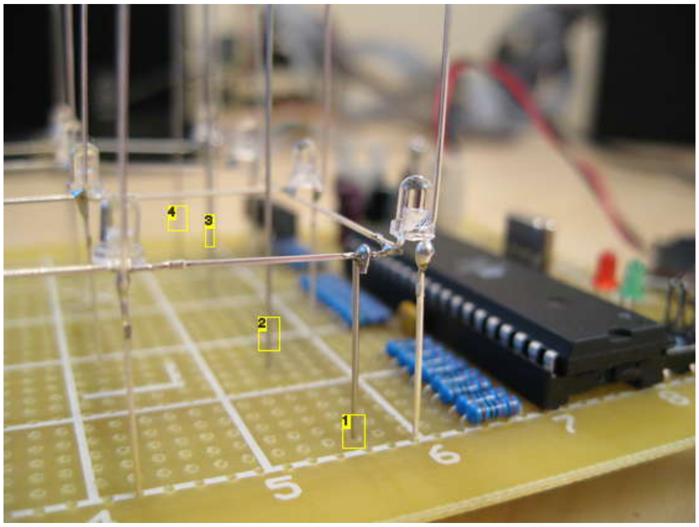


Image Notes
1. Ground for layer 0
2. Layer 1
3. Layer 2
4. Layer 3

Step 9: Compile and program

You now have a led cube. To make use of it, it needs some software.
I have made a driver for rendering a 3d data space on the cube, and functions to display some cool visual effects on the cube.

You can use my code, write your own or build on my code and make more effects.
If you make your own effects, please send me the code. I'm eager to see what you guys make!

To compile the program. Just open a command promt,
enter the directory with the source code
type "make" on the command line.

If you want to use an ATMega32 instead of the ATMega16, just change the mcu setting in the Makefile and recompile (type make). If you use the m32 and don't do this step, the cube won't boot properly (the red and green lights will keep blinking forever).

You should now have a file named main.hex in the source directory.
The next step will show you how to get that code into your cube.

File Downloads

4x4x4_ledcube-0.2.zip (14 KB)
[NOTE: When saving, if you see .tmp as the file ext, rename it to '4x4x4_ledcube-0.2.zip']

4x4x4_ledcube.hex (19 KB)
[NOTE: When saving, if you see .tmp as the file ext, rename it to '4x4x4_ledcube.hex']

Step 10: Program the microcontroller

If you are experiencing problems with speed and/or some LEDs not lighting up. Please read this step carefully.

To program the microcontroller, I use avrdude and the USBTinyISP programmer.

- http://savannah.nongnu.org/projects/avrdude/
- http://www.ladyada.net/make/usbtinyisp/
- http://www.adafruit.com/index.php?main_page=index&cPath=16

My examples will be on an Ubuntu Linux system. The procedure should be pretty much identical on Windows, but I can't help you with that. If you use another programmer, read thet manual for that programmer and avrdude.

First off, Let's just see if we can make contact with the AVR.

Connect the programmer to your cube and your computer.

The command is "avrdude -c usbtiny -p m16", wherer -c specifies the programmer, and -p the AVR model. You can see the output in the images below.

Now, upload the firmware: "avrdude -c usbtiny -p m16 -U flash:w:main.hex".

By now, the cube should reboot and start doing stuff. It will be running at 1mhz (very slowly) using it's internal oscillator. And some of the leds won't work, because some GPIO ports are used for JTAG by default.

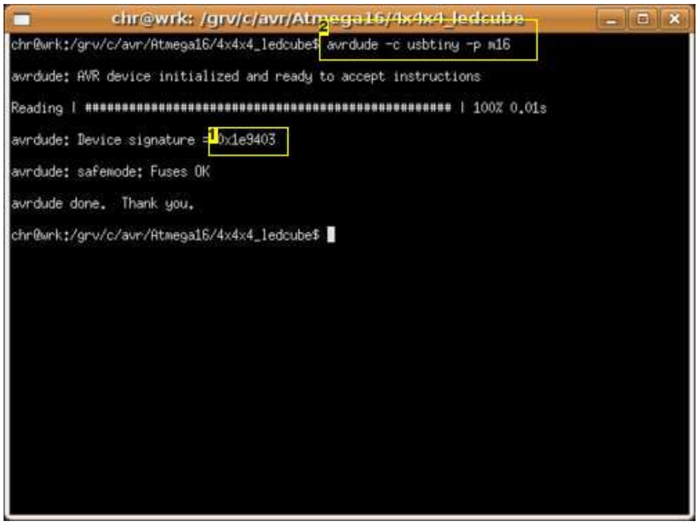
To enable the external oscillator and disable JTAG, we need to program the fuse bytes:
run "avrdude -c usbtiny -p m16 -U lfuse:w:0xef:m"

and "avrdude -c usbtiny -p m16 -U hfuse:w:0xc9:m".

Be carefull when doing this step! If you get it wrong, you can permanently destroy your microcontroller! If you are using another microcontroller than the ATMega16, be sure to read the datasheet carefully before changing the fuse bytes!

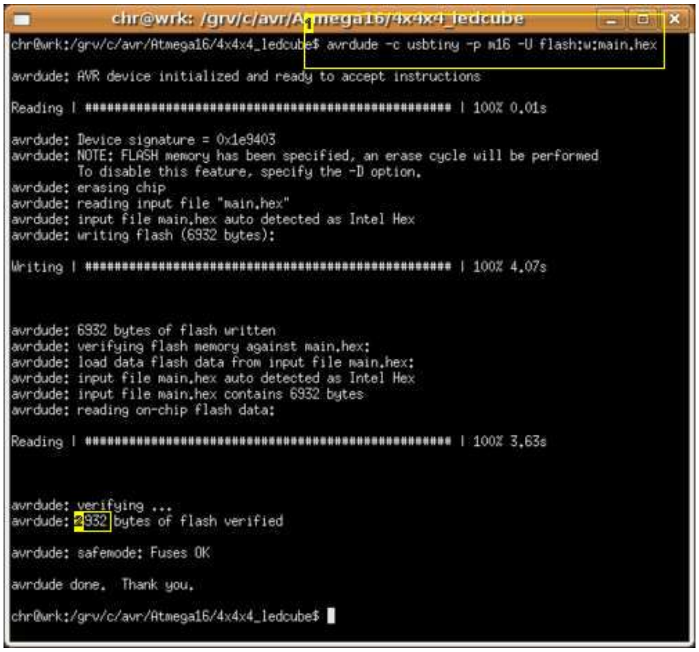
After writing the correct fuse bytes, the cube should reboot and start operating at regular speed with all leds operational.

Enjoy your new cube :D



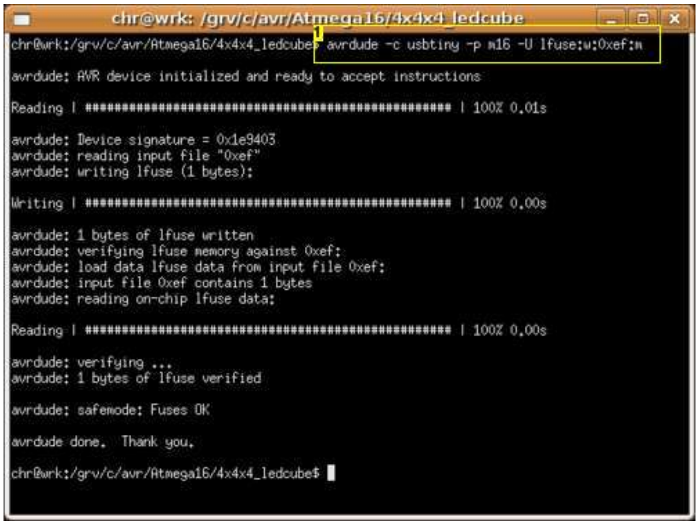
```
chr@wrk:/grv/c/avr/Atmega16/4x4x4_ledcube$ avrdude -c usbtiny -p m16

avrdude: AVR device initialized and ready to accept instructions

Reading | ################################################## | 100% 0.01s

avrdude: Device signature = 0x1e9403

avrdude: safemode: Fuses OK

avrdude done.  Thank you.

chr@wrk:/grv/c/avr/Atmega16/4x4x4_ledcube$
```

Image Notes
1. Success
2. Check if programmer and uC can communicate



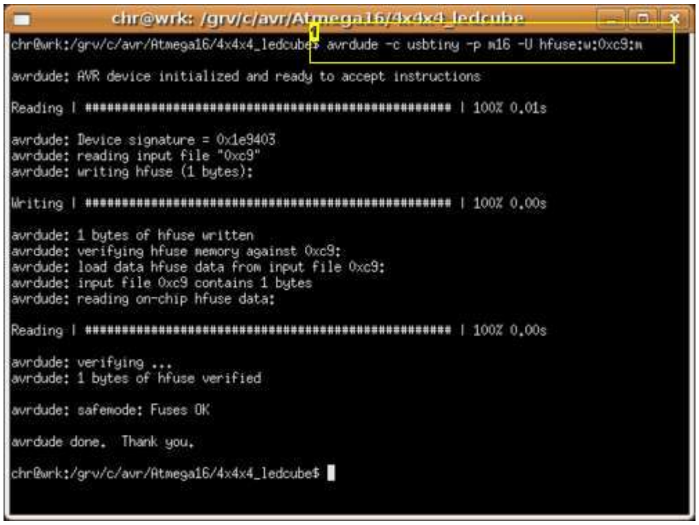
```
chr@wrk:/grv/c/avr/Atmega16/4x4x4_ledcube$ avrdude -c usbtiny -p m16 -U flash:w:main.hex

avrdude: AVR device initialized and ready to accept instructions

Reading | ################################################## | 100% 0.01s

avrdude: Device signature = 0x1e9403
avrdude: NOTE: FLASH memory has been specified, an erase cycle will be performed
         To disable this feature, specify the -D option.
avrdude: erasing chip
avrdude: reading input file "main.hex"
avrdude: input file main.hex auto detected as Intel Hex
avrdude: writing flash (6932 bytes):

Writing | ################################################## | 100% 4.07s



avrdude: 6932 bytes of flash written
avrdude: verifying flash memory against main.hex:
avrdude: load data flash data from input file main.hex:
avrdude: input file main.hex auto detected as Intel Hex
avrdude: input file main.hex contains 6932 bytes
avrdude: reading on-chip flash data:

Reading | ################################################## | 100% 3.63s



avrdude: verifying ...
avrdude: 6932 bytes of flash verified

avrdude: safemode: Fuses OK

avrdude done.  Thank you.

chr@wrk:/grv/c/avr/Atmega16/4x4x4_ledcube$
```

Image Notes
1. Write firmware If you downloaded the file 4x4x4_ledcube.hex, it should be -U flash:w:4x4x4_ledcube.hex
2. 9KB to spare! You have lot's of space to write new effects or store animations.



```
chr@wrk:/grv/c/avr/Atmega16/4x4x4_ledcube$ avrdude -c usbtiny -p m16 -U lfuse:w:0xef:m

avrdude: AVR device initialized and ready to accept instructions

Reading | ################################################## | 100% 0.01s

avrdude: Device signature = 0x1e9403
avrdude: reading input file "0xef"
avrdude: writing lfuse (1 bytes):

Writing | ################################################## | 100% 0.00s

avrdude: 1 bytes of lfuse written
avrdude: verifying lfuse memory against 0xef:
avrdude: load data lfuse data from input file 0xef:
avrdude: input file 0xef contains 1 bytes
avrdude: reading on-chip lfuse data:

Reading | ################################################## | 100% 0.00s

avrdude: verifying ...
avrdude: 1 bytes of lfuse verified

avrdude: safemode: Fuses OK

avrdude done.  Thank you.

chr@wrk:/grv/c/avr/Atmega16/4x4x4_ledcube$
```

Image Notes
1. Write lower fuse bits



```
chr@wrk:/grv/c/avr/Atmega16/4x4x4_ledcube$ avrdude -c usbtiny -p m16 -U hfuse:w:0xc9:m

avrdude: AVR device initialized and ready to accept instructions

Reading | ################################################## | 100% 0.01s

avrdude: Device signature = 0x1e9403
avrdude: reading input file "0xc9"
avrdude: writing hfuse (1 bytes):

Writing | ################################################## | 100% 0.00s

avrdude: 1 bytes of hfuse written
avrdude: verifying hfuse memory against 0xc9:
avrdude: load data hfuse data from input file 0xc9:
avrdude: input file 0xc9 contains 1 bytes
avrdude: reading on-chip hfuse data:

Reading | ################################################## | 100% 0.00s

avrdude: verifying ...
avrdude: 1 bytes of hfuse verified

avrdude: safemode: Fuses OK

avrdude done.  Thank you.

chr@wrk:/grv/c/avr/Atmega16/4x4x4_ledcube$
```

Image Notes
1. Write higher fuse bits

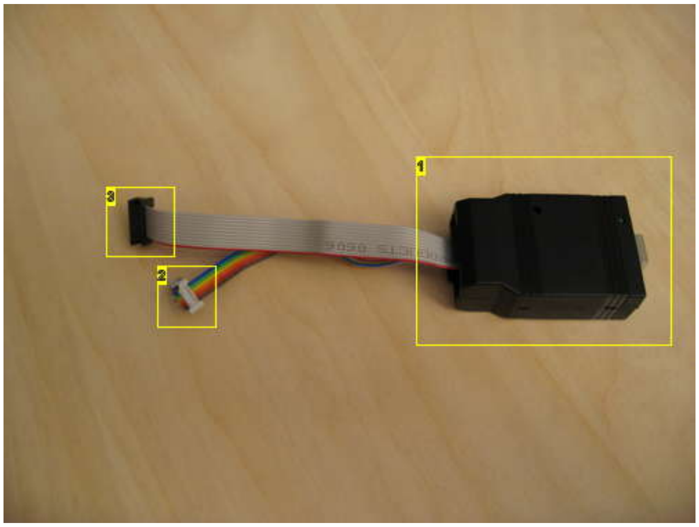


Image Notes
1. USBTinyISP
2. 6pin cable
3. 10pin cable. This cable has one GND lead for each data lead, making it more stable.

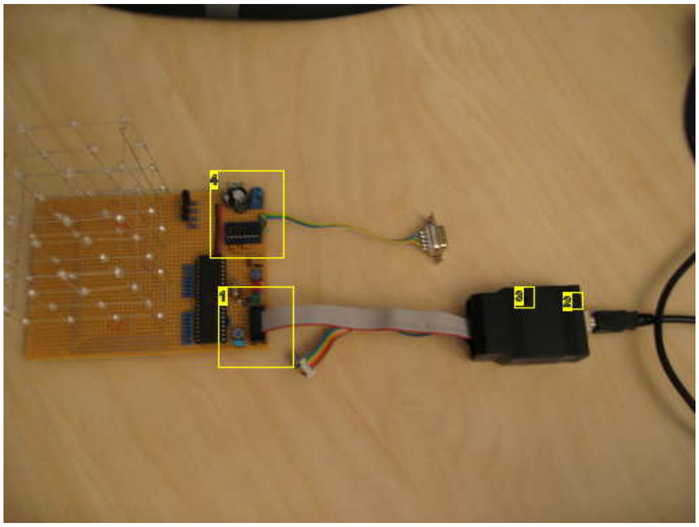


Image Notes
1. USBTinyISP connected to the cube
2. Green lights comes on when connected to the USB port
3. Red light comes on when programming
4. No need to connect to external power. The USBTinyISP supplies the cube with 5V via the ISP cable.

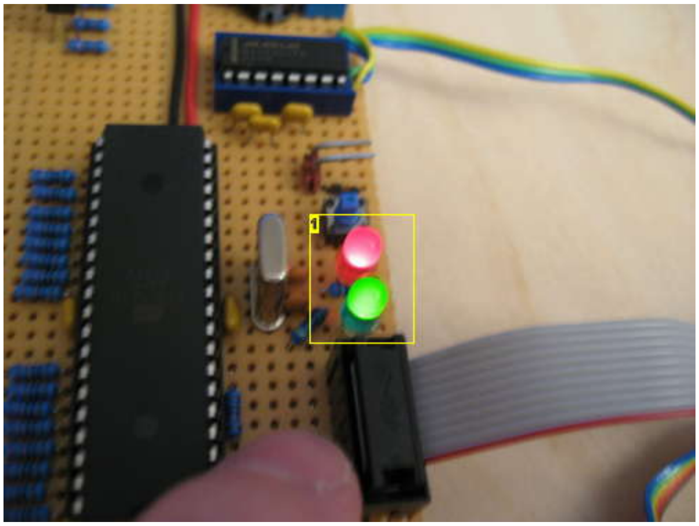


Image Notes
1. When the cube boots up, it flashes the red and green status leds a couple of times. If the leds doesn't do anything else than flasing it's status leds, you have probably flashed it with the wrong firmware. I flashed an m32 with firmware for an m16 once, and got this problem.

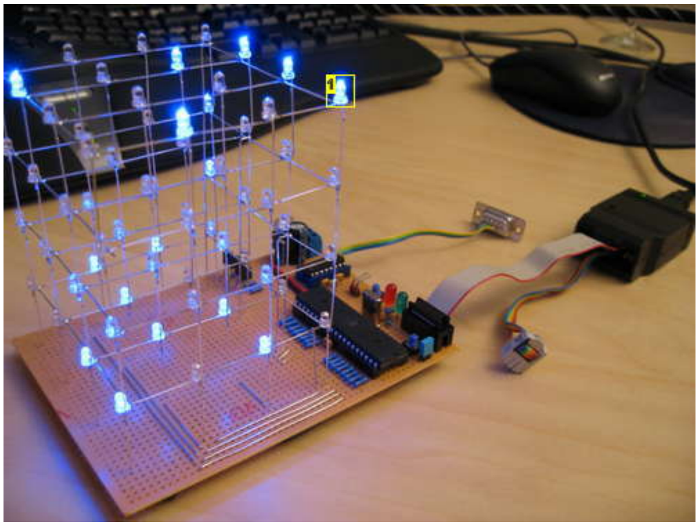


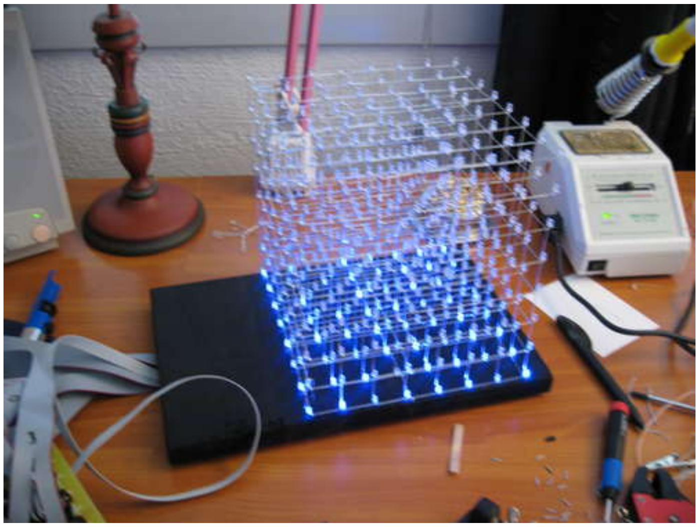
Image Notes
1. It works!

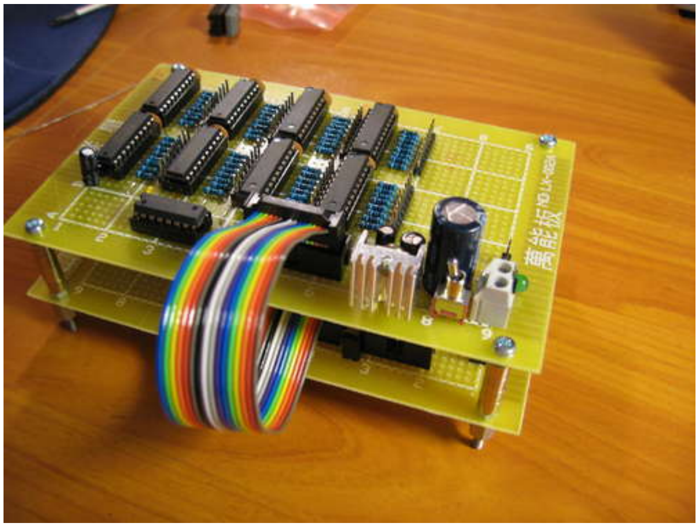
Step 11: Go large - 8x8x8

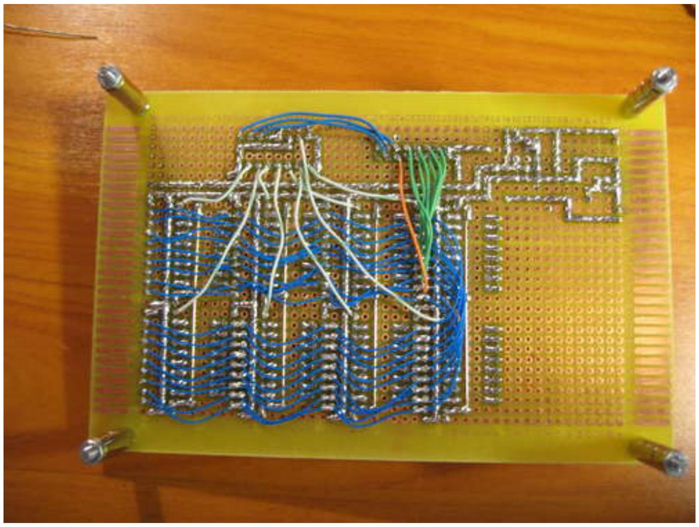
After making this quite fancy 4x4x4 cube, I have also made an enormous 8x8x8 cube. I'll make an instructable for that one when I have time. Meanwhile, see pictures :-)

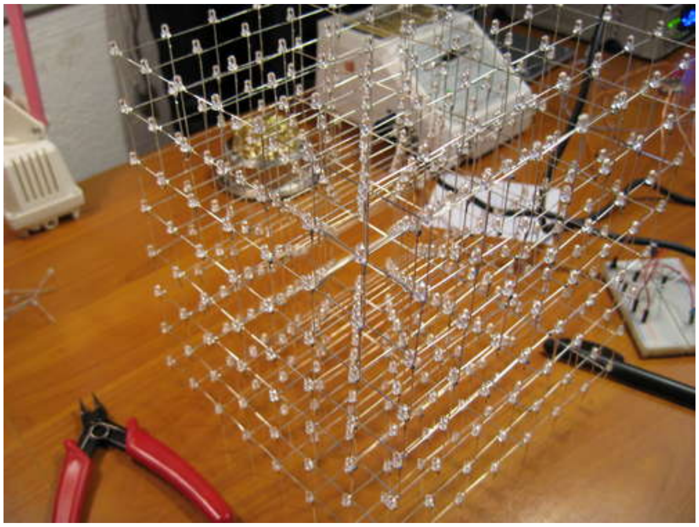
You can find the 8x8x8 version here: http://www.instructables.com/id/Led-Cube-8x8x8/

Please rate this instructable if you like it! :)

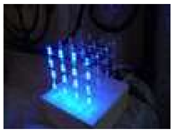






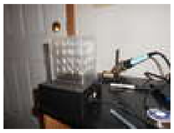


Related Instructables



Led Cube 4x4x4 (video) by bajgik

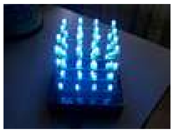
Beginner's Guide - AVR Programming by cl97



Arduino 4x4x4 LED Cube by Phogie7

3D LED Cube by ScitechWA

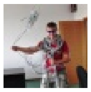
Portal "Still Alive" on AVR microcontrollers by Vladmakesstuff



DIY Funky Nightlight: The 4x4x4 LED Cube by Analogue-Chick

Comments

50 comments **Add Comment** **view all 609 comments**



andrisarkameru says: Dec 11, 2011. 10:44 PM **REPLY**

Hi.
This is an awsome instructable.

I was wondering is it possible to do the same with Arduino chip instead of atmega16? There would be needed a change of code, but as far as I understand it, I would need only to reprogram the part where you give the chip a write command. And probably a bit different resistor values for the leds (since arduino has different max output)

Am I right? Thanks in advance.
P.s. I'm a beginner waiting for it's first Arduiono set to arrive.

cool_jr says: Dec 9, 2011. 10:02 AM **REPLY**

Can the 7805t be substituted with a different voltage regulator (any equivalents that will work)??

albinvadakkekara says: Nov 21, 2011. 5:52 AM **REPLY**

is there any substitution for the Bc 338 transistor?

niksydaz says: Dec 9, 2011. 9:55 AM **REPLY**

bc337 works and did u get the c code right?? i couldn't build it through avrstudio plz help

BBM2 says: Dec 1, 2011. 10:25 AM **REPLY**

We used BC337.
As the Author stated pretty much any NPN rated at or above 250mA will do.

niksydaz says: Dec 9, 2011. 7:57 AM **REPLY**

hi this is a nice project ,,,,but i get some errors in c code while building them..some errors are
1...../effect.c:42: error: 'spinning_line' undeclared (first use in this function)
2..../effect.c:412: error: expected ')' before 'iterations'
there are total of 6 errors at the building time...

hoodkicks says: Dec 8, 2011. 5:04 PM **REPLY**

Quote:
MCUCSR l=(1<MCUCSR l=(1<
If using the Main.c file Make sure to add the following code before your while(1) loop otherwise port c2, c3, c4, and c5 wont light up

magicthegathering says: Sep 5, 2011. 2:44 AM **REPLY**

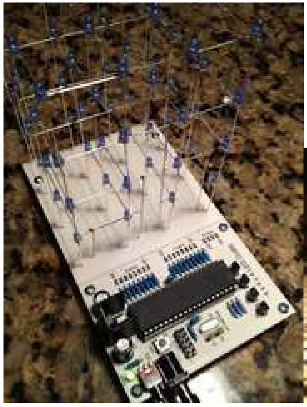
I really appreciate this indestructible. I have never put together an electronics project but would really love to start learning now. I am having trouble understanding the schematic and was wondering where a good place to start is? I know it might be funny attempting to build this with no knowledge, but I have to start somewhere. Any help would be much appreciated.

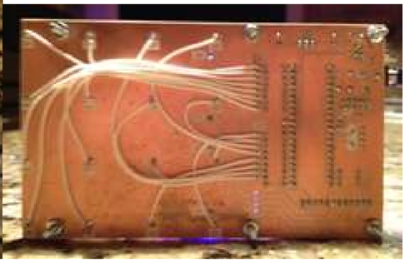
Nitemare says: Dec 1, 2011. 9:57 AM **REPLY**

start out with something small, maybe a 3 by 3 array so you can understand the basics. then try with some basic soldering, you'll need a lot of practice before you can get the cube going, and it will help to know what you're doing if you want your cube to come out clean.

BBM2 says: Nov 27, 2011. 11:18 AM **REPLY**

Excellent Instructable. Very well documented.
Here is our first try. We made our own PCB rather than using perf-board.
We are now building an 8x8x8 cube with home made PCB's as well.
Thanks chr!





Paulogp says: Nov 22, 2011. 12:54 PM **REPLY**

Boa Noite,
É assim eu estou a estudar em Portugal e tou a acabar o meu curso, mas falta-me um projecto e o meu professor aconselhou-me este. Mas o problema é que não consigo associar para Pro e fazer o download do PDF?
Ajudem-me por favor!!!

ksowden says: Nov 13, 2011. 1:00 PM **REPLY**

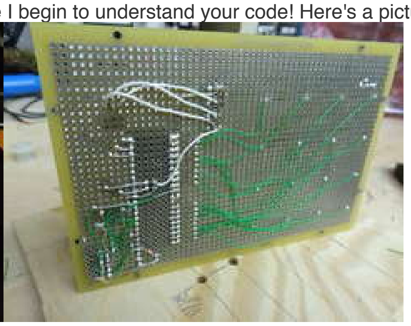
OK so i just built this and enabled the external crystal and disabled jtag and downloaded the 4x4x4 hex file to my atmega164p and only 2 leds light up in the cube and they just stay a solid blue, and also the red and green lights don't light up or blink, i can not seem to figure out whats wrong, any help is appreciated.

oldsmarracin says: Nov 13, 2011. 7:32 AM **REPLY**

awesome instructable i just need help on one thing. is 220ohm good for these leds?
- RoHS : Yes
Life Rating : 100,000 Hours
Emitted Colour : Blue
Size (mm) : 5mm
Lens Colour : Water clear
Peak Wave Length (nm) : 460 ~ 470
Forward Voltage (V) : 3.0 ~ 3.4
Reverse Current (uA) : <= 30
Luminous Intensity Typ Iv (mcd) : 6000(Typical) ~ 8000(Max)
Viewing Angle : 20~25 Degree
Max Power Dissipation(PM): 80mW
Max Peak Forward Current(IFP): 75mA
Lead Soldering Temperature : 240 Degree (<5Sec)
Operating Temperature Range : -25 ~ +85 Degree
Preservative Temperature Range : -30 ~ +100 Degree

mortaldoom780 says: Nov 3, 2011. 12:19 AM **REPLY**

Very nice instructable! I decided to make one of these, and it turned out pretty nice! The software you've written is pretty neat; hopefully I can start developing my own patterns for it soon once I begin to understand your code! Here's a picture of the finished product:



mortaldoom780 says: Nov 3, 2011. 12:22 AM **REPLY**

It looks like I just fried the 2N4401 transistors I was using though...not sure how...?

mateuszrjzr says: Oct 20, 2011. 1:55 PM **REPLY**

hello
I know, that last post was in 2008, but can you explain me why when i'm klicking "4x4x4_ledcube.hex" suddenly i am downloading something like : F6JRI6AFJ1I6CP0.tmp???? please so much help me...

Roshan25 says: Oct 25, 2011. 12:51 AM **REPLY**

you need to rename int to 4x4x4_ledcube.hex

cool55tcars says: Oct 17, 2011. 9:40 PM **REPLY**

what is the blue jumper pin used for that is by the switch and ribbon cable connector???

chempie says: Oct 18, 2011. 2:29 PM **REPLY**

I think that it is an alternate power connector for the circuit. I think that you can use that or the 8-15V connector. The 8-15 power connector would probably be better as it will regulate the voltage on the board.

JozefBachan says: Oct 6, 2011. 12:20 PM **REPLY**

Please, if someone have PDF of this please, contact me.

jeo2121 says: Oct 16, 2011. 10:40 PM **REPLY**

my Email 447810166@qq.com,I have

cvcity says: Oct 11, 2011. 5:16 AM **REPLY**

Hey, can you help me, i need some schematic with pic16f628a to make a project to school. Help me please

00bunge00 says: Oct 7, 2011. 3:39 AM **REPLY**

Did you have to build the TinyASP?

valdis034 says: Oct 6, 2011. 9:12 AM **REPLY**

could you tell what viewing angle and how much mcd has your leds. I am asking because i am afraid that they can be too bright.

00bunge00 says: Sep 16, 2011. 3:59 AM **REPLY**

Im making this for an electrical college project, and am researching different types of LEDs. Has anyone tried using "superbright" LEDs? if so, does it make much of a difference? thanks

these are the LEDs in question: http://www.rapidonline.com/Electronic-Components/Superbright-10mm-LED-64871/?sid=90d51b1d-a731-4a78-bf1e-b26e2495ab34

cbaabc73 says: Sep 12, 2011. 1:52 AM **REPLY**

Want to say thanks for a great instructable! With a little research and some tinkering I was able to build this on the first try. Still don't quiet get the c code so right now just running the default hex code but it still a bunch of fun. Thanks again for the great instructable! now for the 8x8x8... maybe. P.S. Sorry for the poor picture quality

brainbeat2010 says: Aug 28, 2011. 11:30 AM **REPLY**

Can someone help me, if I put the AVR into the socket i become a short circuit.
without avr the circuit is okay. What is wrong?

brainbeat2010 says: Aug 30, 2011. 11:17 AM **REPLY**

problem solved pin 30+31 switched!
My Cube is running!
Is there an solution to run this cube with winamp plugin?

4uguyzz.in says: Aug 28, 2011. 9:29 PM **REPLY**

thank you for the project

is that possible to display letters instead of these animations if it is possible send the code to display alphanumeric display with the ascii code i think it will be more beautifull

EpTheModder says: Aug 20, 2011. 5:27 AM **REPLY**

The store where I'm buying the components doesn't have any 14.????? MHz crystals, so can I use a 15,0575MHz crystal?

refuser says: Nov 22, 2008. 3:09 PM **REPLY**

Amazing instructable man! I really like this one and I have to build it once I finish with my led-pov. Thanks for this one. /Einar

chr says: Nov 22, 2008. 3:14 PM **REPLY**

Thanks. POV stuff is cool :D Here is one I made some months ago.

ssilva7 says: Aug 15, 2011. 11:36 PM **REPLY**

pls send me this circuit

smnoor88 says: Aug 13, 2011. 5:50 AM **REPLY**

hi can u plzz give me full details of this pov stuff i am very thank full to u

Splortched says: Dec 26, 2009. 3:11 PM **REPLY**

Oh my god that is AWESOME!

maxpower49 says: Nov 15, 2009. 2:13 PM **REPLY**

I'm sure your were expecting this but how did you make that

Pachim says: Nov 5, 2009. 8:00 AM **REPLY**

Hello, i'm new here, but i'm interest about doing a 4*4*4 cube.... already in process... can i get your email so ask some questions about it...

mine is deborah1002@hotmail.com

Thanks,

Pachim

refuser says: Nov 23, 2008. 1:25 AM **REPLY**

I had one that I could manually move but now I'd like to make something a little more advanced so I'm going with a motor driven one.
The thing that I am struggling with is to make a better output driver than I had. On the old one I just hard coded everything into the chip. With this I'd like to be able to send strings and patterns to it wirelessly somehow, but I'm not that good of a programmer yet so I'm working on that now =)

mechbot says: Mar 19, 2011. 9:24 AM **REPLY**

step 4 picture 4

quote "since we bent all the cathodes in the same direction, there will be one sticking out to the side. just leave it for now"

i can't seem to find what you did with that cathode that sticks out, it isnt explained in the steps what to do with it later, can you tell me what you did with it?

shredape says: Aug 11, 2011. 2:16 PM **REPLY**

It's used for testing but is not all that necessary. It's used as an extension for a ground wire to hang off of but there's no real reason for it since you can do the same testings with any other position on the layer. Keep it for now, but cut it off when you're all finished.

runewake2 says: May 21, 2011. 10:33 AM **REPLY**

That cathode is used in conjunction with the active anodes. When this and your anodes are active it causes that layer to light. This allows you to light each layer individually.

I think.

Lionverse says: Aug 9, 2011. 11:01 AM **REPLY**

Awesome instructable! I have been looking to build a led cube and yours is the best I have come arcoss - very well put together with thorough instructions. I saw you had ported your 8x8x8 to run off arduino have you thought of doing an instructable on this cube with arduino for newbies like me that are not yey ready to loose the arduino safety net. I'm sure I am not the only one who would appreciate it!
Thanks

npatankar says: Aug 1, 2011. 9:50 PM **REPLY**

hello frnds....i m very new to microcontroller programming....cn sm1 tell me how to program atmega16..which compiler to use...the rs232 connection shown in the circuit.....using tht programming of microcontroller hs to b done?
plz mail me step by step procedure to make it....on my mail id nikhil.patankar390@gmail.com

thanku..............its a awesum project..........i want to make it

shredape says: Jul 30, 2011. 1:04 PM **REPLY**

What is the point of JP1 and JP3?

shredape says: Jul 30, 2011. 2:13 PM **REPLY**

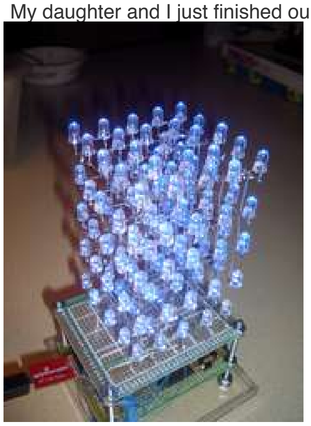
And how are your powering the cube?

4uguyzz.in says: Jul 30, 2011. 1:27 PM **REPLY**

HELLO MY CUBE IS NOT WORKING WHAT MAY BE THE PROBLEM

maewert says: Dec 9, 2010. 7:34 PM **REPLY**

My daughter and I just finished our 5x5x5 cube:



Eric Dugas says: Jul 28, 2011. 5:53 PM **REPLY**

this is so awesome now please tell me your code that your dauther and you bilt

maewert says: Jul 29, 2011. 6:27 AM **REPLY**

I post the code as-is. It isn't pretty code :-(

It does have some elements you may find usefull. I use a timer-based interrupt to do the scanning since even small differences in the scan rate will be seen as one row brighter than the others, etc.

I define routines to easily allow the coder to inspect and set any LED using an x, y, z coordinate system (such as set_on(x,y,z)).

Best Wishes

chris_cube_demo.pde10 KB

emihackr97 says: Dec 10, 2010. 8:39 AM **REPLY**

How did you make that, did you use a normal Arduino or an Arduino Mega??

view all 609 comments