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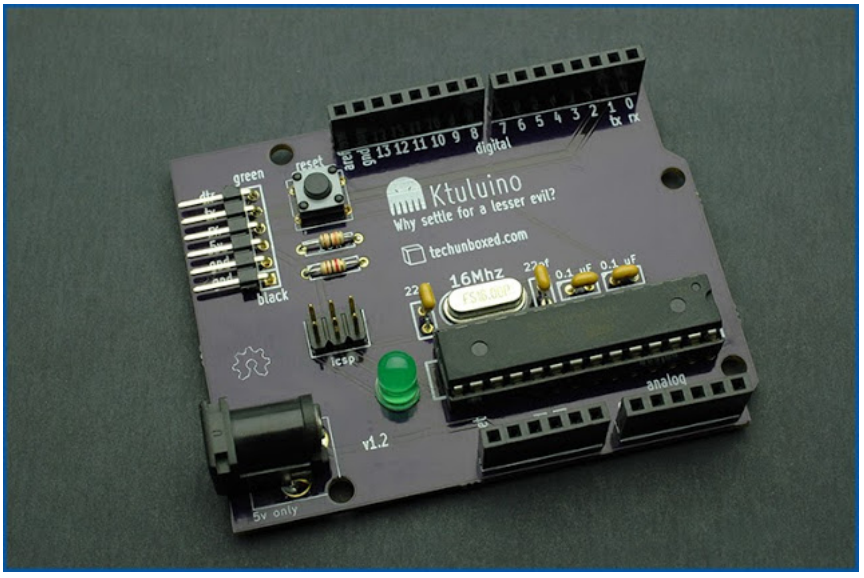
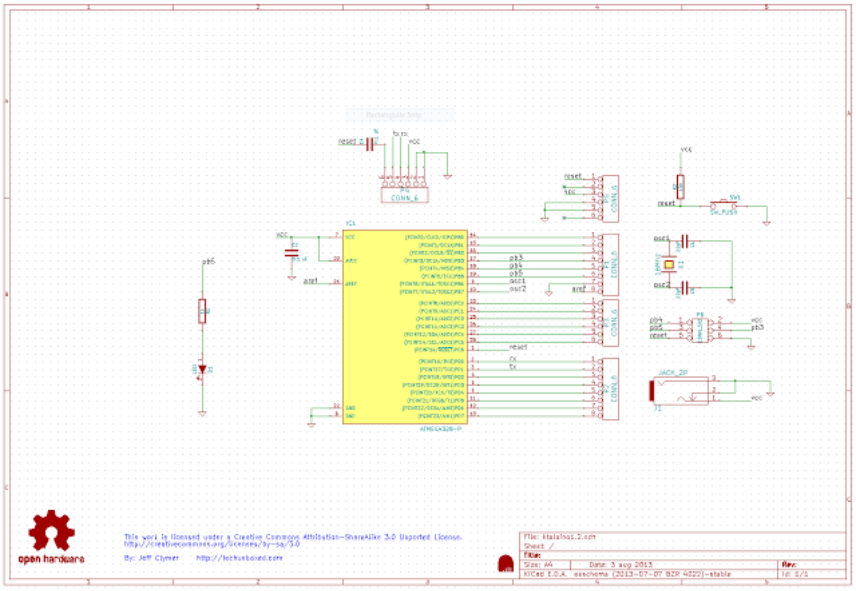
Saturday, August 31, 2013

Ktuluino - How to Build Your Own Arduino Clone



Arduino clones are ubiquitous. A quick web search or a look at any electronics hobbyist website will turn up some kind of Arduino-like microcontroller board. Studies have shown that the absolute last thing the world needs is another Arduino clone that adds nothing or very little to existing designs. One might surmise that these are the exact reasons why someone should never design another Arduino clone, yet here is Ktuluino.

There's nothing original or particularly compelling about the Ktuluino. The name even has "ino" added to the end which has become so overused that it's often painful and cringe inducing. With seemingly everything going against it, why would someone make something like this? The answer is… this board was an exercise in PCB design. I need stuff to practice on, and although there's nothing revolutionary about this board, it is practical. Who can't use another Arduino, or three?



There are some good things about the Ktuluino. It's relatively inexpensive, easy to build, compatible with tons of Arduino shields, and it has a Great Old One silk-screened on the board. If you need a few really cool Arduinos, you can order the boards from OSH Park, or download the Gerbers from Github and have boards made. For build instructions and a bill of materials see below. If you want to design your own Arduino clone, see the Ktuluino schematic and search the web. There's a ton of information and open source designs out there.

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Build Instructions

There's not much to building a Ktuluino. All the component locations are printed on the board. Only the ATMEGA328 and the LED need to be oriented properly. Make certain that the notch in the IC and the socket match up with the notch depicted on the board. For the LED, make sure the flat part of the LED lines up with the flat edge of the LED circle on the board.

The 28-pin DIP socket, 5.5mm x 2.1mm power jack, ICSP header, and female headers can all be omitted to cut costs or if your project doesn't need them.

You'll need either to purchase an ATMEGA328-P-PU that is already programmed with a boot loader or program it yourself with something like an Adafruit Standalone AVR ISP Programmer Shield.

Set the board type in the Arduino IDE to Duemilanove to compile and load sketches to the board.

The board can be powered with 5 volts from the FTDI header or the 5.5 x 2.1mm jack not both at the same time.

Tools

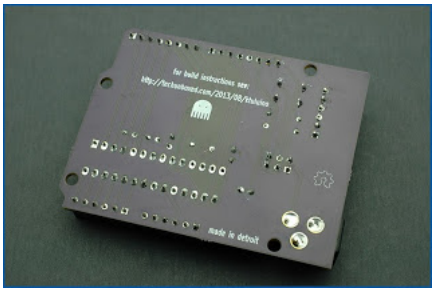
Soldering Iron
Solder (Lead-free solder is harder to work with but less toxic. Choose wisely.)
A Well Ventilated Area or a Fume Extractor
FTDI USB Adaptor or FTDI USB Cable (for connecting Ktuluino to a computer)

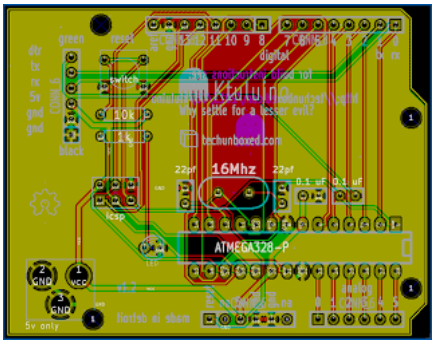
Bill of Materials (for one Ktuluino)

Atmel ATMEGA328P-PU or Adafruit Atmel ATMega328P-PU (pre-programed w/Arduino bootloader)
SPST Push Button
2 x .1 uF Ceramic Capacitor
2 x 22 pF Ceramic Capacitor
16Mhz Crystal Oscillator
Green 5mm LED
10k 5% 1/4 Watt Resistor
1k 5% 1/4 Watt Resistor
0.1" 36-pin Male Header 90 Degree (enough for 6 boards)

Optional

28-pin DIP socket
2 x 8-pin Female Header
2 x 6-pin Female Header
5.5x2.1mm Power Jack
3x2 pin Male Header (ICSP)





Posted by Jeff at 11:16 AM +2 Recommend this on Google

Labels: Arduino, Electronics, Projects, Tech

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Theif Dark September 4, 2013 at 11:12 AM

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I build things like this all the time on a breadboard, it sure would be nice to have one that is compatible with the shields. How much would you sell for a full kit, or everything excluding the MCU?

Reply

Replies

Jeff September 6, 2013 at 10:59 AM

I don't sell Ktuluino kits. You can follow the link in the article to the project on OSH Park and order the circuit boards. Everything else can be purchased from any number of electronics component vendors. The bill of materials contains links to all the components at US retailers.

Reply

hajler September 6, 2013 at 5:24 AM

How about final cost of this project?

Reply

Replies

Jeff September 6, 2013 at 11:25 AM

There's no simple final cost, but they're about $20 a piece for a Ktuluino with OSH Park PCBs.

Unfortunately, the custom PCBs are the most expensive part. It's around $28 for a PCB this size from OSH Park. Whether you want one or two boards, you get three for $28. You may be able to get the boards cheaper from other PCB services, I don't know.

The components cost about $10 per/board. So you can do one for around $38 or three for around $60.

Reply

Chris Miller September 23, 2013 at 2:57 AM

How were you able to use such a nice font in Kicad? Did you import the text as a bitmap (same as the logo)?

Reply

Replies

Chris Miller September 23, 2013 at 3:08 AM

On second glance it seems that it's just the default font after all. Somehow the dimensions and thickness that you used just look extra nice to me.

Anyway, cool writeup :)

Jeff September 23, 2013 at 6:00 AM

You're right Chris. It's the default font.

Reply

Rando February 8, 2014 at 8:04 AM

Are the Kicad project files available? I would like to add some simple sensors, and there's plenty of room...

Reply

burakozen September 1, 2014 at 5:42 AM

After perform the card , do i need just a ftdi cable for programming it ? (of course i use atmega328 with bootloader) :)

Reply

Replies

burakozen September 1, 2014 at 7:28 AM

relpy it yourself :) yes yes , becoz ftdi cable has ft232 its inside .

Jeff September 3, 2014 at 2:39 PM

Yep, you'll need a FTDI cable or a FTDI adapter.

burakozen September 8, 2014 at 4:06 AM

Hey, I wonder these Can ktuluino control servo or stepper motor ?
and what cant it control that which arduino can control ?

Jeff September 12, 2014 at 1:24 PM

The Ktuluino can pretty much do whatever an Arduino Uno can, except the obvious stuff like USB, etc.

Reply

burakozen September 15, 2014 at 7:25 AM

i managed to perform the card and i can control servo, pot, led thank you so much. its working !!!

Reply

Replies

Jeff September 15, 2014 at 10:09 AM

You might be the first person, other than me, that's actually build one of these things. Congratulations and thanks for sharing your experience with us.

Reply

burakozen September 16, 2014 at 5:32 AM

I've just bought a FTDI adapter today.which has FT232RL and 6 outpin of card DTR RX TX 5V CTS GND .. i connect to ktuluino's ftdi pins. it seems work the power goes to ktuluino's led of 13.pin.. but i coulnt manage to upload a programme. i tried all boards on IDE. then i changed to some settings.
Device Manager (in Control Panels > System > Hardware), and find the USB Serial Port under Ports. Right-click and select properties, then go to Port Settings > Advanced and click Set RTS on Close but its not still working. i take this error always 'avrdude: stk500_getsync(): not in sync: resp=0x00'..

Reply

Replies

Jeff September 17, 2014 at 10:14 AM

The IDE needs to be set to Duemilanove. How did you download the program in your previous post. I was under the impression that you were able to some stuff with a servo and an LED.

Reply

Rafi Khan October 21, 2014 at 9:41 PM

Hi I would like to get the boards printed from a different PCB manufacturer but I have no idea what to send them and if I need to modify anything or etc. I have downloaded the files for github but am having trouble understanding how it works.
Thanks
P.S If I wanted a more powerful microcontroller chip how would I implement it in this design?

Reply

Arira Rahma April 27, 2016 at 10:35 PM

Is regulator 7805 necessary?

Reply

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