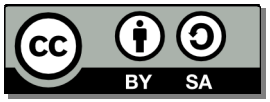
ClockTHREEjr

Assembly Guide and Manual v2.0

C3 jr.

ClockTHREE jr.



Safety Precautions

The assembly of ClockTHREEjr can be dangerous. Lead solder should be handled with care as it is poisonous. Always wash your hands after use.

Soldering irons are hot and can cause a fire if not handled properly. Do not solder around flammable materials.

Always solder in a well ventilated area. We recommend that you use a fume extractor to avoid breathing toxins. It will also prevent loved ones in the vicinity from complaining about your “stinky hobby.”

Never touch the tip of your soldering iron and return the device to its stand when not in use. Do not try to catch a hot soldering iron should you drop it.

Always wear safety glasses when soldering. Solder may splatter as it heats up and we don’t want you losing an eye.

Always wait a few minutes for solder to cool before touching it.

Electricity is dangerous and can cause serious injury or death if not used properly.

Only use the recommended power options within this manual.

Never solder while electricity is applied to the circuit.

Always remove power from the soldering iron when you leave your workspace.

Introduction

Congratulations on your purchase of the ClockTHREEjr kit! We are extremely fortunate to have hobbyists like yourself joining our family! This is a fairly easy project to assemble and you should be able to complete it over a weekend using only basic electronics skills.

Please read through and understand the entire set of instructions before you get started. It could save you hours of rework and much consternation. We've captured all of the mistakes and blunders made in creating and building the prototypes and tried to foresee problems you may have.

Take your time! Enjoy the build process and take a break when you feel fatigued. You will have this clock for years to come so there are no worries if it takes an extra day to build. If you're not sure about something, please ask questions before doing something regretful. We're here to help!

Tips

You should leave the protective film on the front and rear plates until final assembly. The acrylic plates are delicate and the film is there to protect against scratches and smudging. Always place the plates on a soft, clean surface like a towel when handling after the film is removed.

Please be careful when handling the baffles. They are engineered to provide the most light possible to the face so they are thin and somewhat fragile.

Before you solder the IC sockets check that every leg has come through the PCB. Trust us, you don't want to notice a bent pin after soldering the first twenty.

Some components are polarized and must be oriented correctly to ensure a functional clock. Reversing the orientation can also cause catastrophic damage to your clock, and possible injury, when power is applied. Don't worry, though, as the pictures should help you out tremendously.

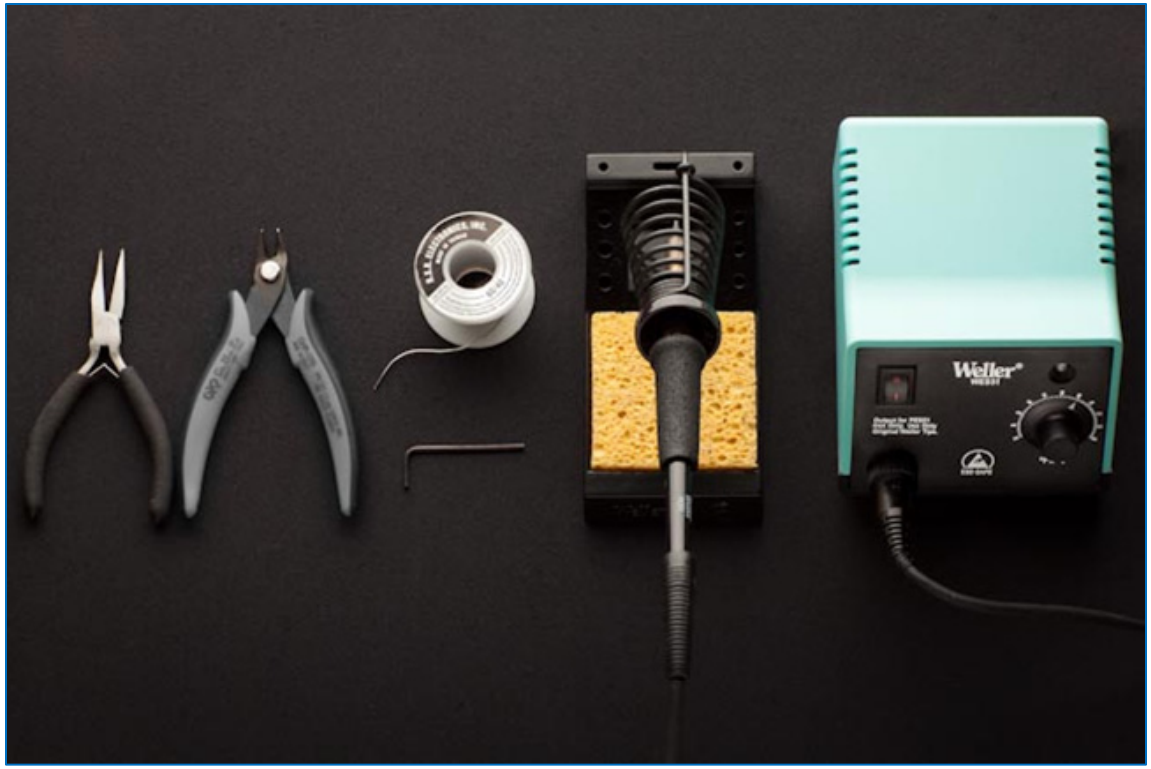
We assume that this is NOT your first soldering project. If it is, we suggest watching some training videos on the internet along with the purchase of a cheap learn-to-solder kit before getting started. A general rule of thumb is to heat the junction for two seconds and then apply a little solder. A little goes a long way and it's easy to add more if needed.

Triple check that your parts are in the correct place with the correct orientation (if applicable). While de-soldering is possible, it is troublesome, time consuming, and risky. Make it a goal that you will not have to de-solder in the course of making this clock.

After each step, evaluate the solder joints from the front and back of the board. On the back, the solder should be shiny and make a volcano shape, as opposed to a dome shape. On the front, you should see that the solder came all the way trough the board. If it doesn't look good, try re-heating the joint until the plated-through-hole sucks up the solder. Strange Fact: Solder is attracted to heat and will move towards it, but gravity will usually prevent you from doing anything too interesting.

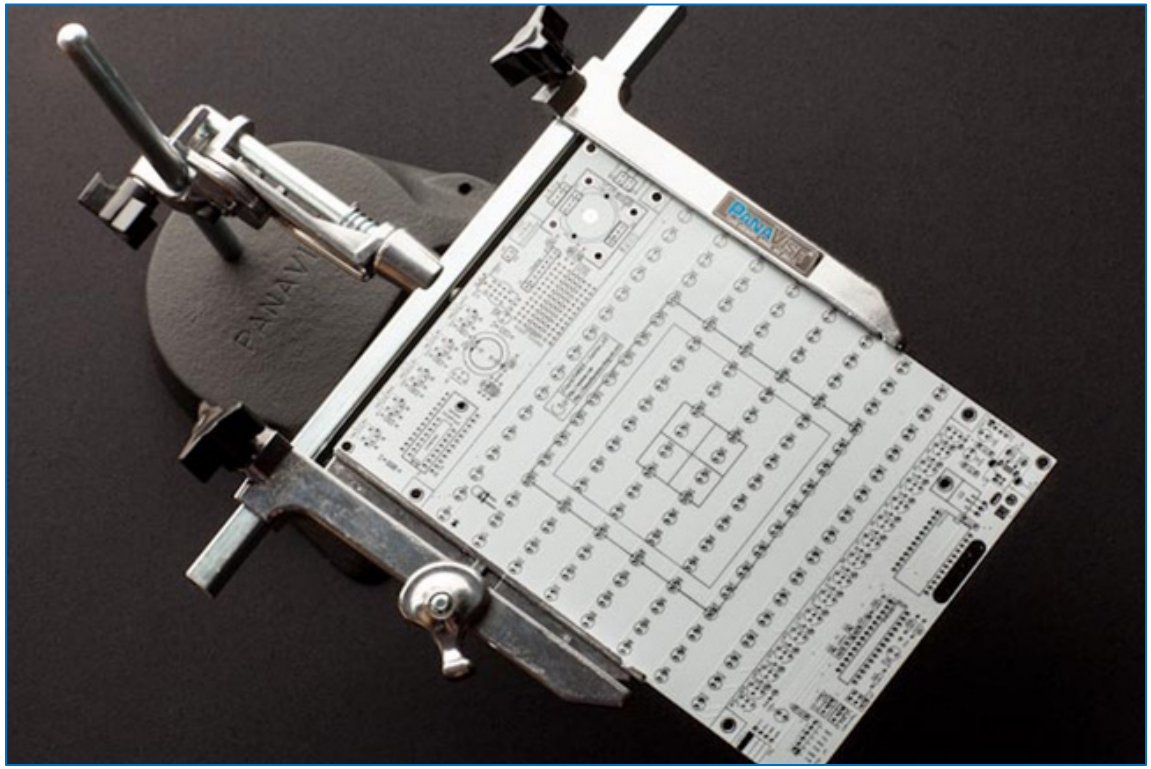
Check that the solder doesn't overlap into the neighboring parts as this will cause a short.

If you do make a mistake, don't panic. Use a solder sucker to remove the solder and pull the piece gingerly while applying heat. If you damage a trace in the process of de-soldering, send a picture of the damaged area and we will help you make the most of the situation. It may be possible to solder a piece of wire around the damage.



Required Tools

1. Needle Nose Pliers
2. Flush or Diagonal Cutters
3. Either 60/40 or 63/37 Rosin Core Lead Solder - .031" Diameter
4. Allen Wrench supplied with Kit
5. Quality Soldering Iron with regular and extra sharp tips



Optional Tools

6. A PanaVise Circuit Board Holder, or similar device, will make your life infinitely easier.

Kit Inventory

BT1 & BATTERY

Battery socket and LR2032 Coin Battery

3003K-ND & P189-ND

C1,C2,C8

100µF Capacitors (x3)

P833-ND

C3-7, C9-10

0.1µF Capacitors (x7)

399-5863-ND

D1-128, D258, D260

CREE 5mm LED (x130)

C535A-WJN-CU0V0231-ND

J1

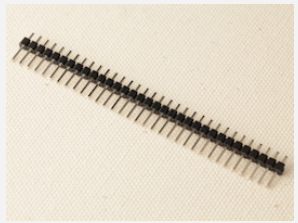
USB Mini B Socket

H2960CT-ND

J1 CABLE

USB A to USB Mini B Cable

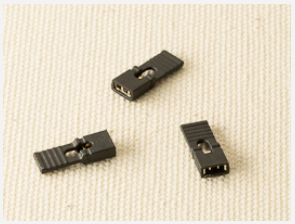
Q365-ND



K1, K2, K4, K5, P7

Header to be clipped into appropriate sizes

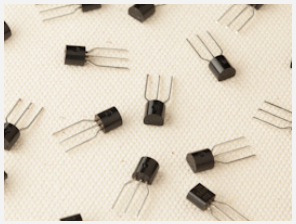
SAM1031-50-ND



JUMPERS

Jumpers for the K headers (x3)

S9341-ND



Q1-17

Transistors (x17)

2N5401GOS-ND

R1-R16, R30

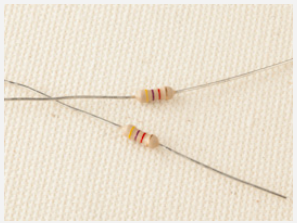
100Ω Resistor (x16)
Brown, Black, Brown, Gold

CF18JT100RCT-ND

R17-19, R22-23, R31, R36-38

10,000Ω Resistor (x9)
Brown, Black, Orange, Gold

CF18JT10K0CT-ND

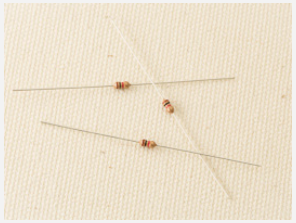


R20,R21

4,700Ω Resistor (x2)
Yellow, Purple, Red, Gold

CF18JT4K70CT-ND

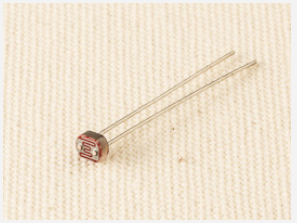
Kit Inventory



R24-26

1,000Ω Resistor (x3)
Brown, Black, Red, Gold

CF18JT1K00CT-ND



R32

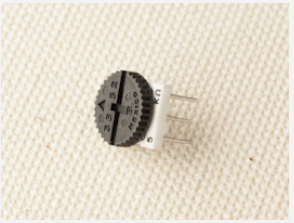
10K-100KΩ Photoconductive Cell

PDV-P9007-ND

R33,R35

680Ω Resistor (x2)
Blue, Gray, Brown, Gold

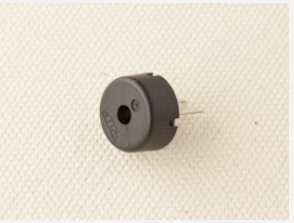
CF18JT680RCT-ND



R34

2,000Ω Thumbwheel Potentiometer

3352T-202LF-ND



SP1

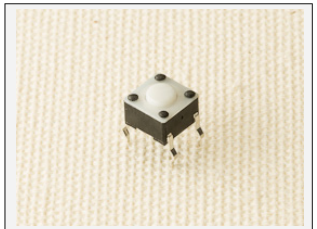
Speaker

102-1169-ND

SW1,SW2,SW3,SW5

Long button tactile switches

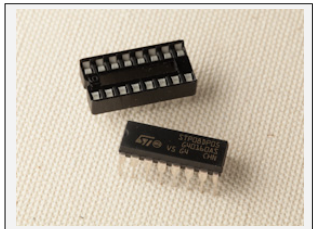
450-1644-ND



SW4

Short button tactile switch

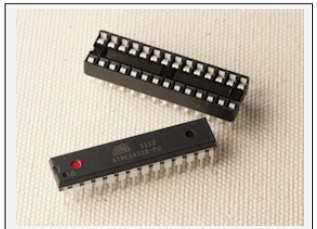
450-1649-ND



U1

16 Pin LED Driver and Socket

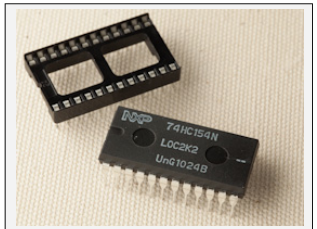
497-6271-5-ND & A100206-ND



U3

28 Pin ATMega328 Controller and Socket

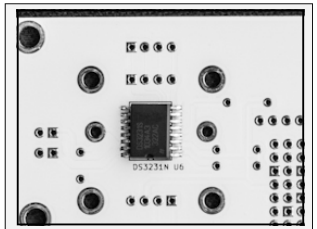
ATMEGA328-PU-ND & A100210_ND



U4

24 Pin IC Decoder/Demux and Socket

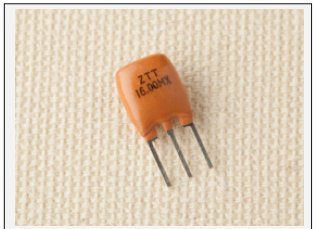
568-1407-5-ND & 3M5479-ND



U6

IC Real Time Clock - Surface Mount

DS3231S#-ND

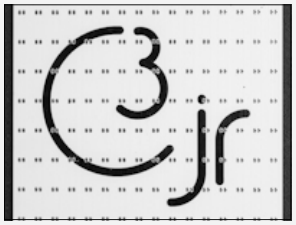


X1

16MHz Resonator with internal capacitor

X908-ND

Kit Inventory



PCB1

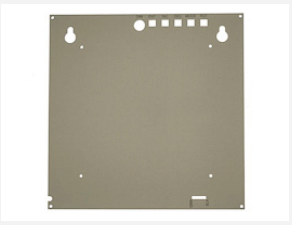
Main Circuit Board

Custom Part

FRONT PLATE

Leave protective film on until final steps

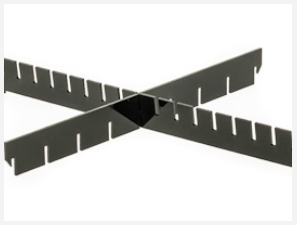
Custom Part



REAR PLATE

Leave protective film on until final steps

Custom Part



BAFFLES

x17 Short Baffles

x9 Long Baffles

Custom Part

FRAME HARDWARE

x12 Hex Screws

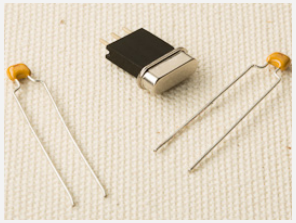
x8 Nuts

x4 Cylinder Spacers

x4 Square Spacers

Hex Wrench

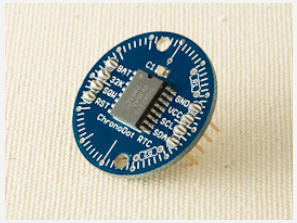
Optional Parts List



C11, C12, X1 ALTERNATE

18pF Caps (x2), 16MHz Crystal instead of Resonator, 3 Pin Socket

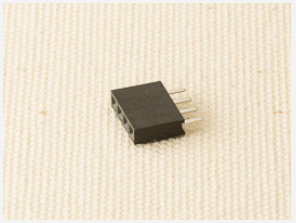
EvilMadScience.com - Search for Kit



CHRONODOT

Real Time Clock Module

Macetech.com - MTRTC001



CD1, CD2, CD3

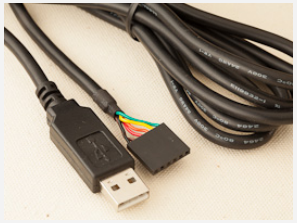
4 Pin Socket - Used with I2SD (CD2/3) or ChronoDot (CD1/2)

3M9515-ND

FRAME

Ikea Ribba 9"x9" Wooden Frame

Ikea.com - 000.780.51



5V FTDI CABLE

USB A to FTDI Cable for Clock Programming - 5 Volt version

768-1015-ND

FTDI SOFTWARE

Install the Arduino Software on your computer to program the clock

http://arduino.cc/

J2

USB B Socket

ED2982-ND

J2 CABLE

USB A to B Cable

AE10620-ND

J3

2.5mm Barrel Socket

CP-002B-ND

J3 POWER

5 Volt Power Supply

T977-P6P-ND

P1

7 Segment 4 Digit Display

Sparkfun.com - COM-09766

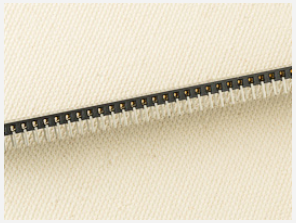
P13

ISP Header 3x2 Pin

SAM1095-36-ND

The Optional Parts List has been included to give our hackers a starting point if they want to go above, and beyond, what we have included with the kit. All items must be purchased separately by the customer. DigiKey.com part numbers have been noted for convenience when possible.

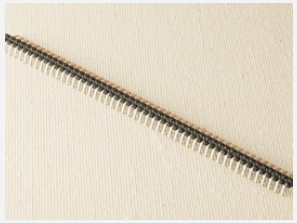
Optional Parts List



P41

4 Pin 90º Socket to Connect Multiple Boards (STACK-L)

SAM1009-50-ND



P42

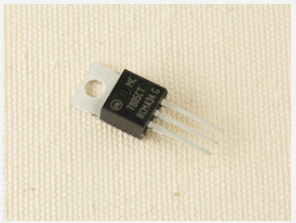
4 Pin 90º Header to Connect Multiple Boards (STACK-R)

SAM1043-50-ND

SW1,SW2,SW3,SW4,SW5

Right Angle Switch for Top Access

450-1657-ND



U2

5v Regulator

MC7805CTGOS-ND

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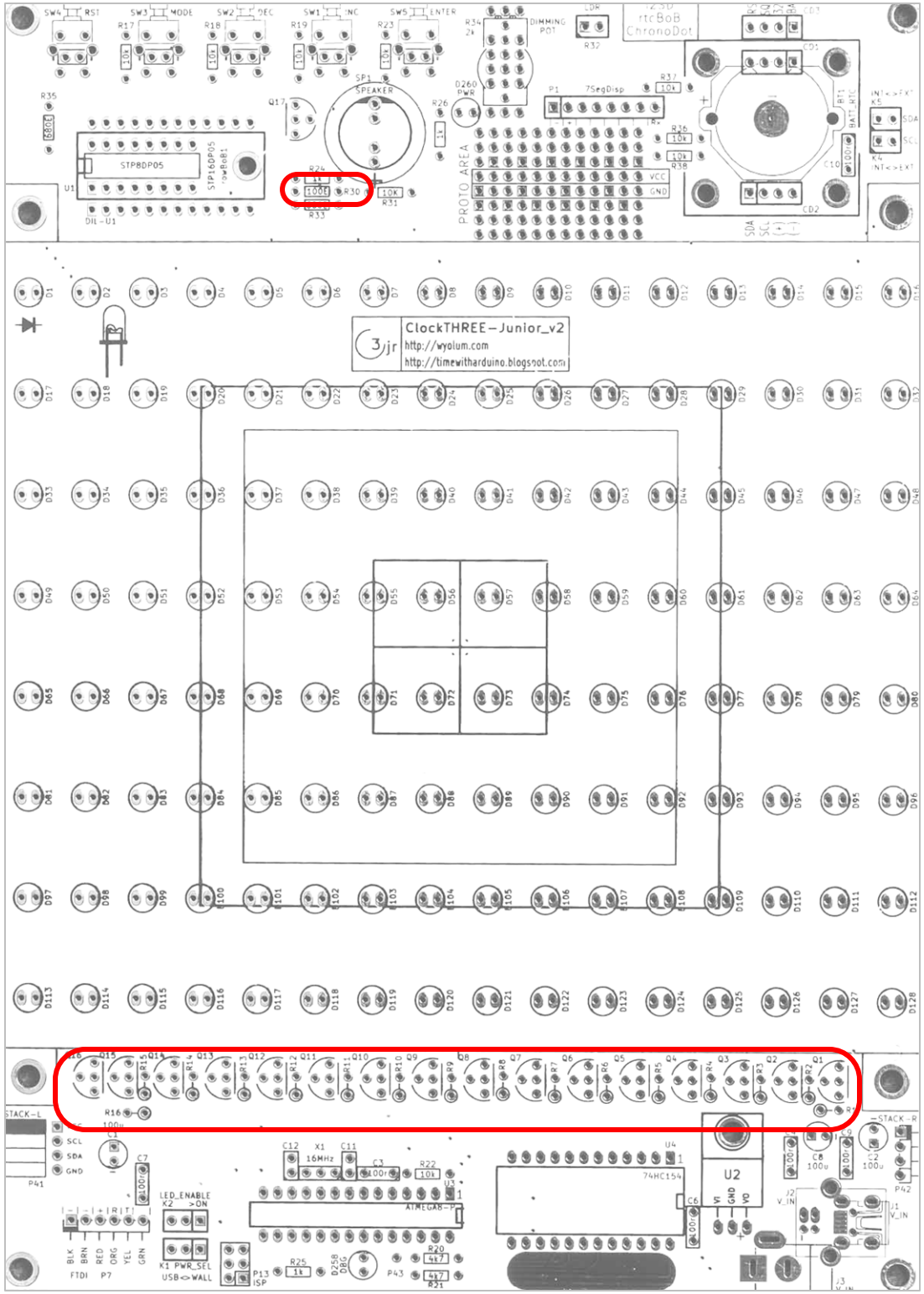
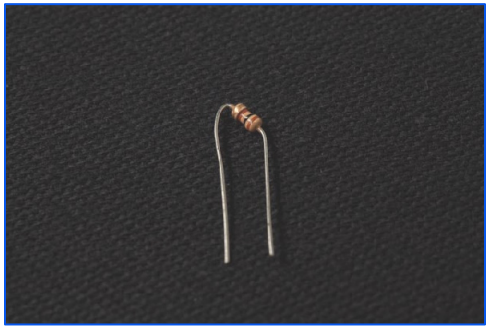
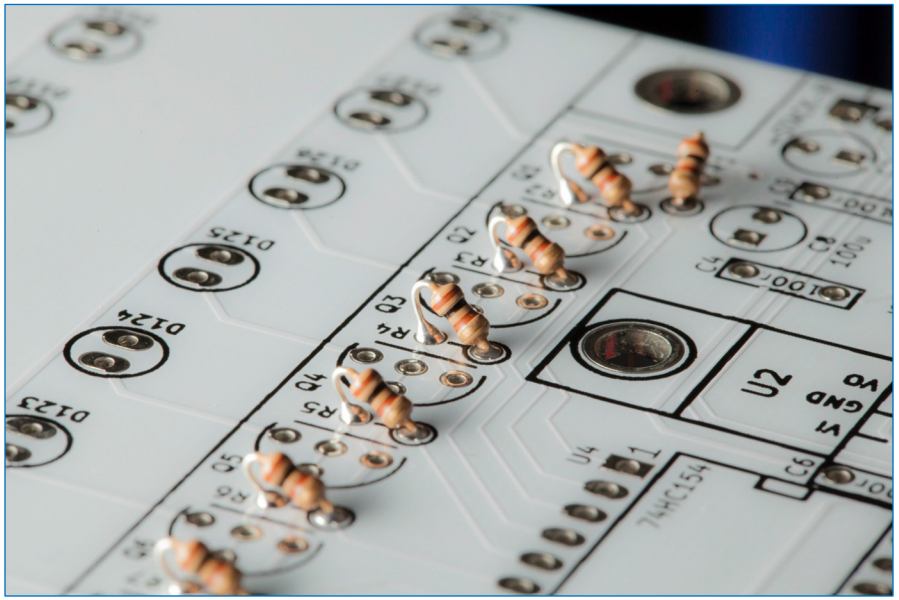
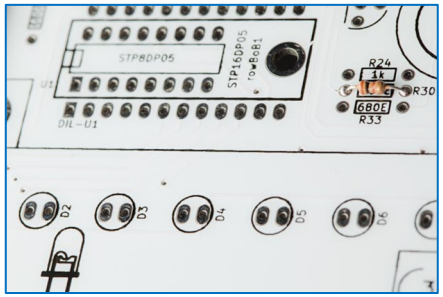
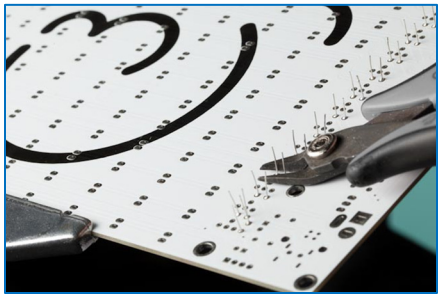


Start your assembly process with the 100 Ω Resistors (**Brown-Black-Brown-Gold**) located at **R1 - R16** and **R30**. The polarity (orientation) does not matter with resistors, but you will need to bend these in the manner shown so that they fit on the board properly in a vertical fashion. These are the only resistors that need to be installed vertically. To solder, you may bend leads at 45° angles, on the underside, so that they stay in place when you flip the board over.





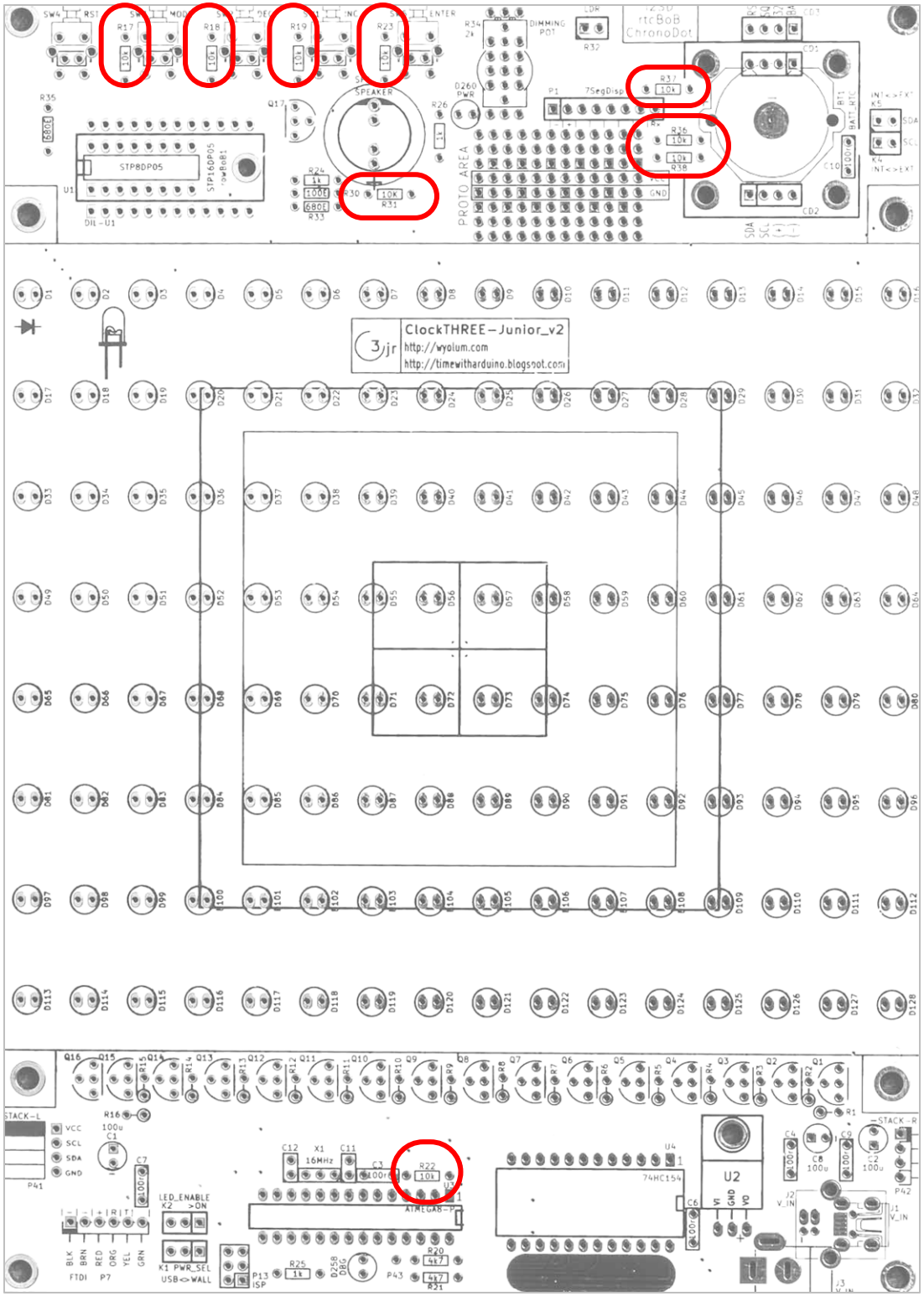




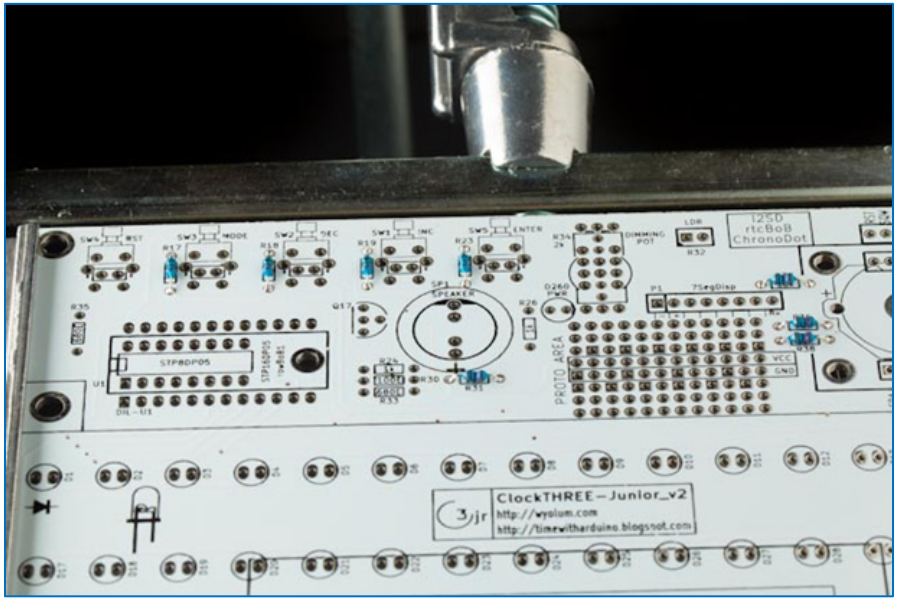
Follow these steps to build your clock!

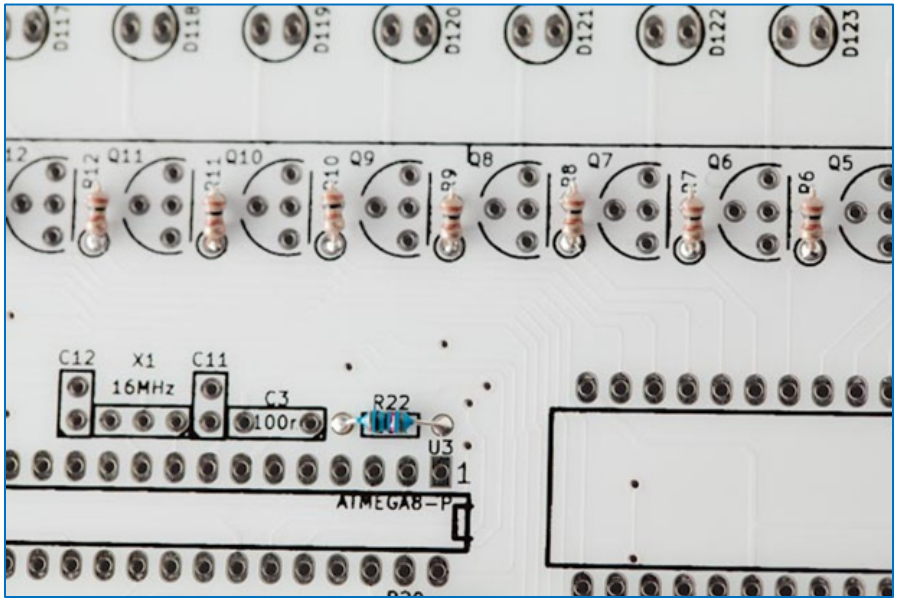
Step 1

100 Ω Resistors



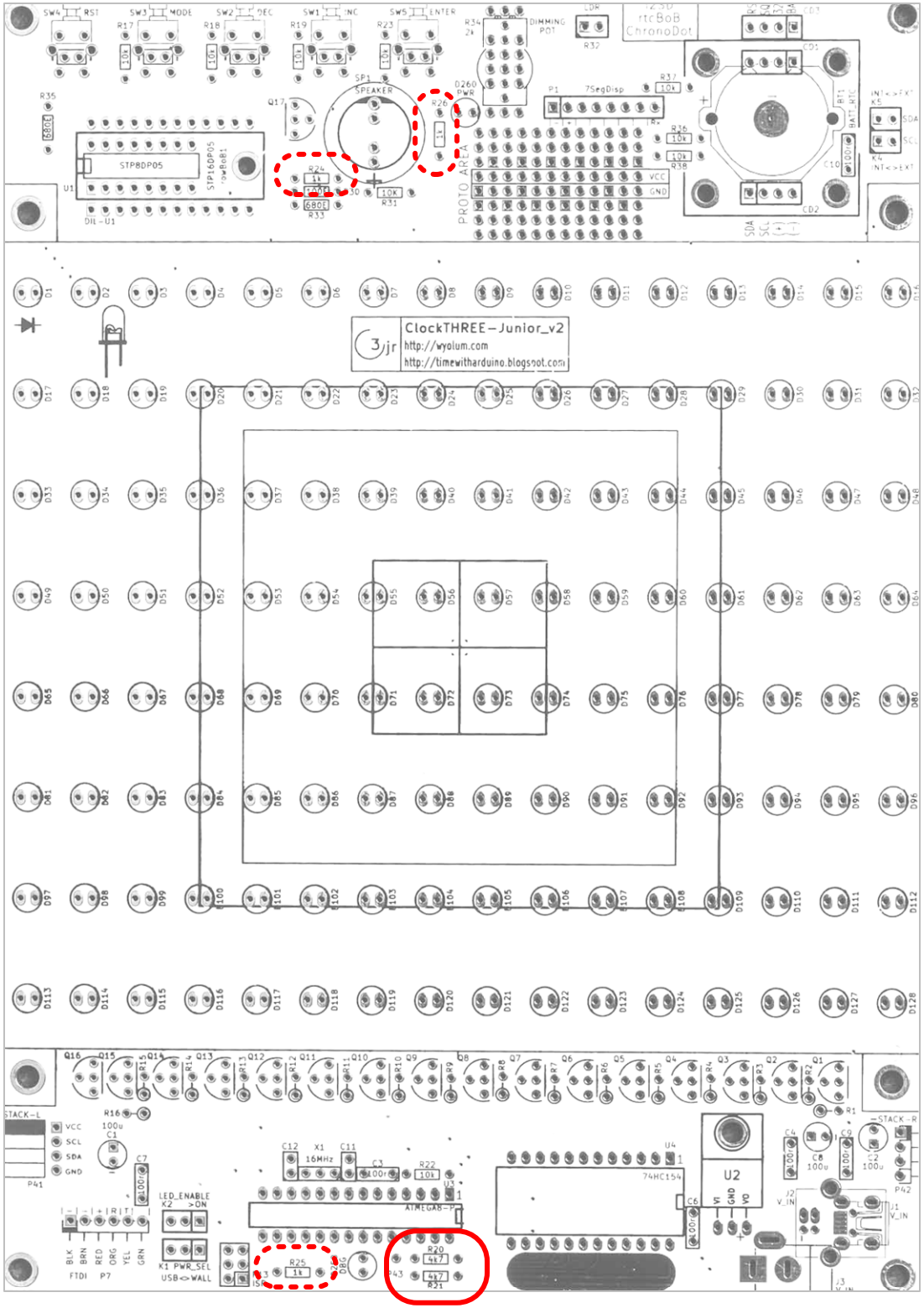
Now we move on to the 10,000 Ω Resistors (**Brown-Black-Orange-Gold**) located at **R17, R18, R19, R22, R23, R31, R36, R37,** and **R38**. While the photo shows resistors with a blue surface color, you will likely receive brown. These are some spares that were lying around waiting on a fun project!



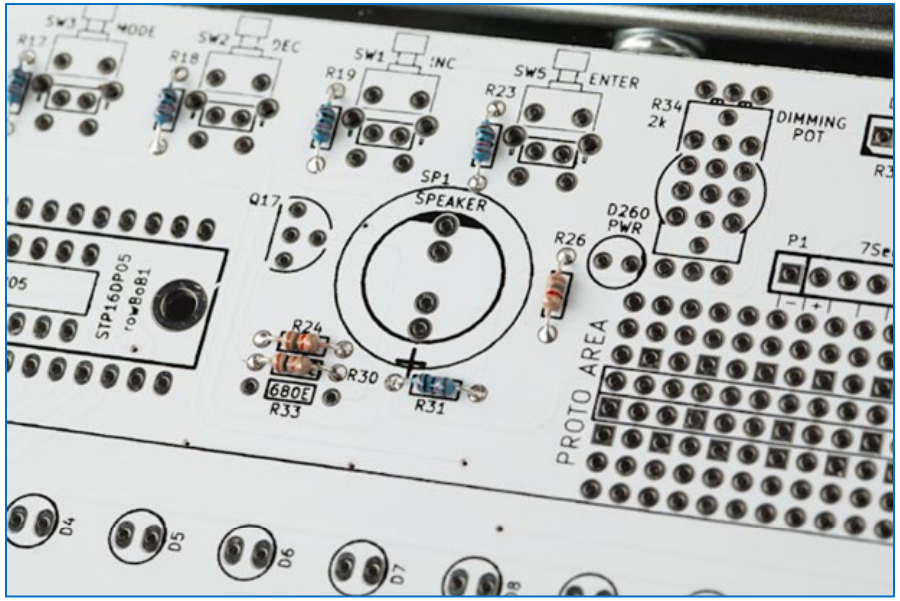


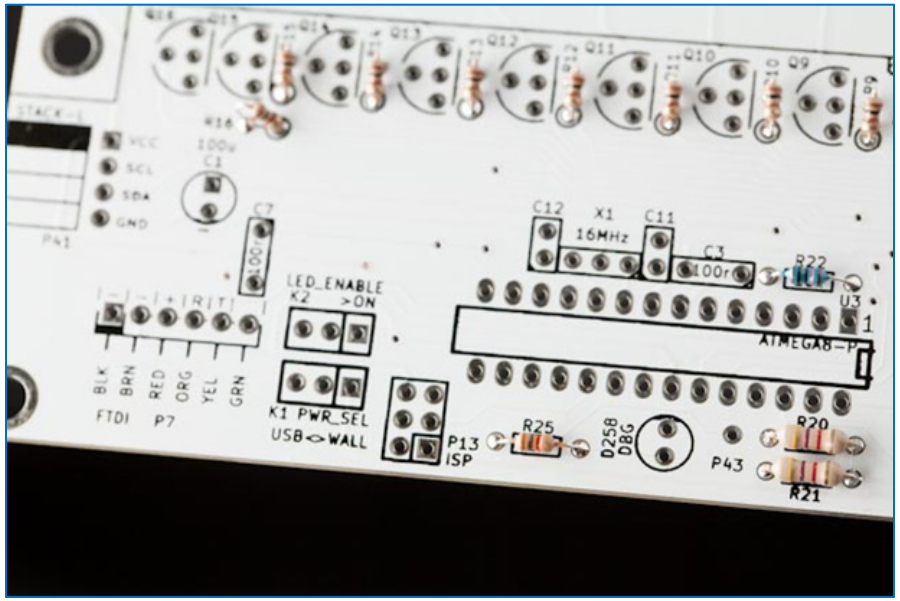
Step 2

10000 Ω Resistors



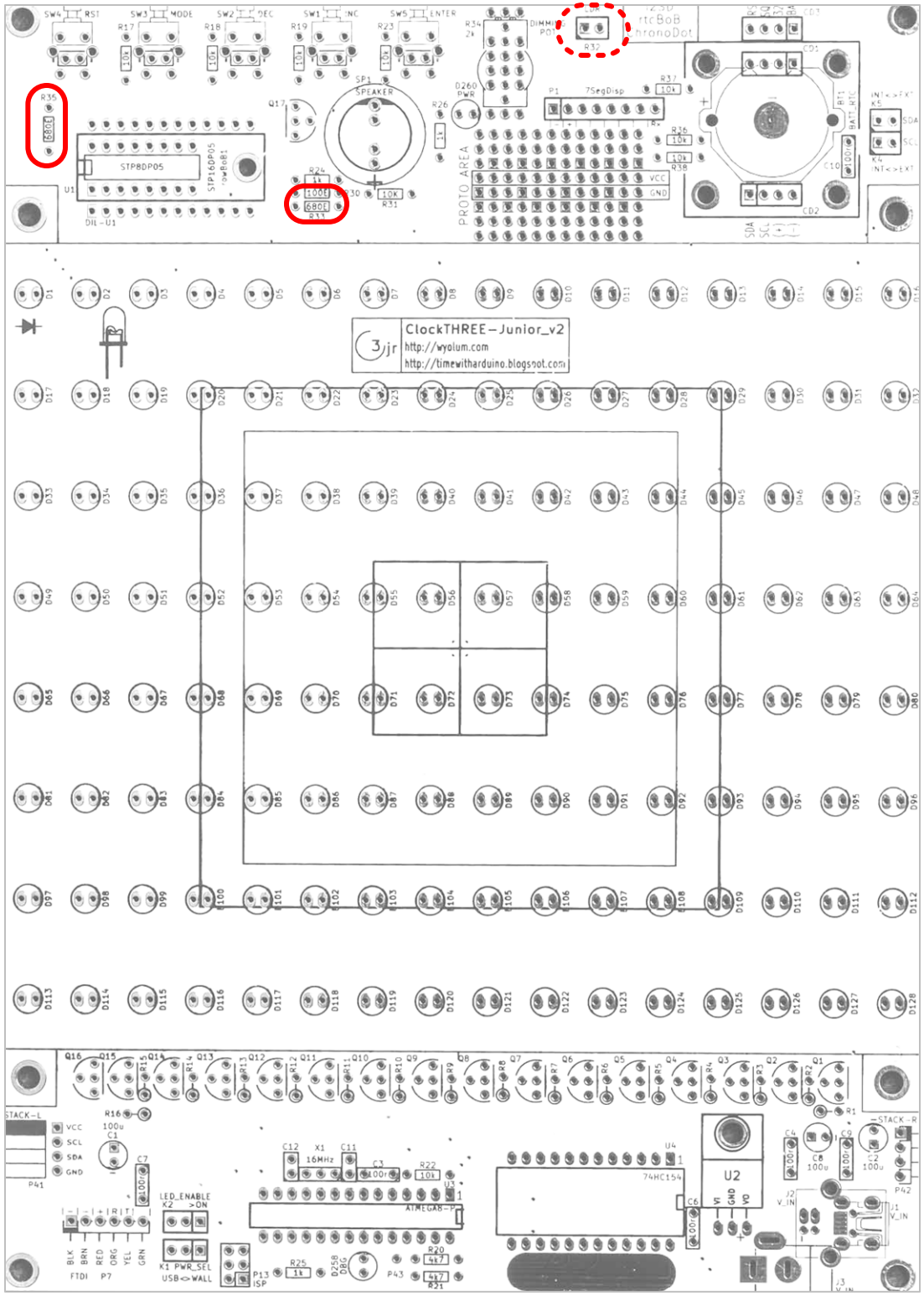
Next are the 4,700 Ω Resistors (**Yellow-Violet-Red-Gold)** located at **R20** and **R21** followed by the 1,000 Ω Resistors **(Brown-Black-Red-Gold)** at **R24, R25,** and **R26**.



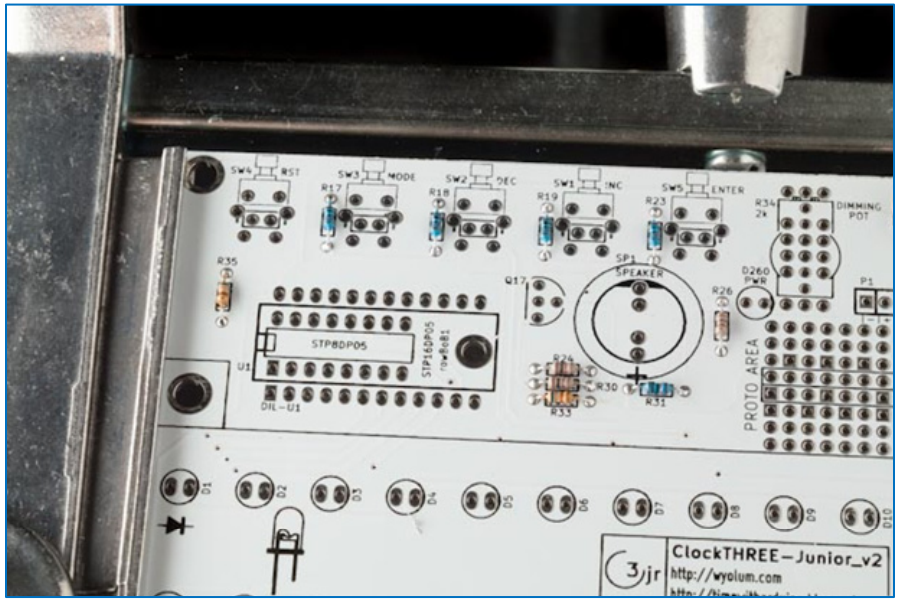


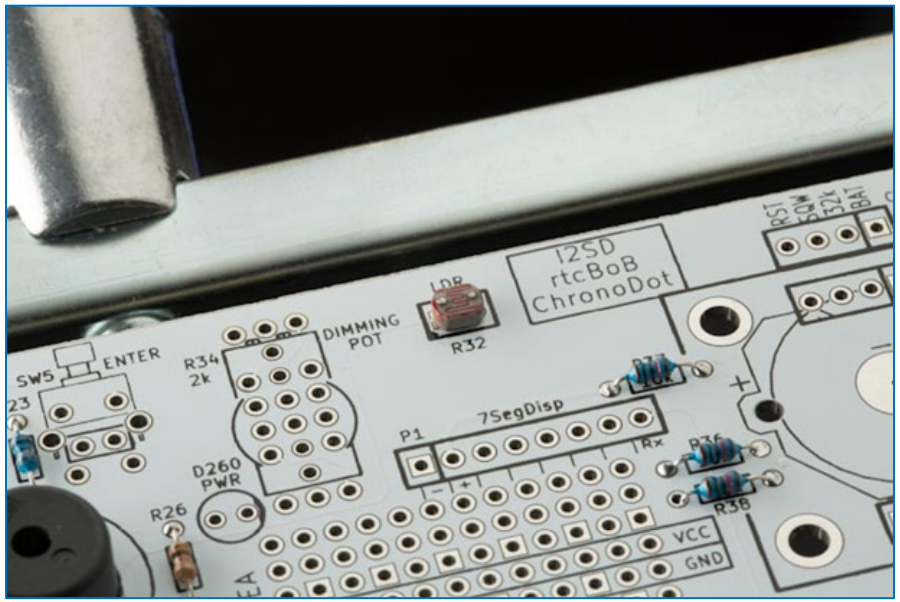
Step 3

4700 Ω and 1000 Ω Resistors



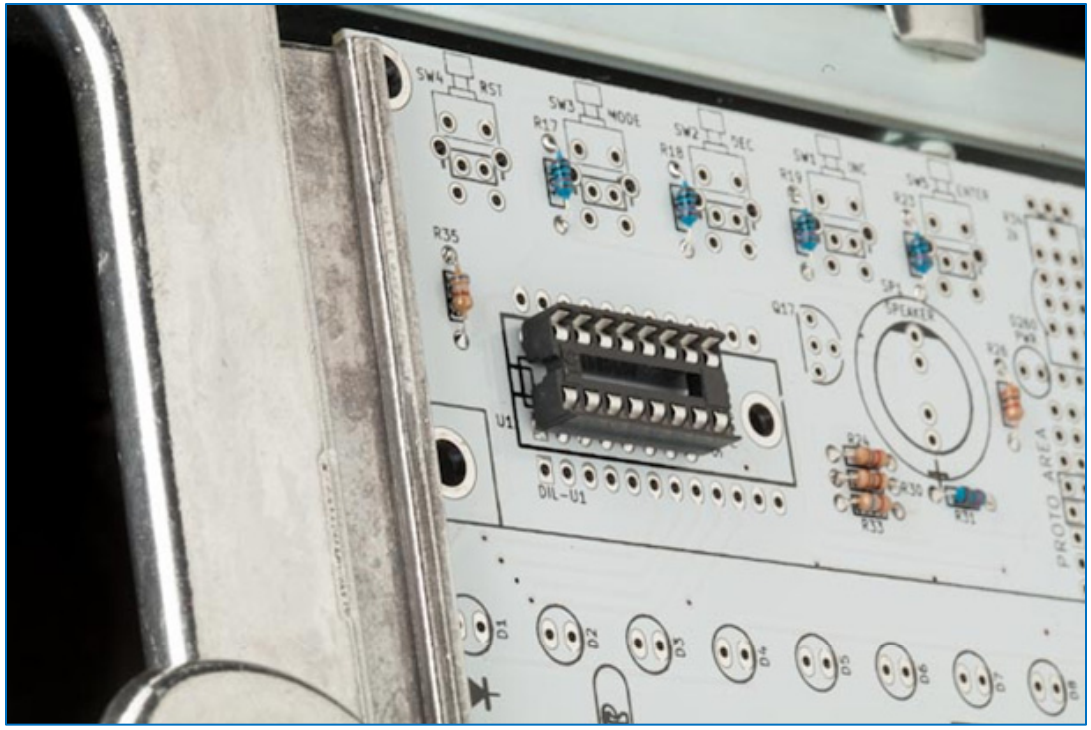
We finish up the Resistors with two 680 Ω (**Blue-Grey-Brown-Gold)** located at **R33** and **R35** along with the **LDR** (Light Dependent Resistor) at **R32**. While the LDR comes with the kit, it is not functional at this time and may (or may not) be supported in future software releases. We really just wanted to give Makers something to tinker with.

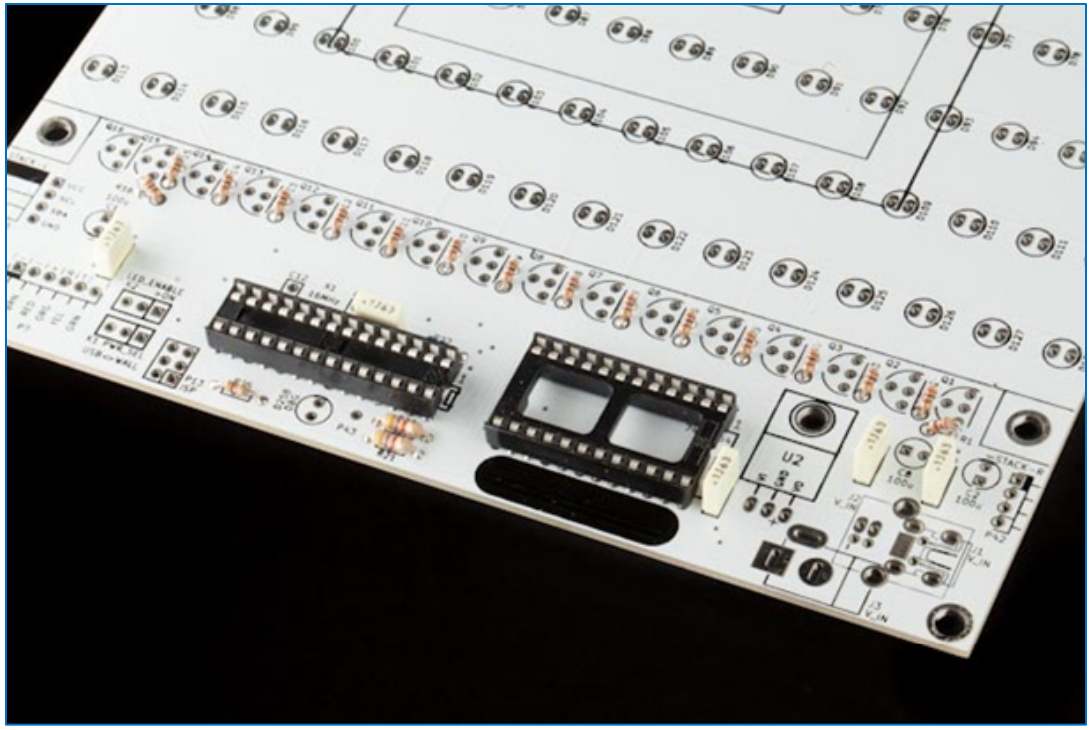




Step 4

680 Ω and LDR Resistors



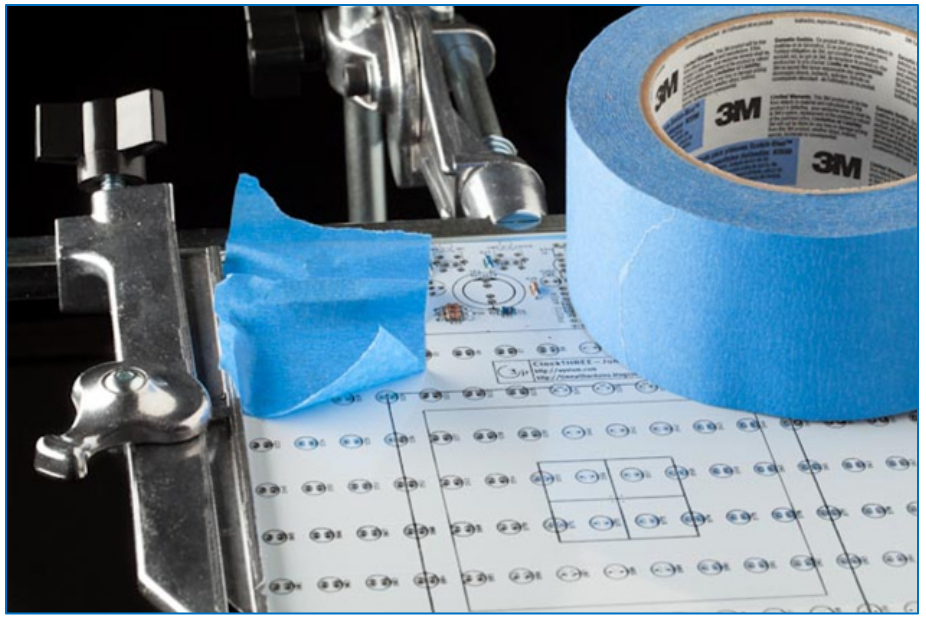


The IC (Integrated Circuit) Sockets are next in the assembly process. The chips and sockets are polarized – Please make sure to align them correctly with the legends on the board indicating indentation positions. If you happen to solder one of the sockets in backwards, don't fret… just make sure to plug the chip in with the notch in the correct position.

U1 – 16 Pin for Row Driver **STP8DP05**
U3 – 28 Pin for **ATMega328** Processor
U4 – 24 Pin for Column Driver **74HC154**

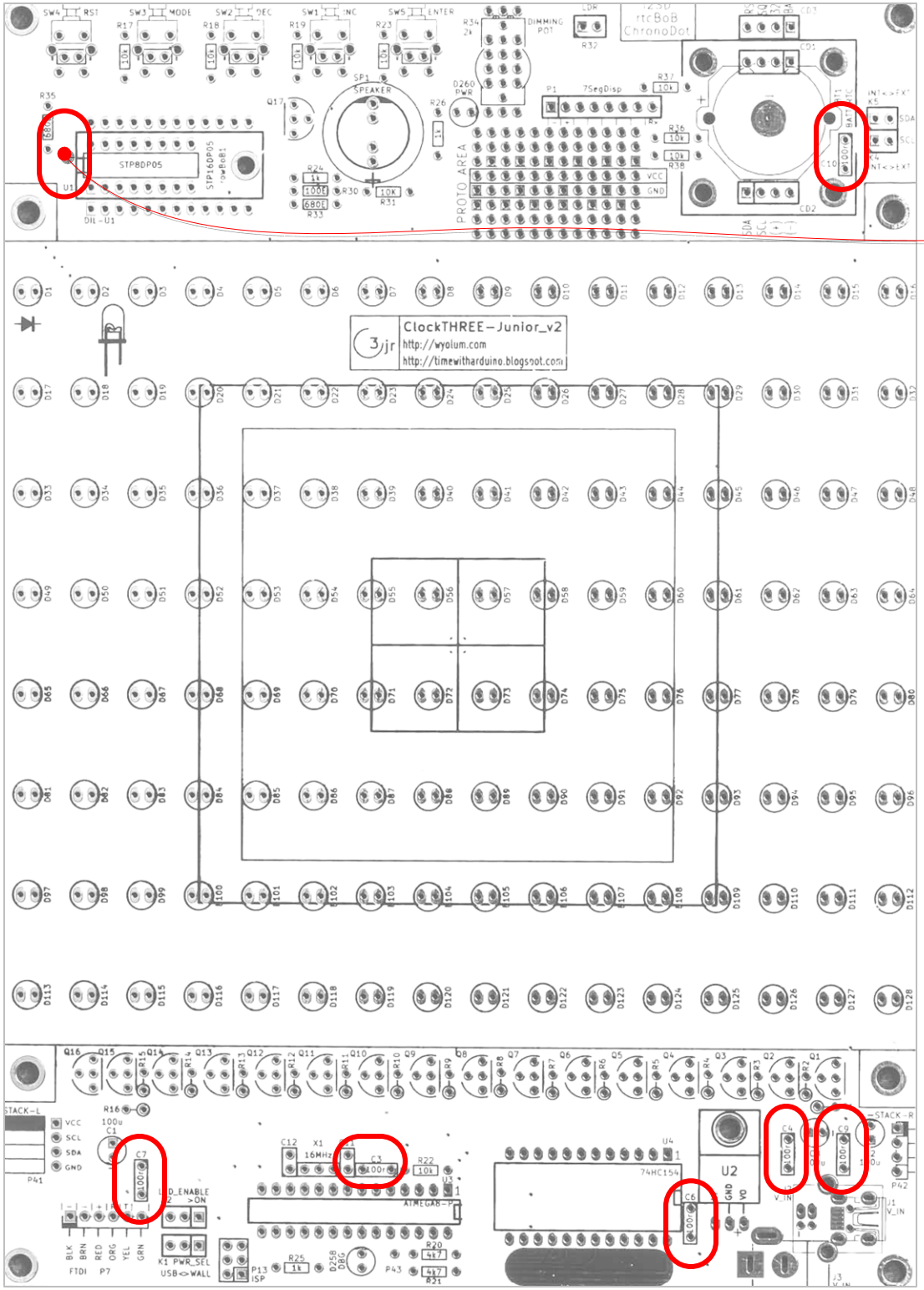
You may find it easier to solder the sockets after applying tape to hold them in place.

Note: Do not install the IC's into their sockets right away. It's far safer to wait until we're ready to test the board, towards the end of this manual, due to the risk of ESD (Electrostatic Discharge).

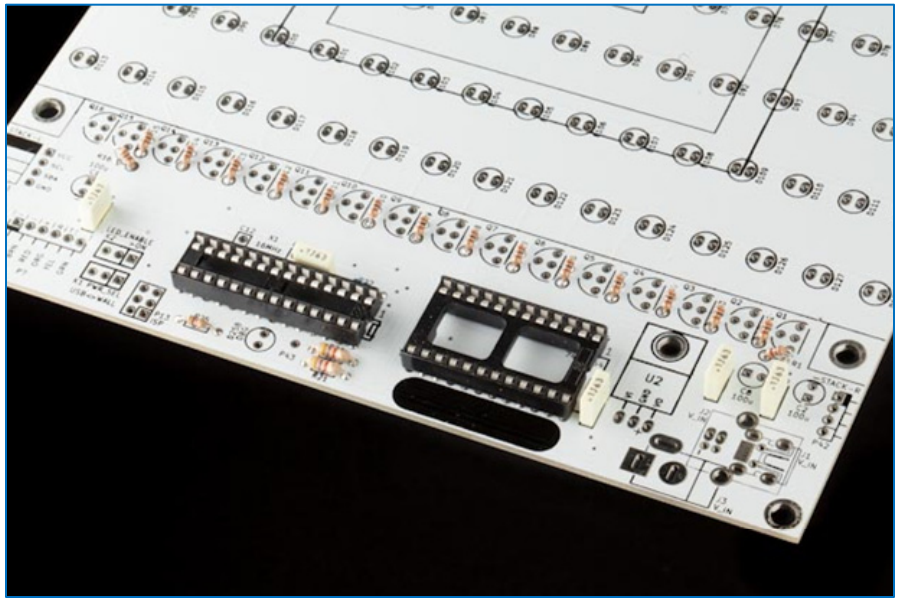


Step 5

IC Sockets

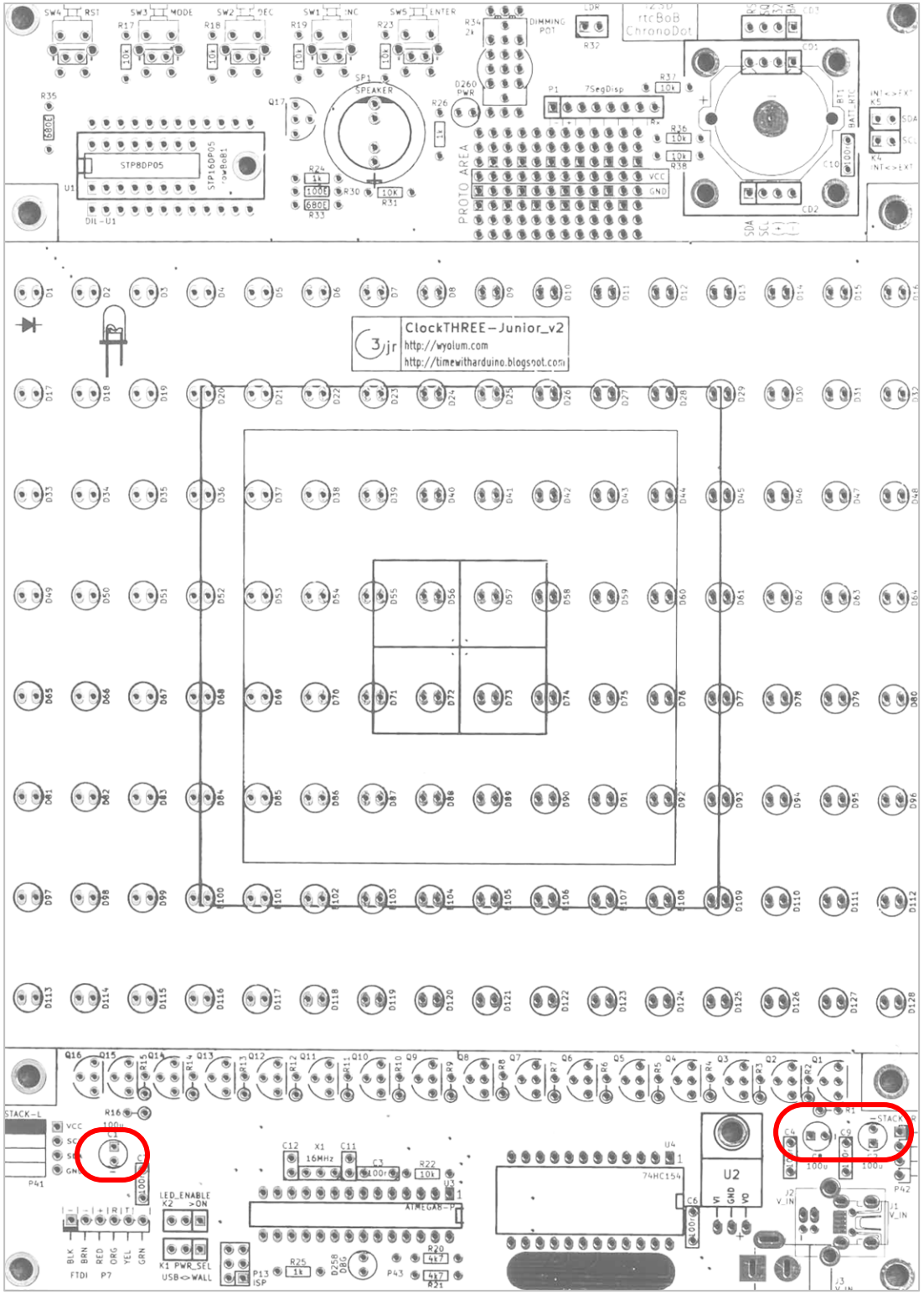


It's now time for the **0.1µF Decoupling Capacitors** that go in **C3, C4, C5, C6, C7, C9,** and **C10**. These little guys are not polarized so they can be placed on the board without worrying about their orientation. **C5** was not on the prototype so the pictures do not reflect the exact location.

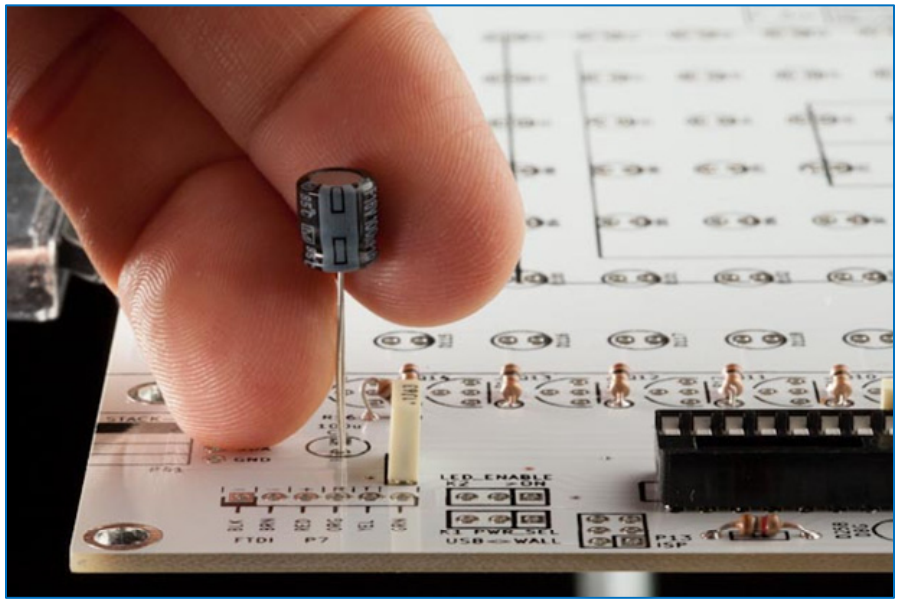


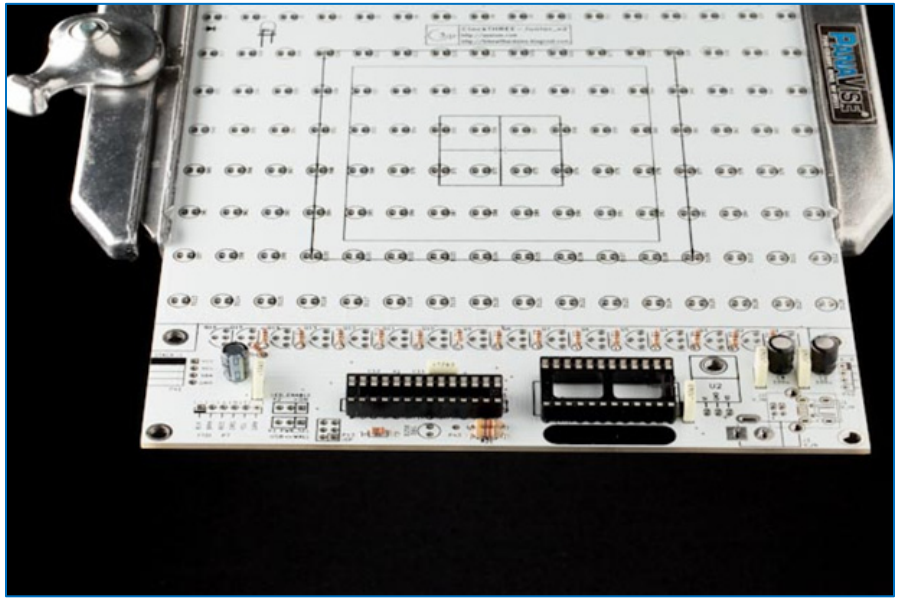
Step 6

0.1µF Capacitors



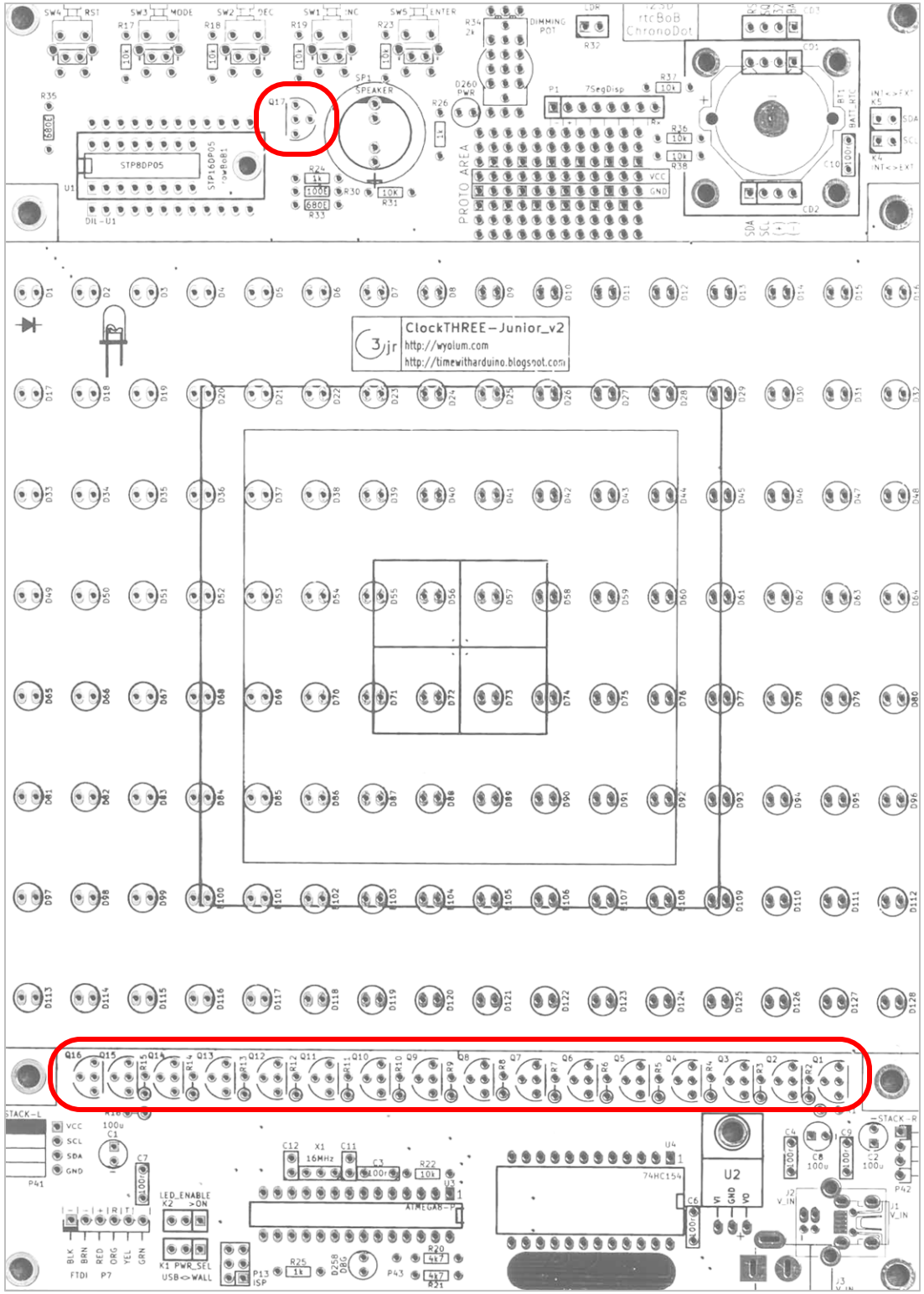
The **100µF Capacitors** located at **C1, C2,** and **C8** are the last to be installed. These are polarized so the board has been marked with a symbol (-) on the negative side. The negative side of the Capacitors is easy to discern by the stripe. The positive lead is also longer than the negative to help out even more.



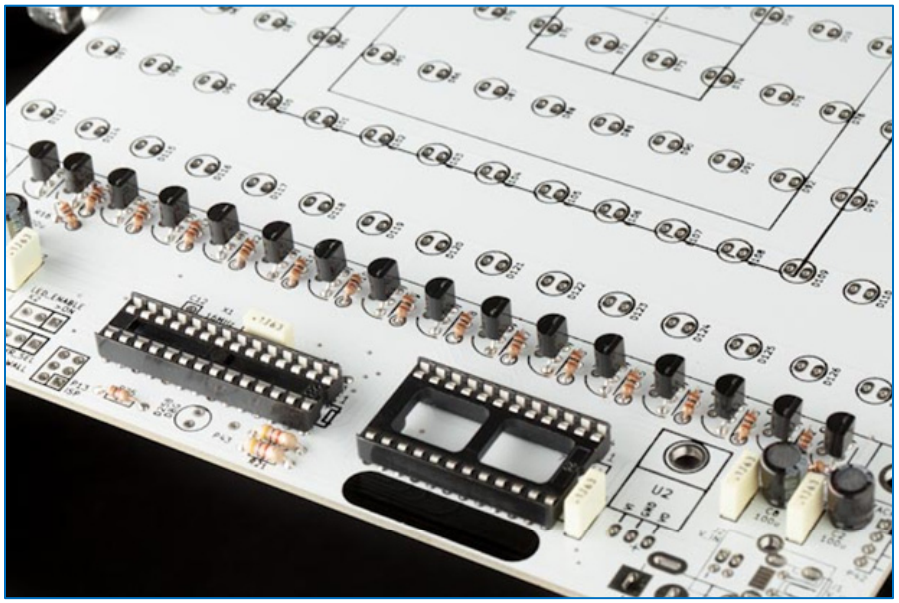


Step 7

100µF Capacitors

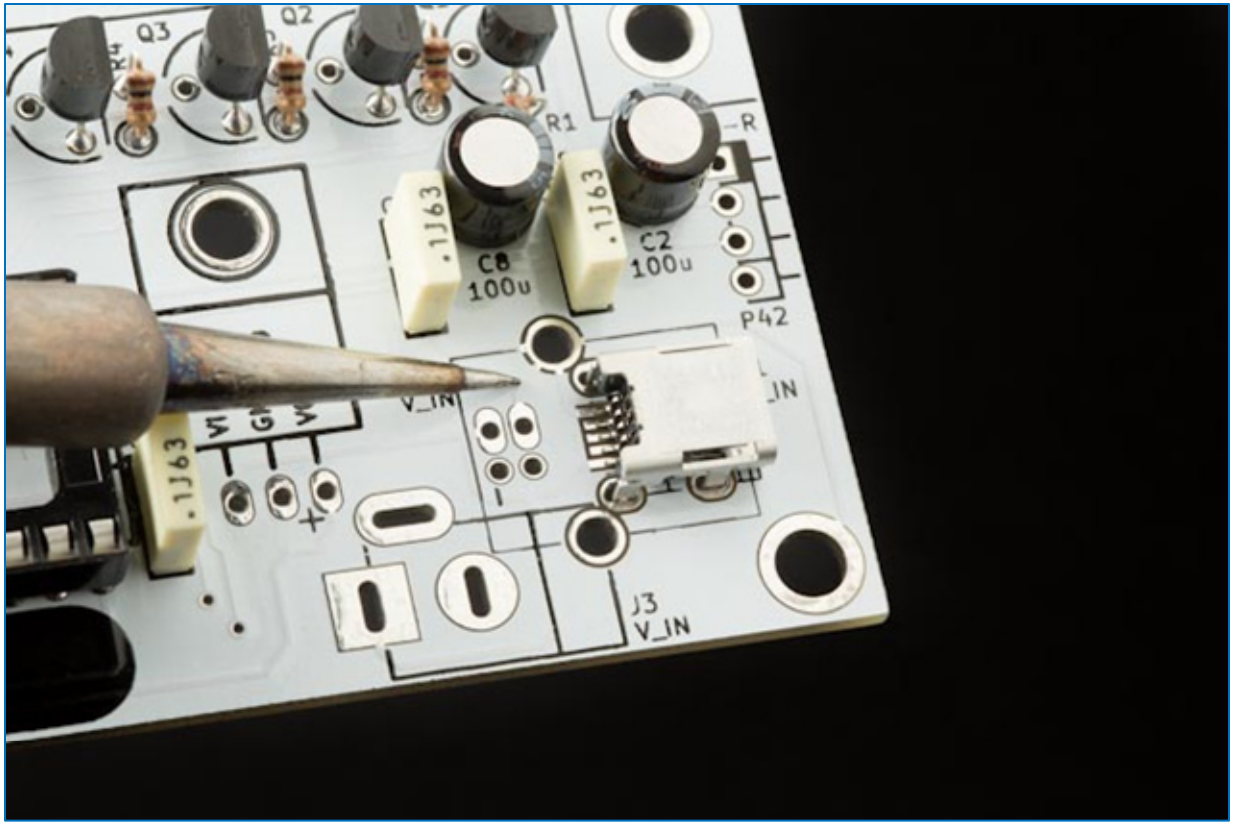


Transistors are installed in **Q1 – Q16** and **Q17** with their curved side matching the drawings on the board. The three legs line up vertically and the fourth side hole can be ignored for now. In the future, we may find interesting transistors with offset legs… We like options!



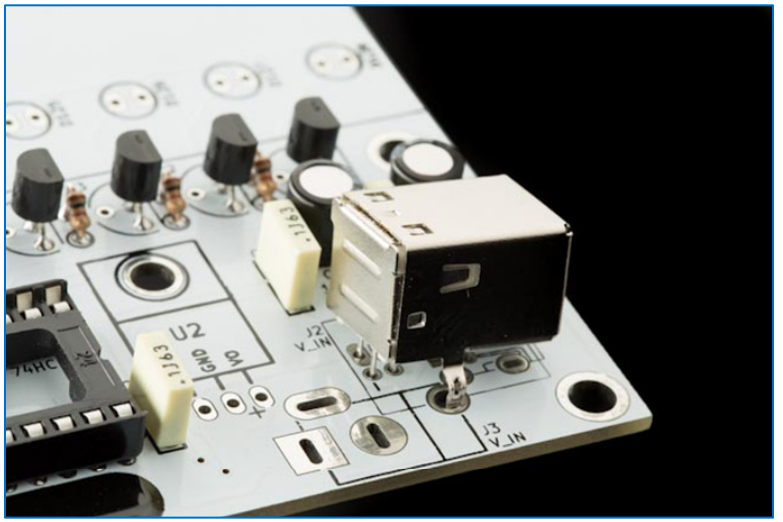
Step 8

Transistors



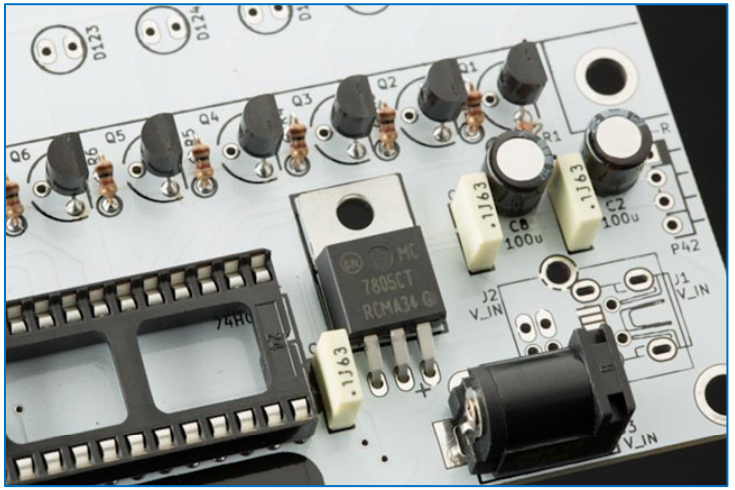
Next, we'll give our clock a **Power Source**. The kit will include **J1,** a **Mini USB socket**, that needs to be carefully soldered onto the board. We suggest using the sharpest possible tip for your iron due to the delicacy of the surface mount connection.

If you choose to purchase a **J2 (USB B socket**) from the optional parts list, you would place it on the board in the orientation shown below.



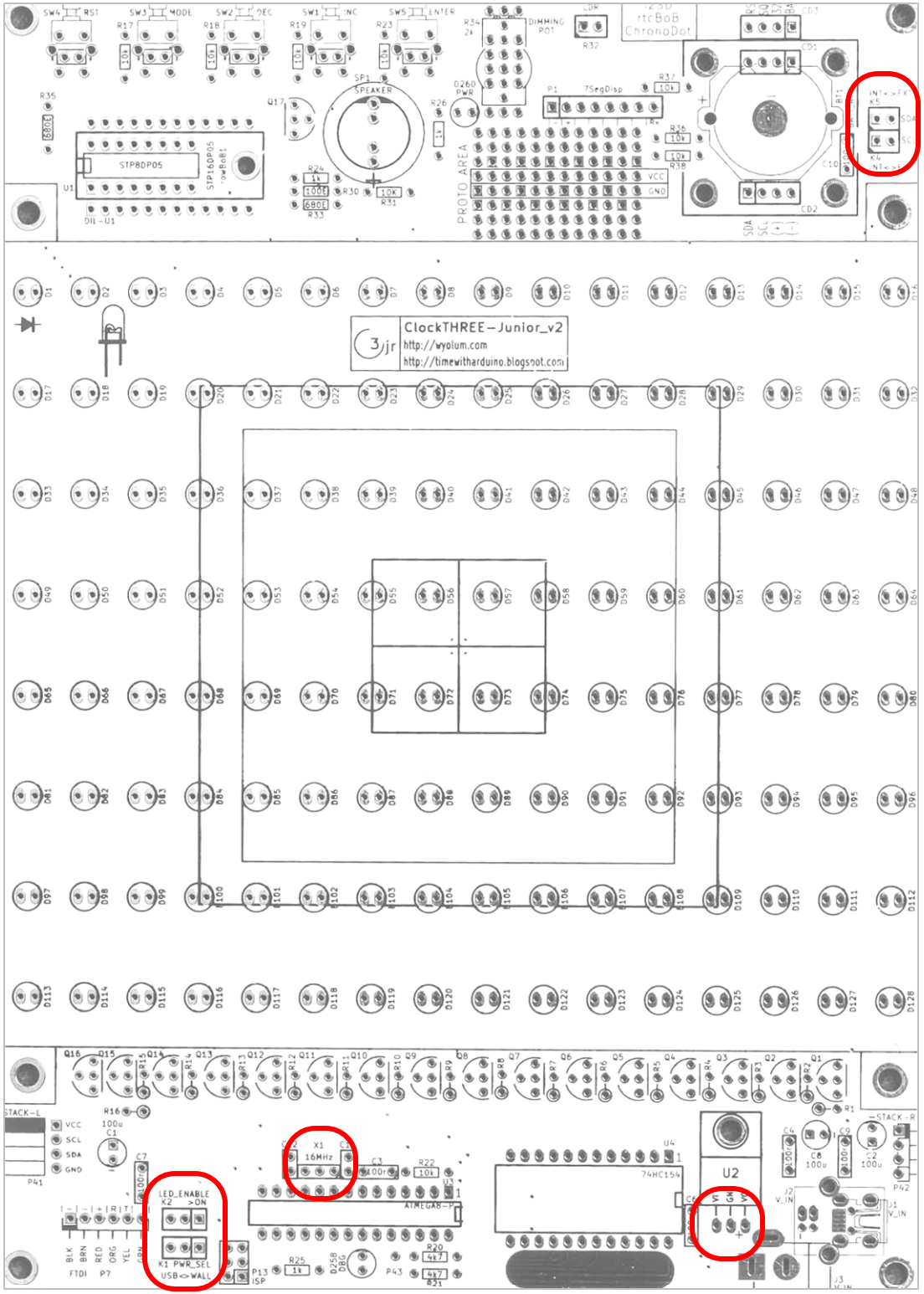
The last power option available to you is through a standard DC power supply. You can purchase **J3** (the **2.5mm Barrel Socket**) separately from the optional parts list along with a 5v power supply.

We highly recommend that you also install **U2** (**5v Regulator**) when using **J3** to prevent the destruction of your board. With the 5v Regulator, we recommend using a 9v – 12v power supply… a lower voltage won't power the board… a higher voltage isn't recommended unless heat sinks are used (Don't start any fires!). The 5v Regulator will help to ensure that your clock doesn't go boom if you accidently plug in the wrong wall wart.

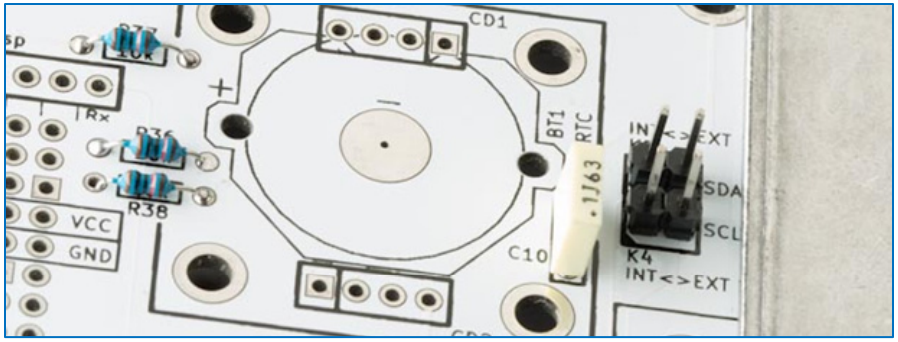


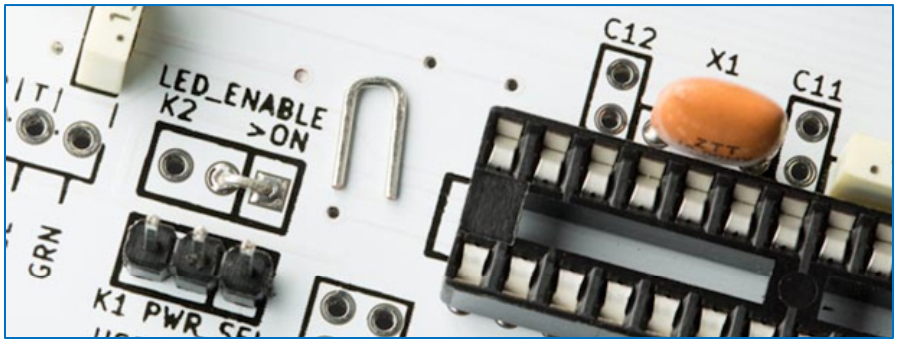
Step 9

Power

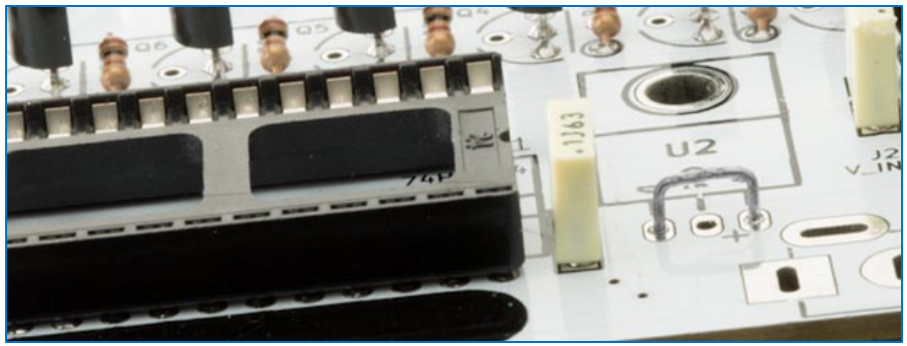


The jumpers are next in line for installation. You may receive many male header pins on a strip, or you may get the header pins already broken up in 3's and 2's. **K1** requires a **3 Pin Male Header** with a **Jumper** to switch between getting power from the options (J1, J2, or J3) on the bottom right side of the board (Wall)… or getting power from the FTDI connection (P7) on the bottom left side of the board (USB). For **K2,** solder in a wire to create a permanent link – see photo… any wire will do. **K4** and **K5** each require a **2 Pin Male Header** and both need a **Jumper** with the stock kit. If you decide to use a different RTC, like the I2SD, rtcBoB, or ChronoDot, you would remove the jumpers. While here, please solder on the 16MHz **Resonator - X1**. It's not polarized and can go in either way.



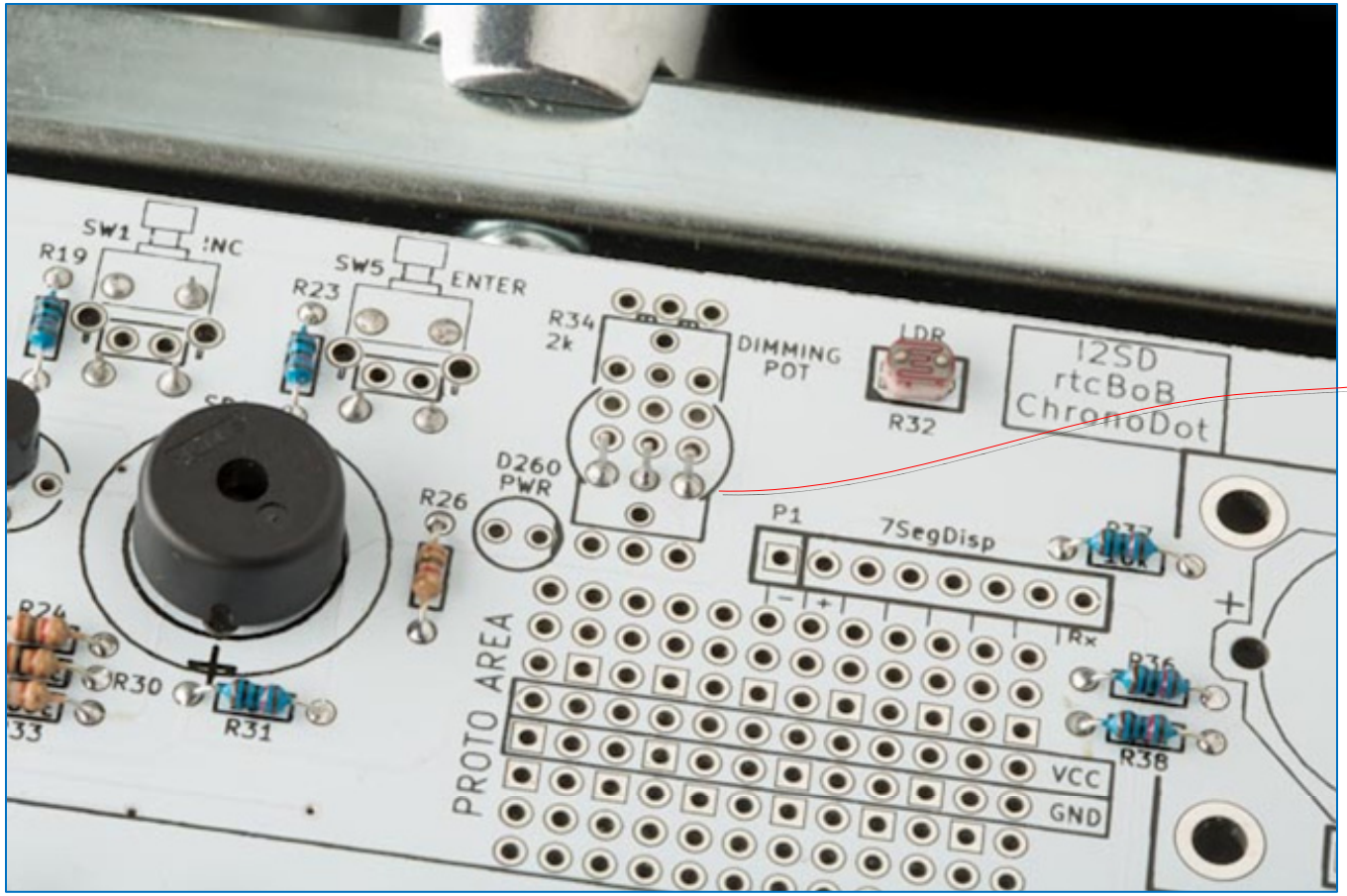


The last jumper is permanent like K2. **U2** requires a **Jumper** between VO and VI unless you install the 5v Regulator… in which case, the Jumper would not be needed. Once again, you may use some scrap wire, or even a heavy staple, as the jumper.

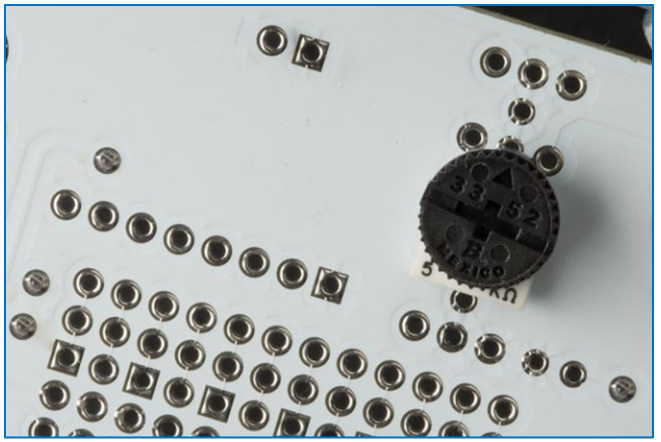


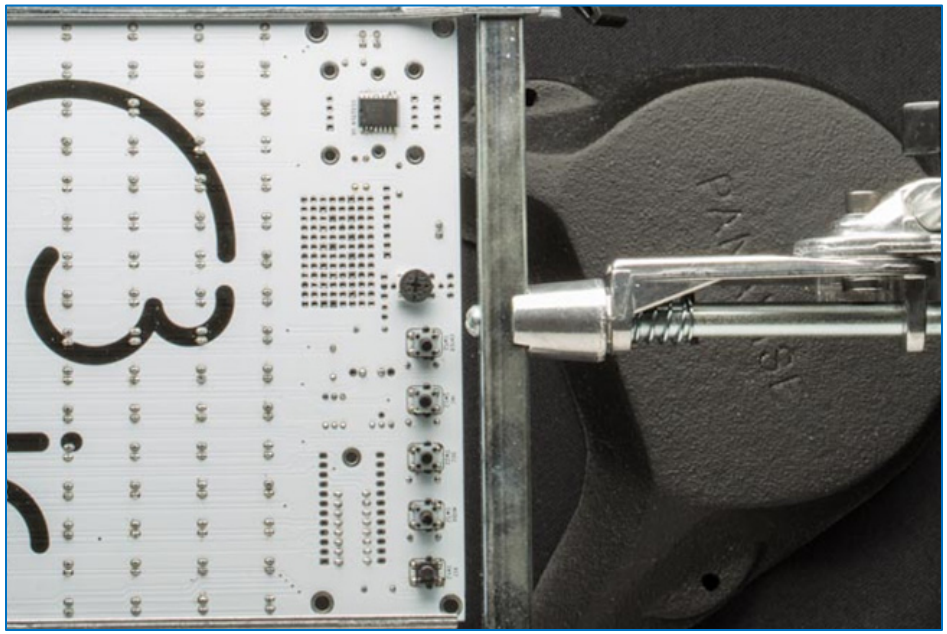
Step 10

Jumpers and Resonator



Start this step by soldering in the **Speaker** at **SP1**. Polarity is shown on the board in case you want to upgrade your horn, but it's not important with the kit speaker. Next is the **Thumb Wheel Potentiometer**, which controls the LED brightness, at **R34,** and this part goes on the back side of the board. Make sure you line the holes up just like the photo to the left.

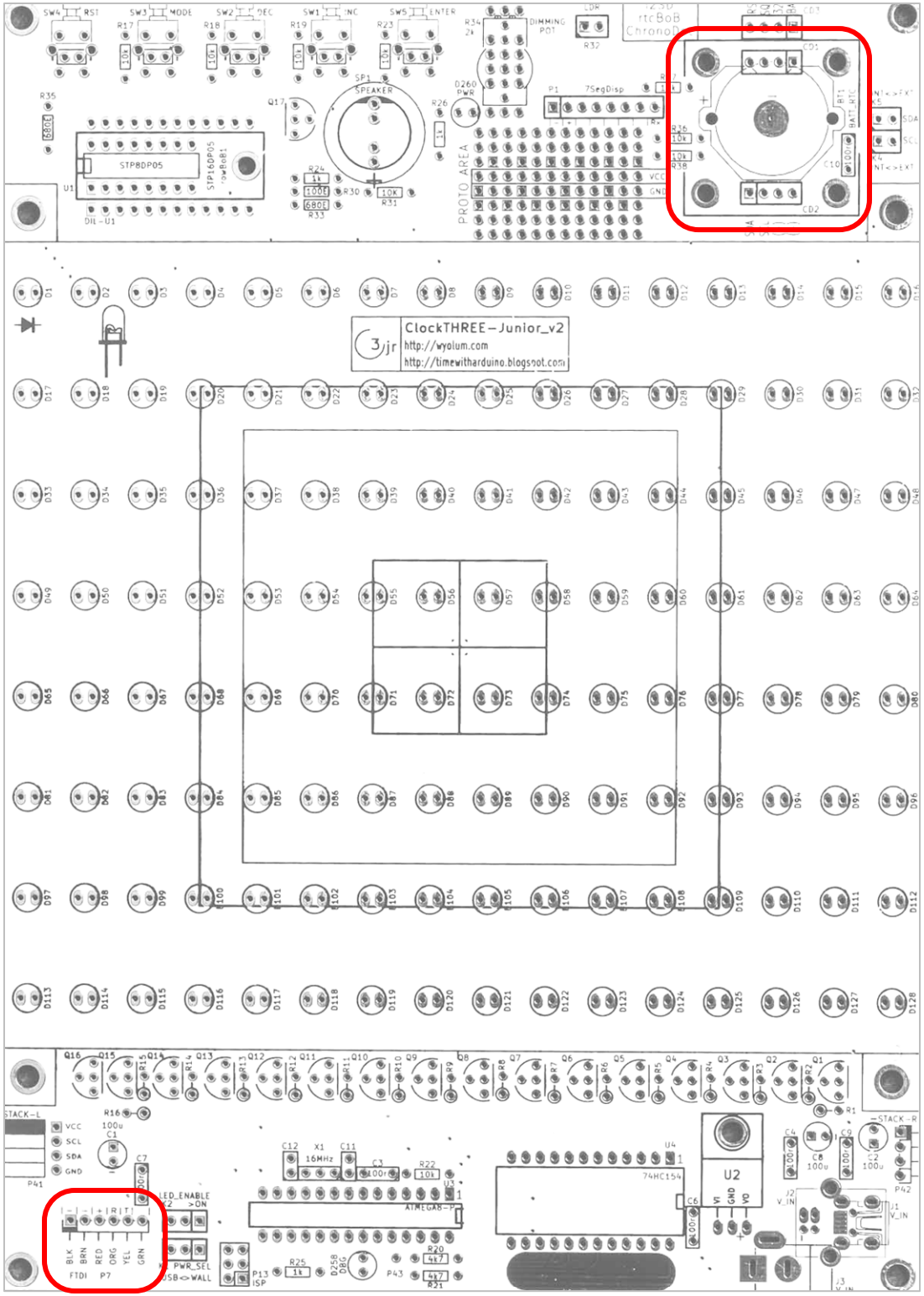




Just past the Potentiometer, on the back of the board, are places for all of the **Switches**. **SW1, SW2, SW3** and **SW5** have longer buttons and the **SW4** Reset Switch has the shorter button. These switches will pop into the board when you press on them, which keeps them in place for soldering.

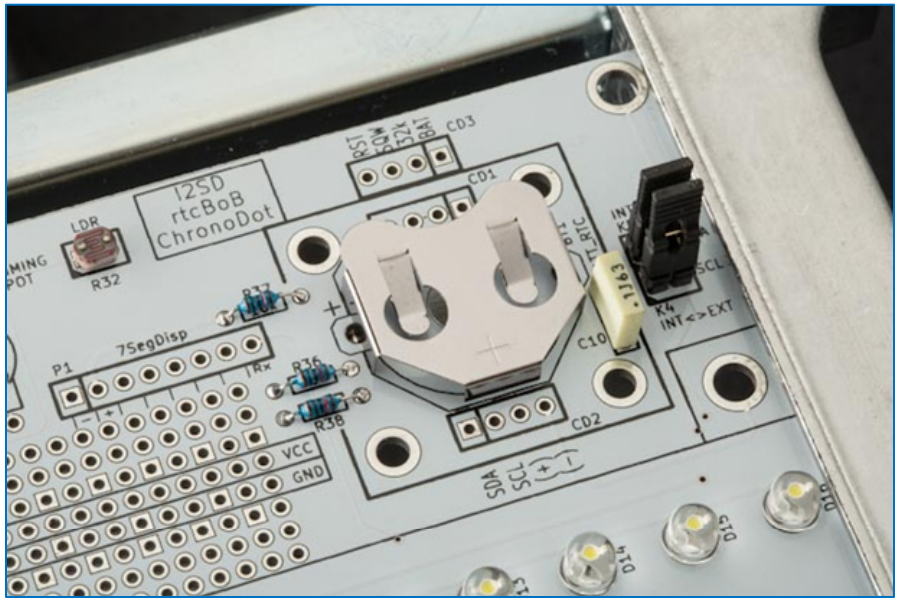
Step 11

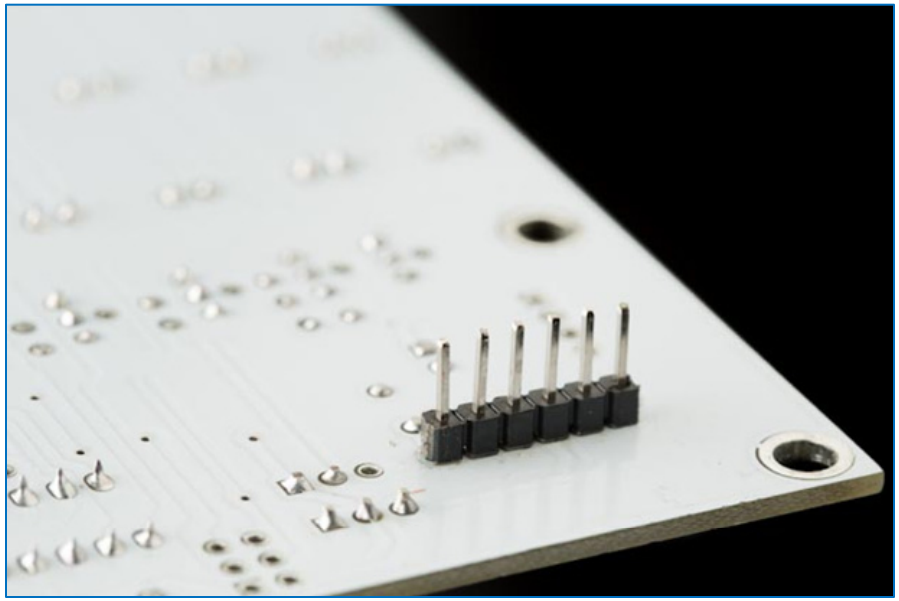
Speaker, Potentiometer, and Switches



The kit comes with a DS3231 Real Time Clock (RTC) located on the back side of the board at U6. Since it is a little tricky to solder, we've taken care of that for you. The DS3231 does need the **Coin Battery** and **Battery Socket** located at **BT1**, so please solder that in now. You may want to give the socket a little extra solder for strength, but do not solder, or heat, any part of the battery.

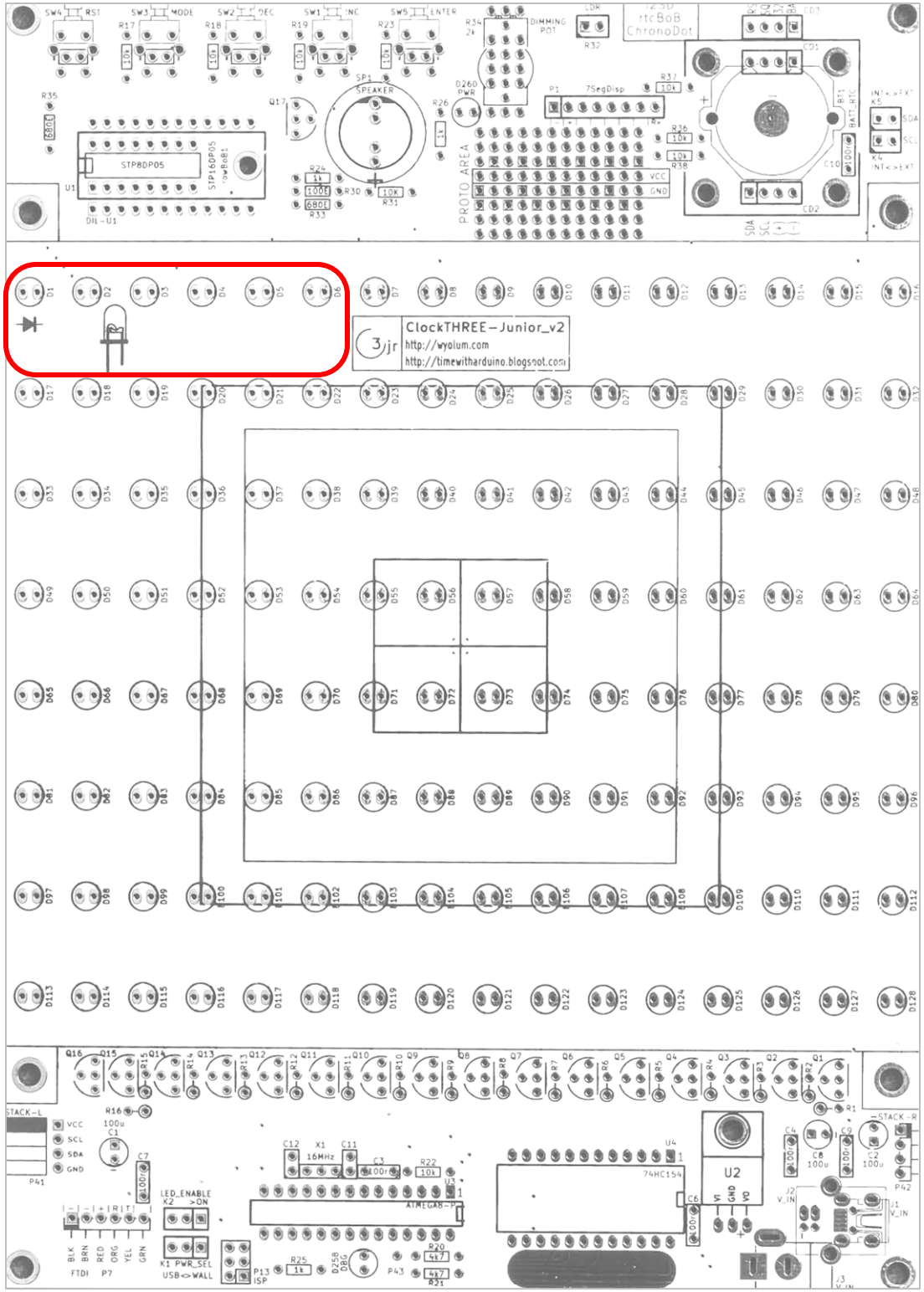
The 6 Pin **FTDI Header** at **P7** rounds out this step and it is mounted on the back of the board just like the switches. This will allow a connection to your computer to program the board, should you want to explore.





Step 12

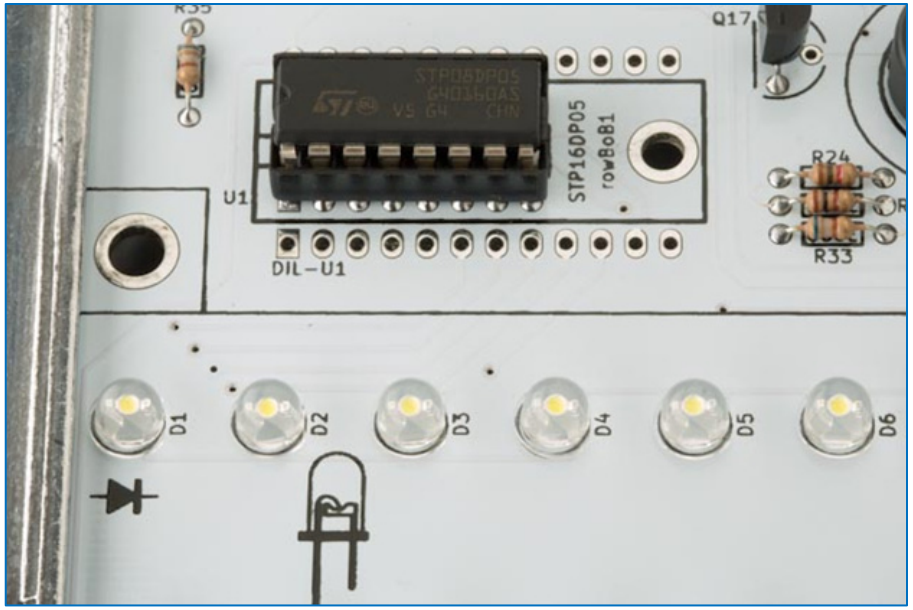
Battery and FTDI Connection



We're almost to the finish line, but first we need to test out the environment before we solder in a bunch of LED's. Let's do a "Smoke Test" by only soldering in the first 6 **LED's** at **D1 – D6**. These 5mm Cree LED's have a long positive lead which goes into the left hole as the drawing on the board points out. When you've finished with these 6 LED's, go ahead and carefully plug in the chips at **U1, U3,** and **U4** making sure the notch on the end is in the correct orientation. If the legs don't line up vertically in the socket, try rolling the chip slowly on a flat surface to bend all of the legs together at once so that they straighten out. Always take your time with IC's as they are easy to mangle… and not easy to replace.

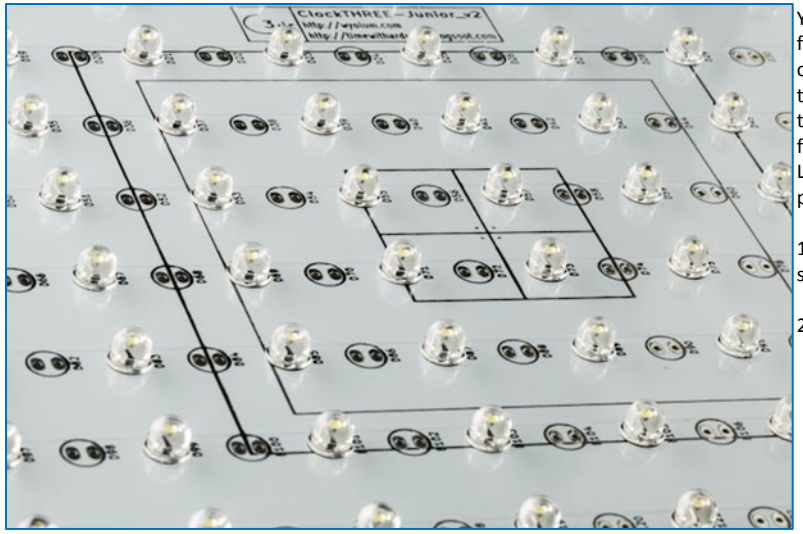
Also make sure that you have placed a plastic jumper on the header at K1 to select "WALL" and that you have soldered the permanent wire at K2 to enable the "ON" position. Once you have double checked everything, take a deep breath and power up the board! Depending on your language, some of the lights will come on (English – D1, D2, D4, and D5). If everything worked out, take a moment to smile and give yourself a big pat on the back!

If the LED's aren't happy, don't worry! Shoot an email to << info@wyolum.com >> <u>before</u> soldering the rest of the LED array. We can help!



Step 13

Smoke Test!



You're probably trying to figure out how to solder on the rest of the LED's in the shortest amount of time. We've found the fastest way to install the LED's is with this two step process:

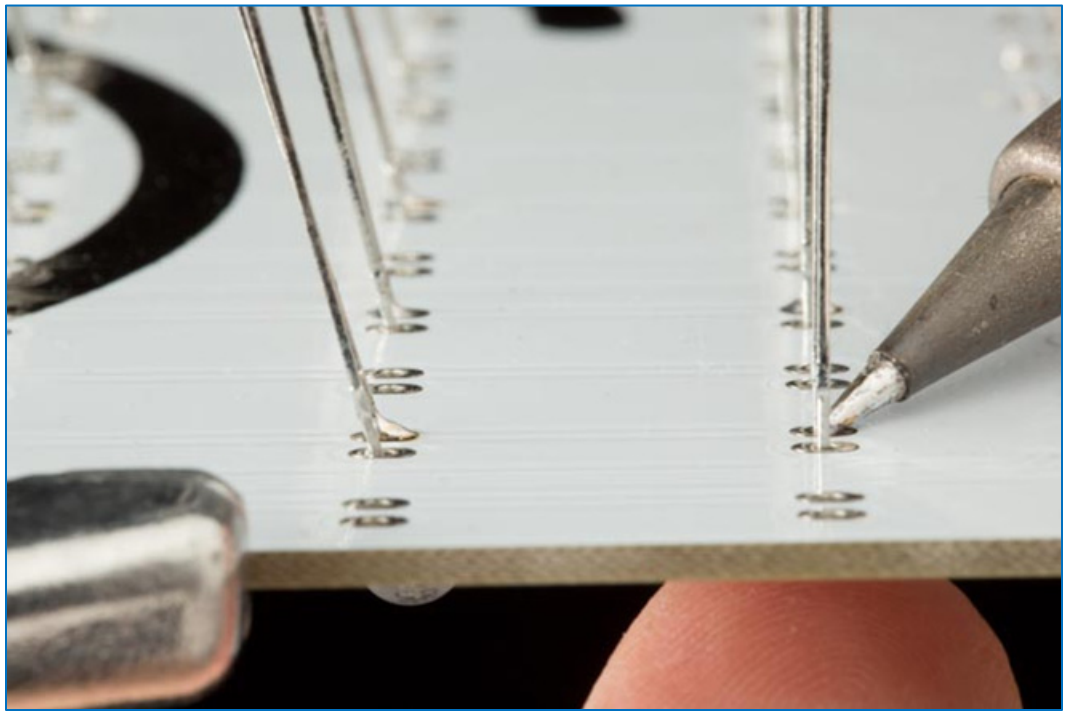
1. Solder every other row simultaneously as a group

2. Solder in the rest.

The challenge is doing the job without bending the leads since that can turn into spaghetti. Adjust your board to a 45° angle (or higher) and only solder in one leg of each LED to keep them stable for the flip.

After you flip the board over, heat up the leg you soldered and use your finger to push each LED flush against the board so that the legs point straight up. Once you have them all straightened out, it's just a matter of soldering in the other leg and cleaning up the original if needed. You might be surprised at how quickly this can flow once you get the hang of it!

Applying too much heat may cook your LED's (and your finger!) so try to use as little as possible.



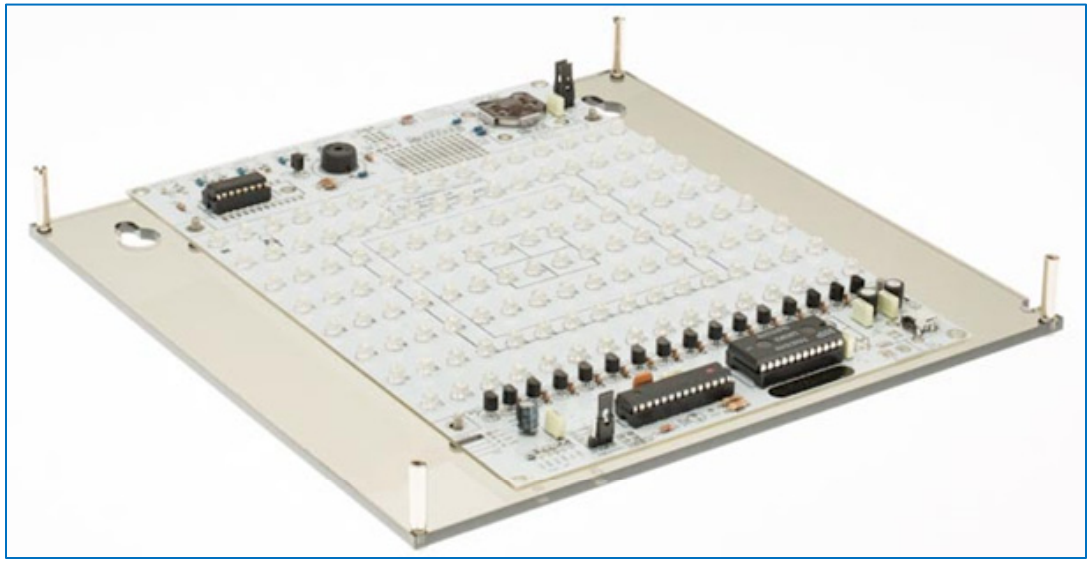
Step 14

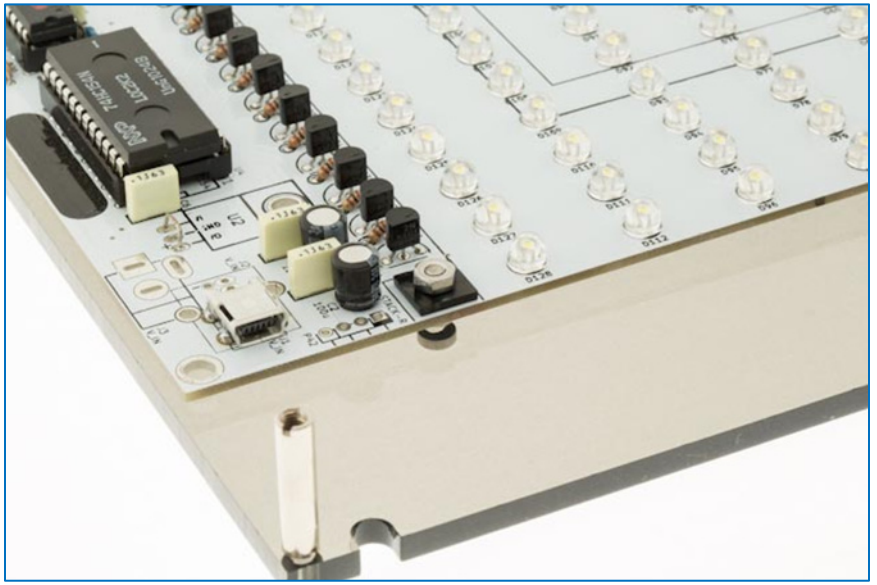
LED Array

We're ready to start making this project look more like a clock! We'll start assembling the enclosure by removing the protective peel from the rear plate. Be very careful to place the front and back plates down on a clean, soft surface to prevent scratches. Start by installing the four corner screws and shafts that will later be used to mount the front plate. Then insert the four inner screws and nuts used to secure the board.

Line up the board with the four inner screws and lay it down so that it's flush with the hardware and oriented properly. The buttons and FTDI connection will need to fall into place with the cutouts on the rear plate.

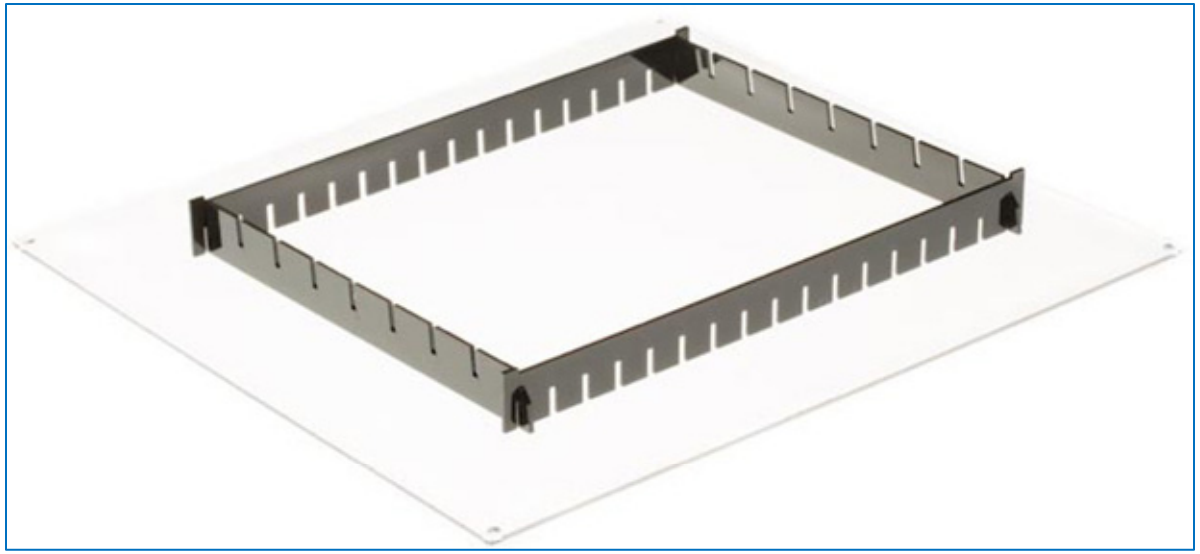
Secure the board with the four square spacers and four nuts. The spacers will help keep the baffle grid in place later on.

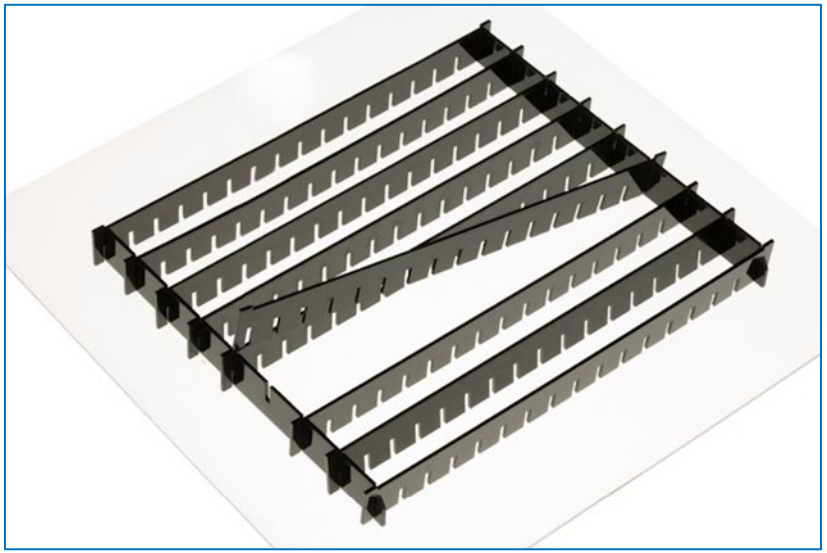




Step 15

Enclosure

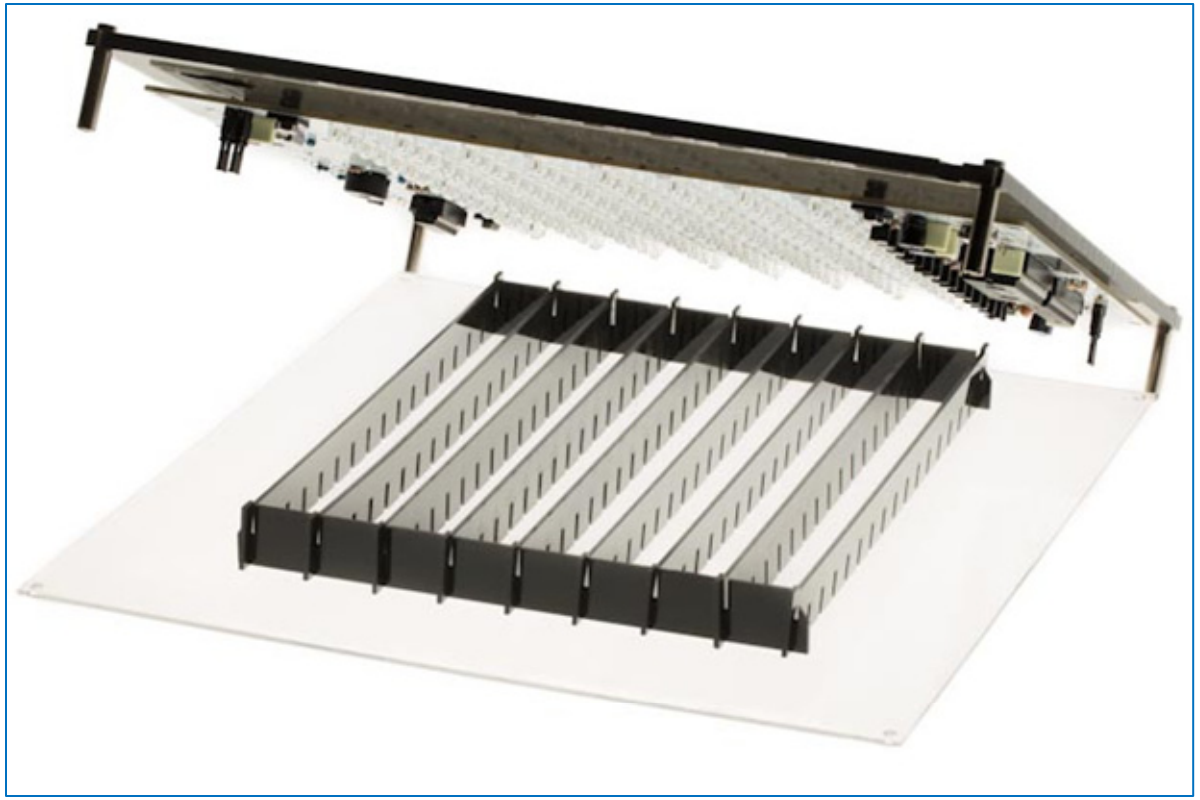


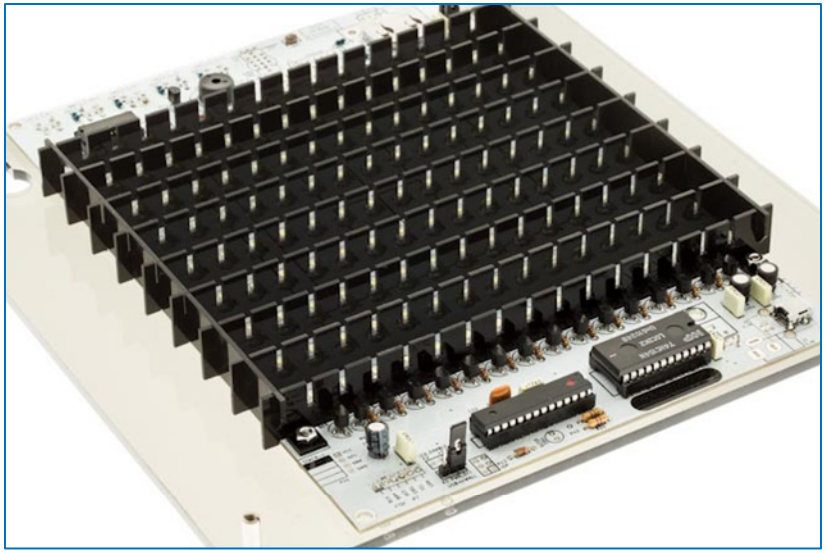


The baffles may seem like a bit of a puzzle, but hopefully these tips will help. First, take two short pieces (slots up) and two long pieces (slots down) and make a square on a flat surface that you'll be able to flip over later. You may consider using a piece of cardboard or large book as your surface.

Next, fill in the rows of long pieces using your two short pieces as columns.

Finally, orient the back plate so that the four square spacers line up at the top and bottom of the grid and lay it down. When you're sure that everything is lined up and fitted, carefully flip everything over so that the back plate is once again on your clean, soft surface.



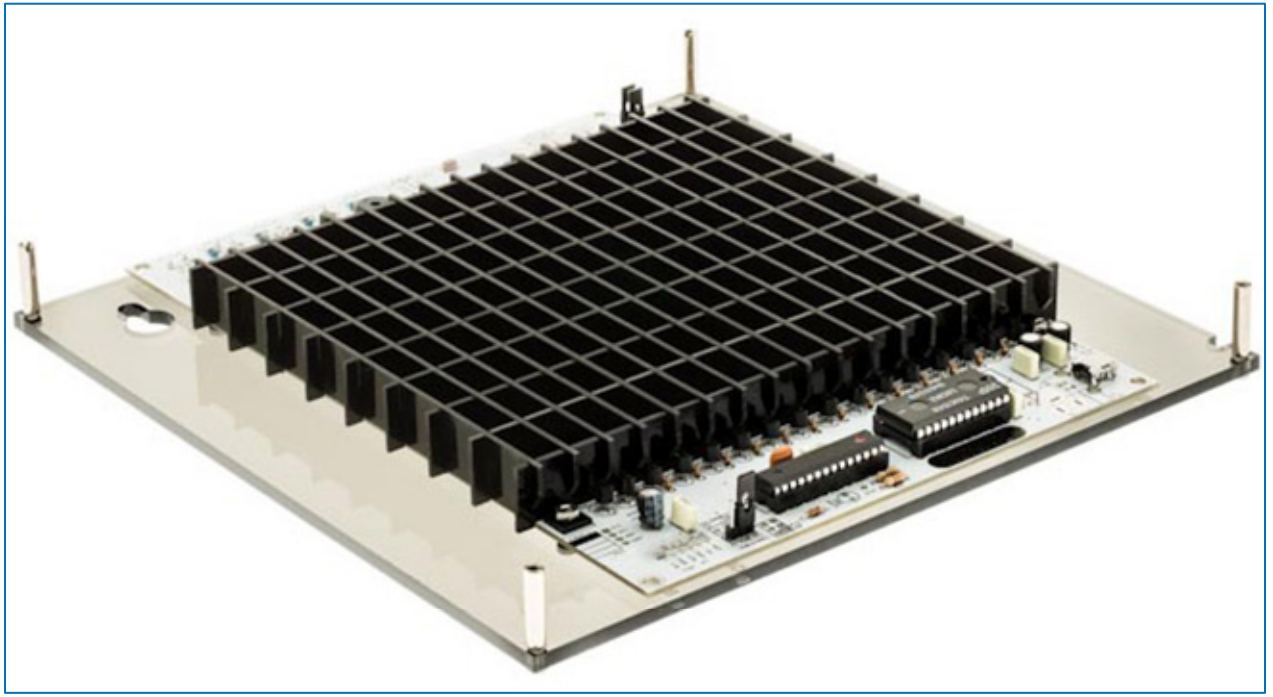


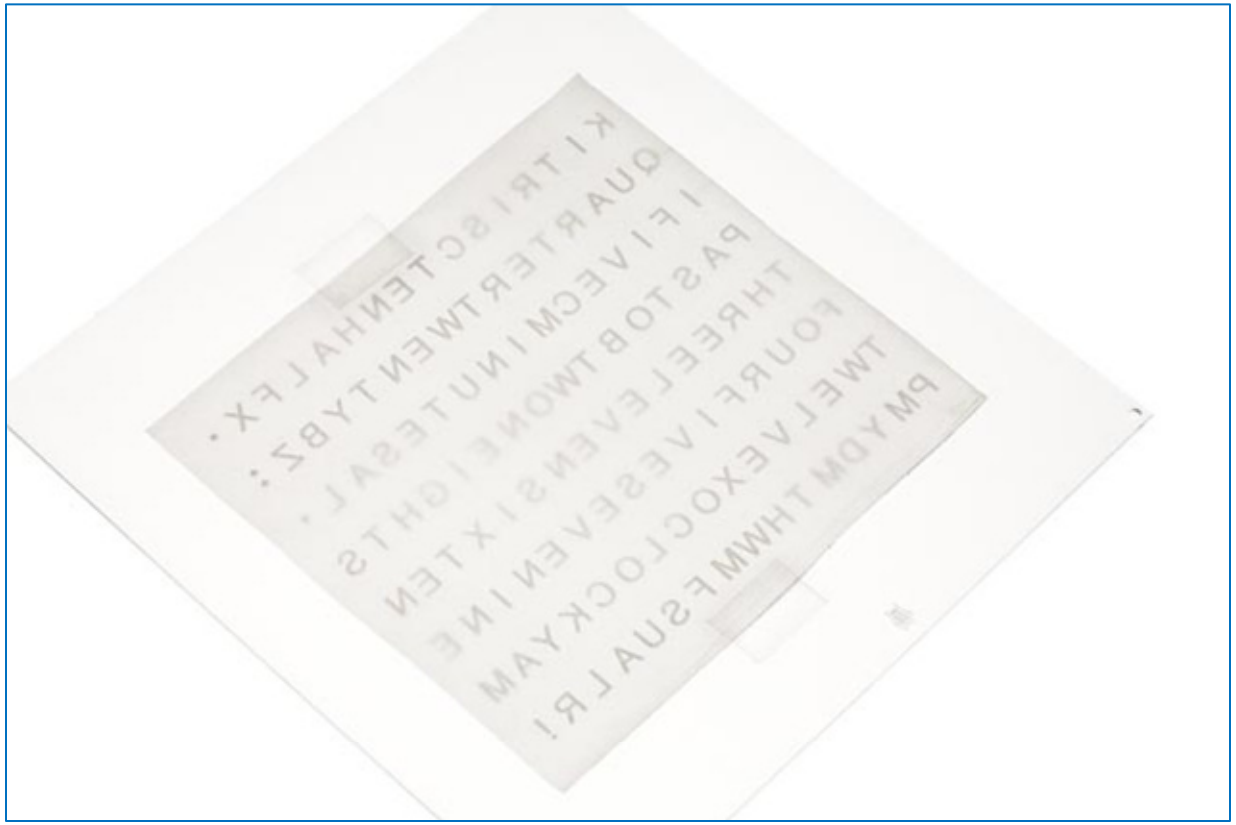
If you find an easier way to do this, please let us know!

Step 16

Enclosure Part 2

Now place the rest of your short pieces onto the grid.





Locate the top plate and carefully remove the protective peel. Place the plate face down on your clean, soft surface to prevent scratches. Center the sheet of paper vellum so that it covers all of the letters and secure it with some tape. This sheet will help to soften and spread the light. If you prefer a softer look, you can layer tracing or parchment (baking) paper until you get the results you're looking for.

Step 17

Enclosure Part 3

You’re almost done!

Ensure that the PWR SEL jumper is in the correct position (Left = FTDI Cable | Right = USB Cable) and mount the front plate to the rear plate.

Great Job! Your clock is complete!

Power ClockTHREEjr up and admire your hard work!

Step 18

Enclosure Part 4

Using ClockTHREEjr

Buttons and Dimmer

You'll find five buttons on the back plate that are used to control your clock along with a thumb wheel to adjust the brightness.

<RST> Reset. The Reset button can be used to restore function if the clock should become unresponsive. It's the same theory as rebooting your computer with [CTRL] + [ALT] + [DEL].

<MODE> Mode brings up the clock menu and is usually the first thing you'll press. The word clock on the face will be replaced with large characters. You can switch between the options (Currently "S" and "N") with the <INC> and <DEC> buttons. Pressing the <ENTER> button chooses a mode to go into.

> The "S" mode is used for setting the date and time. Once you enter the mode, you'll see an alternating "Y", which stands for year, followed by a two digit number flashing continuously. Pressing <INC> or <DEC> will change the two digit year back and forth. Pressing <MODE> acknowledges any changes made and circles through all of the other time settings. Year/Month/Day/Hour/Minute are all represented by their flashing first letter. Press <ENTER> when you are happy with the changes to drop back into normal mode.
>
> The "N" mode is the normal mode for telling time. This option is available to back out of the menu prior to entering a mode. We may include more modes in the future, so this was included as a way to back out of the menu.

<INC> Increment Up. When pressed in the menu, or a mode, this button will switch to the next possibility. When pressed by itself, the clock displays seconds on the clock face. Press any button to switch back to the normal clock mode.

<DEC> Decrement Down. When pressed in the menu, or a mode, this button will switch to the previous possibility. When pressed by itself, the clock will display the temperature in Celsius or Fahrenheit. You can switch between the formats by pressing the <INC> key. Press any button other than <INC> to switch back to the normal clock mode.

<ENTER> Enter. This button is used to lock in your selection.

Programming the ATMega328

ClockTHREEjr comes with a pre-programmed processor, so the clock is ready to use once plugged in. From time to time, we may release a revision to the clocks code which can be programmed into the ATMega328 via an FTDI cable (sold separately) using the free Arduino Software as your deployment tool. If you're not familiar with Arduino, now would be a great time to get involved with this very user friendly device and create some projects of your own. It's incredibly simple, has a huge community to help with your questions, and the knowledge gained will help you to understand the methods for updating your ATMega328's code.

Once you get a handle on the Arduino software, use the "Arduino Duemilanove w/ ATMega328" board setting to program the clock and make sure that you select the right serial port for your cable.

As always, if you have any questions for the WyoLum team, please feel free to contact us in our forums or through the support email address <info@wyolum.com>.

Links

Wyolum: http://www.wyolum.com

Support & Discussion: http://wyolum.com/forum/index.php

WiseTime with Arduino: http://timewitharduino.blogspot.com

C3Jr Project Repository: http://code.google.com/p/clockthree

DigiKey Electronics Parts: http://www.digikey.com

PanaVise Circuit Board Holder at Electronix Express: http://www.elexp.com/pro_v333.htm

Weller WES51 Soldering Station & Tips at Electronix Express: http://www.elexp.com/sdr_es51.htm

Chronodot at Adafruit: http://www.adafruit.com/products/255

7-Segment Serial Display at Sparkfun: http://www.sparkfun.com/products/9766

Arduino: http://arduino.cc

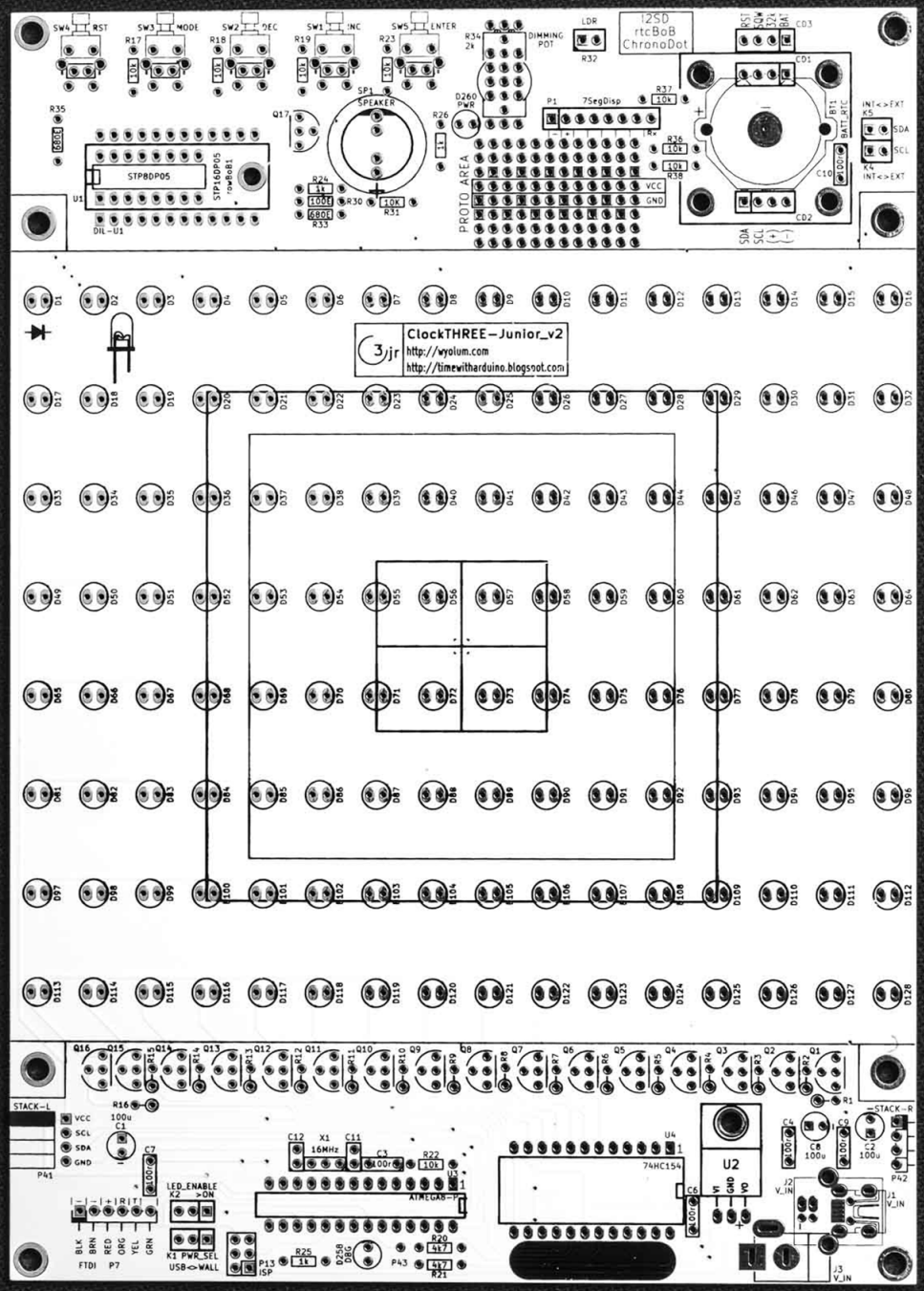
Seeed Studio: http://www.seeedstudio.com/depot

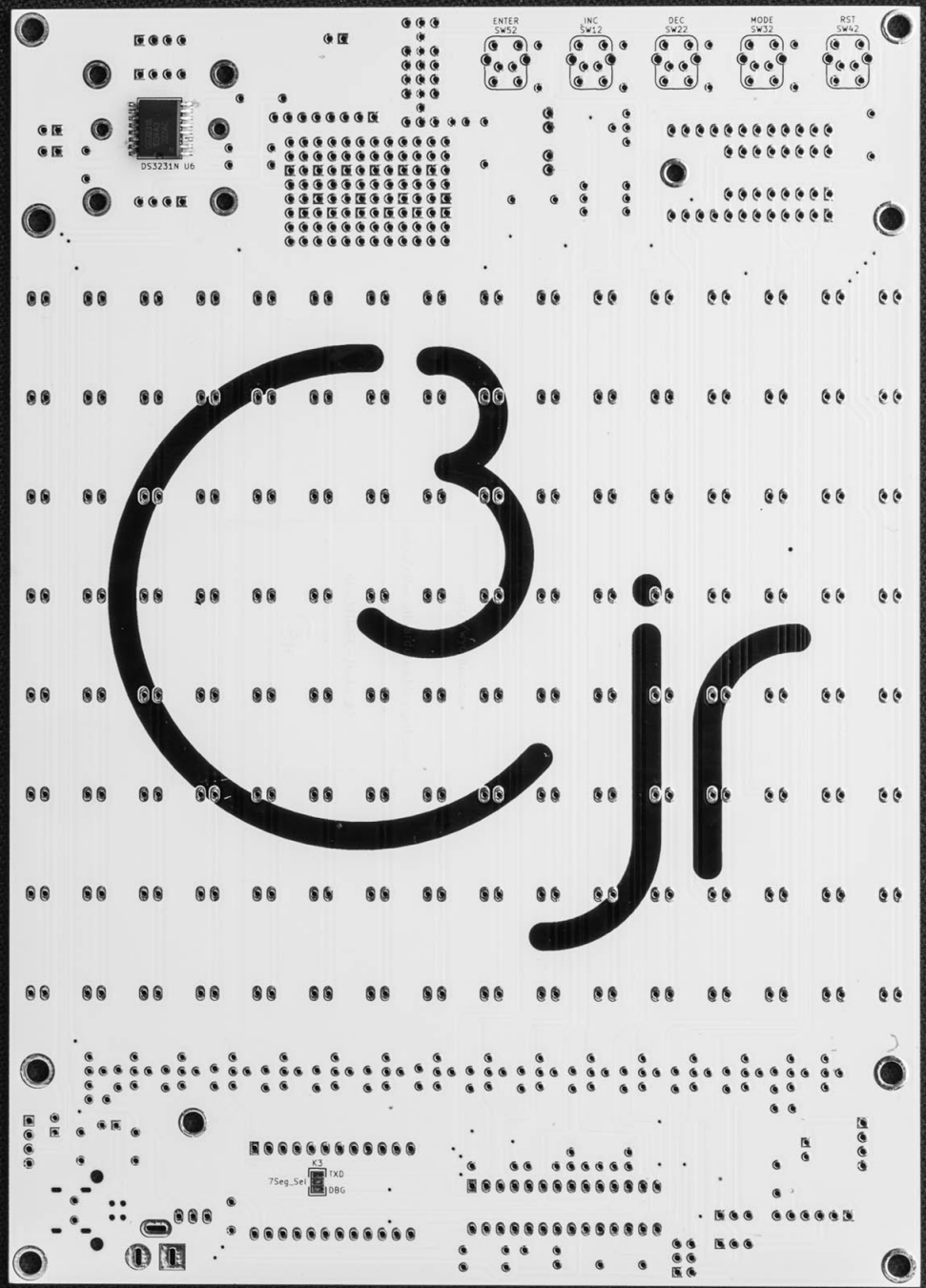
Creative Commons: http://creativecommons.org/licenses

Open Source Hardware (OSHW): http://freedomdefined.org/OSHW

OSHW Logo: http://oshwlogo.com

Open Hardware Summit: http://www.openhardwaresummit.org


ClockTHREE–Junior_v2
http://wyolum.com
http://timewitharduino.blogspot.com
12SD
rtcBoB
ChronoDot
PROTO AREA
SPEAKER
DIMMING POT
LDR
7SegDisp
STP16DP05
DIL-U1
ATMEGA-P
74HC154
16MHz
DS3231N U6
SW4 RST
SW3 MODE
SW2 DEC
SW1 INC
SW5 ENTER
FTDI P7
ISP
P41
P42
P43
STACK-L
STACK-R
LED_ENABLE
K1 PWR_SEL
USB<>WALL
7Seg_Sel
TXD
DBG
V_IN


ENTER SW52
INC SW12
DEC SW22
MODE SW32
RST SW42
DS3231N U6

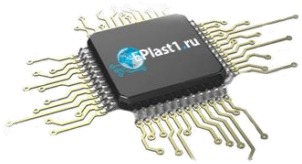
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.