BigTime

Kit Information & Instructions

The SparkFun BigTime kit is an entry-level kit that enables you to build your own watch. This kit, designed for beginner to intermediate level electronics enthusiasts, contains all the parts you need to put together a functioning wrist-watch. Sure to get attention, the BigTime kit will have all your friends wondering where you got your watch - and you can tell them you built it!

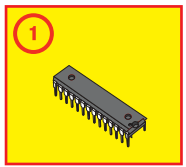
Kit Includes:

- ATMega328
- 7-segment display
- 0.1uF capacitor (qty:2)
- 100k resistor
- 32kHz crystal
- Button
- Coincell battery
- Battery holder
- Enclosure
- Screws (qty:4)

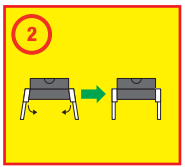
QUICKSTART - YOUR FIRST COMPONENT

Make sure to insert components into the board as far as possible to ensure a proper fit. Check to make sure ATMega328 is fully inserted and laying flat before soldering.

Steps highlighted with a yellow warning triangle represent a polarized component. Pay special attention to the component's markings indicating how to place it on the board.



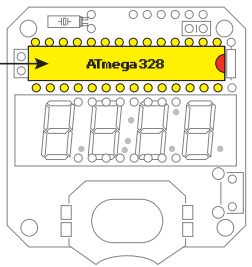
Locate the ATMega328



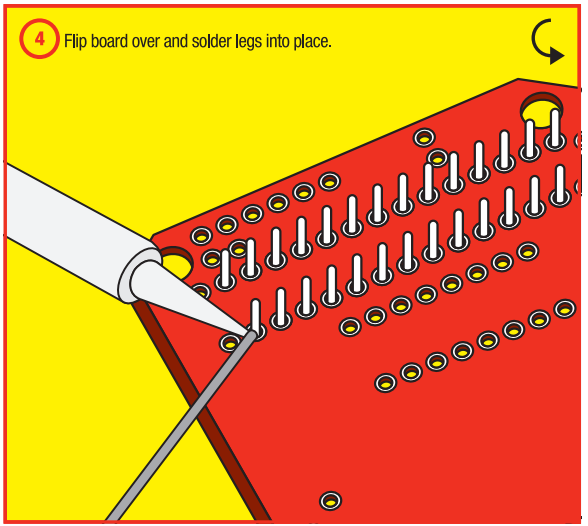
Bend legs slightly inward to 90°

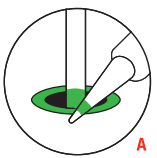
3 ATMega328

Gently insert the ATMega 328 into its footprint. Make sure you match up the **notch on the IC** to the **notch on the board's outline**.

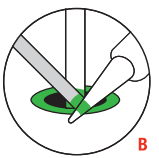


VIEW FROM TOP SIDE OF BOARD

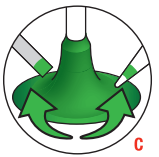




Apply Iron to Leg



Feed Solder into Leg



After Fill
Pull Both Away

Now that you've successfully soldered in the resistor, use the same method to place and solder the rest of the compnents.

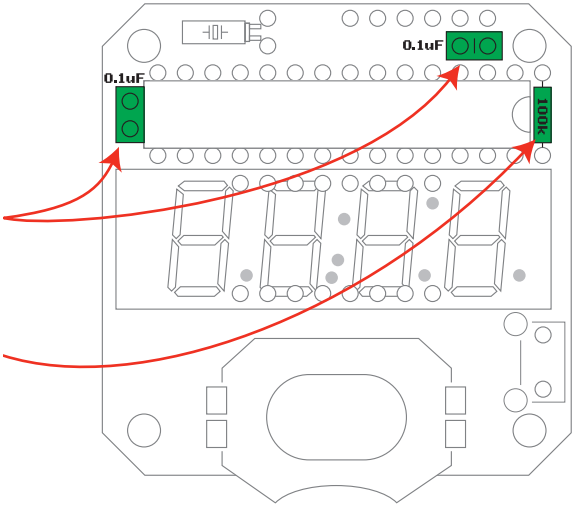
EACH STEP HAS TWO PARTS

- START BY PLACING THE COMPONENT THROUGH THE **TOP SIDE OF THE BOARD.**
- TURN THE BOARD OVER TO SOLDER ON THE **BOTTOM SIDE OF THE BOARD.**

1uF caps x 2 : Insert on the top side, solder on the bottom. After soldering, clip the excess metal off the legs.

100k resistor : Bend the resistor legs so they form a "U" shape. Insert the resistor on the top side, and solder on the bottom. Clip off the excess legs after soldering.

VIEW FROM TOP SIDE OF BOARD

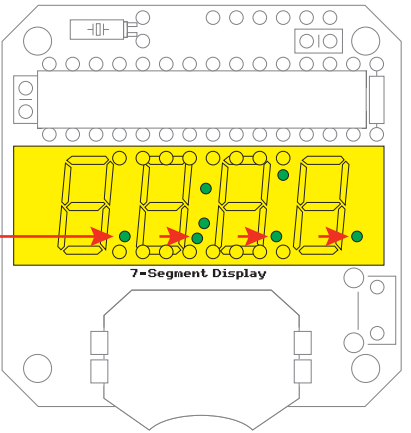


7 100k Resistor

7-Segment Display : As you insert this part, make sure you match up the 4 decimal points on the bottom of the display to those on the PCB. **Your display won't work upside down!** After soldering all legs, clip off any excess.

(Display may have protective film on top, feel free to take this off)

VIEW FROM TOP SIDE OF BOARD



Steps highlighted in yellow represent a polarized component. Pay special attention to the component's markings indicating how to place it on the board.

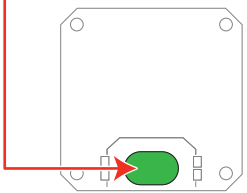
SOLDER ON TOP SIDE OF BOARD for this step only!

8 Battery Holder

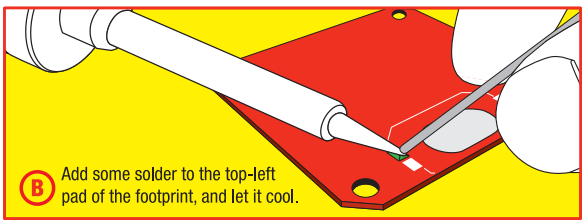
Battery Holder : This is the trickiest part. Make sure you line the battery holder up with the footprint or else you won't be able to insert the battery.

A Add a thin smooth layer of solder to the larger, center pad of the footprint. Don't be afraid to get the pad too hot. A flux pen will also be helpful if you have one.

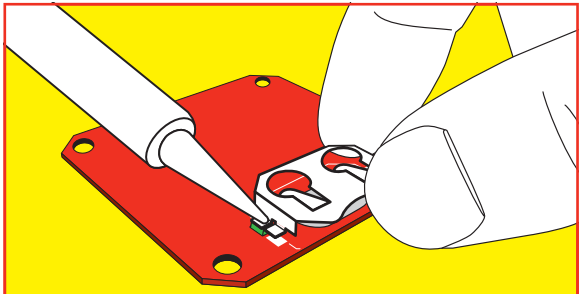
VIEW FROM TOP SIDE OF BOARD



VIEW FROM SIDE OF BOARD
[with solder added]



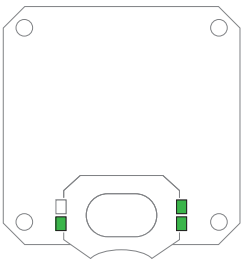
B Add some solder to the top-left pad of the footprint, and let it cool.



C Hold the battery holder from the right and heat the pad you already put solder on. When the solder begins to flow, place the battery holder on the board and remove your iron.

D Solder the three remaining legs of the battery holder in normal fashion.

VIEW FROM TOP SIDE OF BOARD



Sign and Date : Turn the PCB over and date/sign the box that says 'Built On:' - for posterity.

9 Sign Your Board

32 kHz Crystal : Gently guide each leg through the proper hole and push the crystal in as far as possible. After soldering and clipping the legs, bend the crystal over to match the footprint on the board.

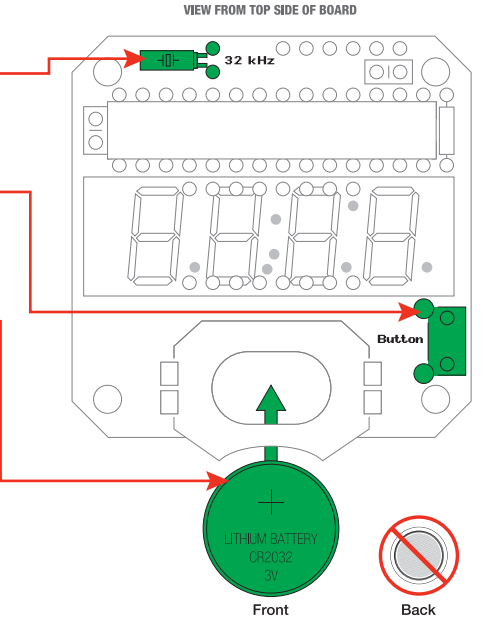
10 32kHz Crystal

Button : Place the legs so the button faces off the top of the board to the right. After soldering all four legs, clip off any excess metal.

11 Button

Battery: Insert the coincell battery positive side up (that's the side with the writing on it). The display should light up.

12 Battery



MECHANICAL ASSEMBLY

Bottom to Top Instructions

13 

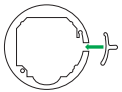
Locate the enclosure piece with two curved rectangle holes. Rotate your piece so the holes are vertically aligned, as seen to the left.

14 

Place this piece directly on top of step 13, with the open end pointed down.

15 

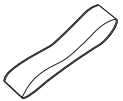
Place your completed board into the open space in step 14's enclosure, battery clip pointed down.

16 

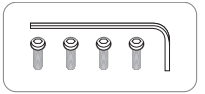
Place this piece on top of the three previous layers. Add the button lever into the opening on the right (see green arrow). The slightly bulbous end of the lever should be at the top.

17 

Place the final piece on top. The cut-out area in the middle should fit snugly around your 7-Segment Display. Once this is in place, use the allen wrench to tighten the four screws into place.

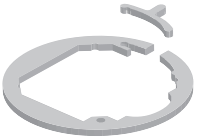
18 

Turn the enclosure upside down and weave the velcro wristband through the two curved rectangle holes, sticky side facing the front. Enjoy your new piece of geek flair.



Some plastic enclosures will need to have the protective film removed first before assembly can take place.

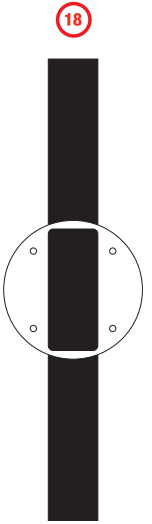
17 

16 

15 

14 

13 

18 

Learning More

To Set the Clock

Hold down the button until you see the colons blink.

Continuing to hold the button will cause the time to increase.

Soldering

The tip of the iron is normally 700 °F, hot enough to melt metal. It is normal for the handle of the soldering iron to heat up a bit. Hold it like a pencil and move your hand further away from the tip if the heat is uncomfortable. The solder smokes because the rosin inside the solder is burning off - it's not harmful.

Microcontroller and PCB

The microcontroller is the brain of the watch. It comes pre-programmed to run the clock properly. It is designed to withstand the heat of the soldering iron and gentle bending of its legs. Just be reasonably gentle with it and you should be fine.