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The Ornament

Instruction Guide

For the best outcome, follow each step in order.
We recommend reading this guide entirely before you get started.
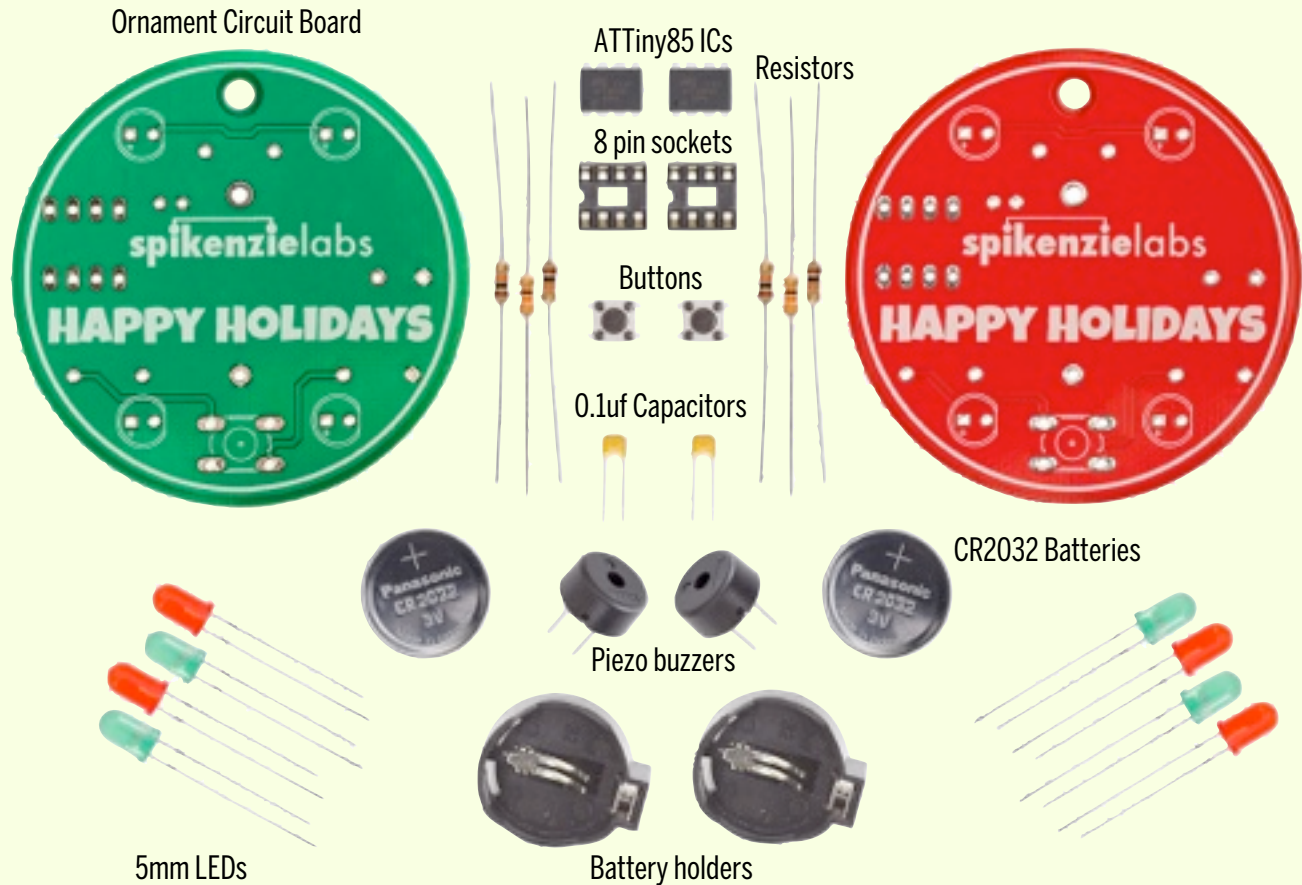
Tools required:
Soldering iron, solder, flush cutters, masking tape (optional).
Guide v0002

Ornament Circuit Board

ATTiny85 ICs

Resistors

8 pin sockets

Buttons

0.1uf Capacitors

CR2032 Batteries

Piezo buzzers

5mm LEDs

Battery holders

Top Side

Bottom side

This kit has some parts mounted onto the top of the board (LEDs and button) - They are soldered on the bottom.

Mounted to the bottom are the battery holder, socket, resistors, piezo buzzer and capacitor. They are soldered on the top.

The photos in this guide will show you clearly which side to mount the components. Soldering is always done on the opposite side. Note the white printing around the part placement spot, and a reference.

The red and green board are built exactly the same way. This guide will show you each step in order for the easiest build. Although this is an easy beginner level soldering kit, please be sure to follow the usual safety precautions. Remember to **protect your eyes with safety glasses** when snipping the excess legs from your soldering.

The ATTiny85 chips have been pre-programmed with songs and a playing-along light show. You can learn more about programming ATMEGA chips at www.arduino.cc

Resistor placement and soldering
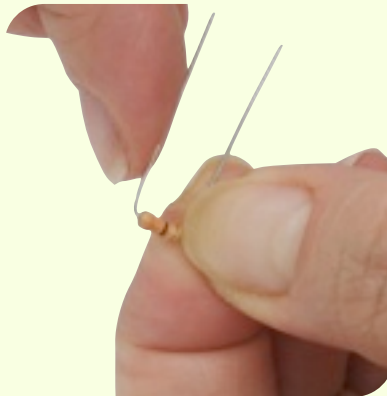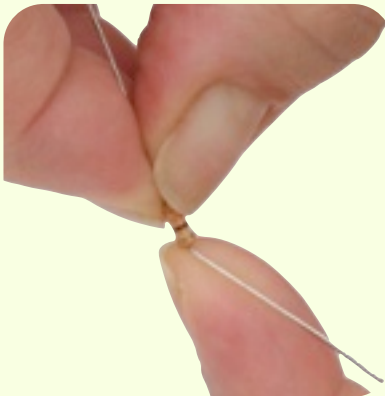
Take a look at the resistors. Each kit has two 10k resistors (Brown-Black-Orange) and one 330 ohm resistor. (Orange-Orange-Brown).

Be mindful not to **confuse them.**

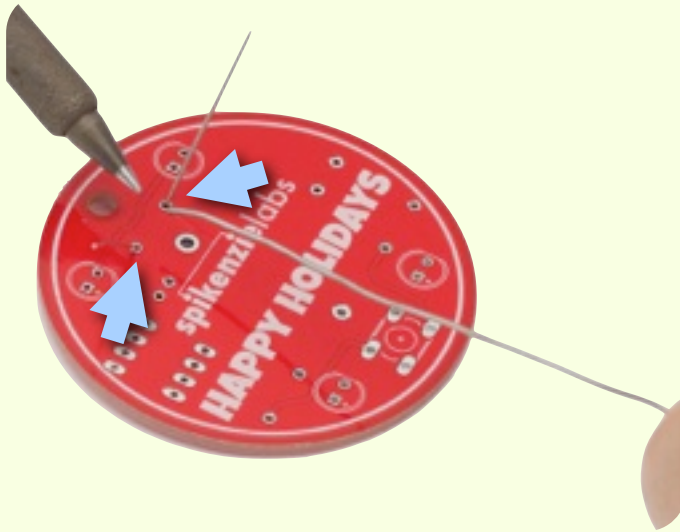Take the one 330 ohm resistor, and bend the legs as in the photo.

Place the 330 ohm resistor through the spot marked R1 on the **bottom** of the PCB. Once the resistor is in place, flip the board over, and spread the legs on the **top**

**Tip:** Use this method of holding in place for all of the long-legged components.

Flip the PCB over, and solder the 2 legs.

Put on your safety glasses, and snip the excess legs from the PCB. Note the flying bits... This is why safety glasses are important!

!

Flying Bits

For the remaining pair of resistors, (10k Brown-Black-Orange). Bend the legs as before, and insert them from the back of the PCB.
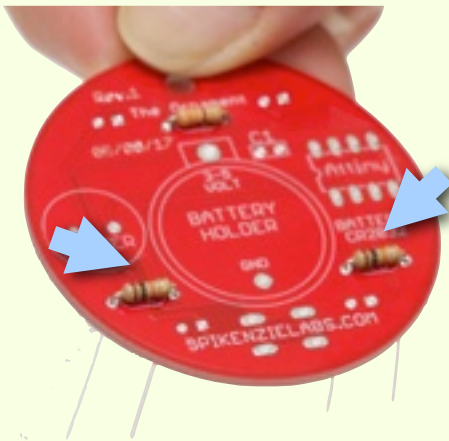
As previously, flip the board over, top side up, and solder the four legs for the resistors you mounted in place.

Put on your safety glasses back on, and snip the four excess legs from the PCB.
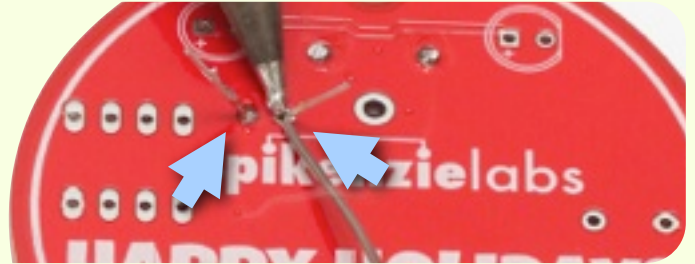
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Flying Bits

Capacitor placement and soldering

Place the single capacitor through the bottom of the PCB into the spot marked C1.

Flip the board over, and solder the capacitor in place.
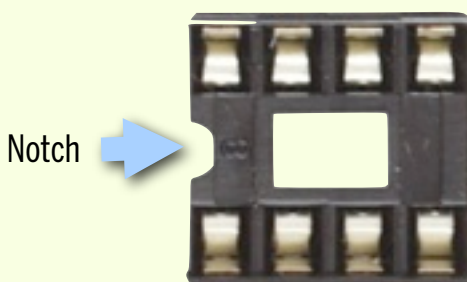
Snip the legs.

!

Flying Bits

8 Pin Socket Placement And Soldering

The 8 pin socket holds the IC, making it easier to solder, and easy to remove if need be.
For some of our beginner kits we use a socket for ICs to decrease the possibility of damage from excessive soldering heat.
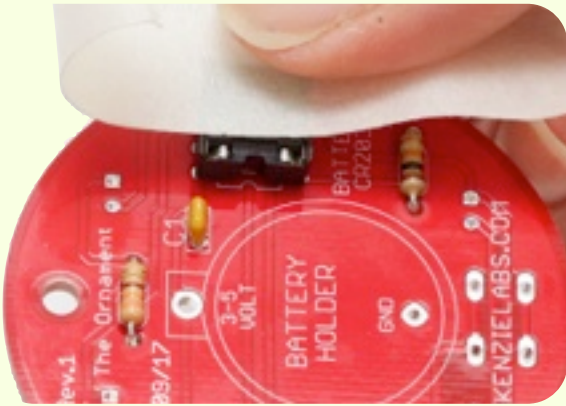
Note the notch on one side.

Notch

Place the 8 pin socket over the spot marked Attiny on the back of the PCB.
Note the notch printed on the PCB, match it with the notch on the socket.
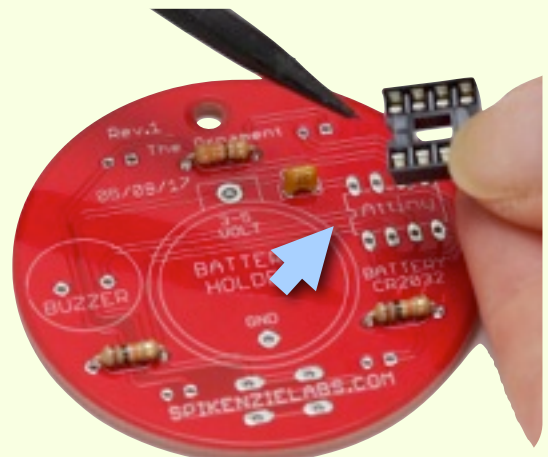
To make soldering the socket easier, you can use a small piece of masking tape to hold it in place.

Flip the PCB over, and solder the 8 pins on the top side. The tape will hold the socket in place.

Put on your safety glasses, and snip the tiny amount of socket leg that is poking above the solder points.
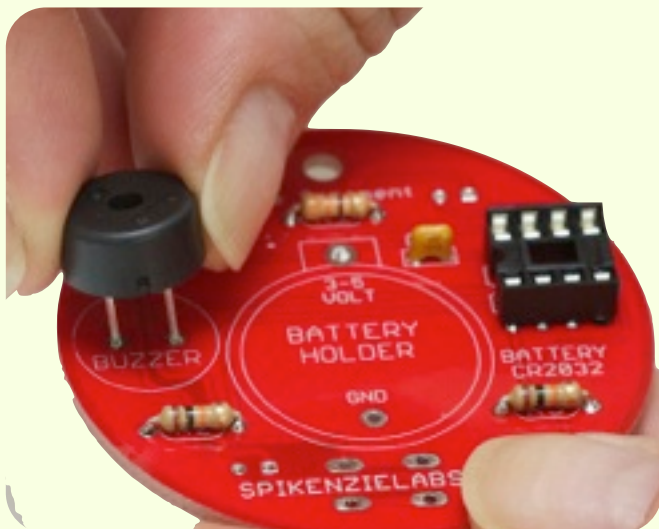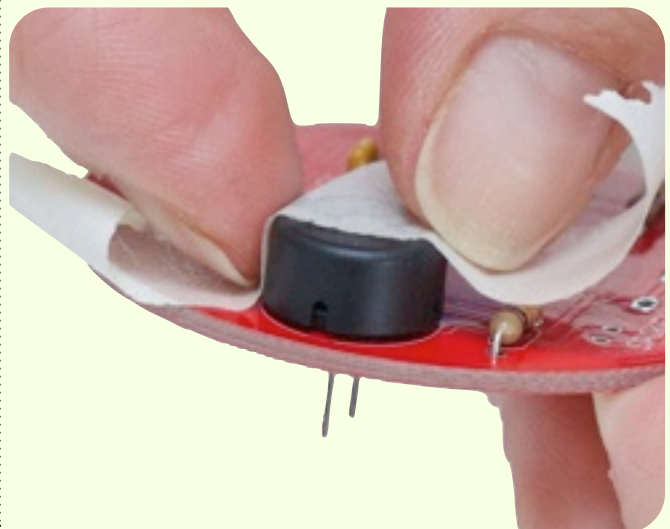
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Flying Bits

Piezo Buzzer Placement and Soldering

Place the piezo buzzer through the bottom of the PCB, at the marked location for BUZZER.

Use a piece of masking tape to hold it in place during soldering.

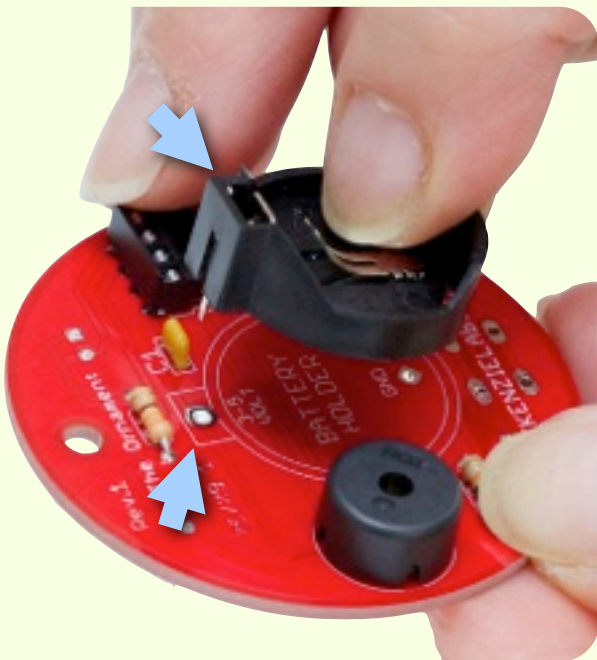Solder the two legs for the buzzer on the top side of the PCB

Safety glasses on once again, and snip the excess legs.

!

Flying Bits

Battery Holder Placement and Soldering

Place the battery holder through the bottom of the PCB, at the marked location for BATTERY HOLDER Be sure to orient the holder to **match the printing** on the PCB.

Use a piece of masking tape to hold it in place during soldering. **Double check** the orientation of the battery holder.

If it is installed in the wrong side or orientation, the ornament will not work at all.

Flip the board over, the soldering for the battery holder is done on the top side of the PCB. Solder the two points
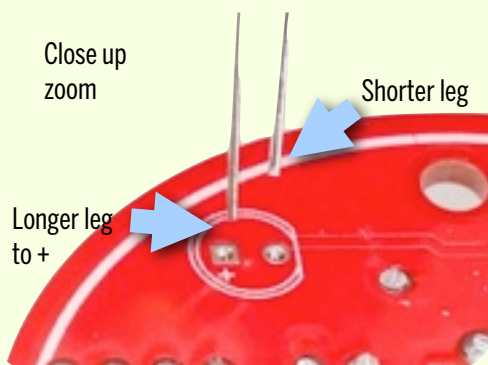
Safety glasses on, snip the ends of the battery holder legs

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Flying Bits

LED Placement and Soldering

You will notice that each LED in this kit has one leg that is longer than the other. **The longer leg is connects to the (+) positive** hole on the PCB.

This is true for all other soldering projects you will do, unless otherwise noted.

!

LED polarity

Longer leg to +

Shorter leg

Close up zoom

Shorter leg

Longer leg to +

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HAPPY HOLIDAYS

Pushing lightly down on the top of the led, then flex the legs out at a slight angle. Doing this will help the LED stay in place for soldering.


Here is a close-up of first led in place, with the legs spread to hold it in place.
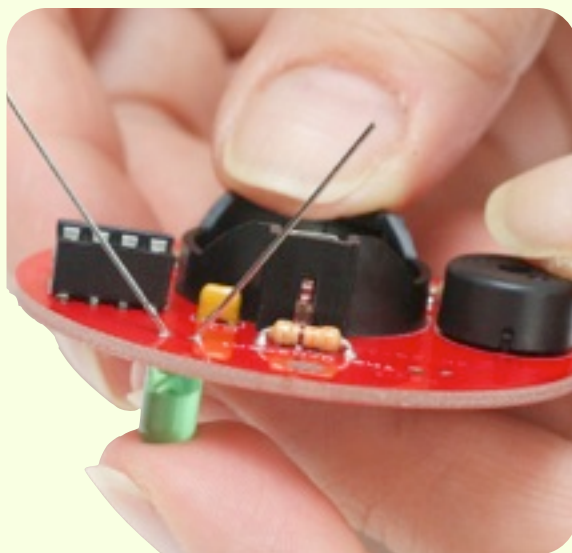

Populate the rest of the LEDS using the same method of holding them in place. Always double check to make sure the **longer** leg is going through the hole **marked (+)**

Solder the eight legs. As you are soldering, check to make sure you don't have too much solder around one leg, where it can touch the other leg.
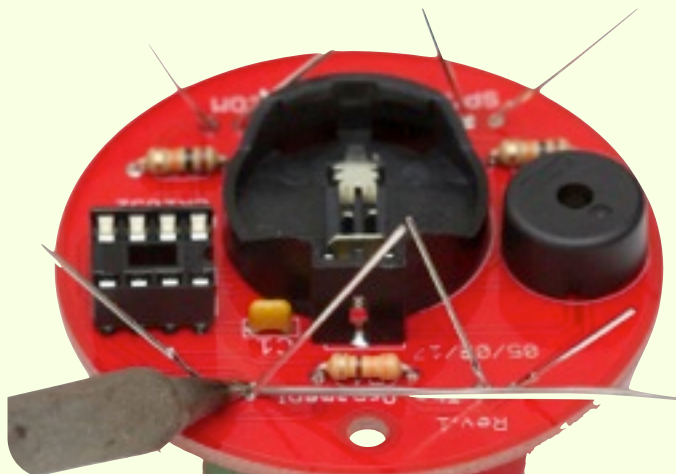
Safety glasses back on. Now trim the eight legs. You can hold onto the leg as it's being snipped. These legs tend to take flight more than others.
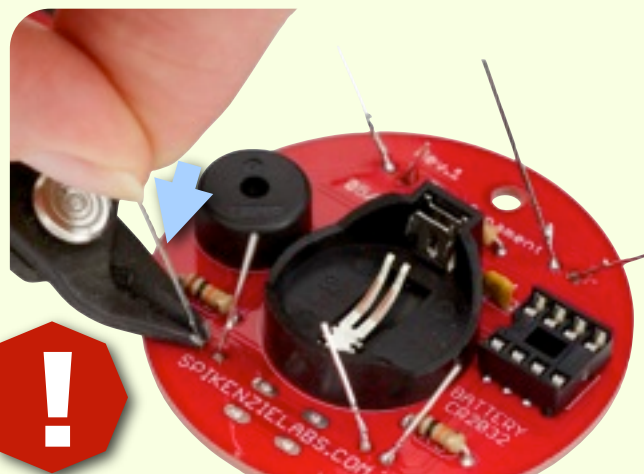
Flying Bits

Placing and Soldering The Button

Line up the button on the top side of the PCB. Get the four legs started to poke through each of the holes.

You may need to gently persuade the button's legs to enter by adjusting them slightly.

Once the button is lined up, press it vertically down so that the button of the button housing contacts the surface of the PCB. You can press the button while this is happening. You will likely feel it clank into place.
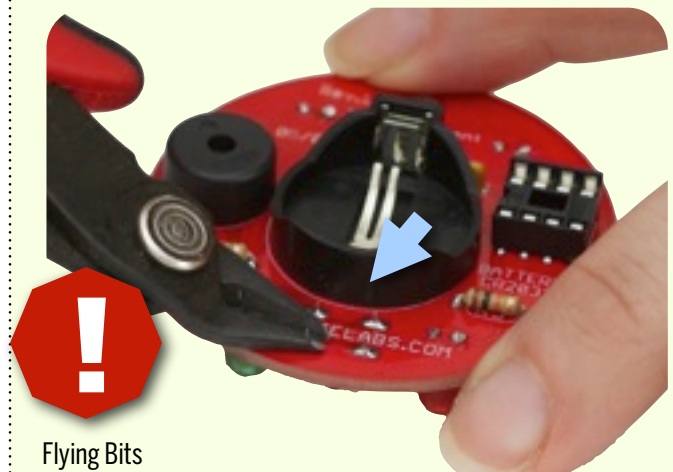
The button on your PCB should look like this

Solder the four legs of the button on the bottom side of the PCB.

For the last time, make sure you have your safety glasses on, and trim off the excess legs from the button.

Flying Bits

Preparing and Placing the Attiny85 IC

Remove the Attiny85 IC from the antistatic foam. Hold it firmly on either end, and press the legs down on a flat hard surface.

When manufactured, the legs are flared out slightly. To be mounted to the socket, the legs need to be closer to the body of the IC.

You can test fit it on the socket if you think you have them straight enough.
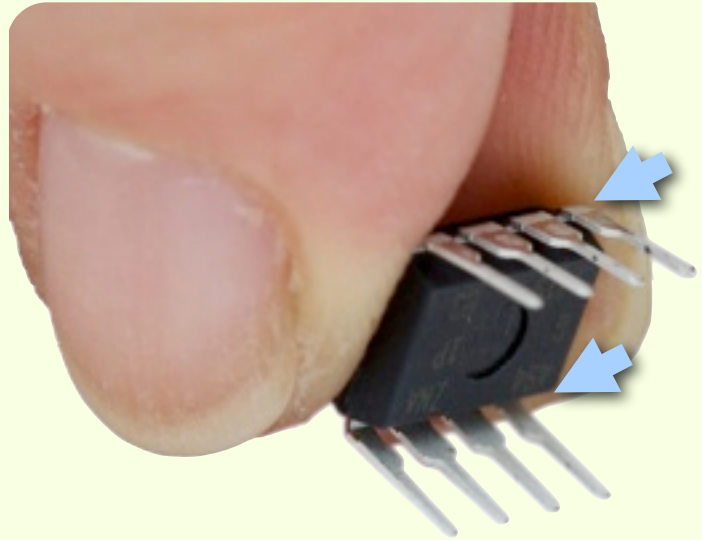
Note the orientation of the IC. The indentation dot at one end of the IC needs to be on the side of the notch on the PCB.

The socket has the same notch. The indentation dot, and notch are there to indicate the orientation of the IC.

Place the Attiny85 IC onto the socket.

Examine all the way around the Attiny85 IC, and make sure all of its legs are inserted into the socket. Once it looks good, press down firmly on the top of the IC with your finger. You will feel it slide into place.

Press lightly down

Battery Installation

Place the battery at an angle to fit it into the battery holder. Printing side up. Press down on the battery, and it will click into place.

All set. Now use a piece of string, or an ornament hanger of your choosing. Press the button and enjoy!

Happy Holidays