

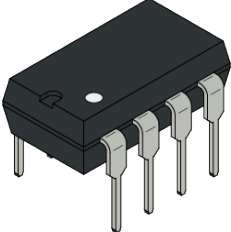
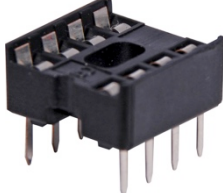




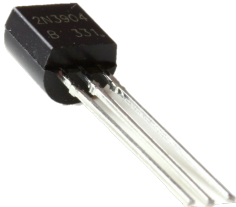








Welcome to the **Water Me Bird kit!** This savvy bird knows when your plants need water and will tweet to let you know.

She does this by measuring the resistance of the soil, when it gets too low the microcontroller (brain) starts the chirp to let your plant is thirsty.

Remember not to water the electronics. =S
-John Missikos

What's in the kit:

 <p>Microcontroller (brain) Find the dot</p>	 <p>U1 Socket holder, find the notch</p>	 <p>SP1 Buzzer, find the (+)</p>
 <p>S2 Switch</p>	 <p>R1, R2, R4 Resistor 10k Ω (Brown, Black, Black, Red, Brown)</p>	 <p>R3 Resistor 100 Ω (Brown, Black, Black, Black, Brown)</p>
 <p>Q1 Transistor – Find the curved back</p>	 <p>JP2 Screw Terminal (holes face outward)</p>	 <p>D1 LED – Find the short side</p>

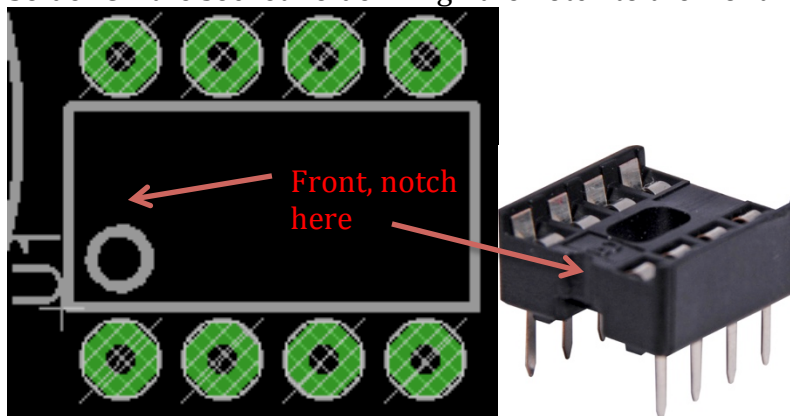
 <p>COIN Battery holder</p>	 <p>3V Battery CR2032 Type</p>	 <p>Bird PCB Printed Circuit Board</p>
 <p>Metal rods (2)</p>		

Conventions:

Each part is given a part number like R1 for the resistors, Q1 for the transistor. This helps you find where it will be placed on the PCB (blue bird which is a circuit with wires in it!).

Construction:

1. Solder Resistor **R3**: 100 Ω resistor (Brown, Black, Black, Black, Brown)
2. Solder Resistors **R1, R2 and R4** 10k Ω resistor (Brown, Black, Black, Red, Brown)
3. Solder Transistor **Q1**. Remember to align the flat side.
4. Solder **U1** the socket holder. Align the notch to the front



5. Solder Switch **S2**. Note the legs come out on the left and right
6. Solder Speaker **SP1**. Align the (+) with that on the board
7. Solder **COIN**. The battery holder has a distinct circle to be aligned.
8. Solder red LED **D1**. Note the red plastic has a flat side that aligns with the marker. Flat side to the right.
9. Solder the screw terminal **JP2**. Note the open holes face down. They will hold the metal rods.

10. Unscrew the terminals **JP2** to allow for the size of the rods. Screw the metal rods into JP2 on the left and right. Leave the middle one empty.
11. Note the microcontroller has a notch and dot at the front. Align this with the front of U1 on the board. When inserting it ensure the legs don't bend out of the socket.
12. The coin battery is to have the (+) face upward. Insert the battery. She is alive. Congrats.

Operation

1. Insert the bird's legs into DRY soil, pack it around the legs.
2. Press the button to tell it what dry is. You have now told the bird to tweet when the soil is like this. It will now chatter away periodically.
3. Water your plant, the bird will now go to sleep
4. When the soil is dry again the bird will tweet periodically.

Trouble shooting

- No sound or light – check battery (+) is face up. Ensure microcontroller has the notch facing left. Ensure LED has flat side on the right.
- No light, but tweets - Ensure LED has flat side on the right.
- No tweet but light – Ensure speaker has (+) at top
- Tweets once then nothing – The bird thinks it is wet. Place it in soil, then press the button to tell it's dry. Chirping should begin. Then water plant and chirping will stop.
- Check transistor is correctly aligned for any other issue

How it works

The microcontroller is a special chip allowing you to program what happens (outputs like speakers and lights) when it detects certain inputs (water detecting legs). In the case of the bird, the controller is told: when you see the resistance between its legs is high (i.e. nothing conducting) then do a tweeting pattern though the speaker and led (output). Repeat this until you see conduction (water helps). If you have seen water for a while, go to sleep more and more to save battery.

Going Further

The code and circuit for the bird is available at:

www.tinkerelectric.com/products/water-me-bird/

This allows you to see how it works and modify it. For more on electronics visit us at: www.TinkerElectric.com