

The Cambie Zapper

Level One Electronics: Project number One.

Name: _____

Keep this package in a safe place it will not be replaced...

Your project contains four resistors labelled R1 through R4. Write down the colour codes for those resistors here.

R1 _____

R2 _____

R3 _____

R4 _____

(12)

Now using a multimeter, measure their actual values and write them below

R1 _____

R2 _____

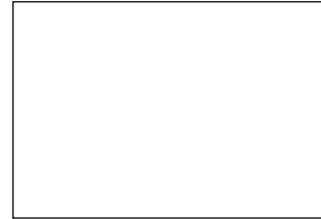
R3 _____

R4 _____ (8)

Why is there a difference between the colour code value and the actual measured value? _____

(5)

Draw the 555 timer with its Correct pin layout below.



(4)

Draw your 2N3904 Transistor In the box below, as it really looks and identify each leg. (E,B & C)



(3)

Answer these questions carefully

1) The letters IC stand for _____

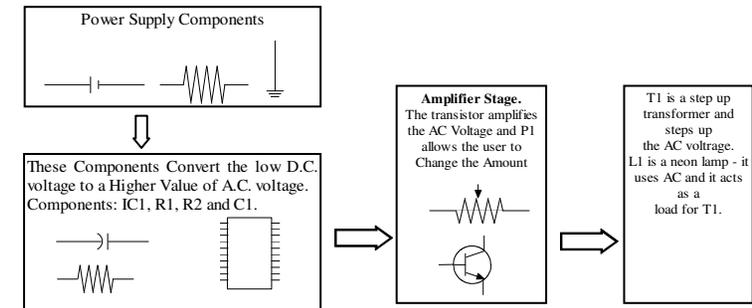
2) A transistor has three legs and they are labelled E, B and C in this order they stand for E _____

B _____

C _____

This is a block diagram of the Tingler. A block diagram groups the individual components so that we understand how they work together. This is also useful when we want to trouble shoot a project that doesn't work. It can lead us to areas that are functioning and those that are not.

BLOCK DIAGRAM



Component Installation Guide

Step 1

Using a multimeter with a continuity tester check all tracks for continuity. That is make sure that they are not broken.

Step 2

You should install all components in the prescribed order and make sure that they are installed with the correct polarity. This applies to everything except the resistors.

Some pointers:

- ✓ Check that all resistors lay the same way i.e. gold stripe on the same side.
- ✓ Components should lie flat except for the transistor, which should be low down but not squashed.
- ✓ All wires should be soldered so that the insulation touches the board and as little bare wire is exposed as possible. Use Stranded wire to connect all parts that are not on a pc board.
- ✓ All solders should be small and neat. Use just enough to cover the hole completely and form a small volcano shaped cone.

At this point your PC board should be complete. It is etched and drilled and you have completed a continuity test.

In order to get your components you will need to get Mr B to sign here that all of the above is complete.

_____ (5)

Identify each component and check that it is correct
You should have
R1, R2, R3, and C1 The IC socket and a battery clip.

Theses need to be installed on the PC board and then soldered in place
Double check that the **IC socket** is the correct way ie pin 1 is in the place for pin 1. Also the **battery clip** has the red and black leads in the correct holes.

Part one of the block diagram is now complete.

We should be able to check that the IC is actually producing an pulsing DC wave form. Perform the following tests:

- Using a DMM set to DC Volts measure across your battery clip leads and record the value _____ .V

This is the power you are providing to the circuit

- Now place the black lead on the negative terminal and the red one between R2 and R3. Record the voltage _____ .V

What do you observe about the two values above?

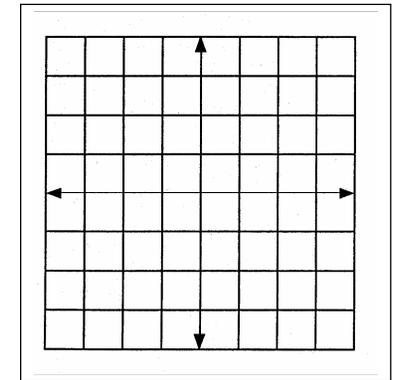
Why does this occur?

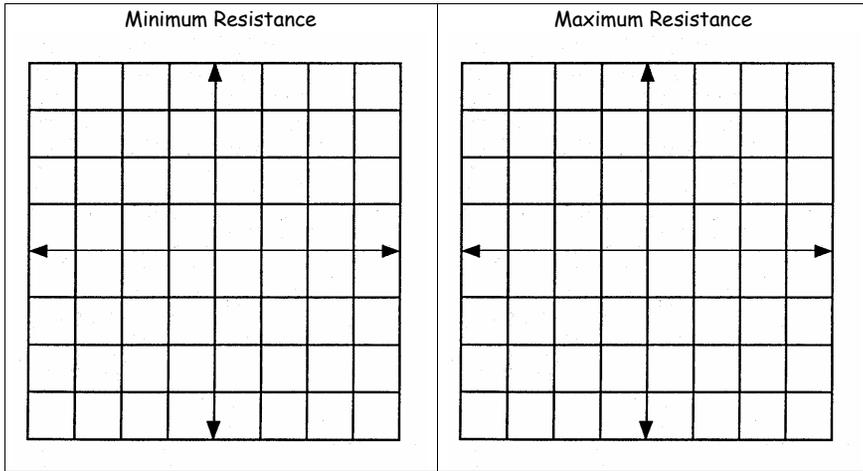
- Now using an oscilloscope, connect the clip to your negative lead and the probe to pin 3 on the IC. Set the Volts/Div to 1V. Draw what you see on the right.



This is varying DC, which is similar to A.C.

- Now go ahead and install R4 and P1. With the 'scope check out what happens as you vary the potentiometer. What do you notice? Draw the two waveforms above.





➤ Now solder in the transformer and draw its circuit symbol below

- Solder in the Neon Lamp.
 - Attach the Touch pads with stranded wire and Have fun...
- Hand in this package and the project for marking.

