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## Building Chua's Circuit



While there are many ways to build a standard Chua's circuit and many variations on the standard, for simplicity, we will focus here on the version made only from resistors, capacitors and op-amps as shown on the previous page.

There are many factors to consider when selecting components, e.g. circuit size, accuracy needed, cost etc. I'll show you how an effective, cheap and compact circuit can easily be built with two 9-volt batteries [Figure B] and the aforementioned components.

Figure C details the component requirements for a 9-volt circuit as constructed in Figure A. If you are using batteries, as opposed to an alternate power source, it is reccomended that you use brand name batteries such as Energizer, Duracell or equivalent. Many off brands can't maintain voltage during the higher current load that occurs when the circuit is chaotic.

All op-amps used are TL082. Each chip has two op-amps--one on either side. You could also use the TL084, which has 4 op-amps, depending on your specific circuit design. L here represents the inductance value of the gyrator, which we are using in place of an actual inductor. Calculating this value can be done as follows:

$$L=(R_7R_9R_{10}C)/R_8$$

This gyrator simulates an ideal inductor, and you will see later how this is useful for measuring the signals produced. If you don't wish to use a gyrator, please read our page on using real physical inductors.

For capacitors, I highly recommend you avoid the common, round, ceramic capacitors. Go for mylar capacitors. They work much better and it will make the output much sharper.

Precision resistors are not really worth it unless you want really clear and precise double scrolls. Regular resistors work just fine. But you do want to get nice, easy to adjust potentiometers. You will be spending most of your time turning these little dials trying to get the right patterns to show up, and you will thank yourself for not using the screwdriver-adjustable only pots. Get something with big nobs that are easy to tune and have fine control. These circuits are sensitive and you want to have control over what is going on.

NEXT

FIGURE A:
fully labeled chua's circuit

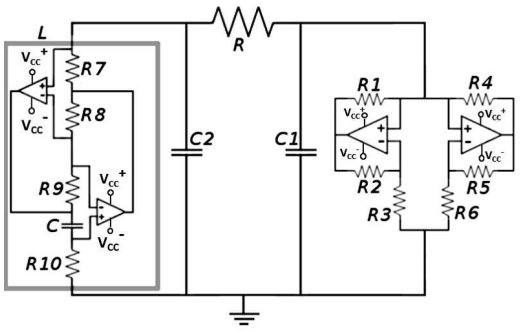


FIGURE B:
battery hook-up

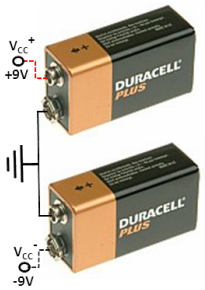


FIGURE C:
component value list

| | |
|---|---|
| R=2.5 kΩ (pot.) | C=100 nF |
| $R_1$=220 Ω | $C_1$=10 nF |
| $R_2$=220 Ω | $C_2$=100 nF |
| $R_3$=2.2 kΩ | |
| $R_4$=22.0 kΩ | L=15 mH |
| $R_5$=22.0 kΩ | |
| $R_6$=3.3 kΩ | |
| $R_7$=100 Ω | |
| $R_8$=1.0 kΩ | |
| $R_9$=1.0 kΩ | |
| $R_{10}$=2.5 kΩ (pot.) | |