

CSCPO01 - Code Practice Oscillator Circuit Sticker

1. General Description

A photo of a prototype CSCPO01 Circuit Sticker code practice oscillator appears in Figure 1.

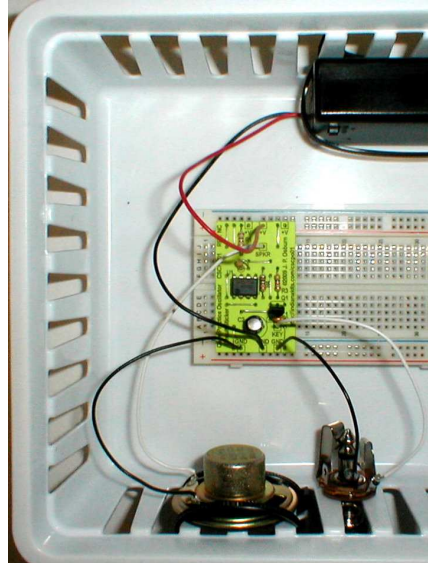


Figure 1 - CSCPO01 Circuit Sticker Code Practice Oscillator Prototype

The CSCPO01 Circuit Sticker code practice oscillator uses the ubiquitous LM555 timer chip to produce square waves at about 700 Hz. Rather than turn the entire circuit on and off as many code practice oscillators do this one is on continuously while operating. A transistor is used to hold the timing capacitor in a discharged state until keydown. During key down the capacitor is allowed to charge and discharge thus causing the oscillator to run and produce the desired tone. This allows the CSCPO01 to be keyed by more than just a straight key, e.g. an electronic keyer or computer. It also eliminates the “chirpiness” that many code practice oscillators have.

2. Features

- ◇ Based on ubiquitous LM555 timer chip
- ◇ Operates on 4.5 volts to 15 volts DC power.
- ◇ Can be keyed by electronic keyers, computers and digital logic.
- ◇ Reduced chirp
- ◇ Circuit Sticker construction on solderless breadboard
- ◇ Circuit Stickers reduce the chance of error compared to building on plain board
- ◇ Circuit Stickers look better compare to plain board
- ◇ Circuit Stickers make it easier to do repairs compared to plain board

3. Applications

- ◇ Morse Code training
- ◇ Something fun to build

4. Schematic

The schematic of the CSRX01 Circuit Sticker receiver appears in Figure 2.

5. Parts List

The parts list for CSRX01 Circuit Sticker receiver appears in Table 1.

6. Layout

The CSCPO01 layout is shown in Figure 3.

7. Assembly Instructions

- ◇ Read all instructions before beginning assembly.
- ◇ Observe all safety precautions during assembly.
- ◇ Inventory parts before beginning assembly.
- ◇ Carefully remove the release paper from the Circuit Sticker and apply it to the solderless board properly aligned and orientated. See Figure 4..
- ◇ Using a sharp point make holes in the Circuit Stickers for the jumper and component leads.
- ◇ The bare wire jumpers are indicated on the Circuit Stickers by straight lines. Use either recycled component leads or 22AWG solid wire to form the jumpers. See Figure 5 as an example.
- ◇ Install the resistors. Some resistors are installed in a “hairpin” configuration. Bend one lead of the resistor back around so the a hairpin is formed. The body of the resistor is positioned over the circle on the Circuit Sticker indicating it’s position and the other lead goes in the other hole.
- ◇ Install the capacitors. Observe correct polarity on the electrolytic capacitor.
- ◇ Inspect the board for wiring errors and incorrectly installed components. Correct any problems before proceeding.
- ◇ Chassis wiring is summarized in Table 2. Use 22AWG solid wire. Install the board, controls, battery holder and connectors in your enclosure. Determine wire lengths, cut, and strip wires. If any chassis parts require wires to be solder to them do so now. Make the connections per Table 2.
- ◇ Again inspect your work for incorrectly installed components, and incorrectly made connections.
- ◇ This completes assembly.

8. Test and Tune Up

- ◇ U1 is not installed.
- ◇ There are no batteries in the battery holder.
- ◇ Measure the resistance between +V and GND. What you measure will depend on what you’re measuring with but it should be high indicating no shorts.
- ◇ Turn the switch off.
- ◇ Install fresh batteries in the battery holder observing correct polarity.
- ◇ Turn the switch on and measure the voltage between +V and GND. It should be the battery voltage,
- ◇ Turn the switch off.
- ◇ Install U1 observing correct orientation and being careful not to bend a pin.
- ◇ Connect a straight key to the key jack.
- ◇ Turn the switch on. There should be no sound.
- ◇ Press the key and there should be a sound.
- ◇ Turn the switch off.
- ◇ This completes test and tune up.

9. Operation

Operation is straight forward. Switch the unit on and send code with the key. When finished don't forget to turn the unit off to keep from running the battery down.

To increase sound level decrease the value of R4. Increasing the value of R4 lowers the sound level.

To change the tone frequency change the value of R2. Increasing the value of R2 lowers the tone frequency and decreasing the value of R2 increases the tone frequency.

The CSCPO01 Code Practice Oscillator can be keyed by electronic keyers and computers that have an open collector output and use negative logic, i.e. low is sound, high is no sound.

The CSCPO01 can be keyed by digital logic with a simple circuit modification. Remove the jumper from +V to R3 and use the now free end of R3 as the digital logic input. A high level is no sound. A low level is sound.

Table 1 - CSCPO01 Circuit Sticker Code Practice Oscillator Parts List

| Item | Quantity | Reference | Description | Marking/Color |
|------|----------|-----------|-----------------------|----------------|
| 1 | 1 | BT1 | 3 AA, 4 AA, or 9V Bat | |
| 2 | 1 | C1 | 0.01uF | 103 |
| 3 | 1 | C2 | 10uF | 10uF |
| 4 | 1 | J1 | KEY JACK | |
| 5 | 1 | LS1 | SPEAKER | |
| 6 | 1 | Q1 | 2N3904 transistor | 2N3904 |
| 7 | 1 | R1 | 1k ohms | brn-blk-red |
| 8 | 1 | R2 | 100k ohms | brn-blk-yel |
| 9 | 1 | R3 | 47k ohms | yel-vio-org |
| 10 | 1 | R4 | 100 ohms | brn-blk-brn |
| 11 | 1 | S1 | On/Off Switch | |
| 12 | 1 | U1 | LM555 | LM555 or NE555 |

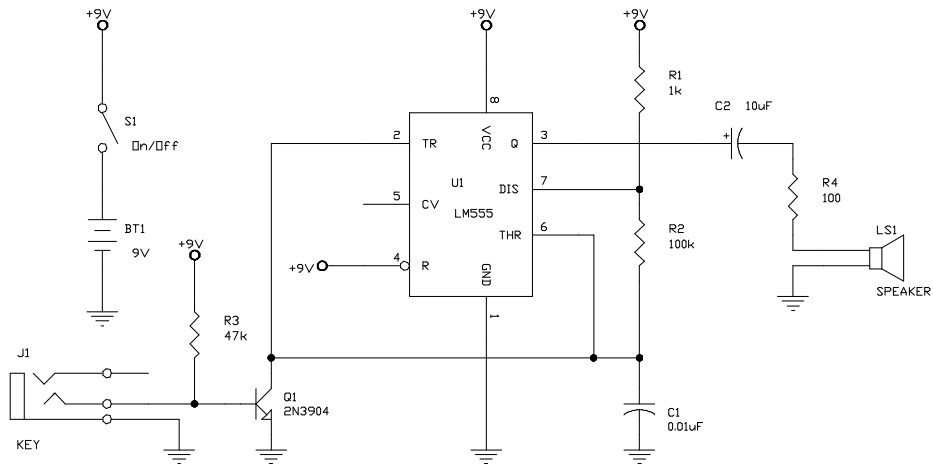


Figure 2 - CSCPO01 Circuit Sticker Code Practice Oscillator Schematic

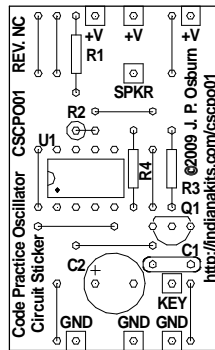


Figure 3 - CSCPO01 Sticker

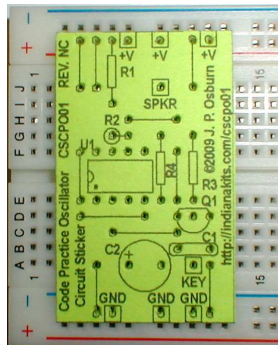


Figure 4 - CSCPO01 Sticker on Solderless Breadboard

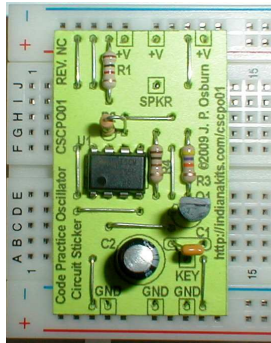


Figure 5 - CSCPO01 Construction

Table 2 - Chassis Wiring

| From | To | Wire Color |
|----------------|------|------------|
| Battery Holder | +V | Red |
| Battery Holder | GND | Black |
| Speaker lug 1 | SPKR | White |
| Speaker lug 2 | GND | Black |
| J1 tip lug | KEY | White |
| J2 sleeve lug | GND | Black |