Electronic Christmas Tree Kit

Simple! Easy to Build. A great first kit. Runs for weeks on a standard 9v battery.



Tools:

Soldering iron, solder, wire cutters, small screwdriver, small pliers.

Parts Supplied:

- 1 Tree-shaped printed circuit board.
- 4 Resistors, 5.6 meg (R1, R2, R3, R4). Dogbone-shaped parts with a wire on each end. The colored rings tell you its value. Green-blue-green-gold means "5.6 meg".
- 4 Ceramic Capacitors, 0.1uF (C1, C3, C5, C7). Tan disks with two wires on one edge. They are marked "104" which is 0.1uF.
- 4 Electrolytic Capacitors, 22uF (C2, C4, C6, C8). Black tubes, marked "22uF". **Polarity sensitive**! The wire with the white stripe and "—" goes in the "—" hole on the board.
- 9 LEDs (D1-D9). Red, green, and yellow tubes with two wires and a rounded top. **Polarity sensitive**! The flat side and short wire goes in the holes toward the top of the board.
- 1 4093 quad NAND gate integrated circuit, marked "CD4093BE". **Polarity sensitive** and **Static-sensitive**! The end with the notch goes toward the top of the board.
- 2 Battery snaps with screws and nuts (one positive, one negative).

Safety:

- Soldering irons are hot! Do not touch the tip, or a connection you just soldered.
- When you cut a wire, the cut piece can shoot off and hit you in the eye! Cut it over a wastebasket to catch the flying piece.

Assembly:

) U1 CD4093BE

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Do you have everything? Then let's begin! Follow these step-by-step instructions. Install each part as shown. All parts (except the battery) go on the top side (with the lettering). Solder each part on the **bottom** side (with the wiring). Place a mark in the box (X) as you finish each step. Leave the parts in the bag until you actually need them (they are small, and easy to lose). Take your time and check your work -- it is hard to remove a part if you put it in wrong!



- + bigger battery snap ()
 -) battery snap (Mount it the same way as the + snap). (
- Plug a standard 9v battery onto the battery snaps. The + side of the battery should () match the + on the board. The LEDs should all start blinking! Now tighten the two nuts. The battery will hold them in exactly the right place so it snaps on and off easily.

REV ¢ http://www.sunrise-ev.com/projects.htm
l leeahart@earthlink.net 1988 edge, Nov "Card" C:\ORCAD\SHEET\XMAS\CARD.SCH Ul is a quad Schmitt-trigger gate. Each section is wired as a ~2 Hz RC oscillator (R=5.6meg, C=0.1uF). Each output has a series 22uF capacitor, powering two back-to-back LEDs. One LED lights on the rising ec and the other on the falling edge. LED current is only limited by the gate's output impedance, so each follows his short but bright to minimize power consumption. Each oscillator is wired slightly differently, fo discourage them synchronizing. D9 is wired in series with the battery to also act as a blocking diode in case the battery is connected backwards. C4 22uF D3 LED Electronics Sartell MN 56377 Christmas 15, 2020|Sheet Lee Hart R2 5.6meg U1D 4093 ζ Modern D4 LED Electronic Electronikit (tm) by Document Number 13 VSSO 12 December 814 8th Ave N, published C6 22uF C3 0.1uF D6 LED An 4 email Title Date: web s t Size К R3 6meg KK N U1B 4093 ξ C5 0.luF D5 LED ິ. ທ ഗ 6 CD4093 quad 2-input Schmitt trigger NAND gate 9 - LEDs, any color or type 5.7 - Capacitor, 0.1UF ceramic 6.8 - Capacitor, 22UF electrolytic 6.9 v battery snaps (can be salvaged from a dead 9v battery) 9.0 battery snaps (can be salvaged from a dead 9v battery) #2-56 machine screws and nuts to mount battery snaps D8 LED 10 C8 22uF R4 6meg U1C 4093 44 ξ C7 0.luF D7 LED . ഗ σ 00 D1 LED 22uF R1 5.6meg U1A 4093 KK N 14 ξ D2 LED Theory of Operation VDDO \sim K K V D9 LED 0.1uF СIJ List 94 1 U1 - CD409 D1-D9 - LF C1,3,5,7 -C2,4,6,8 R1-R4 - R6 B1 - 9 - R6 B1 - 9 - C6 two #2-56 #2-56 $^+$ 1 Parts

Doesn't work? See if the battery is dead, or the snaps are on backwards. Look for parts in the wrong place or backwards, or bad solder joints. If two LEDs don't work, see if one of them is backwards. For help, contact Lee A. Hart, 814 8th Ave N, Sartell MN 56377, 320-656-9574, leeahart@earthlink.net.