

One Digit Counter

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[One Digit](#)

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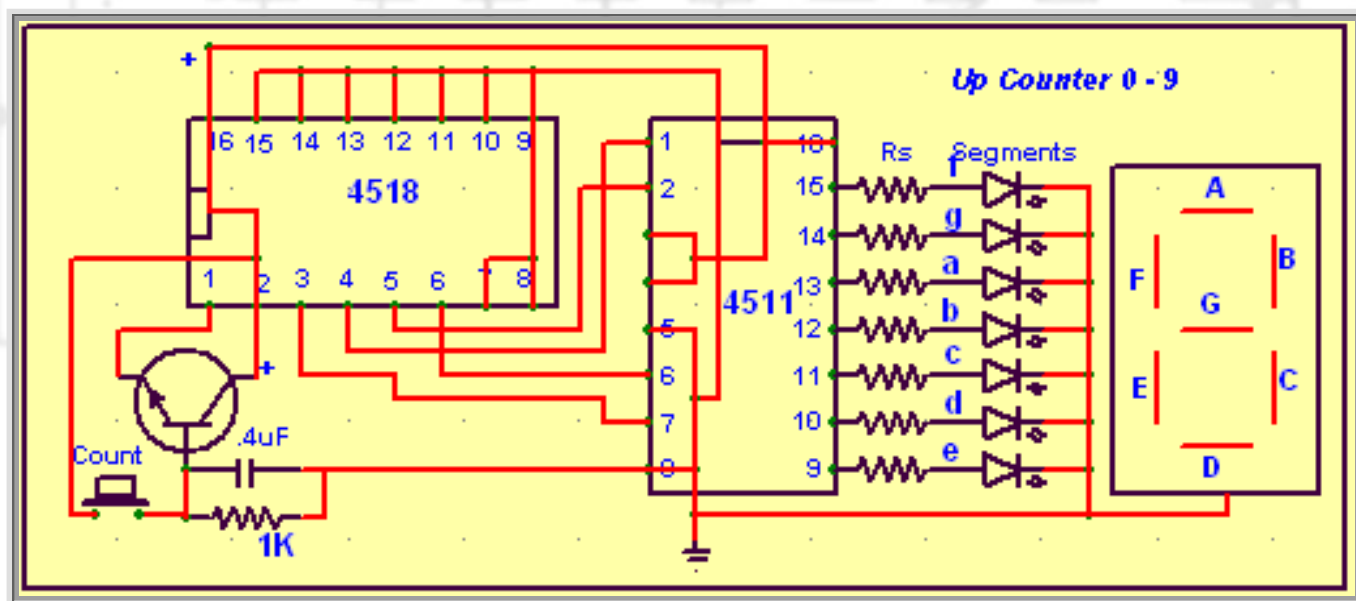
[Up/Down Counter](#)

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One Digit Event Counter

This is a simple one digit counter using CMOS instead of the traditional TTL ICs . Using CMOS makes it possible to use a power supply from 5 to 15 volts as long as we use the correct value for the current limiting resistors (R_s) which can be calculated with the simple following formula " $R_s = \text{Supply voltage} - 1.7 \text{ volts divided by current (10 mA)}$ " .



In designing this circuit , I had in mind a design as simple as can possibly be made with minimum readily available components . For the counter a single chip is used , Of the two counters available on the CMOS 4518 only one is used . The LEDs are not multiplexed and each segments must be connected to it own current limiting resistor . Each segments are single LED which can withstand current of up to 20 mA each but it is recommended that a 10mA maximum current be used to ensure long life with adequate illumination . Thus with an anticipation of all segments when lit showing "8" would amount to a total 7 segments times 10mA would require a total current of 70 mA for the one digit and this should be the minimum supply current plus a 25% for safety for a total of 87.5 mA , so lets say 100 mA power supply at whichever voltage

you chose to use from 5 to 15 volts .

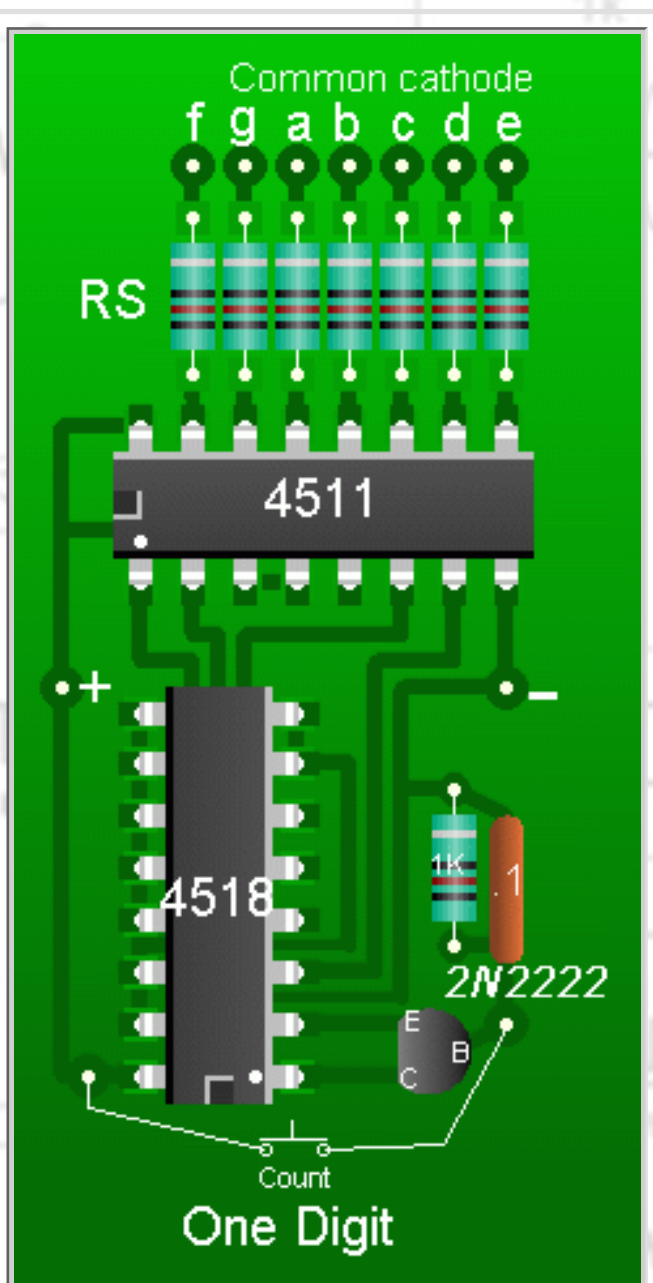
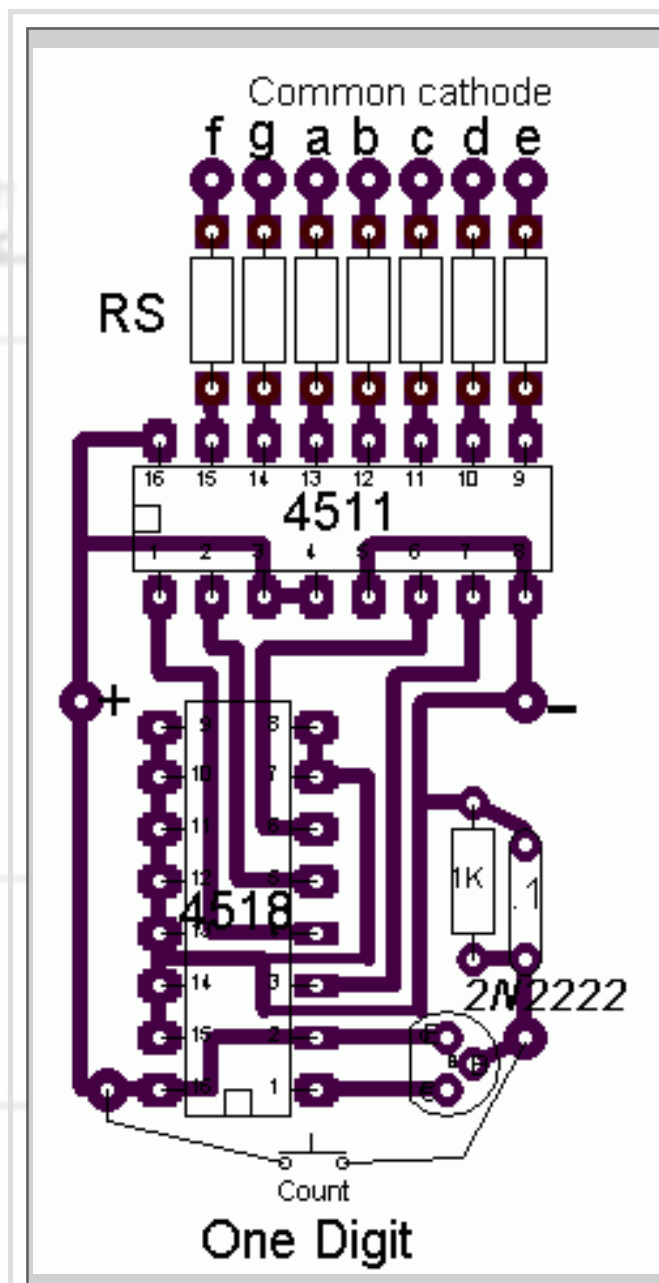
Using the Counter

In order to use the counters the following conditions must be set .

- " Enable " pins 2 and 10 must be HIGH (1)
- " Reset " pins 7 and 15 must be LOW (0)
- " Count " pins 1 and 9 must be HIGH (1)

Normally an IC like a CMOS 40106 is used to debounce a push button switch , a NPN 2N2222 transistor and a 1K resistor with a .1uF capacitor in parallel from base to ground are used to debounced the trigger switch . Most any small signal NPN transistors can be used and a capacitor from .05uF to 1.uF can be used. The lower the capacitor value the faster and noisier the trigger signal will be .

Using a simple push button without the conditioning is not recommended as it will give error counts .See [Switch debouncing](#) for alternate circuits that can be used .



LED Display

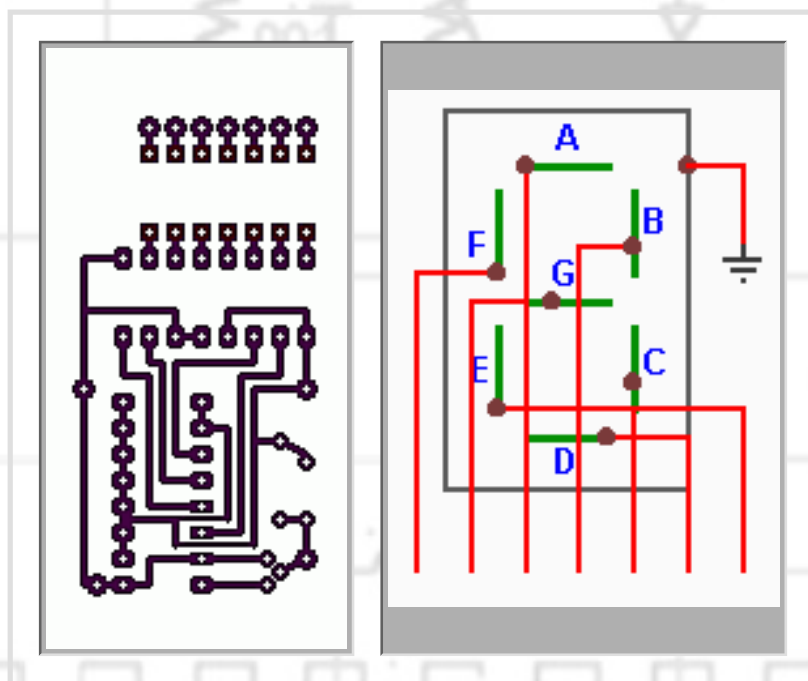
The system can accommodate Common Anode (CA) or Common Cathode (CC) LED displays with single LED segments . This circuit uses a Common Cathode Led Display

Construction

The PCB is actual size and a graphic representation shows how the display is connected to the limiting resistors (Rs) . It is a wise move to use sockets for the ICs . Construction can be made using the PCB layout or hand wired whichever you feel at the moment .

For intermittent operation a 9 volts battery can be used otherwise , several " D " cells in series should be used or a wall transformer type with good rectification can also be used .

If you do not have any experience with this type of project , I would strongly suggest that you start with this one . In order to acquire more knowledge about counters feel free to read the following pages describing in more details more complicated counter projects .


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