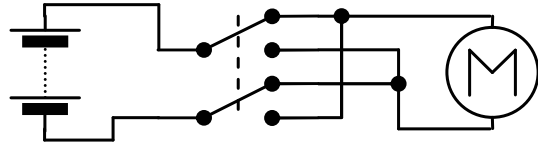


Switches 2

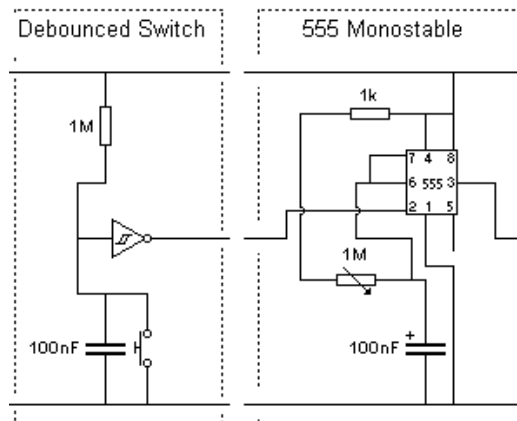
One safety point: you must check the switch contacts can cope with the voltages and currents you are expecting in your circuit.

Here is a dpdt switch being used to reverse a motor.



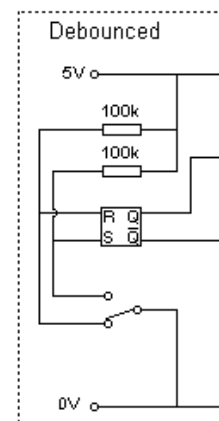
Switch contact bounce is a problem with all mechanical switches. When you operate the switch contact is made but then the contacts vibrate slightly so that you get some rapid switching on and off before the contacts settle into their new position. If you are using the switch to count objects, this “bounce” will give multiple counts. You need to “de-bounce” the switch.

De-bouncing for a push-to-make switch can be done by putting a small capacitor across the switch, even better if that feeds into a “Schmitt trigger” circuit, as shown to the right. The Schmitt trigger will reverse the sense of the switch so you may need to add another inverter to get the logic the right way up.



You could also use a monostable using a 555 chip which will produce a fixed length output pulse without the contact bounce.

If the switch you are using is a spdt changeover switch (toggle, slide or rocker) then you can use a flip-flop in the circuit shown.



If you are using the switch as an input for a microcontroller chip, then you can use software to de-bounce the switch – add a short delay. Here is code for a counter. Elimination of bounce and max speed of counting are all set by the value of the delay.

```
wait1:   if Pin0=0 then wait1   `wait for key press
        gosub display         `show the new count
wait2:   if Pin0=1 then wait2   `wait for key release
        Pause 100             `avoid bounce
        goto wait1           `do it again
```