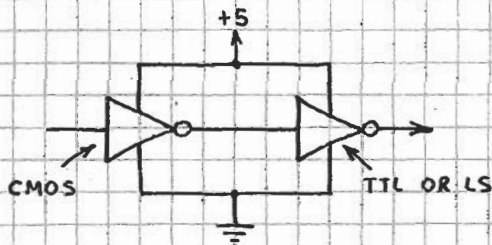
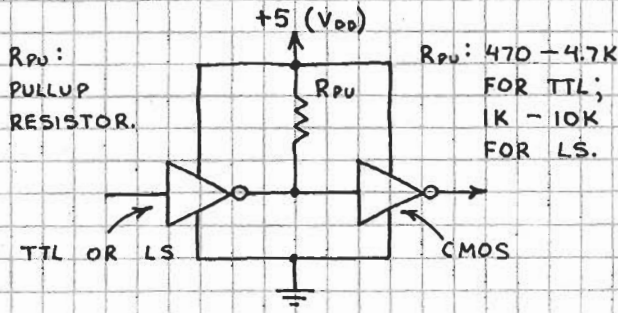
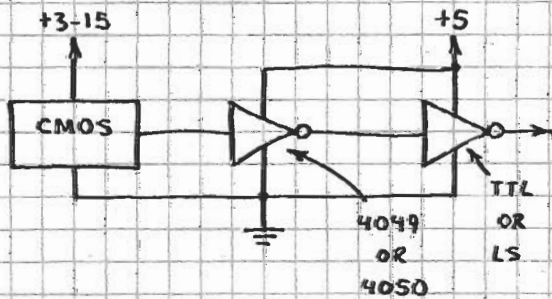
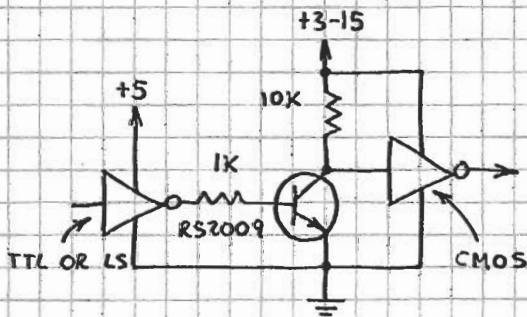


# INTERFACING CMOS

## 1. IF SUPPLY VOLTAGES ARE EQUAL:

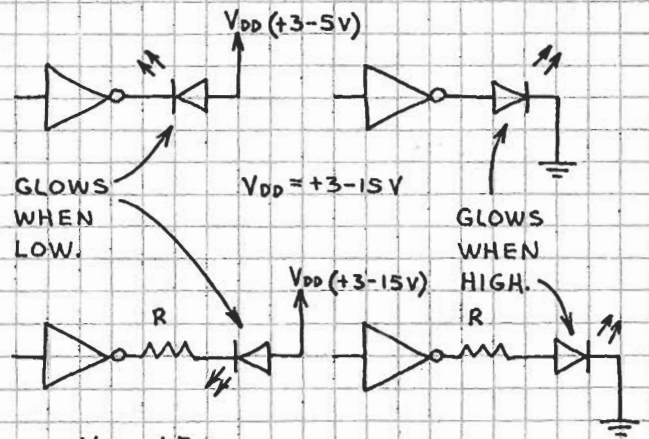


## 2. DIFFERENT SUPPLY VOLTAGES:



NOTE THAT CMOS MUST BE POWERED BY AT LEAST 5 VOLTS WHEN CMOS IS INTERFACED WITH TTL. OTHERWISE THE CMOS INPUT WILL EXCEED  $V_{DD}$ .

## 3. CMOS LED DRIVERS:

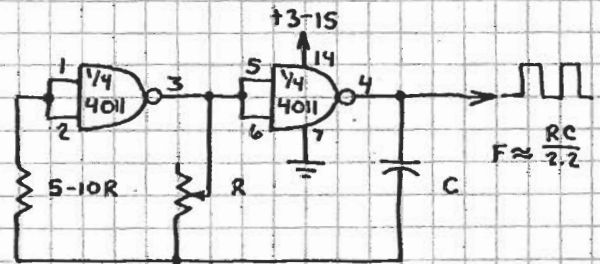


$$R = \frac{V_{DD} - 1.7}{.01} \quad (\text{FOR } 10 \text{ mA LED CURRENT})$$

USE 1000 OHMS FOR MOST APPLICATIONS.

## CMOS LOGIC CLOCK

MANY CIRCUITS IN THIS SECTION REQUIRE A SOURCE OF PULSES. HERE'S A SIMPLE CMOS CLOCK:



TYPICAL VALUES:  $R=100K$ ,  $C=0.01-0.1 \mu F$

OK TO USE 4049... BUT MUCH MORE CURRENT WILL BE REQUIRED.

## CMOS TROUBLESHOOTING

1. DO ALL INPUTS GO SOMEWHERE?
2. ARE ALL IC PINS INSERTED INTO THE BOARD OR SOCKET?
3. IS THE IC HOT? IF SO, SEE 1-2 ABOVE AND MAKE SURE THE OUTPUT IS NOT OVERLOADED.
4. DOES THE CIRCUIT OBEY ALL CMOS OPERATING REQUIREMENTS?
5. HAVE YOU FORGOTTEN A CONNECTION?