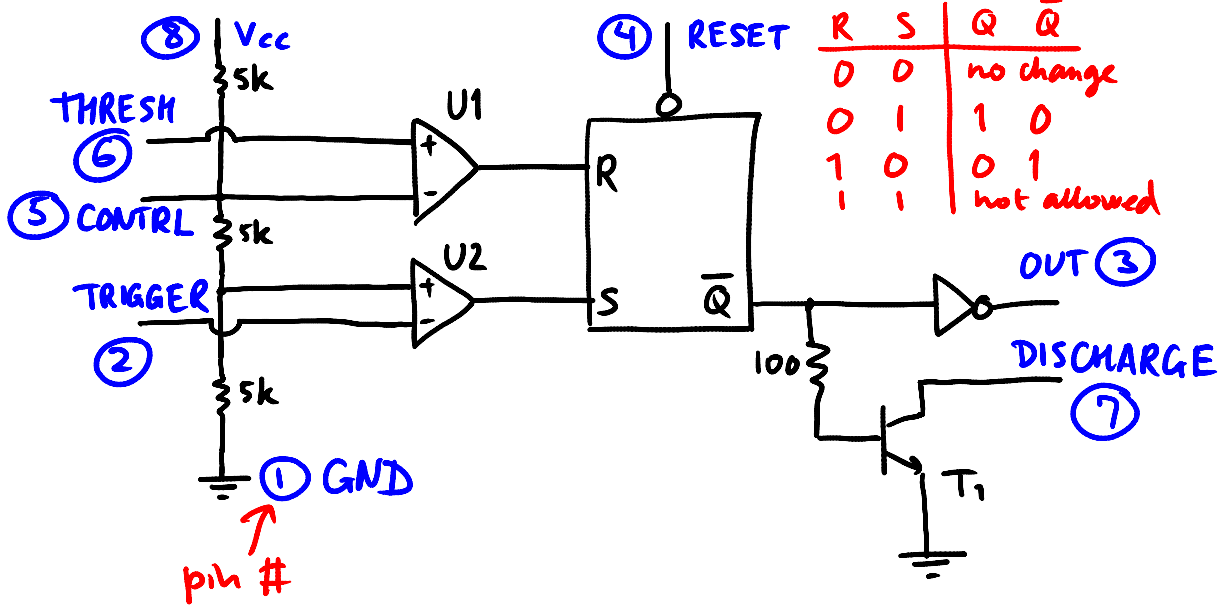


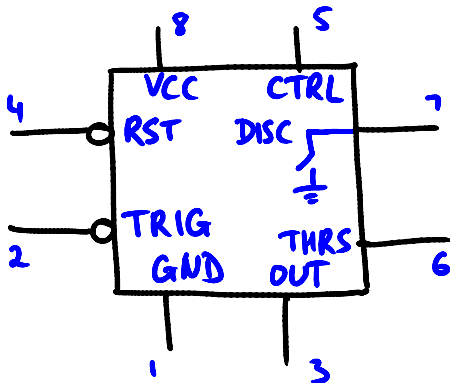
PHYS 3360 / AEP 3630
Lecture 30

555 Timer



2 Comparators $\frac{2}{3}V_{cc}$ & $\frac{1}{3}V_{cc}$ RS latch Saturated Switch
 $T_1 = ON$ if $\bar{Q} = 1$
 $T_1 = OFF$ if $\bar{Q} = 0$

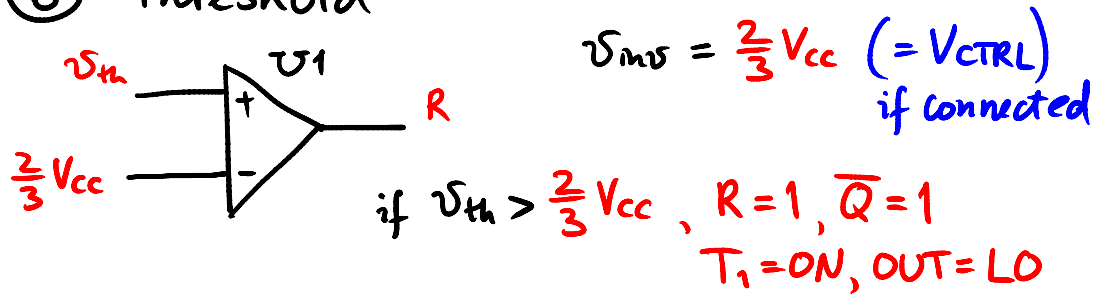
Simplified symbol



supply voltage
 $4.5V \leq V_{cc} \leq 16V$
 output current
 $(I_{out})_{max} \sim 200mA$

Terminals

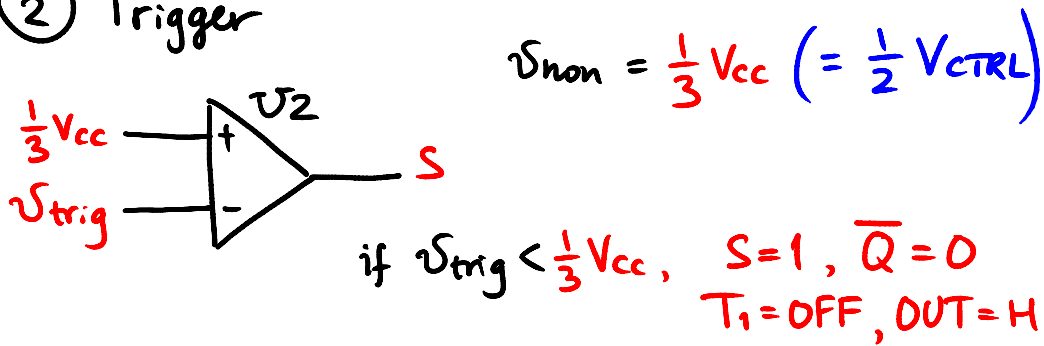
⑥ Threshold



if $V_{th} > \frac{2}{3} V_{cc}$, $R=1$, $\bar{Q}=1$
 $T_1=ON$, $OUT=LO$

if $V_{th} < \frac{2}{3} V_{cc}$, $R=0$ (provided $S=0$)
 $\{ T_1, \bar{Q}, OUT \}$
 $\{ unchanged \}$

② Trigger

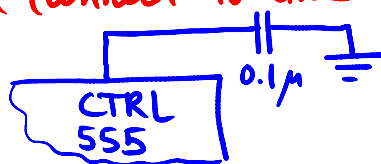


if $V_{trig} < \frac{1}{3} V_{cc}$, $S=1$, $\bar{Q}=0$
 $T_1=OFF$, $OUT=HI$

if $V_{trig} > \frac{1}{3} V_{cc}$, $S=0$ (provided $R=0$)
 $\{ T_1, \bar{Q}, OUT \}$
 $\{ unchanged \}$

\Rightarrow OUTPUT is set by low TRIGGER and
reset by high THRESHOLD

⑤ Control: changes V_{ref} for U_1, U_2 comp.
typically not used (connect to GND thru a cap)

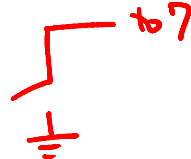


④ Reset

$\overline{RST} = V_{CC}$, the latch operates normally

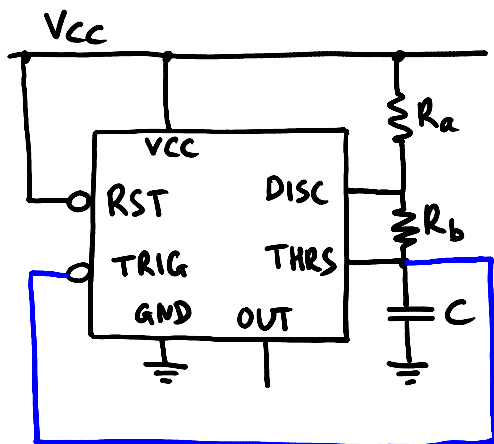
$\overline{RST} = 0$, $\overline{Q} = 1$, $OUT = LO$ regardless of R, S

⑦ Discharge

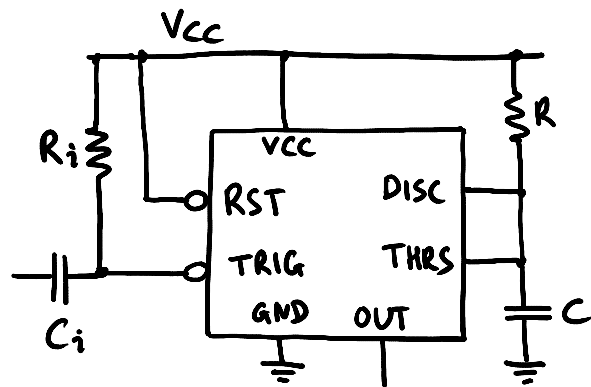
$\overline{Q} = 0$, $T_1 = OFF$ 

$\overline{Q} = 1$, $T_1 = ON$ 

Two basic configurations for 555



oscillator



one-shot
(monostable operation)

Refer to LTspice examples

(details on the working principles next lecture)