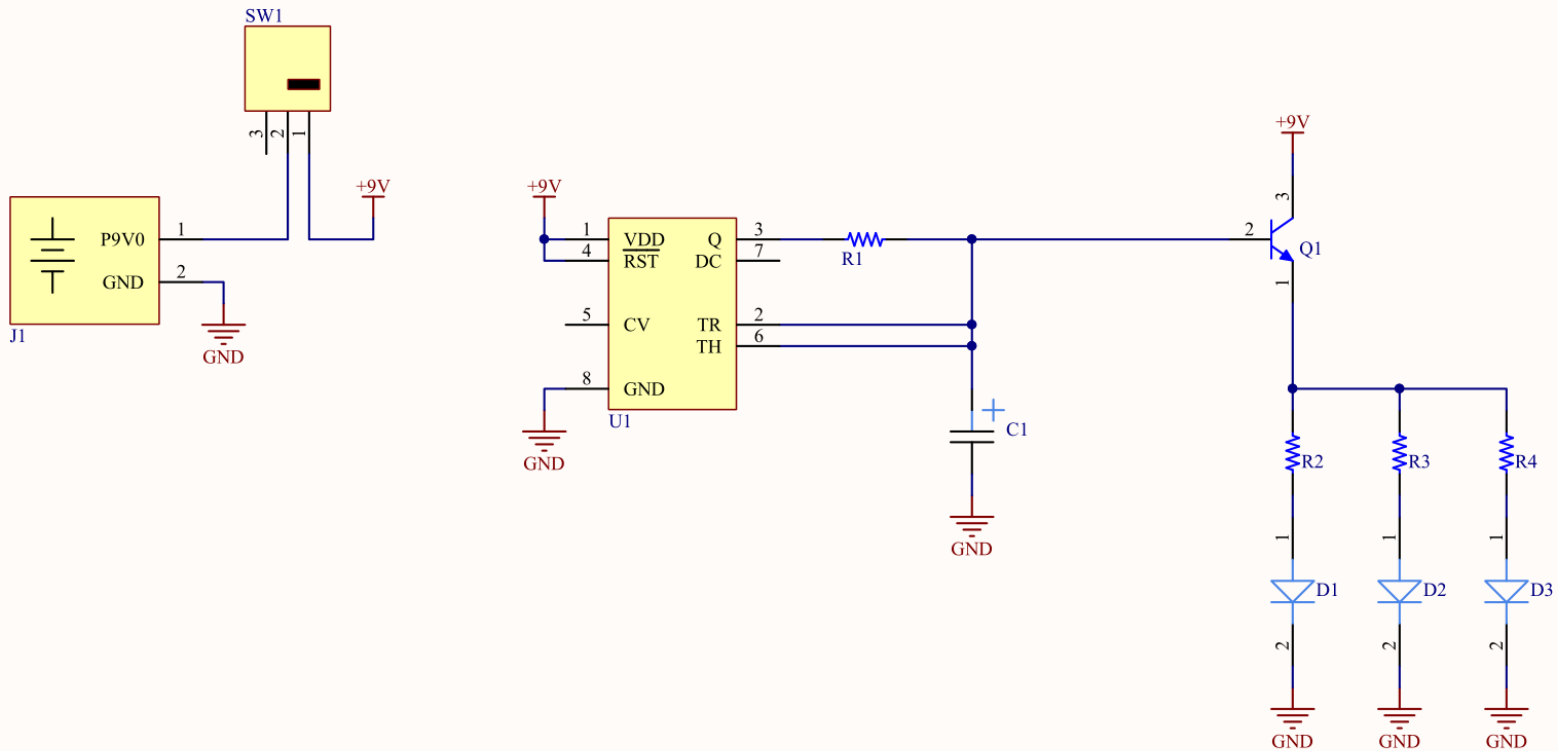




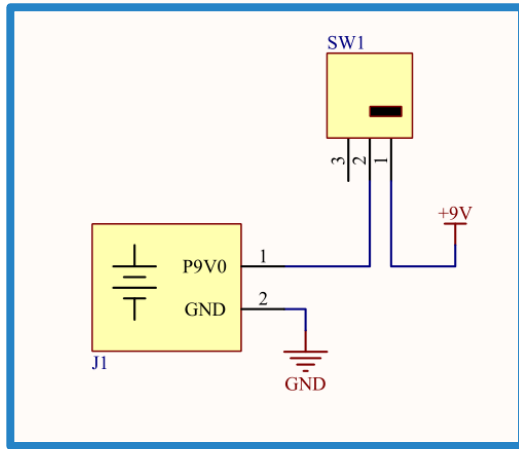
# TWINKLE TWINKLE LITTLE STAR

ASTRANIS XMAS 2018

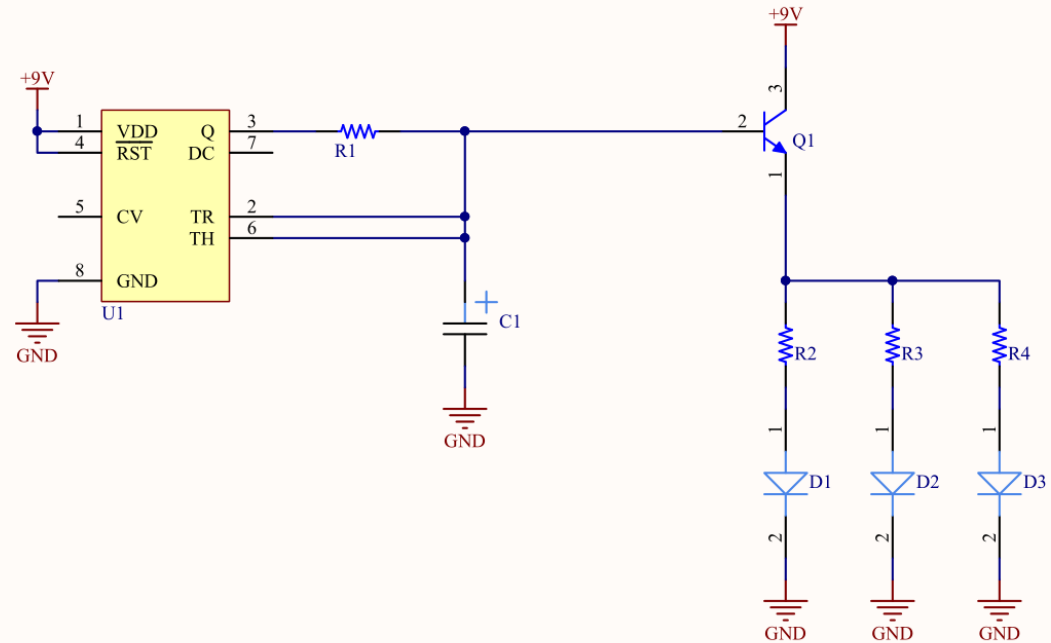
# WHAT ARE WE BUILDING



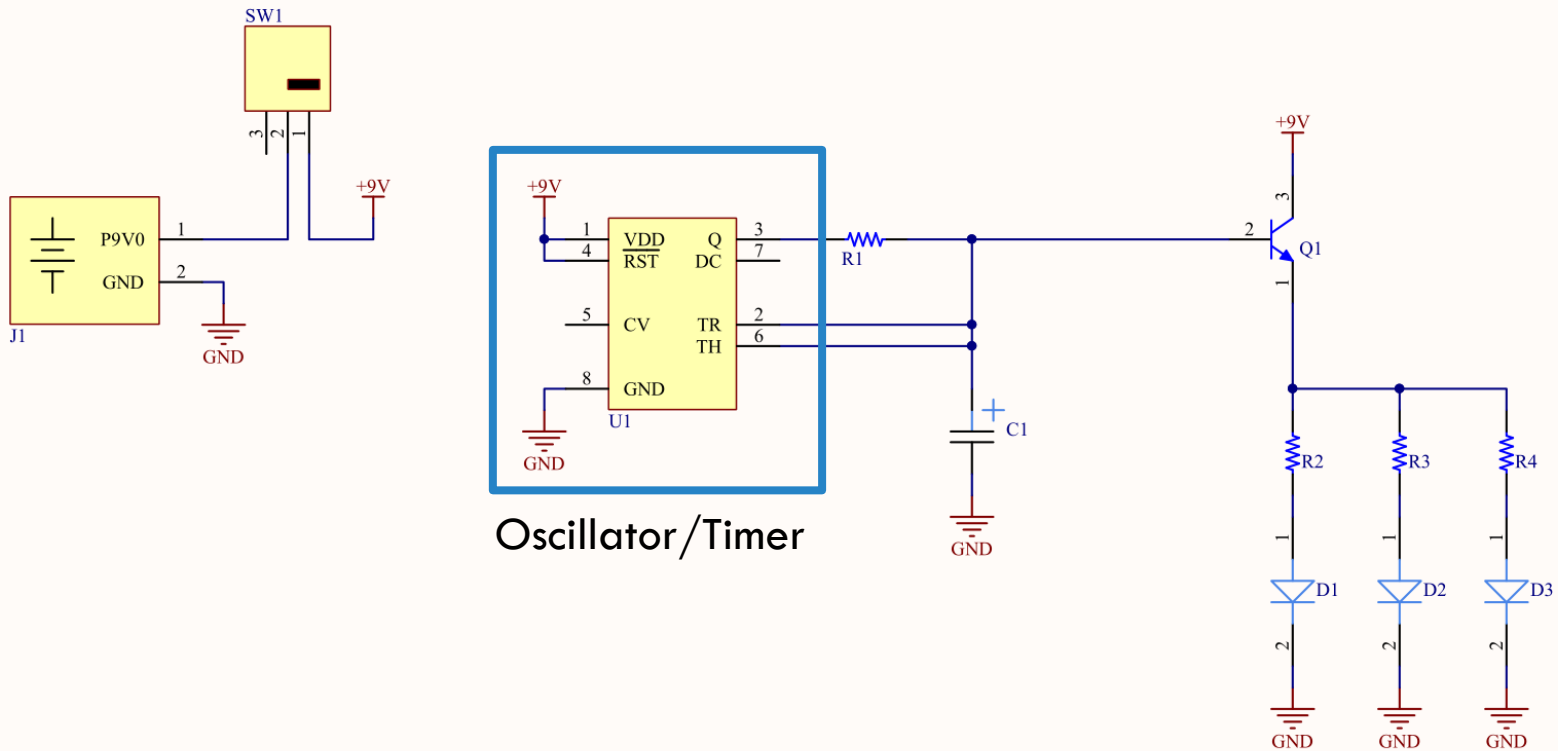
# WHAT ARE WE BUILDING



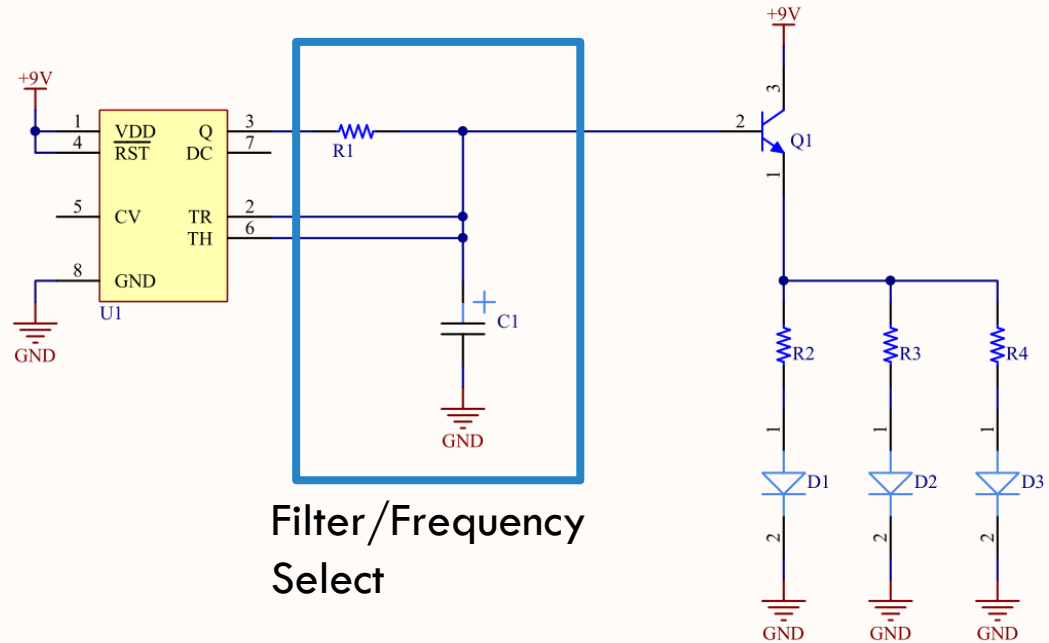
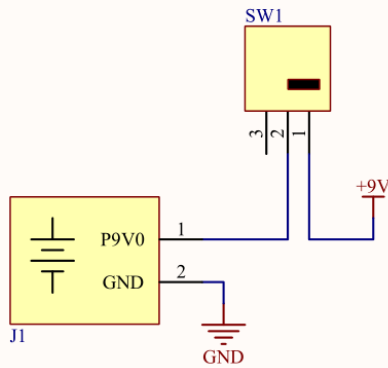
Battery + Switch



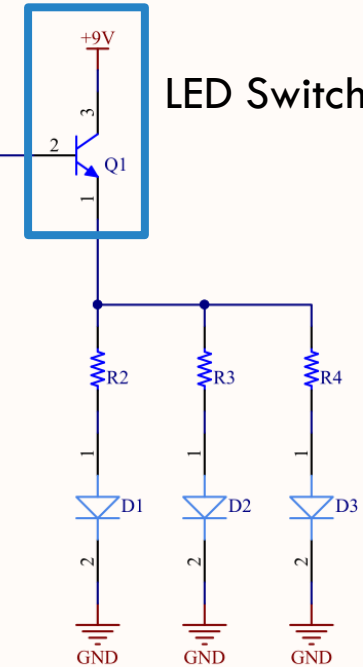
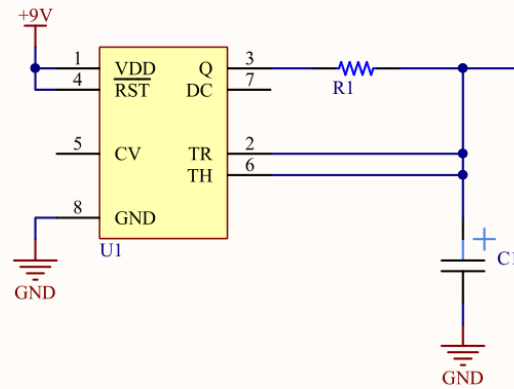
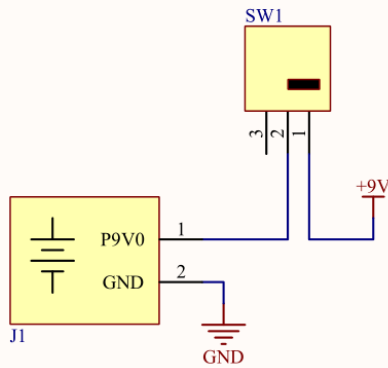
# WHAT ARE WE BUILDING



# WHAT ARE WE BUILDING

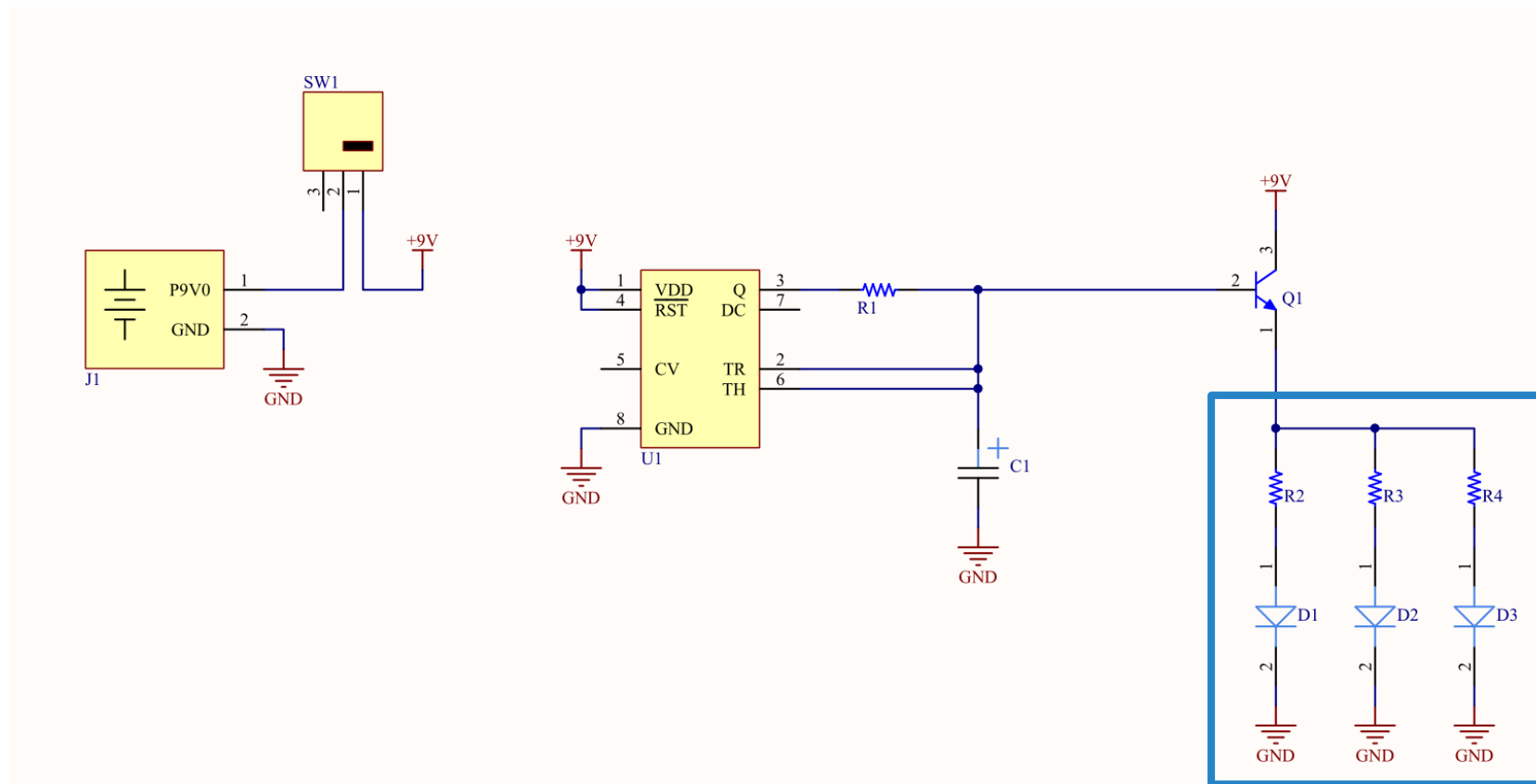


# WHAT ARE WE BUILDING



LED Switch/Transistor

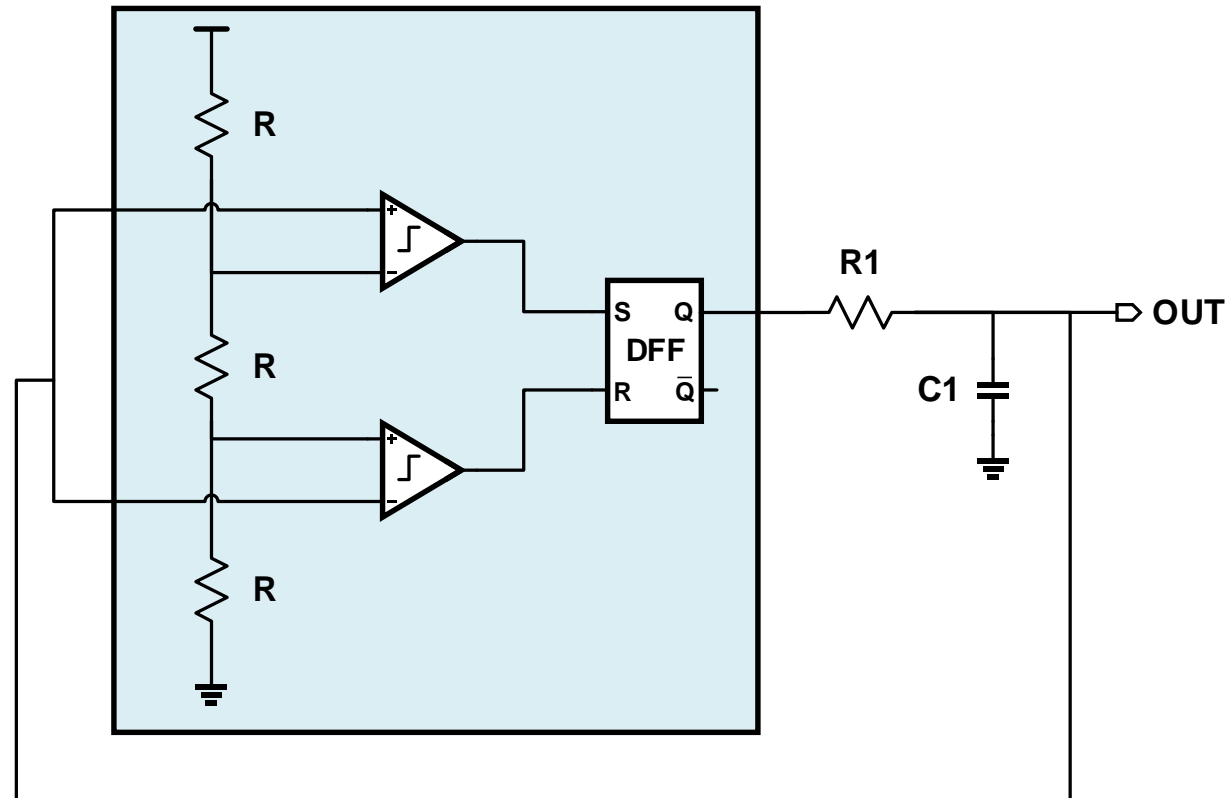
# WHAT ARE WE BUILDING



Lights!

# HOW DOES IT WORK?

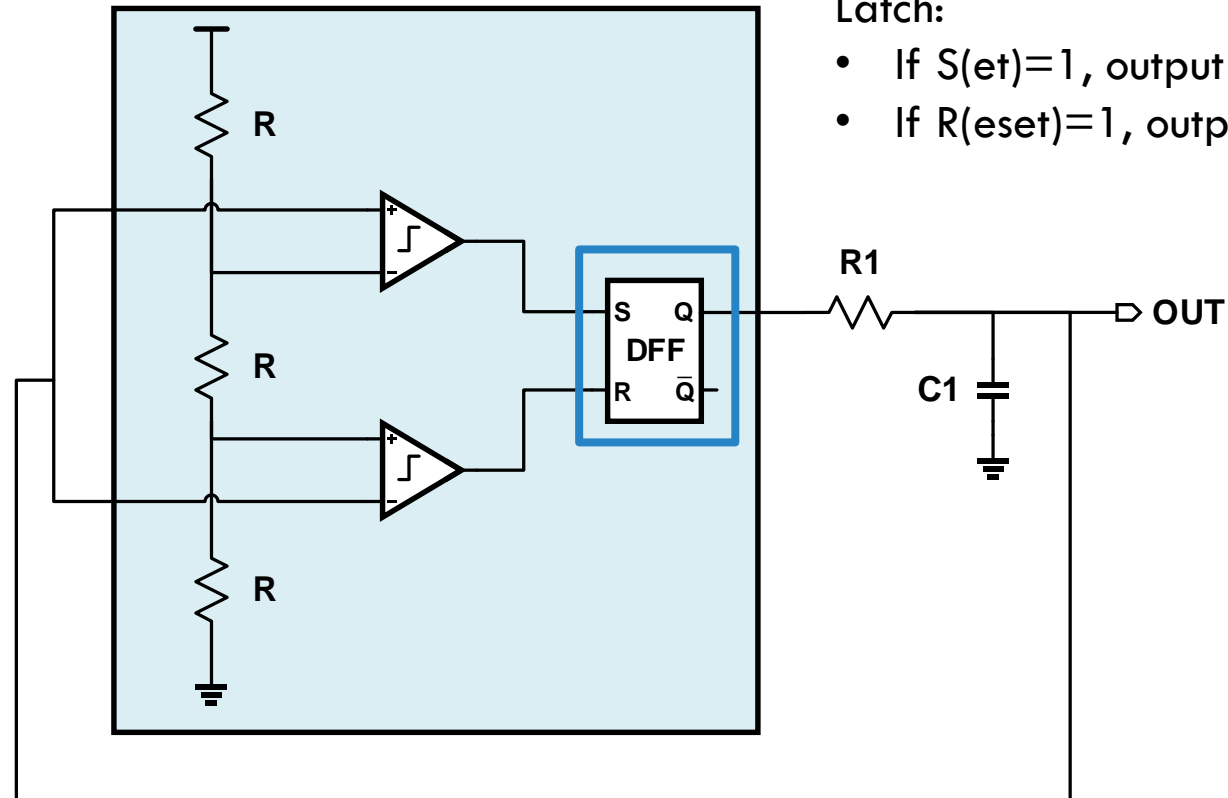
## 555 Timer





# HOW DOES IT WORK?

## 555 Timer

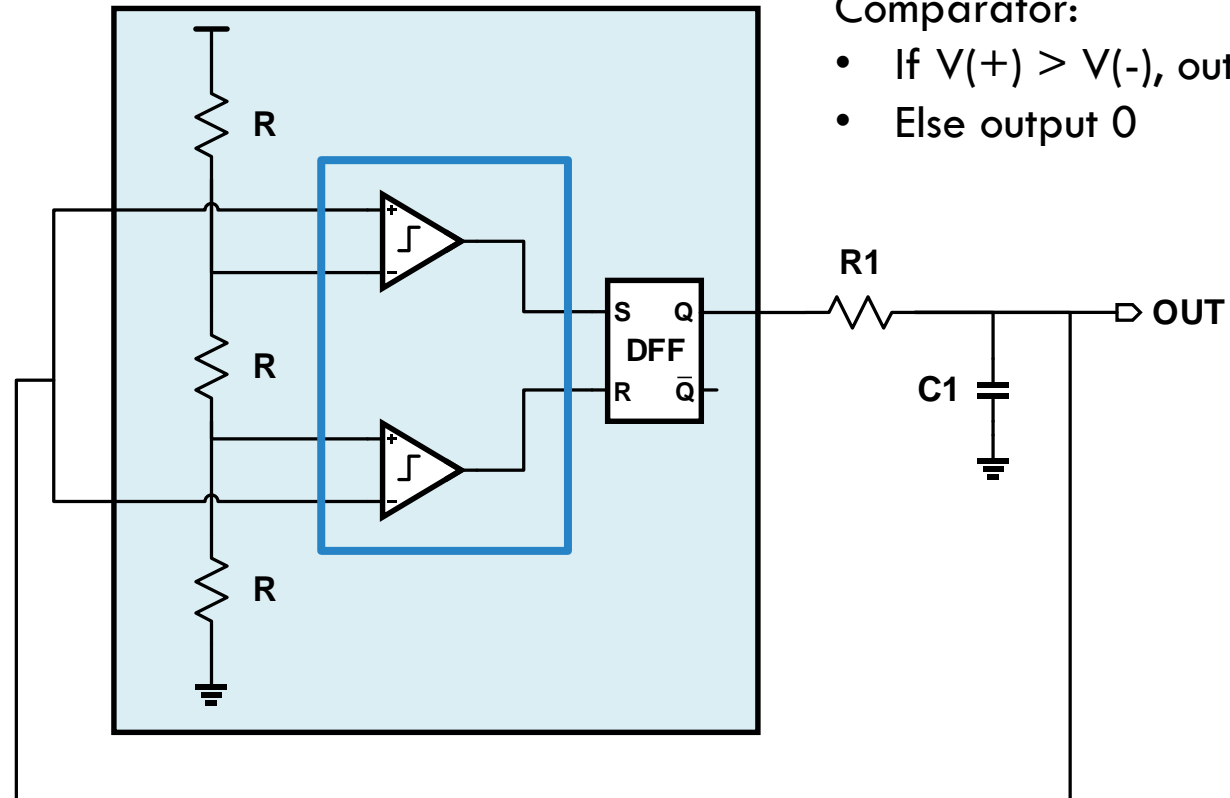


Latch:

- If  $S(et)=1$ , output 1
- If  $R(eset)=1$ , output 0

# HOW DOES IT WORK?

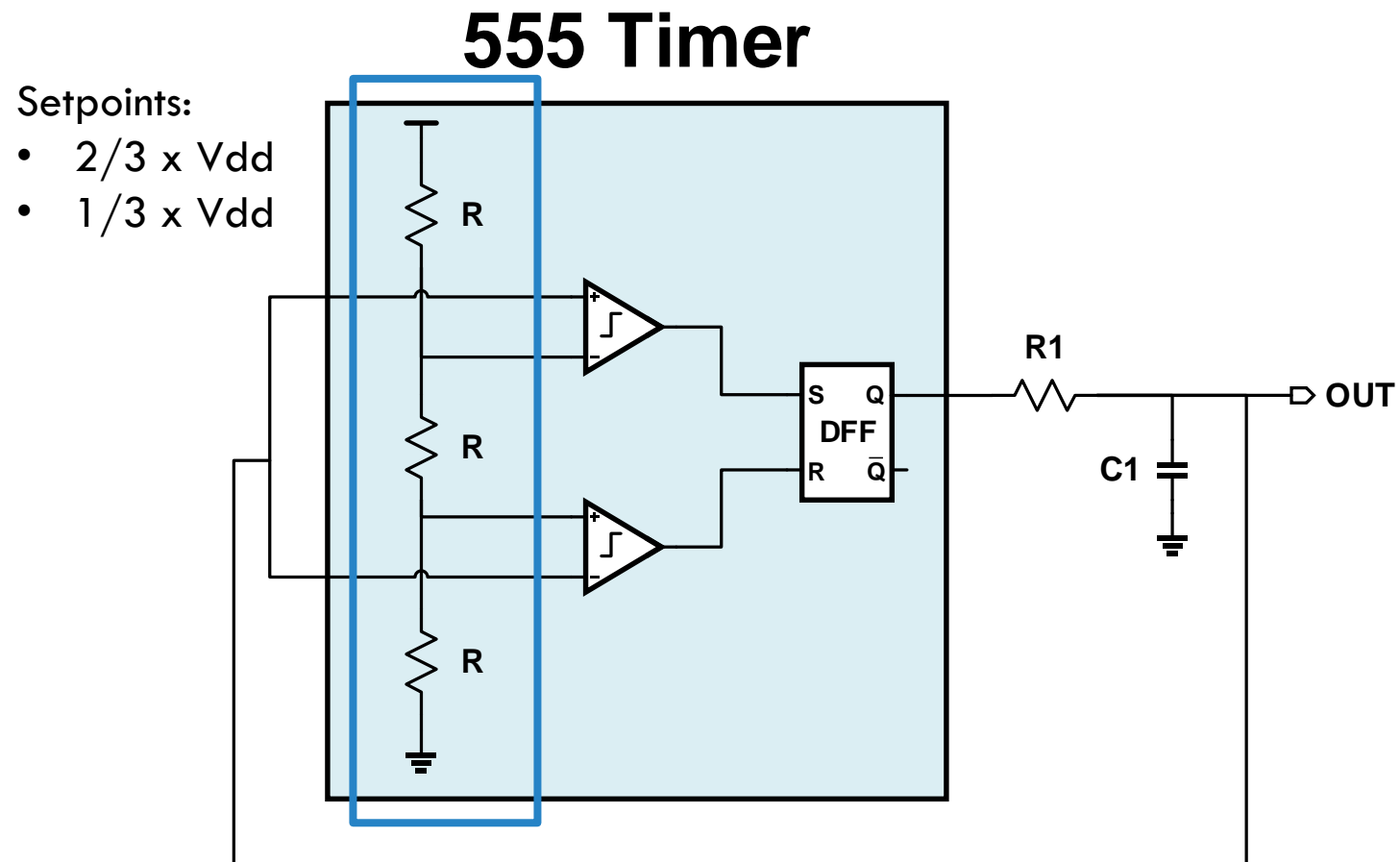
## 555 Timer



Comparator:

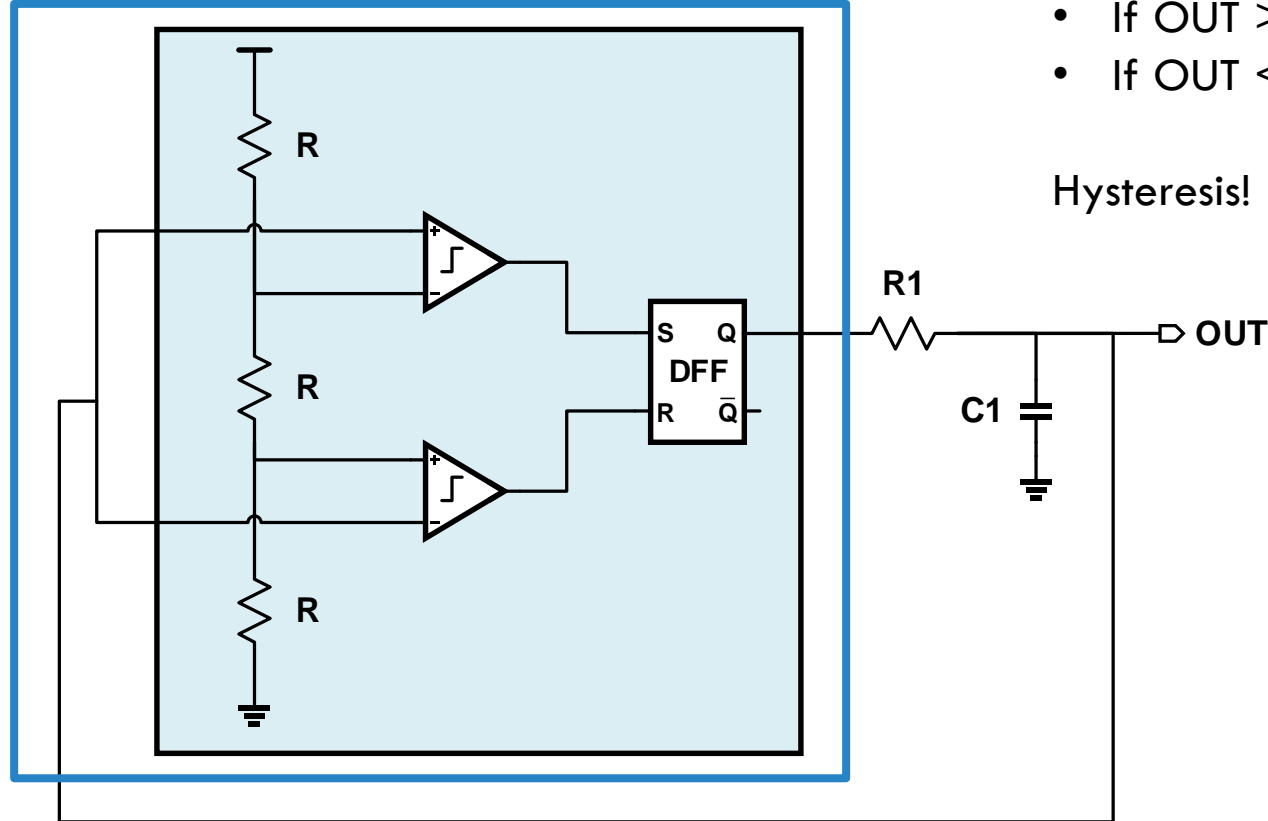
- If  $V(+)$  >  $V(-)$ , output 1
- Else output 0

# HOW DOES IT WORK?



# HOW DOES IT WORK?

## 555 Timer



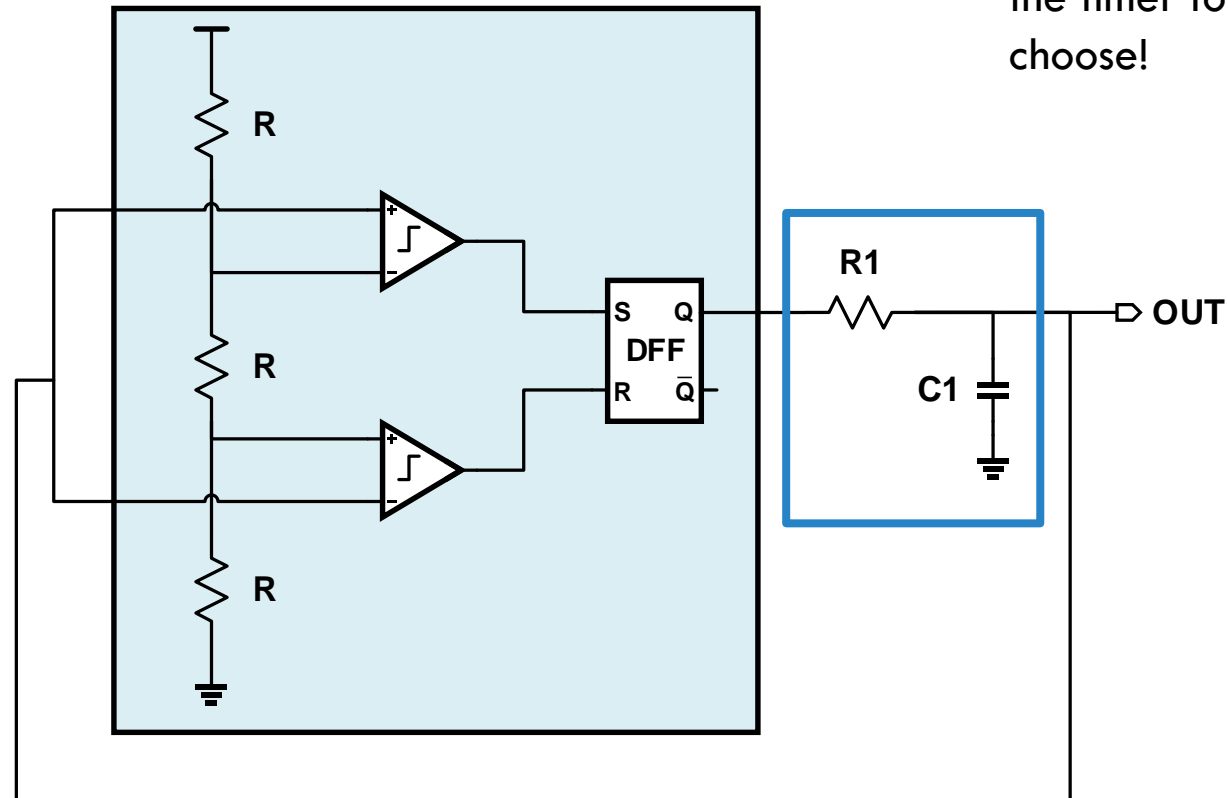
Timer:

- If  $OUT > \frac{2}{3} \times V_{dd}$ , output 0
- If  $OUT < \frac{1}{3} \times V_{DD}$ , output 1

Hysteresis!

# HOW DOES IT WORK?

## 555 Timer



LET'S BUILD ONE!

ALL COMPONENTS GO ON THE BACKSIDE

ANYTHING YOU BREAK WITH SOLDER,  
YOU CAN FIX WITH SOLDER

HAVE FUN =)