

NPN Q1 - Arduino High supplies current to Q1, Q1 turns on to allow current flow thru LEDs. Voltage at A and B will be  $\sim 0.7V$ .

R1 limits current from Arduino into Q1:

$$(5V - 0.7V) / .020A = 215 \text{ ohm}$$

R2 limits current from 12V into the LEDs:

$$(12V - V_f - V_f - V_f - 0.7V) / .020A = R2 \text{ ohm}$$

PNP Q3 - R4 holds Q3 base high to keep Q3 off.

Arduino High supplies current to Q2 base, Q3 turns on to allow current flow thru LEDs.

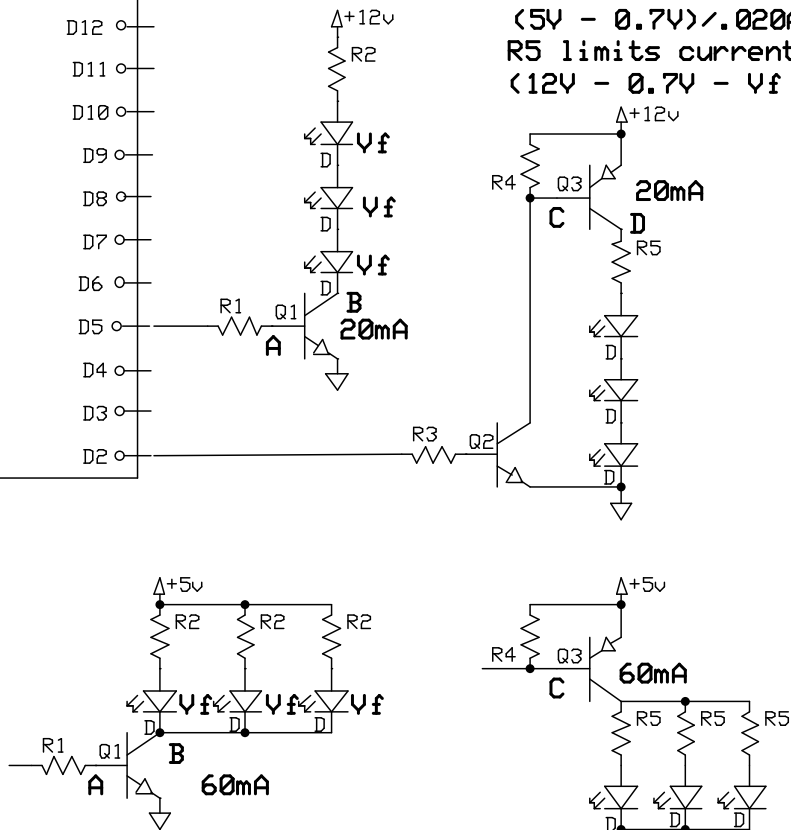
Voltage at C will be  $\sim 0.7V$  and D  $\sim 11.3V$ .

R3 limits current from Arduino into Q2:

$$(5V - 0.7V) / .020A = 215 \text{ ohm}$$

R5 limits current from 12V into the LEDs:

$$(12V - 0.7V - V_f - V_f - V_f) / .020A = R2 \text{ ohm}$$



Alternate methods to drive multiple LEDs