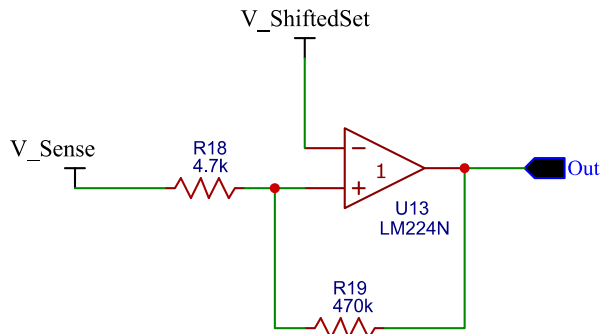


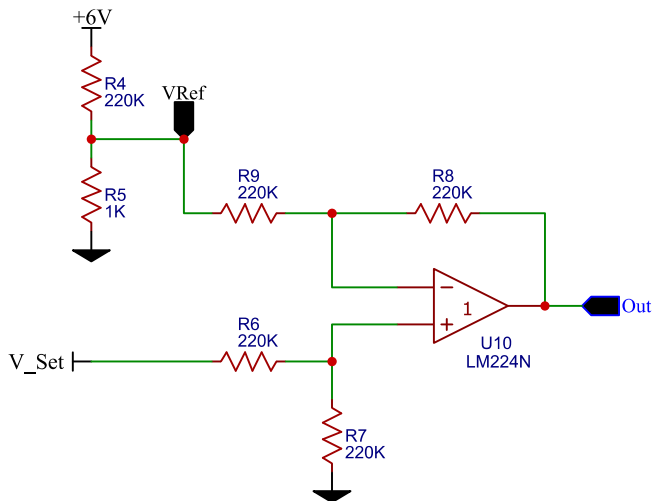
Micro Air Conditioner

Circuit – Designs

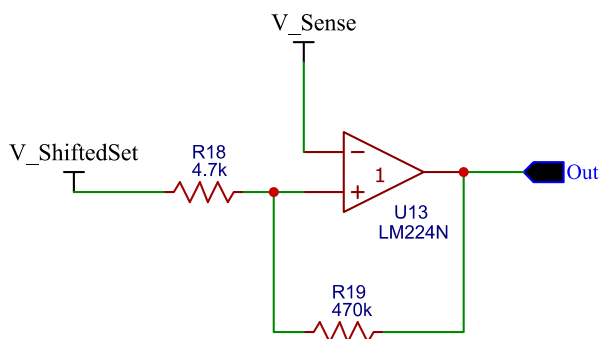
Cooler Comparison Amplifier:



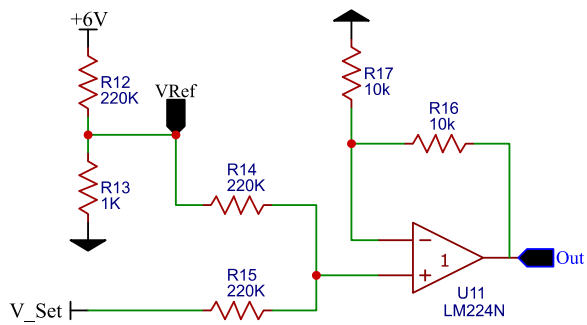
Cooler Differential Amplifier:



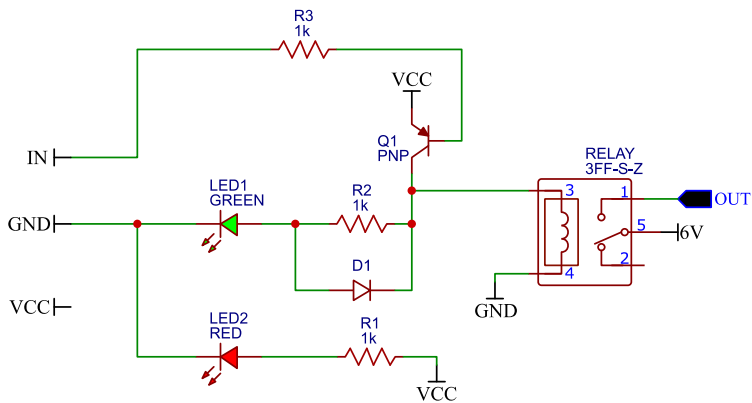
Heater Comparison Amplifier:



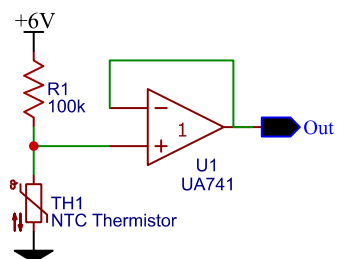
Heater Summing Amplifier:



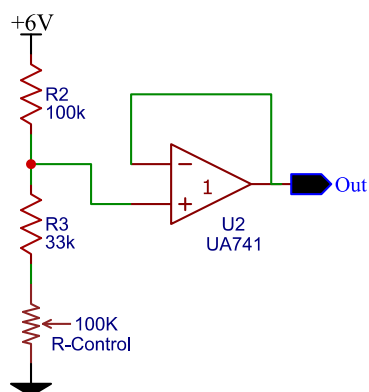
Relay Board Circuit:



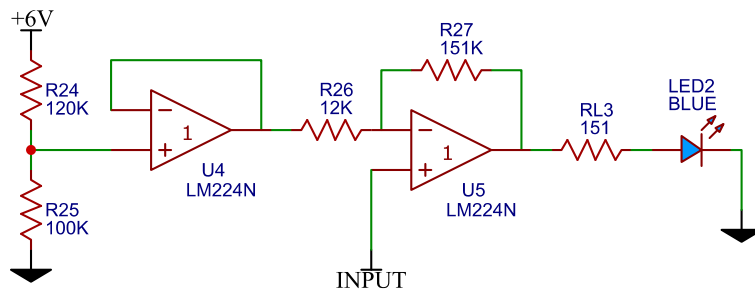
Sensing Unit:



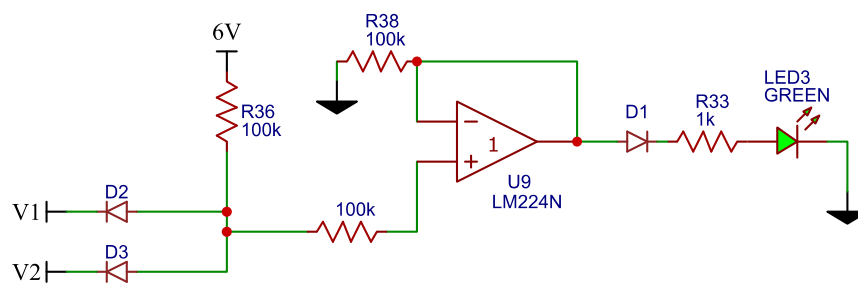
Set Unit:



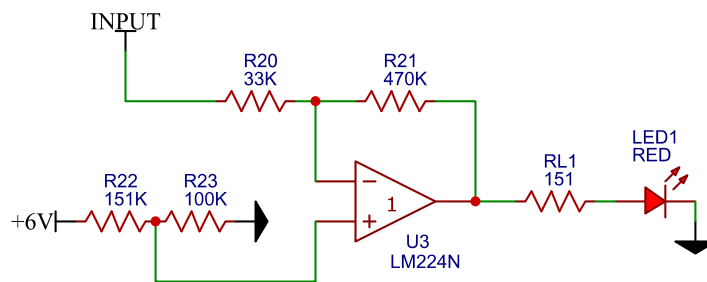
Display Unit (Blue) Circuit:



Display Unit (Green) Circuit:



Display Unit (Red) Circuit:



LTSpice Circuits:

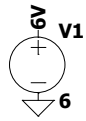
Sensing Unit:

Sensing Unit

Mustafa Emirhan Yaşar - 2517191
Orhan Akarkut - 0018713

.dc temp 20 44 0.1

$R = \{R_r\} \cdot \exp(\{B\} \cdot (1/(\text{temp}+273) - 1/\{Tr\}))$



$R_r = 100k \text{ (ohm)}$.param $R_r = 100k$

$B = 3950 \text{ (K)}$.param $B = 3950$

$Tr = 298 \text{ (K)}$.param $Tr = 298$

$R_t = R_r \cdot \exp(1/T - 1/Tr)$

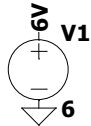
Set Unit:

Set

Mustafa Emirhan Yaşar - 2517191
Orhan Akarkut - 0018713

.step param pot 100k 1e-6 1k

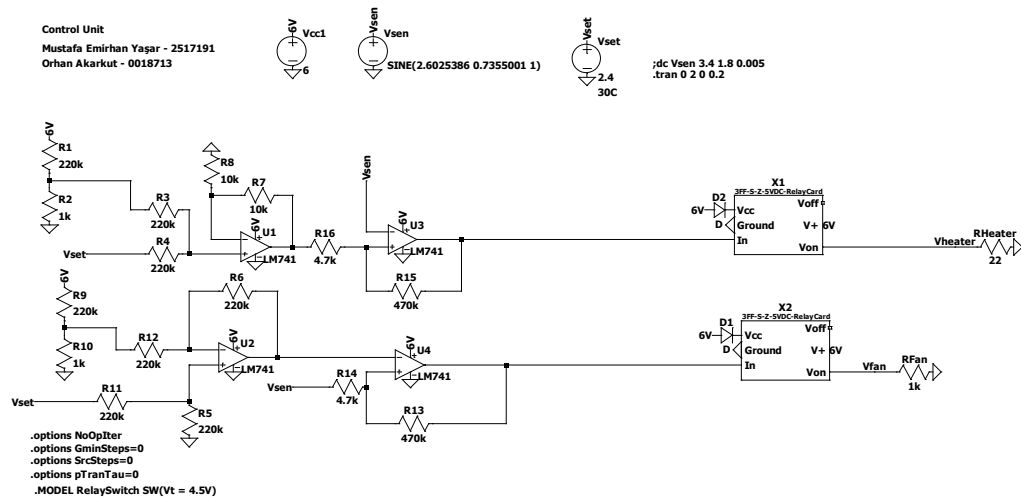
.op



.options NoOpIter
.options GminSteps=0
.options SrcSteps=0
.options pTranTau=0

R-Control
 $R = \{pot\}$

Control Unit:



Display Unit:

