Instructions:

- Copy Title, Overview, BOM, Components, Schematic and Layout templates (the next 5 slides)

- Fill out each slide according to the instructions on the template

- You will be presenting your project to the class, so be ready to talk about the material on your slides. **We are NOT grading you on your presentation skills, but on CONTENT**

Coffee Bean Roaster

Carlson Jansen
Andrew Liu
Mirwais Lodin
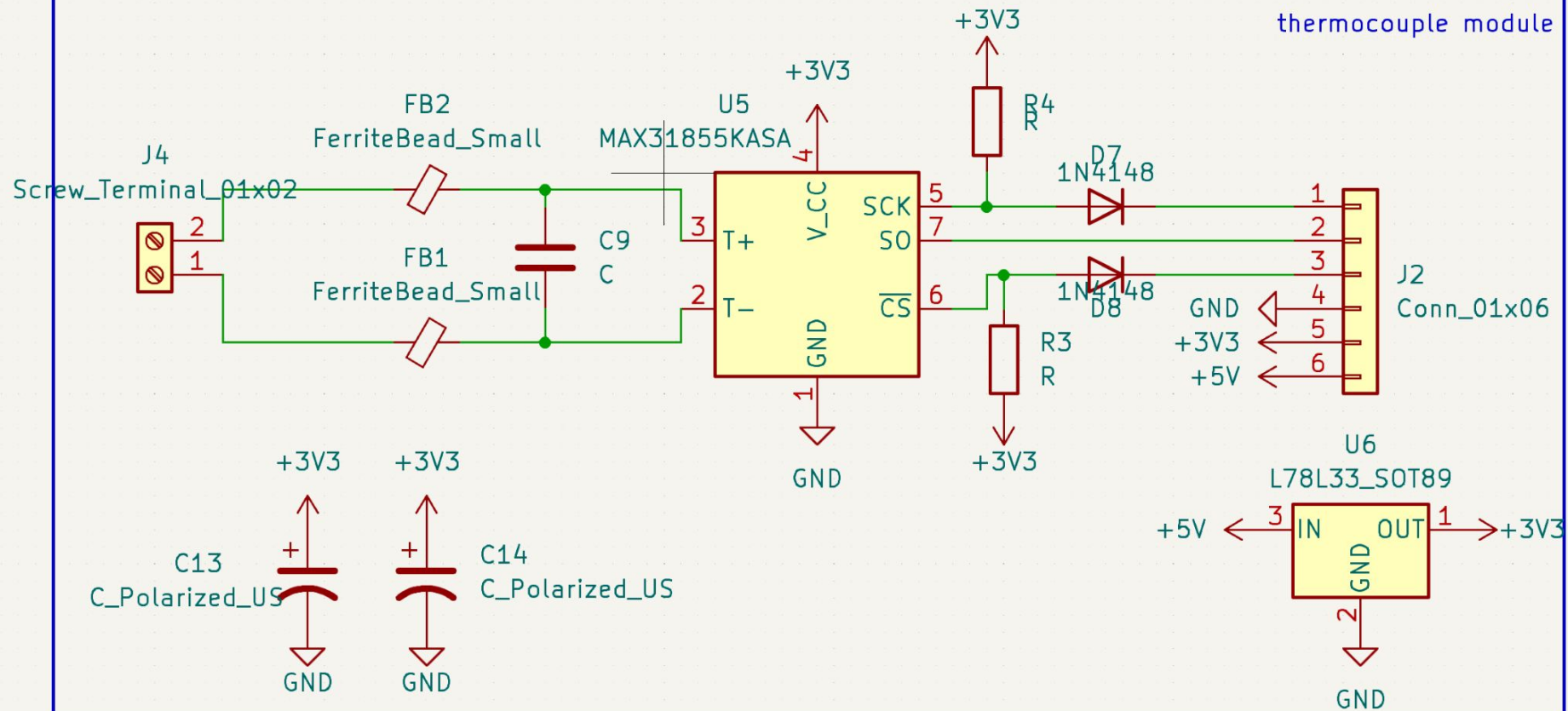Liam McHugh

Project Overview and Name ~1 min

- Our project aims for implementing a functional precision temperature control for equipment like a Coffee Bean Roaster, by recycling simple popcorn maker with built in heater, fan, and AC power distribution.
- The project will dive into recreating thermocouple module, AC or DC heat fan dimmer/control board, wall plug AC/DC converter, additional app/GUI control on screen display.
- Major challenges would be precise feedback control of temperature in the chamber, additional serial peripheral interface bus may be required if multiple thermocouple is desired.
- ESP32, K-Type Thermocouple, 16x4 LCD
- Overall circuit designs (filter types, power regulator type, power source, microcontroller used, important sensors, actuators or ICs, data buses used)
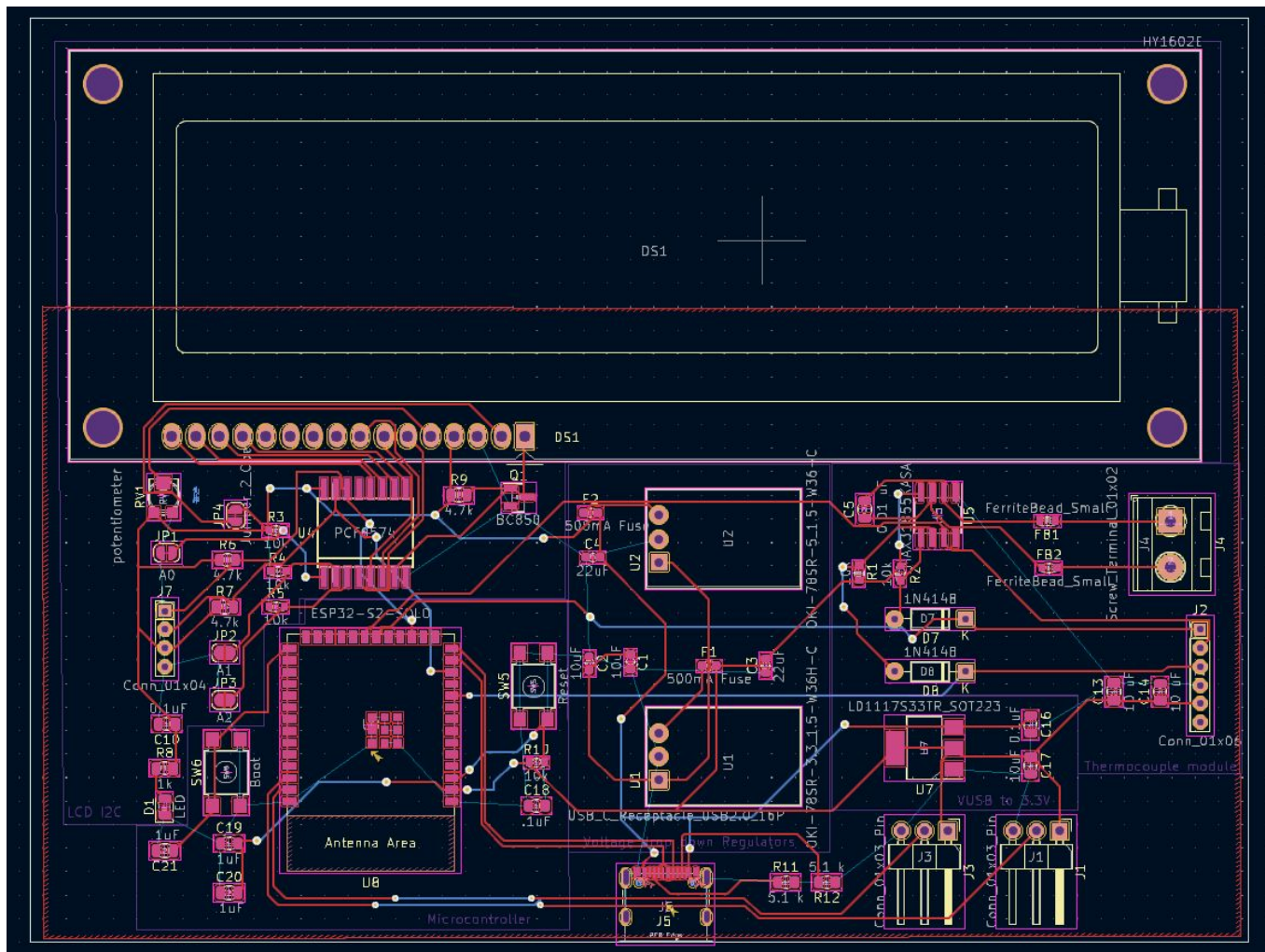
BOM ~30 sec

- Screenshot of BOM, mostly for reference
- **Use multiple slides if necessary**
- Point out expensive parts and the total cost per board

Schematic ~2 min

- **Add more slides with zoomed-in detail views DO NOT JUST SHOW A ZOOMED OUT PHOTO OF THE ENTIRE SCHEMATIC**
- If you do not know the best way to subdivide the schematic for separate screenshots, we recommend breaking it up by circuit category you fulfill for the project requirements
- Crop whitespace so schematic fills as much as possible
- Make sure image is not low resolution
- Box/label sub-blocks if not already done in the schematic

thermocouple module

J4
Screw_Terminal_01x02

FB2
FerriteBead_Small

FB1
FerriteBead_Small

C9
C

U5
MAX31855KASA

+3V3

V_CC 4
T+ 3
T− 2
GND 1
GND

SCK 5
SO 7
CS 6

R4
R

+3V3

D7
1N4148

D8
1N4148

R3
R

+3V3

+3V3

J2
Conn_01x06

1
2
3
4 GND
5 +3V3
6 +5V

+3V3   +3V3

C13
C_Polarized_US

C14
C_Polarized_US

GND   GND

U6
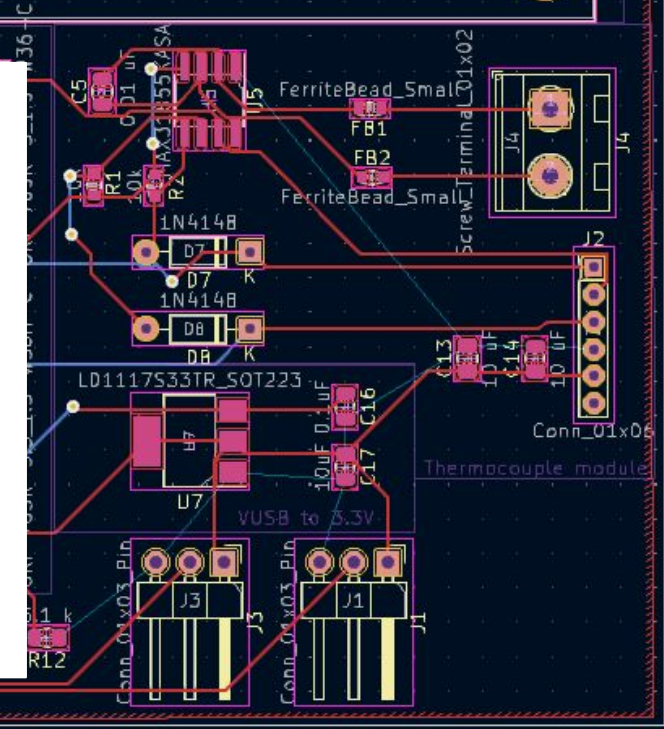L78L33_SOT89

+5V 3 IN   OUT 1 +3V3
GND 2

GND

Zoomed In:
Thermocouple MAX 31855 module ——————>

VUSB to 3.3V voltage Regulator ——————>

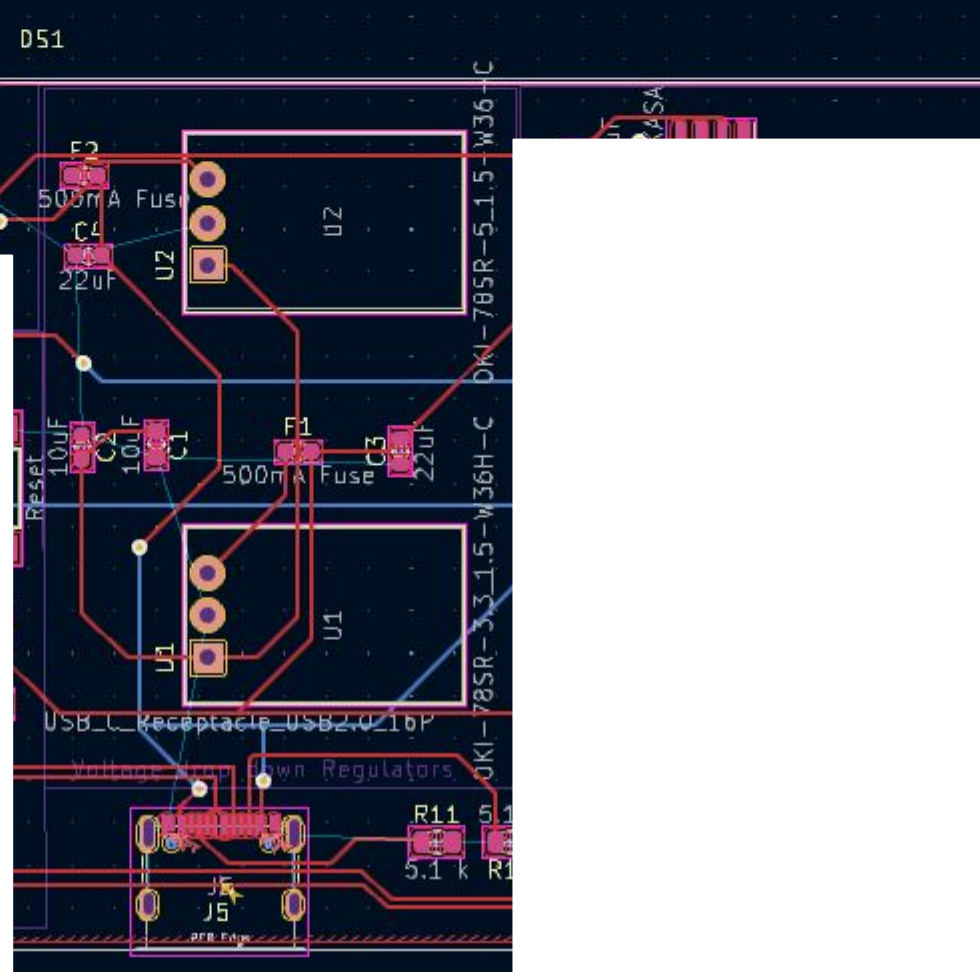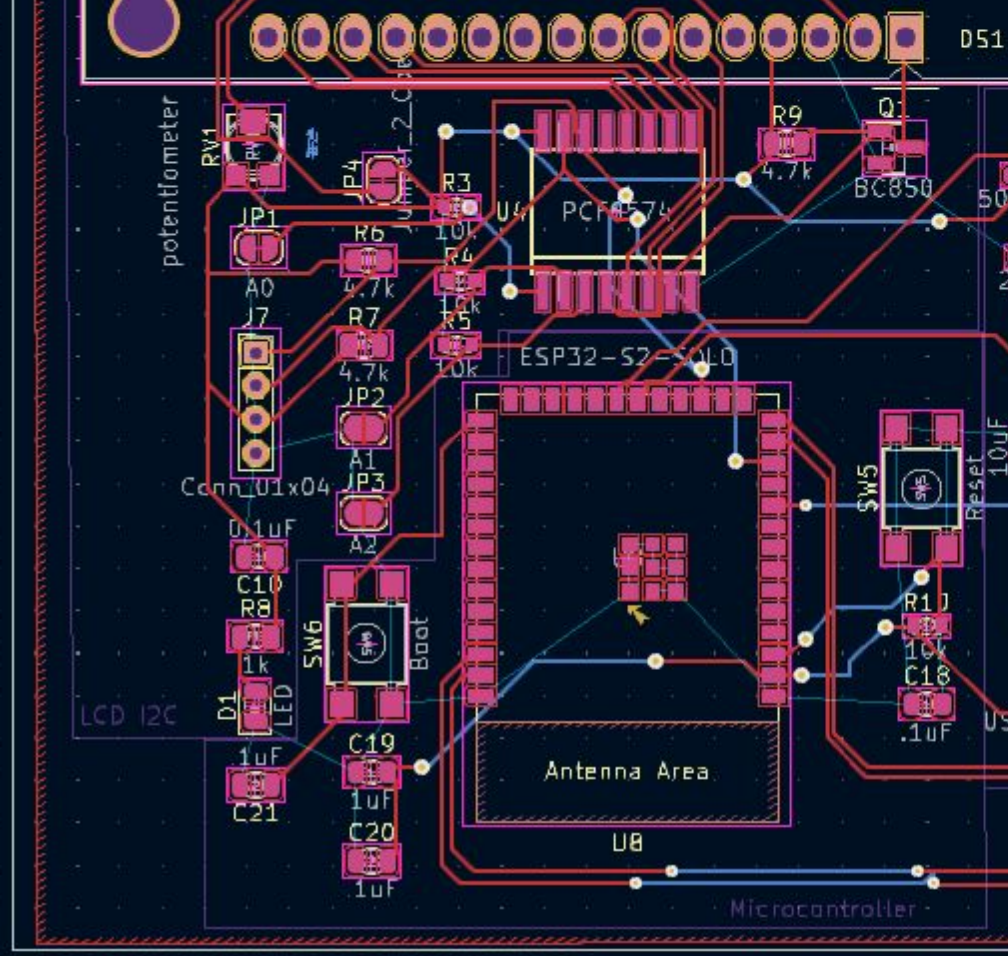Two 1x3 connector Heater & Fan Relays———————>

Zoomed In:
24V DC to 5V Voltage drop down Reg —>

24V DC to 3.3V Voltage Regulator —>

Zoomed In:
← I2C for LCD

← ESP32 S2 SOLO

USBC connector
 I
 V

HY1602E

DS1

DS1

potentiometer

PCF8574
R9 4.7k
Q1
BC850

ESP32-S2-SOLO

R3 10k
R4
R5 10k
R6 4.7k
R7 4.7k

JP1
A0
J7
JP2
JP3
A1
A2

Conn_01x04

0.1uF
C10
R8
1k
D1
LED

SW6
Boot

C19
1uF
C20
1uF
C21
1uF

U8

Antenna Area

SW5
Reset

R10
1CK
C18
.1uF

LCD I2C

Microcontroller

F2
505mA Fuse
C4
22uF

U2

10uF
C1

U2

D1 u

U1

F1
500mA Fuse
220

OK-78SR-5.1.5_W36H-C

OK-78SR-3.3.1.5-W36H-C

USB_C_Receptacle_USB2.0_16P

Voltage Step Down Regulators

J5
PCB Edge

R11 5.1 k
5.1 k R12

Conn_04x03 Pin

J3

Conn_04x03 Pin

J1

MAX3.855 MSA

R1
10k
R2

1N4148
D7
D7 K

1N4148
D8
D8 K

LD1117S33TR_SOT223
U7

10uF 0.1uF
C16
C7

VUSB to 3.3V

FerriteBead_Small
FB1
FB2
FerriteBead_Small

Screw_Terminal_01x02
J4
J4

Conn_01x06

Thermocouple module