

digital

analog

AC-DANGER

AC-DANGER

HeaterNeutral

ACNeutral

AC-DANGER

AC-DANGER

DANKDRYER

v0.9
2024-11
nick black

E+/E-/A-/A+/SHD

5+/5-/LM35/MotorNeutral

M5

J6

J4

J3

J1

R10

Q1

Q2

R3

R15

R14

R8

R5

R4

C3

C7

C5

C1

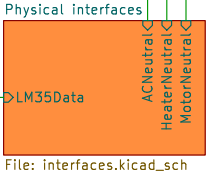
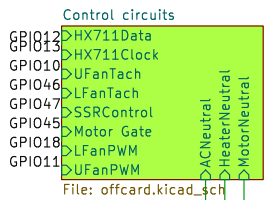
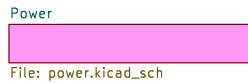
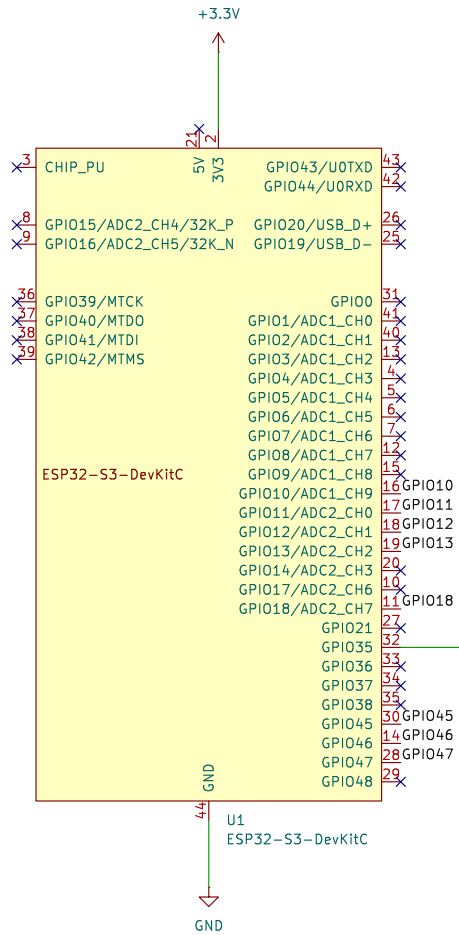
C2

L1

R1

U2

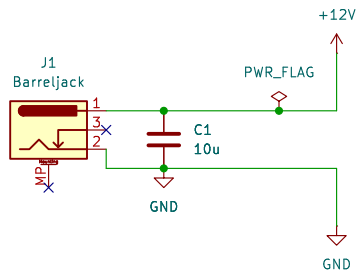
U3



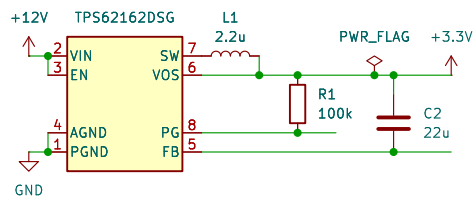
Core MCU: ESP32-S3 3.3V

nick black	
Dirty South Supercomputing	
Sheet: /	
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Title: Dankdryer	
Size: USLetter	Date:
KiCad E.D.A. 8.0.6	Rev: Id: 1/5

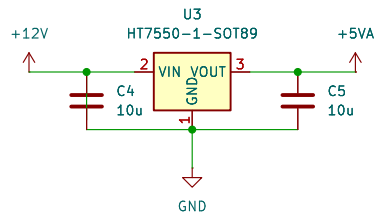
12V



3.3V (Digital)



5V (Analog)



12V+/- via barreljack
12V devices (motor, fans) use input power directly
5V analog devices use quiet linear regulator from 12V
3.3V MCU uses efficient (~85%) buck converter from 12V
TPS6216x takes up to 17V to a fixed 3.3V, max 1A

Power

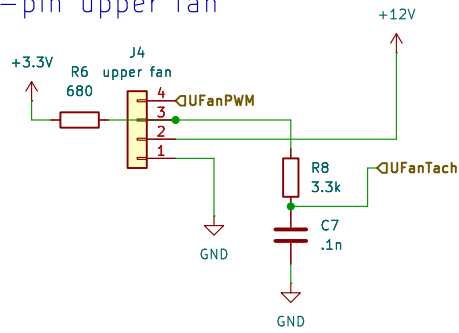
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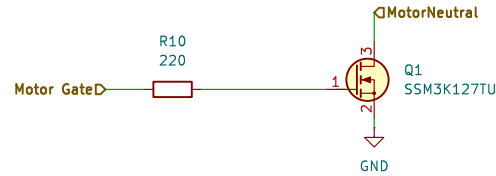
Rev:
Id: 2/5

4-pin upper fan



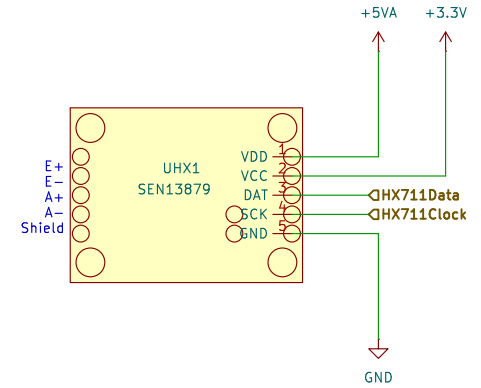
5mA max current permitted on 12V fan tachs
 680Ω on 3.3V → 4.9mA
 1000Ω on 5V → 5mA

12V DC motor



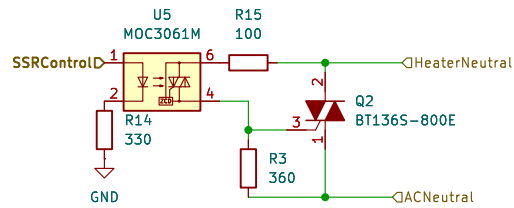
Schottky diode across motor +/- for EMP protection

Scale (24-bit ADC + 5kg load cell)



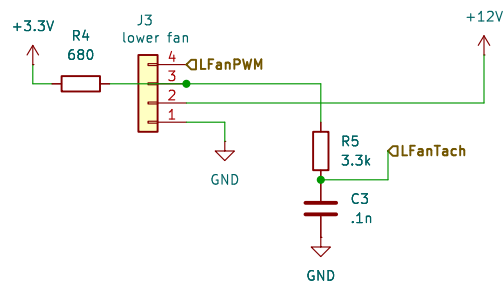
Low RATE yields 10Hz
 XI to GND uses onboard oscillator

120VAC heater



Heater neutral returns from 150C thermostat

4-pin lower fan



Control circuits

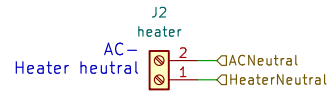
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Size: USLetter Date:
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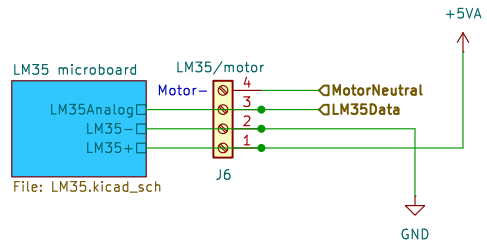
Rev:
 Id: 3/5

Heater hookup



AC—Danger!

LM35/motor hookup



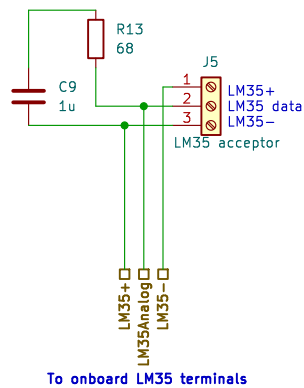
68Ω and 1μF in series from LM35Data to LM35-.
.01μF bypass across LM35+ and LM35-.
LM35 connectors come from the LM35 microboard,
which is suspended near the ceiling.

Sheet: /Physical interfaces/
File: interfaces.kicad_sch

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Rev:
Id: 4/5



The LM35 pokes through the ceiling of the cool chamber, and is accepted by the three screw terminals on this board, which exports three wires in turn. This allows us to easily have our capacitors near the LM35, where we want them.

LM35 microboard

Sheet: /Physical interfaces/LM35 microboard/
File: LM35.kicad_sch

Title:

Size: USLetter Date:

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Id: 5/5

