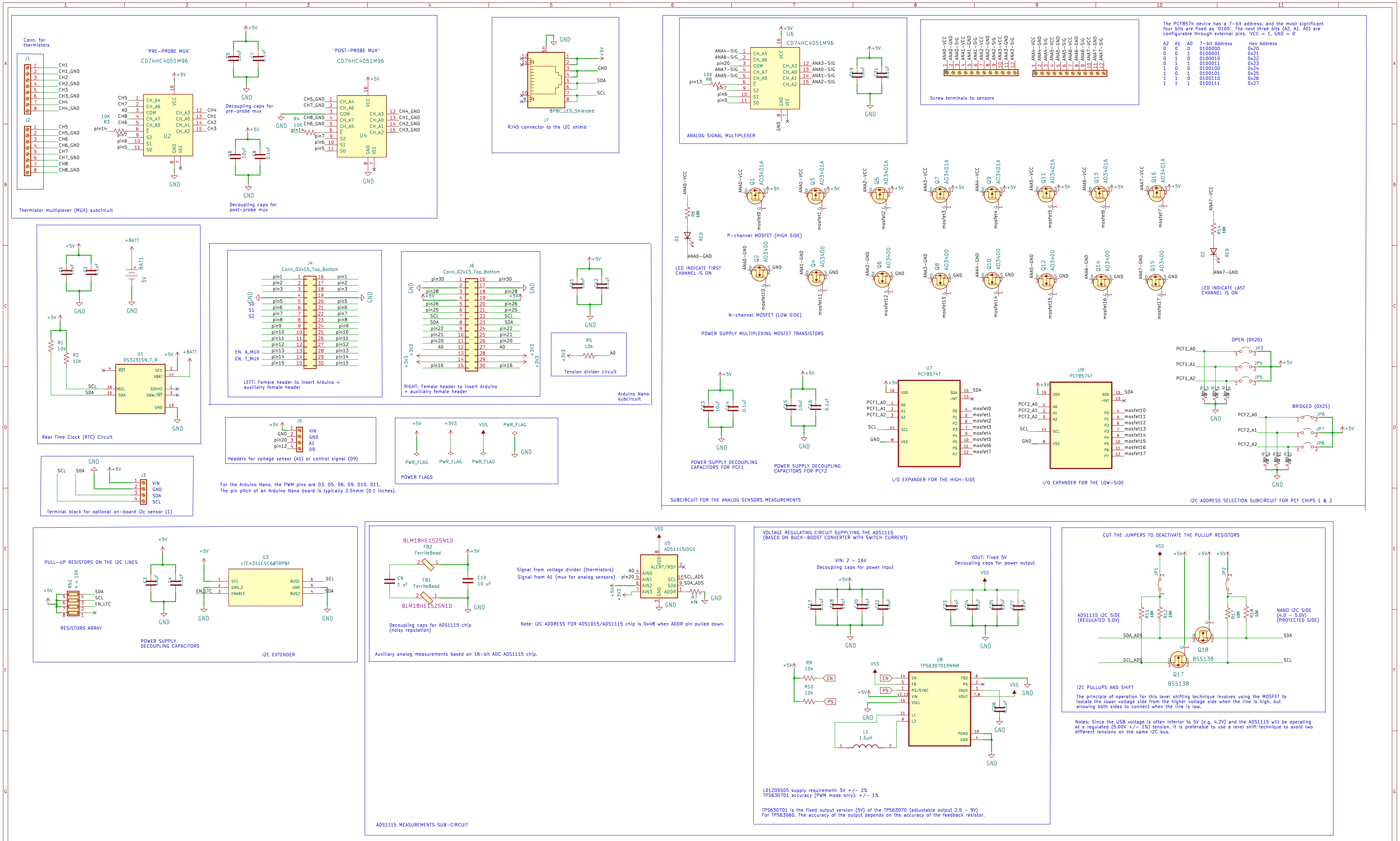
Conn. for thermistors
"PRE-PROBE MUX"
CD74HC4051M96
"POST-PROBE MUX"
CD74HC4051M96
Decoupling caps for pre-probe mux
Decoupling caps for post-probe mux
Thermistor multiplexer (MUX) subcircuit
8P8C_LED_Shielded
J7
RJ45 connector to the I2C shield
U6
CD74HC4051M96
ANALOG SIGNAL MULTIPLEXER
Screw terminals to sensors
P-channel MOSFET (HIGH SIDE)
AO3401A
N-channel MOSFET (LOW SIDE)
AO3400
LED INDICATE FIRST CHANNEL IS ON
LED INDICATE LAST CHANNEL IS ON
POWER SUPPLY MULTIPLEXING MOSFET TRANSISTORS
POWER SUPPLY DECOUPLING CAPACITORS FOR PCF1
POWER SUPPLY DECOUPLING CAPACITORS FOR PCF2
U7
PCF8574T
I/O EXPANDER FOR THE HIGH-SIDE
U9
PCF8574T
I/O EXPANDER FOR THE LOW-SIDE
OPEN (0X20)
BRIDGED (0X21)
SUBCIRCUIT FOR THE ANALOG SENSORS MEASUREMENTS
I2C ADDRESS SELECTION SUBCIRCUIT FOR PCF CHIPS 1 & 2
U1
DS3231SN_T_R
BAT1
3V
Real Time Clock (RTC) Circuit
J4
Conn_02x15_Top_Bottom
LEFT: Female header to insert Arduino + auxiliary female header
J6
Conn_02x15_Top_Bottom
RIGHT: Female header to insert Arduino + auxiliary female header
R5
10k
Tension divider circuit
Arduino Nano subcircuit
J5
VIN
GND
A1
D9
Headers for voltage sensor (A1) or control signal (D9)
PWR_FLAG
POWER FLAGS
J3
VIN
GND
SDA
SCL
Terminal block for optional on-board i2c sensor (1)
PULL-UP RESISTORS ON THE I2C LINES
RN1
4 x 10K
RESISTORS ARRAY
POWER SUPPLY DECOUPLING CAPACITORS
U3
LTC4311CSC6#TRPBF
I2C EXTENDER
BLM18HE152SN1D
FB2
FerriteBead
C9
1 uF
FB1
FerriteBead
BLM18HE152SN1D
C10
10 uF
Decoupling caps for ADS1115 chip (noisy reputation)
Signal from voltage divider (thermistors)
Signal from A1 (mux for analog sensors)
U5
ADS1115IDGS
R7
47K
ADS1115 MEASUREMENTS SUB-CIRCUIT
VOLTAGE REGULATING CIRCUIT SUPPLYING THE ADS1115
(BASED ON BUCK-BOOST CONVERTER WITH SWITCH CURRENT)
VIN: 2 - 16V
Decoupling caps for power input
VOUT: Fixed 5V
Decoupling caps for power output
U8
TPS630701RNMR
L1
1.5uH
CUT THE JUMPERS TO DEACTIVATE THE PULLUP RESISTORS
JP1
JP2
R11 10K
R12 10K
R17 10K
R18 10K
ADS1115 I2C SIDE
(REGULATED 5.0V)
NANO I2C SIDE
(4.0 - 5.0V)
(PROTECTED SIDE)
SDA_ADS
SCL_ADS
SDA
SCL
Q18
BSS138
Q17
BSS138
I2C PULLUPS AND SHIFT

The PCF8574 device has a 7-bit address, and the most significant four bits are fixed as '0100'. The next three bits (A2, A1, A0) are configurable through external pins. 'VCC = 1, GND = 0'

A2	A1	A0	7-bit Address	Hex Address
0	0	0	0100000	0x20
0	0	1	0100001	0x21
0	1	0	0100010	0x22
0	1	1	0100011	0x23
1	0	0	0100100	0x24
1	0	1	0100101	0x25
1	1	0	0100110	0x26
1	1	1	0100111	0x27

For the Arduino Nano, the PWM pins are D3, D5, D6, D9, D10, D11.
The pin pitch of an Arduino Nano board is typically 2.54mm (0.1 inches).

Auxiliary analog measurements based on 16-bit ADC ADS1115 chip.

Note: I2C ADDRESS FOR ADS1015/ADS1115 chip is 0x48 when ADDR pin pulled down.

L01Z05S05 supply requirement: 5V +/- 2%
TPS630701 accuracy (PWM mode only): +/- 1%

TPS630701 is the fixed output version (5V) of the TPS63070 (adjustable output 2.5 - 9V)
For TPS63060, The accuracy of the output depends on the accuracy of the feedback resistor.

The principle of operation for this level shifting technique involves using the MOSFET to isolate the lower voltage side from the higher voltage side when the line is high, but allowing both sides to connect when the line is low.

Notes: Since the USB voltage is often inferior to 5V (e.g. 4.2V) and the ADS1115 will be operating at a regulated (5.00V +/- 1%) tension, it is preferable to use a level shift technique to avoid two different tensions on the same I2C bus.

Jericho Laboratory Inc.
Sheet: /
File: RDL_revE4.kicad_sch
Title: Resistance Data Logger (RDL) Controller
Size: A2 Date: 2024-04-08 **Rev: revE4**
KiCad E.D.A. kicad 7.0.9 Id: 1/1