Data Logger

Logger Power Supply 8.5V
LM2596

U7
+12V — IN+   OUT+ — +9V
Buck Converter
GND — IN−   OUT− — GND
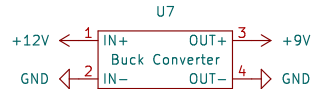
Real Time Clock Module
DS3231 IIC

+5V — +
SDA — D
SCL — C   DS3231
NC   Mini_RTC1
GND — −
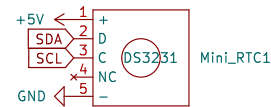
Sapflux Power Supply ~2.5V
LM2596

GND
U8
SF_Heating — OUT−   IN− — GND
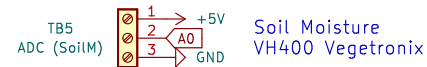TB7   Buck Converter
             OUT+   IN+ — +12V
+2V5
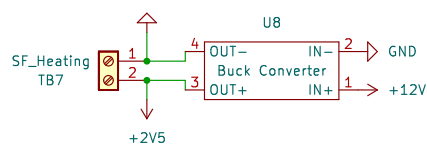
Sensor Screw Terminals

TB5 — +5V
ADC (SoilM) — A0 — GND   Soil Moisture
                            VH400 Vegetronix

TB4 — +5V
SDI−12 (TEROS12) — D5 — GND   Wood Water
                              Teros−12 Meter

TB6 — +5V / GND
I2C (BME280, M...) — SDA / SCL   Temp/Pres/Hum
                                 BME280 Bosch

Logger Microcontroller
Arduino Nano v3

+9V   +5V
VIN 3V3 +5V
D0/RX   RESET
D1/TX   RESET
D2
D3
D4 — D4
D5   AREF
D6
D7 — D7   A0 — A0
D8   A1
D9   A2
D10   A3
CS — D11 A4 — SDA
MOSI — D12 A5 — SCL
MISO   A6
CLK — D13 A7
GND GND
GND   GND
Arduino Nano (Logger)

Micro−SD Card Reader
SPI

+5V
microSD Module U5
3V3
CS — CS
MOSI — MOSI
CLK — CLK
GND MISO — MISO
GND
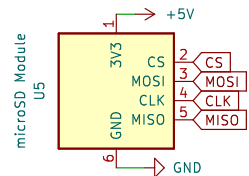
Sapflux Thermocouple Reader
MCP9600 Adafruit

ADR
A4
A3
A2
A1
SDA — SDA
SCL — SCL   MCP9600
GND — GND   U4
+5V — VIN
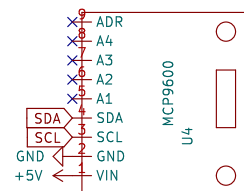
433MHz RF Module Screw Terminal

GND
D4 — RF Module
+5V   TB8
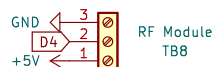
Timer

Timer Microcontroller
Arduino Nano v3

+7.5V
VIN 3V3 +5V 5V_Relay
D0/RX   RESET
D1/TX   RESET
D2
D3 — D3
D4   AREF
D5
D6
D7 — D7   A0
D8   A1
D9   A2
D10   A3
D11   A4
D12   A5
D13   A6
GND GND A7
GND GND
Arduino Nano (Timer)

Timer Power Supply 8.5V
LM2596

+BATT
U6
TB1 — IN+   OUT+ — +7.5V
12V BAT   Buck Converter
       IN−   OUT− — GND
GND

Relay Module Screw Terminal

+12V — TB2
+BATT — Relay_Mod

5V_Relay — Relay_Mod
D3 — TB3
GND
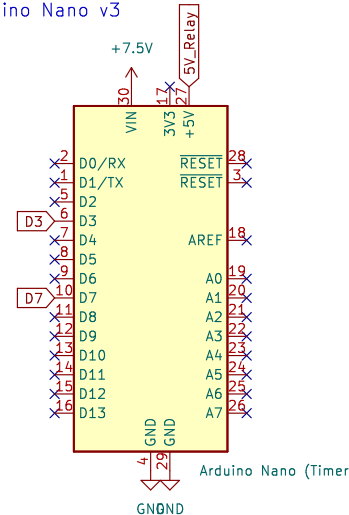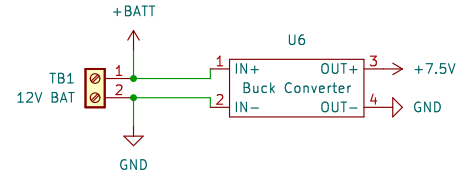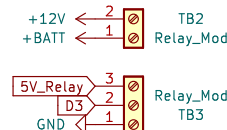
Pinout Diagrams
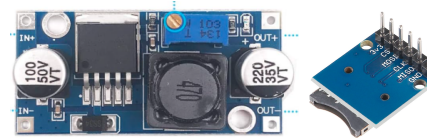
SCK/D13 (16)   (15) D12/MISO
+3V3 (17)   (14) ~D11/MOSI
AREF (18)   (13) ~D10/SS
A0/D14 (19)   (12) ~D9
A1/D15 (20)   (11) D8
A2/D16 (21)   (10) D7
A3/D17 (22)   (9) ~D6
SDA/A4/D18 (23)   (8) ~D5
SCL/A5/D19 (24)   (7) D4
A6/D20 (25)   (6) ~D3
A7/D21 (26)   (5) D2
+5V (27)   (4) GND
RESET (28)   (3) RESET
GND (29)   (2) D0/RX
VIN (30)   (1) D1/TX

SPACL
v1
By: Suvan A. Cabraal
Matheny Ecohydrology Lab
The University of Texas at Austin

Sheet: /
File: SPACL.kicad_sch

Title: Soil Plant Atmosphere Continuum Logger (SPACL)

Size: A4   Date: 7/24/2025   **Rev:** 1.0
KiCad E.D.A. kicad 7.0.10   Id: 1/1