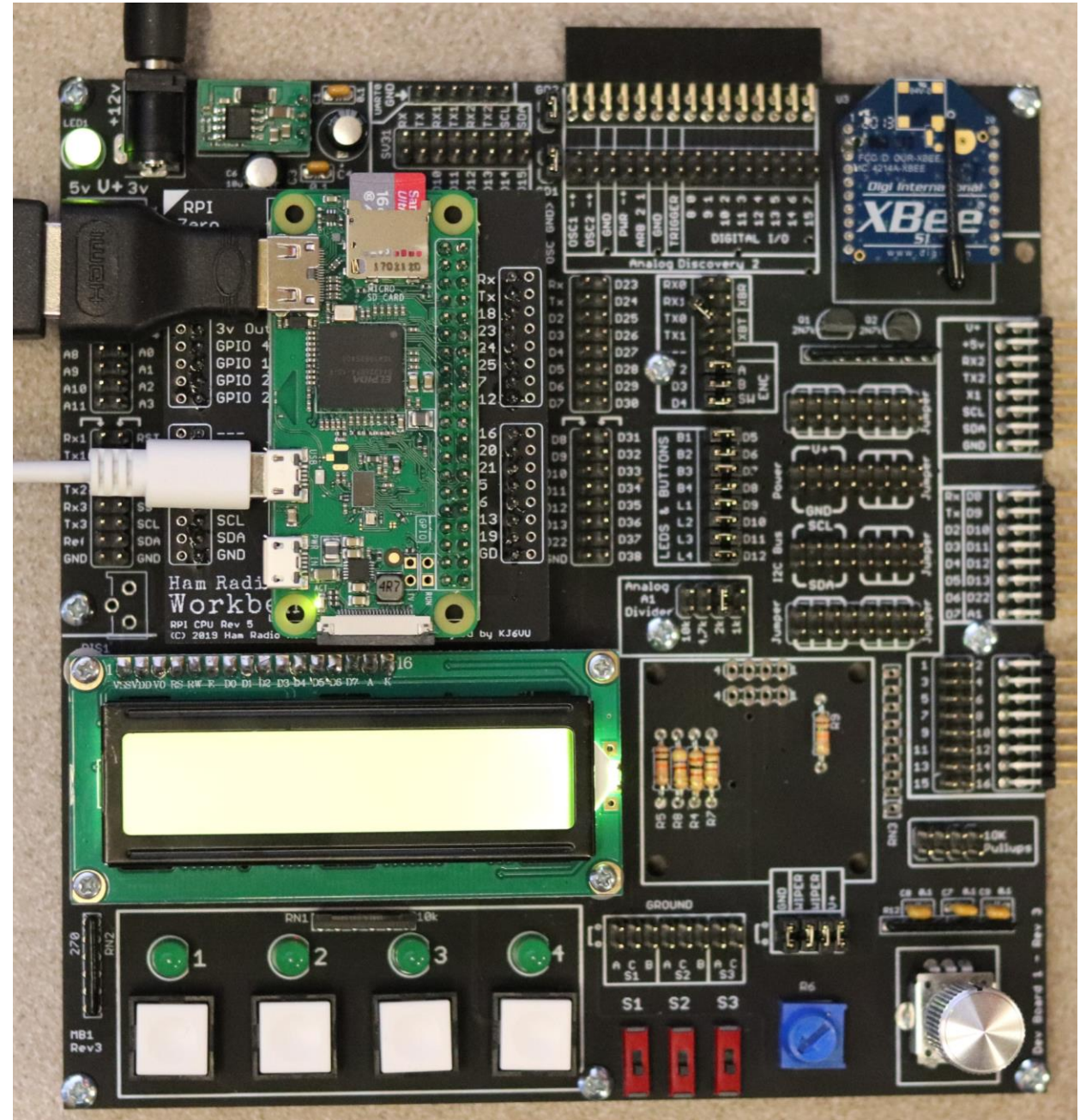


BenchDuino Development System Overview

George Zafiropoulos
KJ6VU



What is BenchDuino ?

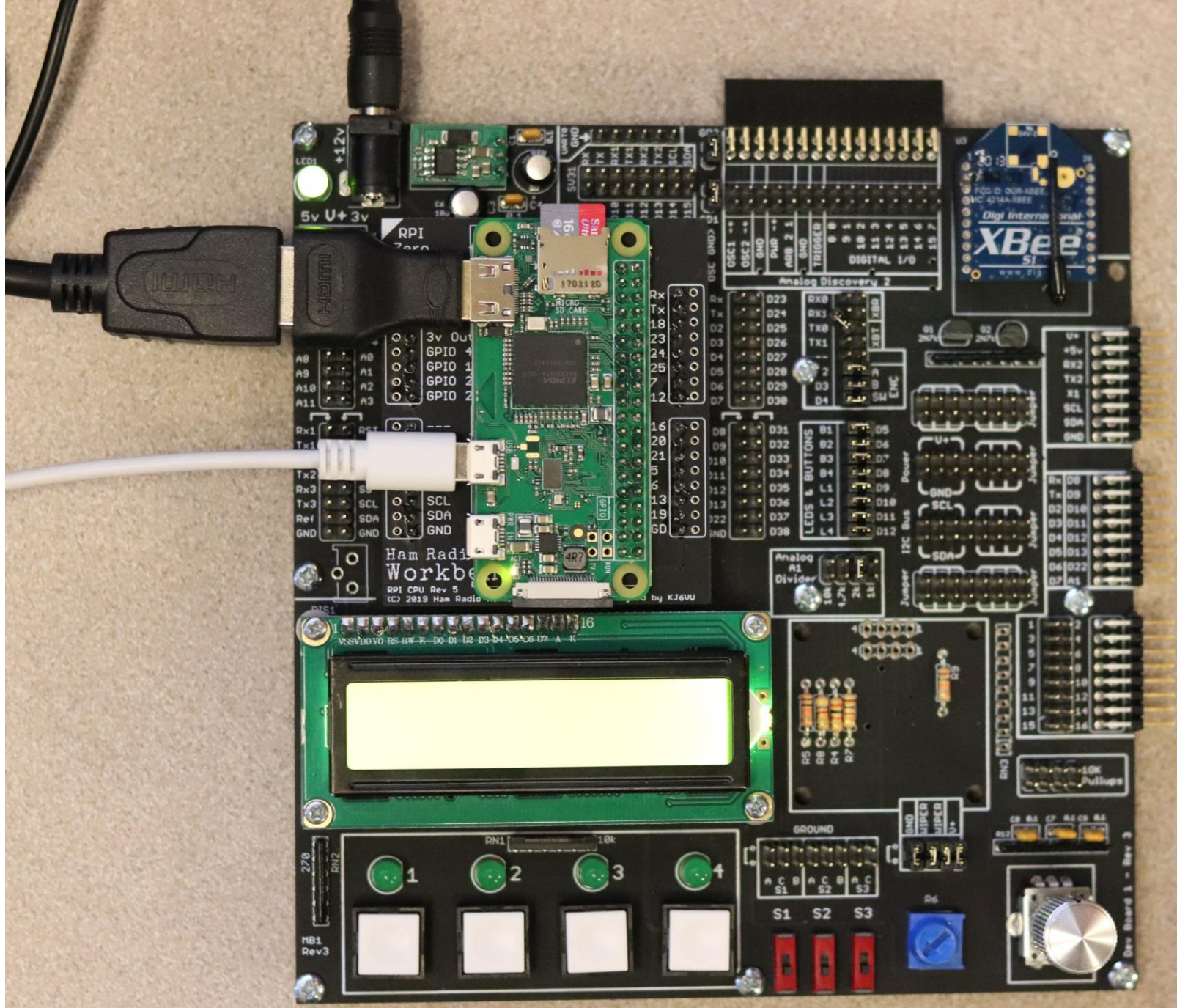
- Prototyping & development board set
- Quickly assemble microcontroller-based prototypes
- Supporting multiple processors (Arduino, Raspberry Pi, PIC, Feather...)
- Typical most often used peripherals
- Expansion to external breadboards or custom PCBs
- Built on a custom pinout and board geometry definition
- Reference board designs available so you can make your own

Why?

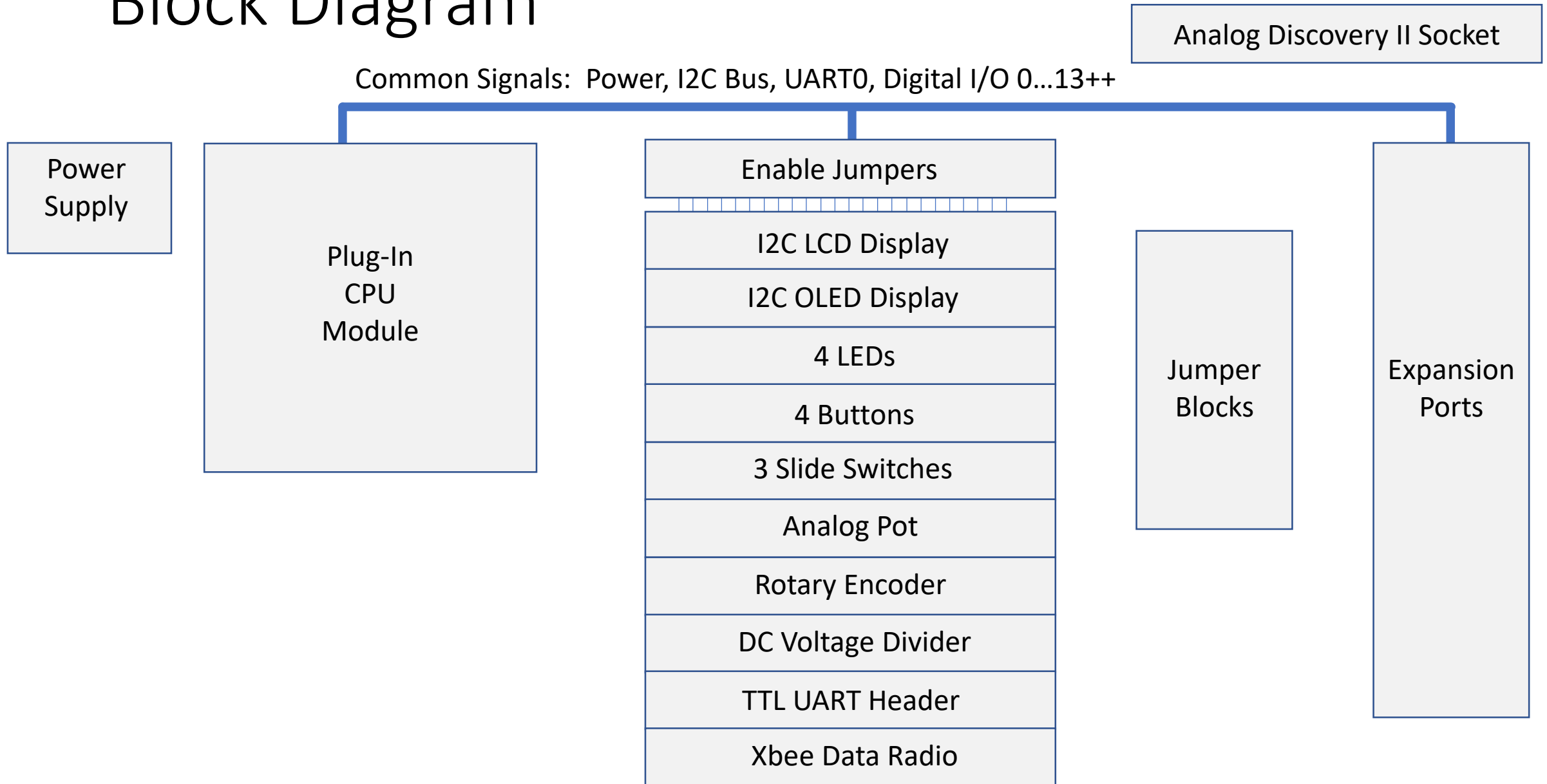
- Every one of my projects has a typical set of hardware...
 - Microcontroller Rotary encoder
 - LCD UART or Xbee comms
 - Buttons Potentiometer
 - LEDs Switches
- Every prototype is a fragile jumble of wires or a series of discarded PCBs
- I want a reliable, standardized platform for prototyping

Board Set

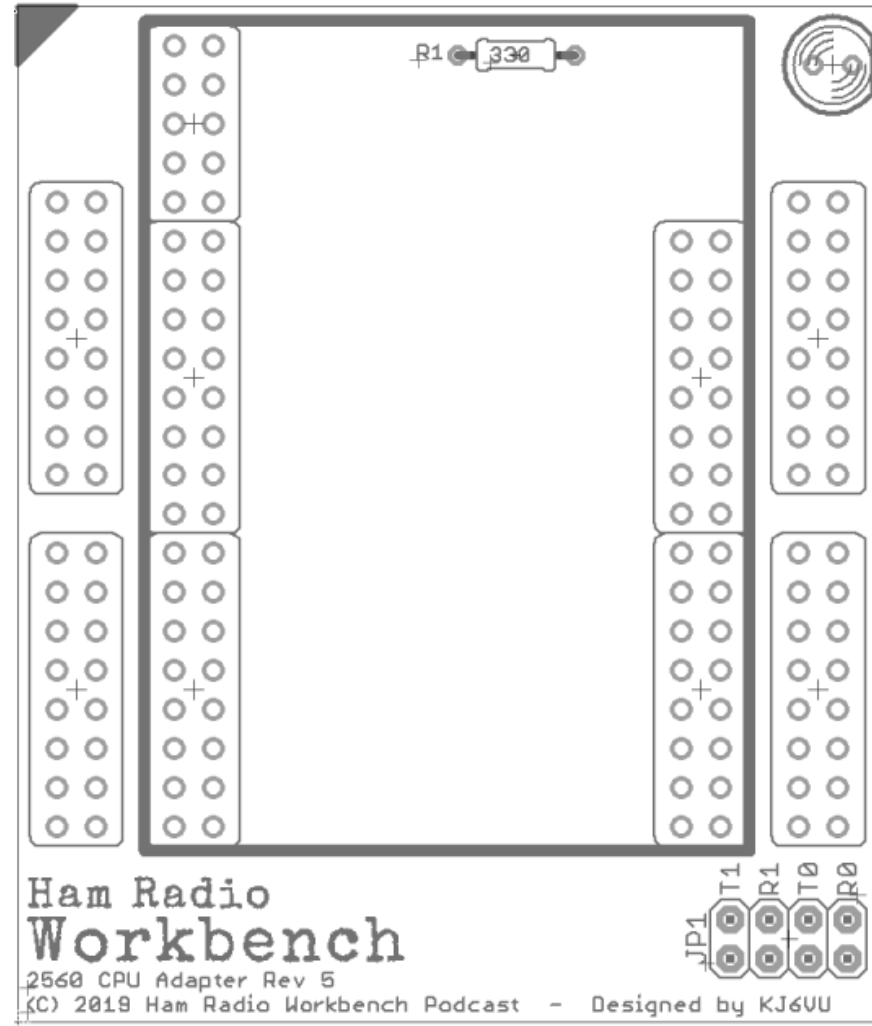
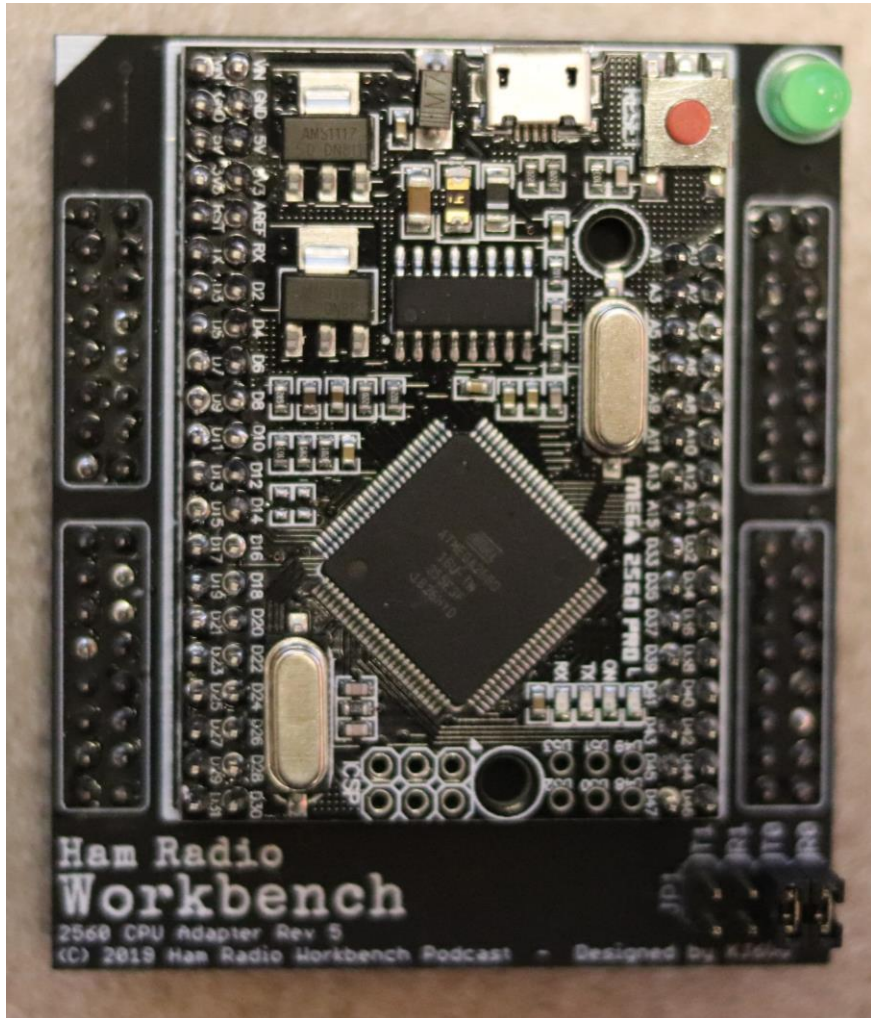
- Motherboard
- CPU Board
- Expansion host board
- Prototype board
- Project boards



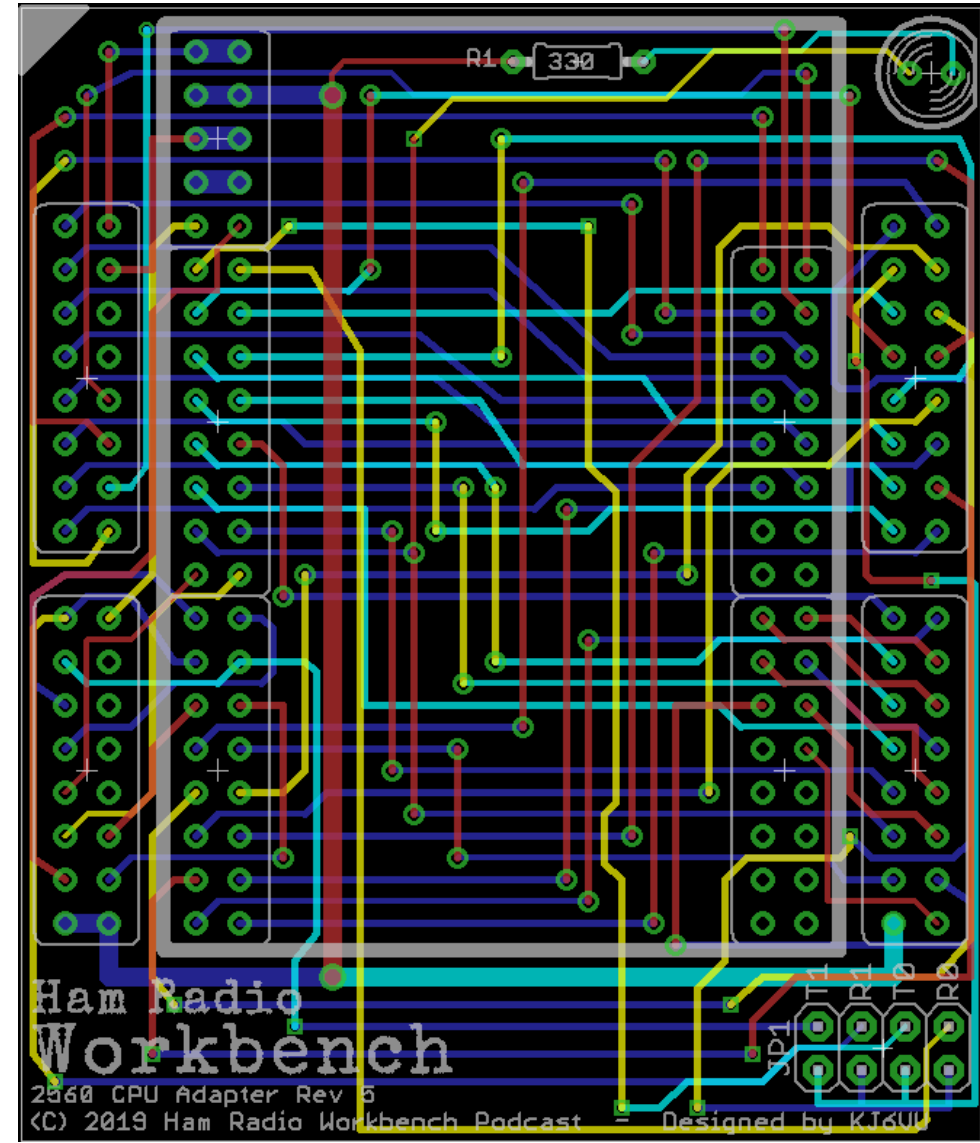
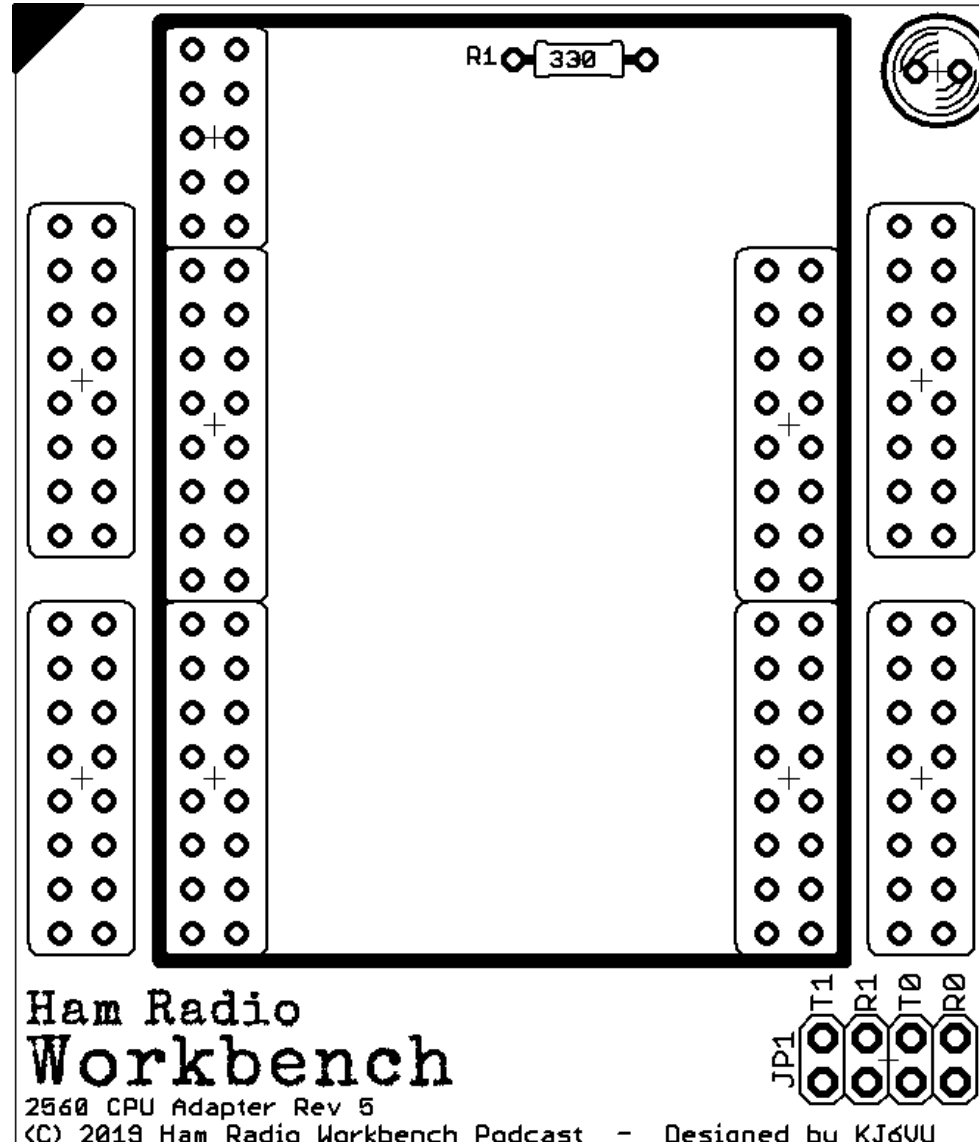
Block Diagram



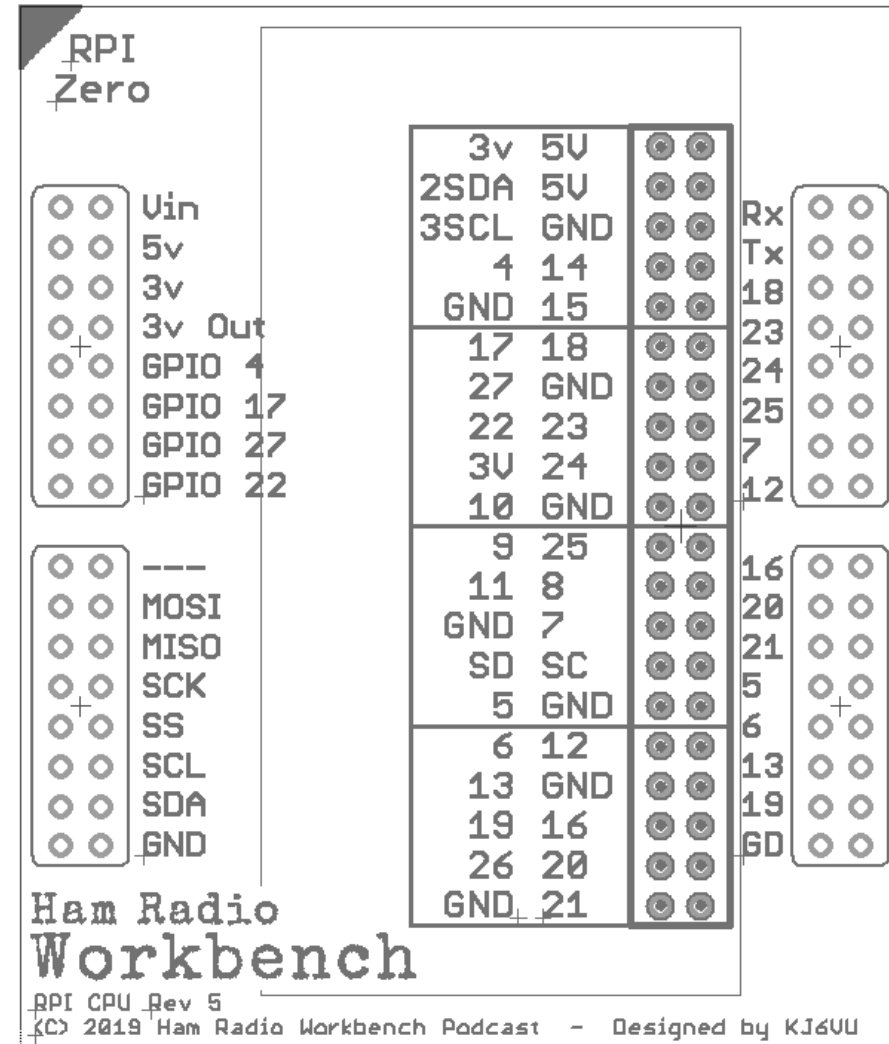
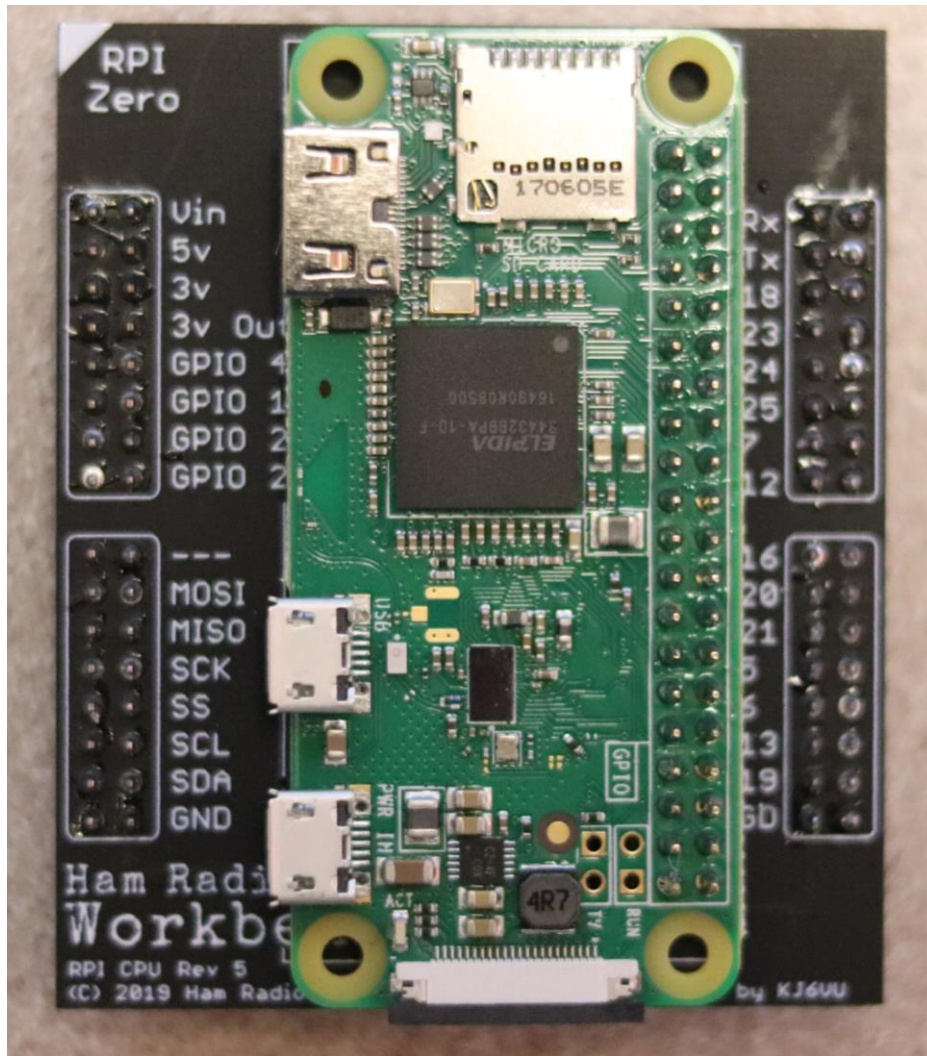
Arduino CPU Board



Arduino CPU



Raspberry Pi Zero Board



CPU Board Pinout

Analog Inputs

A4	○ ○	Vin
A5	○ ○	6V
A6	○ ○	3V In
A7	○ ○	3V Out
A8	○ ○	A0
A9	○ ○	A1
A10	○ ○	A2
A11	○ ○	A3

Serial Busses

RX1	○ ○	RST
TX1	○ ○	MSI
RX2	○ ○	MSO
TX2	○ ○	SCK
RX3	○ ○	SS
TX3	○ ○	SCL
Ref	○ ○	SDA
GND	○ ○	GND

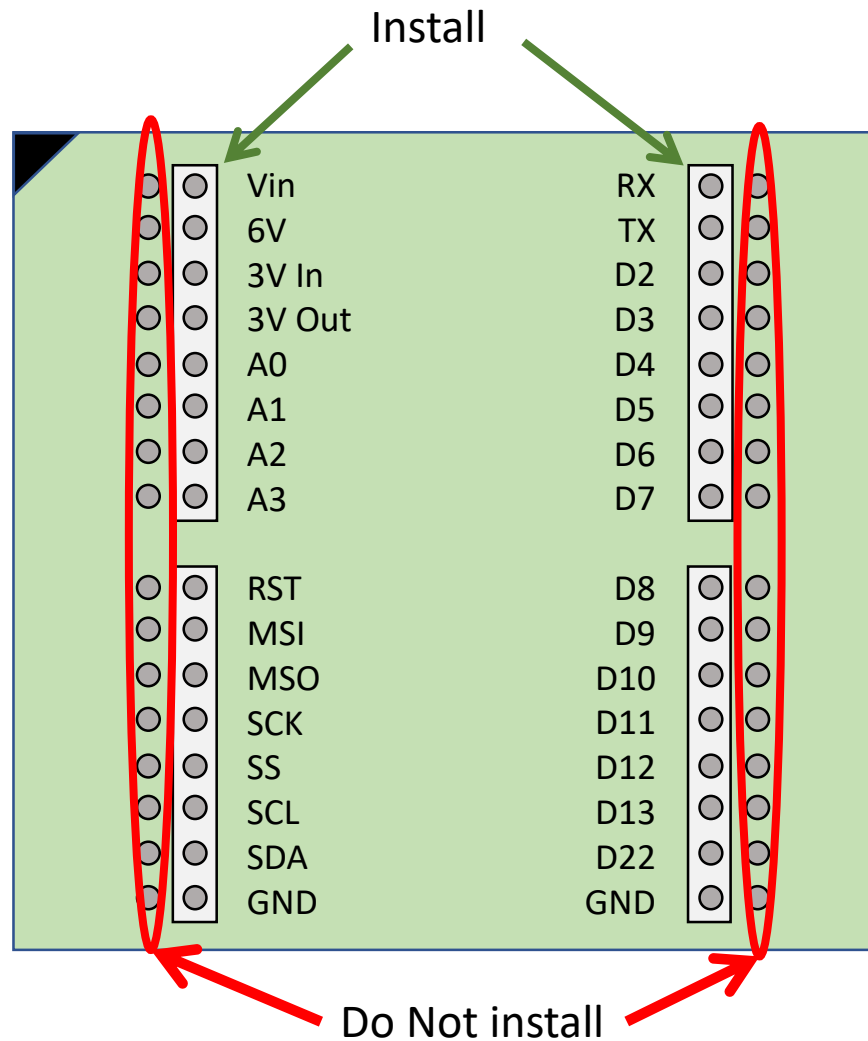
RX	○ ○	D23
TX	○ ○	D24
D2	○ ○	D25
D3	○ ○	D26
D4	○ ○	D27
D5	○ ○	D28
D6	○ ○	D29
D7	○ ○	D30

D8	○ ○	D31
D9	○ ○	D32
D10	○ ○	D33
D11	○ ○	D34
D12	○ ○	D35
D13	○ ○	D36
D22	○ ○	D37
GND	○ ○	D38

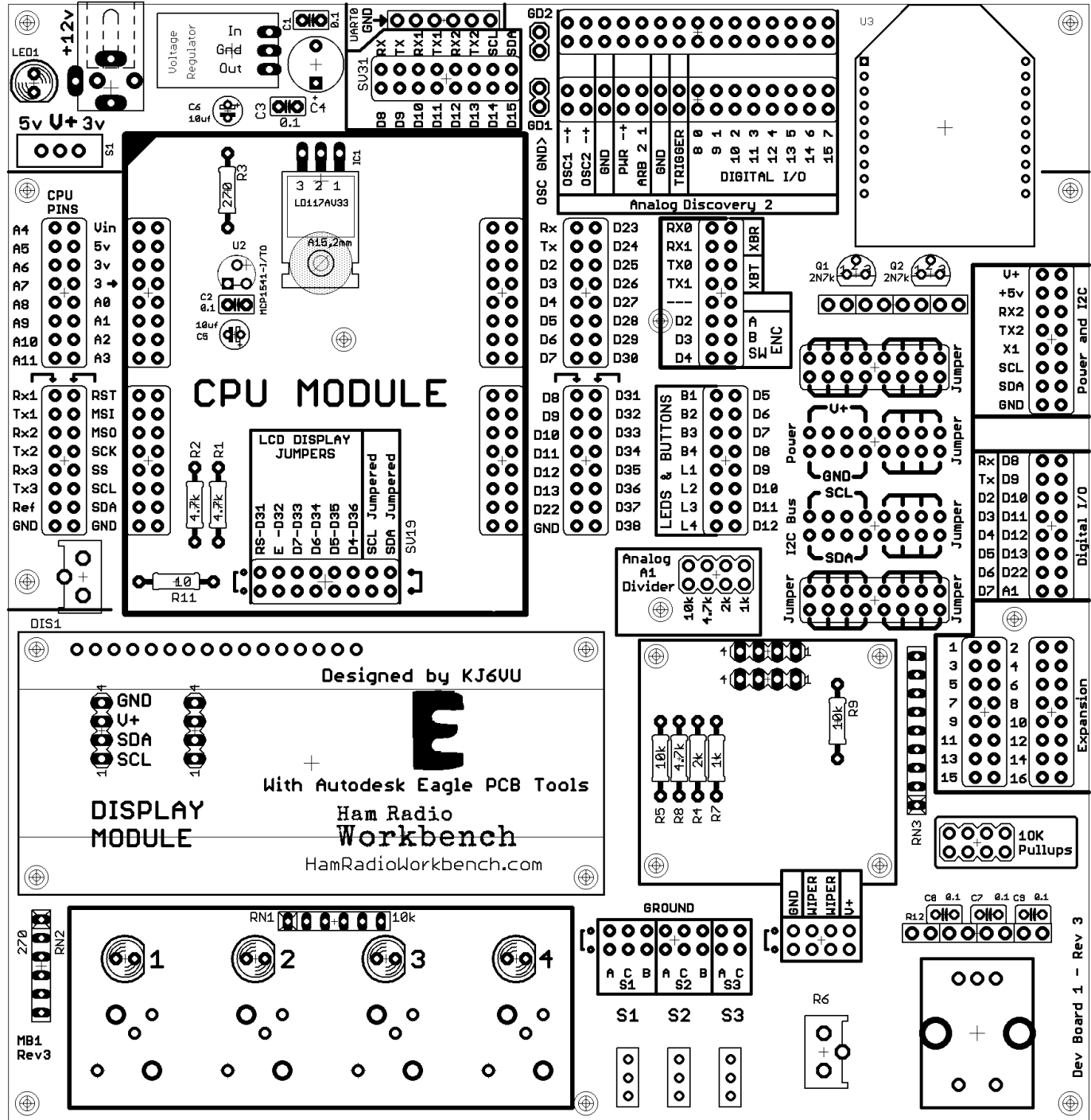
Digital I/O

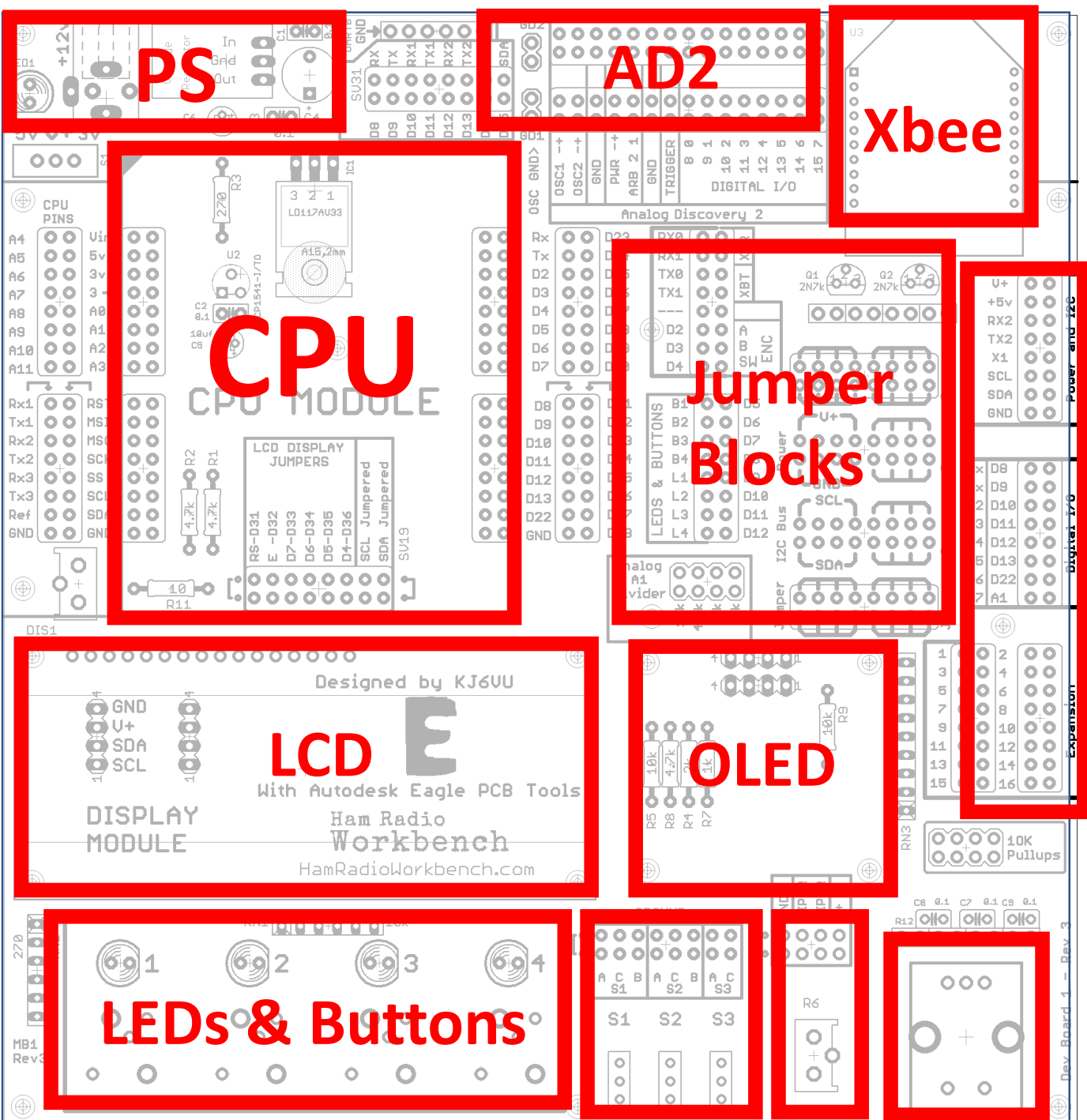
Raspberry Pi Zero Assembly

Only install the 4 female headers on the inner rows



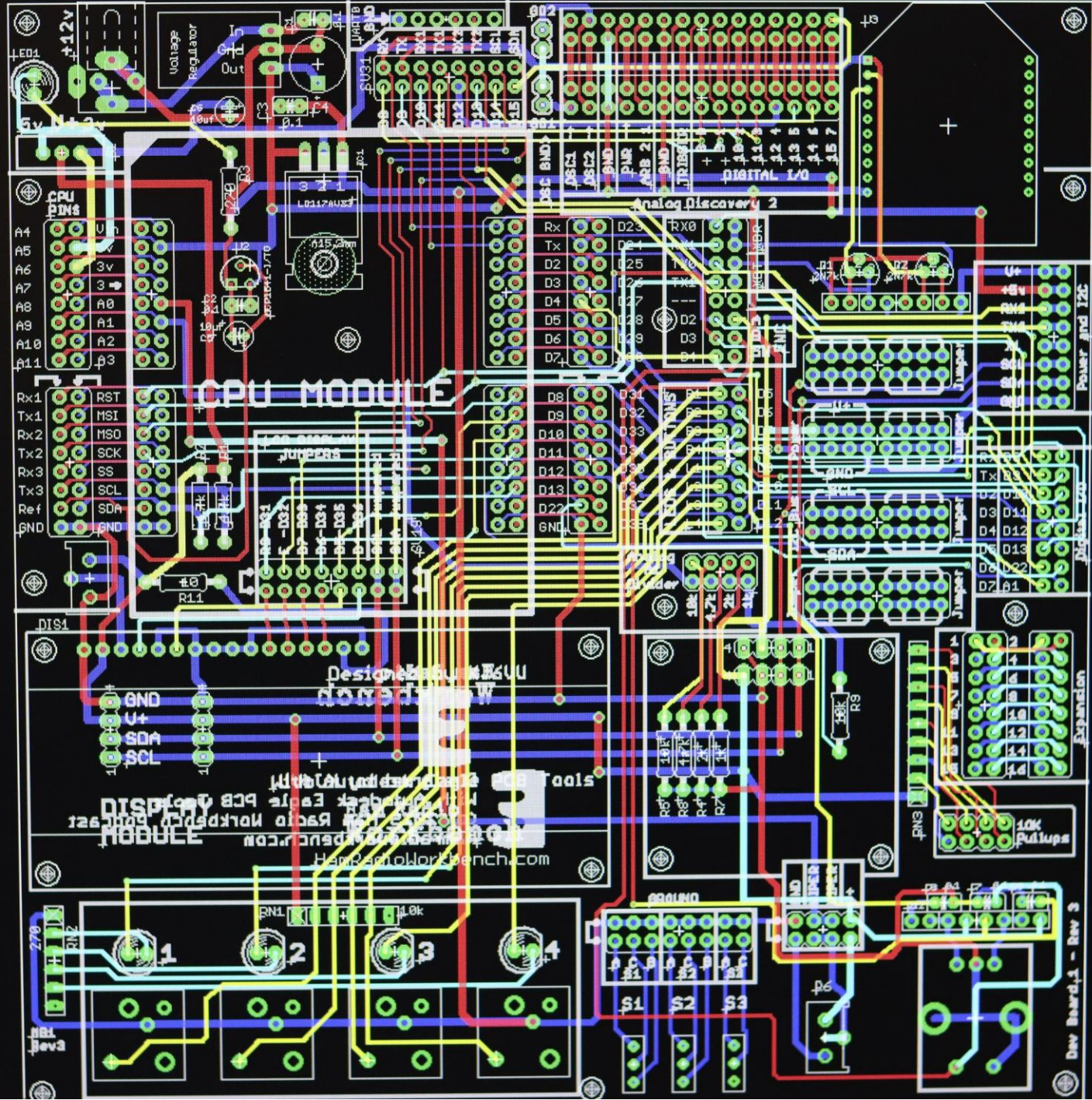
MoBo

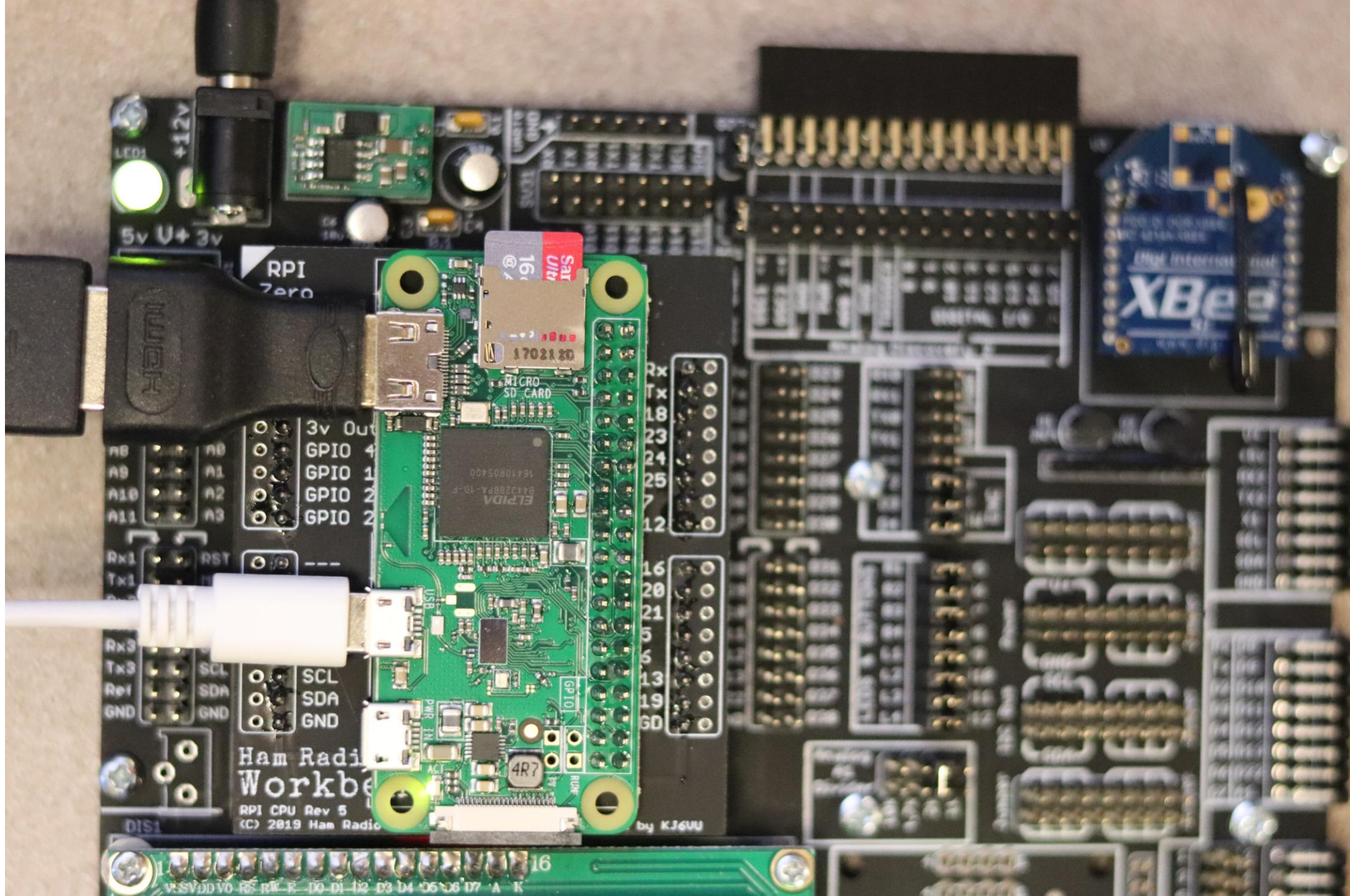




Expansion Bus

**Switches
Pot
Encoder**





LED1
+12V
5v U+ 3v

RPI
Zero

Sat
Ultra
16
17021.20

MICRO
SD CARD

ELPIDA
8A43288FA-10-F
16410R05400

3v Out
GPIO 4
GPIO 1
GPIO 2
GPIO 2

Rx1
Tx1

Rx3
Tx3

Ref
GND

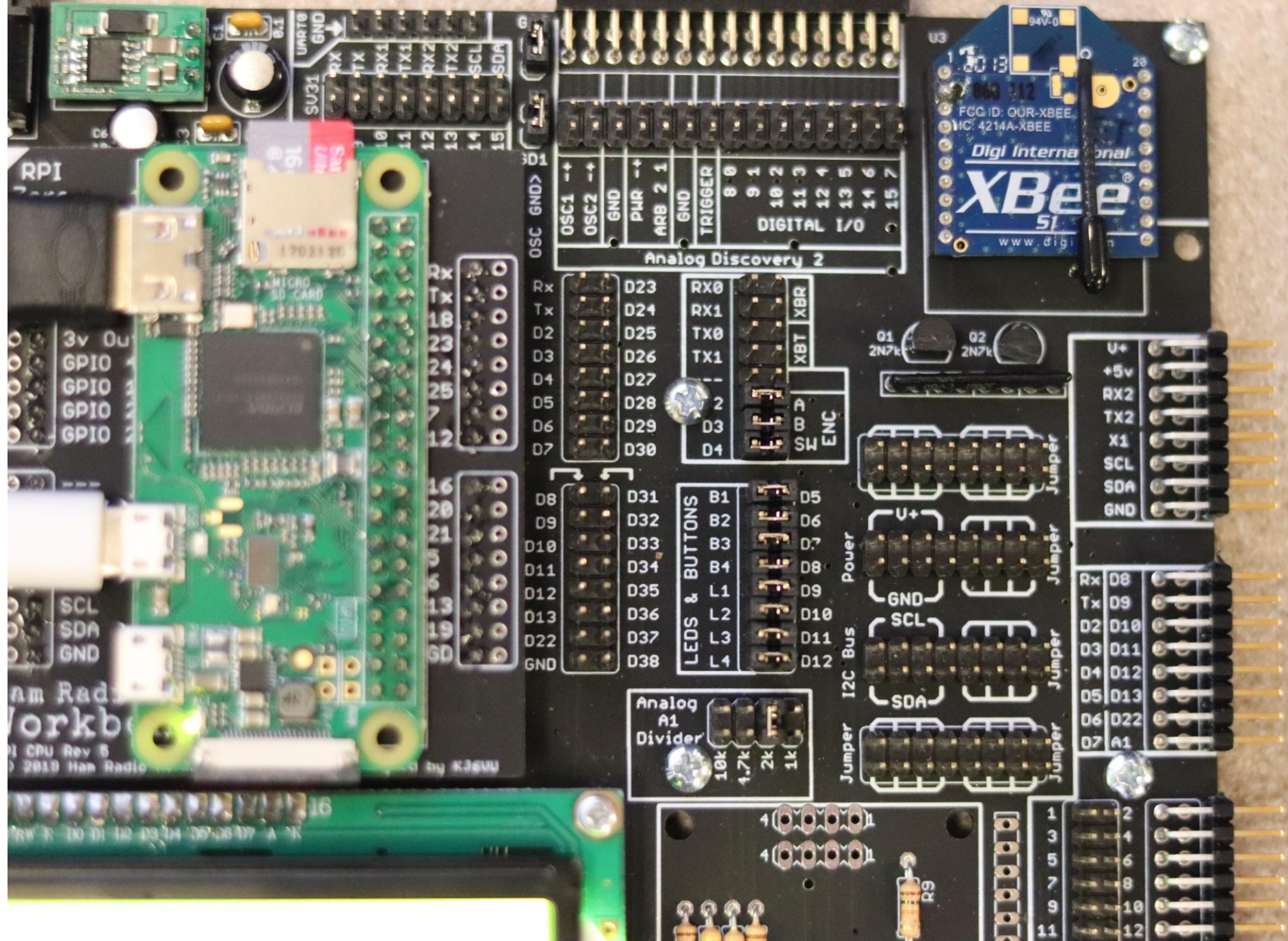
SCL
SDA
GND

Ham Radio
Workbe
RPI CPU Rev 5
(C) 2019 Ham Radio

by K76WU

16
V-SVDDV0 R5 RW R DO-D1 I2 D3 D4 D5 D6 D7 A K

XPB



**ANALOG
DISCOVERY 2**

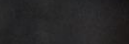
DIGILENT

1-2-3-4-5-6-7
1-2-3-4-5-6-7
1-2-3-4-5-6-7
1-2-3-4-5-6-7

OSC1	OSC2	GND	DIR	TRIGGER	DIGITAL I/O
1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18

FCG ID: 00R-XBEE
MC: 421A-XBEE
XBee
SI

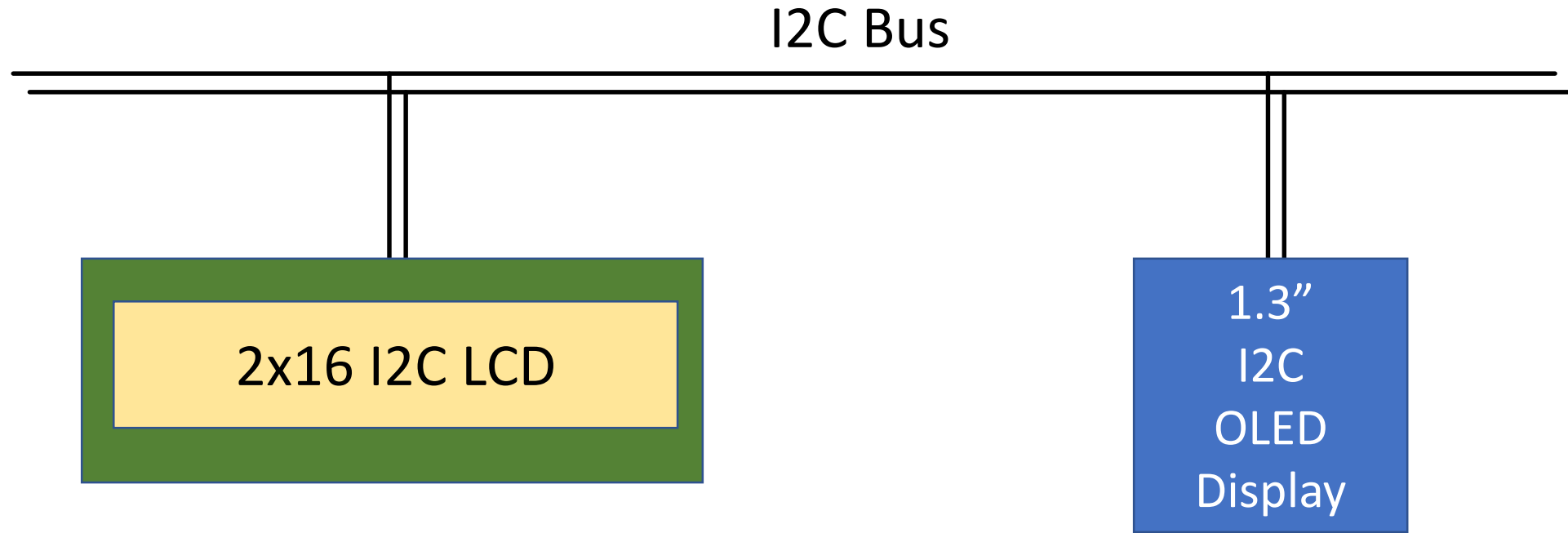
+12V



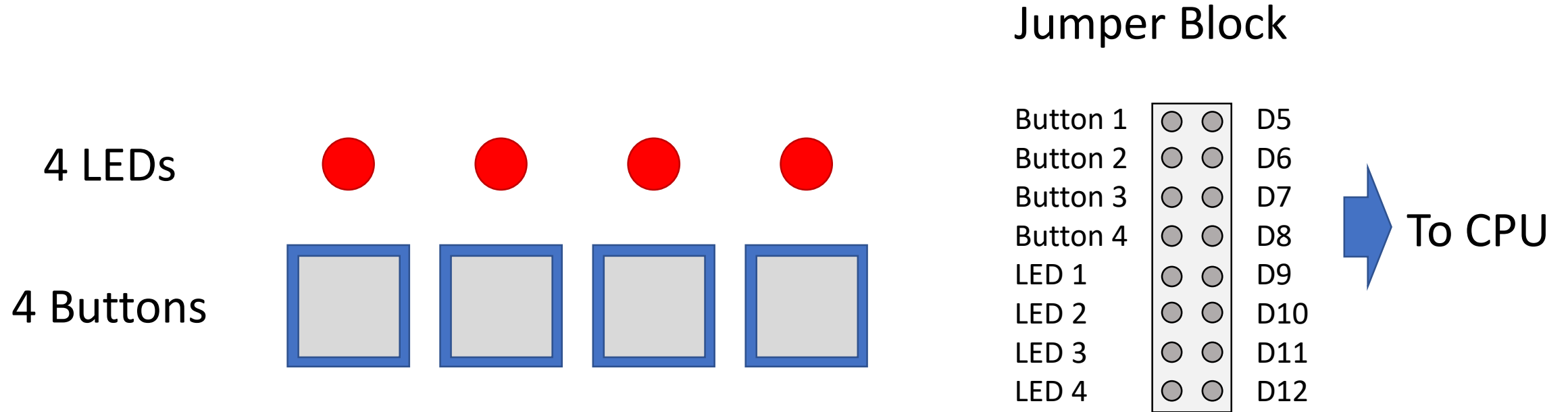
A6
A7
A8
A9
A10
A11

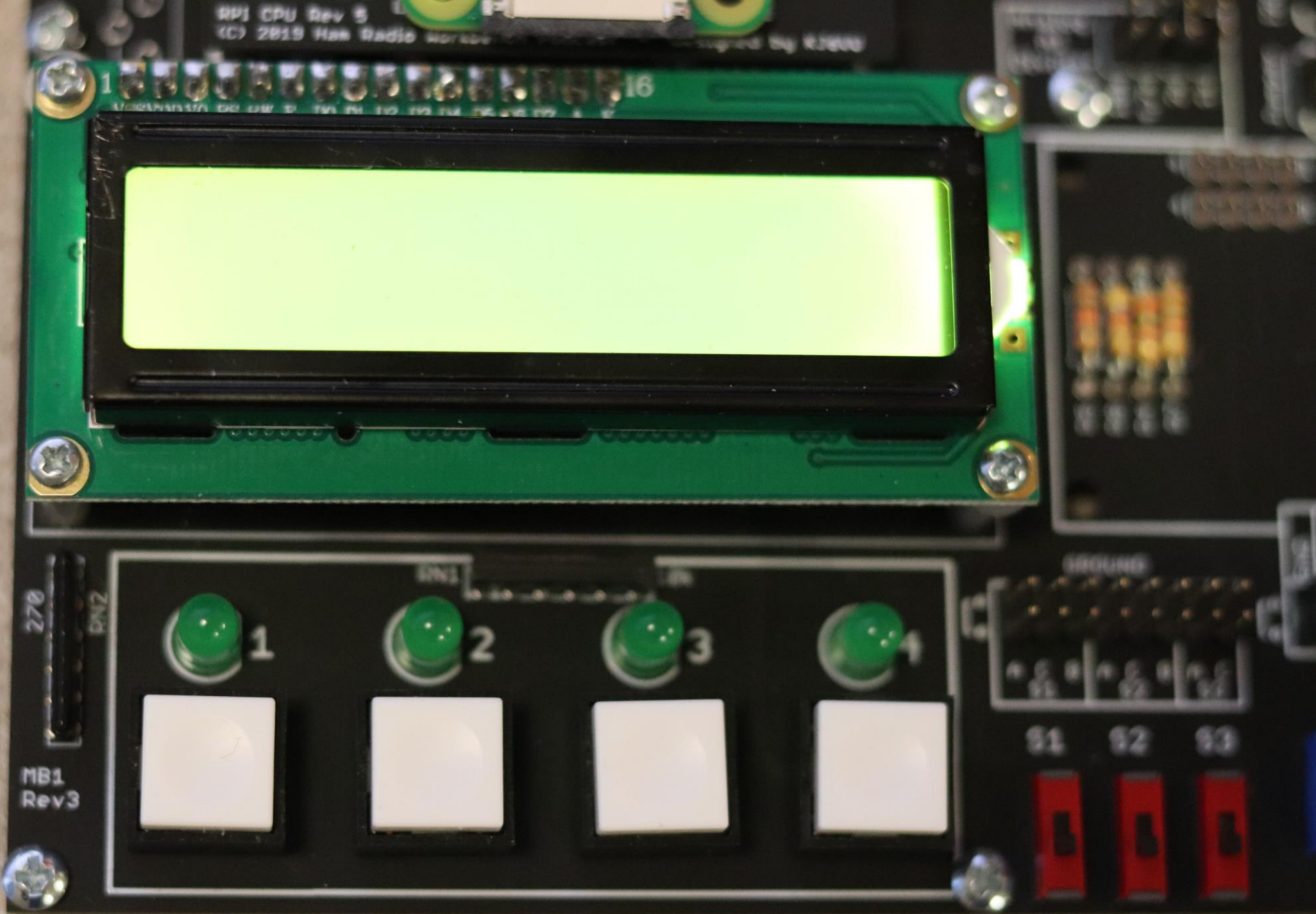
+5v
RX2
TX2
X1
SCL
SDA

Dev Board Peripherals



Dev Board Peripherals





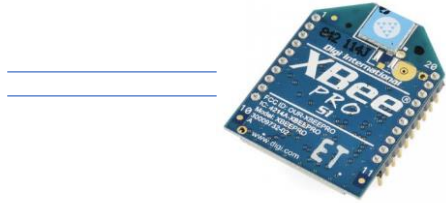
Dev Board Peripherals

Jumper Block

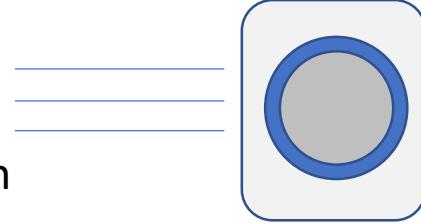
To CPU



RX0	○ ○	Xbee Rx
RX1	○ ○	Xbee Rx
TX0	○ ○	Xbee Tx
TX1	○ ○	Xbee Tx
----	○ ○	----
D2	○ ○	Encoder A
D3	○ ○	Encoder B
D4	○ ○	Encoder Switch



Data Radio



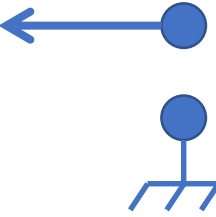
Rotary Encoder

To CPU
ADC INPUT 1



Divider		
A1	○ ○	10K
A1	○ ○	4.7K
A1	○ ○	2K
A1	○ ○	1K

10K Input



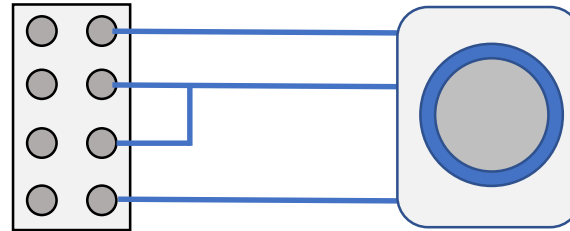
Analog Input

Dev Board Peripherals

To CPU
ADC INPUT 0



V+
Wiper
Wiper
GND

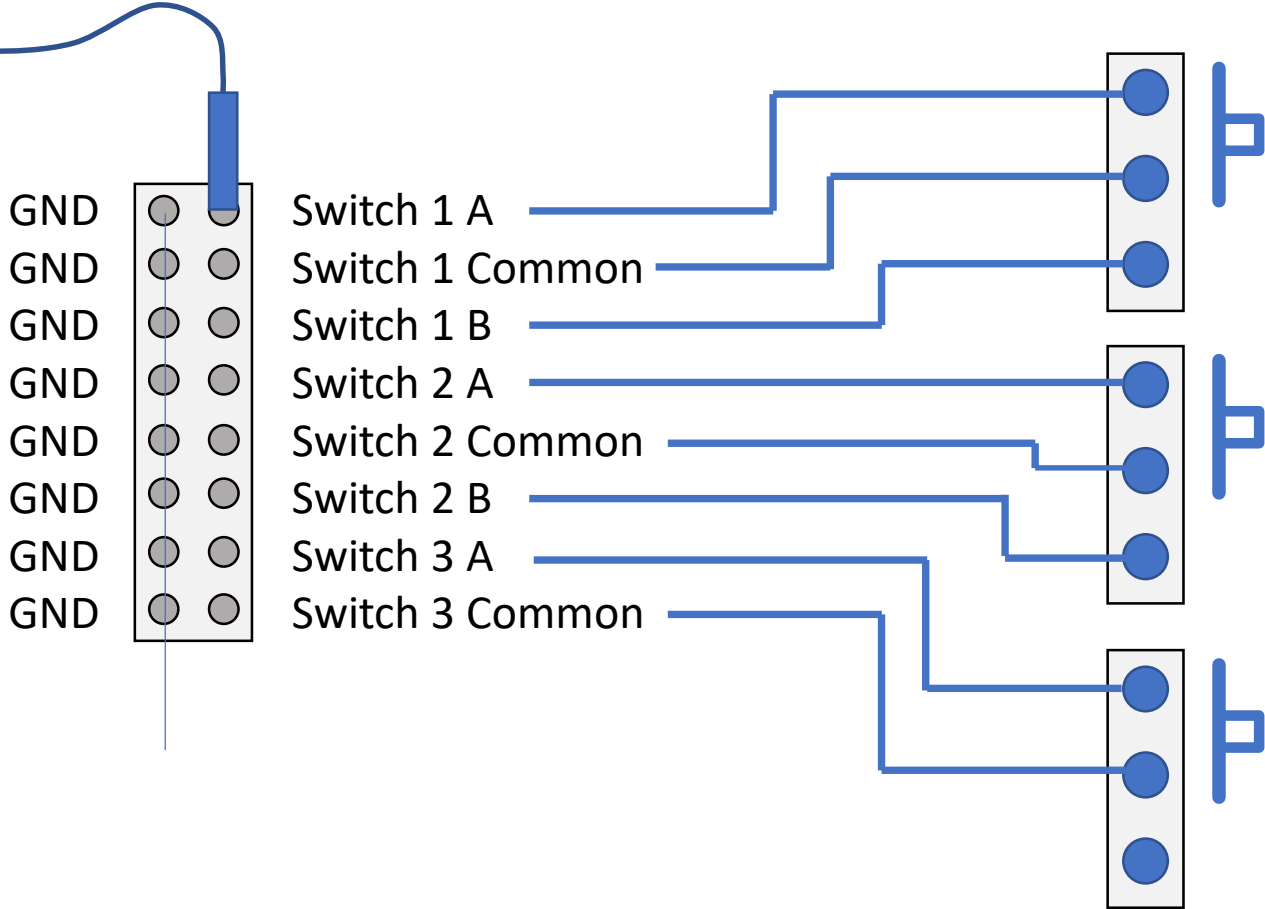


Analog Pot

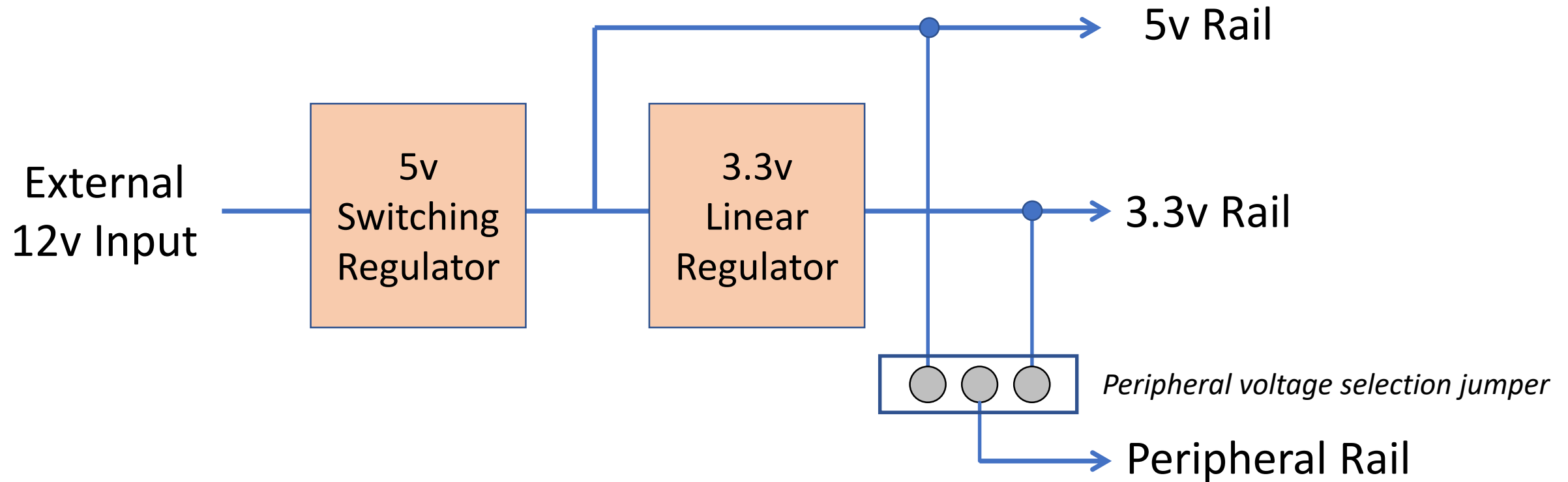
Dev Board Peripherals

Slide Switches

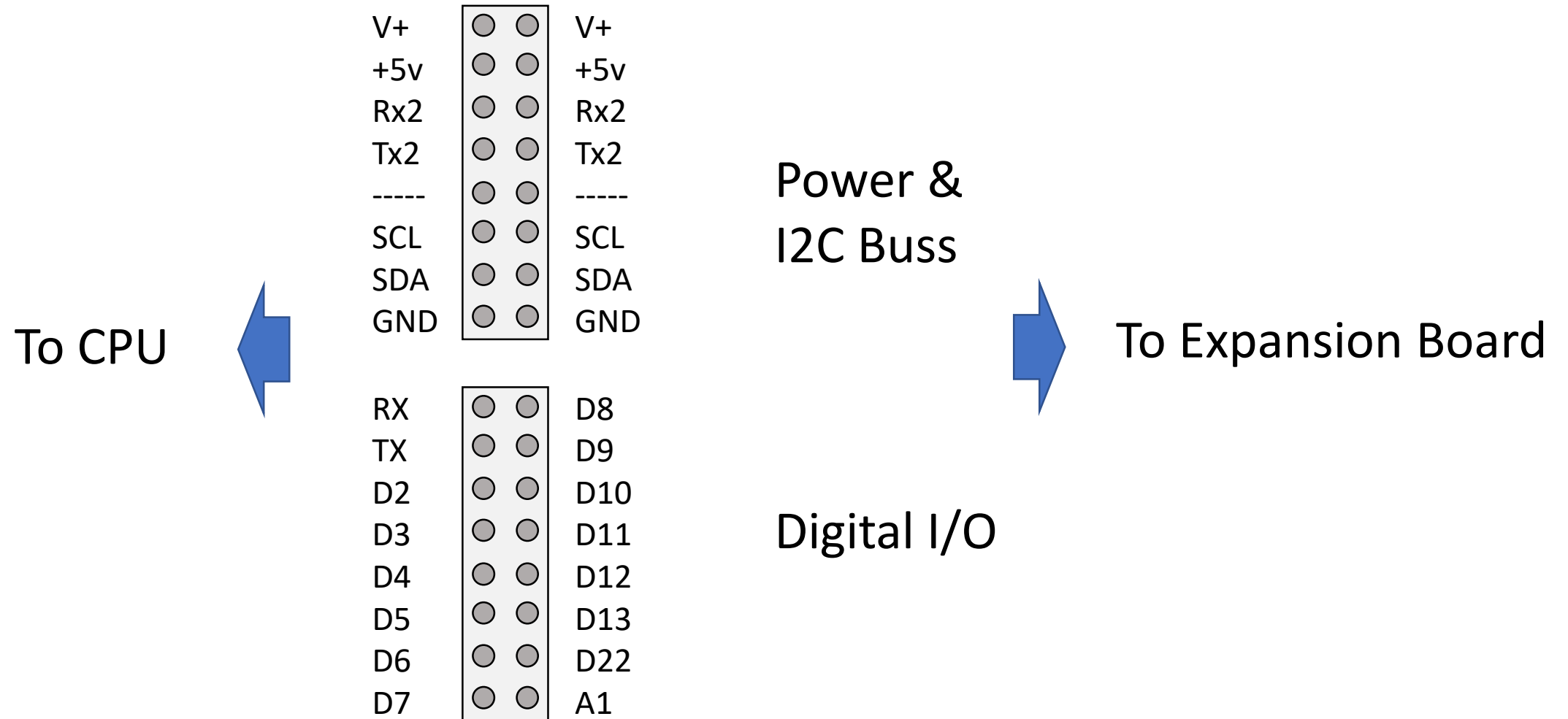
Jumper To CPU



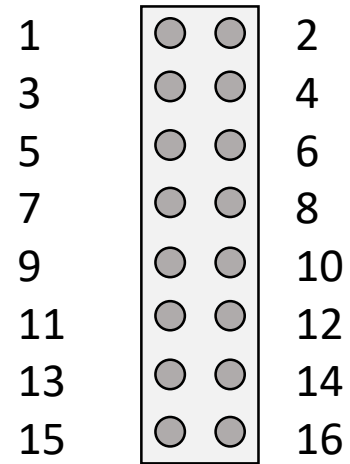
Dev Board Power



Dev Board Expansion Buss Connectors



Dev Board Passive Expansion Connectors



To Expansion Board

Dev Board Jumper Blocks

