standard easy to find components. Thin film for the Rs, and MLCC X7R for the Cs. The battery connector is a standard JST type two position (with polarity key at the **TOP**), and the SD card holder that we are using is ST-TF-003A.

OPENBCI CYTON BOARD

Cyton Board Specs:

- Power with 3-6V DC Battery ONLY
- PIC32MX250F128B Micrcontroller with chipKIT UDB32-MX2-DIP bootloader
- ADS1299 Analog Front End
- LIS3DH 3 axis Accelerometer
- RFduino BLE radio
- Micro SD card slot
- Voltage Regulation (3V3, +2.5V, -2.5V)
- Board Dimensions 2.41” x 2.41” (octogon has 1” edges)
- Mount holes are 1/16” ID, 0.8” x 2.166” on center

Breakout pins:

- Program pins for bootloading PIC
  - PGC, PGD, VDD, MCLR, GND
- Serial pins for programming RFduino
  - RFTX, RFRX, RFRST, GND
- SPI bus pins on the 3V side for Daisy Module expansion
  - DVDD, GND, MISO, MOSI, SCK, CS, CLK, RST
- Unused PIC32 pins
  - D11 (A5), D12 (A6), D13 (A7), D17, D18

The SPI bus pins on 3V side include CLK, which is tied to the ADS1299 CLK pin for timing the Daisy Module, and a RST pin which is tied to the ADS1299 MCLR pin for hardware reset of the ADS chips. We use a PICkit 3 to bootload the PIC chips. Pins D11, D12, and D13 can be digital or analog (called by their A number above for analog purposes). D11 is also PGD, and has the blue LED in series with a 1K resistor connected to AGND. D12 is PGC, for bootloading purposes. D17 and D18 are digital I|O only. D17 is connected to the PROG pushbutton. The PROG button can be used as an input by setting it’s MODE direction and doing digitalRead on it (there is a 470K pulldown on D17, pressing PROG pulls pin D17 up to DVDD).

Push Buttons

The RST pushbutton is connected to MCLR on the PIC. Pressing it will reset the PIC. To put the PIC into bootloader mode so that it can be re-programmed, press the RST button and hold it down. Then press the PROG button. Then release the RST button, and the blue LED will blink pleasantly, announcing that the PIC is

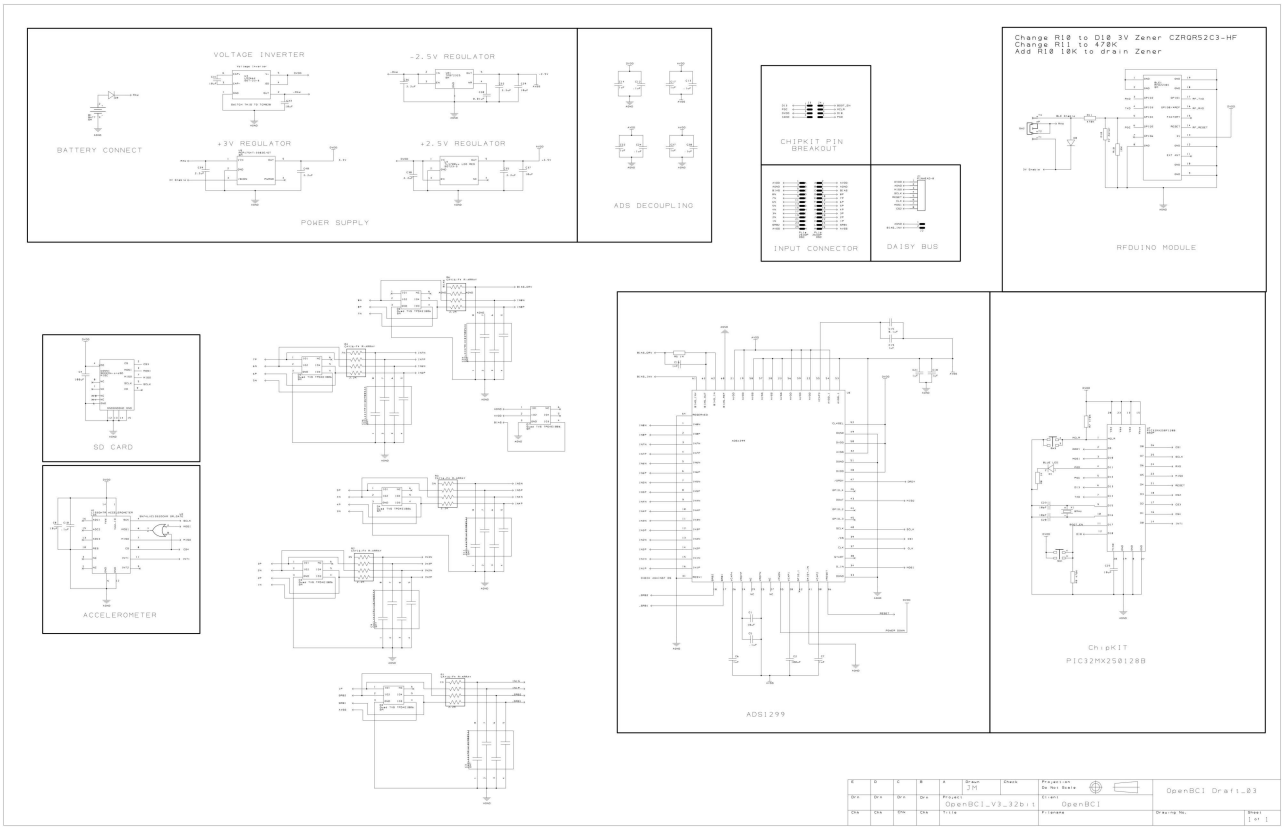
Slide switch is power for the board. The slide switch has three positions:

- BLE activates a pull-up on RFduino pin 4
- OFF disconnects the battery input
- PC does NOT activate pull-up on RFduino pin 4

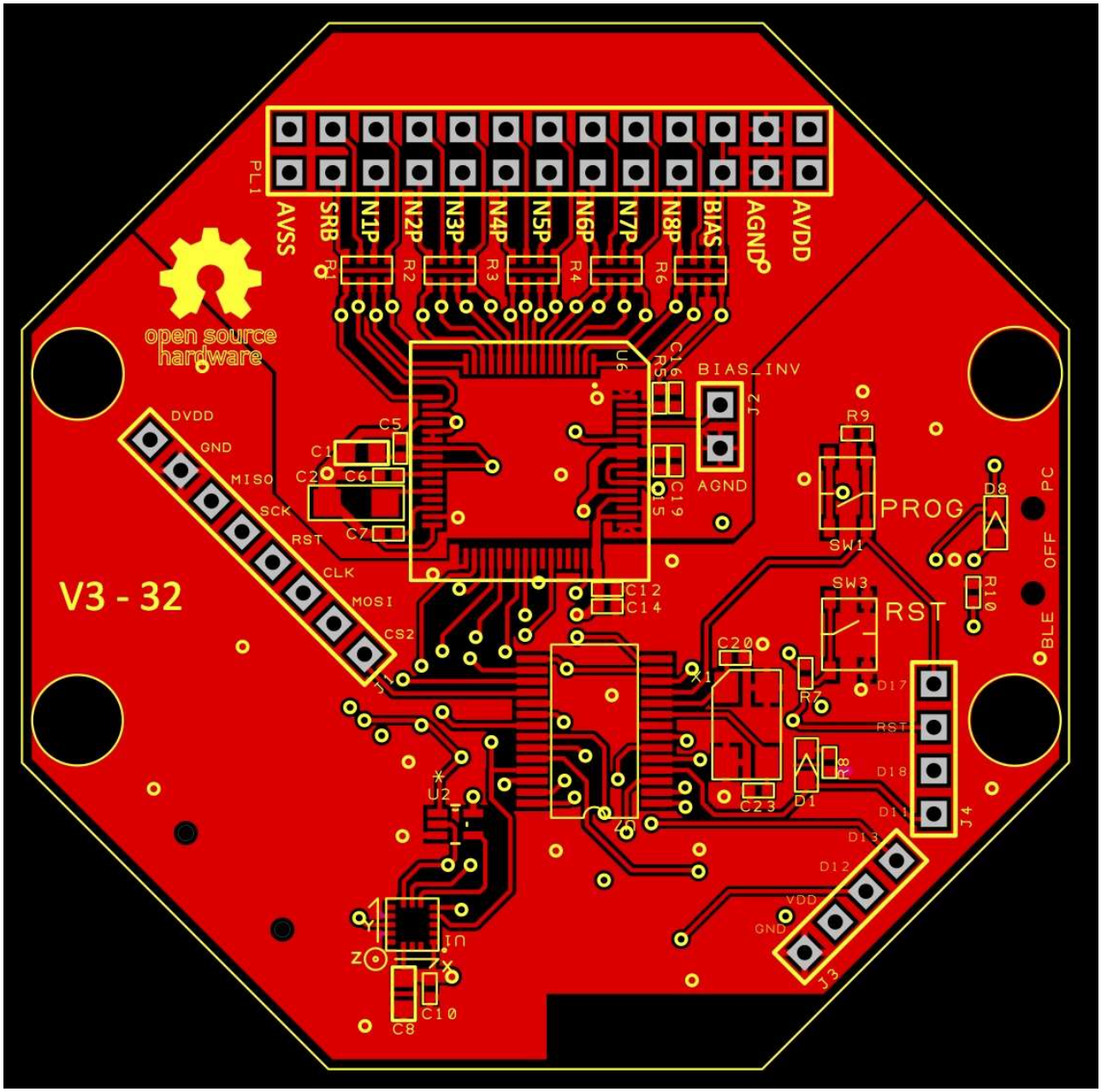
NOTE: BLE|PC selection is NOT implemented!

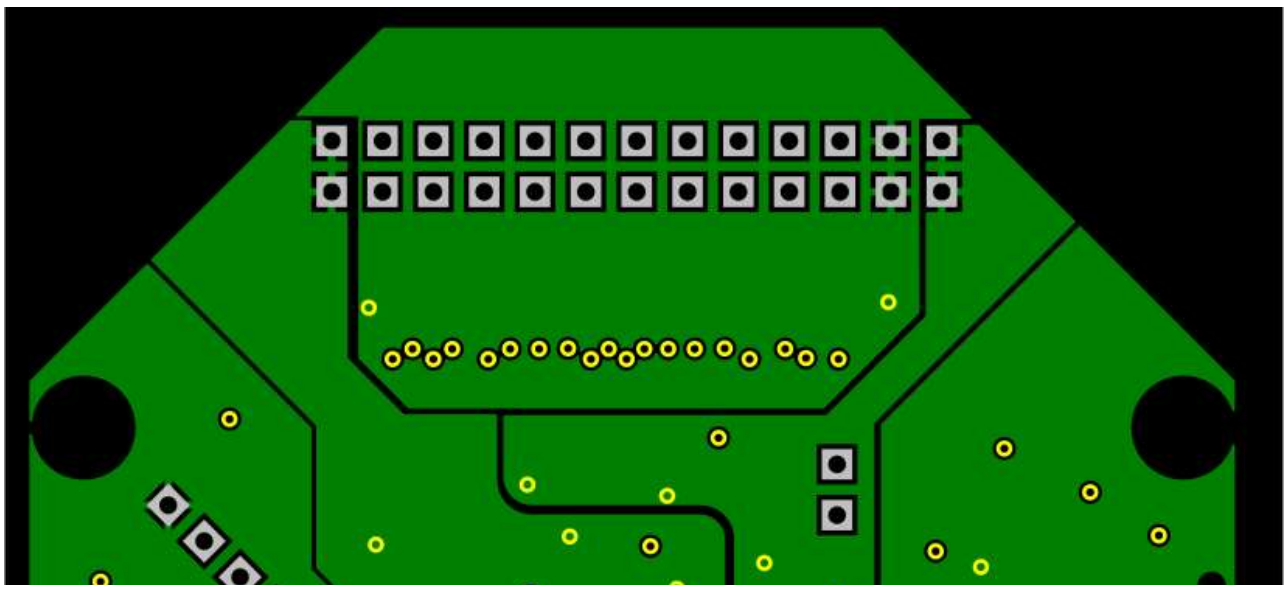
Swtiching either BLE or PC will produce the same result. The option is available for future development…

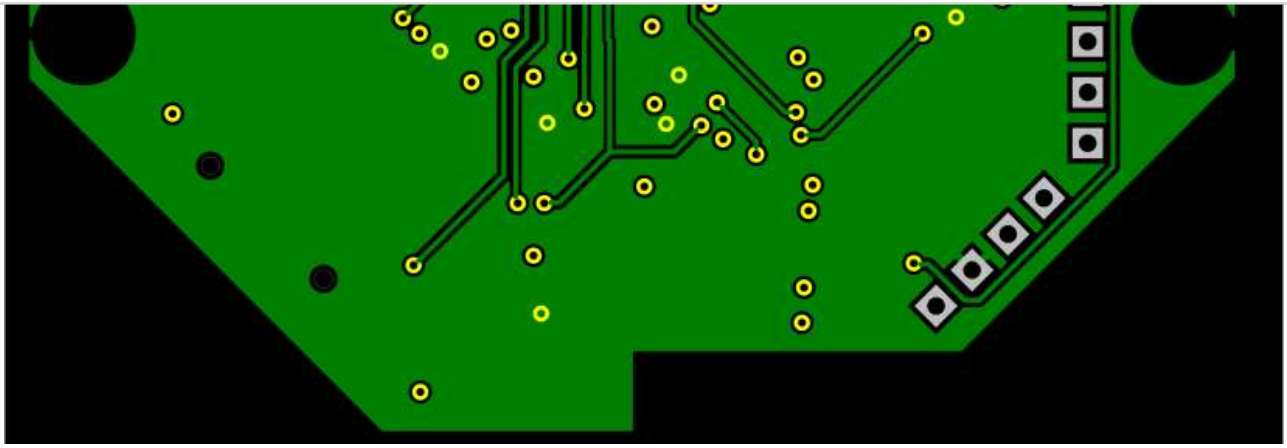
OpenBCI Cyton Board Circuit Schematic

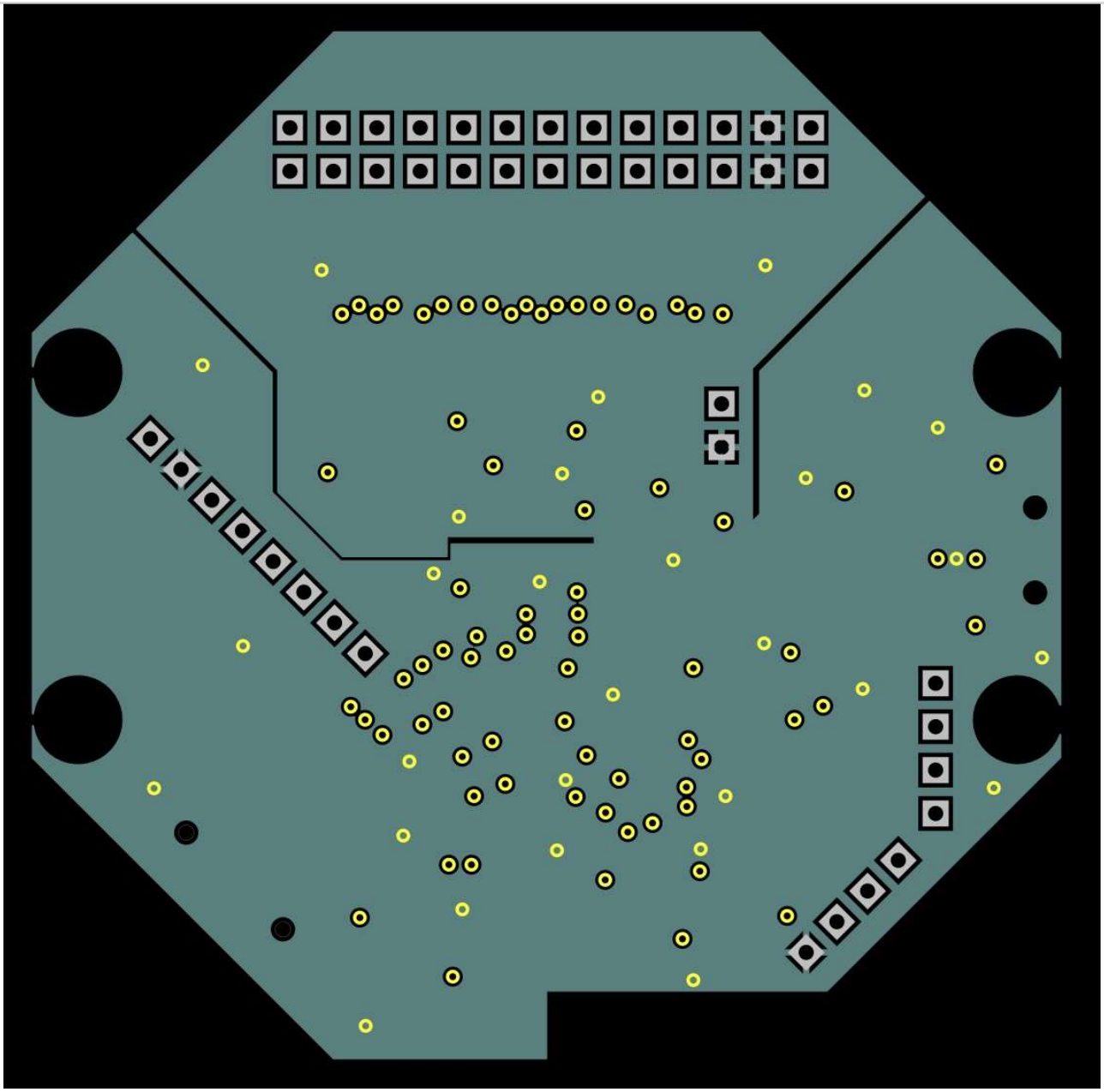


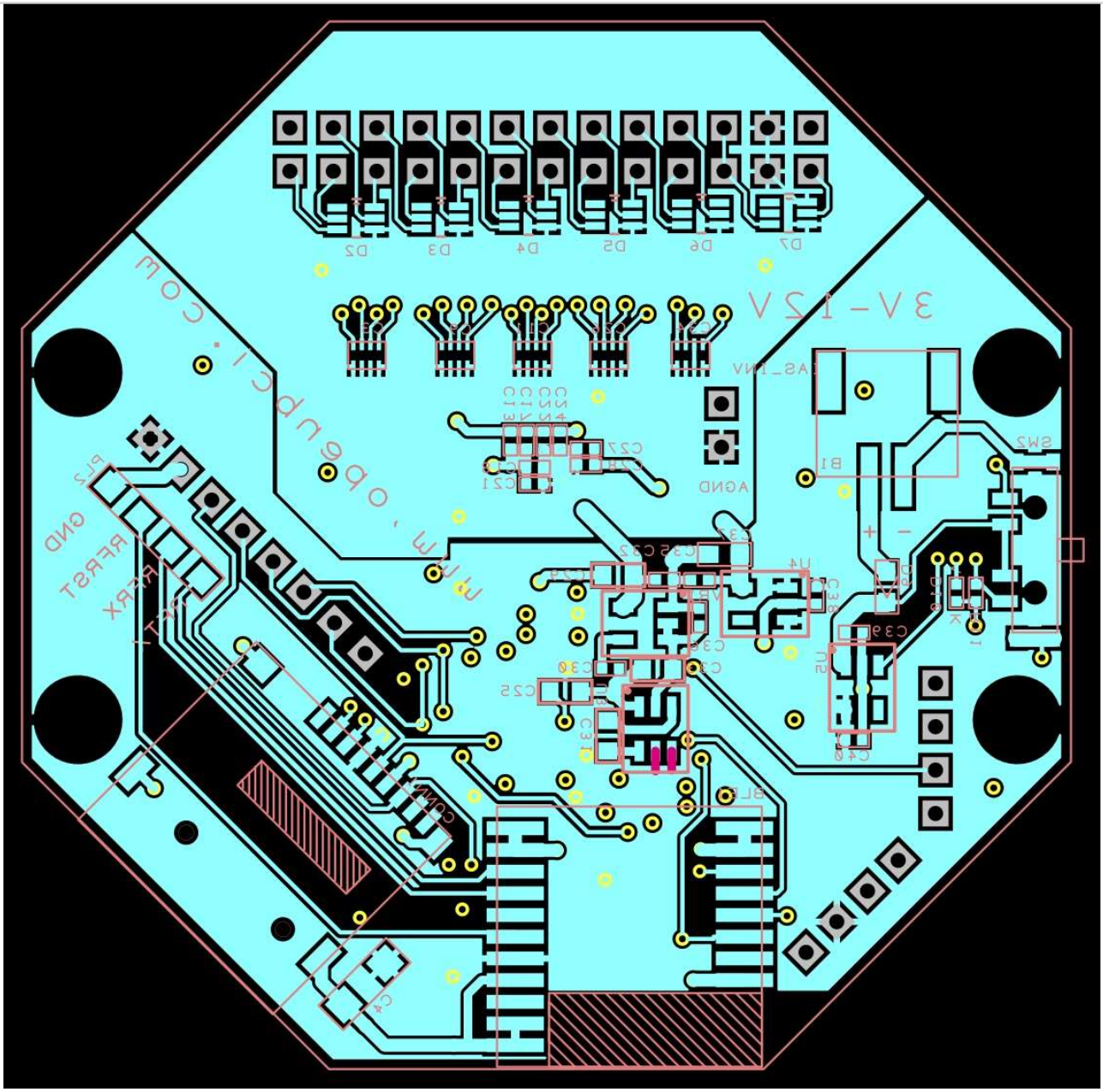
Cyton Board PCB Layer Images


PL1
AVSS
SRB
N1P
N2P
N3P
N4P
N5P
N6P
N7P
N8P
BIAS
AGND
AVDD
open source hardware
DVDD
GND
MISO
SCK
RST
CLK
MOSI
CS2
V3 - 32
BIAS_INV
J2
AGND
PROG
SW1
SW3
RST
PC
OFF
BLE
J4
J3
VDD
GND









Cyton Board PCB Files

OpenBCI 32bit gerber & BOM

OPENBCI USB DONGLE

The OpenBCI USB Dongle is used to connect your computer to the Cyton Board.

Dongle Specs

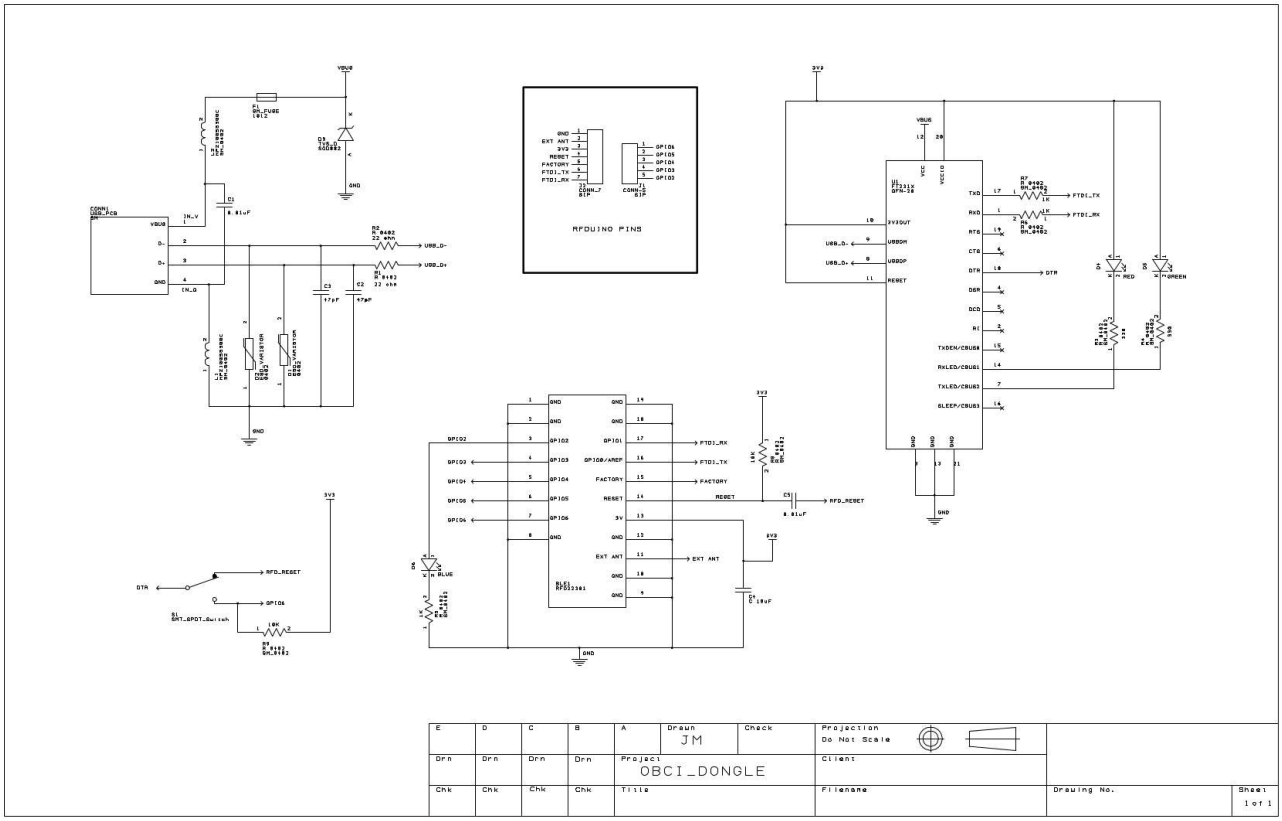
- Power via USB connector ONLY
- RFduino BLE radio module

RFduio pins are broken out in the same order and layout as the RFduino radio and shields. That makes the OpenBCI USB Dongle compatible with the RFduino shields, if you like. The TXD (red) and RXD (greed) LEDs are connected to outputs from the FTDI chip. The blue LED is connected to RFduino GPIO2.

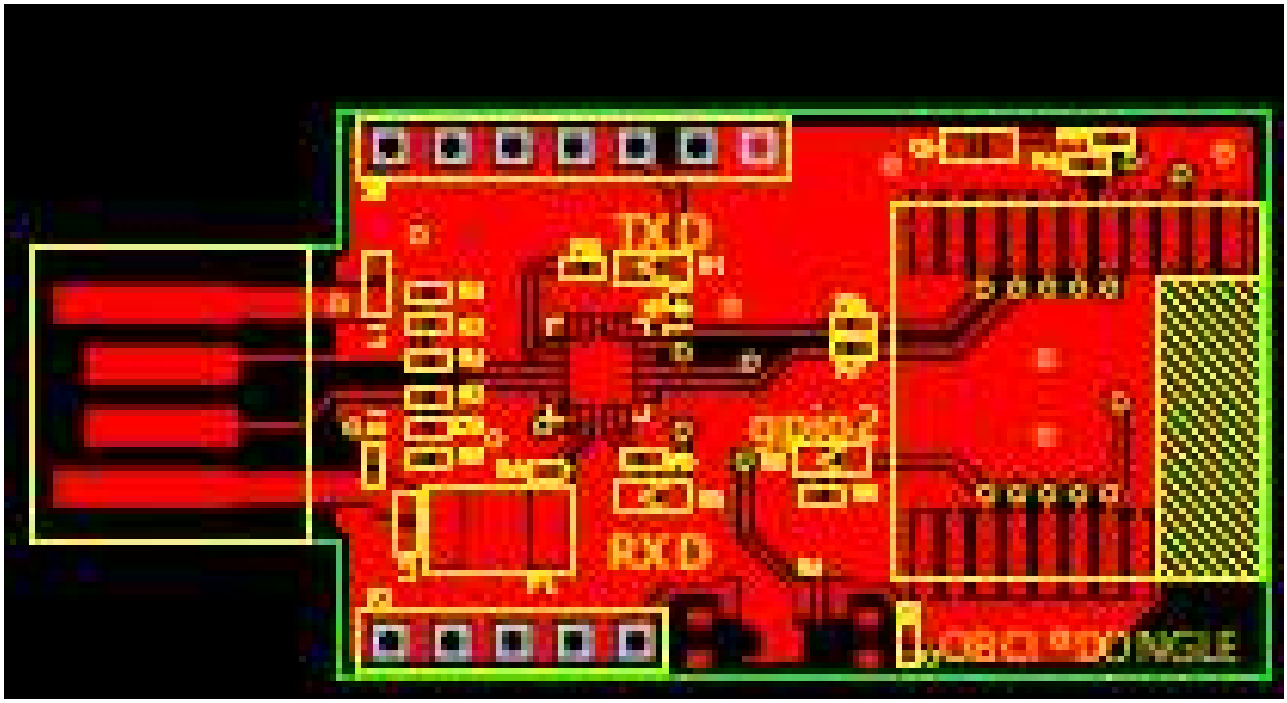
Slide Switch

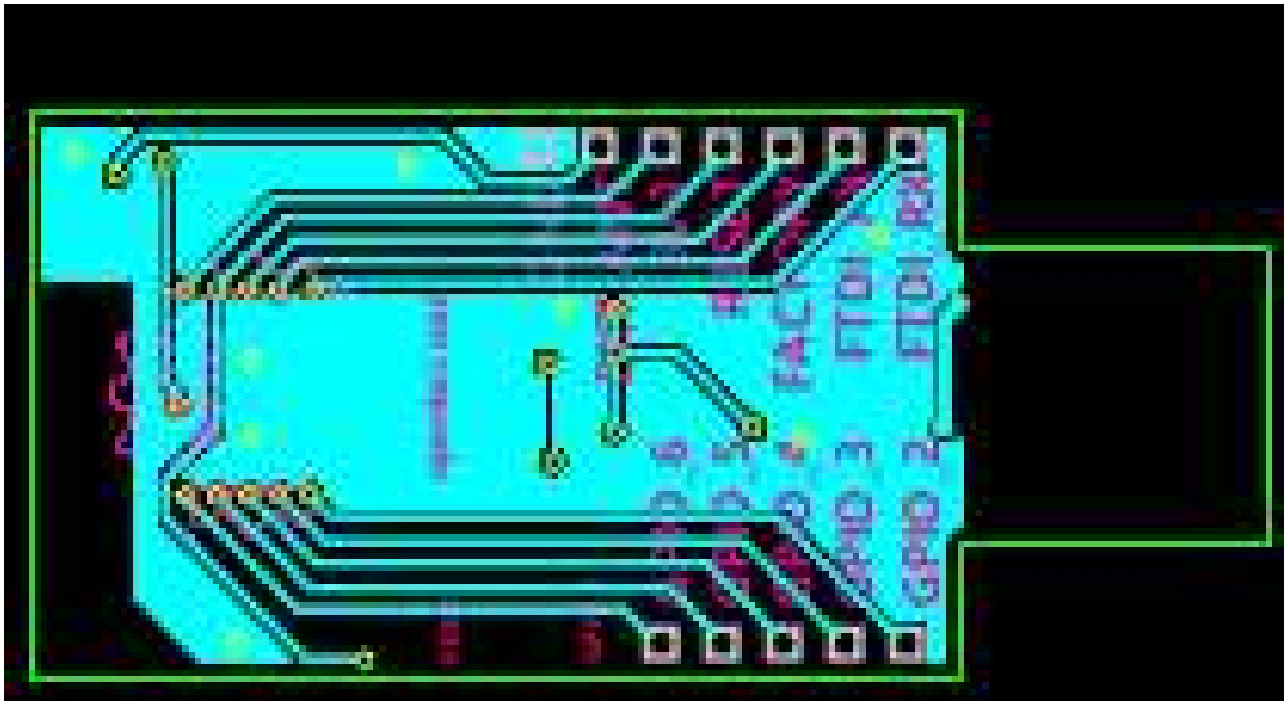
The slide switch on the Dongle has two positions (noted on the bottom silkscreen). When the switch is on the GPIO6 side, the FTDI DTR pin is routed to RFduino pin 6 and it is ready to pass data to-from the Cyton board. This configuration is 'normal' mode, and also allows for programming the Cyton board over air. When the switch is on the RESET side, the FTDI DTR pin is routed to the RFduino RESET pin. This mode allows for re-programming the RFduino on the Dongle.

OpenBCI Dongle Circuit Schematic



Dongle PCB Layer Images





Dongle PCB Files

OpenBCI Dongle gerber & BOM (518K zip)

OPENBCI DAISY MODULE

The OpenBCI Daisy Module is a daugher card to the Cyton Board, and expands the number of sensor channels from **8** to **16**.

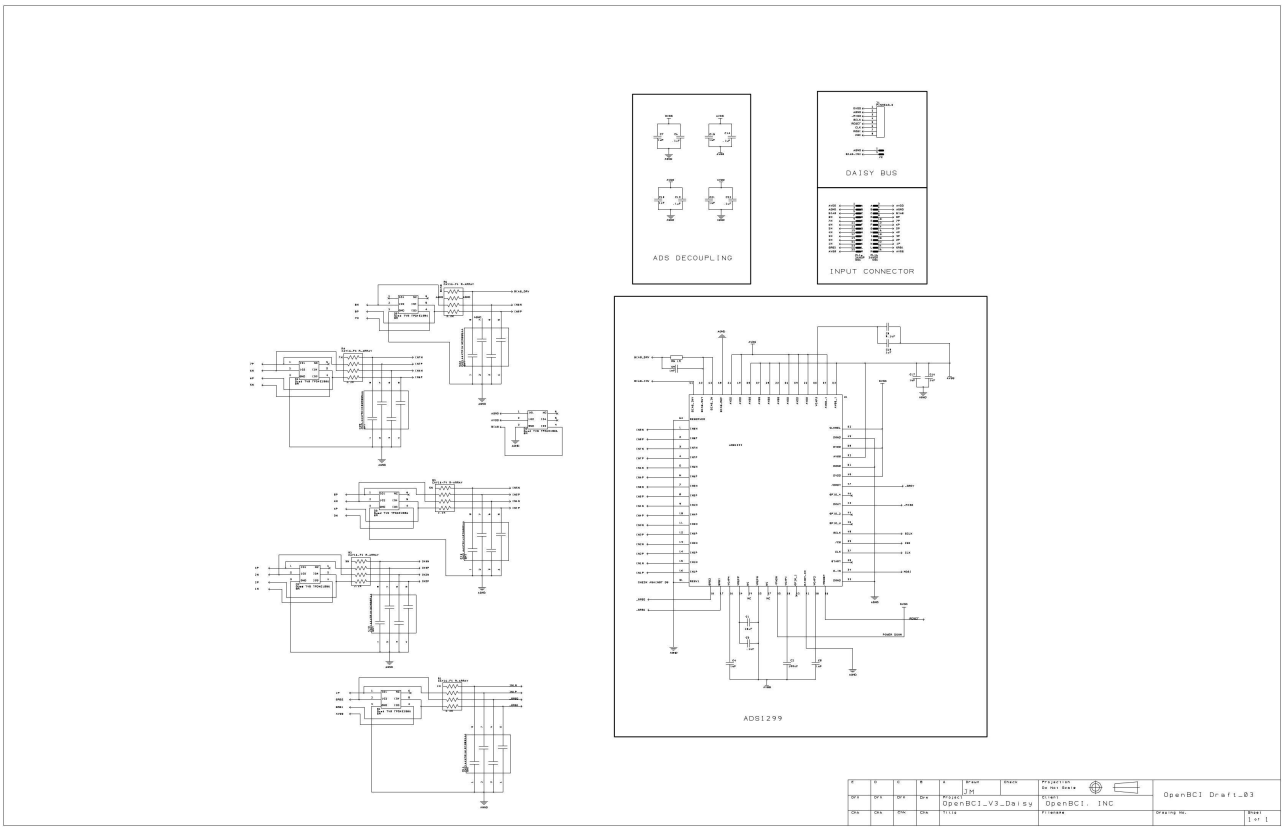
Breakout pins:

- SPI bus pins for communication with OpenBCI Board
  - DVDD, GND, MISO, MOSI, SCK, CS, CLK, RST
- Analog Power and BIAS pins
  - AVDD, AVSS, AGND, BIAS

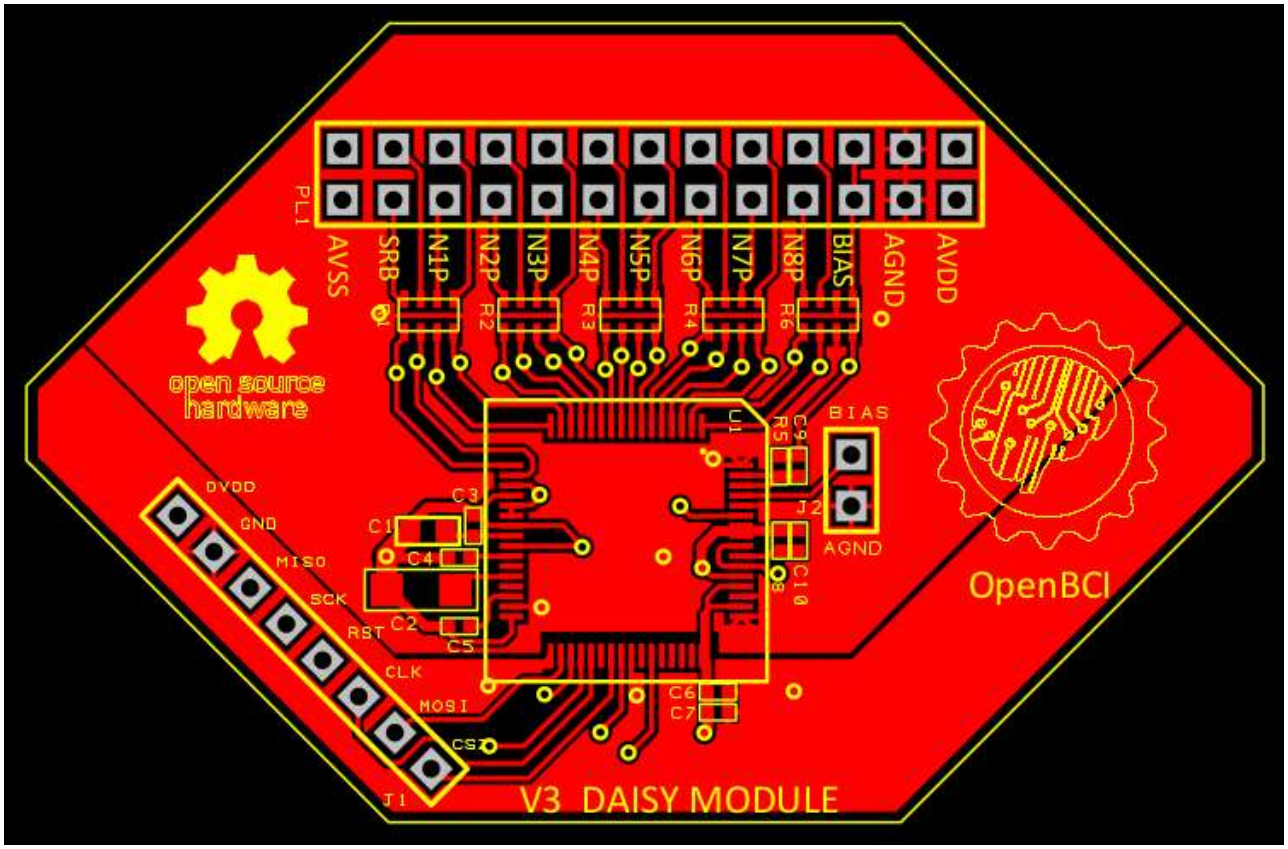
The OpenBCI Daisy Module should be used as an expansion card for the OpenBCI Board ONLY. Daisy Modyle requires an external clock signal (2.048MHz) to be applied to the CLK pin.

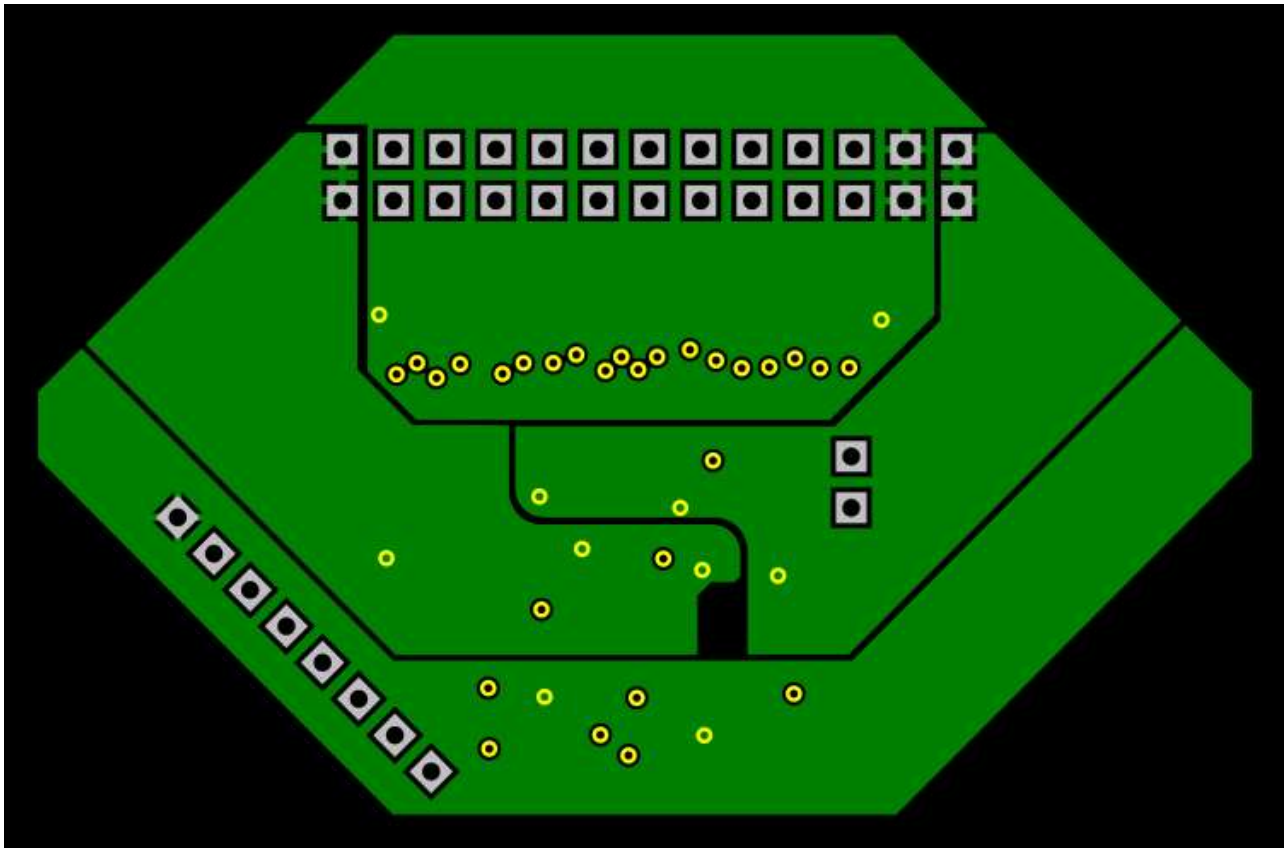
NOTE This design contains an error documented here. If you intend to use these designs, be aware that you will have to make the change to the PCB file.

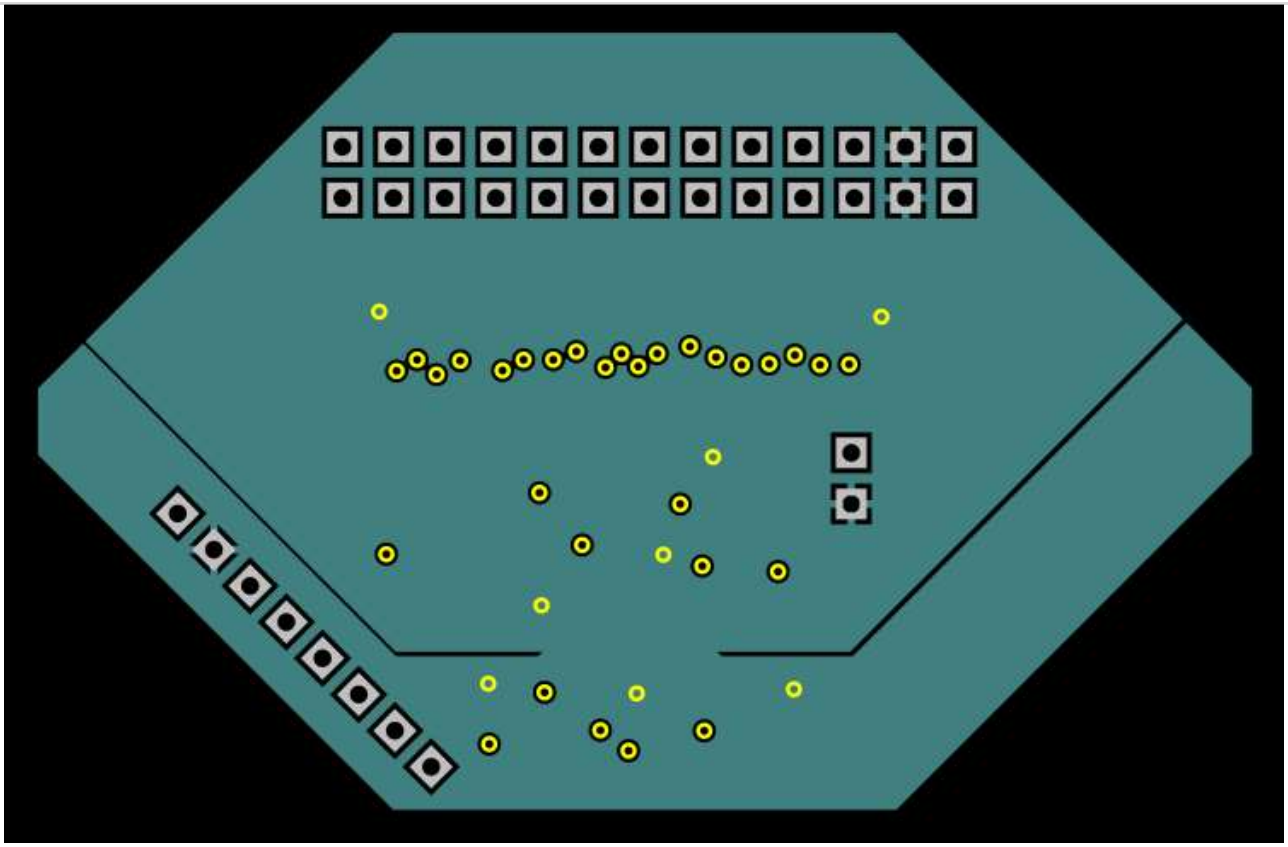
OpenBCI Daisy Module Circuit Schematic

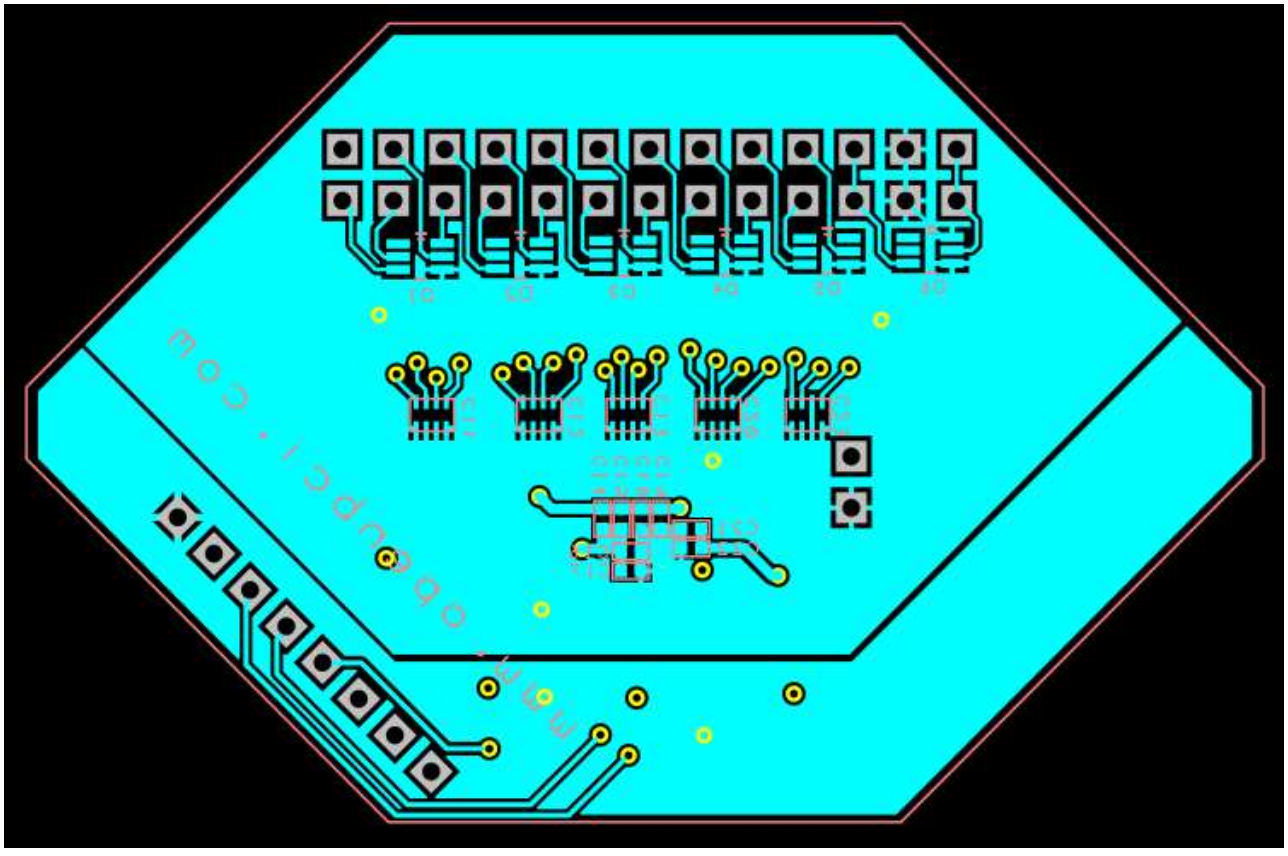


Daisy Module PCB Layer Images


PL1
AVSS
SRB
N1P
N2P
N3P
N4P
N5P
N6P
N7P
N8P
BIAS
AGND
AVDD
open source hardware
DVDD
GND
MISO
SCK
RST
CLK
MOSI
CS
J1
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
R1
R2
R3
R4
R5
R6
U1
J2
BIAS
AGND
OpenBCI
V3 DAISY MODULE







Daisy Module PCB Files

OpenBCI Daisy Module gerber & BOM (532K zip)