

\*\*\*\*\*DRAFT\*\*\*\*\*

## *Adapting the OLED designed for the ICOBOARD to the CATBOARD*

05/27/18

\*\*\*\*\*DRAFT\*\*\*\*\*

The youtube video <https://www.youtube.com/watch?v=UMDcnwZA2YE> describes the interface between an OLED display and the ICOBOARD.

**Goal of this effort:** Is to perform the same functions using the CATBOARD instead of the ICOBOARD.

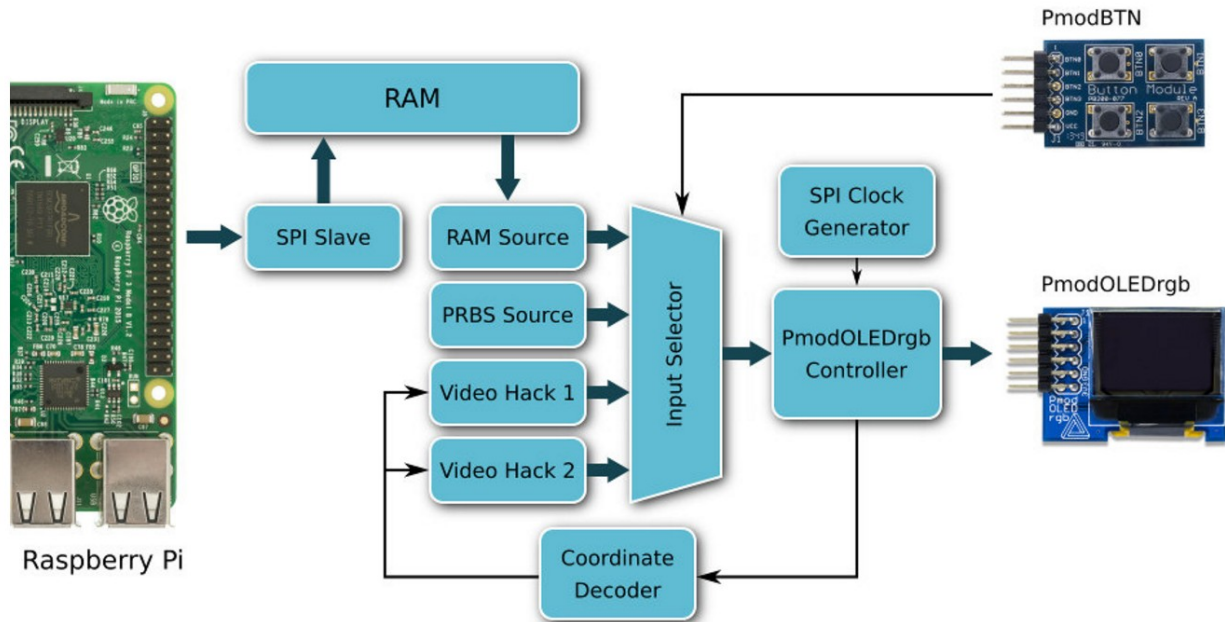
## otl-icoboard-pmodoldergb-demo

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Design Block Diagram

## Design Structure



First forked the repository <https://github.com/jhol/otl-icoboard-pmodoledrgb-demo>

**git clone** <https://github.com/develone/otl-icoboard-pmodoledrgb-demo.git>

**"cd otl-icoboard-pmodoledrgb-demo/"**

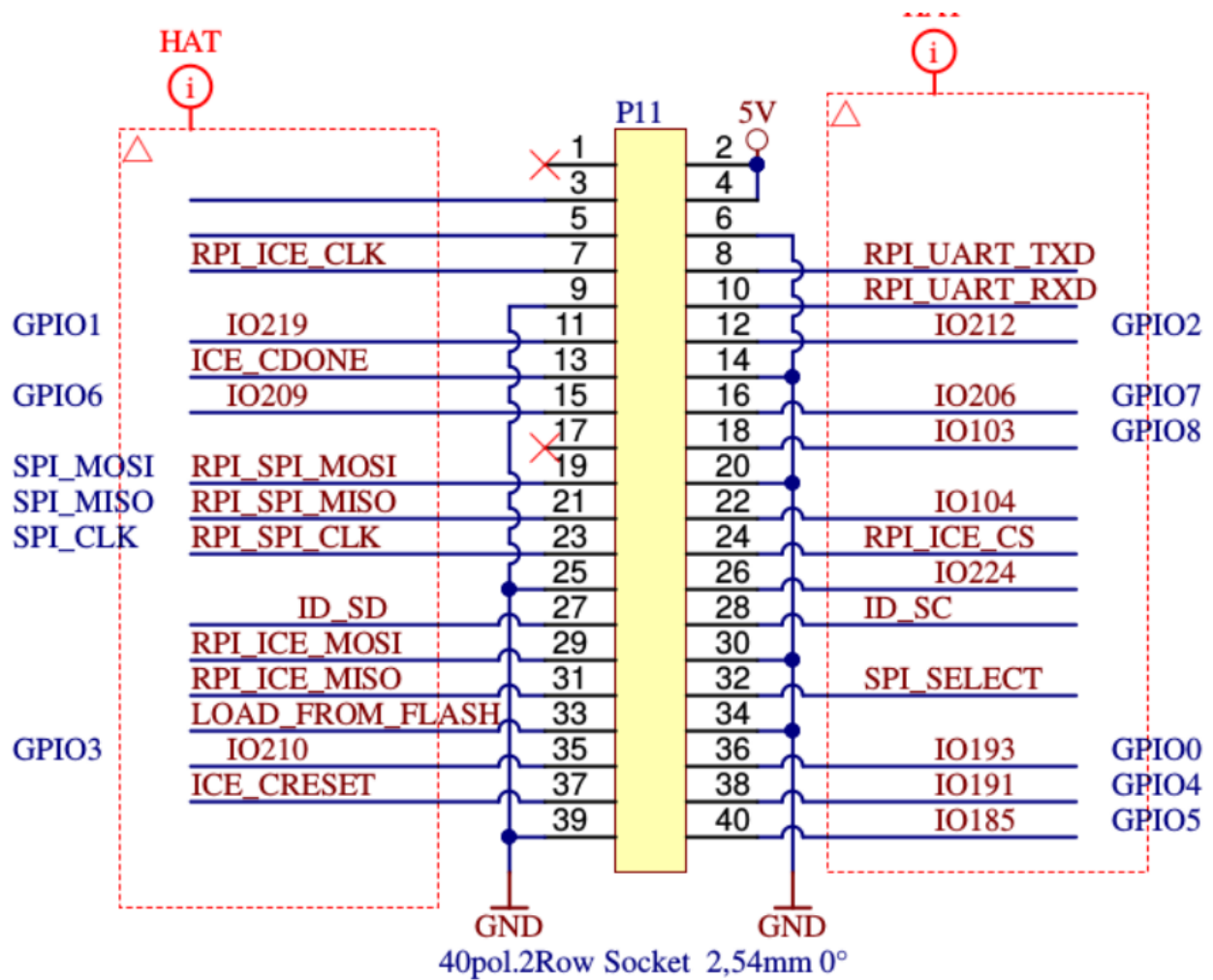
Need to create a new branch to track the changes required for the CATBOARD.

**"git branch catboard"**

Even though the FPGAs ice40 HX8K are same for the CATBOARD and the ICOBOARD.

1.) The first issue is the interface between the Raspberry Pi and FPGA hat.

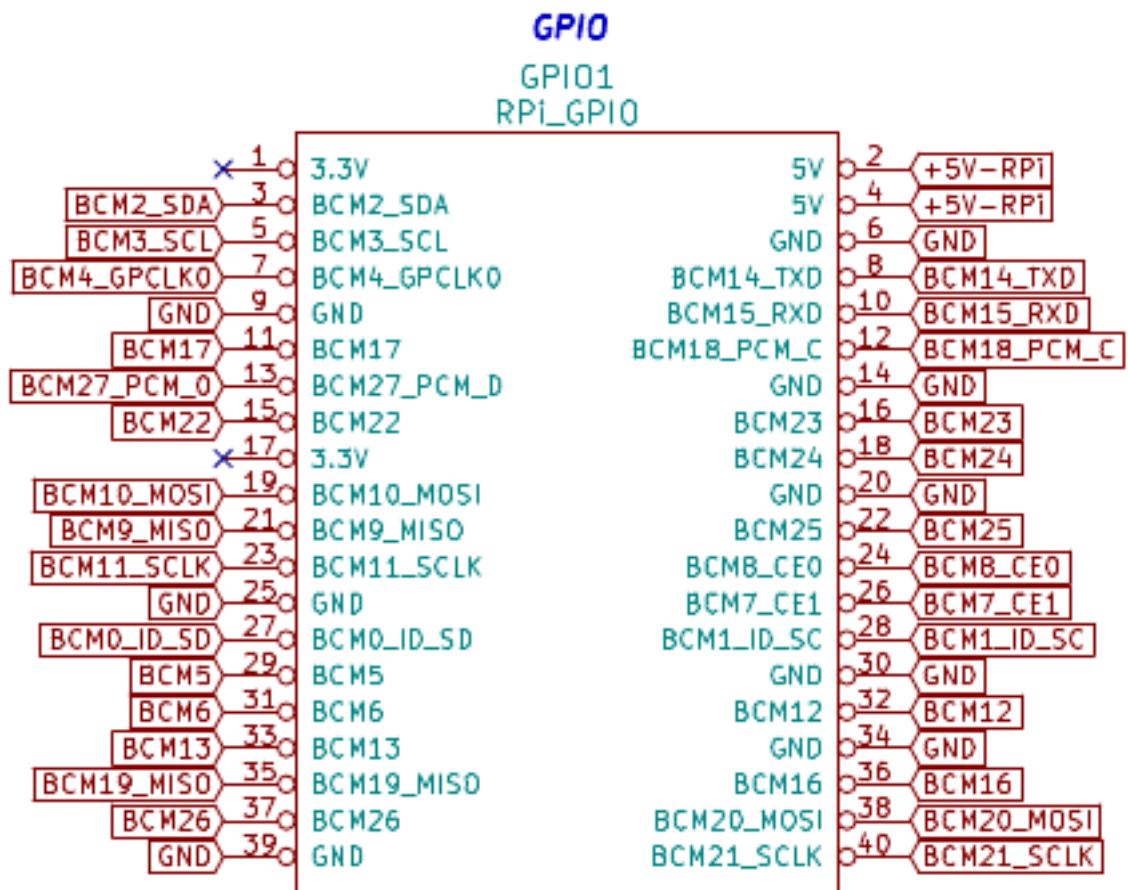
ICOBOARD RPi



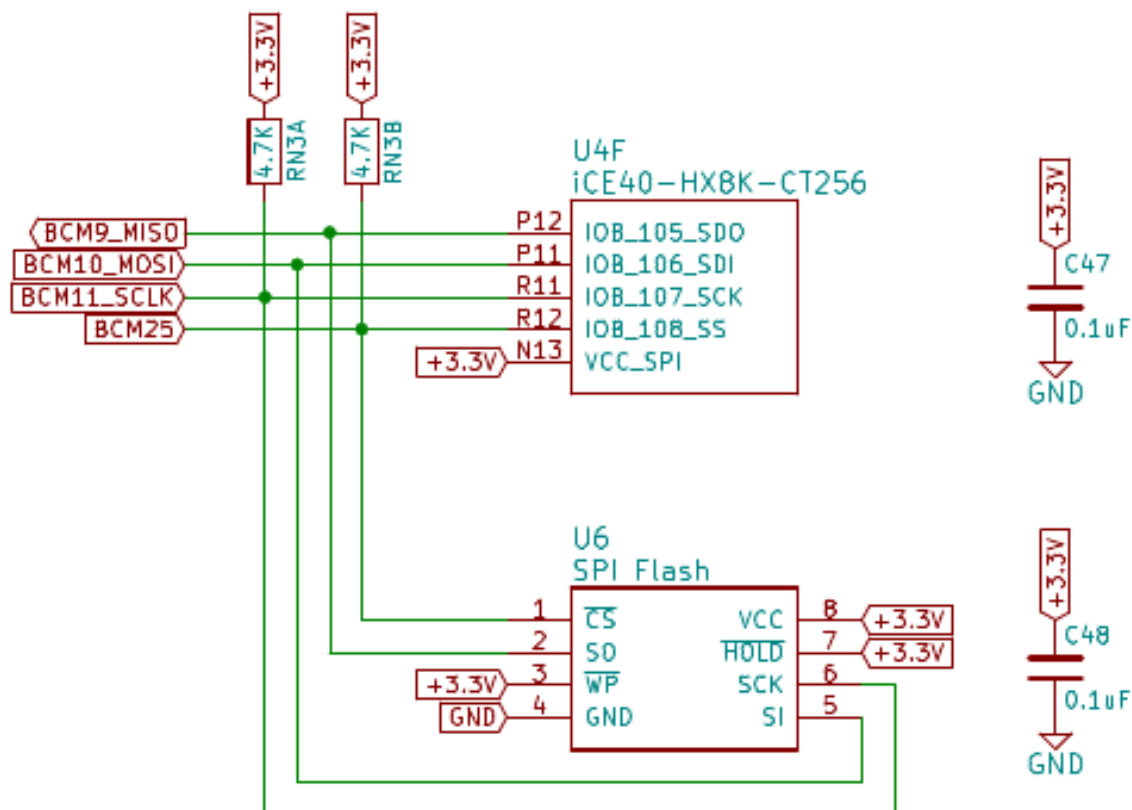
RPI\_SPI\_CLK Pin 23 Pi



CATBOARD RPi



BCM11\_SCLK Pin 23



- 2.) The 2<sup>nd</sup> issue is the PMOD connections to FPGA are different.
- 3.) Third, I do not have a Digilent PMOD 4 push button switch module.
- 4.) The 4<sup>th</sup> issue is the PHASE LOCK LOOP difference.

```
set_io clk_100mhz C8 #R9
```

```
set_io pmod1_1 A11 #D8
```

```
set_io pmod1_2 B12 #B9
```

```
set_io pmod1_3 B14 #B10
```

```
set_io pmod1_4 B15 #B11
```

```
# 654321 catboard # 654321 icoboard
```

```
# xxxxxx PMOD3 A # xxxxxx PMOD1 A
```

```
# xxxxxx PMOD3 B # xxxxxx PMOD1 B
```

```
# 654321 # 654321
```

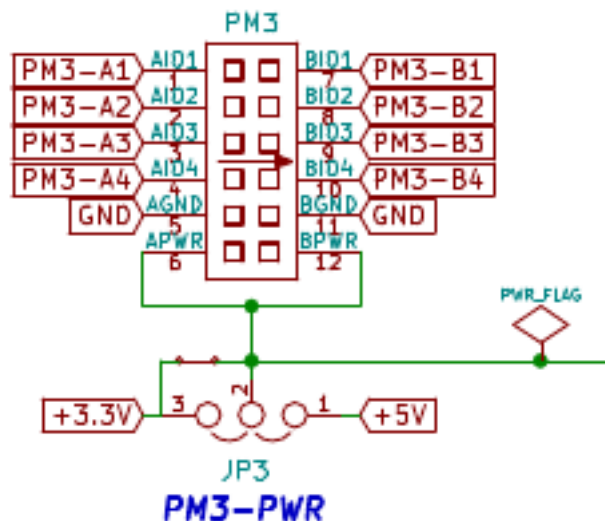
```
#
```

```
set_io pmod1_7 B10 #B8
```

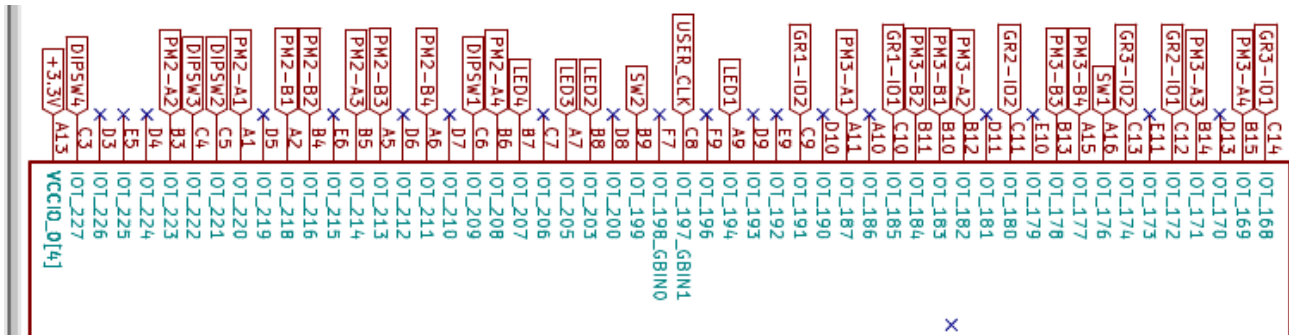
```
set_io pmod1_8 B11 #A9
```

```
set_io pmod1_9 B13 #A10
```

```
set_io pmod1_10 A15 #A11
```



CATBOARD connection to FPGA pins PMOD 2 & PMOD 3 push button switches, dip switch, and leds.



In top.v

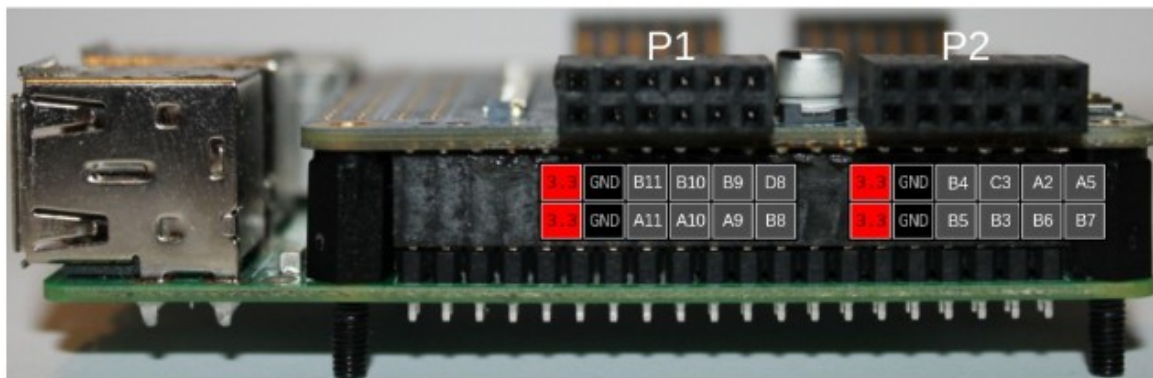
```
module top(clk_100mhz, pmod1_1, pmod1_2, pmod1_3, pmod1_4, pmod1_7, pmod1_8,
  pmod1_9, pmod1_10, pmod2_7, pmod2_8, pmod2_9, pmod2_10, rpi_sck, rpi_cs,
  rpi_mosi);
```

```
input rpi_sck, rpi_cs, rpi_mosi;
rpi_sck
rpi_cs
rpi_mosi
```

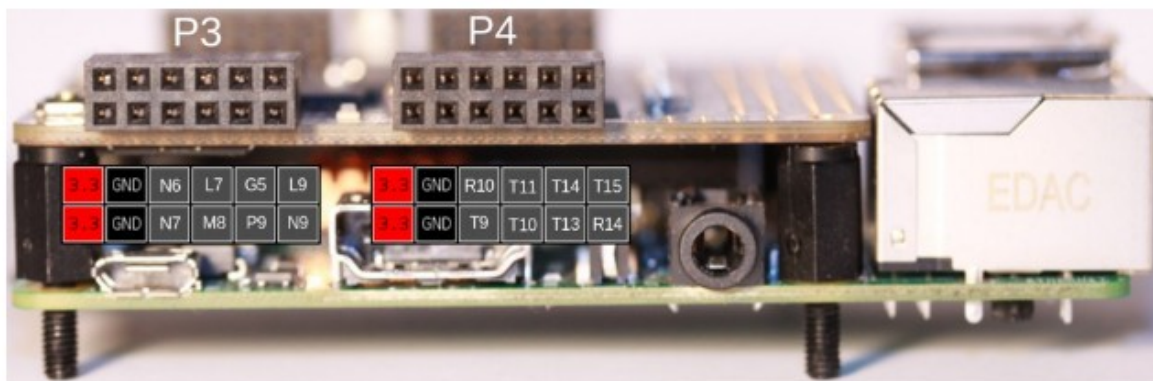
```
spi_ram_slave spi_ram_slave(clk, rpi_sck, rpi_cs, rpi_mosi,
  ram_addr, ram_data, ram_wr);
module spi_ram_slave(clk, sck, cs, mosi, ram_addr, ram_data, ram_wr);
PMOD pin out on icoboard
```



## Pinout Pmod P1 and P2



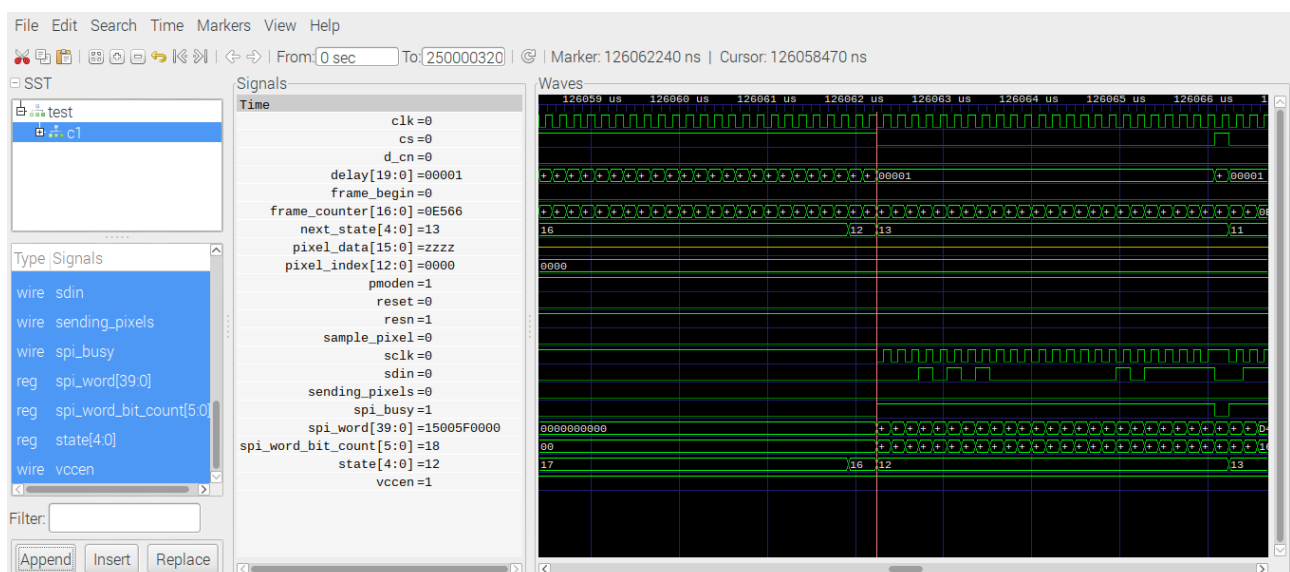
## Pinout PMOD P3 and P4



***“cd otl-icoboard-pmodoledrgb-demo/fw”***

***“make”***

***“make simulate-pmodoledrgb\_controller” Creates the VCD file pmodoledrgb\_controller.vcd .***



***“make simulate-spi\_ram\_slave”*** Creates the VCD file spi\_ram\_slave.vcd.

