

## OFF BOARD CONNECTORS

J5			
39	GPIO21	GND	40 GND
37	GPIO20	GPIO26	38
35	GPIO16	GPIO19	36 LED0
GND	33	GPIO13	34 DEBUG0
31	GND	GPIO6	32 DEBUG1
29	GPIO12	GPIO5	30 DEBUG2
27	GND	GPIO5	28
25	IN_SC	IN_SD	26 GND
23	GPIO7/CE1	GND	24
21	GPIO8/CE0	GPIO11/SCK	22
GND	19	GPIO9/MISO	20
BOOT1	17	GPIO10/MOSI	18 3V3
BP_RST	15	GPIO24	16 BOOT0
GND	13	GPIO23	14 RPI_TRIG
USER_BTN	11	GND	12 RES_BYP
IF_TX	9	GPIO18	10 GND
IF_RX	7	GPIO15/RX	GND
GND	5	GPIO14/TX	8 EXT_V_EN
5V	3	GND	6 RPI_SCL
5V	1	GPIO3/SCL	4 RPI_SDA
		GPIO2/SDA	2 3V3

Raspberry Pi 3 Model B+  
Samtec BCS-120-L-D-TE

J3 J4			
DUT_RST	1	PB12	GND
DUT_CTS	2	PB13	GND
DUT_RTS	3	PB14	3V3
USER_BTN	4	PB15	NRST
DUT_IC	5	PA8	PB11
IF_TX	6	PA9	PB10
IF_RX	7	PA10	PB1
USB_DM	8	PA11	PB0
USB_DP	9	PA12	PA7
DUT_NSS	10	PA15	PA6
DUT_SCK	11	PB3	PA5
DUT_MISO	12	PB4	PA4
DUT_MOSI	13	PB5	PA3
DUT_SCL	14	PB6	PA2
DUT_SDA	15	PB7	PA1
DUT_PWM	16	PB8	PA0
DUT_DAC	17	PB9	PC15
	18	5V	PC14
GND	19	GND	PC13
3V3	20	3V3	VBAT

Samtec SLW-120-01-F-S

Samtec SLW-120-01-F-S

J2			
GND	1	GND	6 GND
BOOT1	2	BOOT1	5 BOOT0
3V3	3	3V3	4 3V3

Samtec SLW-103-01-L-D

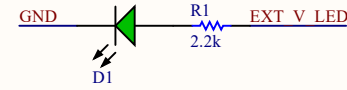
J1			
DUT_NSS	1	2	DUT_MOSI
DUT_MISO	3	4	DUT_SCL
DUT_IC	5	6	DUT_SDA
GND	7	8	DUT_PWM
DUT_RST	9	10	DUT_SCK
DUT_CTS	11	12	DUT_SCK
DUT_RTS	13	14	DUT_SCK
DUT_RX	15	16	DUT_SCK
DUT_TX	17	18	DUT_SCK
DUT_ADC	19	20	DUT_SCK

3M D2520-6002-AR

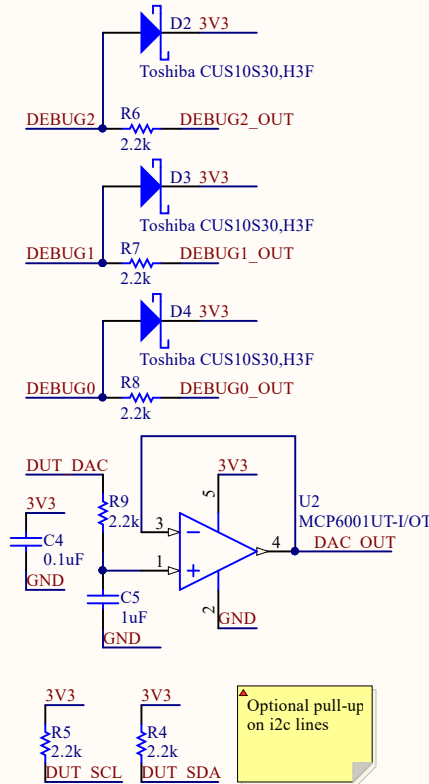
Optional low pass filter for the sck line since clock ringing can occur.

The RPi pinout is vertically mirrored since it is an upside down connector.

## LEDS

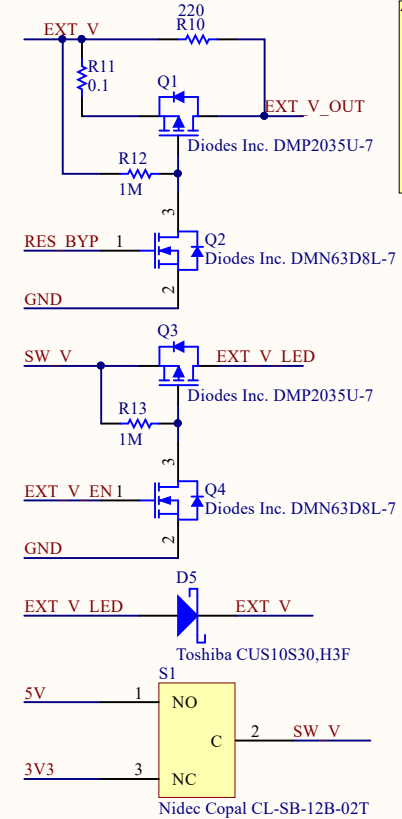


## SIGNAL CONDITIONING



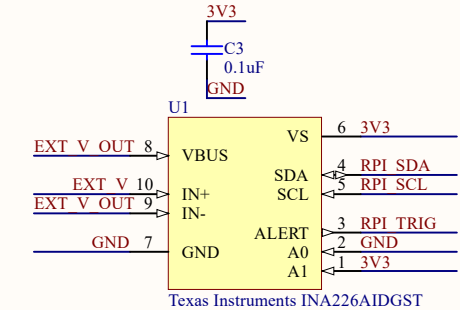
Optional pull-up on i2c lines

## CONTROL



Low current resolution  
2.5uV/220Ohms=11.4nA  
Low current max  
11.4nA\*2^15=372uA  
High current resolution  
2.5uV/0.1Ohm=25uA  
High current max  
25uA\*2^15=819mA

## POWER MEASURING



Title **RIOT HiL CI HAT**

HAW Hamburg  
Kevin Weiss

Size: A4

Number:1

Revision:2C

Date: 10/06/2019

Time: 16:36:34

Sheet 1 of 1

File: bph.SchDoc

CIRCUITMAKER

## Design Rules Verification Report

Filename : C:\ProgramData\Altium\CircuitMaker {382DEE72-D86A-42B9-BAC2-0111D092FF90}\Projects\848933AC-9F1C-44E3-8F1C-68CEACBCBD93\65a71a72-7911-418c-9cee-440acca976dc\bph.CMPcbDoc

Warnings 0  
Rule Violations 0

Warnings	
Total	0

Rule Violations	
Unpoured Polygon (Allow unpoured: False)	0
Net Antennae (Tolerance=0mm) (All)	0
Silk primitive without silk layer	0
Silk to Silk (Clearance=0.051mm) (All),(All)	0
Silk To Solder Mask (Clearance=0.051mm) (IsPad),(All)	0
Minimum Solder Mask Sliver (Gap=0.025mm) (All),(All)	0
Hole To Hole Clearance (Gap=0.254mm) (All),(All)	0
Hole Size Constraint (Min=0.025mm) (Max=2.54mm) (All)	0
Height Constraint (Min=0mm) (Max=25.4mm) (Preferred=12.7mm) (All)	0
Width Constraint (Min=0.254mm) (Max=0.508mm) (Preferred=0.254mm) (All)	0
Power Plane Connect Rule(Relief Connect )(Expansion=0.508mm) (Conductor Width=0.254mm)	0
Clearance Constraint (Gap=0.203mm) (All),(All)	0
Un-Routed Net Constraint ( (All) )	0
Short-Circuit Constraint (Allowed=No) (All),(All)	0
Clearance Constraint (Gap=0.305mm) (InPolygon),(All)	0
Total	0

**Electrical Rules Check Report**

Class	Document	Message
		Successful Compile for bph.PrjPcb