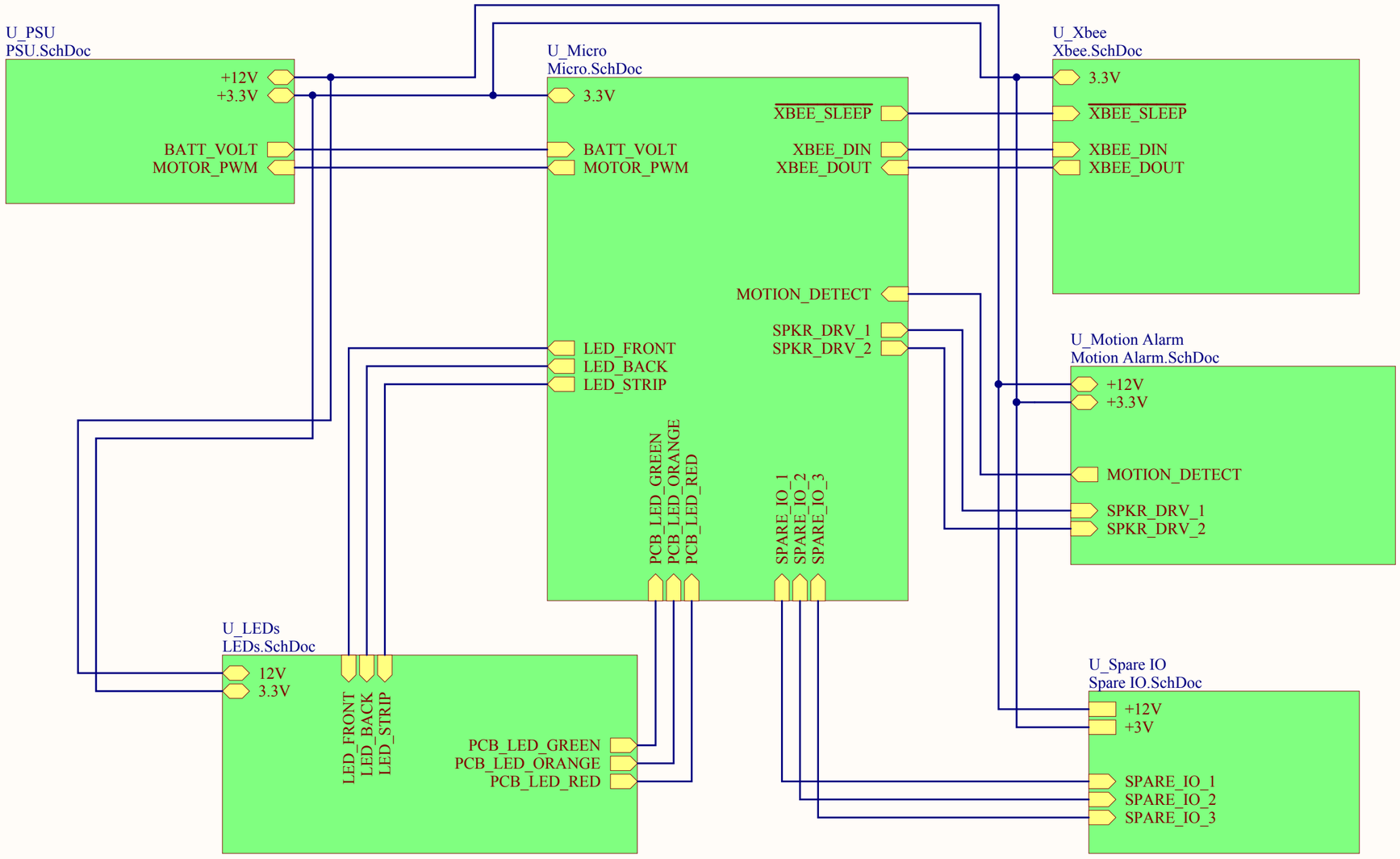
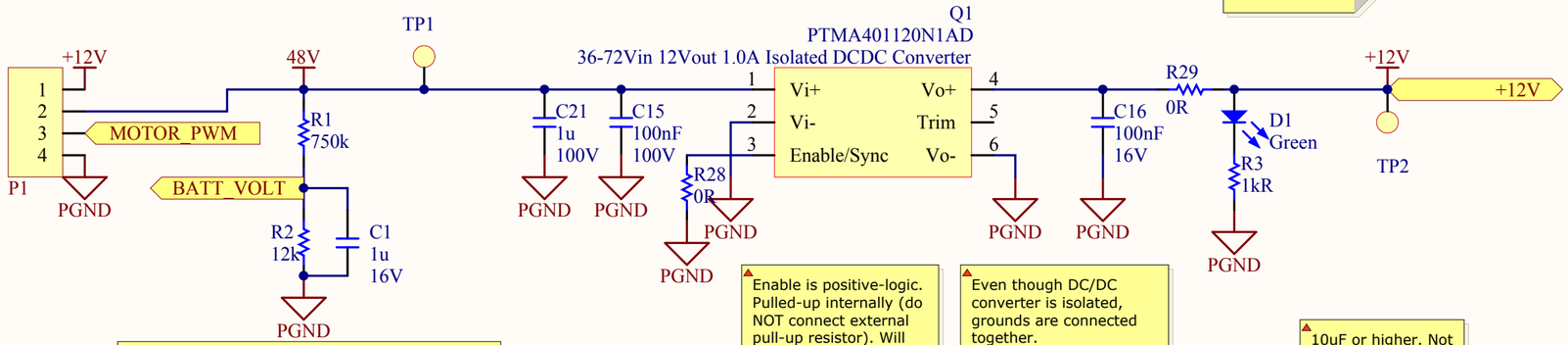


Title: Top Level Design	
Document Name: Top Level.SchDoc	
Project Name: Skateboard Motherboard Transceiver v1.1.PrjPCB	Sheet 1 of 7
Cient: Geo	Revision: v1.1
Company Name: CladLabs	Modified Date: 7/1/2012
Drawn By: Geoffrey Hunter	

Battery input. Rated nominal voltage is 48V, but normally sits around 53V. Can get up to 60V when charging.

Comes from motor controller board, 12V supply and PWM signal for motor controller also sent back in the same connector.



ADC input cannot exceed 3.3V when input is at it's maximum of 60V.

Vout = 945mV when Vin=60V. C1 for stability.

Also, care has to be taken to make sure that the micro's ESD diodes don't conduct more than 100uA at start-up. Worst case is 60V on rail and micro supply still at 0, pulling BATT_VOLT to 0.7V and sinking 79uA.

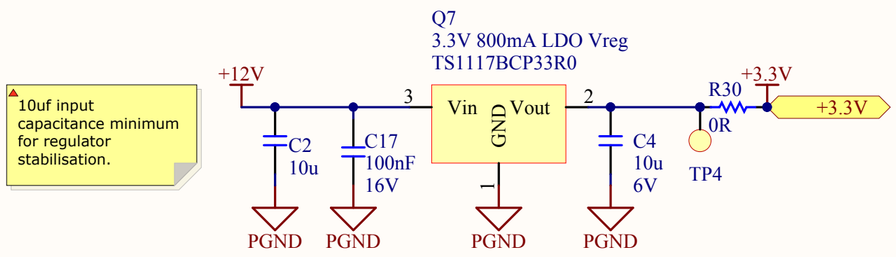
Designed For:
3.0Vout at 60Vin
with 10uA draw.

Enable is positive-logic. Pulled-up internally (do NOT connect external pull-up resistor). Will be on by default, ground if wanting to disable.

Even though DC/DC converter is isolated, grounds are connected together.

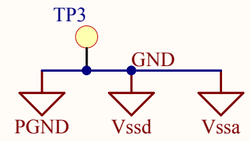
Power indication LED.
Designed for 10mA @ 12V bus.

10uF or higher. Not needed for DC/DC stabilization but needed for linear reg stabilization.



10uf input capacitance minimum for regulator stabilisation.

Regulator drops 12V down to 3.3V for microcontroller and Xbee module.



Star-connection of grounds. Particular care to keep power ground seperated from the others because of motor.

Title: Power Supply	
Document Name: PSU.SchDoc	
Project Name: Skateboard Motherboard Transceiver v1.1.PrjPcb	Sheet 2 of 7
Cient: Geo	Revision: v1.1
Company Name: CladLabs	Modified Date: 7/1/2012
Drawn By: Geoffrey Hunter	

Debug/spare I/O header.

Internal IMO and PLL used, no external oscillator/crustal needed.

Vddd and Vdda share the same voltage source.

Programming done through 2-wire SWD interface to

The minimum voltage for any power pin is 2.7V

Negative-logic reset pin with manual/automatic option.

LED_FRONT used for front left light, while SPARE_IO_1 used for front right light.

Part designators between skateboard and remote PCB's on micro schematics are kept the same where possible.

GPIO -> 4mA source, 8mA sink, LVTTL or CMOS mode
SIO -> 4mA source, 10mA sink, Voltage level shifting, Overvoltage

Default reset state for all I/O is high-impedence analog

The analog power supply (Vdda) must be equal or greater than all of the other voltages applied to the microcontroller power pins and cannot exceed 5.5V.

TQFP package does not have a center pad.

P4 Latch Header: SPARE1, SPARE2, SPARE3, SPARE4

P5: SWDIO, SWDCK, SWV

SW1

U1 CY8C5246AX1-054

1	P2[5]	100	Vddio2
2	P2[6]	99	P2[4]
3	P2[7]	98	P2[3]
4	P12[4], SIO	97	P2[2]
5	P12[5], SIO	96	P2[1]
6	P6[4]	95	P2[0]
7	P6[5]	94	P15[5]
8	P6[6]	93	P15[4]
9	P6[7]	92	P6[3]
10	RSVD	91	P6[2]
11	RSVD	90	P6[1]
12	RSVD	89	P6[0]
13	RSVD	88	Vddd
14	Vssd	87	Vssd
15	XRES	86	Vccd
16	P5[0]	85	P4[7]
17	P5[1]	84	P4[6]
18	P5[2]	83	P4[5]
19	P5[3]	82	P4[4]
20	P1[0], SWDIO	81	P4[3]
21	P1[1], SWDCK	80	P4[2]
22	P1[2]	79	IDAC2, P0[7]
23	P1[3], SWV	78	IDAC0, P0[6]
24	P1[4]	77	P0[5]
25	P1[5]	76	SAR0ref, P0[4]
26	Vddio1	75	Vddio0
27	P1[6]	74	REF0, Po[3]
28	P1[7]	73	P0[2]
29	P12[6], SIO	72	P0[1]
30	P12[7], SIO	71	P0[0]
31	P5[4]	70	P4[1]
32	P5[5]	69	P4[0]
33	P5[6]	68	SIO, P12[3]
34	P5[7]	67	SIO, P12[2]
35	P15[6], USB D+	66	Vssd
36	P15[7], USB D-	65	Vdda
37	Vddd	64	Vssa
38	Vssd	63	Vcca
39	Vccd	62	NC
40	NC	61	NC
41	NC	60	NC
42	MHzXout	59	NC
43	MHzXin	58	NC
44	P3[0], IDAC1	57	NC
45	P3[1], IDAC3	56	kHzXin, P15[3]
46	P3[2], REF1	55	kHzXout, P15[2]
47	P3[3]	54	SIO, P12[1]
48	P3[4]	53	SIO, P12[0]
49	P3[5]	52	P3[7]
50	Vddio3	51	P3[6]

XC1 9C-24.000MEEJ-T 24MHz

Title	Microcontroller
Document Name	Micro.SchDoc
Project Name	Skateboard Motherboard Transceiver v1.1.PrjPcb
Sheet	Sheet 3 of 7
Cient	Geo
Revision	v1.1
Company Name	CladLabs
Modified Date	7/1/2012
Drawn By	Geoffrey Hunter

Part designators between skateboard and remote PCB's on Xbee schematics are kept the same where possible.

Vddd

C19 1u

C20 100n

Vssd

Xbee module decoupling caps.

Vddd

3.3V

U3

1	Vcc	AD0/DIO0	20
14	Vref	AD1/DIO1	19
10	GND	AD2/DIO2	18
13	ON/SLEEP	AD3/DIO3	17
5	RESET	AD4/DIO4	11
6	PWM0/RSSI	Associate/AD5/DIO5	15
7	PWM1	RTS/AD6/DIO6	16
2	Dout	CTS/DIO7	12
3	Din/CONFIG	DO8*	4
8	[reserved]	DTR/Sleep_RQ/DI8	9

MaxStream Xbee Rf Module

Vssd

XBEE_DOUT

XBEE_DIN

TP15

TP16

Default UART transmission speed of MaxStream Xbee Module is 9600 baud.

R23 150R

D10 Green

Vssd

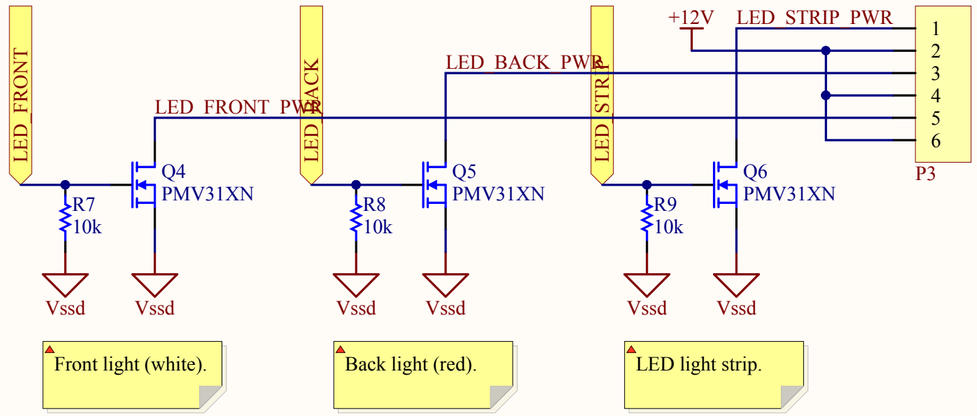
TP14

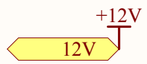
R19 10k

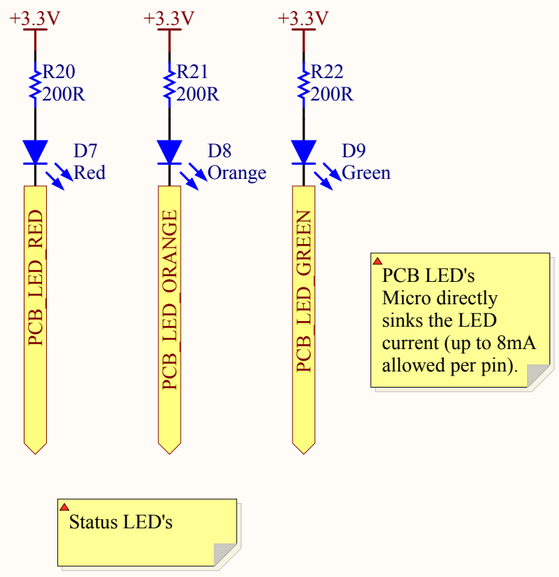
XBEE-SLEEP-REQ

GND

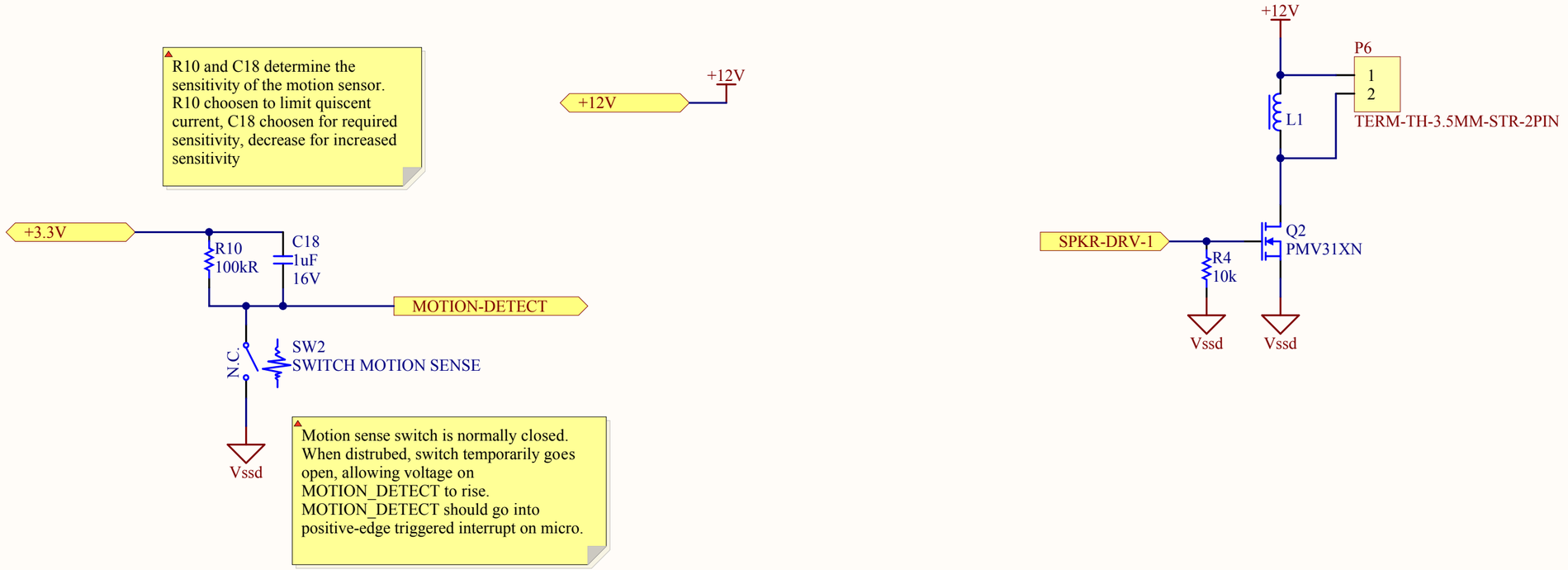
Title: Xbee Communications	
Document Name: Xbee.SchDoc	
Project Name: Skateboard Motherboard Transceiver v1.1.PrjPCB	Sheet 4 of 7
Cient: Geo	Revision: *
Company Name: CladLabs	Modified Date: 7/1/2012
Drawn By: Geoffrey Hunter	



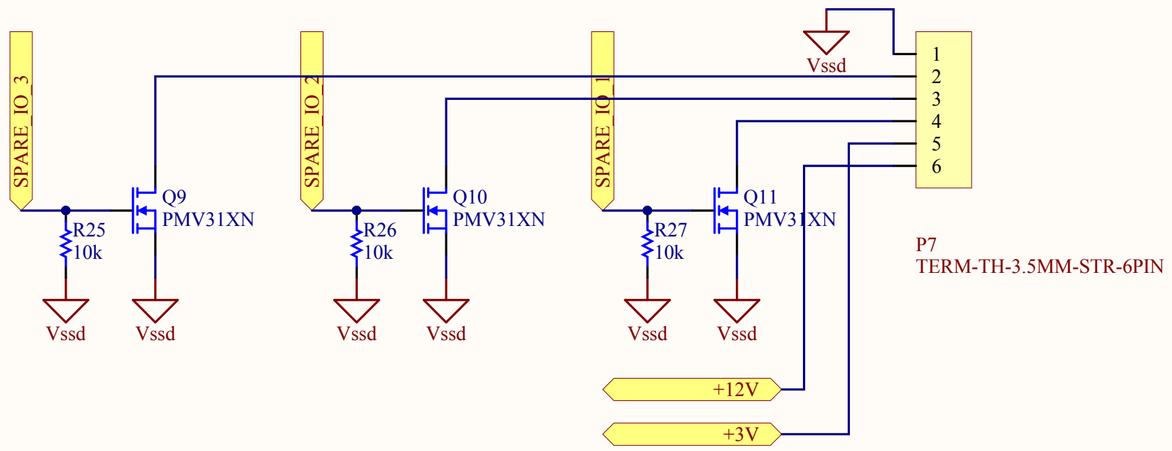




Title: LED's	
Document Name: LEDs.SchDoc	
Project Name: Skateboard Motherboard Transceiver v1.1.PrjPcb	Sheet 5 of 7
Cient: Geo	Revision: v1.1
Company Name: CladLabs	Modified Date: 7/1/2012
Drawn By: Geoffrey Hunter	



Title	Motion Alarm
Document Name	Motion Alarm.SchDoc
Project Name	Skateboard Motherboard Transceiver v1.1.PrjPcb
Sheet	Sheet 6 of 7
Cient	Geo
Revision	v1.1
Company Name	CladLabs
Modified Date	7/1/2012
Drawn By	*



Title	Spare I/O
Document Name	Spare IO.SchDoc
Project Name	Skateboard Motherboard Transceiver v1.1.PrjPcb
Sheet	7 of 7
Cient	Geo
Revision	v1.1
Company Name	CladLabs
Modified Date	7/1/2012
Drawn By	Geoffrey Hunter