

OLLO\_S1 >> OLLO\_S1  
OLLO\_S3 >> OLLO\_S3  
OLLO\_S5 >> OLLO\_S5  
OLLO\_S6 >> OLLO\_S6  
OLLO\_S8 >> OLLO\_S8  
OLLO\_S10 >> OLLO\_S10  
  
OLLO\_S11 >> OLLO\_S11  
OLLO\_S13 >> OLLO\_S13  
OLLO\_S15 >> OLLO\_S15  
OLLO\_S16 >> OLLO\_S16  
OLLO\_S18 >> OLLO\_S18  
OLLO\_S20 >> OLLO\_S20

DXL\_TXD >> DXL\_TXD  
DXL\_RXD >> DXL\_RXD  
DXL\_DIR >> DXL\_DIR  
  
USER\_UART2\_RX >> USER\_UART2\_RX  
USER\_UART2\_TX >> USER\_UART2\_TX  
  
USER\_UART8\_RX >> USER\_UART8\_RX  
USER\_UART8\_TX >> USER\_UART8\_TX  
  
SYS\_STS\_LED >> SYS\_STS\_LED  
SYS\_USER\_LED1 >> SYS\_USER\_LED1  
SYS\_USER\_LED2 >> SYS\_USER\_LED2  
SYS\_USER\_LED3 >> SYS\_USER\_LED3  
SYS\_USER\_LED4 >> SYS\_USER\_LED4

ADC\_BAT\_PWR\_IN >> BATT\_CHARGE\_LED  
TEST\_PIN[1..18] >> TEST\_PIN[1..18]

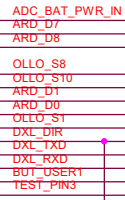
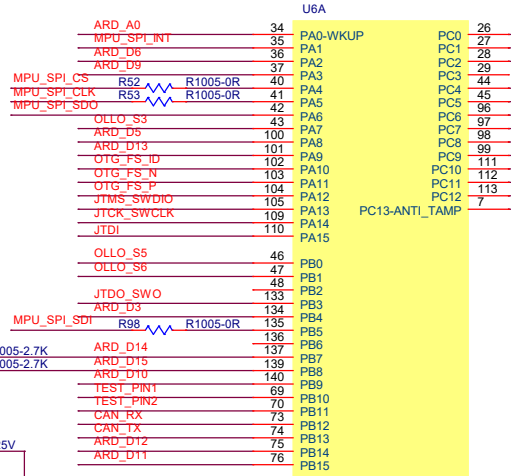
CAN\_TX >> CAN\_TX  
CAN\_RX >> CAN\_RX  
  
J1MS\_SWCLK >> J1MS\_SWCLK  
J1DO\_SWO >> J1DO\_SWO  
J1DI >> J1DI  
MCU\_NRESET >> MCU\_NRESET

BUT\_USER1 >> BUT\_USER1  
BUT\_USER2 >> BUT\_USER2  
SW\_USER1 >> SW\_USER1  
SW\_USER2 >> SW\_USER2  
  
MPU\_SPI\_CLK >> MPU\_SPI\_CLK  
MPU\_SPI\_CS >> MPU\_SPI\_CS  
MPU\_SPI\_SDO >> MPU\_SPI\_SDO  
MPU\_SPI\_SDI >> MPU\_SPI\_SDI  
MPU\_SPI\_INT >> MPU\_SPI\_INT

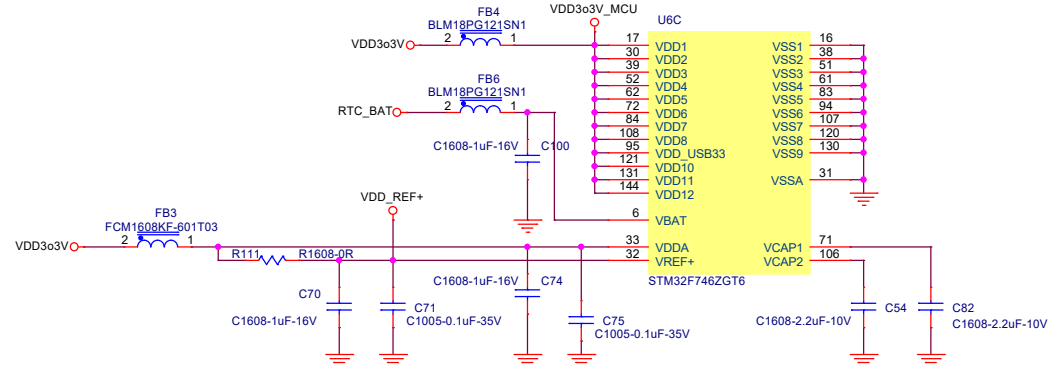
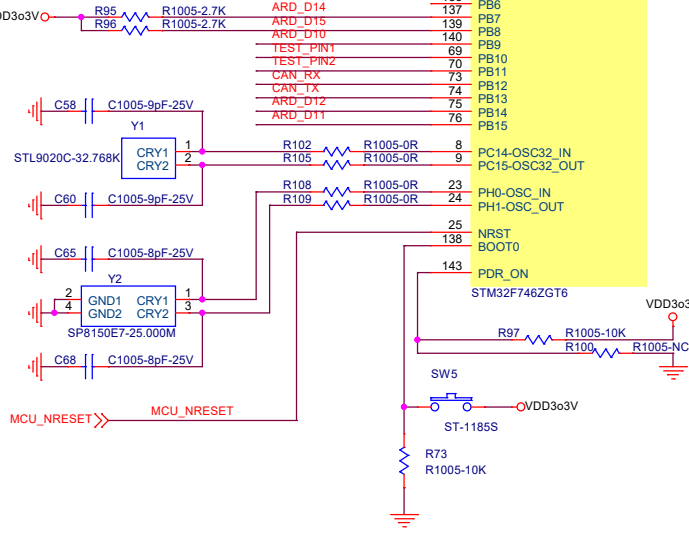
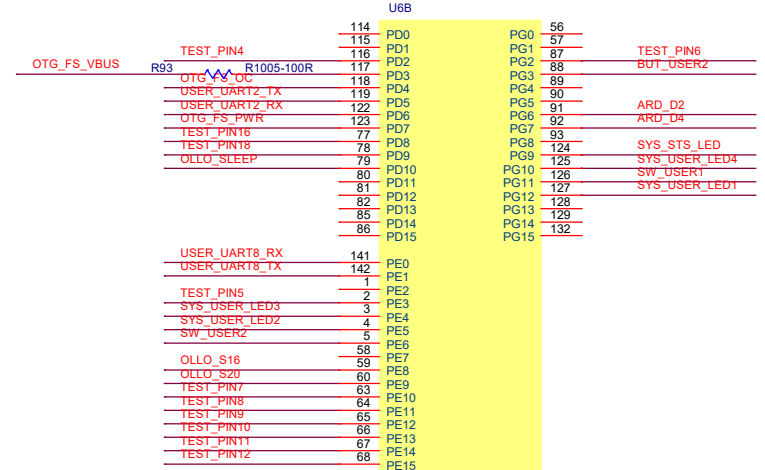
OTG\_FS\_VBUS >> OTG\_FS\_VBUS  
OTG\_FS\_N >> OTG\_FS\_N  
OTG\_FS\_P >> OTG\_FS\_P  
OTG\_FS\_ID >> OTG\_FS\_ID  
OTG\_FS\_OC >> OTG\_FS\_OC  
OTG\_FS\_PWR >> OTG\_FS\_PWR  
OLLO\_SLEEP >> OLLO\_SLEEP

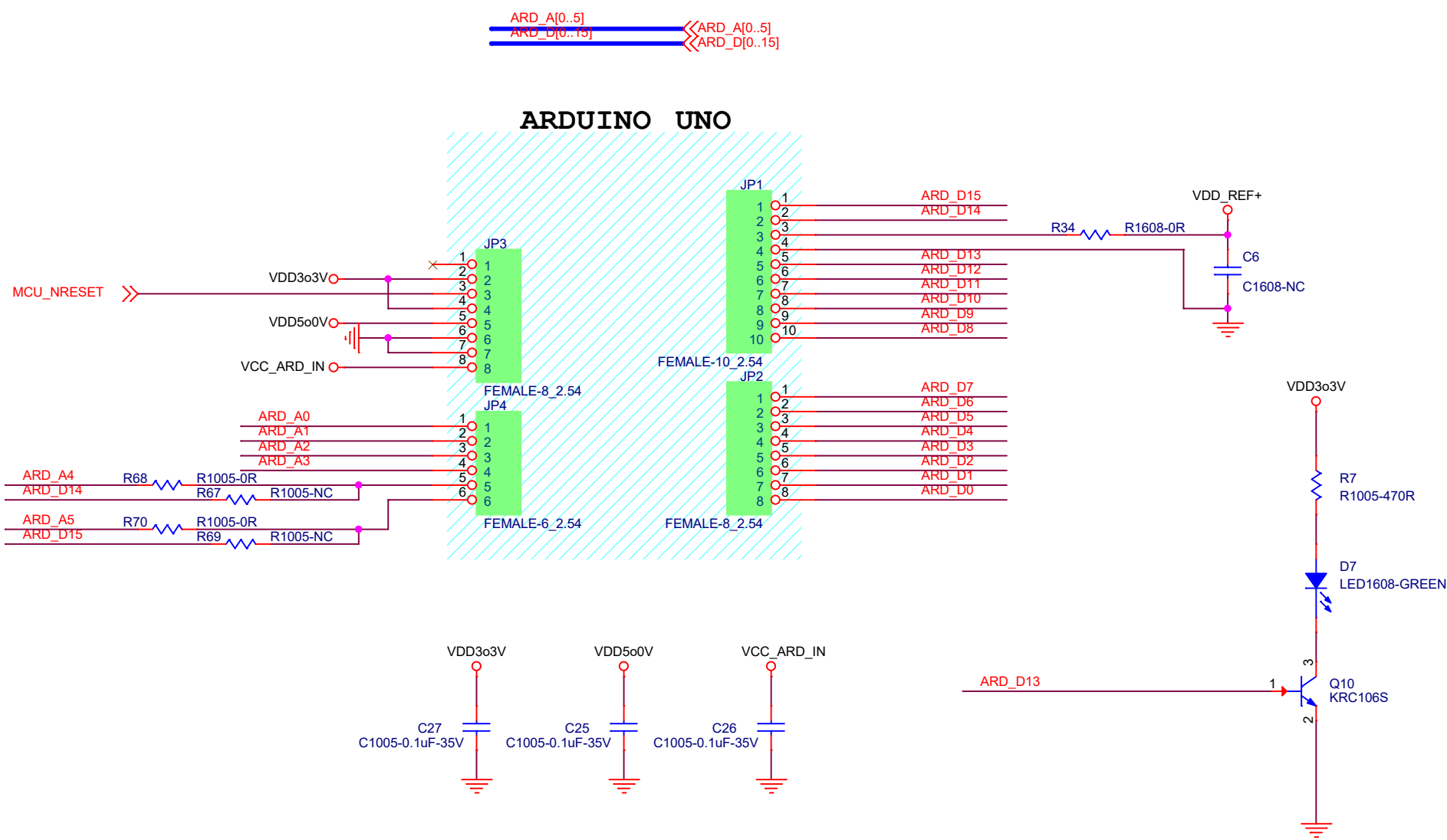
ARD\_A[0..5] >> ARD\_A[0..5]  
ARD\_D[0..15] >> ARD\_D[0..15]

BUZZER\_SIG >> BUZZER\_SIG  
DXL\_PWR\_EN >> DXL\_PWR\_EN

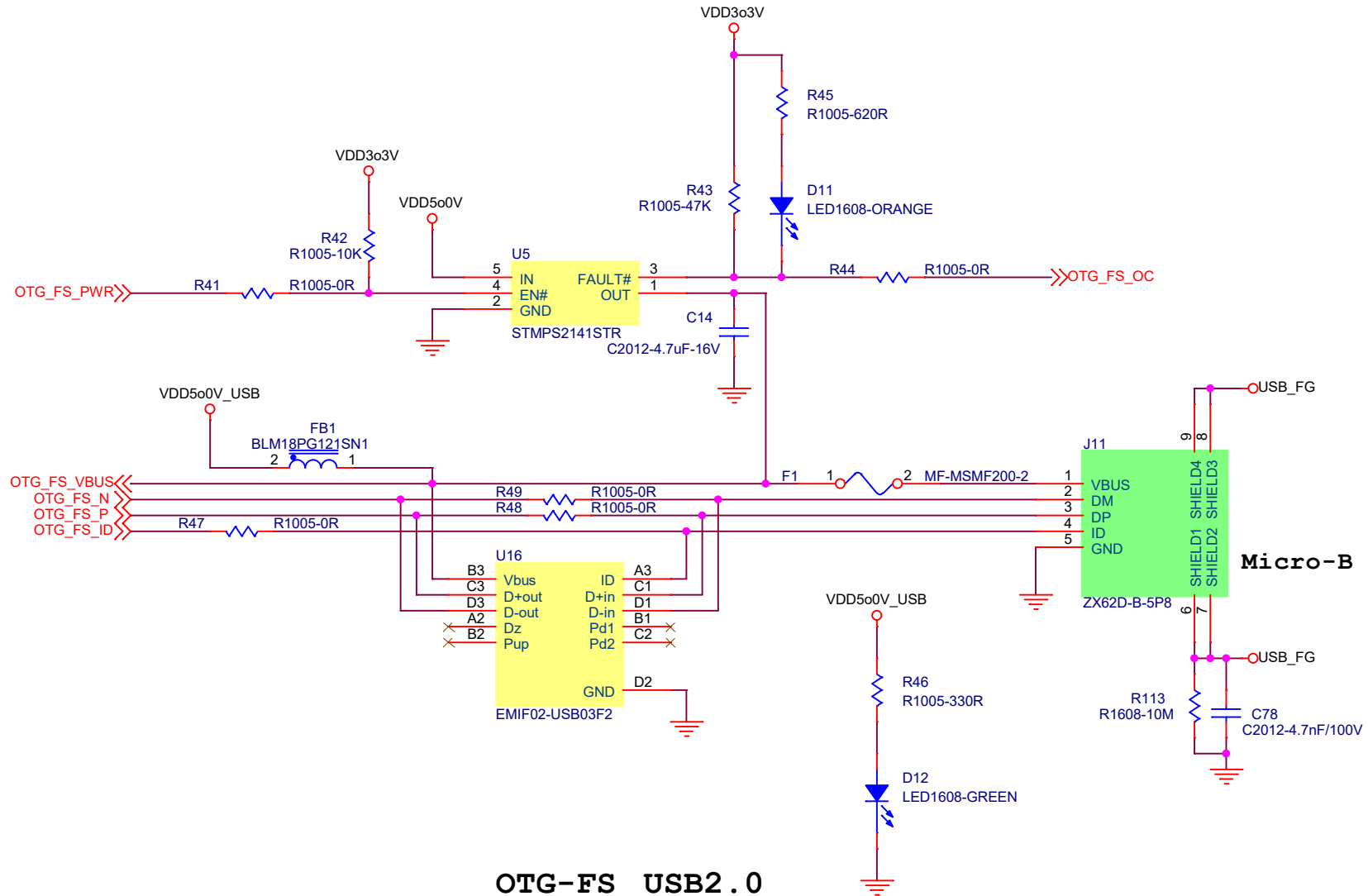


MCU

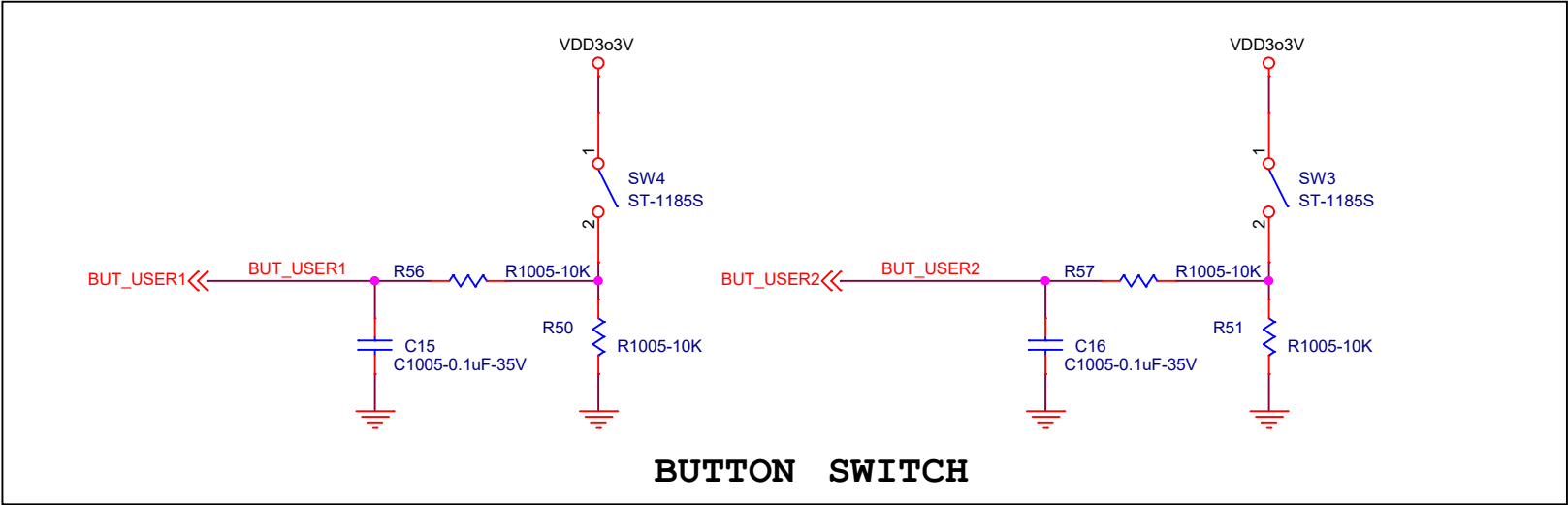




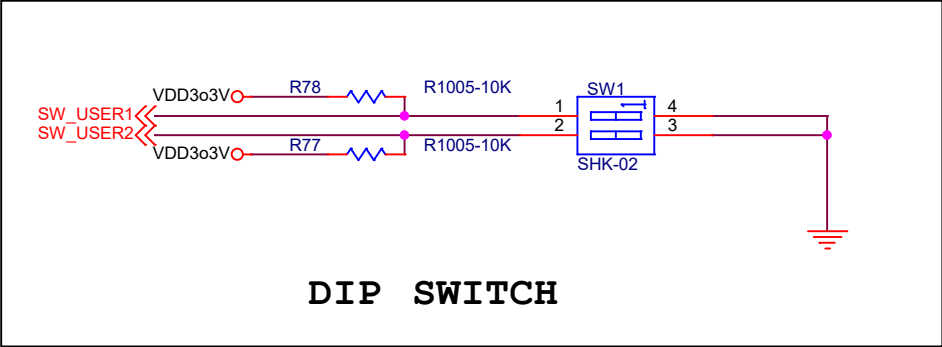
ROBOTIS / OROCA			
Title			
OpenCR			
Size	Document Number		Rev
A4	ARDUINO SHIELD		F
Date:	Friday, April 14, 2017		Sheet 2 of 12



ROBOTIS / OROCA			
Title			
OpenCR			
Size	Document Number		Rev
A4	OTG-FS(USB2.0 Micro-AB)		F
Date:	Friday, April 14, 2017		Sheet 3 of 12



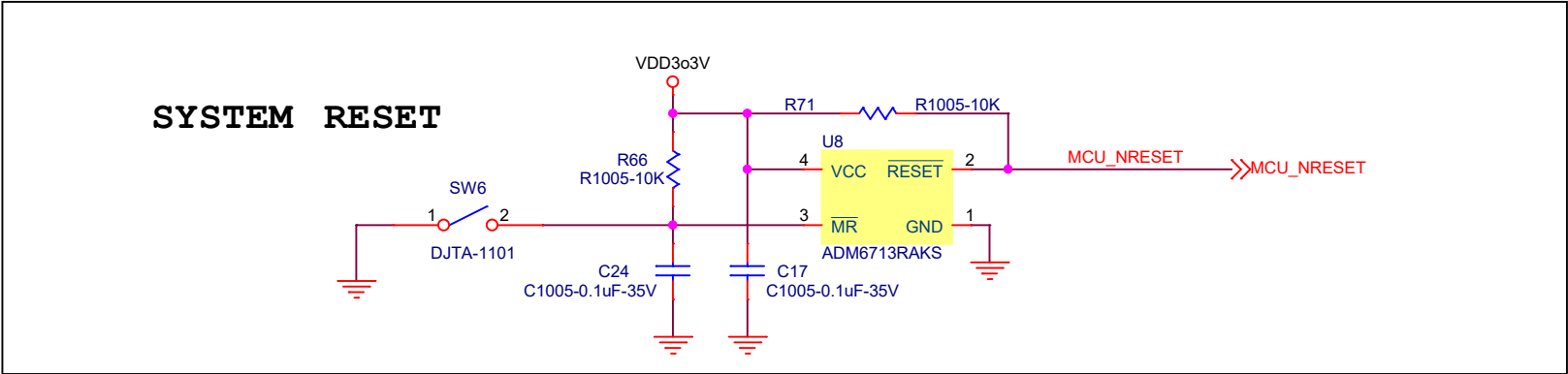
**BUTTON SWITCH**



**DIP SWITCH**

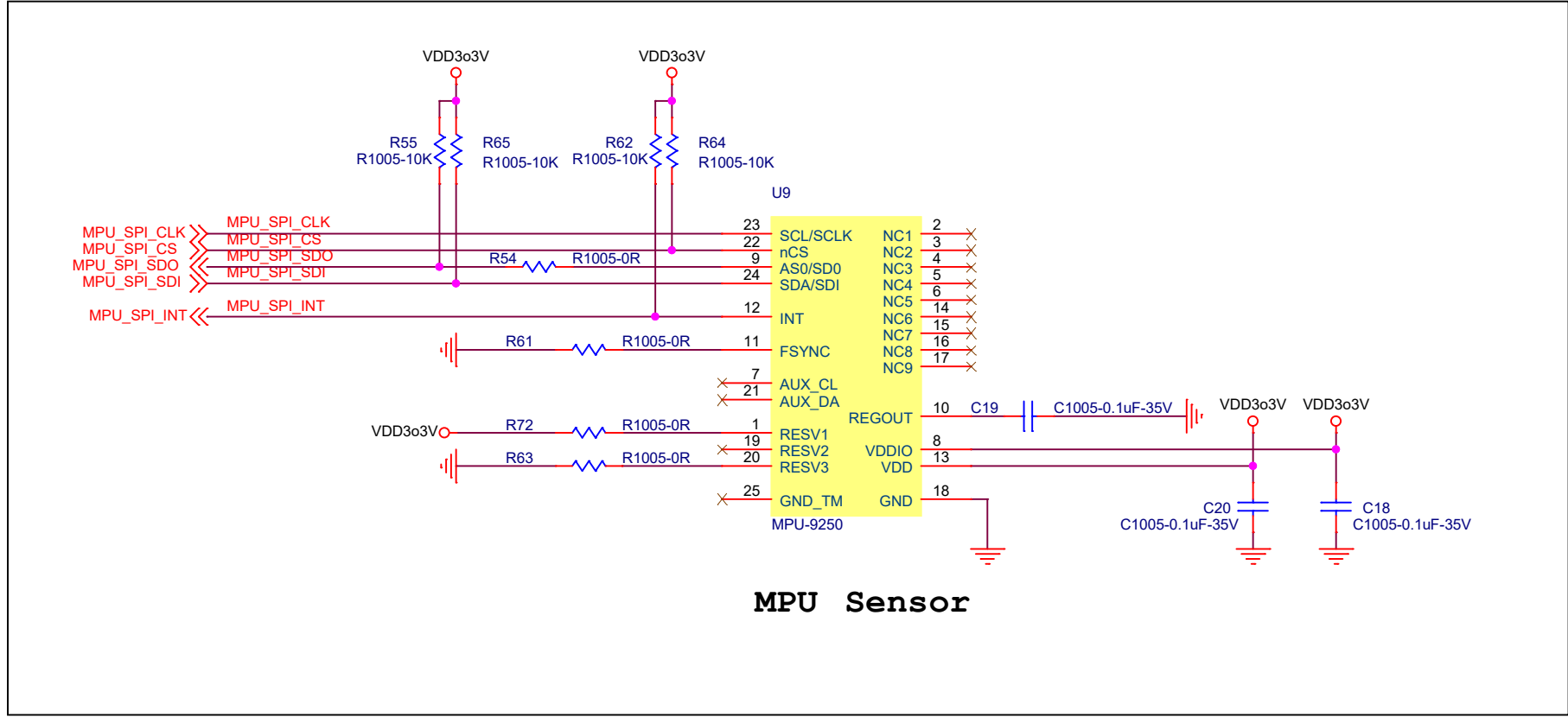


**BUZZER**



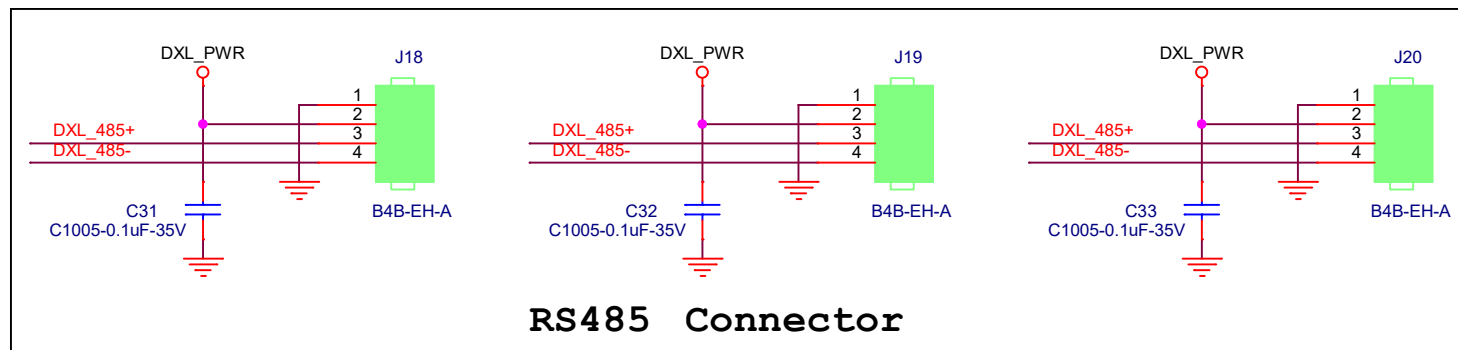
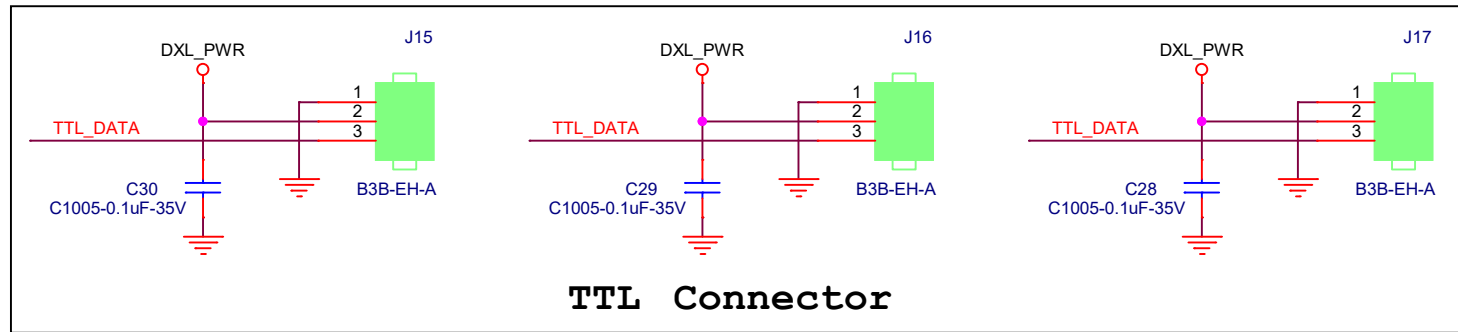
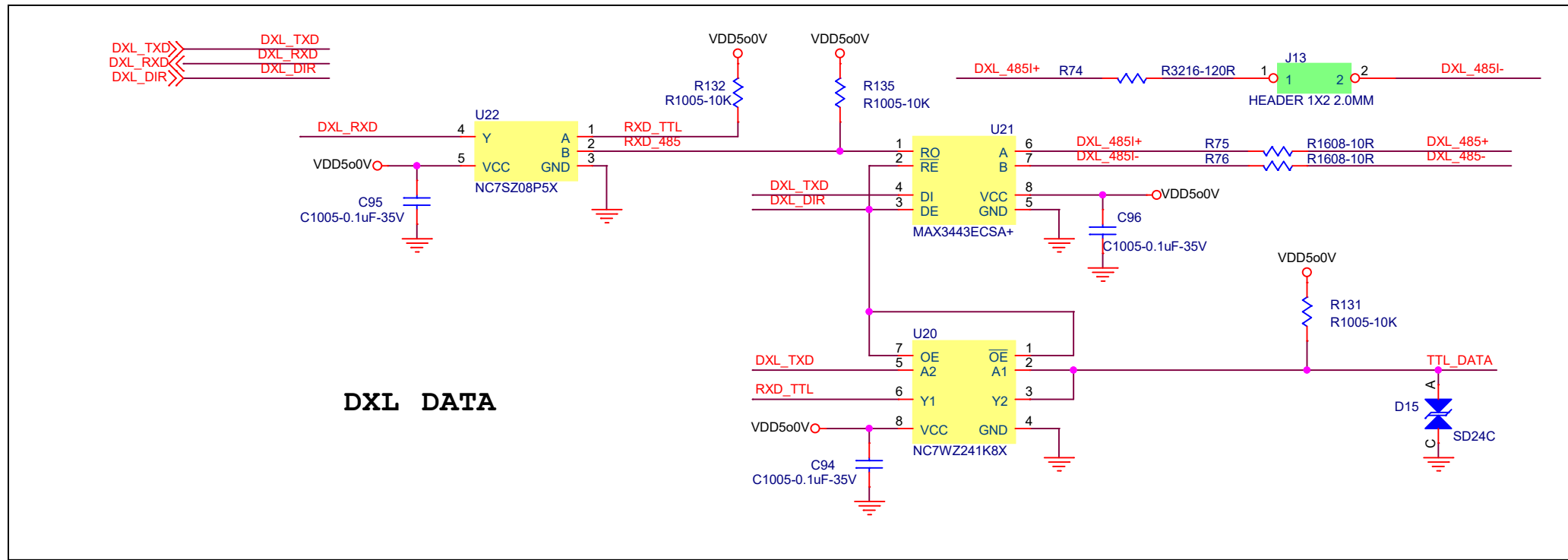
**SYSTEM RESET**

ROBOTIS / OROCA		
Title		
OpenCR		
Size	Document Number	Rev
A4	PUSH/SIIDE SW	F
Date:	Friday, April 14, 2017	Sheet 4 of 12



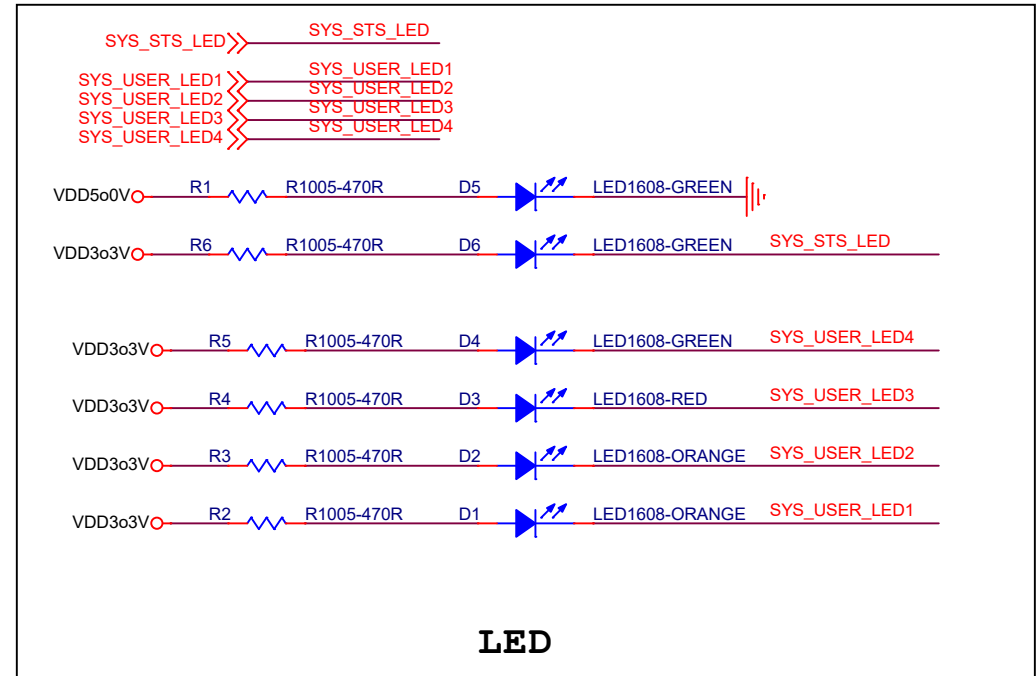
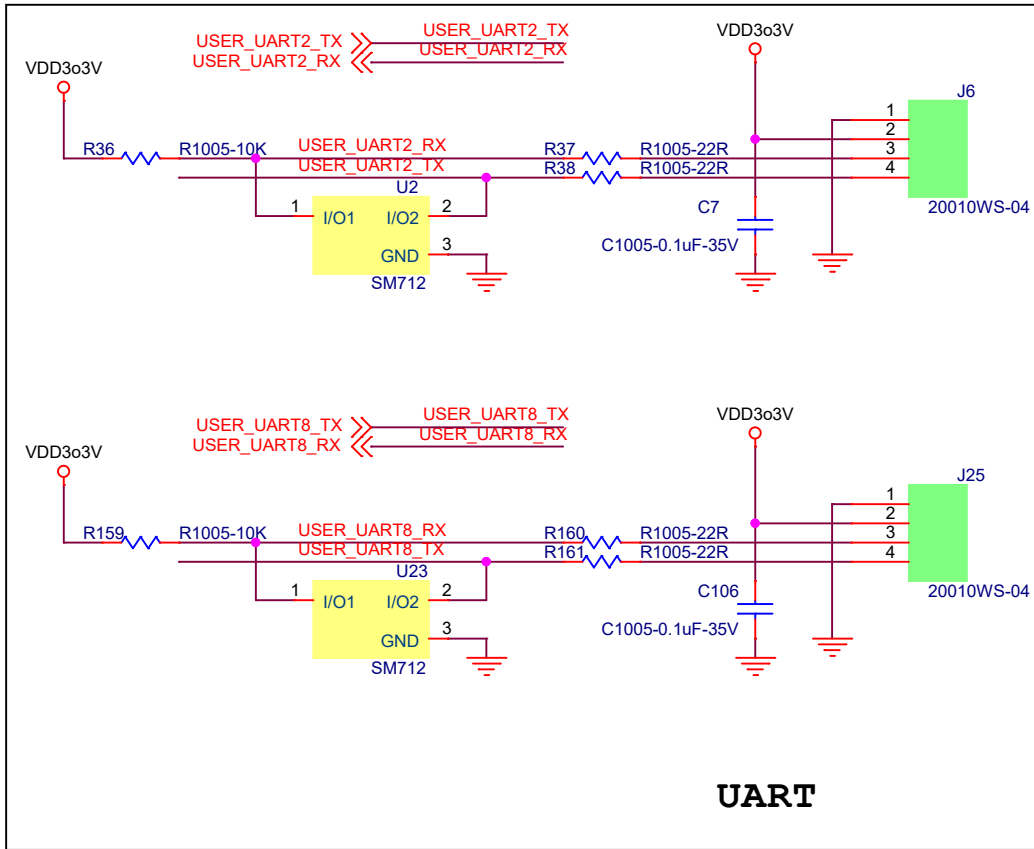
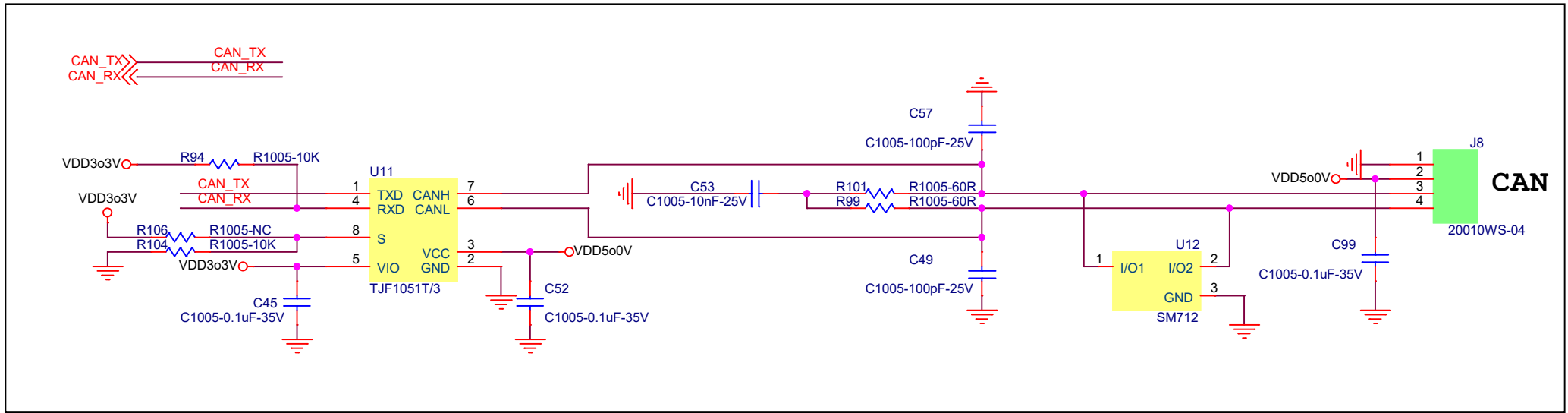
MPU Sensor

ROBOTIS / OROCA		
Title		
OpenCR		
Size	Document Number	Rev
A4	MPU SENSOR	F
Date:	Friday, April 14, 2017	Sheet 5 of 12



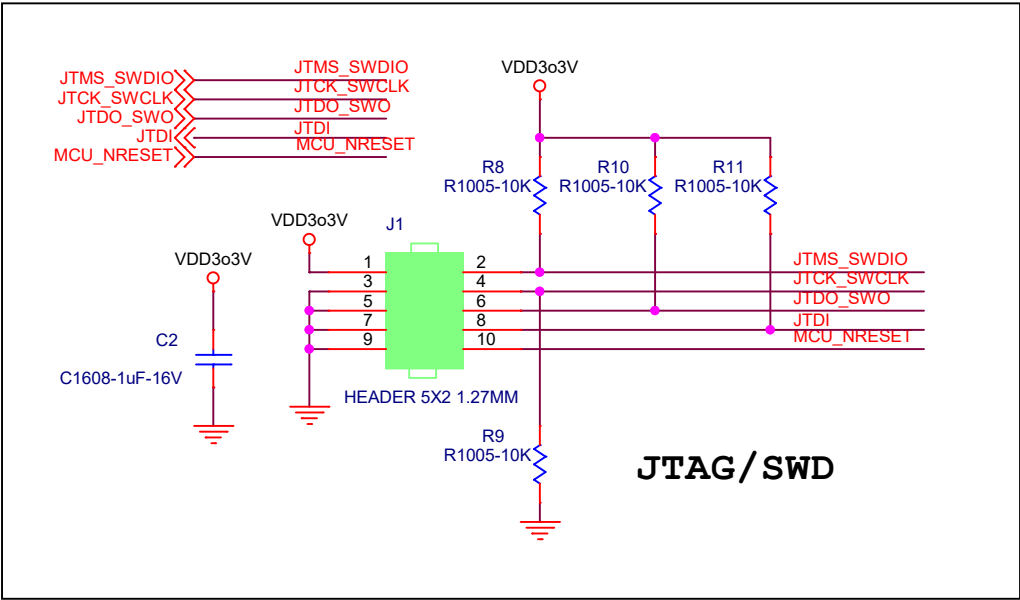
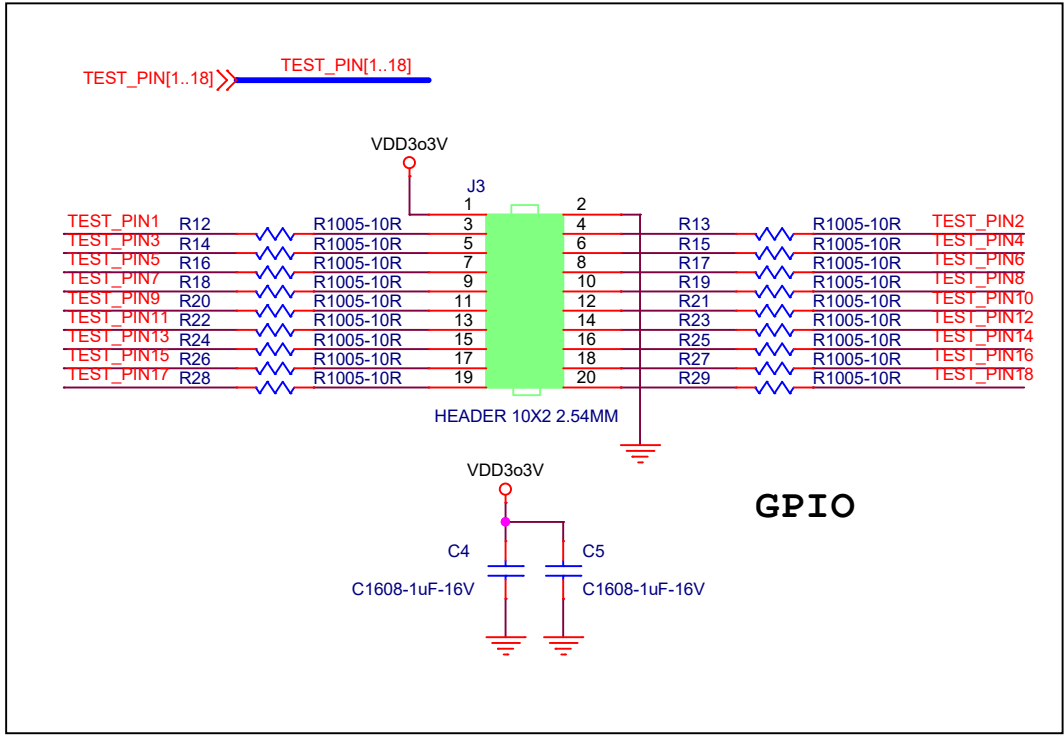
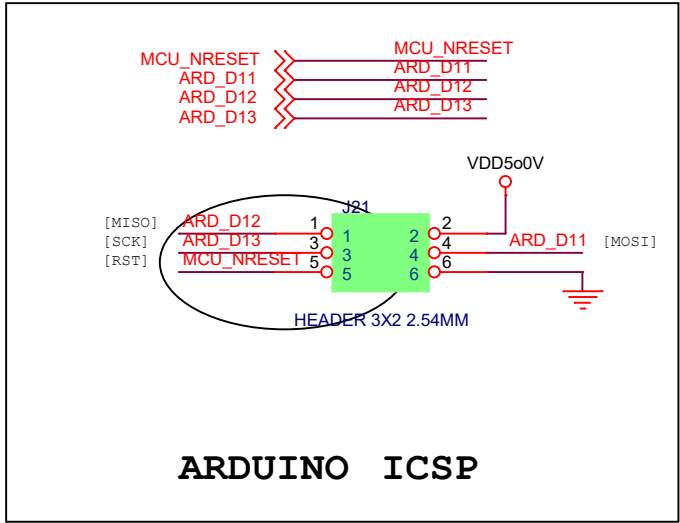
ROBOTIS / OROCA		
Title		
OpenCR		
Size	Document Number	Rev
A4	RS485/TTL DXL	F
Date:	Friday, April 14, 2017	Sheet 6 of 12



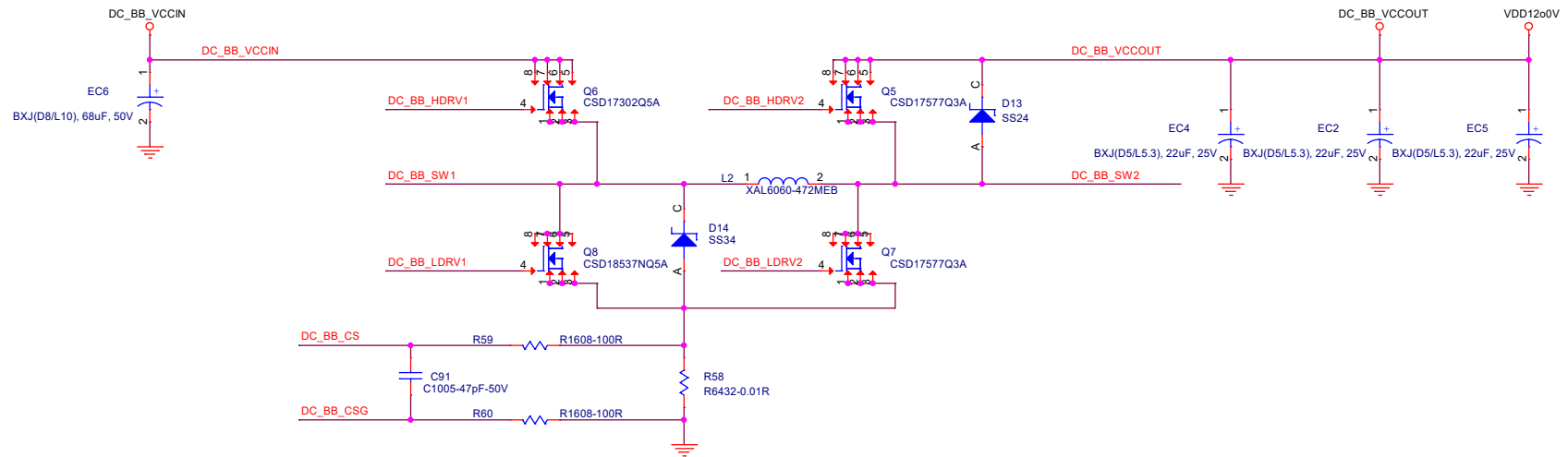


ROBOTIS / OROCA		
Title		
OpenCR		
Size	Document Number	Rev
A4	CAN/UART/LED	F
Date:	Friday, April 14, 2017	Sheet 8 of 12

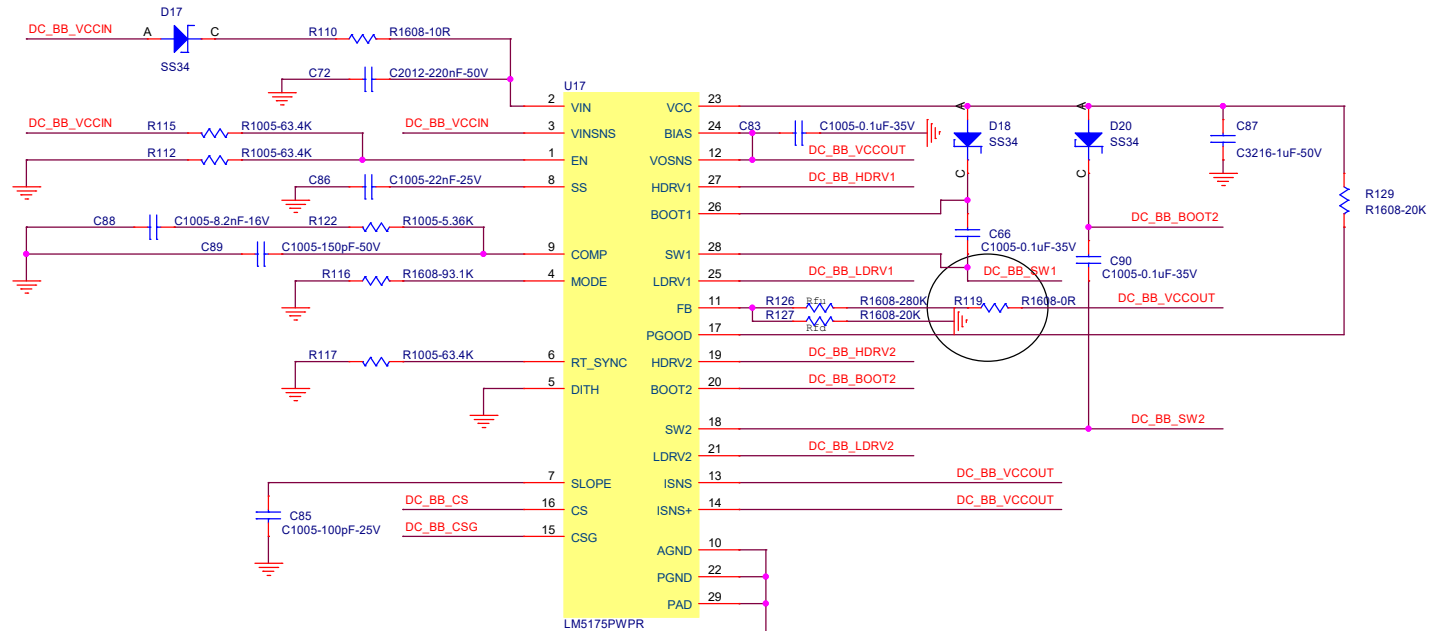




ROBOTIS / OROCA		
Title		
OpenCR		
Size	Document Number	Rev
A4	JTAG/SWD/OLLO/GPIO	F
Date:	Friday, April 14, 2017	Sheet 9 of 12



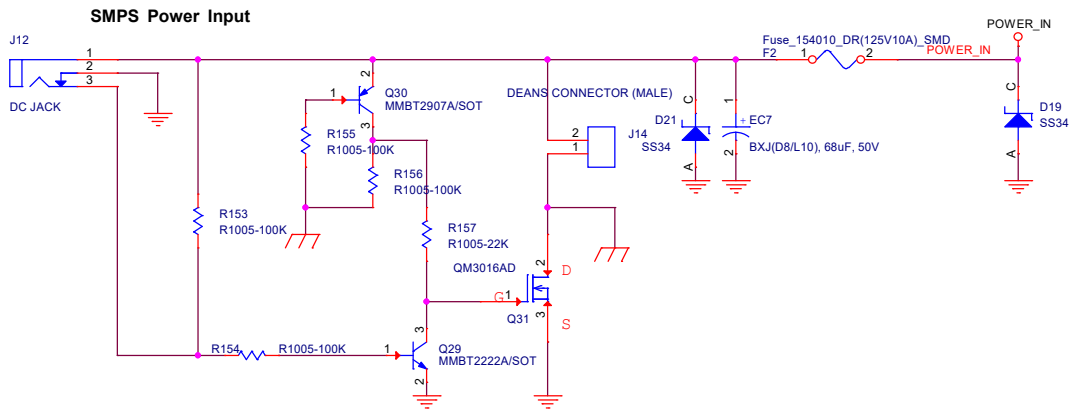
**Buck-Boost Power**



**Buck-Boost Controller**

$$R_{fd} = ((V_{out} - 0.8) / 0.8) * R_{fd}$$

ROBOTIS / OROCA			
Title			
OpenCR			
Size	Document Number		Rev
A3	BUK-BST POWER		F
Date:	Friday, April 14, 2017	Sheet	10 of 12



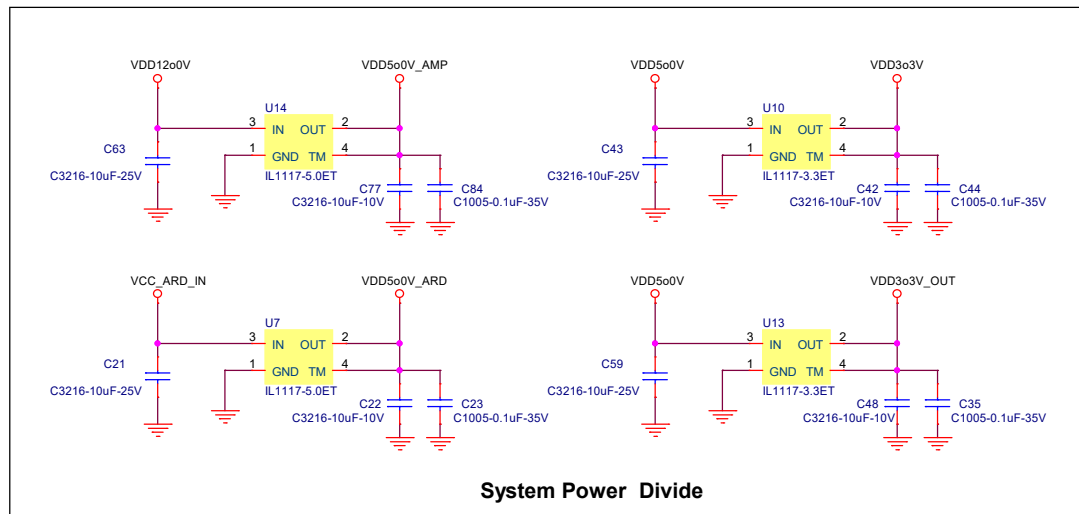
**DC 7V ~ 24V Power Input  
Battery Power Input**



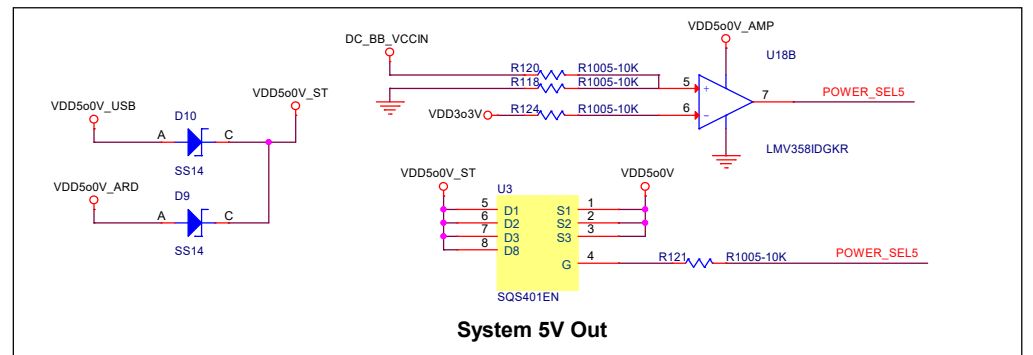
**SMPS, Battery Output**

**RTC BATTERY INPUT**

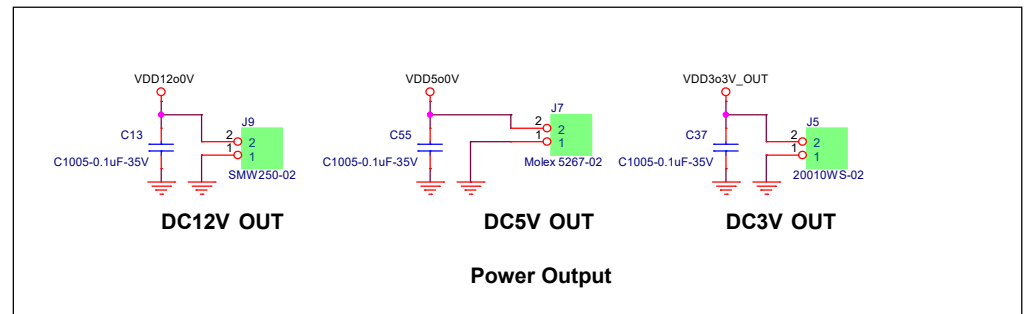
**Main Power In**



**System Power Divide**



**System 5V Out**

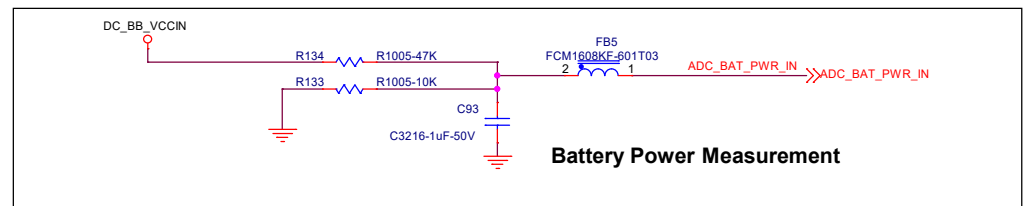


**DC12V OUT**

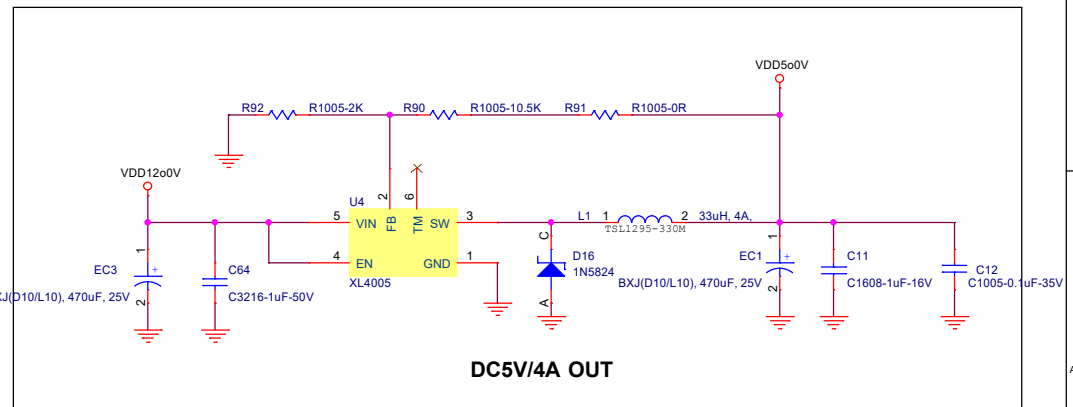
**DC5V OUT**

**DC3V OUT**

**Power Output**

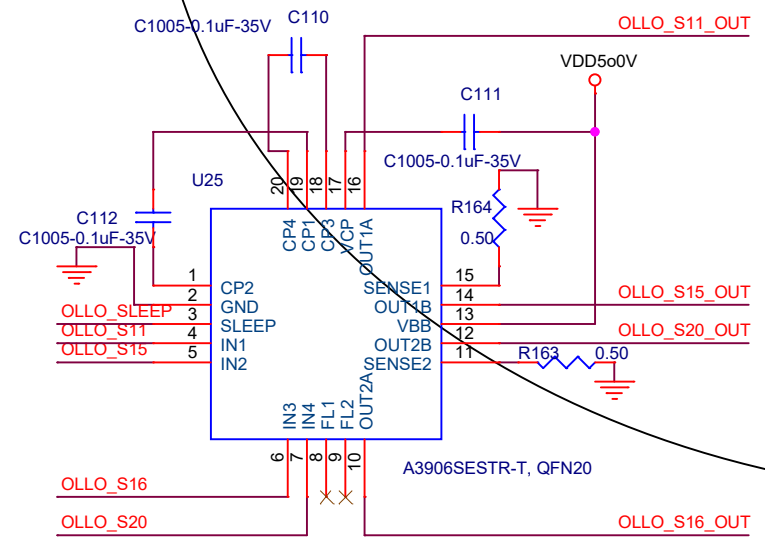
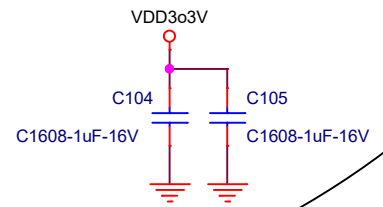
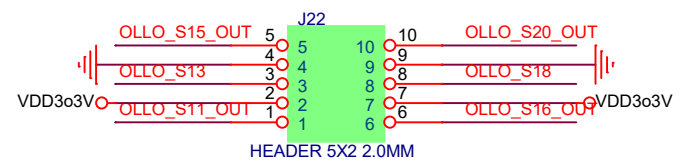
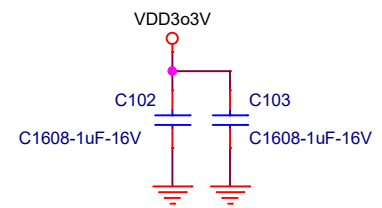
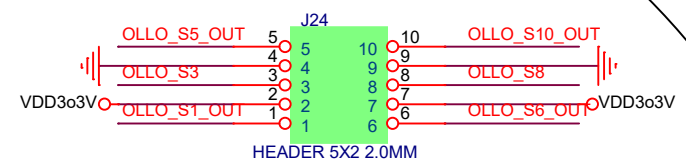
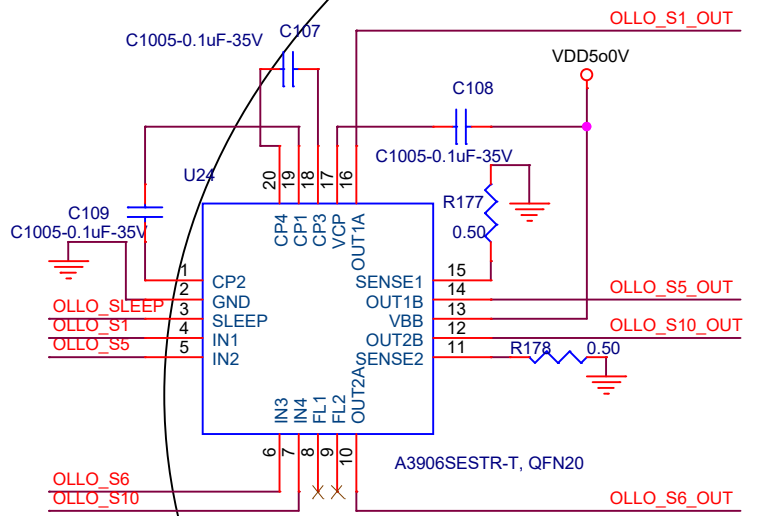
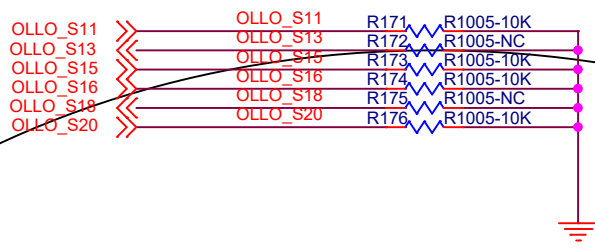
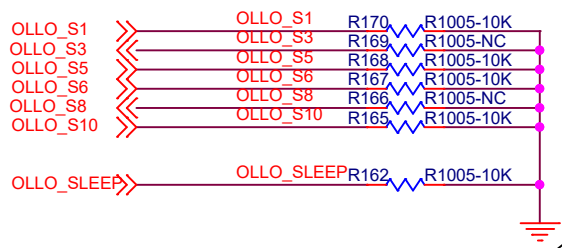


**Battery Power Measurement**



**DC5V/4A OUT**

ROBOTIS / OROCA			
Title	OpenCR		
Size	Document Number	Rev	
A3	INPUT POWER	F	
Date:	Friday, April 14, 2017	Sheet	10 of 12



OLLO

ROBOTIS / OROCA			
Title			
OpenCR			
Size	Document Number		Rev
A4	OLLO		F
Date:	Friday, April 14, 2017		Sheet 10 of 12