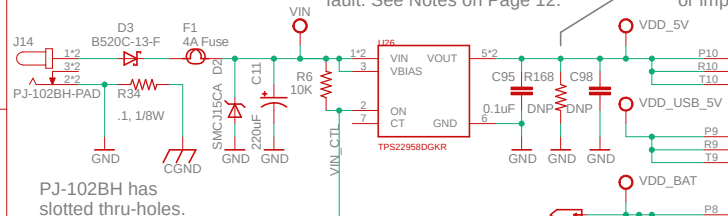


Power & Reset

Power input protection. Adjust according to your application.

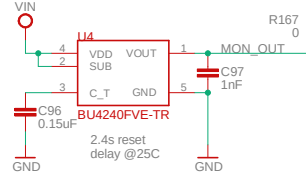
Rev 4: Load Switch added to mitigate PMIC lockup due to VIN Brownout fault. See Notes on Page 12.

R168 can be populated with a resistor in case the load switch does not have QOD or implement your own QOD circuit.



PJ-102BH has slotted thru-holes.

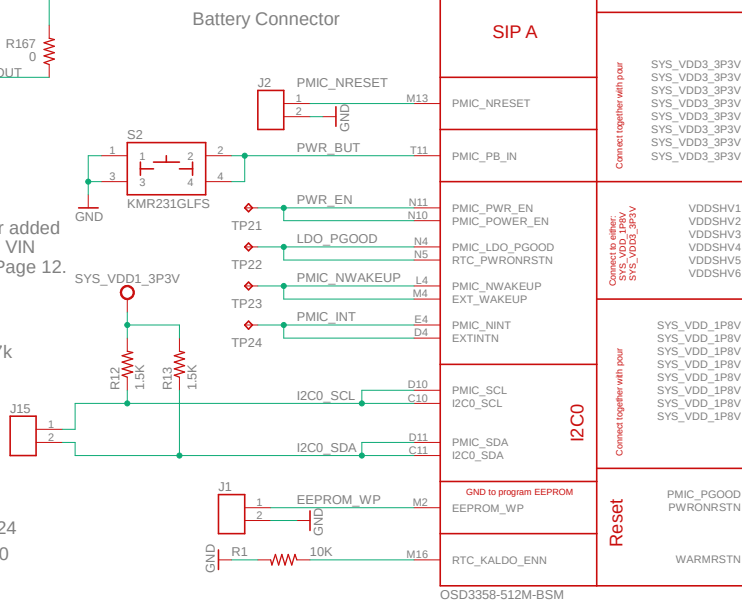
Rev 4: PMIC_BAT_SENSE by default shorted to VIN_BAT. For maintain backward compatibility, PMIC_BAT_SENSE can be isolated by depopulating the resistor R165.



Rev 4: PMIC Reset Supervisor added to mitigate PMIC lockup due to VIN Brownout fault. See Notes on Page 12.

The OSD335x-SM contains 4.7k pull-up resistors on I2C0. External resistors added so that pull-up strength can be changed due to layout or other requirements.

I2C0 Devices inside SIP:
TPS65217 I2C Address: 0x24
EEPROM I2C Address: 0x50

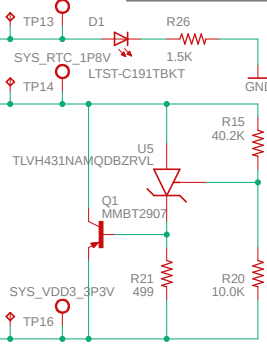


RTC_KALDO_ENN is grounded thru a 10K ohm resistor so that the internal RTC LDO is enabled and CAP_VDD_RTC does not need to be connected to VDD_CORE.

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Reference, Evaluation and Development (RED) Platform

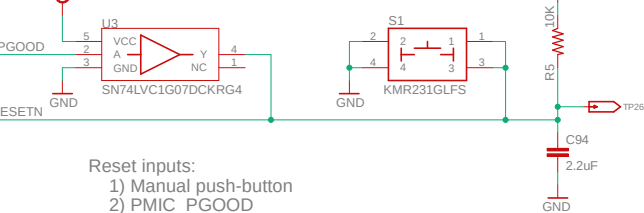
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This is a clamping circuit between the SYS_RTC_1P8V and SYS_VDD3_3P3V outputs of the TPS65217 power management IC inside the OSD335x-SM. The clamping circuit is related to power down issues (see <https://octavosystems.com/osd335x/clamping/> for more information). This may not be needed in your application if the power down conditions do not apply to your application.

Rev 4: Reset Supervisor U4 repurposed to monitor VIN_AC to prevent PMIC lockup due to VIN Brownout fault. Reset supervisor from previous revisions can still be used if desired.



To Print: Use 8.5"x11" paper in landscape; 0.69 scaling factor.

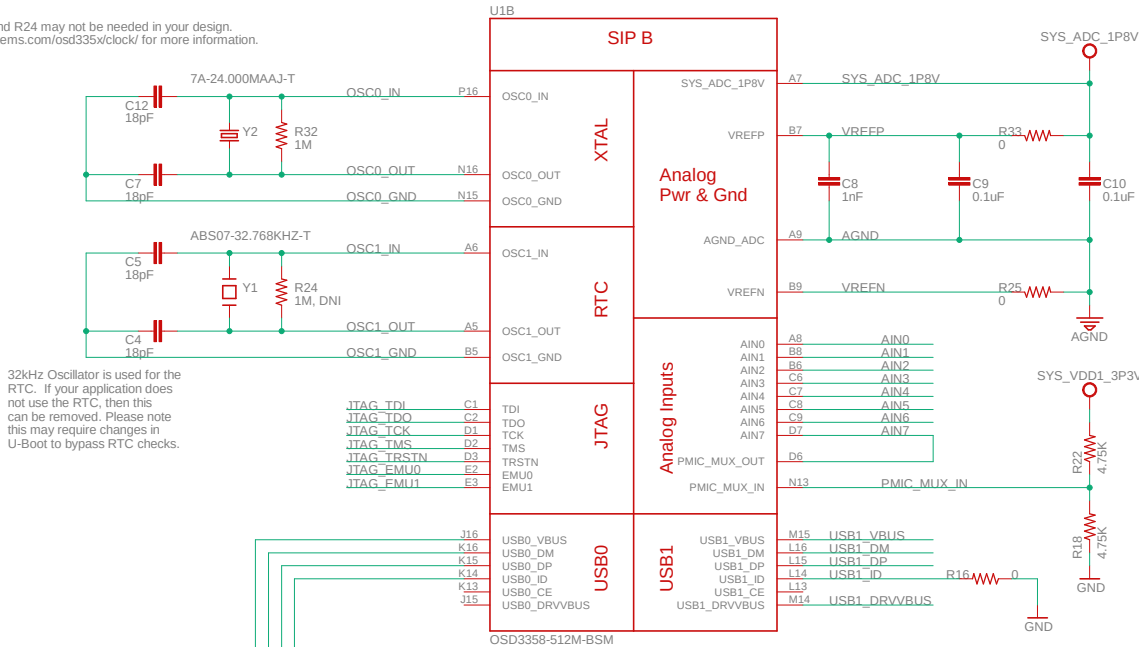


Octavo Systems LLC.	
OSD3358-SM-RED Platform	
6/30/2021 9:12 AM	
Sheet:	1/12
Rev 4	

Clocks, Analog & USB

The values for C7 and C12 can be calculated using information in FAQ: <https://octavosystems.com/faq/design-oscillator-circuit-ost335x-family-devices/#more-3862>

Clock resistors R32 and R24 may not be needed in your design. See <https://octavosystems.com/ost335x/clock/> for more information.



32kHz Oscillator is used for the RTC. If your application does not use the RTC, then this can be removed. Please note this may require changes in U-Boot to bypass RTC checks.

The 0 Ohm resistor (R10) on the VBUS input can be replaced with a ferrite bead for noise suppression or a solder bridge for cost reduction.

USBx_VBUS is a voltage sense input. It is NOT a power output pin. The USBx peripheral will be enabled only if a valid voltage ($\geq 4.4V$) is present on this pin. For more info see "USB Circuitry" article on www.octavosystems.com/app_notes

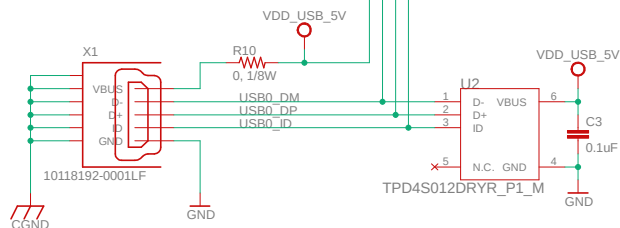
If the analog interface is not used, then VREFP and VREFN should be shorted to AGND.

SYS_ADC_1P8V and AGND_ADC are connected to SYS_VDD_1P8V and DGND, respectively, through ferrite beads inside the SIP. It is not necessary to connect these rails to anything else. However, bypass capacitors should be added to reduce noise, if needed for your application.

Maximum voltage for the analog inputs is 1.8V.

AIN7 currently monitors the PMIC voltages via the internal PMIC mux. See the 'Analog Multiplexer' section of the TPS65217 datasheet. For the internal PMIC voltages, there are dividers within the PMIC to keep the monitored voltages under 1.8V. However, PMIC_MUX_IN does not have any dividers and must be less than 1.8V. By default, PMIC_MUX_OUT is Hi-Z. The MUXCTRL register in the PMIC is used to select the PMIC_MUX_OUT voltage path.

SYS_VDD1_3P3V is a 3.3V output of the OSD3358-512M-BSM. A divide by 2 resistor divider is used to ensure that the PMIC_MUX_IN voltage does not exceed 1.8V. It is not necessary to monitor the TL5209 LDO output and this can be removed if desired.



Per the TPD4S012 datasheet, D-, D+ and ID have the same ESD circuitry. Therefore, to ease routing, D- and D+ have been swapped from the default mapping.

USB Client



Octavo Systems LLC.	
OSD3358-SM-RED Platform	
6/30/2021 9:12 AM	
Sheet:	2/12
Rev 4	

SiP Interfaces

Resistor and capacitor footprints are added to CLKOUT1/CLKOUT2 in case EMI suppression is needed.

Nets like CLKOUT2, GPIO0_7 and GPIO1_16 are resistor muxed to increase the functionality of the Cape Headers. This is not needed if your application does not require Cape Header compatibility.

The eMMC_RSTN signal no longer uses an open-drain inverter to control the eMMC reset input (See OSD3358 SBC Reference Design). This was done to save cost given that there was no software infrastructure in place around them eMMC reset. To put the eMMC in reset the pin is now active low.

Octavo Systems LLC.

OSD3358-SM-RED Platform

6/30/2021 9:12 AM

Sheet:

3/12

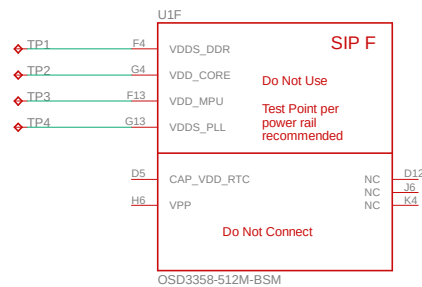
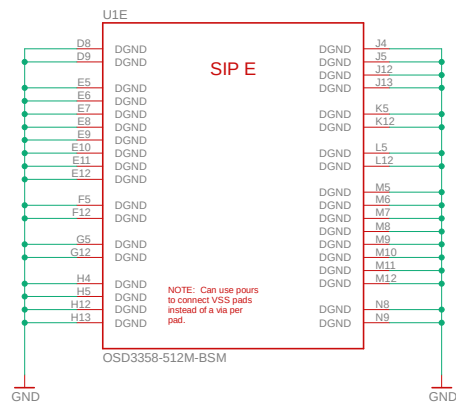
Rev 4

The eMMC_RSTN signal no longer uses an open-drain inverter to control the eMMC reset input (See OSD3358 SBC Reference Design). This was done to save cost given that there was no software infrastructure in place around the eMMC reset. To put the eMMC in reset the pin is now active low.

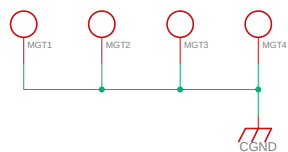


Octavo Systems LLC.	
OSD3358-SM-RED Platform	
6/30/2021 9:12 AM	
Sheet: 3/12	Rev 4

SiP GND & Misc



Mounting Holes



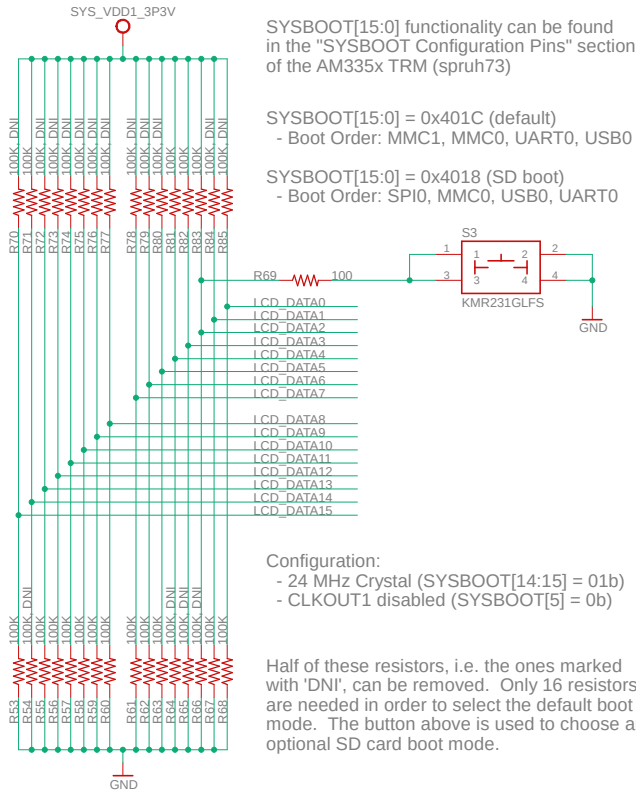
Mounting holes and other connector shields are part of a ground ring, CGND. This ring is connected to ground via a resistor on Page 1.

Fiducials



Octavo Systems LLC.	
OSD3358-SM-RED Platform	
6/30/2021 9:12 AM	
Sheet:	4/12
Rev 4	

Boot configuration

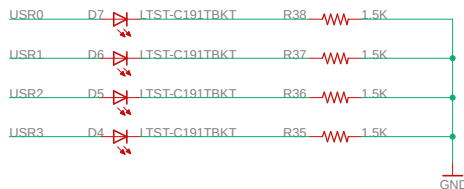


SYSBOOT[15:0] functionality can be found in the "SYSBOOT Configuration Pins" section of the AM335x TRM (spruh73)

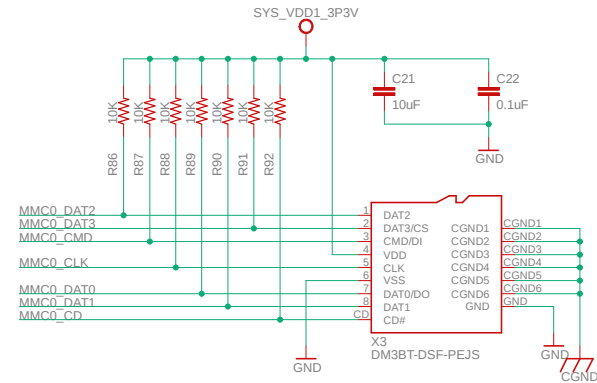
SYSBOOT[15:0] = 0x401C (default)
- Boot Order: MMC1, MMC0, UART0, USB0

SYSBOOT[15:0] = 0x4018 (SD boot)
- Boot Order: SPI0, MMC0, USB0, UART0

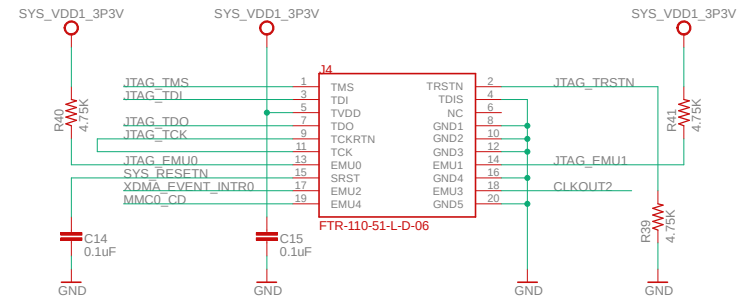
User LEDs



Micro SD card slot



JTAG Header



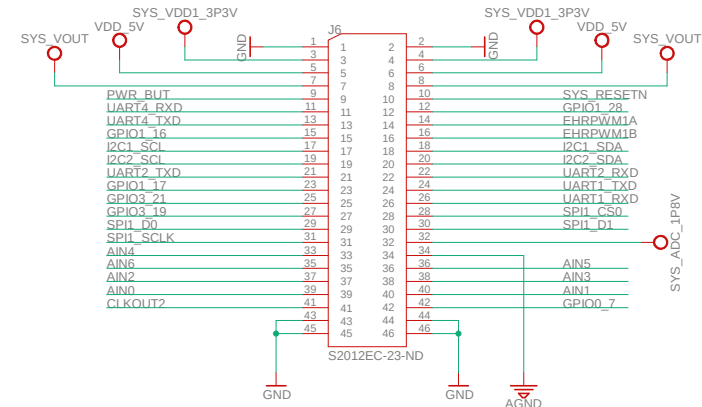
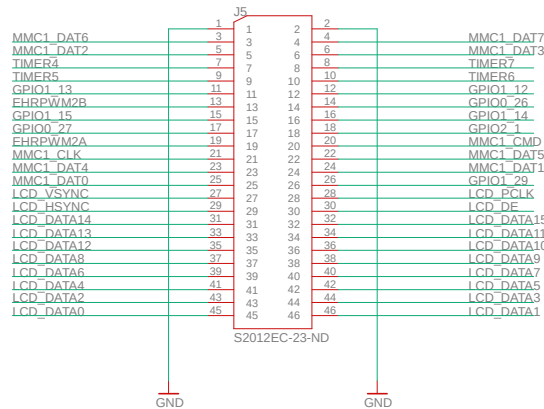
Only connect EMU2, EMU3 and EMU4 if you plan to use advanced JTAG features (HS-RTDX, Core Trace, System Trace, etc) of higher end debuggers:

- http://processors.wiki.ti.com/index.php/JTAG_Connectors
- http://processors.wiki.ti.com/index.php/XDS_Target_Connection_Guide

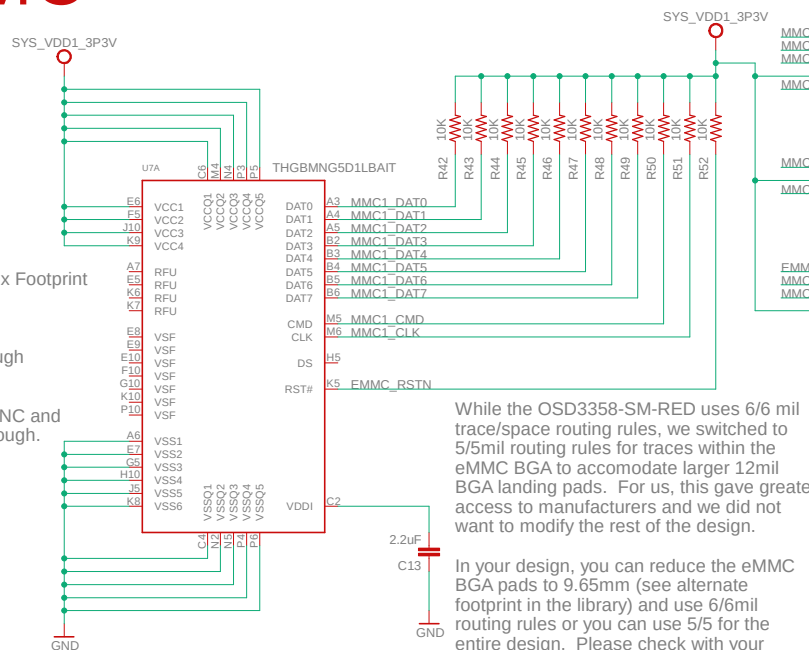


Octavo Systems LLC.	
OSD3358-SM-RED Platform	
6/30/2021 9:12 AM	
Sheet:	5/12
	Rev 4

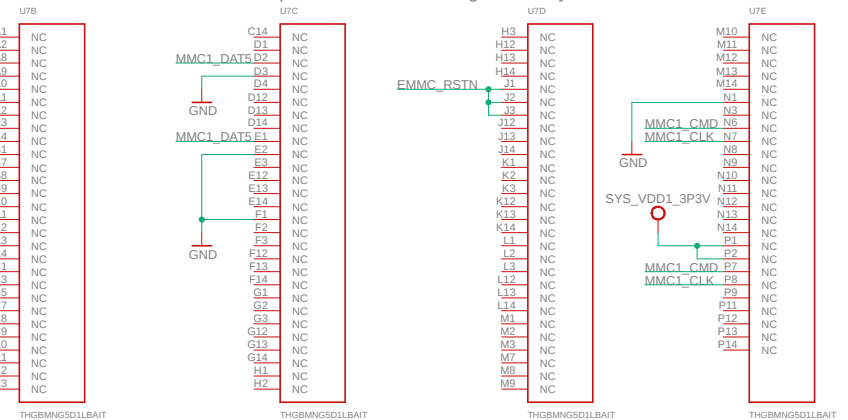
Cape Headers



eMMC



These connections show which pads were routed through in the layout to reduce DRCs.



Generic eMMC 5.x Footprint

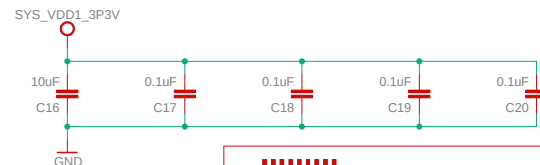
NOTE 7:

Do not route through RFU / VSF pins.

All other pins are NC and can be routed through.

While the OSD3358-SM-RED uses 6/6 mil trace/space routing rules, we switched to 5/5mil routing rules for traces within the eMMC BGA to accommodate larger 12mil BGA landing pads. For us, this gave greater access to manufacturers and we did not want to modify the rest of the design.

In your design, you can reduce the eMMC BGA pads to 9.65mm (see alternate footprint in the library) and use 6/6mil routing rules or you can use 5/5 for the entire design. Please check with your manufacturer for the best set of design rules.



Suitable alternate parts:

1. WESTERN DIGITAL DEUTSCHLAND SDIN8DE2-16G-XI
2. SDIN8DE2-16G (Rev3 uses this)

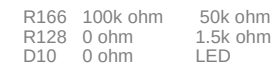
Please choose an appropriate footprint compatible eMMC based on size and availability.

Octavo Systems LLC.
OSD3358-SM-RED Platform

6/30/2021 9:12 AM

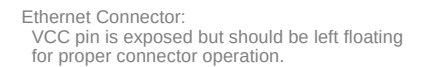
Sheet: 6/12 Rev 4

NOTE: Due to part sourcing issues, both the USB2534 and USB2514B devices are supported. See compatibility note below to understand the population requirements to support each device.

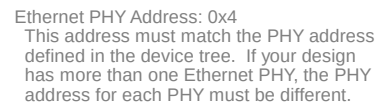


Sheet:	7/12	Rev 4
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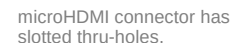
Ethernet



Configuration



I2C Address: 0x70



For the TPD4E05 parts, you can route through the NC pins. These pins are next to the signal pins and connected to reduce DRC errors in layout.

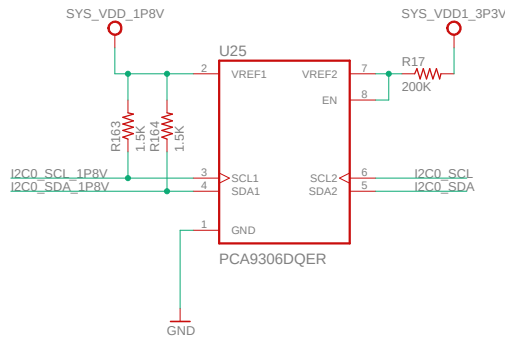
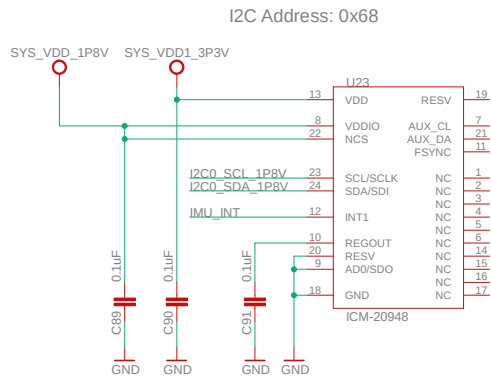


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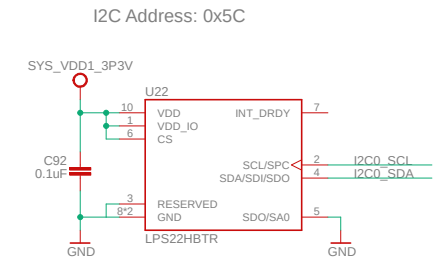
6/30/2021 9:12 AM

Sheet:	9/12	Rev 4
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9-axis IMU

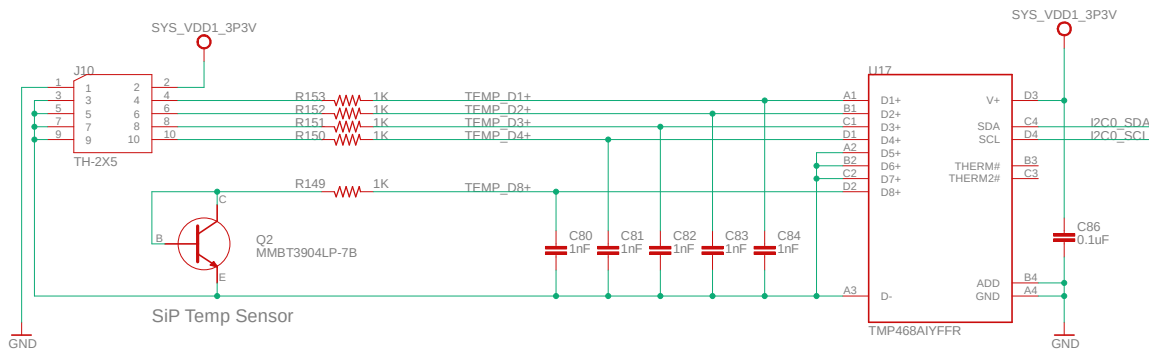


Barometer



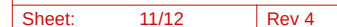
Temperature Sensor + Hub

I2C Address: 0x48



Due to routing constraints, D5+, D6+ and D7+ are not used.

E



Notes

Rev 4:

1) Initial Production Release.

2018/05/14 (schematic only update):

- 1) Added note to calculate capacitance for C7 and C21
- 2) Added complete part number of APX811

2018/11/15 (schematic only update):

- 1) Upated component values to match BOM / remove un-needed tolerances / voltages
- 2) Added notes on I2C0 pull-ups and TPD4S012

2019/03/25 (schematic only update):

- 1) Added notes on USBx_VBUS and eMMC reset
- 2) Added I2C addresses for all I2C components

2021/03/08:

- 1) Updated U23 - replaced IMU-9250 (obsolete) with ICM-20948
- 2) Added U25 for 3.3V <-> 1.8V voltage translation for U23
- 3) Shorted pin 20 of U23 to GND
- 4) R158 pulled up to SYS_VDD1_3P3V
- 5) Updated D8 & D9 - replaced IP4283CZ10 with TPD4E05U06
- 6) eMMC routing updated to be compatible with JEDEC spec v5.x
- 7) Updated Octavo Logo to v2
- 8) Soldermask polygon of U17, U18, U19, U20, U24 updated
- 9) Component values of R8, R157 updated
- 10) U7 & U16 alternate part numbers added under notes in Sch
- 11) 0 ohm jumper (R165) added between VIN_BAT & PMIC_BAT_SENSE
- 12) Eth Phy strapping improved - values of R123, R124 updated, LED_ACT pull up moved to ETH_VDDIO
- 13) Reset Supervisor circuit updated to mitigate PMIC lockup due to VIN Brownout fault.
See Solution3 of <http://www.ti.com/lit/an/slva901/slva901.pdf>
- 14) 2 pin jumper J12 added for DCAN interface. Silkscreen improved
- 15) Barometer U22 updated due to part sourcing issues
- 16) MPN and package names updated
- 17) Silk screen refined
- 18) Added R168 to be used as a bleed resistor in case brownout load switch does not have QOD



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OSD3358-SM-RED Platform

6/30/2021 9:12 AM

Sheet: 12/12 Rev 4