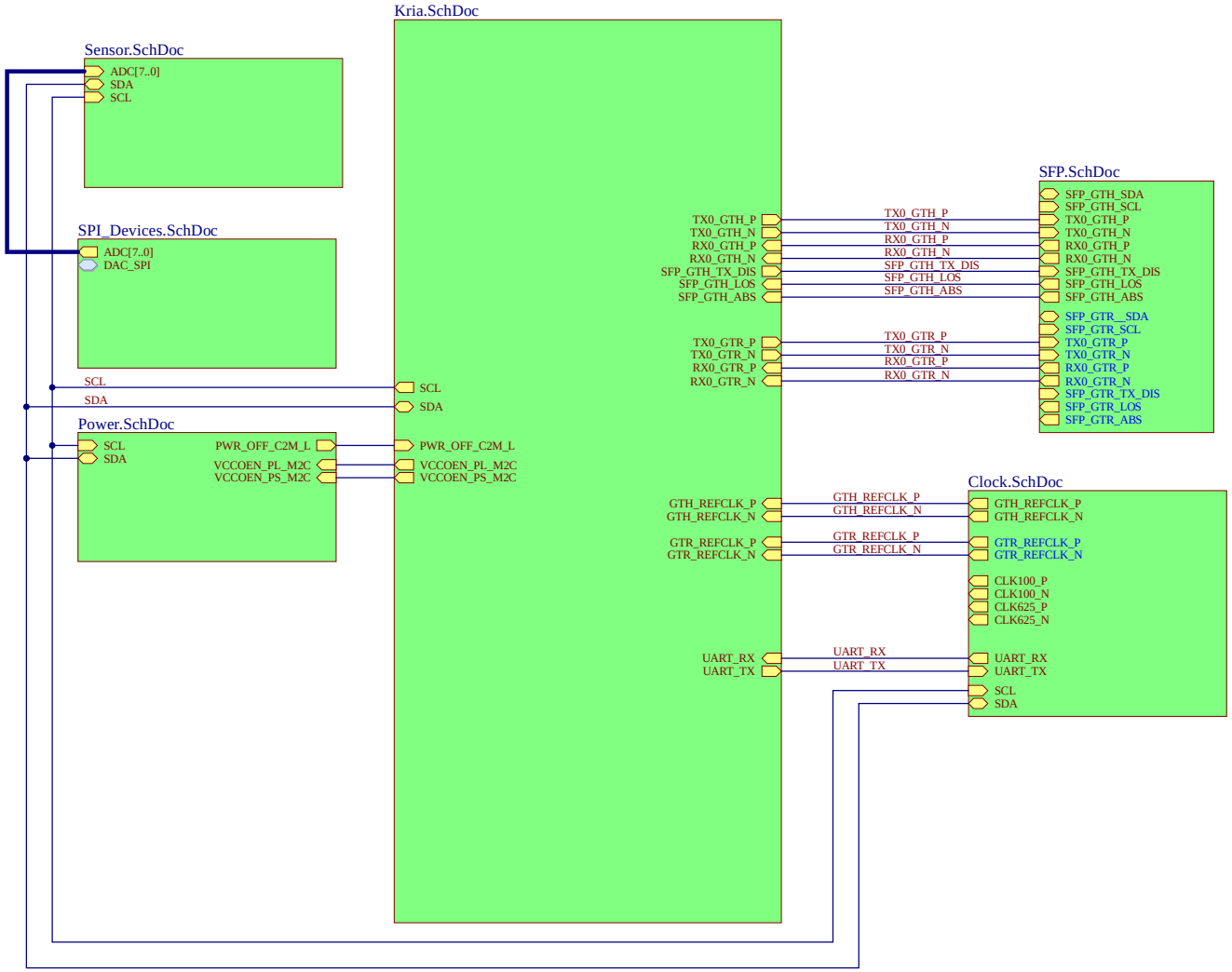

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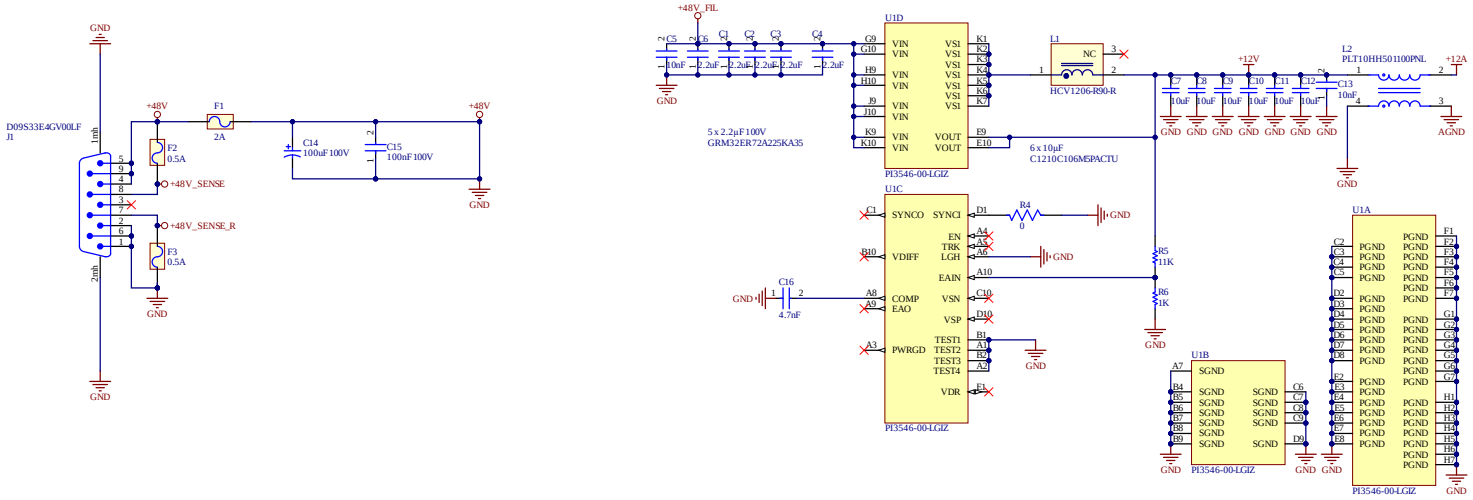
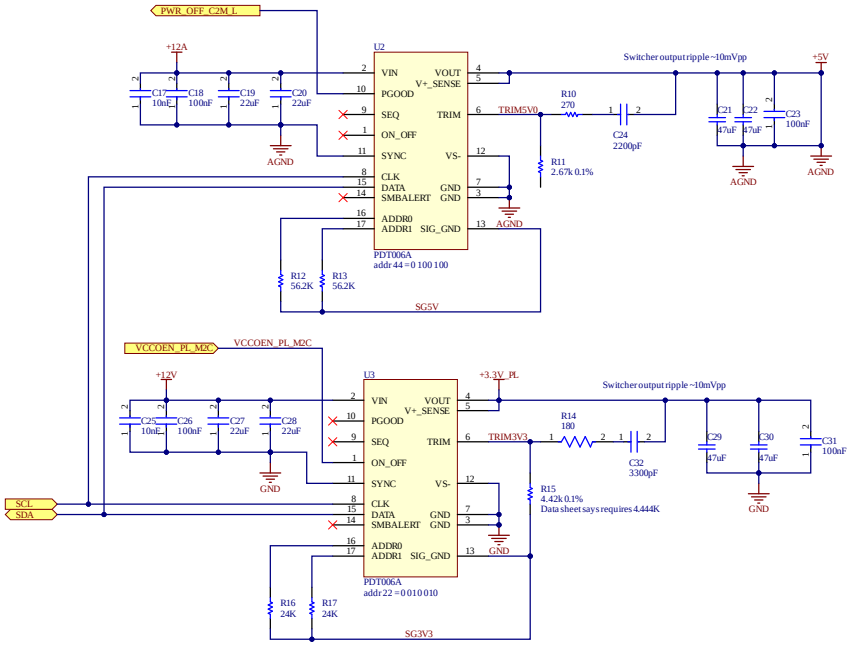
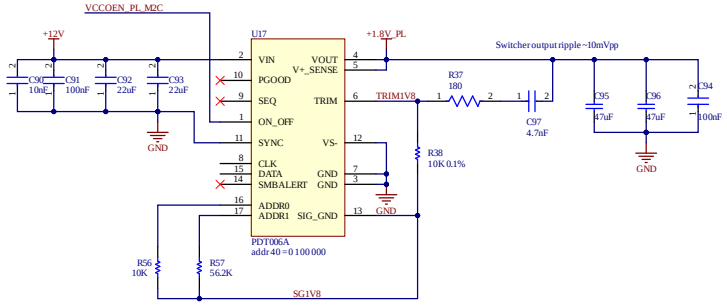
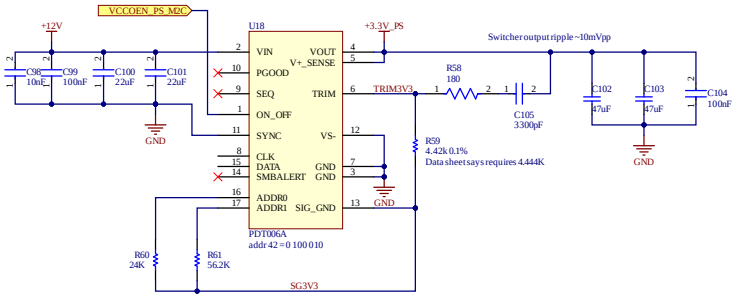
Kria Test Board		**Top Level**			
Date: 12/13/2022 Time: 11:32:18 AM	Sheet 1 of 7	Size B	Rev 0	Drawing Number 177000	
Engineer	M. Marchan				01-Dec-2022
Drawn	T. Deline				01-Dec-2022
Checked	J. Olsen				01-Dec-2022
Approved	T. Shaw, D. Christian				01-Dec-2022



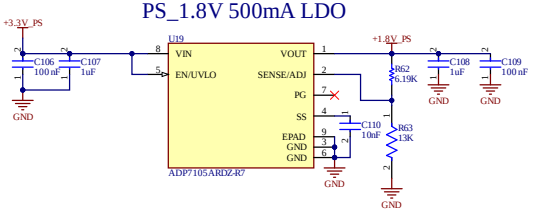
PWROFF_C2M_L is an active-Low signal to power down the SOM and pulled High to the +5V SOM input power rail.







PS_1.8V 500mA LDO



Power sequencing required?
If possible, use regulators with I2C (PMBus) interface and tie it to the Kria
Maybe OK to use LDO to make +1.8V from the +3.3V rail
Do we need any other power rails? +2.5V?

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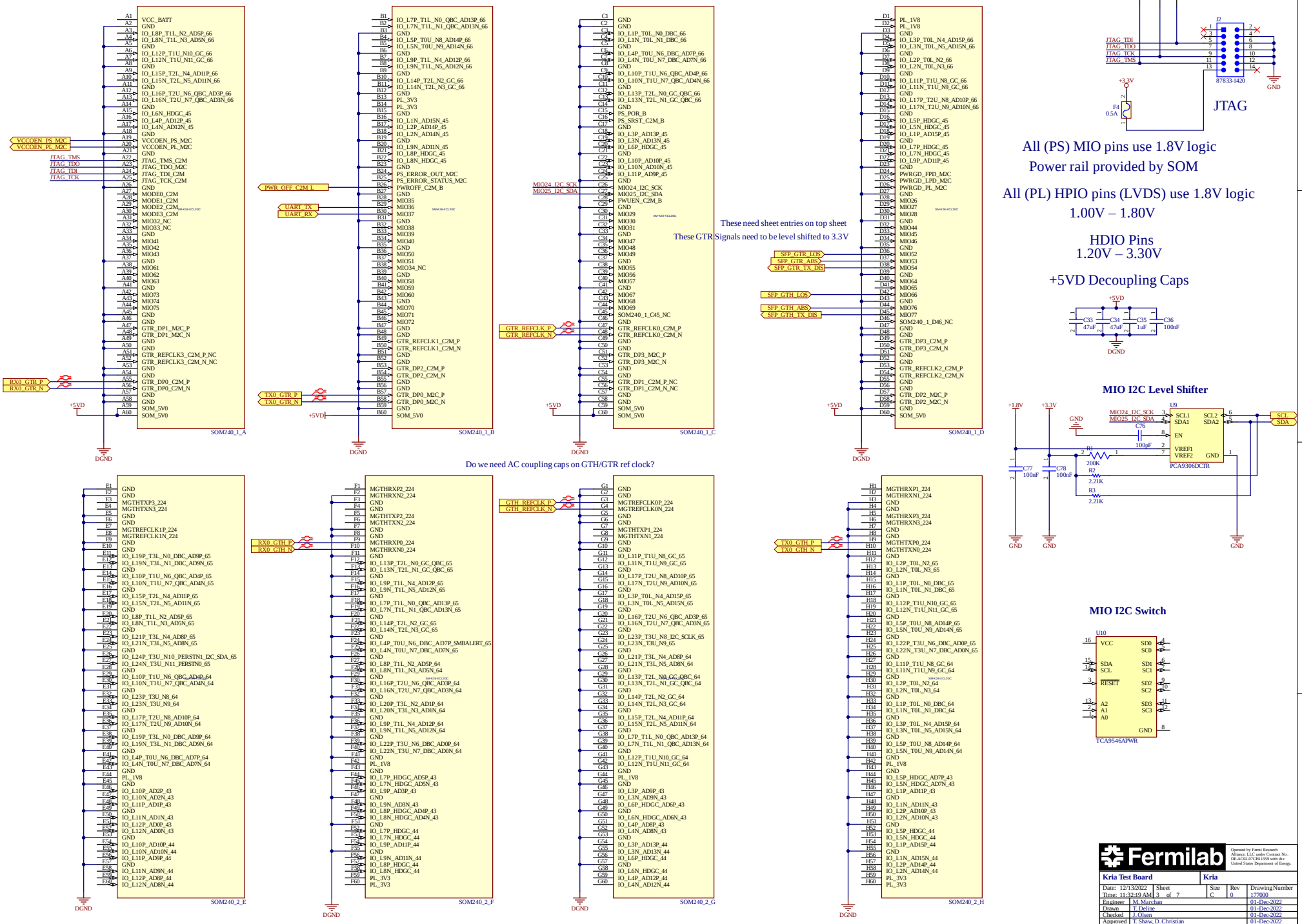
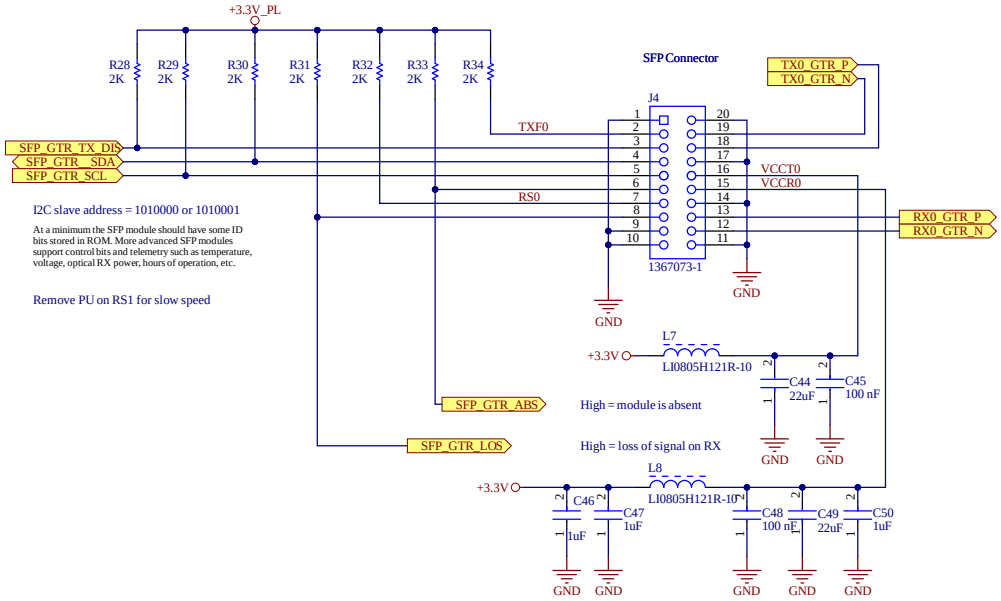
Kria Test Board			Power		
Date: 12/13/2022	Sheet 2 of 7	Size C	Rev 0	Drawing Number 177000	
Time: 11:32:18 AM					
Engineer	M. Marchan			01-Dec-2022	
Drawn	T. Deline			01-Dec-2022	
Checked	J. Olsen			01-Dec-2022	
Approved	T. Shaw, D. Christian			01-Dec-2022	

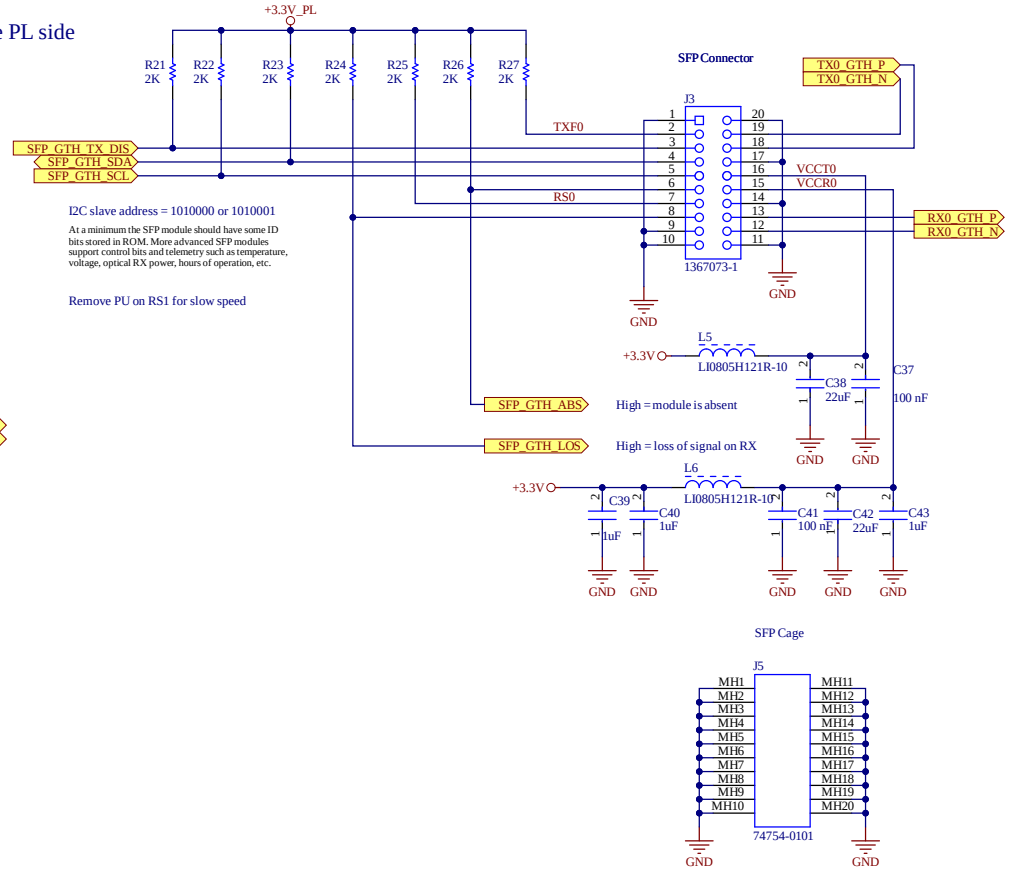

SOM240_1_A
SOM240_1_B
SOM240_1_C
SOM240_1_D
SOM240_2_E
SOM240_2_F
SOM240_2_G
SOM240_2_H
VCCOEN_PS_M2C
VCCOEN_PL_M2C
JTAG_TMS
JTAG_TDO
JTAG_TDI
JTAG_TCK
RX0_GTR_P
RX0_GTR_N
TX0_GTR_P
TX0_GTR_N
PWR_OFF_C2M_L
UART_TX
UART_RX
MIO24_I2C_SCK
MIO25_I2C_SDA
GTR_REFCLK_P
GTR_REFCLK_N
SFP_GTR_LOS
SFP_GTR_ABS
SFP_GTR_TX_DIS
SFP_GTH_LOS
SFP_GTH_ABS
SFP_GTH_TX_DIS
+5VD
DGND
These need sheet entries on top sheet
These GTR Signals need to be level shifted to 3.3V
Do we need AC coupling caps on GTH/GTR ref clock?
+3.3V
JTAG
All (PS) MIO pins use 1.8V logic
Power rail provided by SOM
All (PL) HPIO pins (LVDS) use 1.8V logic
1.00V – 1.80V
HDIO Pins
1.20V – 3.30V
+5VD Decoupling Caps
MIO I2C Level Shifter
PCA9306DCTR
MIO I2C Switch
TCA9546APWR
Fermilab
Kria Test Board
Kria
Date: 12/13/2022
Time: 11:32:19 AM
Sheet 3 of 7
Size C
Rev 0
Drawing Number 177000
Engineer M. Marchan 01-Dec-2022
Drawn T. Deline 01-Dec-2022
Checked J. Olsen 01-Dec-2022
Approved T. Shaw, D. Christian 01-Dec-2022

If we want to keep the PL and PS sides seperate we will need seperate I2C bus on the PS side and on the PL side



GTR (PS) SFP

1 Gb Ethernet Slow Controls



GTH (PL) SFP

10 Gb Ethernet or DAQ link
up to 10 Gbps

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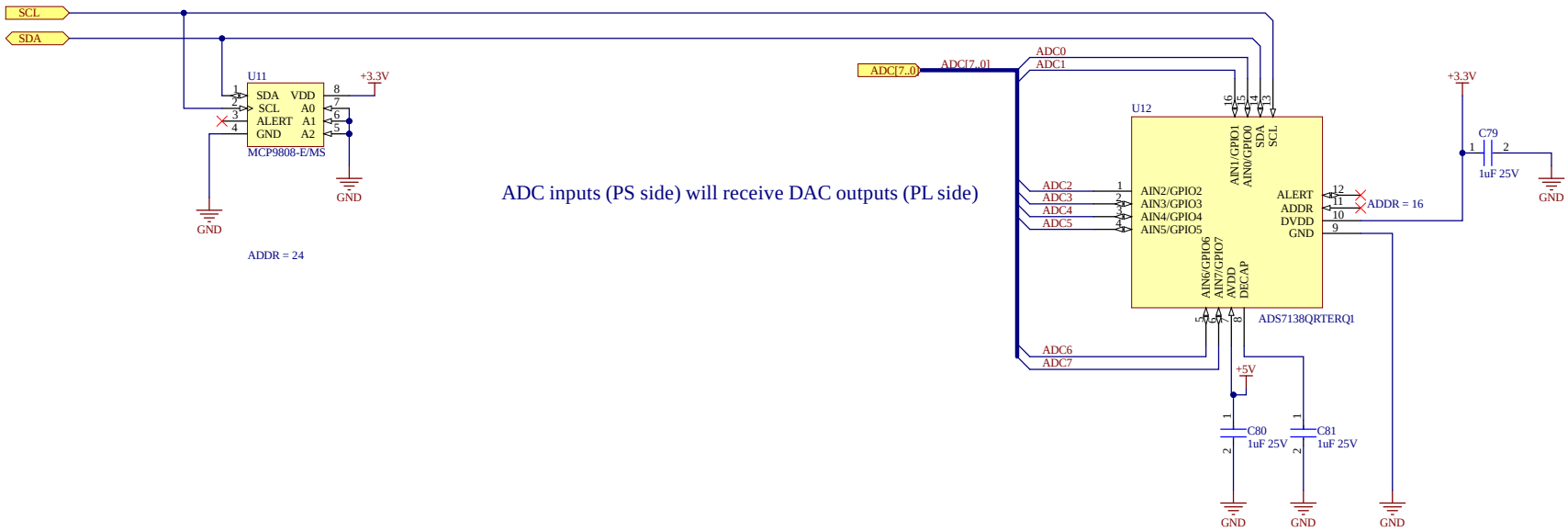
Kria Test Board				SFP	
Date: 12/13/2022 Time: 11:32:20 AM	Sheet 4 of 7	Size B	Rev 0	Drawing Number 177000	
Engineer	M. Marchan				01-Dec-2022
Drawn	T. Deline				01-Dec-2022
Checked	J. Olsen				01-Dec-2022
Approved	T. Shaw, D. Christian				01-Dec-2022

I2C Temperature Sensor

I2C 8 channel ADC



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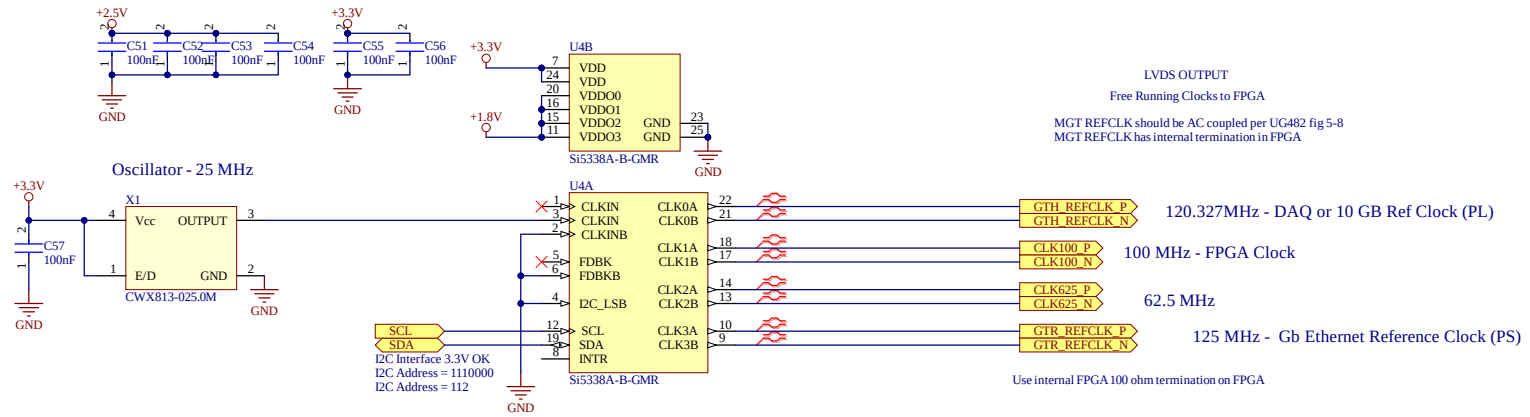
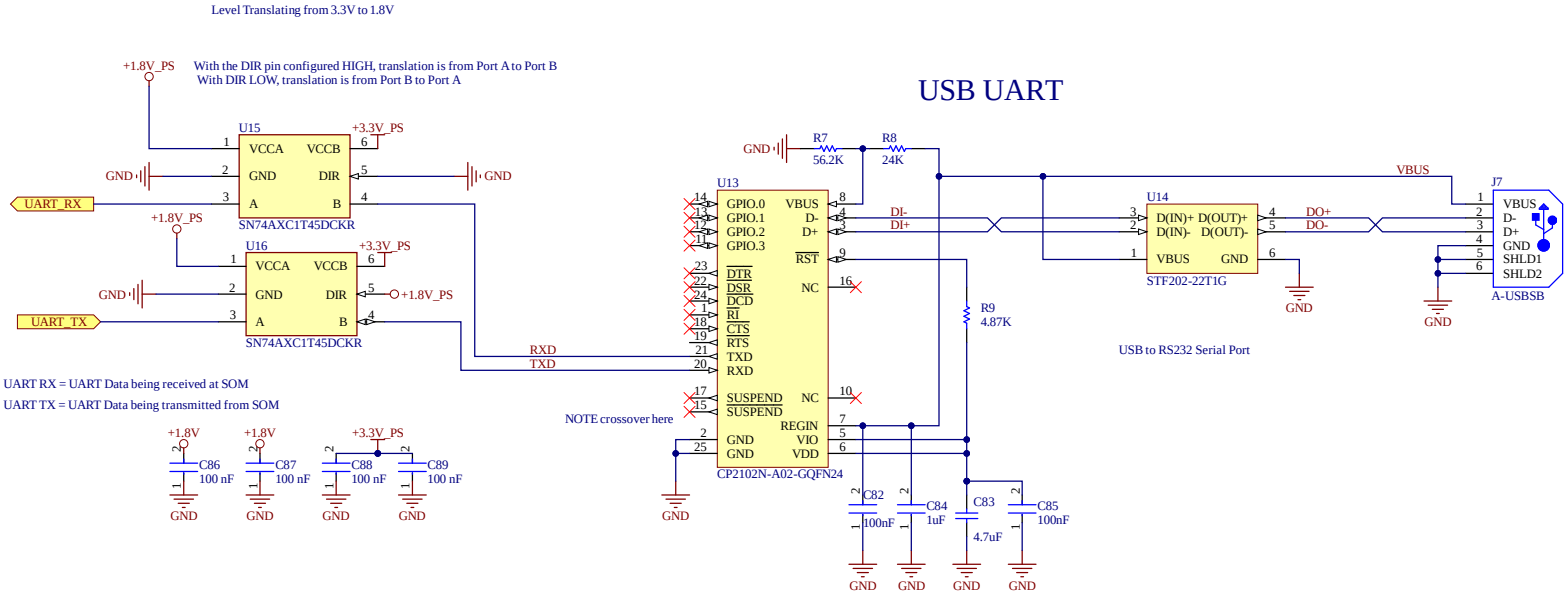
Kria Test Board				**Sensor**	
Date: 12/13/2022 Time: 11:32:21 AM	Sheet 5 of 7	Size B	Rev 0	Drawing Number 177000	
Engineer	M. Marchan				01-Dec-2022
Drawn	T. Deline				01-Dec-2022
Checked	J. Olsen				01-Dec-2022
Approved	T. Shaw, D. Christian				01-Dec-2022

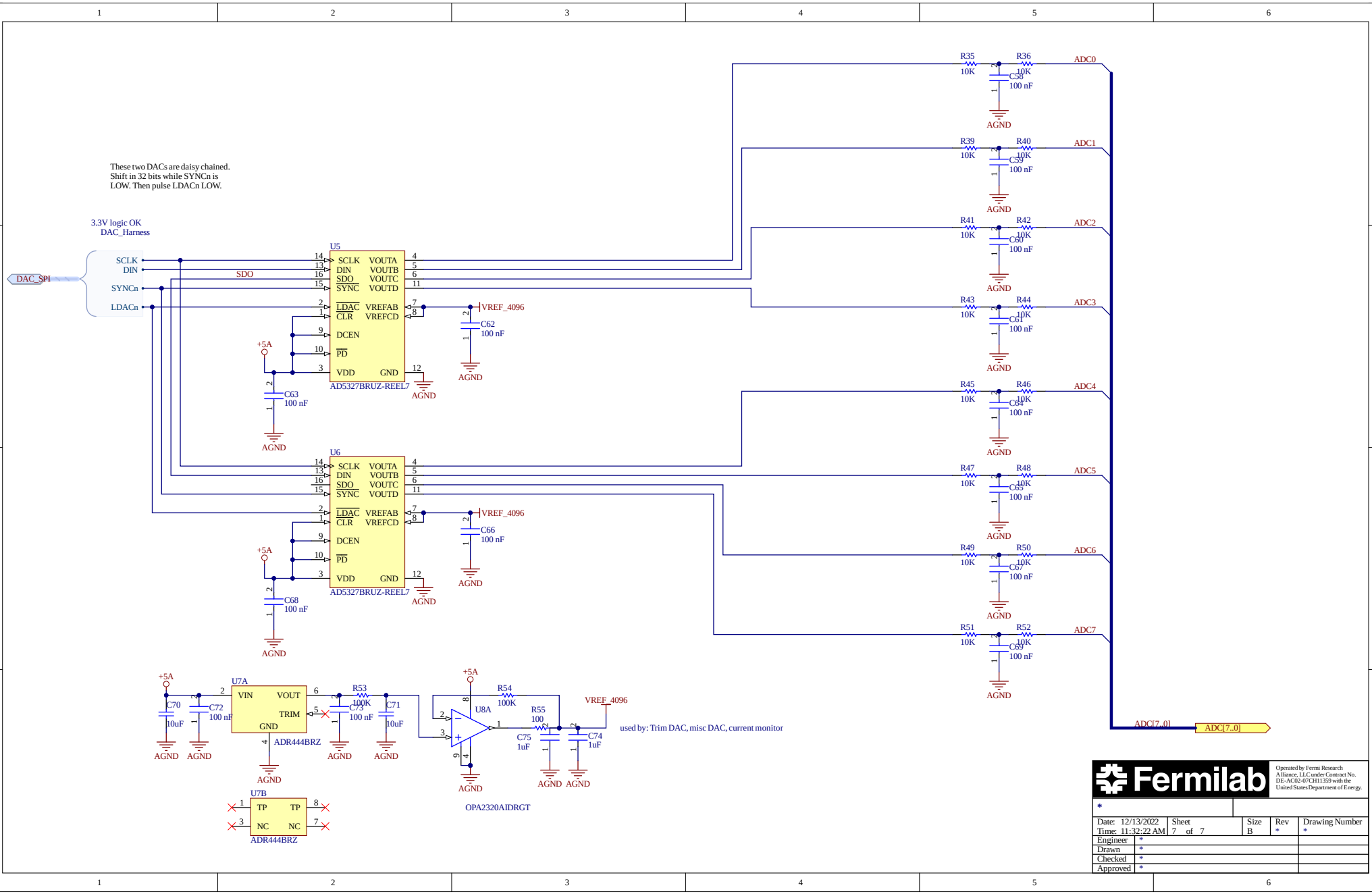


Clock Generator Chip



USB UART

Fermilab	Operated by Fermi Research Alliance, LLC under Contract No. DE-AC02-07CH11359 with the United States Department of Energy.				
Kria Test Board		**Clocks**			
Date: 12/13/2022 Time: 11:32:21 AM	Sheet 6 of 7	Size B	Rev 0	Drawing Number 177000	
Engineer	M. Marchan			01-Dec-2022	
Drawn	T. Deline			01-Dec-2022	
Checked	J. Olsen			01-Dec-2022	
Approved	T. Shaw, D. Christian			01-Dec-2022	


These two DACs are daisy chained.
Shift in 32 bits while SYNCn is
LOW. Then pulse LDACn LOW.
3.3V logic OK
DAC_Harness
DAC_SPI
SCLK
DIN
SYNCn
LDACn
SDO
U5
U6
SCLK
DIN
SDO
SYNC
LDAC
CLR
DCEN
PD
VDD
GND
VOUTA
VOUTB
VOUTC
VOUTD
VREFAB
VREFCD
AD5327BRUZ-REEL7
VREF_4096
+5A
AGND
C62 100 nF
C63 100 nF
C66 100 nF
C68 100 nF
R35 10K
R36 10K
C58 100 nF
R39 10K
R40 10K
C59 100 nF
R41 10K
R42 10K
C60 100 nF
R43 10K
R44 10K
C61 100 nF
R45 10K
R46 10K
C64 100 nF
R47 10K
R48 10K
C65 100 nF
R49 10K
R50 10K
C67 100 nF
R51 10K
R52 10K
C69 100 nF
ADC0
ADC1
ADC2
ADC3
ADC4
ADC5
ADC6
ADC7
ADC[7..0]
U7A
VIN
VOUT
TRIM
GND
ADR444BRZ
C70 10uF
C72 100 nF
C73 100 nF
C71 10uF
R53 100K
U7B
TP
NC
ADR444BRZ
U8A
R54 100K
R55 100
C75 1uF
C74 1uF
OPA2320AIDRGT
used by: Trim DAC, misc DAC, current monitor
Fermilab
Operated by Fermi Research Alliance, LLC under Contract No. DE-AC02-07CH11359 with the United States Department of Energy.
Date: 12/13/2022
Time: 11:32:22 AM
Sheet 7 of 7
Size B
Rev *
Drawing Number *
Engineer *
Drawn *
Checked *
Approved *

Line #	Name	Description	Designator	Quantity	Manufacturer 1	Manufacturer Part Number 1	Manufacturer Lifecycle 1	Supplier 1	Supplier Part Number 1	Supplier Unit Price 1	Supplier Subtotal 1
	270		R10	1							
	11K	11k 1% 0603	R5	1							
	100nF	04022D104KAT2A CAP CER 0.1UF 10V X5R 0402	C18, C23, C26, C31, C36, C51, C52, C53, C54, C55, C56, C91, C94, C99, C104	15							
	100pF	06032C101KAT2A	C76	1							
	10nF	06033C103KAT2A CAP CER 10nF 25V X7R 0603	C5, C13, C17, C25, C90, C98, C110	7							
	100uF 100V	Aluminum Electrolytic Capacitor, 100 uF, +/- 20%, 100 V, -40 to 85 degC, 2-Pin THD, RoHS, Bulk	C14	1							
	ADS7138 QRTERQ1	Automotive, 8-channel, 140-kSPS, 12-bit analog-to-digital converter (ADC) with I2C, GPIOs and CRC 16-WQFN -40 to 125	U12	1							
	4.7nF	C0603C472K5RACTU CAP 4.7nF 50V ±10% 0603 (1608 Metric) Thickness 1mm SMD	C16, C97	2							
	10uF	C1210C106M5PACTU Cap Ceramic 10uF 50V X5R 20% Pad SMD 1210 85C T/R	C7, C8, C9, C10, C11, C12	6							
	4.7uF	C2012X7R1A475K085AC CAP, MLCC, X7R, 4.7UF, 10V, 0805	C83	1							
	1uF	CAP CER 1UF 6.3V X5R 0603, GRM188R60J105KA01D CAP CER 1UF 6.3V X5R 0603	C39, C40, C43, C46, C47, C50, C74, C75, C84, C107, C108	11							
	2200pF	CAP CER 2200PF 50V X7R 0603	C24	1							
	3300pF	CAP CER 3300PF 50V X7R 0603	C32, C105	2							
	UI0805H121R-10	Chip Bead, 100 MHz, 800 mA, -40 to 125 degC, 2-Pin SMD (0805), RoHS, Tape and Reel	L5, L6, L7, L8	4							
	D09S33E4GV00LF	CONN D-SUB RCPT 9POS R/A SOLDER	J1	1							
	A-USBSB	Connector Receptacle, USB Type B, Right Angle, -20 to 85 degC, 4-Pin THD, RoHS, Tray	J7	1							
	PI3546-00-LGIZ	DC DC CONVERTER 12V	U1	1							
	PCA9306DCTR	Dual Bi-Directional I2C-Bus and SMBus Voltage Level-Translator, 0 to 5.5V, -40 to 85 degC, 8-pin SM8 (DCT), Green (RoHS & no Sb/Br)	U9	1							
	4.42k 0.1%	ERA3AEB4421V 4.42 kOhms ±0.1% 0.1W, 1/10W Chip Resistor 0603	R15, R59	2							
	10K 0.1%	ERA-3AEB103V RES SMD 10K OHM 0.1% 1/10W 0603	R38	1							
	2.67k 0.1%	ERA-3AEB2671V RES SMD 2.67KOHM 0.1% 1/10W 0603	R11	1							
	100	ERJ3EKF1000V Checked RES SMD 100 OHM 1% 1/10W 0603 Chip SMD Resistors 0.00475	R55	1							
	1K	ERJ-3EKF1001V 1K Ohm 1% 1/10W	R6	1							
	10K	ERJ-3EKF1002V THICK FILM CHIP RES, 0603, 1%,	R18, R19, R20, R35, R36, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R56	20							
	100K	ERJ-3EKF1003V 0603 100K Ohm 1% 0.1W	R53, R54	2							
	13K	ERJ-3EKF1302V RES SMD 13K OHM 1% 1/10W 0603	R63	1							
	2K	ERJ-3EKF2001V RES SMD 2K OHM 1% 1/10W 0603 Chip SMD	R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34	14							
	200K	ERJ-3EKF2003V RES SMD 200K OHM 1% 1/10W 0603	R1	1							
	2.21K	ERJ-3EKF2211V Thick Film Resistors - SMD 0603 2.21Kohms 1% AEC-Q200	R2, R3	2							
	24K	ERJ-3EKF2402V RES SMD 24K OHM 1% 1/10W 0603	R8, R16, R17, R60	4							
	4.87K	ERJ-3EKF4871V Res Thick Film 0603 4.87K Ohm 1% 1/10W	R9	1							
	56.2K	ERJ-3EKF5622V RES SMD 56.2K OHM 1% 1/10W 0603	R7, R12, R13, R57, R61	5							
	6.19K	ERJ-3EKF6191V 6.19 kOhms ±1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric) Automotive AEC-Q200 Thick Film	R62	1							
	0	ERJ-3GEY0R00V 0 ohm	R4	1							
	1367073-1	Female Connector, Pitch 0.8 mm, 2 x 10 Position, Height 5.4 mm, -55 to 85 degC, RoHS, Tape and Reel	J3, J4	2							
	100 nF, 100nF	GCJ188R71C104KA01D CAP CER 0.1UF 16V X7R 0603	C37, C41, C45, C48, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C72, C73, C77, C78, C82, C85, C86, C87, C88, C89, C106, C109	29							
	1uF 25V	GCM188R71E105KA64D Ceramic Capacitor for Automotive 1uF ±10% 25VDC X7R 0603 Paper T/R	C79, C80, C81	3							
	22uF	GRM21BR60J226ME39L CAP CER 22UF 6.3V X5R 0805	C38, C42, C44, C49	4							
	47uF	GRM21BR61A476ME15K Chip Multilayer Ceramic Capacitors for General Purpose, 0805, 47uF, X5R, 15%, 20%, 10V	C33, C34	2							
	47uF	GRM32ER70J476ME20L 47uF 1210 6.3Volts X7R 20%	C21, C22, C29, C30, C95, C96, C102, C103	8							
	22uF	GRM32ER71E226KE15L CAP CER 22UF 25V X7R 1210	C19, C20, C27, C28, C92, C93, C100, C101	8							
	2.2uF	GRM32ER72A225KA35L Chip Capacitor, 2.2 uF, +/- 10%, 100 V, -55 to 125 degC, 1210 (3225 Metric), RoHS, Tape and Reel	C1, C2, C3, C4, C6	5							
	1uF	GRM155R61A105KE15D CAP CER 1UF 10V X5R 0402	C35	1							
	100nF 100V	GRM188R72A104MA35D CAP CER 0.1UF 100V X7R 0603	C15	1							
	TCA9546APWR	IC I2C SW 4CH W/RESET 16TSSOP	U10	1							
	ADP7105ARDZ-R7	IC REG LIN POS ADJ 500MA 8SOIC	U19	1							
	PLT10HH501100PNL	Ind Common Mode Choke Wirewound 9uH 500Ω @ 10MHz 10A Embossed T/R	L2	1							
	HCV1206-R90-R	Inductor Power Wirewound 900nH 10% 100KHz Ferrite 14A 4.6mOhm DCR T/R	L1	1							
	0.5A	Littelfuse Omni-Block SMT fuse 0.5A Fast	F2, F3, F4	3							
	2A	Littelfuse Omni-Block SMT fuse 2A	F1	1							
	87833-1420	Male Header, Pitch 2 mm, 2 x 7 Position, Height 6.4 mm, -55 to 105 degC, RoHS, Rail/Tube	J2	1							
	CWX813-025.0M	OSC XO 25.000MHZ LVCMOS SMD	X1	1							
	SI5338A-B-GMR	PLL Clock Generator Single 0.16MHz to 710MHz 24-Pin QFN T/R	U4	1							
	OPA2320AIDRGT	Precision, 20 MHz, 0.9 pA Ib, RRIO, CMOS Operational Amplifier, 1.8 to 5.5V, -40 to 125 degC, 8-pin SON (DRG8), Green (RoHS & no Sb/Br)	U8	1							
	AD5327BRUZ-REEL7	Quad 12-Bit Voltage Output Digital-to-Analog Converter, 2.5 to 5.5V, 400 uA, -40 to +105 degC, RU-16, Pb-Free, Reel	U5, U6	2							
	PDT006A	Regulator switching DLynx 6A	U2, U3, U17, U18	4							
	180	RES SMD 180 OHM 1% 1/10W 0603	R14, R37, R58	3							
	74754-0101	SFP+ Cage, Single Port, Height 10.85 mm, Tail Height 3.05 mm, -40 to 85 degC, RoHS, Tray	J5, J6	2							
	SN74AXC1T45DCKR	Single-bit dual-supply bus transceiver 6-SC70 -40 to 125	U15, U16	2							
	CP2102N-A02-GQFN24	Single-Chip USB to UART Bridge, 4 Dig I/O Pins, Internal Oscillator, 1024 Bytes EEPROM, -40 to 85 degC, 24-pin QFN	U13	1							
	SM-K26-XCL2GC	System-On-Module, Zynq Ultrascale+Mpsoc Rohs Compliant: Yes	UA1	1							
	MCP9808-E/MS	Temp Sensor Digital Serial (2-Wire, I2C, SMBus) Automotive 8-Pin MSOP Tube	U11	1							
	ADR444BRZ	Ultralow Noise, LDO XFET Voltage Reference with Current Sink and Source, 4.096 V Output, 4.6 to 18 V Supply, Industrial, 8-pin SOIC (R-8), Tube	U7	1							
	STF202-22T1G	USB Filter with ESD Protection, -55 to 125 degC, 6-Pin TSOP, Pb-Free, Tape and Reel	U14	1							
	10uF	ZRB18AC81A106KE01L 10uF, 10 V, 0603 ± 10%, X6S	C70, C71	2							