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Title <b>Starboard</b>			University of Alberta Department of Electrical and Computer Engineering Edmonton AB, Canada T6G 1H9
Size: Letter	Number: 1	Revision: *	
Date: 6/27/2020	Time: 8:09:18 PM	Sheet 1 of 8	
File: C:\Users\nicho\AlbertaSat\projects\Hyperion Solar Panels\Starboard\Starboard.SchDoc			UNIVERSITY OF ALBERTA EDMONTON-ALBERTA-CANADA

A

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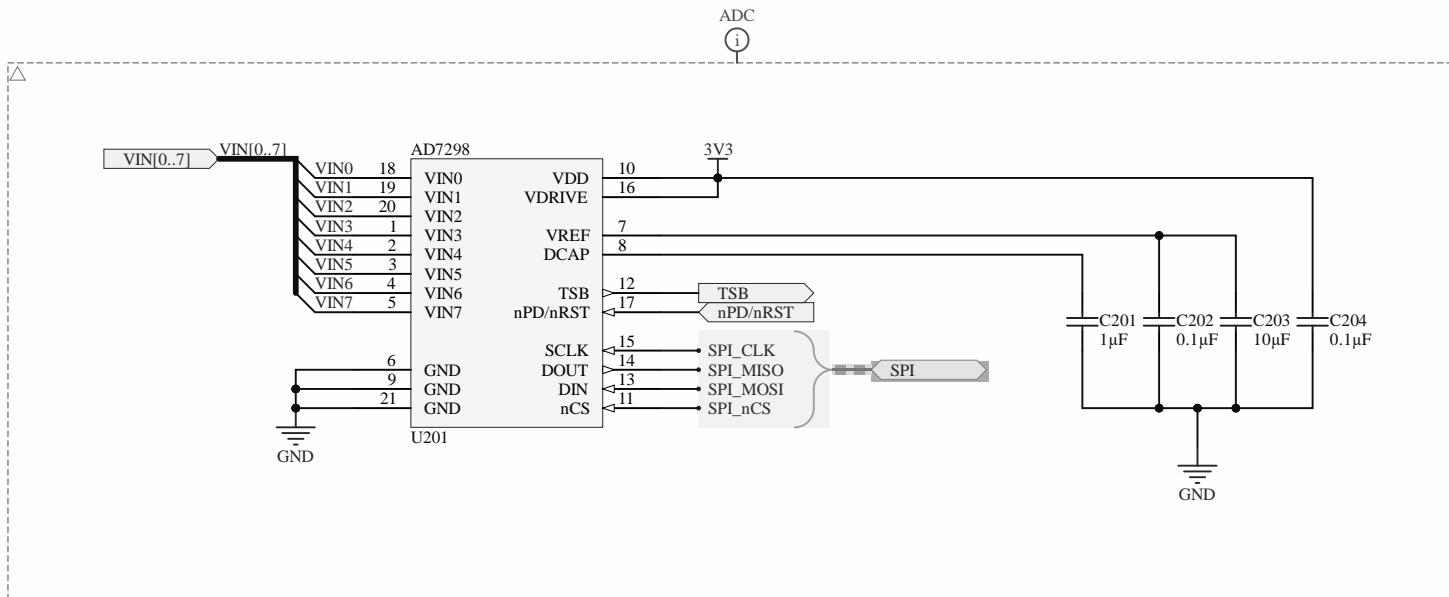
B

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C

D

D



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Title **AD7298 12-Bit SPI ADC**

Size: Letter	Number: 2	Revision: *
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Date: 6/27/2020 Time: 8:09:18 PM Sheet 2 of 7

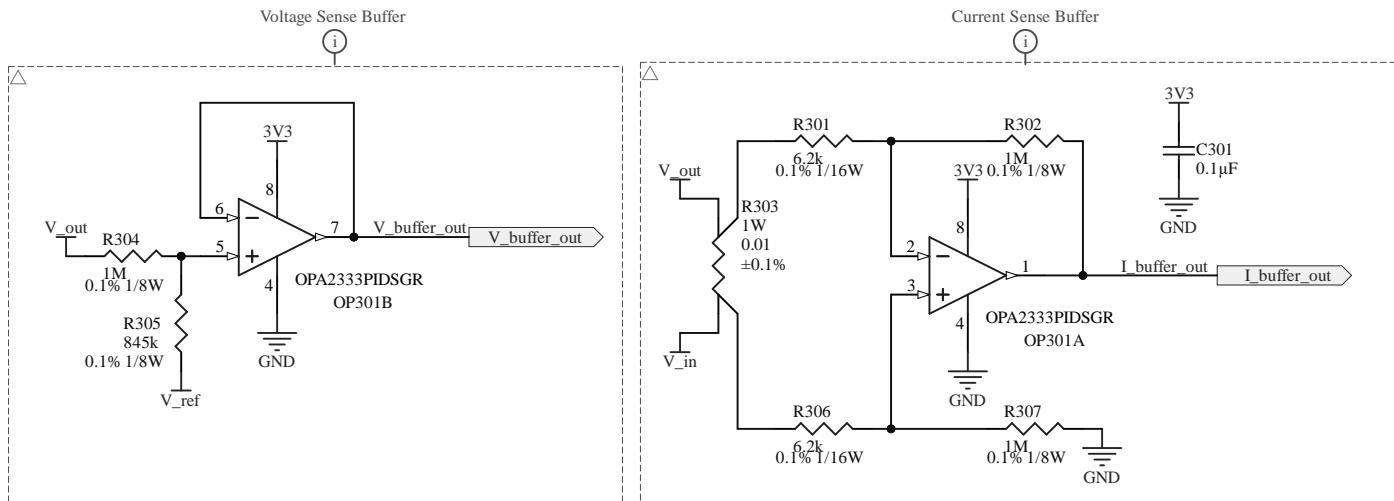
File: C:\Users\nicho\AlbertaSat\libraries\Schematic Sheets\AD7298 12-Bit SPI ADC.SchDoc

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Department of Electrical  
and Computer Engineering  
Edmonton AB, Canada  
T6G 1H9

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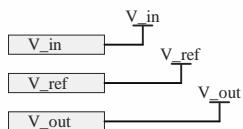
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#### Voltage Sense Buffer:

$$\begin{aligned} V_{\text{buffer\_out}} &= V_{\text{out}} * \left( \frac{R305 + R304}{R305} \right) \\ &= 0.458 V_{\text{out}} \\ &\leq 2.49 \text{ V} \end{aligned}$$

#### Current Sense Buffer:

$$\begin{aligned} V_{\text{sense}} &= V_{\text{in}} - V_{\text{out}} \\ &= I^* R303 \\ &\leq 1.5 \text{ A} * 0.01 \text{ Ohm} \\ &\leq 0.015 \text{ V} \\ G_{\text{diff}} &= R304 / R301 \\ &= 1 \text{ M} / 6.2 \text{ k} = 161 \\ G_{\text{cm}} &= 0 \\ I_{\text{buffer\_out}} &\leq 2.415 \text{ V} \end{aligned}$$

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Title <i>Current_Voltage_Sensor</i>			University of Alberta Department of Electrical and Computer Engineering Edmonton AB, Canada T6G 1H9
Size: Letter	Number: 3	Revision: *	UNIVERSITY OF ALBERTA EDMONTON-ALBERTA-CANADA
Date: 6/27/2020	Time: 8:09:18 PM	Sheet 3 of 8	
File: C:\Users\nicho\AlbertaSat\libraries\Schematic Sheets\Current_Voltage_Sensor.SchDoc			

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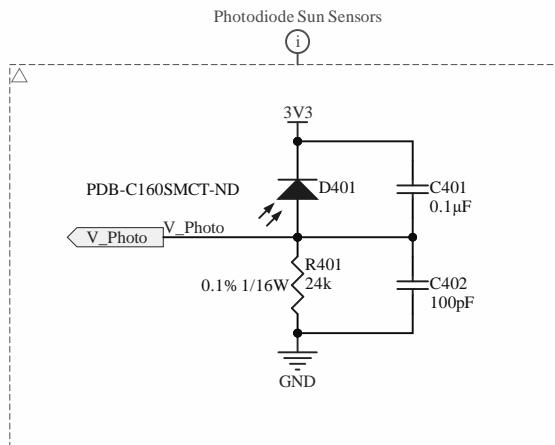
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**Photodiode:**

$$I_{sc} = 80\mu A; I_{dark} = 2nA \rightarrow I_{illum} < 100\mu A$$

$$V_{photo} = I_{illum} R \leq 2.5 V \rightarrow R \geq 25k\Omega$$

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Title <b>Photodiode_Sun_Sensor</b>			University of Alberta Department of Electrical and Computer Engineering Edmonton AB, Canada T6G 1H9
Size: Letter	Number:4	Revision:*	UNIVERSITY OF ALBERTA EDMONTON-ALBERTA-CANADA
Date: 6/27/2020	Time: 8:09:18 PM	Sheet 4 of 7	
File: C:\Users\nicho\AlbertaSat\libraries\Schematic Sheets\Photodiode_Sun_Sensor.SchDoc			

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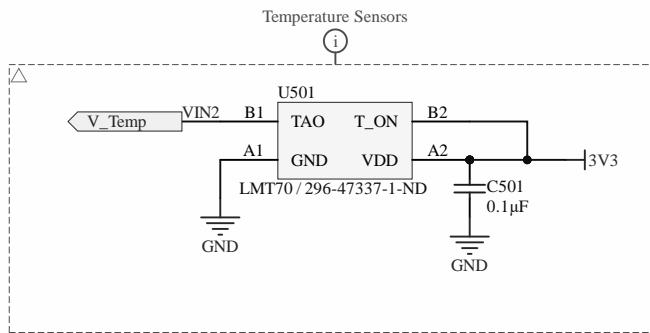
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Title <b>Temp_Sensor</b>			<i>University of Alberta Department of Electrical and Computer Engineering Edmonton AB, Canada T6G 1H9</i>
Size: Letter	Number: 5	Revision: *	
Date: 6/27/2020	Time: 8:09:18 PM	Sheet 5 of 7	
File: C:\Users\nicho\AlbertaSat\libraries\Schematic Sheets\Temp_Sensor.SchDoc			<b>UNIVERSITY OF ALBERTA</b> EDMONTON·ALBERTA·CANADA

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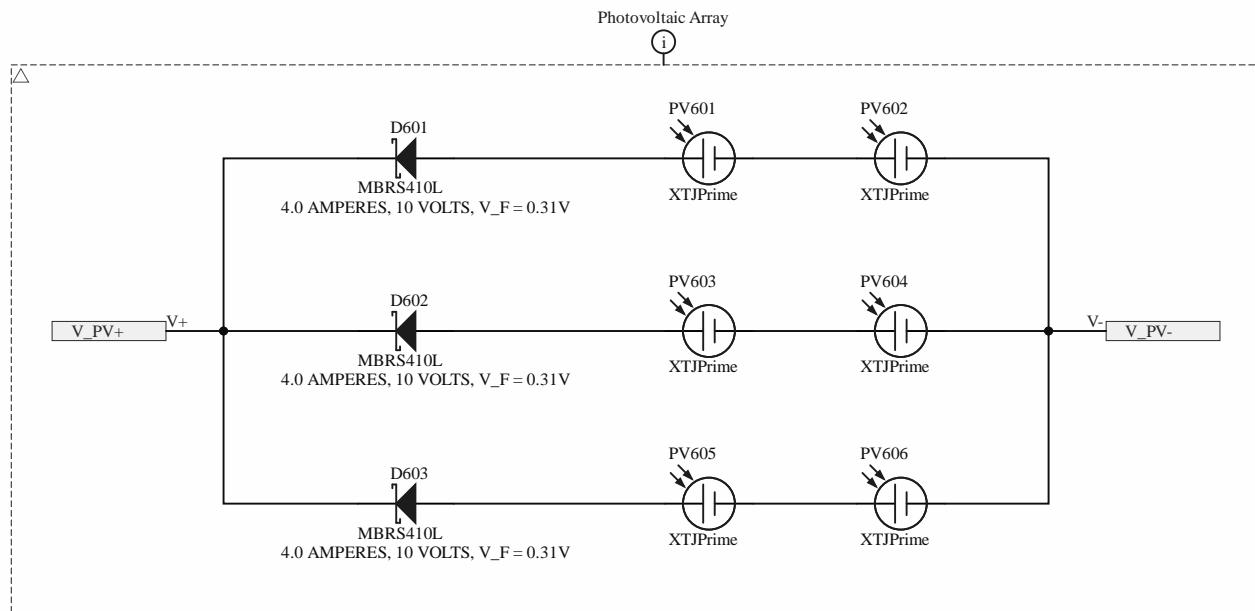
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Title **XTJ-Prime\_2S2P**

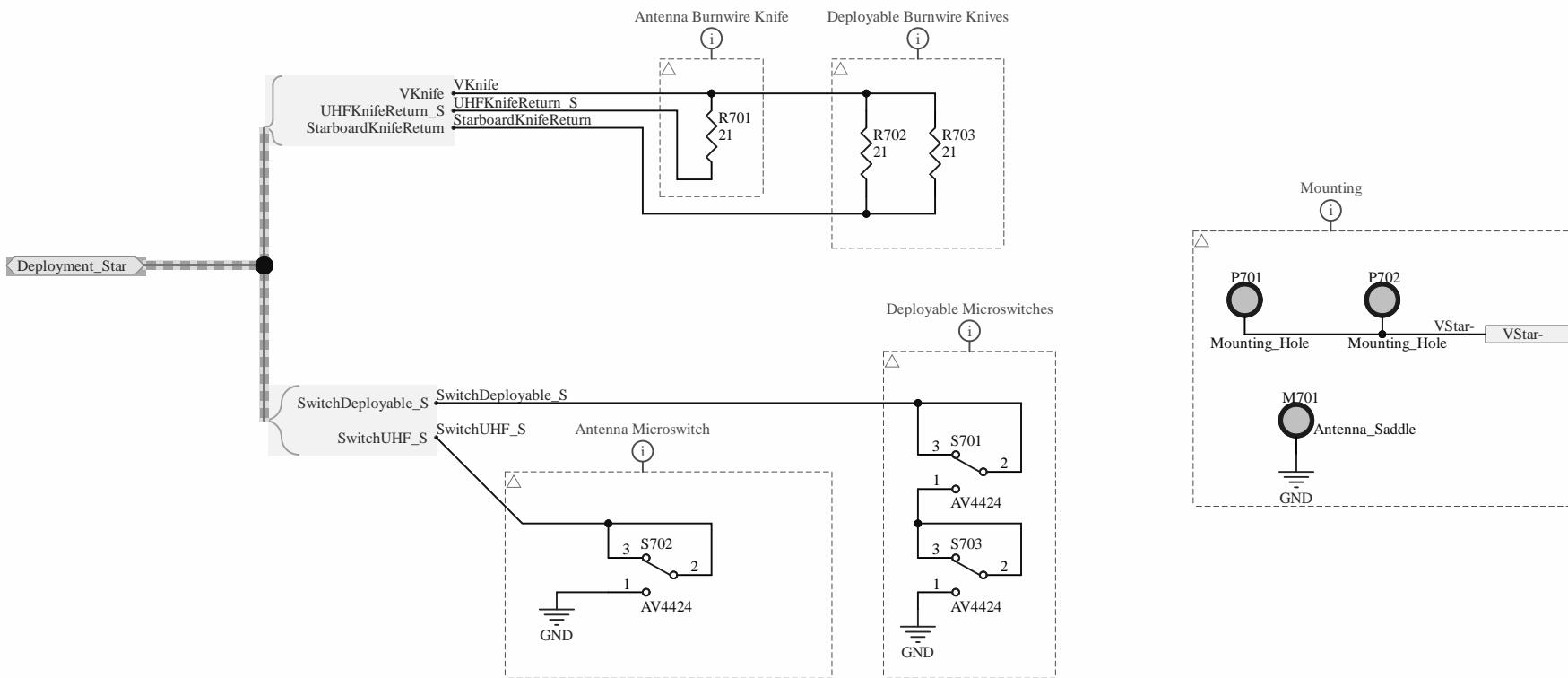
Size: Letter	Number: 6	Revision: *
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Date: 6/27/2020 Time: 8:09:18 PM Sheet 6 of 8

File: C:\Users\nicho\AlbertaSat\libraries\Schematic Sheets\XTJ-Prime\_2S1P.SchDoc

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Department of Electrical  
and Computer Engineering  
Edmonton AB, Canada  
T6G 1H9

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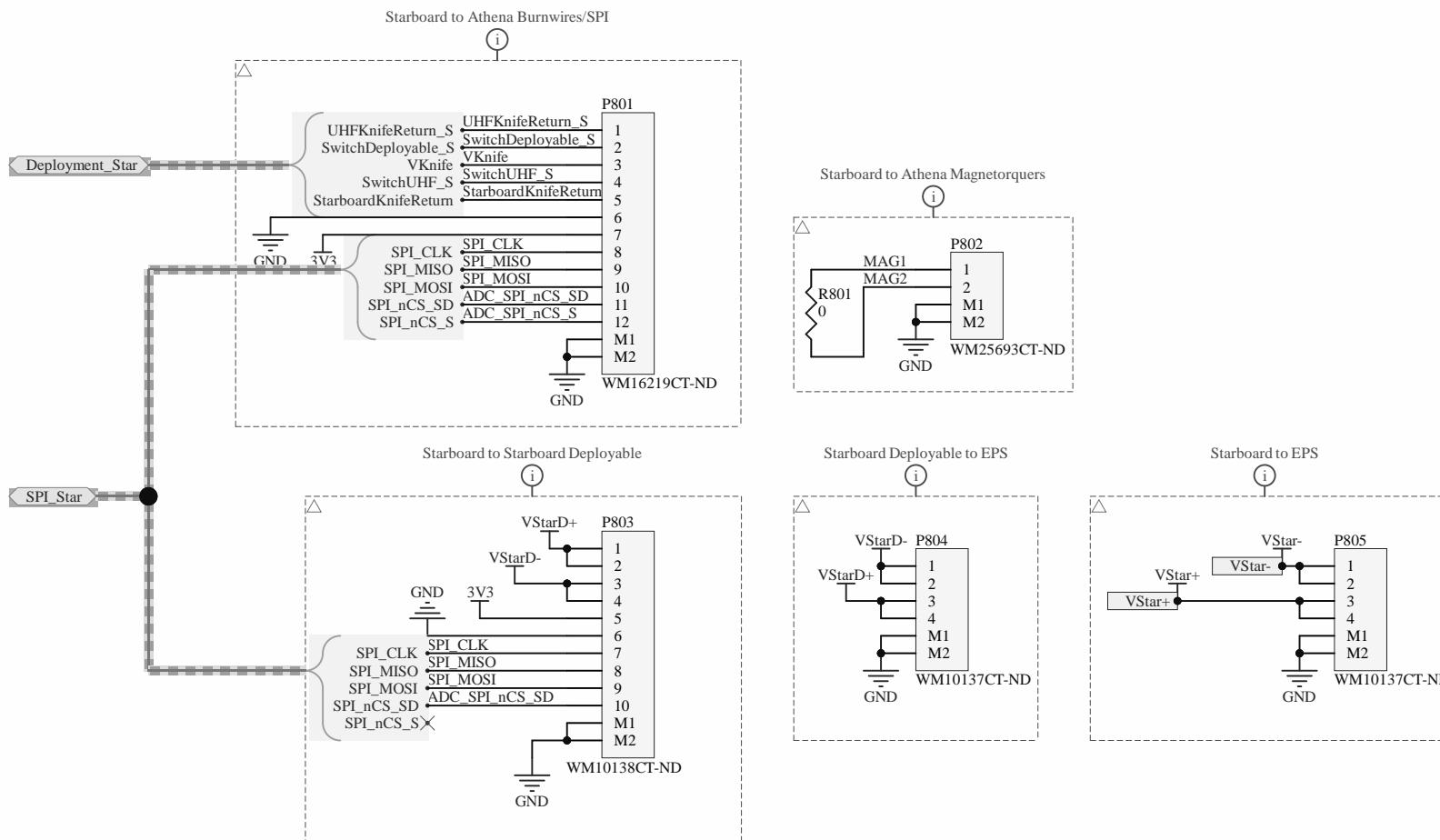


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Title <b>Mech_Interface_Starboard</b>			<b>University of Alberta Department of Electrical and Computer Engineering Edmonton AB, Canada T6G 1H9</b>
Size: Letter	Number: 7	Revision: *	
Date: 6/27/2020	Time: 8:09:18 PM	Sheet 7 of 8	
File: C:\Users\nicho\AlbertaSat\projects\Hyperion Solar Panels\Starboard\Mech_Interface_Starboard.SchDoc			<b>UNIVERSITY OF ALBERTA EDMONTON-ALBERTA-CANADA</b>

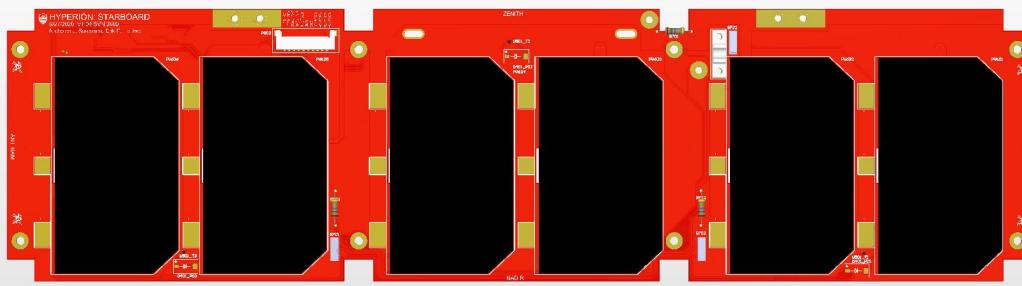
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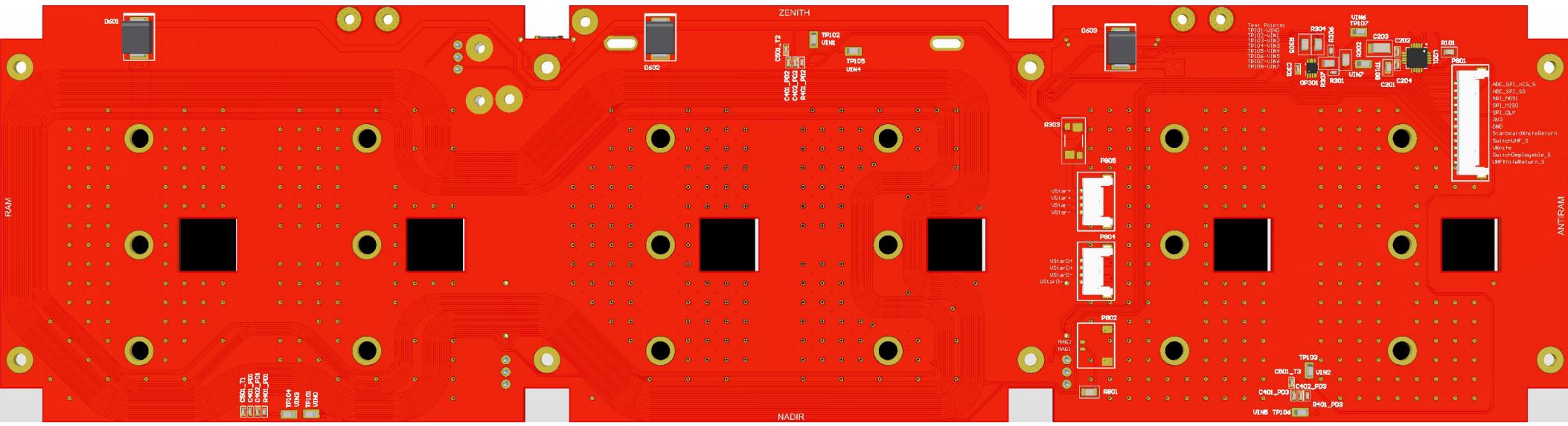


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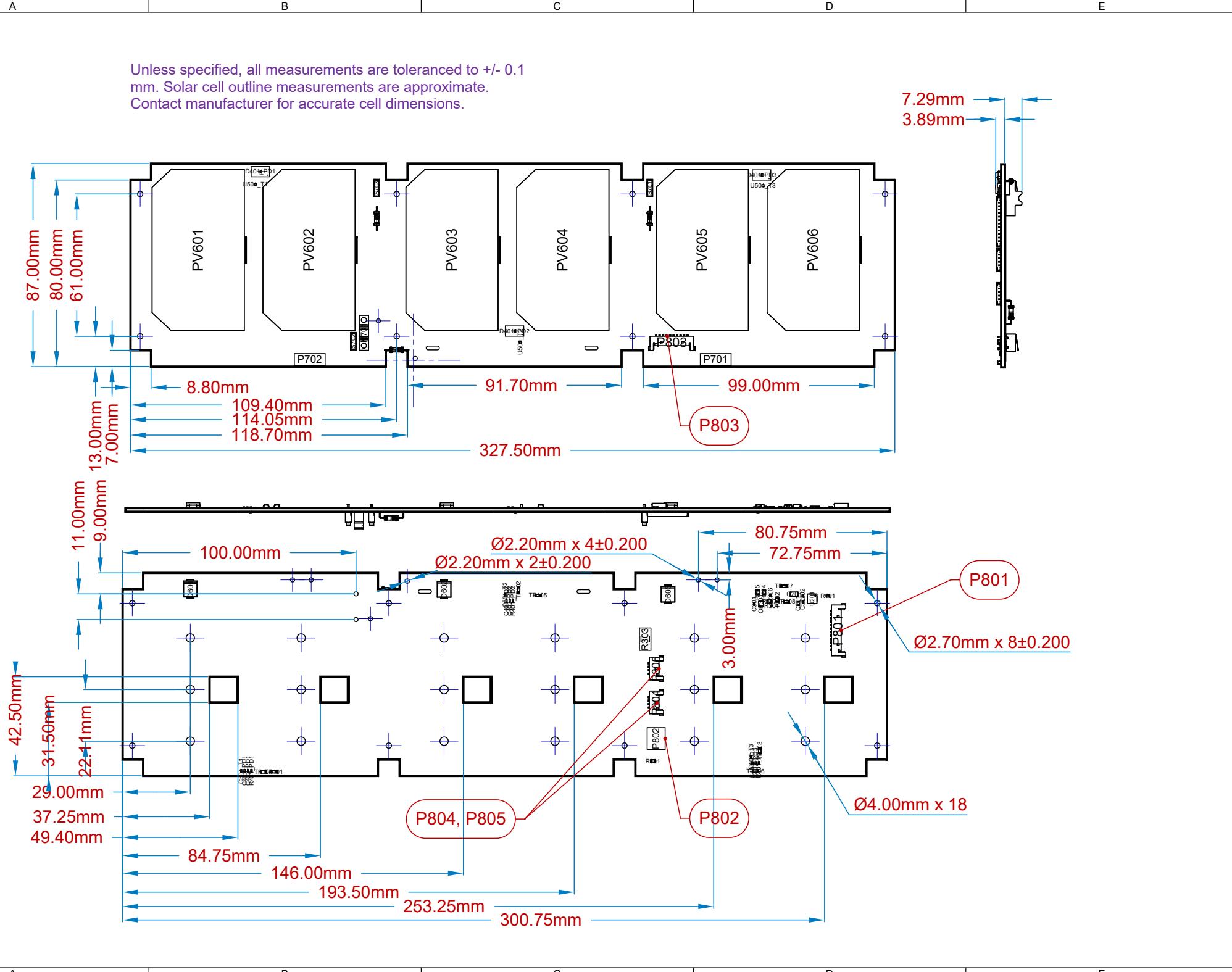
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Title <b>Starboard_Headers</b>			<i>University of Alberta Department of Electrical and Computer Engineering Edmonton AB, Canada T6G 1H9</i>
Size: Letter	Number: 8	Revision: *	
Date: 6/27/2020	Time: 8:09:18 PM	Sheet 8 of 8	
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Description	Designator	LibRef	Quantity	Footprint	Supplier 1	Supplier Link
CAP CER 1UF 25V X7R 0603	C201	PC-TDK-02603	1	TDK-CGA3E	Digi-key	<a href="http://www.digikey.ca/product-search/en?keywords=445-6931-1-ND">http://www.digikey.ca/product-search/en?keywords=445-6931-1-ND</a>
CAP CER 0.1UF 50V X7R 0402	C202, C204	PC-TDK-02259	2	TDK-CGA2B	Digi-key	<a href="http://www.digikey.ca/product-search/en?keywords=445-6899-1-ND">http://www.digikey.ca/product-search/en?keywords=445-6899-1-ND</a>
CAP CER 10UF 25V X7R 1206	C203	PC-TDK-02917	1	TDK-CGA5L	Digi-key	<a href="http://www.digikey.ca/product-search/en?keywords=445-6990-1-ND">http://www.digikey.ca/product-search/en?keywords=445-6990-1-ND</a>
CAP CER 0.1UF 35V X7R 0402, CAP CER 0.1UF 50V X7R 0402, CAP CER 100PF 50V COG 0402	C301, C401_PD1, C401_PD2, C401_PD3, C402_PD1, C402_PD2, C402_PD3, C501_T1, C501_T2, C501_T3	PC-TDK-02255, PC-TDK-02259, PC-TDK-01227	10	TDK-CGA2B	Digi-key	<a href="http://www.digikey.ca/product-search/en?keywords=445-6901-1-ND">http://www.digikey.ca/product-search/en?keywords=445-6901-1-ND</a> , <a href="http://www.digikey.ca/product-search/en?keywords=445-6899-1-ND">http://www.digikey.ca/product-search/en?keywords=445-6899-1-ND</a> , <a href="http://www.digikey.ca/product-search/en?keywords=445-5596-1-ND">http://www.digikey.ca/product-search/en?keywords=445-5596-1-ND</a>
SENSOR PHOTODIODE 850NM 2SMD GW	D401_PD1, D401_PD2, D401_PD3	PXX-ADP-00000	3	PDB-C160SM	Digi-key	
SCHOTTKY BARRIER RECTIFIERS 4.0 AMPERES, 10 VOLTS, V_F = 0.31V	D601, D602, D603	PXX-ONS-00003	3	ONS-875	Digi-key	# <a href="https://www.digikey.com/product-detail/en/on-semiconductor/MBRS410LT3G/MBRS410LT3GOSCT-ND/1967073#">https://www.digikey.com/product-detail/en/on-semiconductor/MBRS410LT3G/MBRS410LT3GOSCT-ND/1967073#</a>
	M701	PXX-ABS-00001	1	ANTENNA_SADDLE	Digi-key	
CMOS Amplifier 2 Circuit Rail-to-Rail 8-WSON (2x2)	OP301	73	1	TI-DSG0008A	Digi-Key	# <a href="https://www.digikey.ca/product-detail/en/texas-instruments/OPA2333PIDSGR/296-51501-1-ND/9745865#">https://www.digikey.ca/product-detail/en/texas-instruments/OPA2333PIDSGR/296-51501-1-ND/9745865#</a>
	P701, P702	PXX-ABS-00004	2	DEPHINGE_MOUNTING_HOLE_BODY	Digi-key	
CONN HEADER SMD R/A 12POS 1.5MM	P801	71	1	MOLX-5040501291	Digi-Key	# <a href="https://www.digikey.ca/product-detail/en/molex/5040501291/WM16219CT-ND/6702294#">https://www.digikey.ca/product-detail/en/molex/5040501291/WM16219CT-ND/6702294#</a>
CONN HEADER SMD R/A 2POS 1.5MM	P802	61	1	MOLX-5040500291	Digi-Key	# <a href="https://www.digikey.ca/product-detail/en/molex/5040500291/WM25693CT-ND/9954119#">https://www.digikey.ca/product-detail/en/molex/5040500291/WM25693CT-ND/9954119#</a>
CONN HEADER SMD R/A 10POS 1.5MM	P803	69	1	MOLX-5040501091	Digi-Key	# <a href="https://www.digikey.ca/product-detail/en/molex/5040501091/WM10138CT-ND/4357655#">https://www.digikey.ca/product-detail/en/molex/5040501091/WM10138CT-ND/4357655#</a>
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	PV601, PV602, PV603, PV604, PV605, PV606	PBT-SPEC-00002	6	XTJ Prime	Spectrolab	
RES SMD 10K OHM 1% 1/8W 0603	R101	PR-VSH-00143	1	VSH-0603MCT	Digi-key	<a href="http://www.digikey.ca/product-search/en?keywords=MCT0603-10.0K-CFCT-ND">http://www.digikey.ca/product-search/en?keywords=MCT0603-10.0K-CFCT-ND</a>
RES SMD 6.2K OHM 0.1% 1/16W 0402, RES SMD 24K OHM 0.1% 1/16W 0402	R301, R306, R401_PD1, R401_PD2, R401_PD3	16853, 17830	5	PANA-ERA2A	Digi-Key	<a href="http://www.digikey.ca/product-search/en?keywords=P6.2KCNCT-ND">http://www.digikey.ca/product-search/en?keywords=P6.2KCNCT-ND</a> , <a href="http://www.digikey.ca/product-search/en?keywords=P24KCNCT-ND">http://www.digikey.ca/product-search/en?keywords=P24KCNCT-ND</a>
RES SMD 1M OHM 0.1% 1/8W 0805, RES SMD 845K OHM 0.1% 1/8W 0805	R302, R304, R305, R307	19706, 19643	4	PANA-ERA6A	Digi-Key	<a href="http://www.digikey.ca/product-search/en?keywords=P11MDACT-ND">http://www.digikey.ca/product-search/en?keywords=P11MDACT-ND</a> , <a href="http://www.digikey.ca/product-search/en?keywords=P845KDACT-ND">http://www.digikey.ca/product-search/en?keywords=P845KDACT-ND</a>
RES SMD 0.01 OHM 0.1% 1W 2512	R303	PR-VSH-00237	1	VSH-2512R4C	Digi-key	<a href="http://www.digikey.ca/product-search/en?keywords=Y1487-01-ND">http://www.digikey.ca/product-search/en?keywords=Y1487-01-ND</a>
21 Ohms ±1% 1W Through Hole Resistor Axial Flame Proof, Moisture Resistant, Safety Metal Film	R701, R702, R703	PR-VSH-00317	3	VSH-CPF1	Digi-key	# <a href="https://www.digikey.ca/product-detail/en/vishay-dale/CPF121R000FKEE6/CPF21.0CCT-ND/2713126#">https://www.digikey.ca/product-detail/en/vishay-dale/CPF121R000FKEE6/CPF21.0CCT-ND/2713126#</a>
RES SMD 0.0 OHM JUMPER 1/5W 0805	R801	PR-VSH-00003	1	VSH-0805MCU	Digi-key	<a href="http://www.digikey.ca/product-search/en?keywords=MCU0805-0.0-ZZCT-ND">http://www.digikey.ca/product-search/en?keywords=MCU0805-0.0-ZZCT-ND</a>
SWITCH SNAP ACT SPDT 500MA 30V	S701, S702, S703	20035	3	PANA-AV4424	Digi-Key	# <a href="https://www.digikey.com/product-detail/en/panasonic-electric-works/AV4424/255-3743-ND/646766#">https://www.digikey.com/product-detail/en/panasonic-electric-works/AV4424/255-3743-ND/646766#</a>
PC TEST POINT MINI SMD	TP101, TP102, TP103, TP104, TP105, TP106, TP107, TP108	PTP-KS-00001	8	KS-5017	Digi-key	<a href="http://www.digikey.ca/product-detail/en/keystone-electronics/5017/36-5017TR-ND/2217304">http://www.digikey.ca/product-detail/en/keystone-electronics/5017/36-5017TR-ND/2217304</a>
IC ADC 12BIT SAR 20LF CSP-WQ	U201	PU-ADI-00007	1	ADI-CP-20-8	Digi-key	# <a href="https://www.digikey.ca/product-detail/en/analog-devices-inc/AD7298BCPZ/AD7298BCPZ-ND/2507320#">https://www.digikey.ca/product-detail/en/analog-devices-inc/AD7298BCPZ/AD7298BCPZ-ND/2507320#</a>
Temperature Sensor Analog, Local -55°C ~ 150°C 5.194mV/°C 4-DSBGA (0.81x0.81)	U501_T1, U501_T2, U501_T3	70	3	TI-YFQ0004	Digi-Key	# <a href="https://www.digikey.ca/product-detail/en/texas-instruments/LMT70YFQR/296-47337-1-ND/7688347#">https://www.digikey.ca/product-detail/en/texas-instruments/LMT70YFQR/296-47337-1-ND/7688347#</a>

