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Title Zenith			University of Alberta Department of Electrical and Computer Engineering Edmonton AB, Canada T6G 1H9
Size: Letter	Number: 1	Revision: *	
Date: 6/27/2020	Time: 8:06:23 PM	Sheet 1 of 8	
File: C:\Users\nicho\AlbertaSat\projects\Hyperion Solar Panels\Zenith\Zenith.SchDoc			UNIVERSITY OF ALBERTA EDMONTON-ALBERTA-CANADA

A

A

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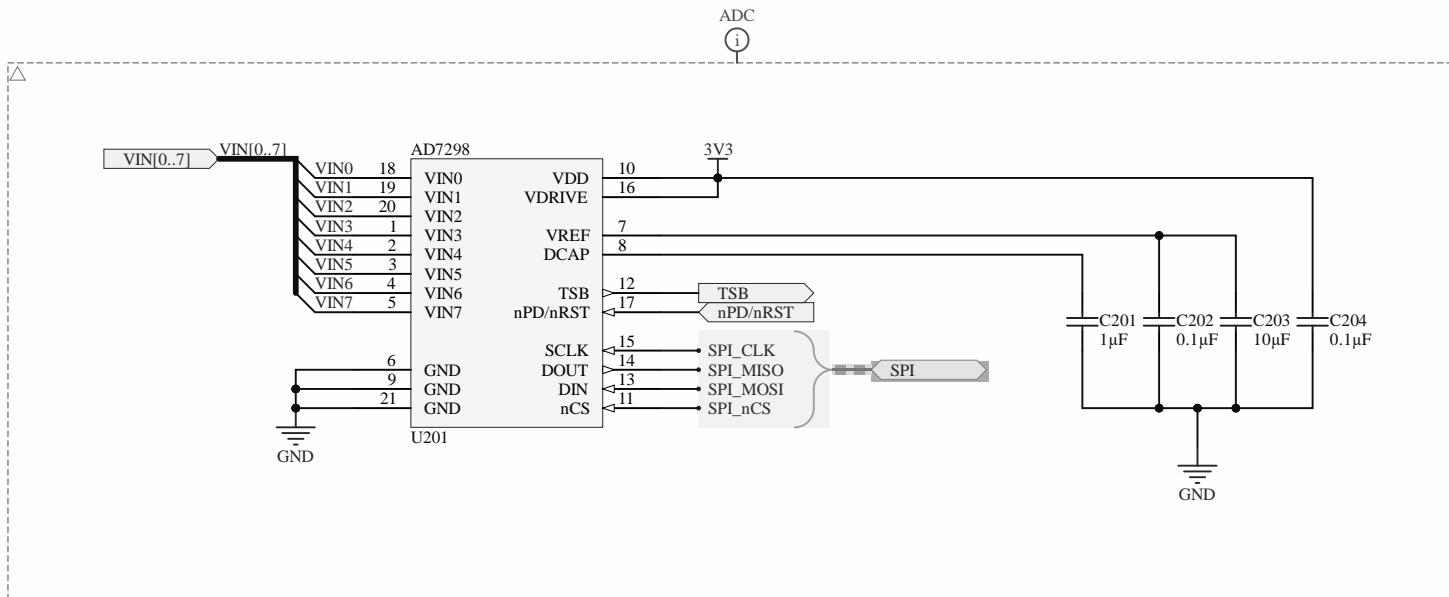
B

C

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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: 8:06:23 PM Sheet 2 of 7

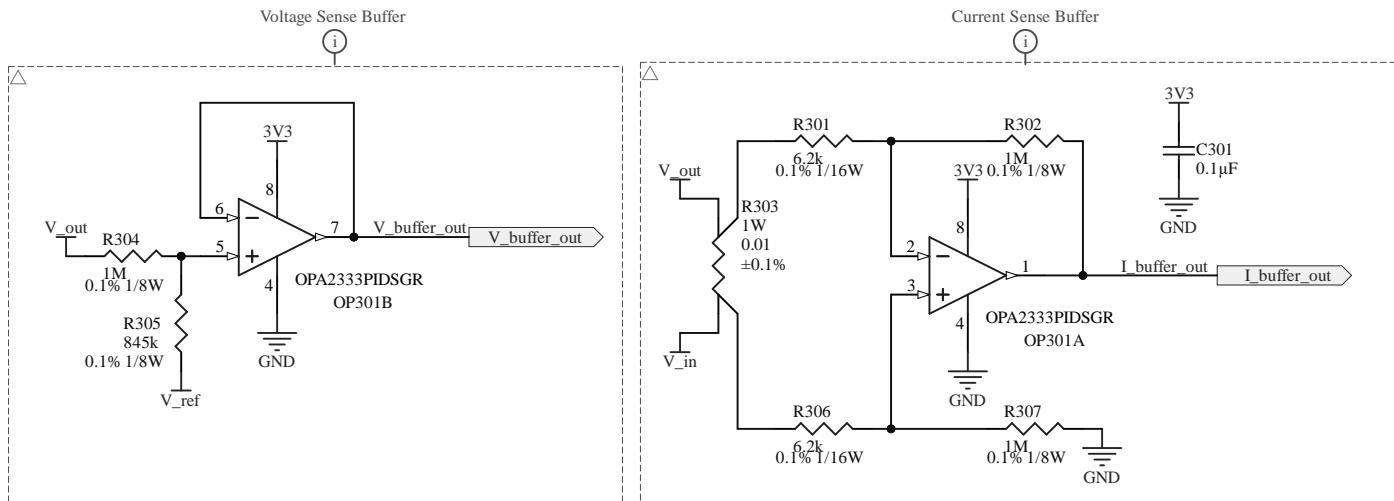
File: C:\Users\nicho\AlbertaSat\libraries\Schematic Sheets\AD7298 12-Bit SPI ADC.SchDoc

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

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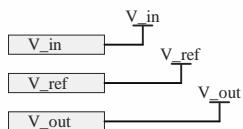
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Voltage Sense Buffer:

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

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 Current_Voltage_Sensor			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: 8:06:23 PM	Sheet 3 of 8	
File: C:\Users\nicho\AlbertaSat\libraries\Schematic Sheets\Current_Voltage_Sensor.SchDoc			

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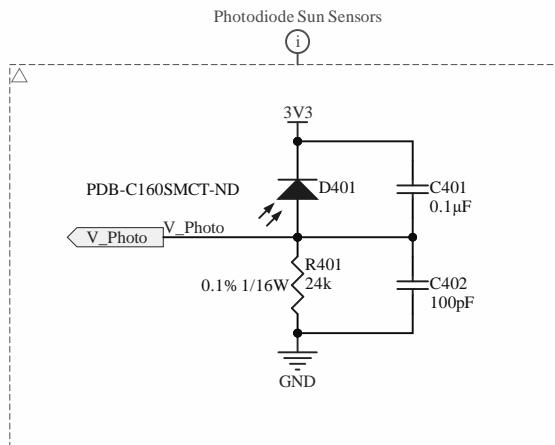
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Photodiode:

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

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

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Title Photodiode_Sun_Sensor			<i>University of Alberta Department of Electrical and Computer Engineering Edmonton AB, Canada T6G 1H9</i>
Size: Letter	Number: 4	Revision: *	
Date: 6/27/2020	Time: 8:06:24 PM	Sheet 4 of 7	
File: C:\Users\nicho\AlbertaSat\libraries\Schematic Sheets\Photodiode_Sun_Sensor.SchDoc			UNIVERSITY OF ALBERTA EDMONTON-ALBERTA-CANADA

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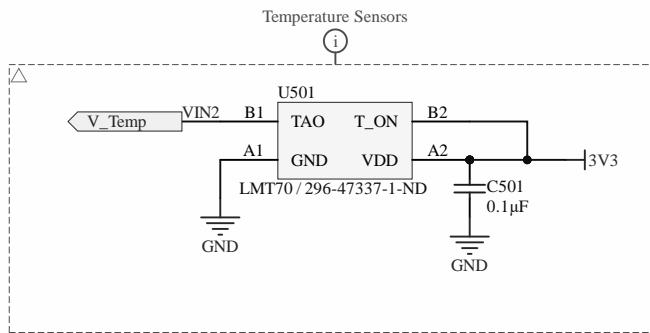
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Title Temp_Sensor			<i>University of Alberta Department of Electrical and Computer Engineering Edmonton AB, Canada T6G 1H9</i>
Size: Letter	Number: 5	Revision: *	
Date: 6/27/2020	Time: 8:06:24 PM	Sheet 5 of 7	
File: C:\Users\nicho\AlbertaSat\libraries\Schematic Sheets\Temp_Sensor.SchDoc			UNIVERSITY OF ALBERTA EDMONTON-ALBERTA-CANADA

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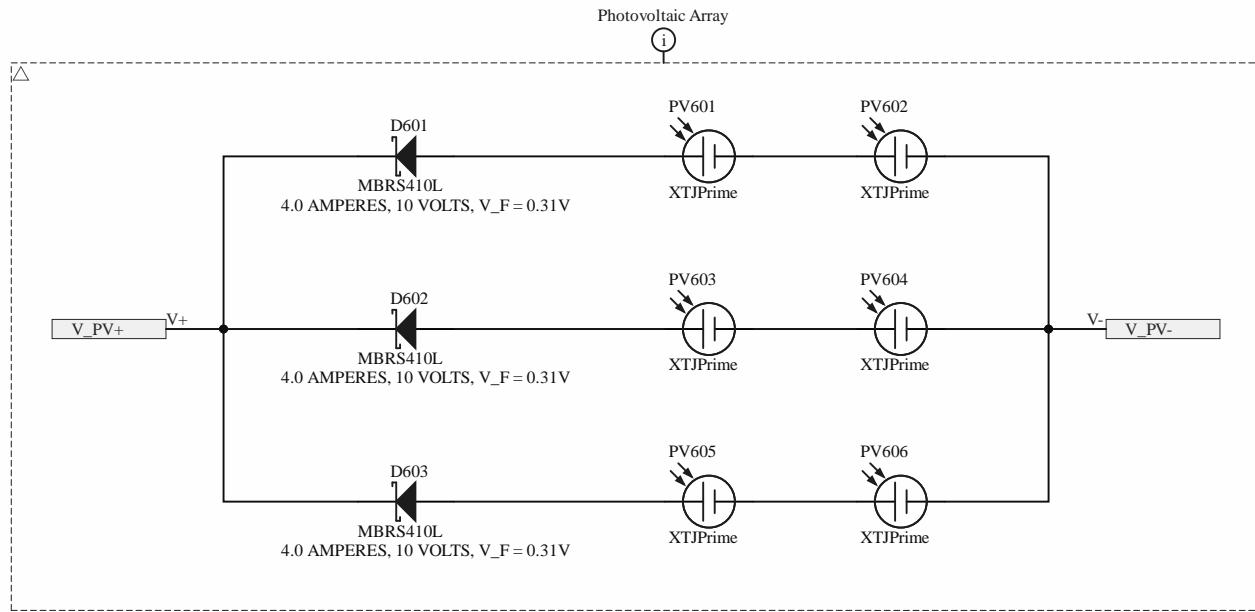
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Title **XTJ-Prime_2S2P**

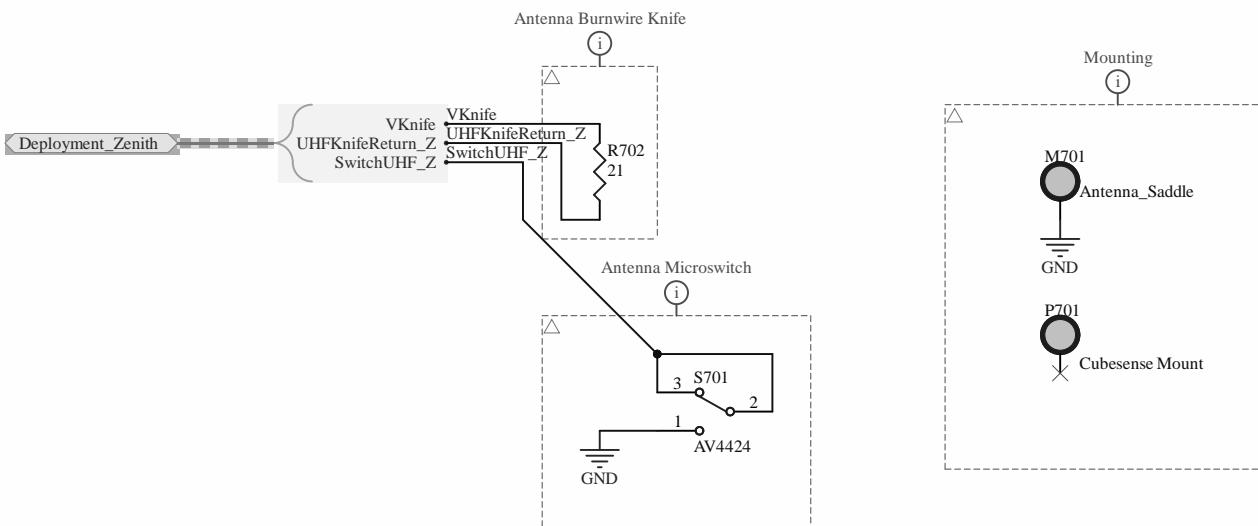
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Date: 6/27/2020	Time: 8:06:24 PM	Sheet 6 of 8
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File: C:\Users\nicho\AlbertaSat\libraries\Schematic Sheets\XTJ-Prime_2S1P.SchDoc
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Department of Electrical
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Edmonton AB, Canada
T6G 1H9



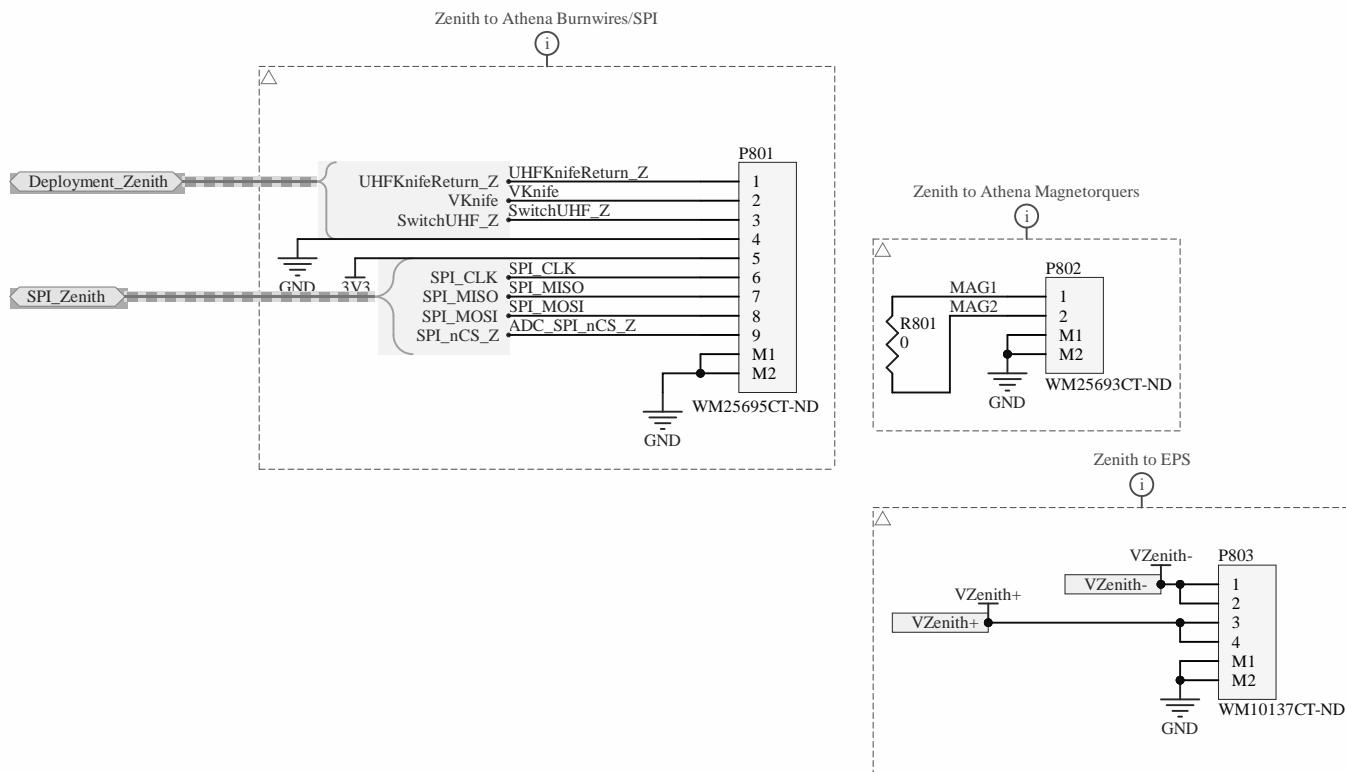


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Title Mech_Interface_Zenith			<i>University of Alberta Department of Electrical and Computer Engineering Edmonton AB, Canada T6G 1H9</i>
Size: Letter	Number: 7	Revision: *	
Date: 6/27/2020	Time: 8:06:24 PM	Sheet 7 of 8	
File: C:\Users\nicho\AlbertaSat\projects\Hyperion Solar Panels\Zenith\Mech_Interface_Zenith.SchDoc			UNIVERSITY OF ALBERTA EDMONTON-ALBERTA-CANADA

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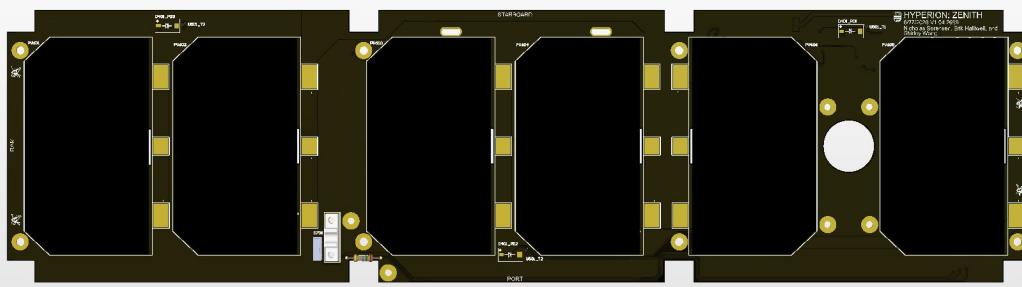
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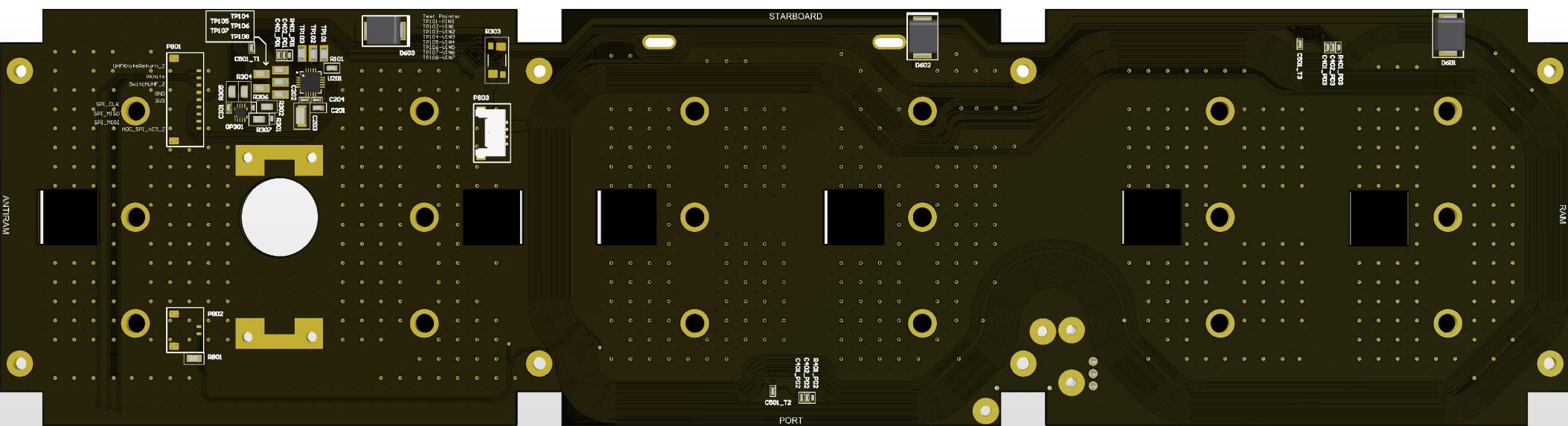
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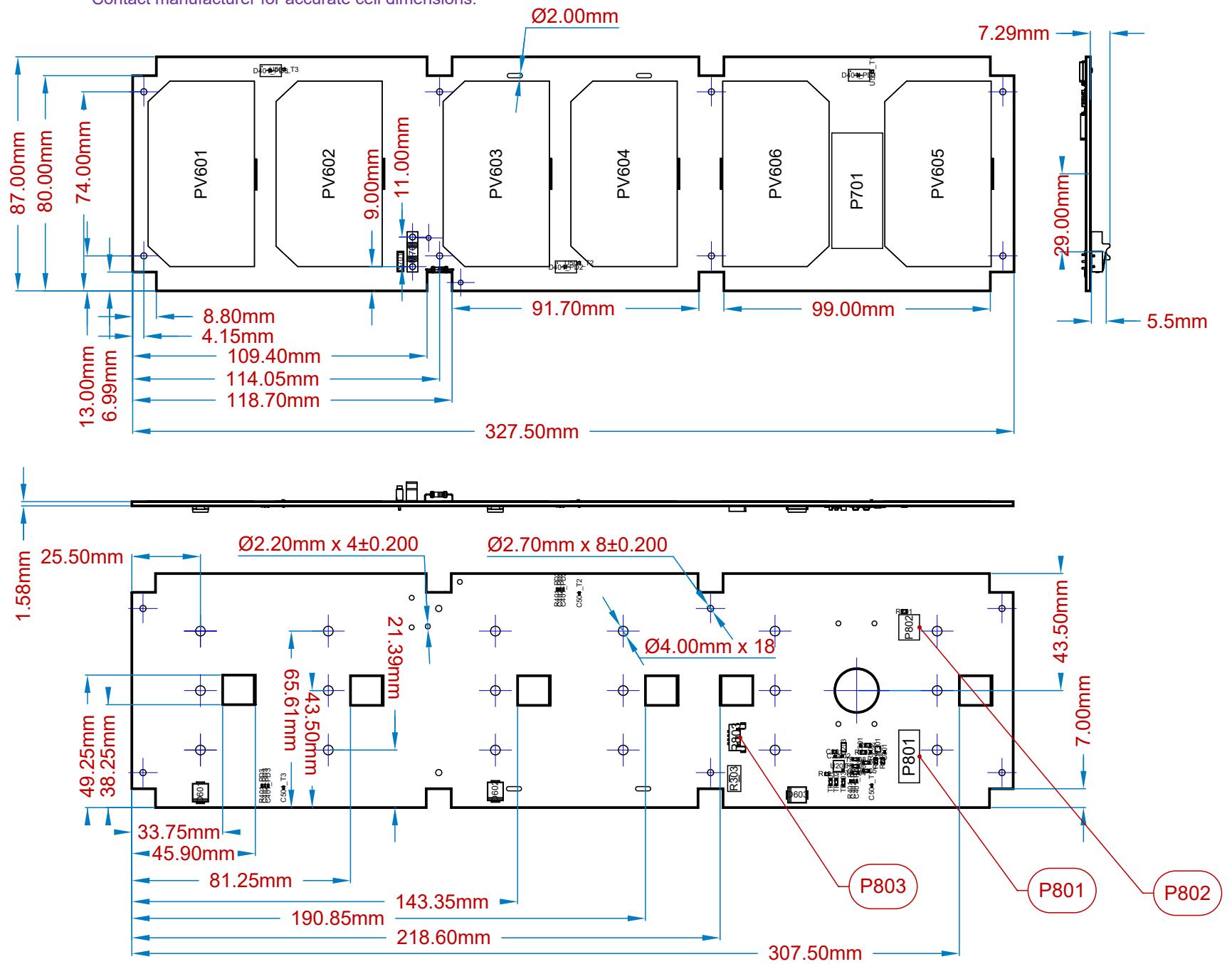
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Title Zenith_Headers			<i>University of Alberta Department of Electrical and Computer Engineering Edmonton AB, Canada T6G 1H9</i>
Size: Letter	Number: 8	Revision: *	
Date: 6/27/2020	Time: 8:06:24 PM	Sheet 8 of 8	
File: C:\Users\nicho\AlbertaSat\projects\Hyperion Solar Panels\Zenith\Zenith_Headers.SchDoc			UNIVERSITY OF ALBERTA EDMONTON-ALBERTA-CANADA





Unless specified, all measurements are toleranced to +/- 0.1 mm. Solar cell outline measurements are approximate. Contact manufacturer for accurate cell dimensions.



Description	Designator	Footprint	LibRef	Quantity	Supplier 1	Supplier Link
CAP CER 1UF 25V X7R 0603	C201	TDK-CGA3E	PC-TDK-02603	1	Digi-key	http://www.digikey.ca/product-search/en?keywords=445-6931-1-ND
CAP CER 0.1UF 50V X7R 0402	C202, C204	TDK-CGA2B	PC-TDK-02259	2	Digi-key	http://www.digikey.ca/product-search/en?keywords=445-6899-1-ND
CAP CER 10UF 25V X7R 1206	C203	TDK-CGA5L	PC-TDK-02917	1	Digi-key	http://www.digikey.ca/product-search/en?keywords=445-6990-1-ND
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	TDK-CGA2B	PC-TDK-02255, PC-TDK-02259, PC-TDK-01227	10	Digi-key	http://www.digikey.ca/product-search/en?keywords=445-6901-1-ND , http://www.digikey.ca/product-search/en?keywords=445-6899-1-ND , http://www.digikey.ca/product-search/en?keywords=445-5596-1-ND
SENSOR PHOTODIODE 850NM 2SMD GW	D401_PD1, D401_PD2, D401_PD3	PDB-C160SM	PXX-ADP-00000	3	Digi-key	
SCHOTTKY BARRIER RECTIFIERS 4.0 AMPERES, 10 VOLTS, V_F = 0.31V	D601, D602, D603	ONS-875	PXX-ONS-00003	3	Digi-key	# https://www.digikey.com/product-detail/en/on-semiconductor/MBRS410LT3G/MBRS410LT3GOSCT-ND/1967073#
	M701	ANTENNA_SADDLE	PXX-ABS-00001	1	Digi-key	
CMOS Amplifier 2 Circuit Rail-to-Rail 8-WSON (2x2)	OP301	TI-DSG0008A	73	1	Digi-Key	# https://www.digikey.ca/product-detail/en/texas-instruments/OPA2333PIDSGR/296-51501-1-ND/9745865#
	P701	Cubesense_Mount	PXX-ABS-00006	1	Digi-key	
CONN HEADER SMD R/A 9POS 1.5MM	P801	MOLX-5040500991	68	1	Digi-Key	# https://www.digikey.ca/product-detail/en/molex/5040500991/WM25695CT-ND/9954121#
CONN HEADER SMD R/A 2POS 1.5MM	P802	MOLX-5040500291	61	1	Digi-Key	# https://www.digikey.ca/product-detail/en/molex/5040500291/WM25693CT-ND/9954119#
CONN HEADER SMD R/A 4POS 1.5MM	P803	MOLX-5040500491	63	1	Digi-Key	# https://www.digikey.ca/product-detail/en/molex/5040500491/WM10137CT-ND/4357653#
	PV601, PV602, PV603, PV604, PV605, PV606	XTJ Prime	PBT-SPEC-00002	6	Spectrolab	
RES SMD 10K OHM 1% 1/8W 0603	R101	VSH-0603MCT	PR-VSH-00143	1	Digi-key	http://www.digikey.ca/product-search/en?keywords=MCT0603-10.0K-CFCT-ND
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	PANA-ERA2A	16853, 17830	5	Digi-Key	http://www.digikey.ca/product-search/en?keywords=P6.2KCNCT-ND , http://www.digikey.ca/product-search/en?keywords=P24KCNCT-ND
RES SMD 1M OHM 0.1% 1/8W 0805, RES SMD 845K OHM 0.1% 1/8W 0805	R302, R304, R305, R307	PANA-ERA6A	19706, 19643	4	Digi-Key	http://www.digikey.ca/product-search/en?keywords=P1MDACT-ND , http://www.digikey.ca/product-search/en?keywords=P845KDACT-ND
RES SMD 0.01 OHM 0.1% 1W 2512	R303	VSH-2512R4C	PR-VSH-00237	1	Digi-key	http://www.digikey.ca/product-search/en?keywords=Y1487-.01-ND
21 Ohms ±1% 1W Through Hole Resistor Axial Flame Proof, Moisture Resistant, Safety Metal Film	R702	VSH-CPF1	PR-VSH-00317	1	Digi-key	# https://www.digikey.ca/product-detail/en/vishay-dale/CPF121R000FKEE6/CPF21.0CCT-ND/2713126#
RES SMD 0.0 OHM JUMPER 1/5W 0805	R801	VSH-0805MCU	PR-VSH-00003	1	Digi-key	http://www.digikey.ca/product-search/en?keywords=MCU0805-0.0-ZZCT-ND
SWITCH SNAP ACT SPDT 500MA 30V	S701	PANA-AV4424	20035	1	Digi-Key	# https://www.digikey.com/product-detail/en/panasonic-electric-works/AV4424/255-3743-ND/646766#
PC TEST POINT MINI SMD	TP101, TP102, TP103, TP104, TP105, TP106, TP107, TP108	KS-5017	PTP-KS-00001	8	Digi-key	http://www.digikey.ca/product-detail/en/keystone-electronics/5017-36-5017TR-ND/2217304
IC ADC 12BIT SAR 20LFCSP-WQ	U201	ADI-CP-20-8	PU-ADI-00007	1	Digi-key	# https://www.digikey.ca/product-detail/en/analog-devices-inc/AD7298BCPZ/AD7298BCPZ-ND/2507320#
Temperature Sensor Analog, Local -55°C ~ 150°C 5.194mV/°C 4-DSBGA (0.81x0.81)	U501_T1, U501_T2, U501_T3	TI-YFQ0004	70	3	Digi-Key	# https://www.digikey.ca/product-detail/en/texas-instruments/LMT70YFQR/296-47337-1-ND/7688347#

