

Port Deployable Headers
Port_Deployable_Headers.SchDoc

SPI_Port

SPI_CLK → SPI_CLK
SPI_MISO → SPI_MISO
SPI_MOSI → SPI_MOSI
SPI_nCS_PD → SPI_nCS
SPI_nCS_P ←

U_AD7298 12-Bit SPI ADC

nPD/nRST

TSB

VIN[0..7]

VIN[0..7]

VIN0

VIN1

VIN2

VIN3

VIN4

VIN5

VIN6

VIN7

TP101

TP102

TP103

TP104

TP105

TP106

TP107

TP108

T1

Temp_Sensor.SchDoc

V_Temp

T2

Temp_Sensor.SchDoc

V_Temp

T3

Temp_Sensor.SchDoc

V_Temp

PV1

Photodiode_Sun_Sensor.SchDoc

V_Photo

PV2

Photodiode_Sun_Sensor.SchDoc

V_Photo

PV3

Photodiode_Sun_Sensor.SchDoc

V_Photo

Current and Voltage Sensors

Current_Voltage_Sensor.SchDoc

V_buffer_out

I_buffer_out

V_out

V_ref

V_in

VPortD+

VPortD-

Photovoltaic Array
XTJ-Prime_2S1P.SchDoc

V_PV-

V_PV+

Mechanical Interfacing

Mech_Interface_Port_Deployable.SchDoc

VPortD-

Copyright 2019 Nicholas J. Sorensen, and Erik F. Halliwell

This file and the information within it are licensed under the terms of the Apache License, Version 2.0 (the "License"); you may not use or redistribute this file except in compliance with the License. You may obtain a copy of the License at: <http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, content distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Title **Port Deployable**

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



Size: Letter

Number: 1

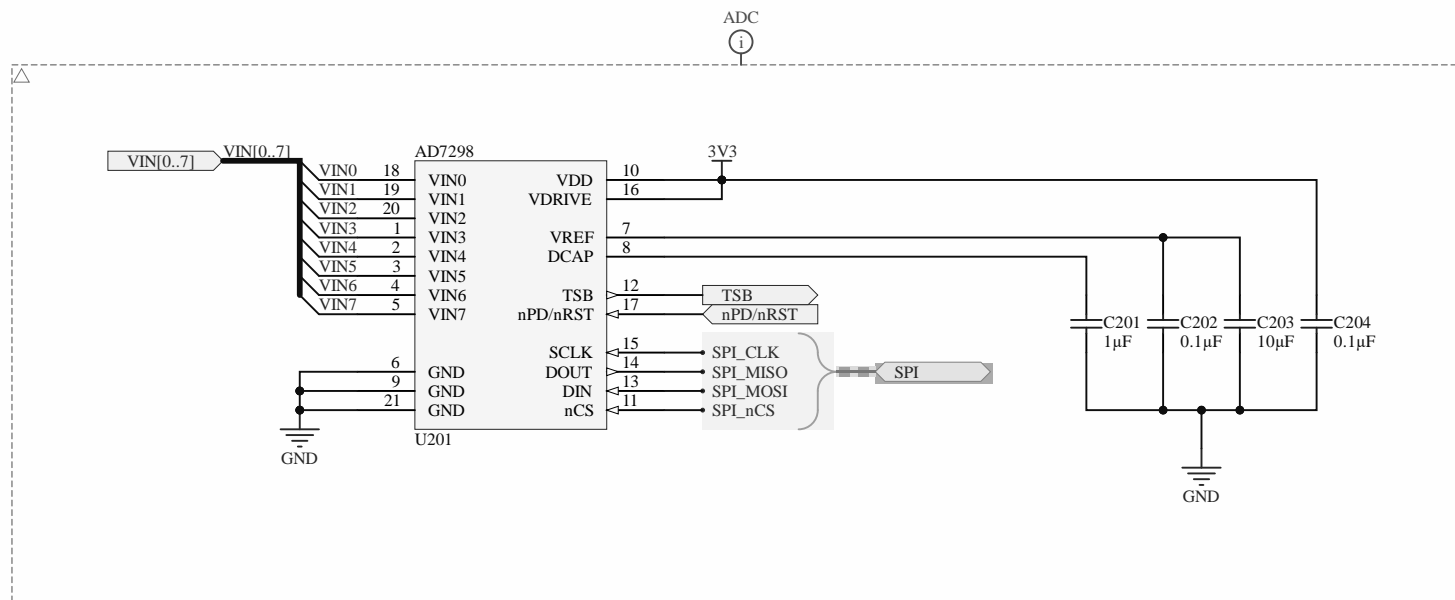
Revision:*

Date: 5/31/2020

Time: 9:59:35 PM

Sheet 1 of 8

File: C:\Users\nicho\AlbertaSat\projects\Hyperion Solar Panels\Port Deployable\Port Deployable.SchDoc



Copyright 2019 Nicholas J. Sorensen, and Erik F. Halliwell

This file and the information within it are licensed under the terms of the Apache License, Version 2.0 (the "License"); you may not use or redistribute this file except in compliance with the License. You may obtain a copy of the License at: <http://www.apache.org/licenses/LICENSE-2.0>
 Unless required by applicable law or agreed to in writing, content distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Title **AD7298 12-Bit SPI ADC**

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



Size: Letter

Number: 2

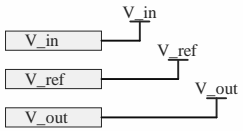
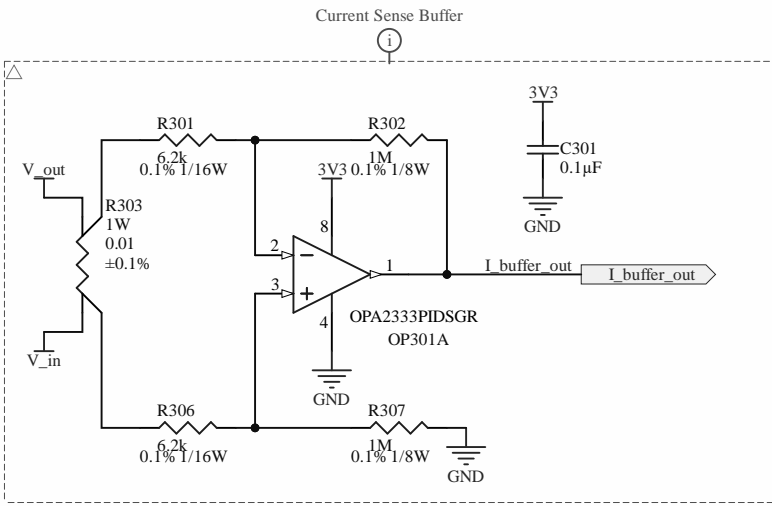
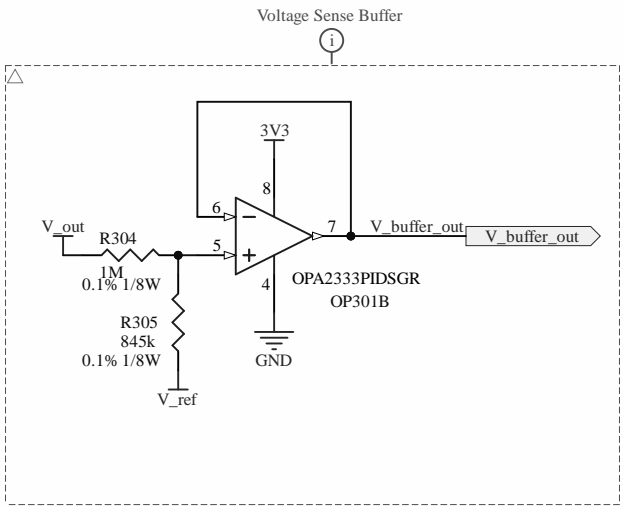
Revision: *

Date: 5/31/2020

Time: 9:59:35 PM

Sheet 2 of 8

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



Voltage Sense Buffer:


$$V_{\text{buffer_out}} = V_{\text{out}} * (R305 / (R305 + R304))$$
$$= 0.458 V_{\text{out}}$$
$$\leq 2.49 \text{ V}$$

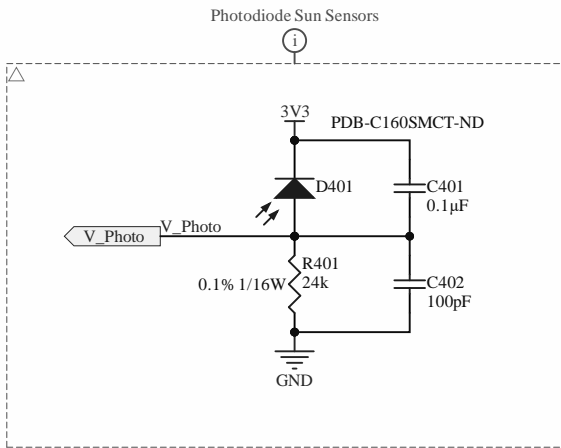
Current Sense Buffer:


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

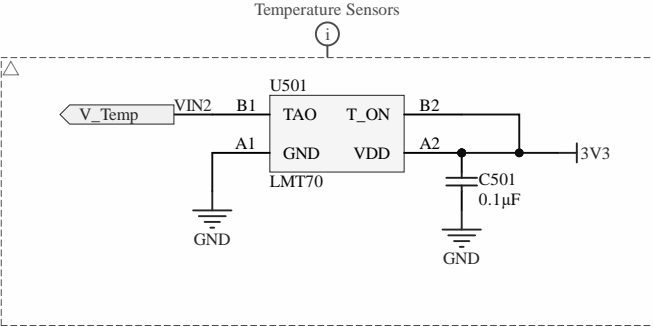
Copyright Nicholas J. Sorensen, and Erik F. Halliwell

This file and the information within it are licensed under the terms of the Apache License, Version 2.0 (the "License"); you may not use or redistribute this file except in compliance with the License. You may obtain a copy of the License at: <http://www.apache.org/licenses/LICENSE-2.0> Unless required by applicable law or agreed to in writing, content distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Title Current_Voltage_Sensor			University of Alberta Department of Electrical and Computer Engineering Edmonton AB, Canada T6G 1H9	 UNIVERSITY OF ALBERTA EDMONTON · ALBERTA · CANADA
Size: Letter	Number:3	Revision:*		
Date: 5/31/2020	Time: 9:59:35 PM	Sheet 3 of 8		
File: C:\Users\nicho\AlbertaSat\projects\Hyperion Solar Panels\Common Schematics\Current_Voltage_Sensor.SchDoc				




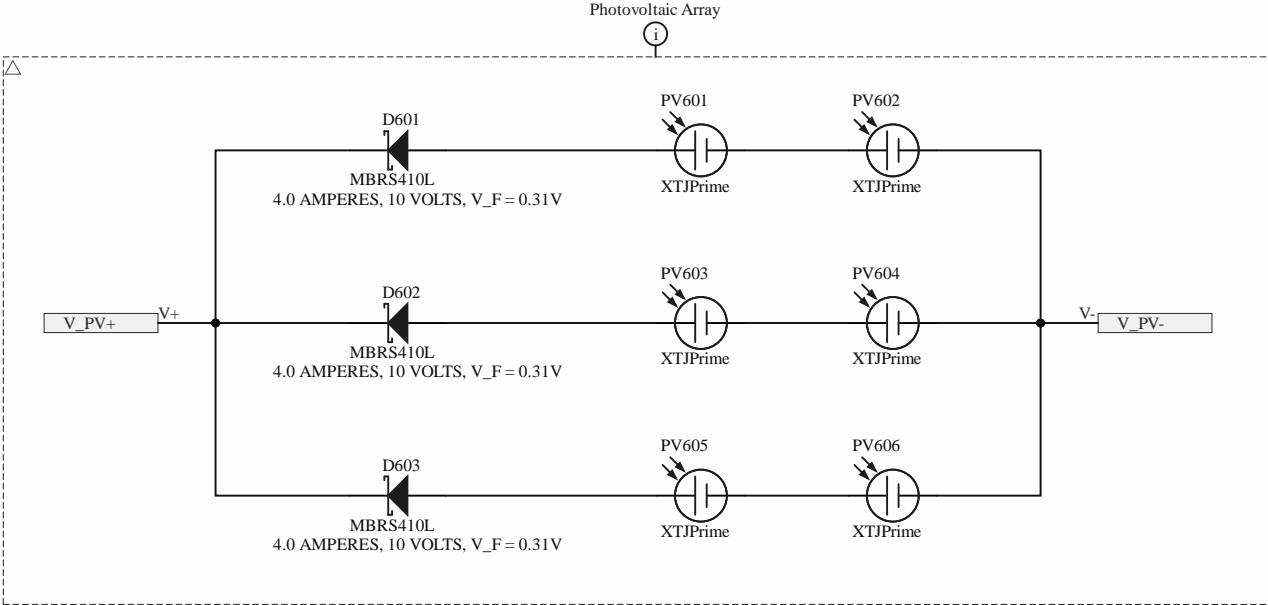
Copyright			Nicholas J. Sorensen, and Erik F. Halliwell		
This file and the information within it are licensed under the terms of the Apache License, Version 2.0 (the "License"); you may not use or redistribute this file except in compliance with the License. You may obtain a copy of the License at: http://www.apache.org/licenses/LICENSE-2.0 Unless required by applicable law or agreed to in writing, content distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.					
Title <i>Photodiode_Sun_Sensor</i>			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: 5/31/2020	Time: 9:59:35 PM	Sheet 4 of 8			
File: C:\Users\nicho\AlbertaSat\projects\Hyperion Solar Panels\Common Schematics\Photodiode_Sun_Sensor.SchDoc					



Copyright Nicholas J. Sorensen, and Erik F. Halliwell

This file and the information within it are licensed under the terms of the Apache License, Version 2.0 (the "License"); you may not use or redistribute this file except in compliance with the License. You may obtain a copy of the License at: <http://www.apache.org/licenses/LICENSE-2.0>
Unless required by applicable law or agreed to in writing, content distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Title <i>Temp_Sensor</i>			University of Alberta Department of Electrical and Computer Engineering Edmonton AB, Canada T6G 1H9	 EDMONTON · ALBERTA · CANADA
Size: Letter	Number: 5	Revision: *		
Date: 5/31/2020	Time: 9:59:35 PM	Sheet 5 of 8	File: C:\Users\nicho\AlbertaSat\projects\Hyperion Solar Panels\Common Schematics\Temp_Sensor.SchDoc	

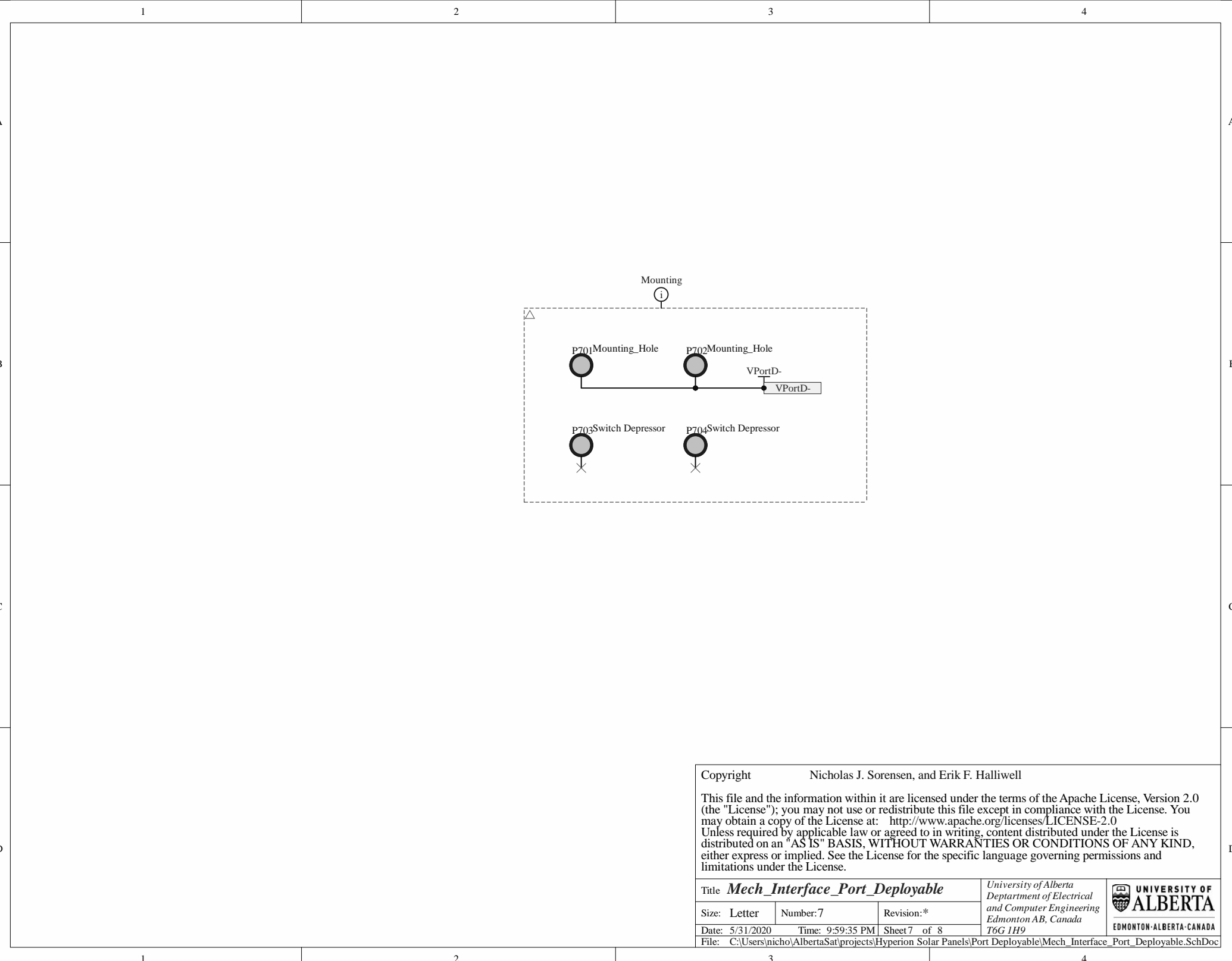


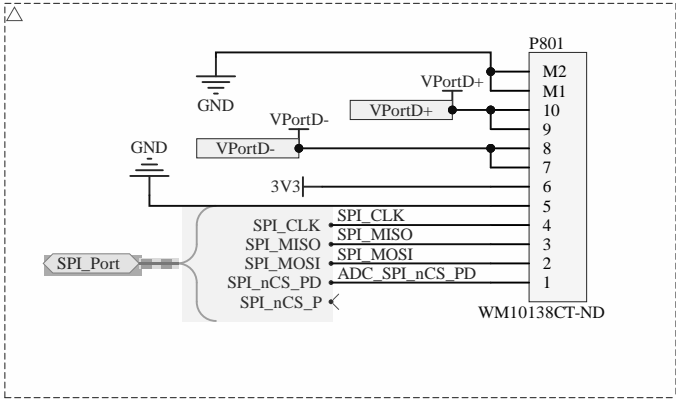
Copyright

Nicholas J. Sorensen, and Erik F. Halliwell

This file and the information within it are licensed under the terms of the Apache License, Version 2.0 (the "License"); you may not use or redistribute this file except in compliance with the License. You may obtain a copy of the License at: <http://www.apache.org/licenses/LICENSE-2.0>
Unless required by applicable law or agreed to in writing, content distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Title <i>XTJ-Prime_2S2P</i>			University of Alberta Department of Electrical and Computer Engineering Edmonton AB, Canada T6G 1H9	UNIVERSITY OF ALBERTA EDMONTON · ALBERTA · CANADA
Size: Letter	Number: 6	Revision: *		
Date: 5/31/2020	Time: 9:59:35 PM	Sheet 6 of 8		
File: C:\Users\nicho\AlbertaSat\projects\Hyperion Solar Panels\Common Schematics\XTJ-Prime_2S1P.SchDoc				




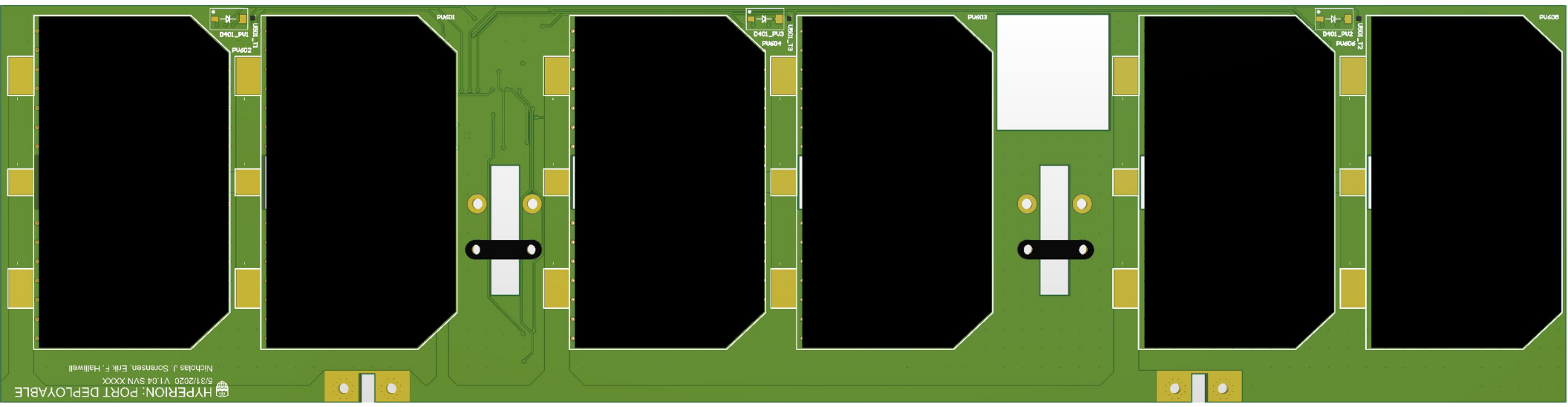


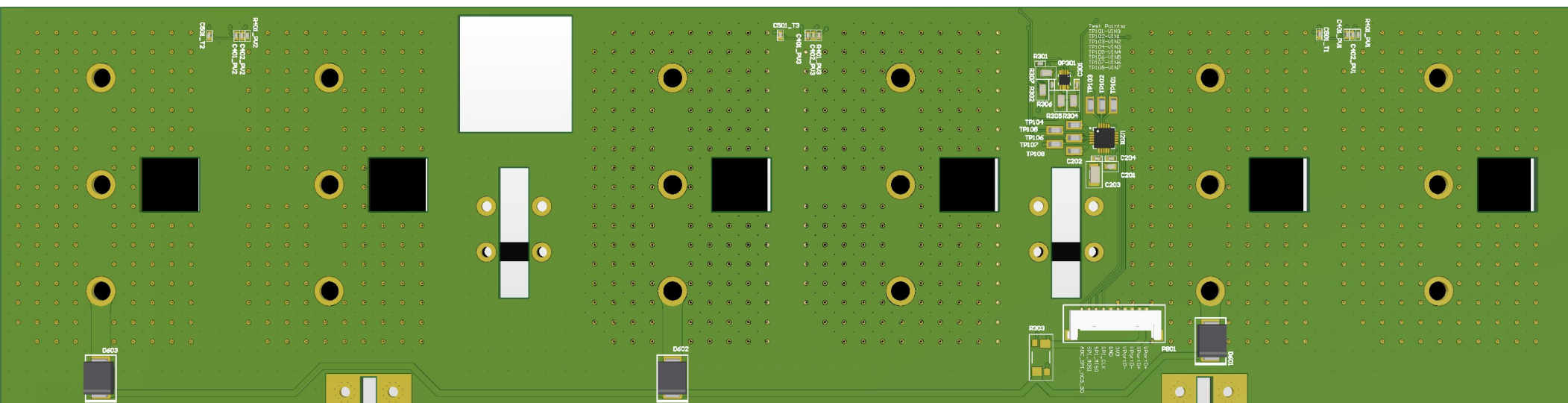
Copyright

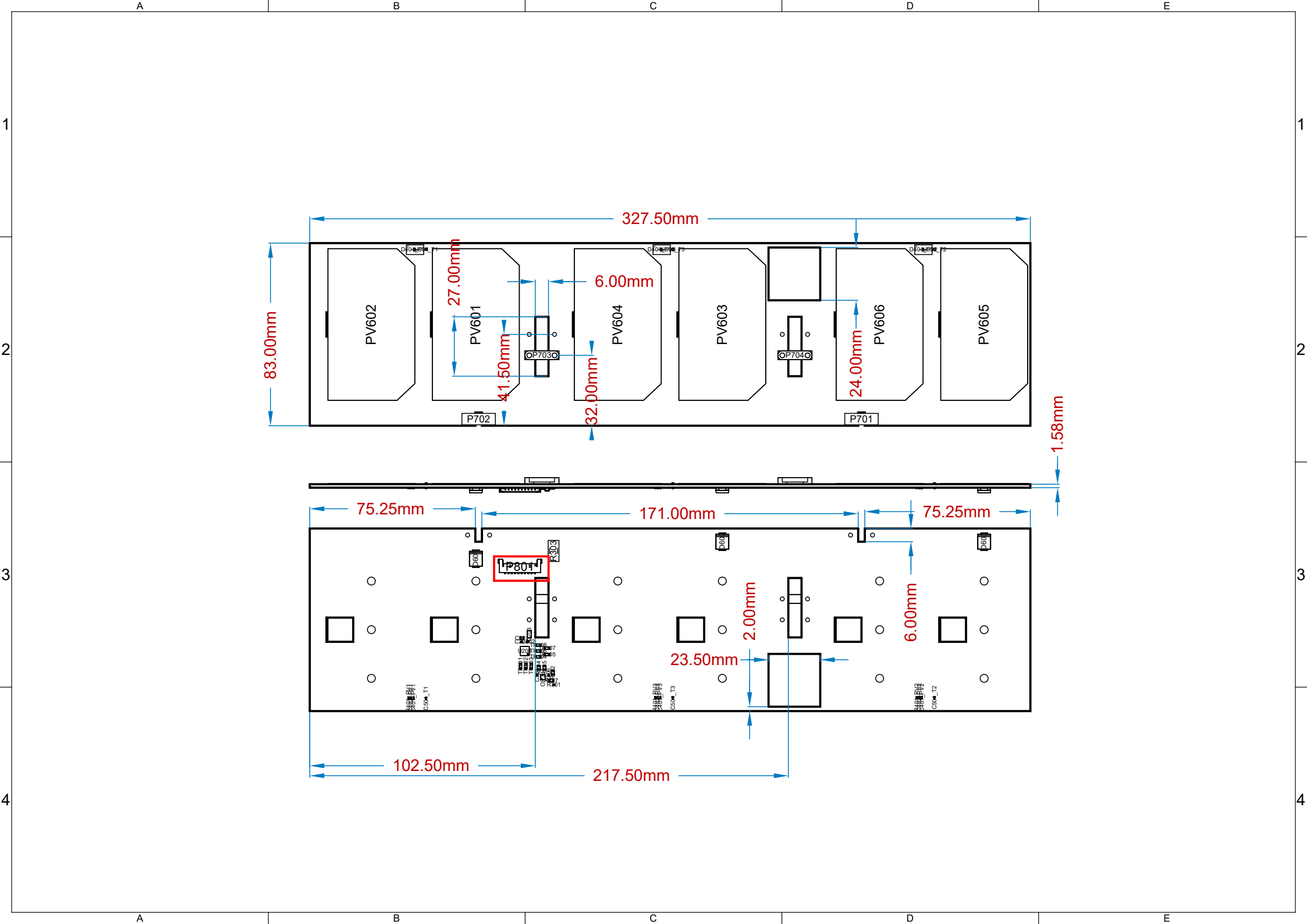
Nicholas J. Sorensen, and Erik F. Halliwell

This file and the information within it are licensed under the terms of the Apache License, Version 2.0 (the "License"); you may not use or redistribute this file except in compliance with the License. You may obtain a copy of the License at: <http://www.apache.org/licenses/LICENSE-2.0>
Unless required by applicable law or agreed to in writing, content distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

Title <i>Port_Deployable_Headers</i>			University of Alberta Department of Electrical and Computer Engineering Edmonton AB, Canada T6G 1H9	 UNIVERSITY OF ALBERTA EDMONTON · ALBERTA · CANADA
Size: Letter	Number: 8	Revision: *		
Date: 5/31/2020	Time: 9:59:35 PM	Sheet 8 of 8		
File: C:\Users\nicho\AlbertaSat\projects\Hyperion Solar Panels\Port Deployable\Port_Deployable_Headers.SchDoc				







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_PV1, C401_PV2, C401_PV3, C402_PV1, C402_PV2, C402_PV3, 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_PV1, D401_PV2, D401_PV3	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#
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#
Depolyable Hinge Mounting hole.	P701, P702	DepHinge_Mounting_Hole	PXX-ABS-00003	2	N/A	
Hardware for depressing the switch	P703, P704	Switch_Depressor	PXX-ABS-00005	2	Digi-key	
CONN HEADER SMD R/A 10POS 1.5MM	P801	MOLX-5040501091	69	1	Digi-Key	https://www.digikey.ca/product-detail/en/molex/5040501091/WM10138CT-ND/4357655#
	PV601, PV602, PV603, PV604, PV605, PV606	XTJ Prime	PBT-SPEC-00002	6	Spectrolab	
RES SMD 6.2K OHM 0.1% 1/16W 0402, RES SMD 24K OHM 0.1% 1/16W 0402	R301, R306, R401_PV1, R401_PV2, R401_PV3	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
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#

