protoDUNE 2 – Daphne Integration in the SC

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Xavier Pons

CERN
EP-DT
Detector Technologies

DUNE

Installation of the Daphne boards in the cryostat

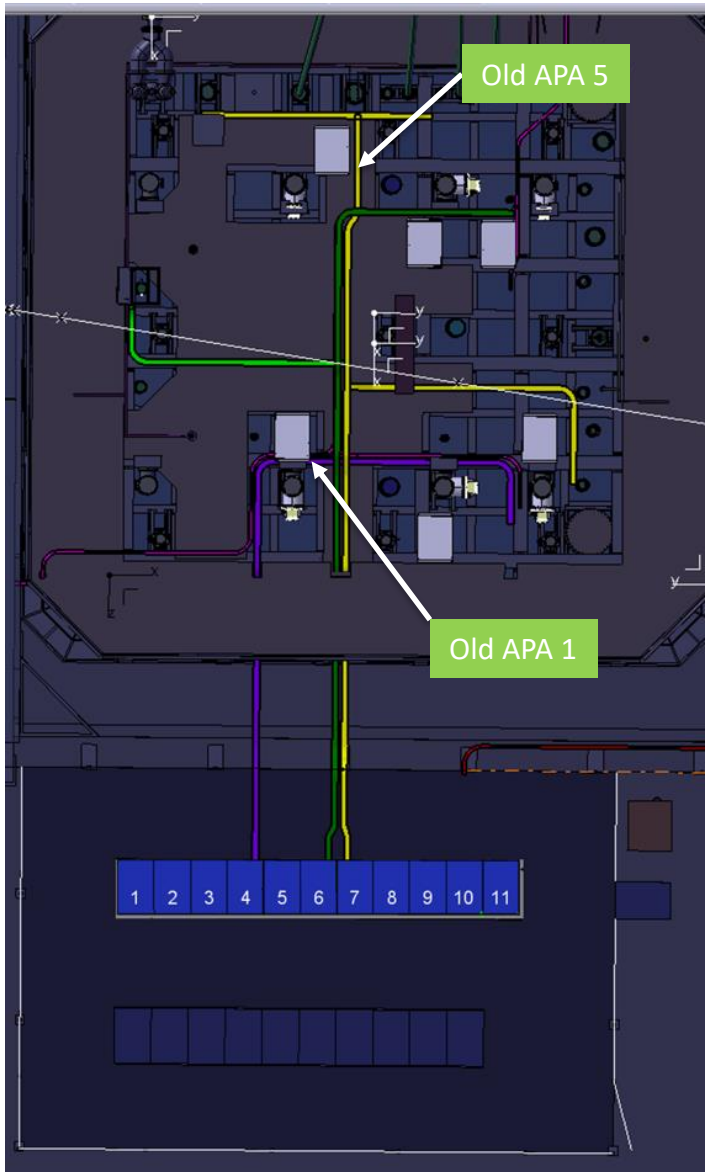
The 4 units (or 5) Daphne 1U crate will be installed in the old SSP's mini –12U rack on top of the cryostat

Constraint in the cable length of the warm cable from the flange to Daphne => maximum length 3 meters

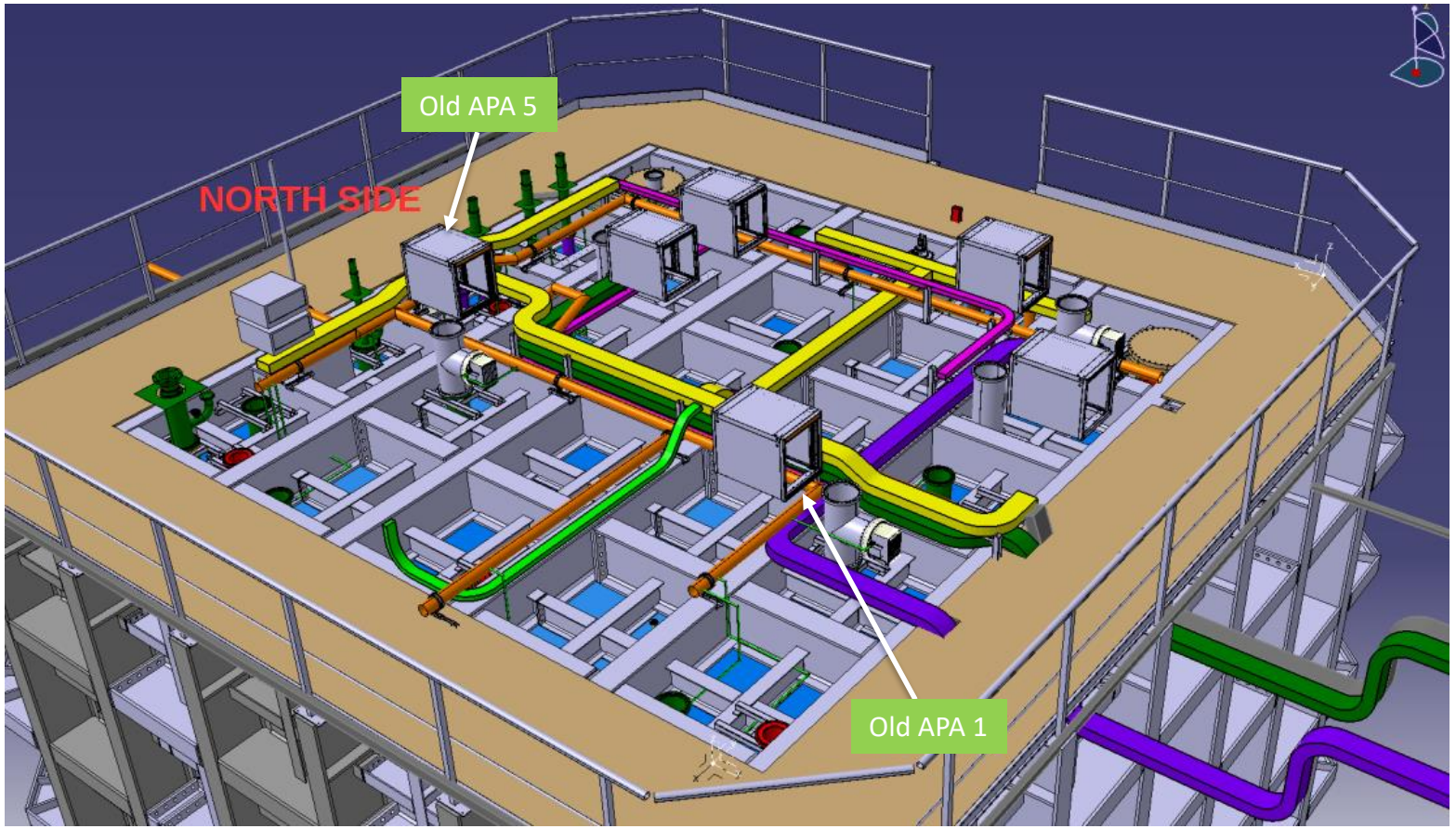
The best option is to use the mini-racks close to the flange, so the ones used for old APA1 and APA5

According protoDUNE1 convention

APA 1 => PD US-Ras
APA 5 => PD US-Das



Installation of the Daphne boards in the cryostat



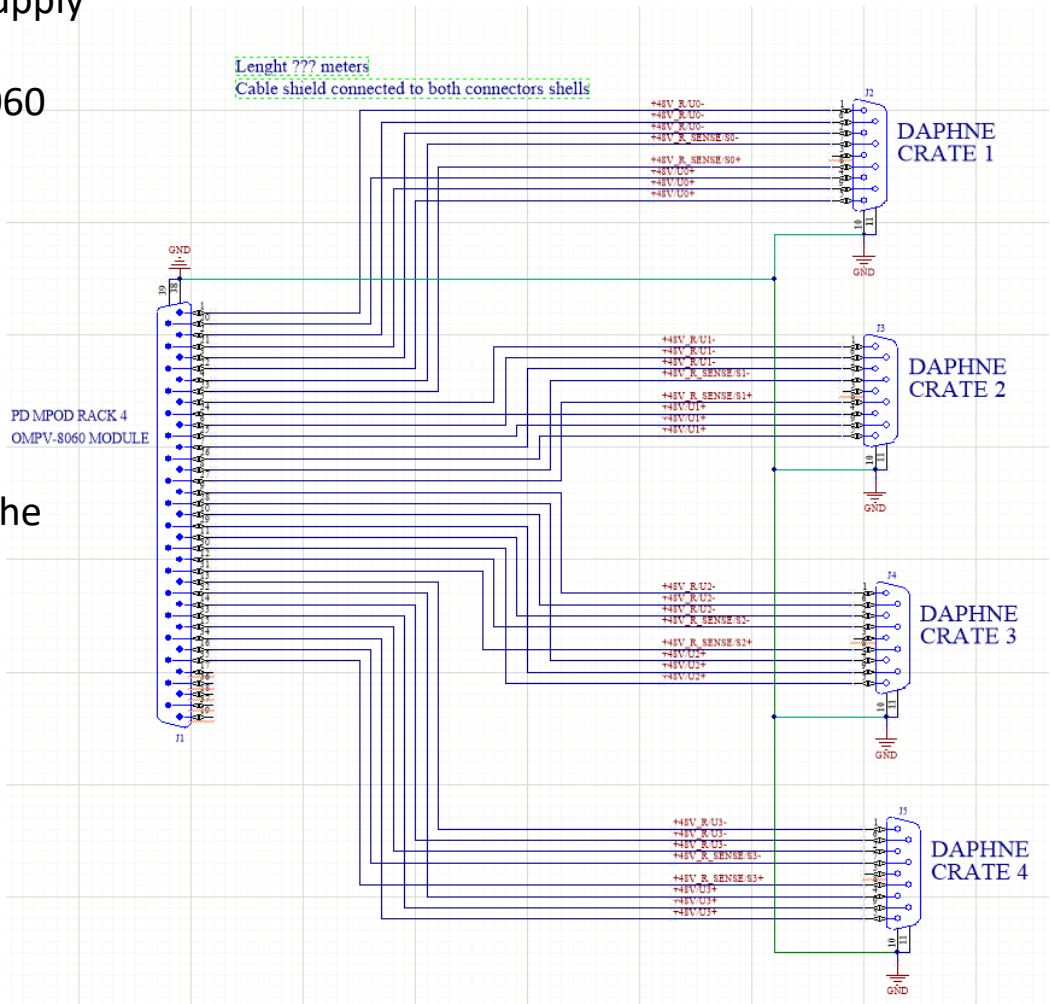
DAPHNE 48V power supply proposal

To use the old Photon Detector MPOD power supply

There is spare free connector Module OMPV 8060 (8x60V)

Slot 3 – Second Connector Capacity 4 channels

The idea is with one single cable from the MPOD SUB-D 37 connector and then spited at the mini-crate to SUB-D 9 (X4) mapped for DAPHNE
Shield continuity to all connectors

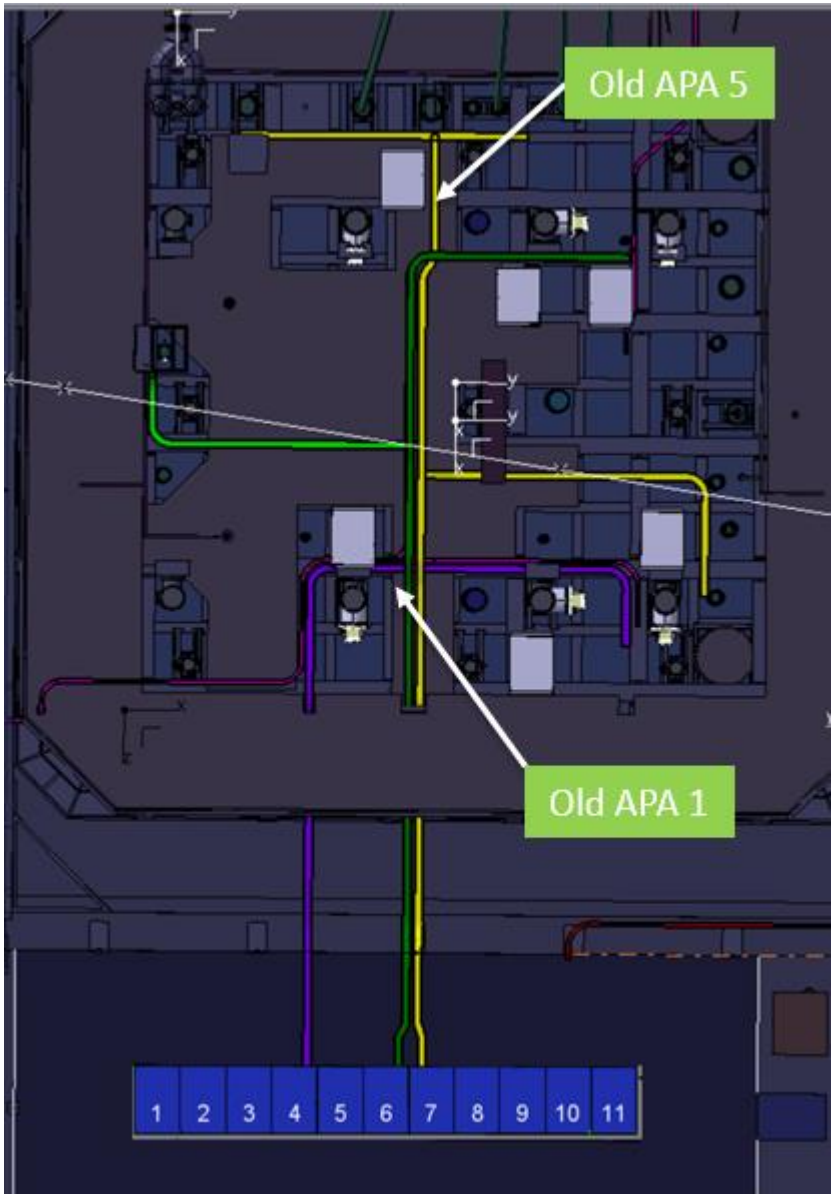


DAPHNE 48V power supply proposal

Cable length

RaS Side (Old APA1) => 10 meters

DaS Side (Old APA5) => 18 meters

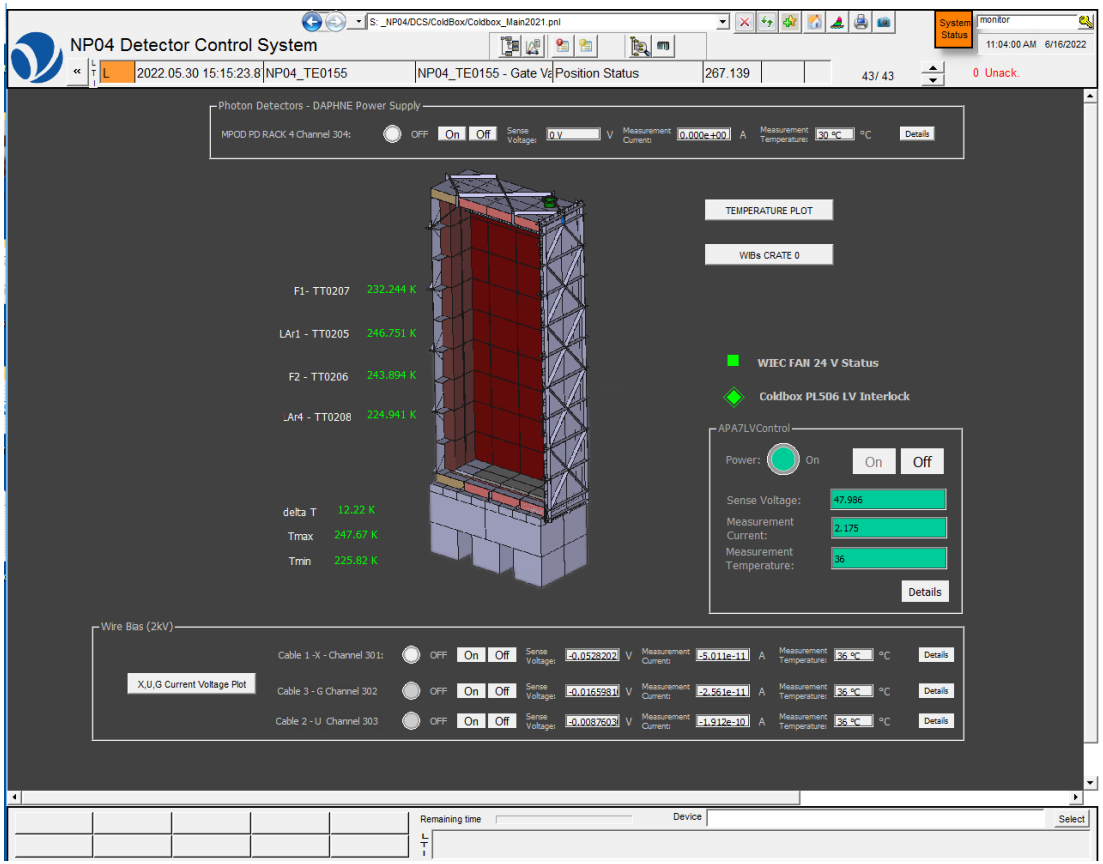


Daphne power supply and interlock in the WINCC OA SC

The power supply channels for DAPHNE will be controlled and monitored with WINCC OA Slow Controls like in the Cold-Box

Software Interlocks between DAPHNE, purity monitor and LED's cameras can be implemented like in protoDUNE1

Hardware interlock can be implemented if the MPOD module allows it reference OMPV 8060I
Otherwise by cutting the power of the MPOD by DCS-DDSS PLC



Daphne Current interlock through OPC UA??

Wiener MPV8060 8X60v

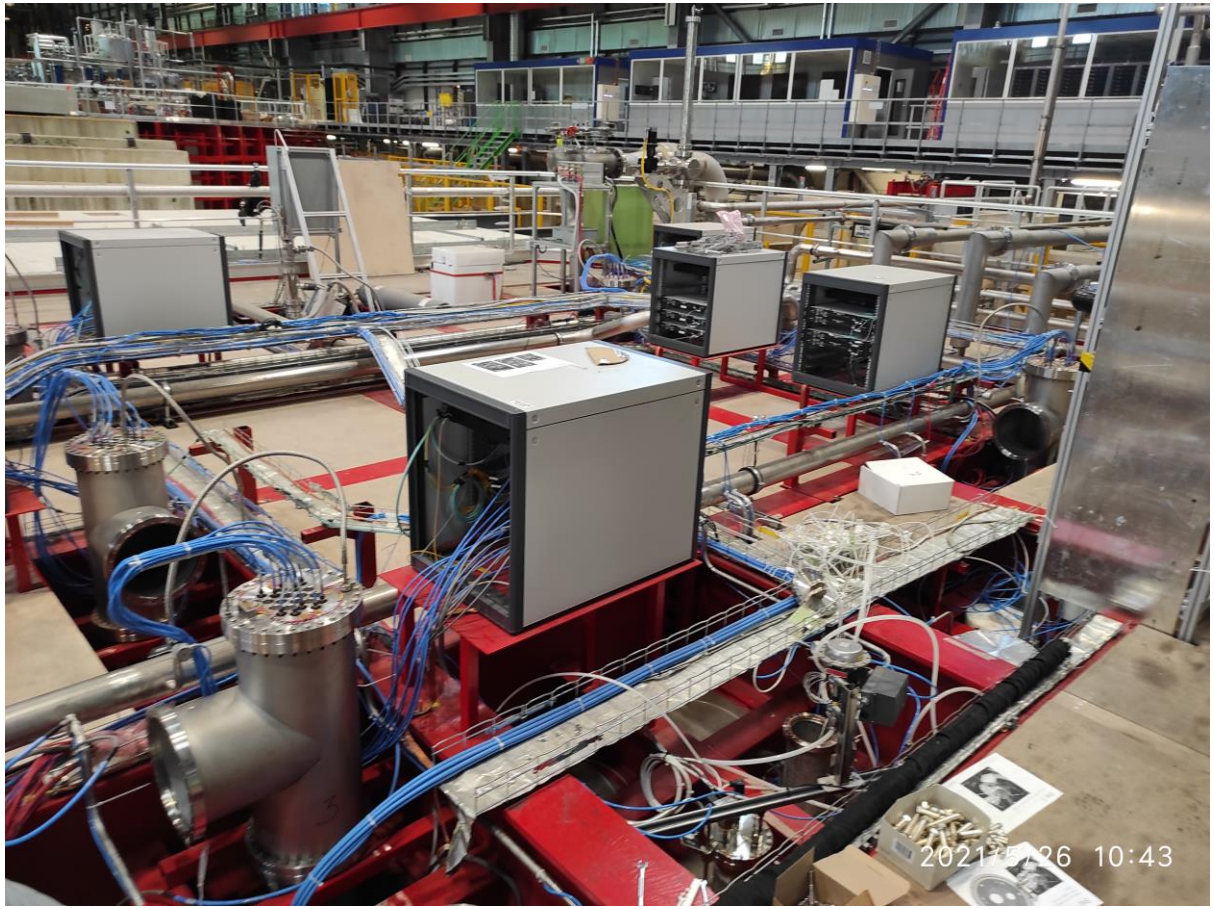
DSUB37 female (Channel 0..3)	Pin	Signal	TOP Connector
	1	U0-	Channel 0 negative output
	20	U0+	Channel 0 positive output
	2	U0-	Channel 0 negative output
	21	U0+	Channel 0 positive output
	3	U0-	Channel 0 negative output
	22	U0+	Channel 0 positive output
	4	S0-	Channel 0 negative sense input
	23	S0+	Channel 0 positive sense input
	5	U1-	Channel 1 negative output
	24	U1+	Channel 1 positive output
	6	U1-	Channel 1 negative output
	25	U1+	Channel 1 positive output
	7	U1-	Channel 1 negative output
	26	U1+	Channel 1 positive output
	8	S1-	Channel 1 negative sense input
	27	S1+	Channel 1 positive sense input
	9	U2-	Channel 2 negative output
	28	U2+	Channel 2 positive output
	10	U2-	Channel 2 negative output
	29	U2+	Channel 2 positive output
	11	U2-	Channel 2 negative output
	30	U2+	Channel 2 positive output
	12	S2-	Channel 2 negative sense input
	31	S2+	Channel 2 positive sense input
	13	U3-	Channel 3 negative output
	32	U3+	Channel 3 positive output
	14	U3-	Channel 3 negative output
	33	U3+	Channel 3 positive output
	15	U3-	Channel 3 negative output
	34	U3+	Channel 3 positive output
	16	S3-	Channel 3 negative sense input
	35	S3+	Channel 3 positive sense input
	17	INTERLOCK0	Optional interlock input: The four channels of this connector are
	36	INTERLOCK1	enabled only if a signal is applied here
	18	LOOP0	Safety Loop, LOOP0 and LOOP1 are connected to each other, no
	37	LOOP1	connection to other potentials
	19	CHASSIS	Connected to chassis / front panel

DSUB37 female (Channel 4..7)	Pin	Signal	Bottom Connector
	1	U4-	Channel 4 negative output
	20	U4+	Channel 4 positive output
	2	U4-	Channel 4 negative output
	21	U4+	Channel 4 positive output
	3	U4-	Channel 4 negative output
	22	U4+	Channel 4 positive output
	4	S4-	Channel 4 negative sense input
	23	S4+	Channel 4 positive sense input
	5	U5-	Channel 5 negative output
	24	U5+	Channel 5 positive output
	6	U5-	Channel 5 negative output
	25	U5+	Channel 5 positive output
	7	U5-	Channel 5 negative output
	26	U5+	Channel 5 positive output
	8	S5-	Channel 5 negative sense input
	27	S5+	Channel 5 positive sense input
	9	U6-	Channel 6 negative output
	28	U6+	Channel 6 positive output
	10	U6-	Channel 6 negative output
	29	U6+	Channel 6 positive output
	11	U6-	Channel 6 negative output
	30	U6+	Channel 6 positive output
	12	S6-	Channel 6 negative sense input
	31	S6+	Channel 6 positive sense input
	13	U7-	Channel 7 negative output
	32	U7+	Channel 7 positive output
	14	U7-	Channel 7 negative output
	33	U7+	Channel 7 positive output
	15	U7-	Channel 7 negative output
	34	U7+	Channel 7 positive output
	16	S7-	Channel 7 negative sense input
	35	S7+	Channel 7 positive sense input
	17	INTERLOCK0	Optional interlock input: The four channels of this connector are
	36	INTERLOCK1	enabled only if a signal is applied here
	18	LOOP0	Safety Loop, LOOP0 and LOOP1 are connected to each other, no
	37	LOOP1	connection to other potentials
	19	CHASSIS	Connected to chassis / front panel

MPOD Low Voltage Series - 8 channels with floating ground

Type	Channels	Voltage	I Max	Peak Power	V-Res	I-Res	Ripple
MPV 4008I	4	0 to 8V	20A	100W / ch.	0.5mV	1mA	<3mVpp
MPV 4016I	4	0 to 15V	10A	100W / ch.	1mV	0.5mA	<2mVpp
MPV 4030I	4	0 to 30V	5A	100W / ch.	2mV	0.52mA	<2mVpp
MPV 4060I	4	0 to 60V	2A	100W / ch.	4mV	0.12mA	<2mVpp
MPV 8008D	8	0 to 8V	10A	50W / ch.	0.5mV	0.5mA	<3mVpp
MPV 8008I	8	0 to 8V	10A	50W / ch.	0.5mV	0.5mA	<3mVpp
MPV 8008LD	8	0 to 8V	5A	40W / ch.	0.5mV	0.25mA	<3mVpp
MPV 8008LI	8	0 to 8V	5A	40W / ch.	0.5mV	0.25mA	<3mVpp
MPV 8016D	8	0 to 15V	5A	50W / ch.	1mV	0.25mA	<2mVpp
MPV 8016I	8	0 to 15V	5A	50W / ch.	1mV	0.25mA	<2mVpp
MPV 8030D	8	0 to 30V	2.5A	50W / ch.	2mV	0.12mA	<2mVpp
MPV 8030I	8	0 to 30V	2.5A	50W / ch.	2mV	0.12mA	<2mVpp
MPV 8060D	8	0 to 60V	1A	50W / ch.	4mV	0.06mA	<2mVpp
MPV 8060I	8	0 to 60V	1A	50W / ch.	4mV	0.06mA	<2mVpp
MPV 8120D	8	0 to 120V	100mA	50W / ch.	4mV	4 µA	<2mVpp
MPV 8120I	8	0 to 120V	100mA	50W / ch.	4mV	4 µA	<2mVpp
MPV 8120LD	8	0 to 120V	16mA	50W / ch.	4mV	4 µA	<2mVpp
MPV 8120LI	8	0 to 120V	16mA	50W / ch.	4mV	4 µA	<2mVpp

mini-rack 12 U



protoDUNE 1 – naming convention (R. Acciari)