

DAPHNE at CERN

Integration and Status

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Introduction

- ▶ 2 activities are running in parallel at CERN concerning DAPHNE.
 - ▶ DAQ integration
 - ▶ Stand alone readout of analog signals from coldboxes
- ▶ To test the DAQ integration with the analog readout we may need to use the long optical connections for FELIX, slow Control, and timing interface, (Already installed).
- ▶ In the standalone setup is preferred to use GbETH in the entire readout of the coldboxes (APA 1, 2, 3, 4) because it may be difficult to do online monitoring through LArSoft
- ▶ To mitigate the possibility of not been able to read modules at ProtoDUNE, 6 DAPHNEs should be used. (Polarization BIAS)

DAQ Integration

- ▶ First week of June we will not have activities related with the unitary tests of the interfaces with DAQ. (We have a lot of activity in both groups this week)
- ▶ Slow Control and DAQ slow communication: Hardware is already working using the Raspberry Pi OPC-UA server. We need to decide if the OPC-UA server will be used for DAQ communication with DAPHNE using a different namespaces for each.

Connection DAQ - NP04 Top

To test the connection with the analog system, we may need to use one DAPHNE on the NP04 Top.

Those connections are already installed, one DAPHNE should be installed in the NP04 Rack on the Top.

DAQ Integration

- ▶ In Bicocca, Fermilab, NIU, and CERN we are measuring long undershoot of the analog signals $\sim 10\mu s$
- ▶ We don't expect this undershoot to have any impact on the integral analysis, nevertheless the deconvolution would be heavily affected.
- ▶ We may need to increase the length of the window we use to send waveforms to the DAQ system by a factor of 2. This would give us a more reliable data acquisition for different purposes.
- ▶ Nevertheless, increasing the wavelength decreases the output bandwidth of DAPHNE (events/s)

DAQ Integration

2 different setups are used at CERN:

- ▶ One for DAQ integration and,
- ▶ one for Coldbox.

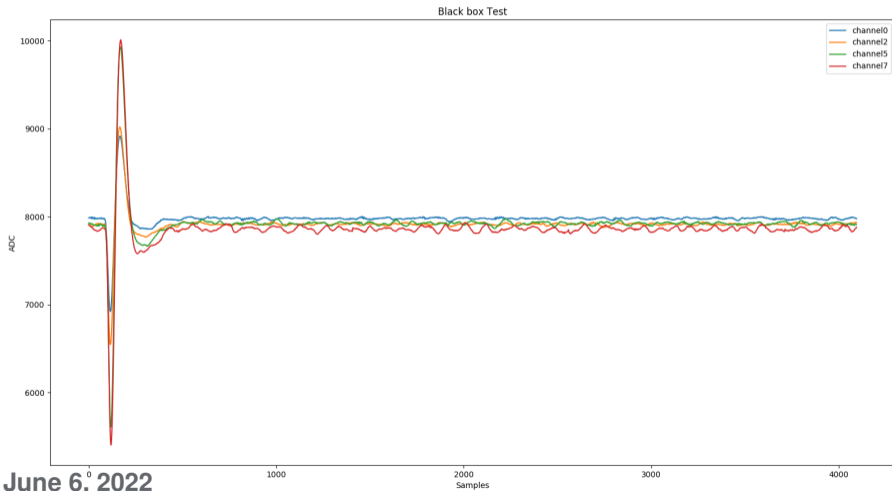
Gb for standalone readout

To make online monitoring of the APA PD system we are planning to use only the GbETH connection to avoid any difficulty on the reading out from LarSoft.

Blackbox Readout with DAPHNE



Blackbox Readout with DAPHNE



APA 1 Readout

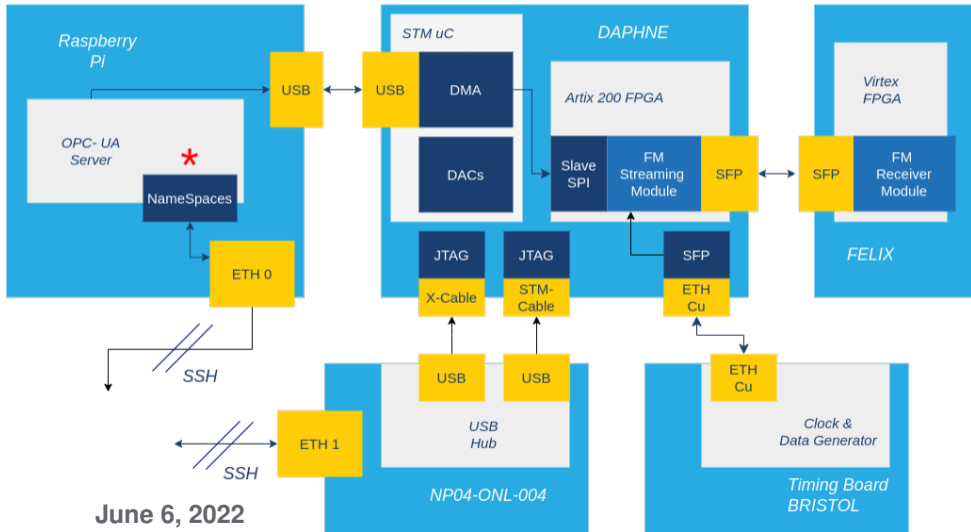
DAPHNE Setup in the NP04 Top

- ▶ Installed and working.
- ▶ We have already measured some signals from the Coldbox

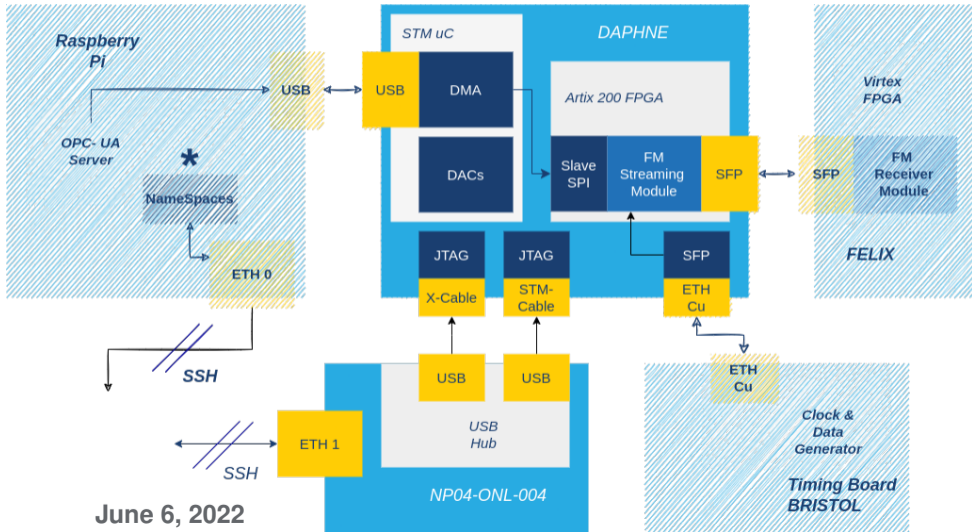
The logo for the DUNE experiment, featuring the letters 'DUNE' in a bold, white, sans-serif font. The letter 'U' is stylized with a curved line passing through it, and the letter 'N' is also stylized with a curved line passing through it. The letters are set against a light gray background.

DEEP UNDERGROUND
NEUTRINO EXPERIMENT

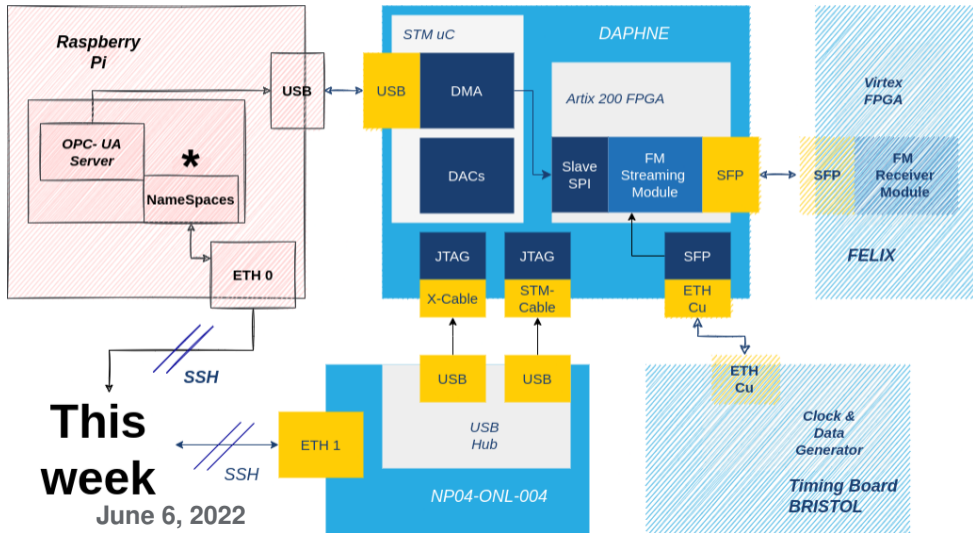
DAPHNE Connections



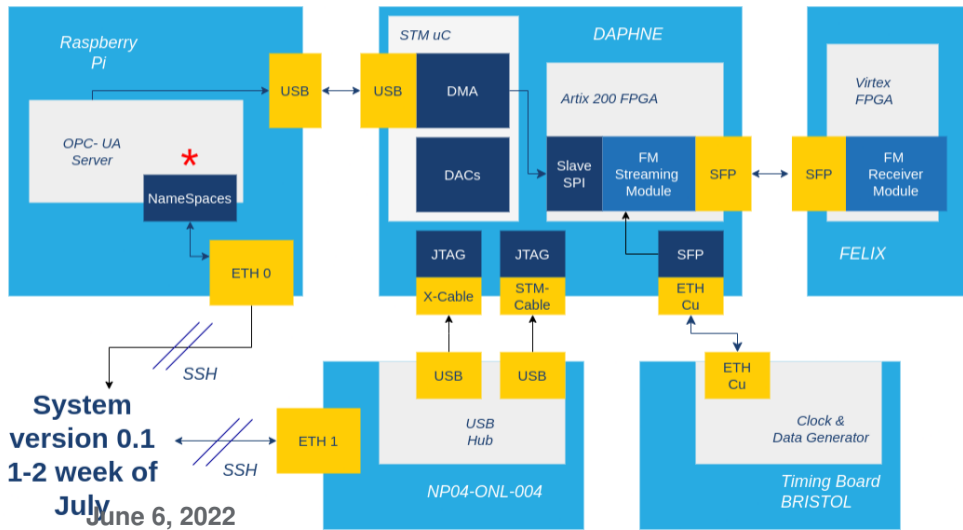
Tested Connections



OPC-UA Server with serial Communication



DAQ Loops of Control?

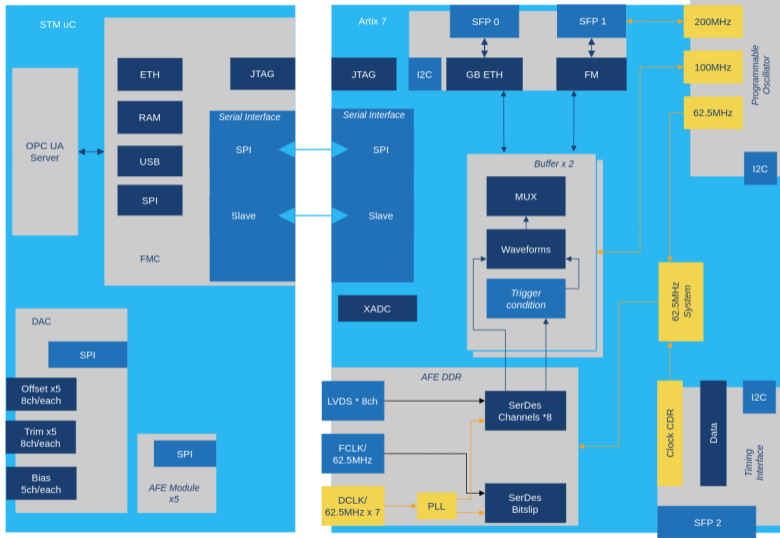


System version 0.1
 1-2 week of July
 June 6, 2022

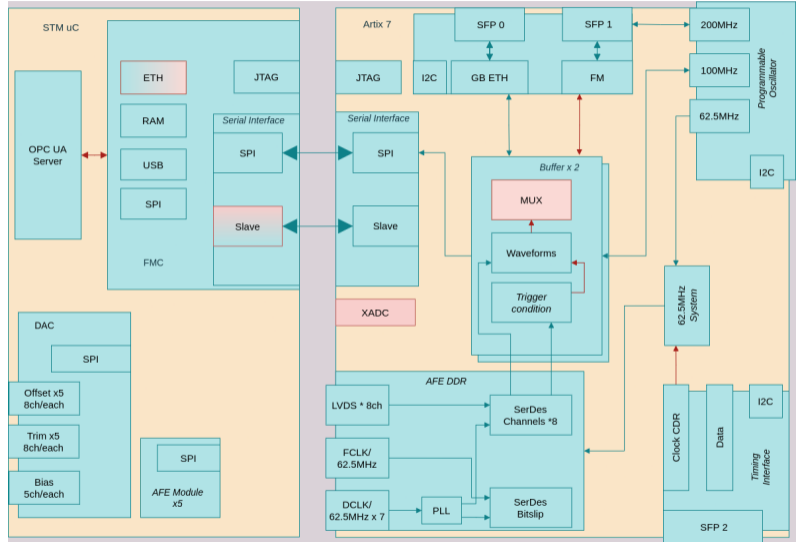
DAQ Format

Created:	16 Mar.2021																																
Updated:	18may2022																																
Version:	v2.0																																
K/D	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
0	0001	0x00						0x00						0x00						SOF (K.28.1)													
1	0000	14-bit Trigger Peak height										Channel #										DAPHNE #						Data Version#					
2	0000	20-bit PDS Reserved Bits																		12-bit WF length in Words													
3	0000	Packet Counter[31:0]																															
4	0000	Timestamp Waveform [31:0]																															
5	0000	Timestamp Waveform [63:32]																															
6	0000	T(2) [3:0]			T(1) [13:0]						T(0) [13:0]																						
7	0000	T(4) [7:0]			T(3)[13:0]						T(2)[13:4]						T(4)[13:8]																
8	0000	T(6)[11:0]			T(5)[13:0]						T(7)[13:0]						T(4)[13:8]																
9	0000	T(9)[1:0]			T(8)[13:0]						T(7)[13:0]						T(6)[13:12]																
10	0000	T(11)[5:0]			T(10)[13:0]						T(9)[13:2]						T(11)[13:6]																
11	0000	T(13)[9:0]			T(12)[13:0]						T(11)[13:6]						T(13)[13:10]																
12	0000	T(15)[13:0]			T(14)[13:0]						T(13)[13:10]						T(15)[13:10]																
13	0000	T(18) [3:0]			T(17) [13:0]						T(16) [13:0]						T(18)[13:10]																
142	0000	T(313)[1:0]			T(312)[13:0]						T(311)[13:0]						T(313)[13:12]																
143	0000	T(315)[5:0]			T(314)[13:0]						T(313)[13:2]						T(315)[13:6]																
144	0000	T(317)[9:0]			T(316)[13:0]						T(315)[13:6]						T(317)[13:10]																
145	0000	T(319)[13:0]			T(318)[13:0]						T(317)[13:10]						T(319)[13:10]																
146	0000	32-bit flex word																															
147	0000	BUSY Signal			CRC-20																		EOF (K.28.6)										
148	0001	0x00						0x00						0x00						IDLE (K.28.5)													

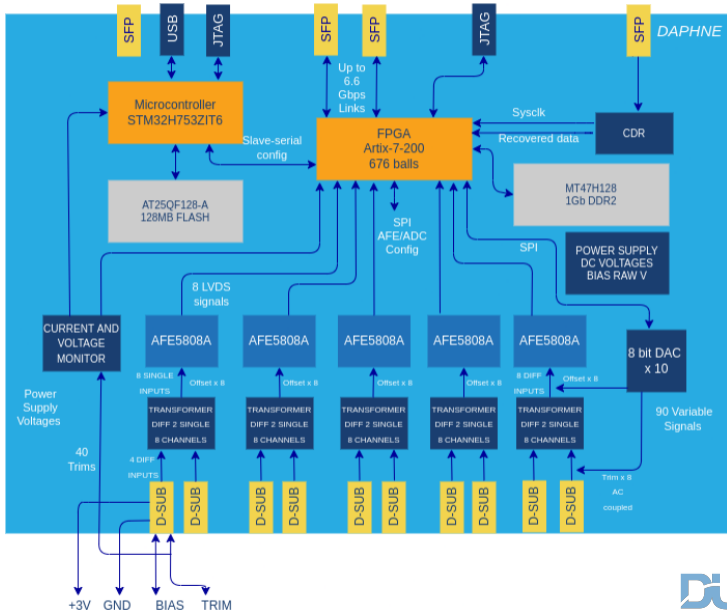
Firmware Scheme



Firmware Scheme Status



Hardware Scheme



Hardware Scheme Status

