Subject: Re: 2x2@MINOS electronics integeration
Date: Mon, 11 Nov 2019 18:10:34 +0300
From: Nikolay Anfimov <anphimov@gmail.com>

Dear Ting,

I guessed that you discussed most of these topics with Igor who presented light readout at the collaboration meeting. My apologies for the misunderstanding. I can briefly answer some questions. Sasha Selyunin (he is in the mail list) will provide more details soon. Please attach him to our discussions also. Some questions will be figured out after tests in Bern only.

- Access (links) to documentations describing your subsystem

https://www.overleaf.com/read/bvfxwxsmycmk

- Number of readout/control electronics modules for your subsystem

In total, we have to provide the readout for 384 SiPM channels (192 for LCM and 192 - ArcLight).
1. We are going to use 7 ADC VME modules + 1 VME trigger unit so we require 1 VME crate and 1 19'' rack.
2. 8 Programmable Gain Amplifiers (PGA) pre-Amplifiers units 220x147x100 mm which are placed close (1-2 m) to main cryostat vessel.
3. 4 modules of custom made power supply based on DACs or 8 CAEN WA7040ANXAA4 - A7040AN modules with 48 channels/each + SYx527LC mainframe. We will make a decision after the prototype tests at Bern Uni.

- Size of chassis of electronics for your subsystem (NIM,VME, custom box etc)

we need 1 VME crate with 8 free slots and 1 19'' rack. In a case of CAEN Power supply for SiPM, we need 8 CAEN WA7040ANXAA4 - A7040AN modules with 48 channels/each + SYx527LC mainframe.

- DC power supplies and distribution modules for your subsystem and control protocol

We require Power supplies for the PGA amplifiers - +5V 60A, +/-5V 6A, +/-5 V 4A. Clean DC with very low ripple < 3 mV

- AC power requirement including power estimate, ripple noise, required PDU outlets (# of 110V/208V etc.), remote control and backup (UPS) needs

1. 4 outlets of 220-240 V AC for SiPM power supply units - 10 Amps more than enough.
2. 3 outlets of 110V AC for DAQ computer + laptops

- Cooling/heat requirement (water cooled, forced air cooled, heat-tape etc.)

Air cooling for PGA amplifiers. Fans would be enough for room temperature. What is the environment in the halll? Humidity, Temperature, etc..

- Cabling and grounding: input/output to/from TPC modules, cryostat flange, front-end crates and DAQ servers

In current approach, we need
1. 64 FCS8-20-01-L-S-A-TR connectors on both sides (cool and warm) of the flange.
2. VME crate in 19'' rack.
3 DAQ server (we install our software on a PC). PC requirements: Sasha will figure it out ASAP.
4. 120 m of 3M-170034 ribbon cable.

- Network requirement: switches, Ethernet port etc.

We need 10-port 10 Gbps optical switch with SFP+ for ADC readout + 1 PCI-e Ethernet Card with 10 Gbps SFP+

- Monitoring and control scheme/method (analog interface? Digital interface? Work with EPICS?)

We are developing our own SlowControl software for Light readout.

- Proximity requirement: is the rack placed on the MINOS west catwalk, or on 2x2 vessel top flange?

1. PGA amplifiers are at 1m distance from the Vessel flange
2. VME crate with ADCs is at 7.5m from PGA amplifier units.

Sorry for the inconvenience with the schedule. I or Sasha will be glad to answer any further questions. If you decide to arrange a phone meeting please let us know.

Best,

Nikolay