

# SNO+ Surface Test Stand User's Guide

Andy Mastbaum <[mastbaum@hep.upenn.edu](mailto:mastbaum@hep.upenn.edu)>, March 2015

## Introduction

The SNO+ surface test stand is a minimal but representative collection of detector hardware, intended for hardware debugging and testing of the DAQ software. It consists of a timing rack with an SBC and MTC/D in a VME crate, a 10 MHz clock source, and a TUB; a data crate with an XL3, a CTC modified to provide low bias current to the trigger sum, up to two FECs and PMTICs, and a high voltage supply with a test load; a DAQ computer (Mac Mini) for running Orca/penn\_daq and an event builder computer (iMac); a switch for the private (10.0.0.0/24) network; and a telnet power switch for controlling power remotely.

## Coordinating Use

Only one user at a time can operate the test stand, so it is important to plan ahead and coordinate use. If you know in advance that you'll need the test stand at a specific time, send an email to the DAQ development mailing list ([snoplusdaqel@snolab.ca](mailto:snoplusdaqel@snolab.ca)). Otherwise, if there has been no email to the list, the test stand power is off, and no one appears to be using the DAQ machine, announce your presence on the mailing list and proceed with testing.

## Starting the Test Stand Remotely

1. Connect to the SNO+ VPN
2. VNC to the test stand DAQ computer ([snotdaq2@teststand.sp.snolab.ca](mailto:snotdaq2@teststand.sp.snolab.ca))
  - a. Usual DAQ password (i.e. same as daq1)
  - b. If it looks like someone might be doing something, try to get their attention
3. Optionally connect to the test stand builder ([snotdaq@builder2.sp.snolab.ca](mailto:snotdaq@builder2.sp.snolab.ca))
  - a. Usual DAQ password
4. Telnet to the test stand power control (`telnet 192.168.80.16`)
  - a. Usual DAQ password
  - b. If the power is on, try again later or send an email to the list
  - c. Otherwise, use the commands `/ON n` and `/OFF n` to control power, where "n" is 1 for the timing rack and 2 for the data rack. Use `/H` for help.
5. Be sure to initialize the MTC/D and any installed FECs soon after powering on
6. Check the low voltage read-back for the FEC(s) and XL3
7. Proceed with testing

## High Voltage Testing

An important aspect of DAQ debugging is testing the HV controls. Ramping HV requires that the rack is closed and secured (by Noel), the XL3 is plugged into the HV supply, and the HV supply

has a test load box attached. Until further notice, *a/ways* send an email to the mailing list and confirm that everything is correctly set up before proceeding with any HV testing.

### **Low Voltage Checks**

Bad voltages can cause hardware damage, and there is no slow controls system on the test stand to provide feedback. Check the FEC and XL3 voltages at power up and periodically during testing, and power down and send an email to the list if you suspect there is a voltage problem.

### **Using the Test Stand in Person**

In person, you may either telnet to the power switch or press and hold the buttons to enable/disable rack power; the switch is located on top of the MTC/D crate. At the desk, the DAQ computer is on the right, and the test stand builder is the iMac to the left. If you remove or reposition any boards while using the test stand, it is important that you communicate the new configuration to the [snoplusdaqel@snolab.ca](mailto:snoplusdaqel@snolab.ca) mailing list, and it would also be nice to update Orca settings appropriately.

### **Shutting Down the Test Stand**

In order to prolong the life of the hardware, we should aim to minimize power cycling and initialize Xilinx chips as few times as possible. So, if someone is waiting to use the test stand, even in the next few hours, leave it on and communicate the state (what is on, what is initialized, etc.) to the next person.

Otherwise, when finished using the test stand, power down both the timing and data racks, and quit any Orca sessions and close all other windows on the DAQ and builder machines. This will help make it clear to the next person that no one is currently using the system.

If you changed any settings in the Orca file, be sure to return them to their former state.