SVT Hardware Interlock System Update

Detector Support Group

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03/21/2018

NI cRI0 Processor Failure

- After the power outage on 3-6-2018, the SVT Hardware Interlock System cRio 9067 processor failed to boot.

- The system was bypassed to enable the SVT HV/LV and chiller to operate without the interlock system.

Replacement Processor

- A replacement cRio has been ordered and delivery is expected by 3-27-2018.

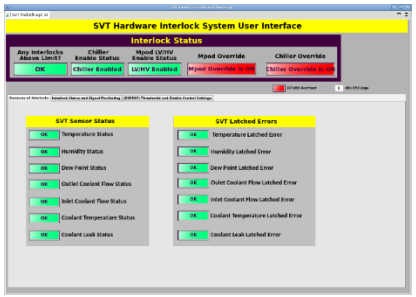
- Replacement cRio is NI-9035.
  - Same as the other interlock systems.

- In the interim, a loaner cRio NI-9035 has been installed, configured, and tested.

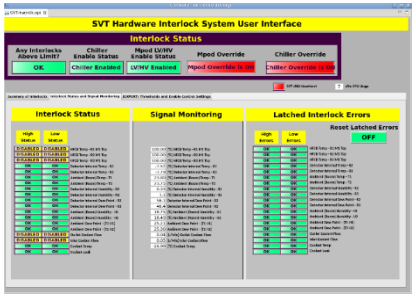
New Program Features - EPICS Interface

- EPICS client interface.
- Link to CSS screen added to SVT Hard Interlocks on main SVT overview.
- Four main tabs on EPICS user interface.
- Same layout as LabVIEW user interface.
- SoftIOC reset added to main Hall B IOC screen.

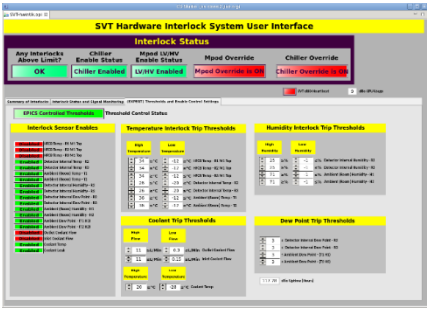
New Program Features - EPICS Interface



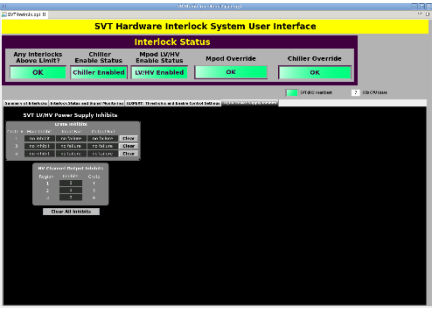
Summary of Interlocks



Interlock Status and Signal Monitoring



Thresholds And Enable Control Settings



LV/HV Power Supply Inhibits

New Program Features - Data logging

- Added EPICS Data logging
  - 118 EPICS SVT hardware interlock signals to Mya archiving.
  - Requested same dead band as similar slow control signal type (temperature, humidity, etc.).

New Program Features – Averaging

- Added Averaging Option
  - Allows for input signal averaging before interlock processing.
  - Controls accessible via LabVIEW user interface only.
  - Currently set to 100 samples, 10ms sampling.

New Program Features – Trip Delay

- Added Trip Delay Option
  - Allows option for time delay before tripping interlock.
  - Controls accessible via LabVIEW user interface only.
  - Currently set to 3 seconds.

New Program Features – User Interface

- LabVIEW User Interface
  - Adds delay trip control and signal averaging control.
  - Adds threshold configuration file status, up time counter, and system heartbeat.
  - Region 4 deleted.
  - User Interface link now loaded and tested on SVTINTERLOCKS computer in counting house.

New Program Features – Threshold Control

- Two modes of threshold control.
  - LabVIEW and EPICS control – Only one can be in control at a time.
  - Control mode chosen via LabVIEW user interface only.
  - Threshold control status indicator available on EPICS threshold control screen.

New Program Features – Threshold Control

- All thresholds are saved as a text file on SD drive in cRio.
  - File is automatically updated with timestamp upon any threshold change.
  - Thresholds are automatically restored on cRio boot.
  - Threshold configuration file status available on LabVIEW interface.

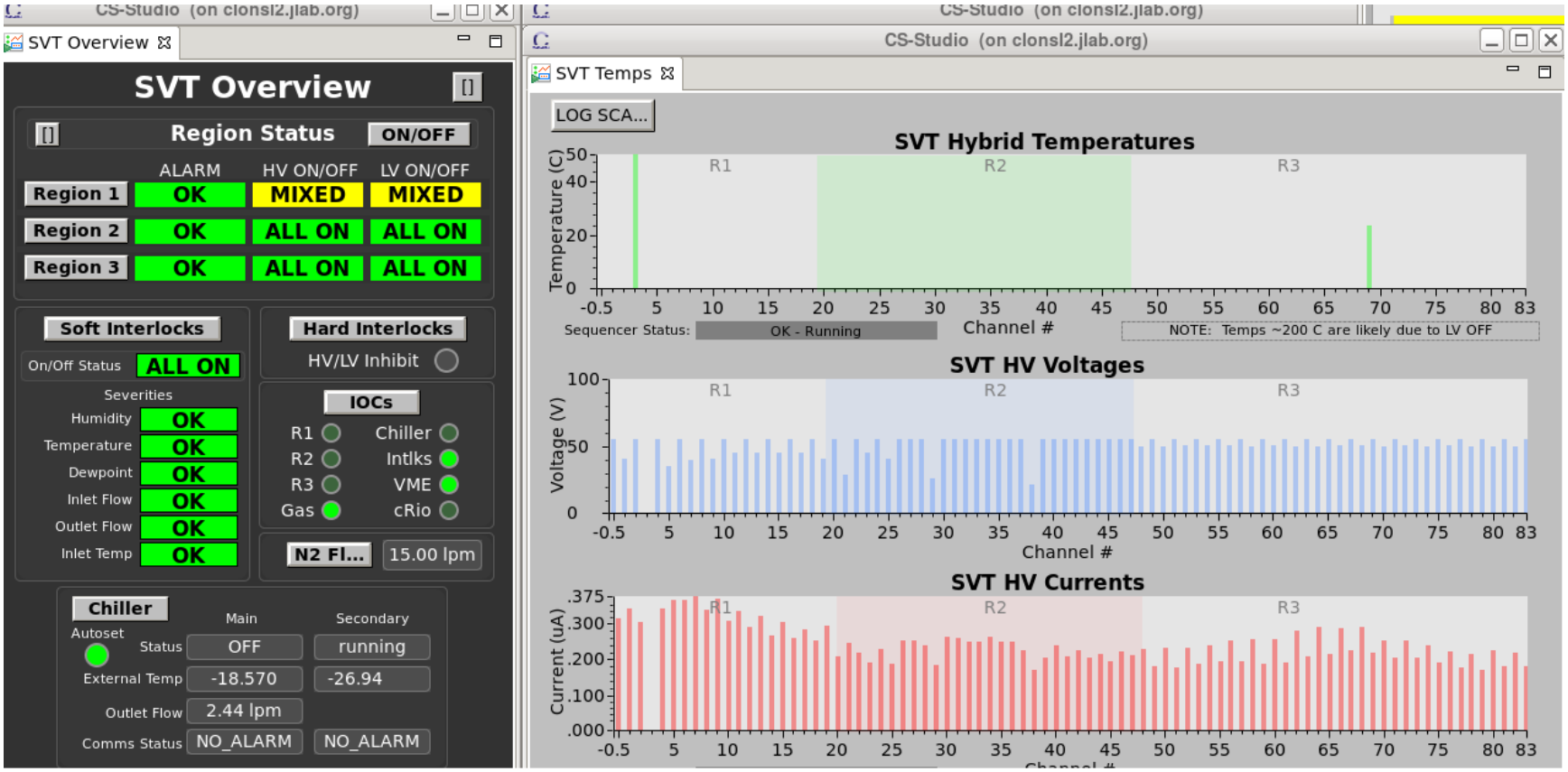
LabVIEW Real-Time Program Update

- Correctly reads negative coolant temperatures.
- Fixed ambient temperature T2 interlock.
- Humidity readings below 0% RH not permitted.
- Corrected in/out coolant flow signals.
- Region 4 deleted from interlock logic.
- Leak sensor repaired and tested.

Summary

- On 3-6-2018, the SVT Hardware Interlock System cRio processor failed to boot.
- A replacement cRio has been ordered and delivery is expected by 3-27-2018.
- In the interim, a loaner cRio has been installed, configured, and tested.
- The latest version of the hardware interlock program has been installed and tested.
- **All outstanding hardware and software issues have been resolved with this SVT Hardware Interlock System update.**

SVT Status


CS-Studio (on clonsl2.jlab.org)
SVT Overview
SVT Overview
Region Status
ON/OFF
ALARM
HV ON/OFF
LV ON/OFF
Region 1
OK
MIXED
MIXED
Region 2
OK
ALL ON
ALL ON
Region 3
OK
ALL ON
ALL ON
Soft Interlocks
On/Off Status
ALL ON
Severities
Humidity
Temperature
Dewpoint
Inlet Flow
Outlet Flow
Inlet Temp
OK
Hard Interlocks
HV/LV Inhibit
IOCs
R1
R2
R3
Gas
Chiller
Intlks
VME
cRio
N2 Fl...
15.00 lpm
Chiller
Autoset
Main
Secondary
Status
OFF
running
External Temp
-18.570
-26.94
Outlet Flow
2.44 lpm
Comms Status
NO_ALARM
NO_ALARM
CS-Studio (on clonsl2.jlab.org)
SVT Temps
LOG SCA...
SVT Hybrid Temperatures
Temperature (C)
R1
R2
R3
Sequencer Status:
OK - Running
Channel #
NOTE: Temps ~200 C are likely due to LV OFF
SVT HV Voltages
Voltage (V)
SVT HV Currents
Current (uA)