DSG NPS Collaborators' Meeting Update

Aaron Brown and the Detector Support Group

12/03/2020

Contents

- Hardware Status
- CAEN HV Module Ramp Testing
- CAEN HV Module Trip Testing
- NPS Hardware Interlock System
- Conclusion

Hardware Status

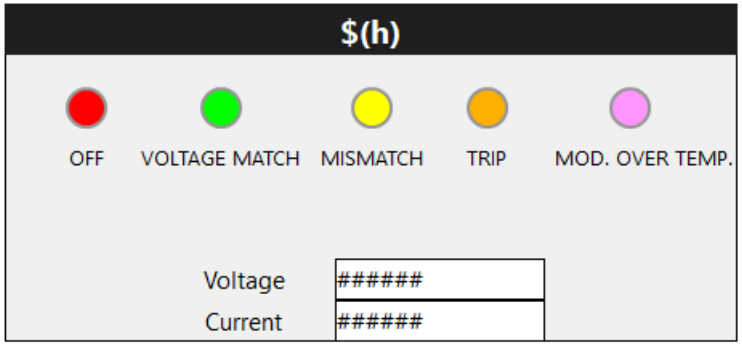
- HV Divider Cables
  - Mindy Leffel has fabricated 1020 of 1100 cables
  - Expect to have all cables fabricated by January 2021

- Procurement status for cables/connectors
  - Radiall 52-pin connectors: ETA November 2020 **DELAYED**
    - Expected by end of December 2020
  - SAMTEC IPBD-15-D-K & IPBD-08-D-K: ETA November 2020 **ARRIVED**
  - GWP 142’ multi-conductor wire: ETA December 2020 **ARRIVED**

Hardware Status

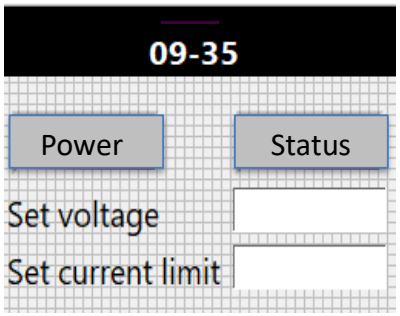
- Module Testing
  - George Jacobs completed ramp testing of all HV modules
    - Module #297 is defective; could not be tested
  - Used Python program with Pyepics package

- PMT status pop-up screen
  - 70 of 1080 screens completed



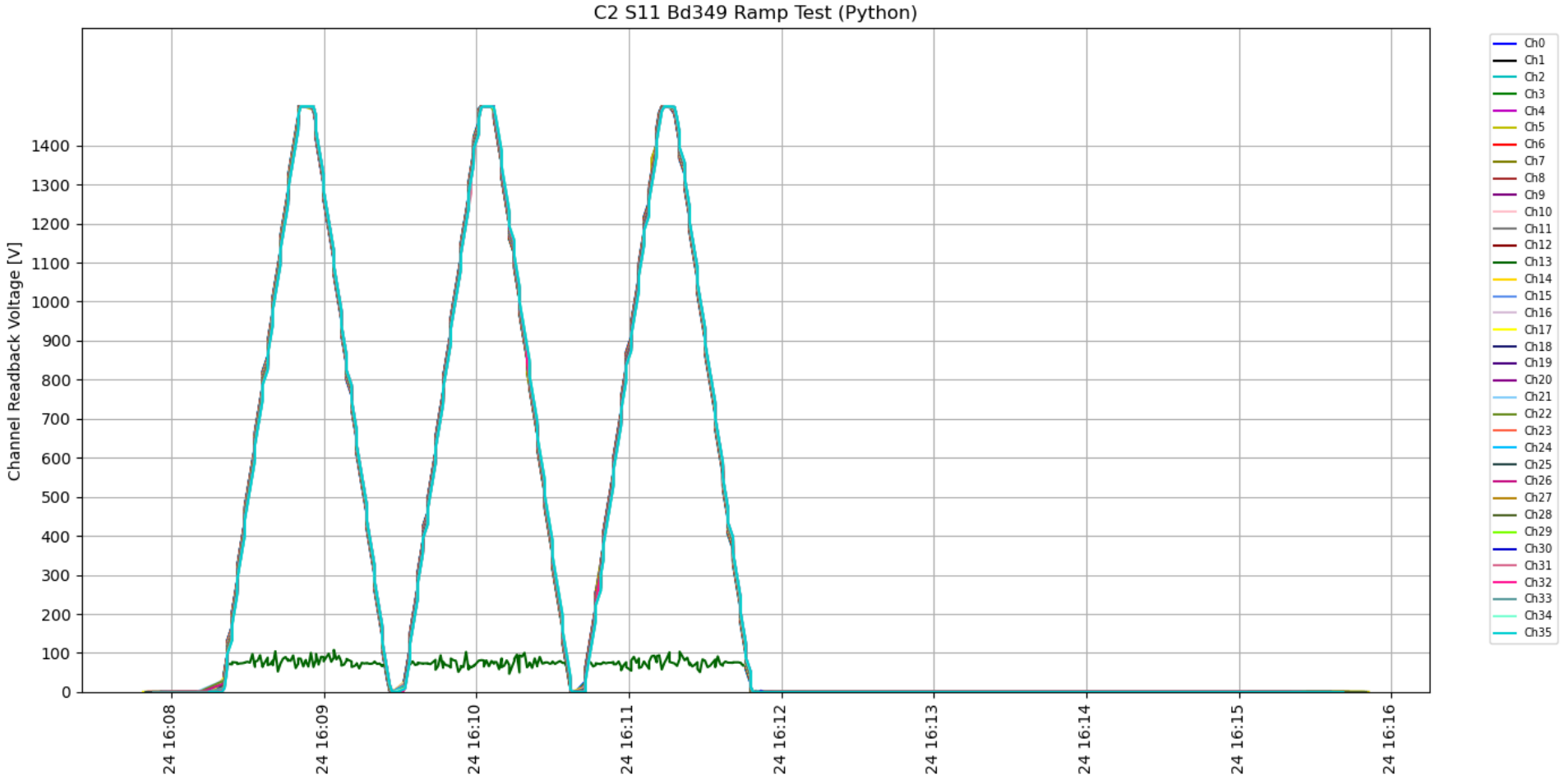
PMT Status Dashboard

- PMT settings pop-up screen
  - Sets voltage and current
  - Mary Ann Antonioli completed 468 of 1080



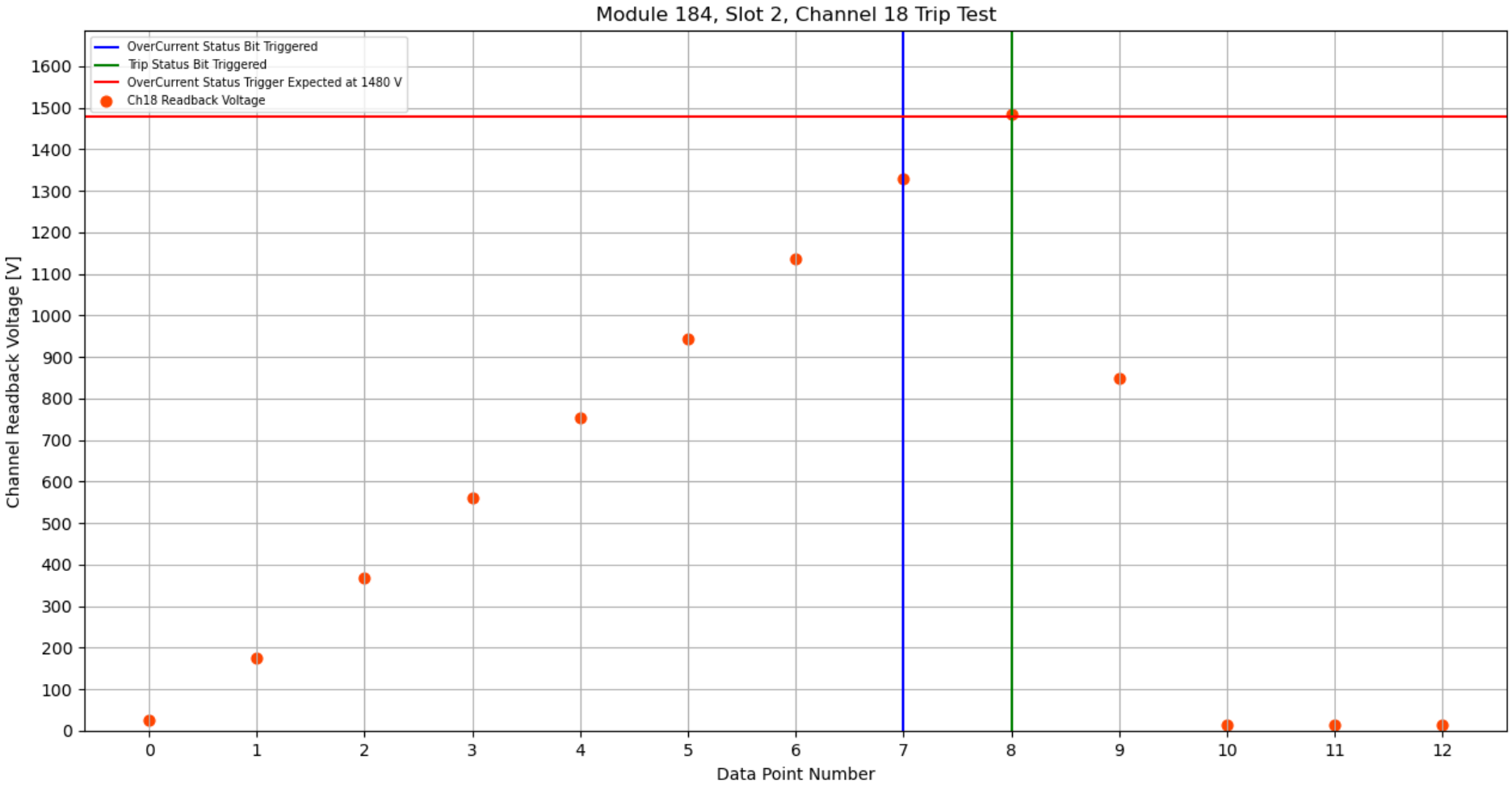
PMT Settings Screen

CAEN HV Module Ramp Testing



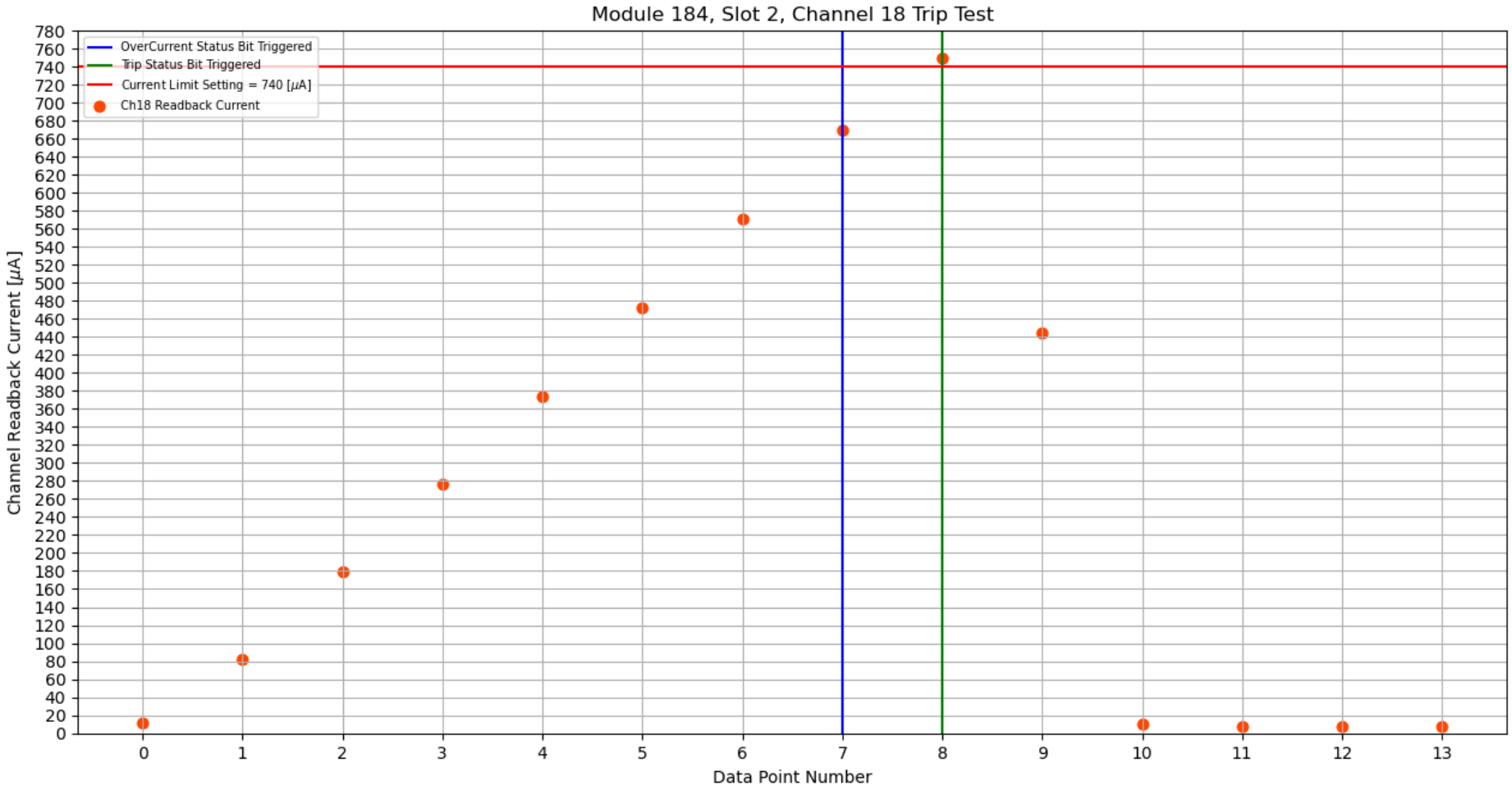
- New Python ramp test program addresses EPICS communication issues experienced when using CSS-BOY script for testing
- Module #349 has a bad channel: Ch #13 failed to ramp beyond 75 V

CAEN HV Module Trip Testing (Voltage)



- All channels ramped from 0 V to 1500 V at ~200 V/s
  - Mary Ann Antonioli has analyzed ~600 channels
  - Readback voltage did not reach 0 V after trip

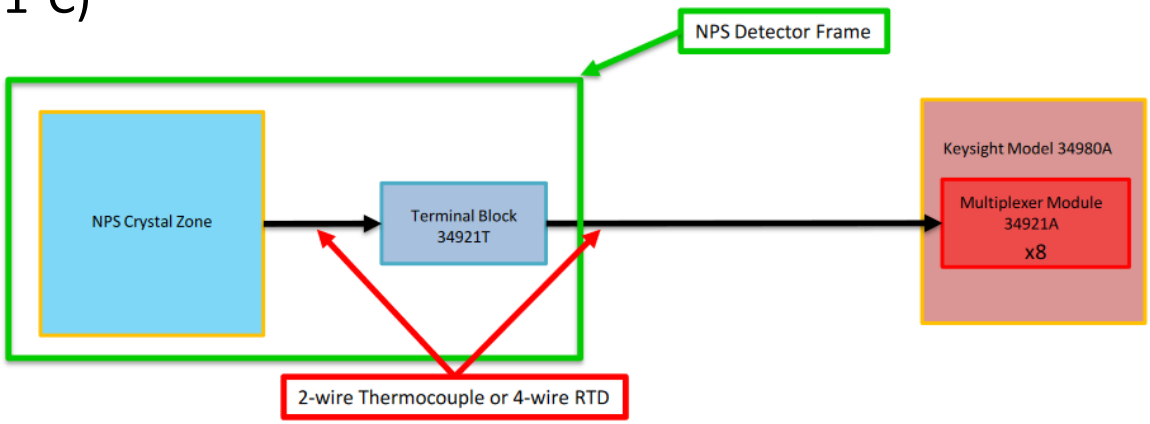
CAEN HV Module Trip Testing (Current)



- Readback current never reached 0 μA after trip

NPS Hardware Interlock System

- Monitors environmental conditions within NPS detector frame
- Protects detector by interlocking on:
  - Humidity (~30-40% RH)
    - Sensor sensitivity of ± 3%
  - Temperature
    - Crystal zone (18°C ± 0.1°C)
    - Electronics zone (TBD)
  - Coolant leaks
  - Fan speed
  - Chiller status



Crystal Zone Temperature Scanner

- Monitored signals transmitted to EPICS
- Developing a 3-dimensional model of the detector using NX12 to determine where to place temperature and humidity sensors

Conclusions

DSG is making good progress in all areas!

Thank You