



U.S. DEPARTMENT OF  
**ENERGY**



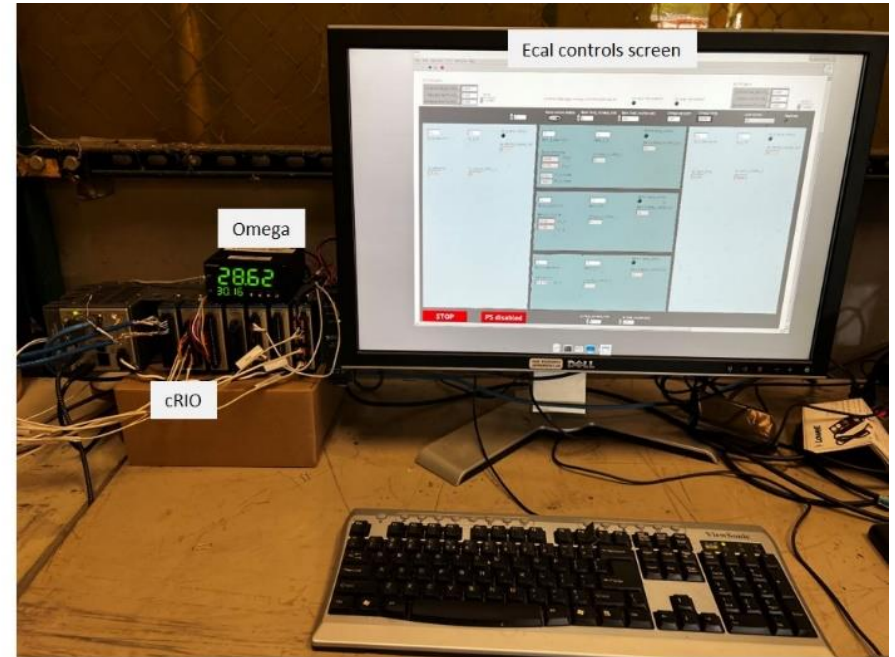
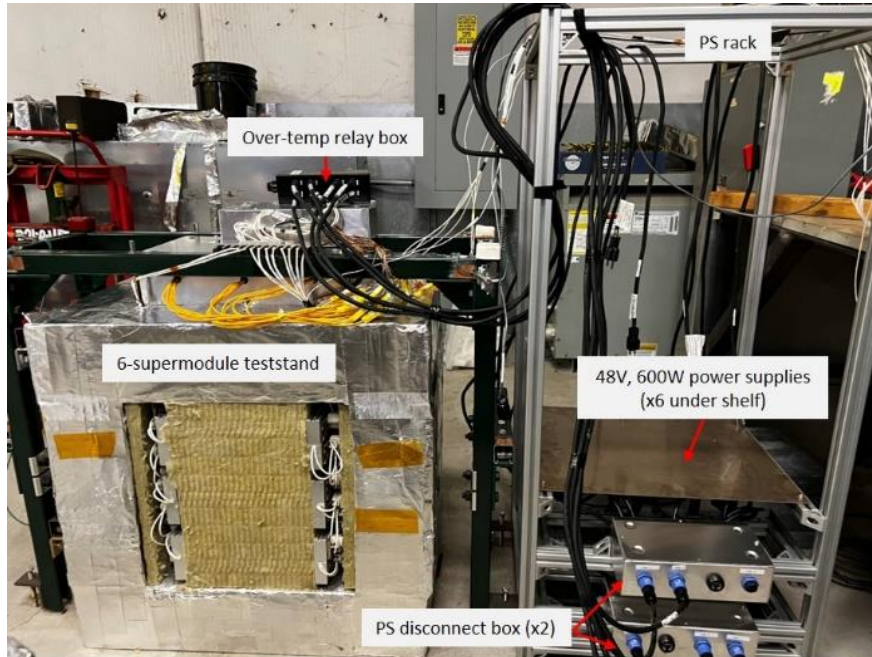
# ECAL Heater Controls Update

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# Six-Supermodule Test Stand Update



- Controls and test stand ready for low temperature testing
  - Testing start date is 2023/8/4

# Full System Procurement

Item	Component	Manufacturer	Units	Cost per unit	Subtotal	Lead time	Comment
	DAQ system						
1	<a href="#">cRIO 9045 controller</a>	National Instruments	1	\$5,992.00	\$5,992.00	55 days	Programmable access controller
2	PS-10 power supply	National Instruments	1	\$311.00	\$311.00	55 days	cRIO power supply
3	Power cord	National Instruments	1	\$21.00	\$21.00	55 days	cRIO power cord
4	<a href="#">NI-9264 16 ch. analog output</a>	National Instruments	3	\$1,812.00	\$5,436.00	55 days	Provides 0-10 V for supply control
6	<a href="#">NI-9213 16 ch. thermocouple module</a>	National Instruments	3	\$2,217.00	\$6,651.00	55 days	Reads heater thermocouples for controls
8	<a href="#">NI-9205 32ch. analog input module</a>	National Instruments	2	\$1,538.00	\$3,076.00	55 days	PS output current sense
	Current sensors						
11	<a href="#">AMP25S current sensor</a>		44	\$14.90	\$655.60	in stock	Reads PS output current and converts to voltage
	Temperature sensors						
12	<a href="#">WTK-10-60 (Type K thermocouple)</a>	Omega	91	\$26.68	\$2,427.88	90 in stock (4 weeks)	Thermocouple rated to 482°C
13	<a href="#">Ceramic thermocouple connectors</a>	Omega	91	\$12.44	\$1,132.04	53 in stock (4 weeks)	High temp connection to extend thermocouples
14	<a href="#">GG-K-20-500 thermocouple cable</a>	Omega	10	\$467.00	\$4,670.00	2 in stock (2 weeks)	500' spool thermocouple extension wire
	Safety controls						
15	<a href="#">Omega CN8DPT-330 process controller</a>	Omega	3	\$462.00	\$1,386.00	2 in stock (1 in house)	Over-temp process controller
	Safety controls Relays						
16	<a href="#">G7L-2A-BUBJ-CB DC24 DPST relay</a>	Omron	22	\$17.07	\$375.54	in stock	NO 25 A contacts, 24 V coil (2 channels per relay)
				Total	\$32,134.06		

- Marc McMullen started procurement on 2023/8/4
- An additional NI-9213 thermocouple module has been purchased to support the six-supermodule test stand

# DSG Work Request Overview

- Additional monitoring for the full detector
  - Estimated ~100 thermocouples to monitor
    - Procure thermocouples + 100% spares (200 thermocouples)
  - Possible additional monitoring parameters
    - Airflow
    - Power supply current/voltage
- Additional support for connecting the full system

# Current DSG Support

- Heater control and monitoring (44 channels)
  - Procure
    - 1 cRIO
    - Thermocouples
    - Cables and connectors
  - Write controls software
  - Install controls equipment in Hall A

# Upcoming DSG Support

- Over-temperature interlock controls
  - Procure
    - 3 Omega process controllers
    - Chassis components (relay chassis)
    - Thermocouples
    - Cables and connectors
  - Design and fabricate
    - Relay chassis
    - Cables
  - Configure and monitor software
    - Install Omega process controllers in Hall A

Thermocouple installation to the detector to be done by Hall A technical group

# Additional Support Request

- 44 power supplies (1 per channel)
  - Procure supplies and cables
  - Install connectors and extension cables on power supplies
    - AC power
    - Output power
    - Controls cables
  - Disconnect chassis
    - Can be combined with over-temperature relay chassis

Power supplies and disconnect chassis to be installed in Hall A by Hall A technical group



# Additional Support Request

- Detector monitoring (100+ channels)
  - Procure
    - 1 cRIO and modules
    - Thermocouples
    - Extension cables and connectors
  - Write monitoring software
  - Install cRIO in Hall A

Thermocouple installation to the detector to be done by Hall A technical group

# Conclusion

- DSG has started testing the controls software on the six-supermodule test stand
- DSG has started procurement of components for the full control system
- DSG management has been updated on the additional support requests

# The End