High Voltage CAEN Tests

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HV CAEN SY4527 Tests

- **Test 1: Hardware test**
  - Voltage test with load connected
    - Voltage readout
    - Current readout
    - Trip levels (Power limit)

- **Test 2: Voltage Ramp Up/Down Test with GECO 2020**
  - GECO 2020 script ramps up/down all channels simultaneously
    - All channels ramp to 1500 V with no load connected
    - Repeated 100 times.
  - Uses GECO 2020 to control, monitor and data log ten channels' parameters
    - Verify any latency to ramp up/down
    - Compare set vs read voltage and other eight parameters

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HV CAEN SY4527 Tests – Cont'd

- **Test 3: Voltage Ramp Up/Down Test via EPICS Client**

  - Test run with developed CSS-BOY screens (EPICS Client) to control and monitor all channels

  - Uses developed EPICS data logger to record PVs

  - Uses GECO interface and advanced data logged functions to verify set/read parameters
    - Communication between CAEN EPICS Server and EPICS Client
    - Ensure all set/read PVs match with actual parameters
    - Check random changes of PV/parameters during manual voltage ramps
    - Ramp Up/Down latencies
    - Compare set vs read voltage

HV CAEN SY4527 Tests – Cont'd

- **Test 4: Stability Test with GECO/EPICS Client**

  - Test run for 24 hours with one or sixteen boards connected

    - At 0 V and 1500 V, no load connected

  - Test uses GECO/EPICS Client interface to control, monitor and log board's parameters

    - Check for set parameters changes
    - Check voltage spikes for all channels
    - Compare set vs read voltage values and the other eight parameters
    - Verify accuracy and stability for set voltage

Summary of Tests

Test #	Name	Description	Checks	GECO			EPICS Client		
				Control	Monitor	Logging	Control	Monitor	Logging
1	Hardware Test	Voltage test. Load is connected for each channel. Uses external devices to measure and verify CAEN output voltage and current readouts	1. Voltage and current readouts 3. Trip Level (Power limit) 4. Compare read GECO parameters with external devices' measurements (LabVIEW code)	X	X				
2	Voltage Ramp Up/Down via GECO 2020	Ramp up/down all channels simultaneously 100 times per trial. All channels ramp to 1500 V, no load connected	1. Voltage ramp up/down latencies. 2. Compare set with read voltage and another 9 parameters	X	X	X		X	
3	Voltage Ramp Up/Down via EPICS Client	Run developed CSS screens and EPICS data logger. Uses java scripts to sets all channels' parameters simultaneously. Voltage set to 1500 V. No load connected	1. Communications between CAEN EPICS Server and EPICS Client. 2. Ensure that all set/read PVs match with actual parameters. 3. Check random changes of PV/parameters during voltage ramp. 4. Compare set with read voltage and another 8 parameters		X		X	X	X
4	Stability Test	Runs for 24 hours with a single and 16 boards at 0 V and 1500 V. No load connected	1. Stability for set voltage 2. Ensure that set parameters do not change. 3. Voltage Spikes for all channels. 4. Compare set with read voltage and another 8 parameters	X	X	X	X	X	

Table title: **High Voltage Tests Description for CAEN SY4527 Systems**

Conclusions

- Tests performed for SY4527 mainframe and boards

  - A7030TN, A1535, and A7435

  - Noticed:
    - Issues when crate is controlled/monitored by EPICS client
    - Ramp up delay issues (fixed by updating firmware on board)
    - Communication loss of board with the mainframe when load is connected

- The plan is to repeat these tests on the new batch of A7030TN boards and SY4527 mainframe

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