Hall B DAQ and rg-h

Sergey Boyarinov

Nov 13, 2026

Current status

- Expected event rate at high luminosity is 85kHz (from Valery Kubarovsky)
- Current DAQ event rate with reliable running is 30kHz
- Upgrade is needed to at least 100kHz event rate
- Trigger system upgrade and/or streaming DAQ

DAQ upgrade plan to 100kHz event rate

- Trigger-based mode is used
- FADC250, DCRB, VSCM, SSP, FAV3 boards will stay
- CAEN TDCs have to be replaced with JLAB vfTDCs
- MM readout to be decided, proposed solution is new SAMPA ASIC based front-end board – under development
- SVT ASIC performance have to be validated for high luminosity running
- Some VTPs have to be used as both trigger and readout modules if needed
- Some boards firmware and CODA software have to be validated and may need to be modified/fixed
- uRWELL readout - under development(VMM3)

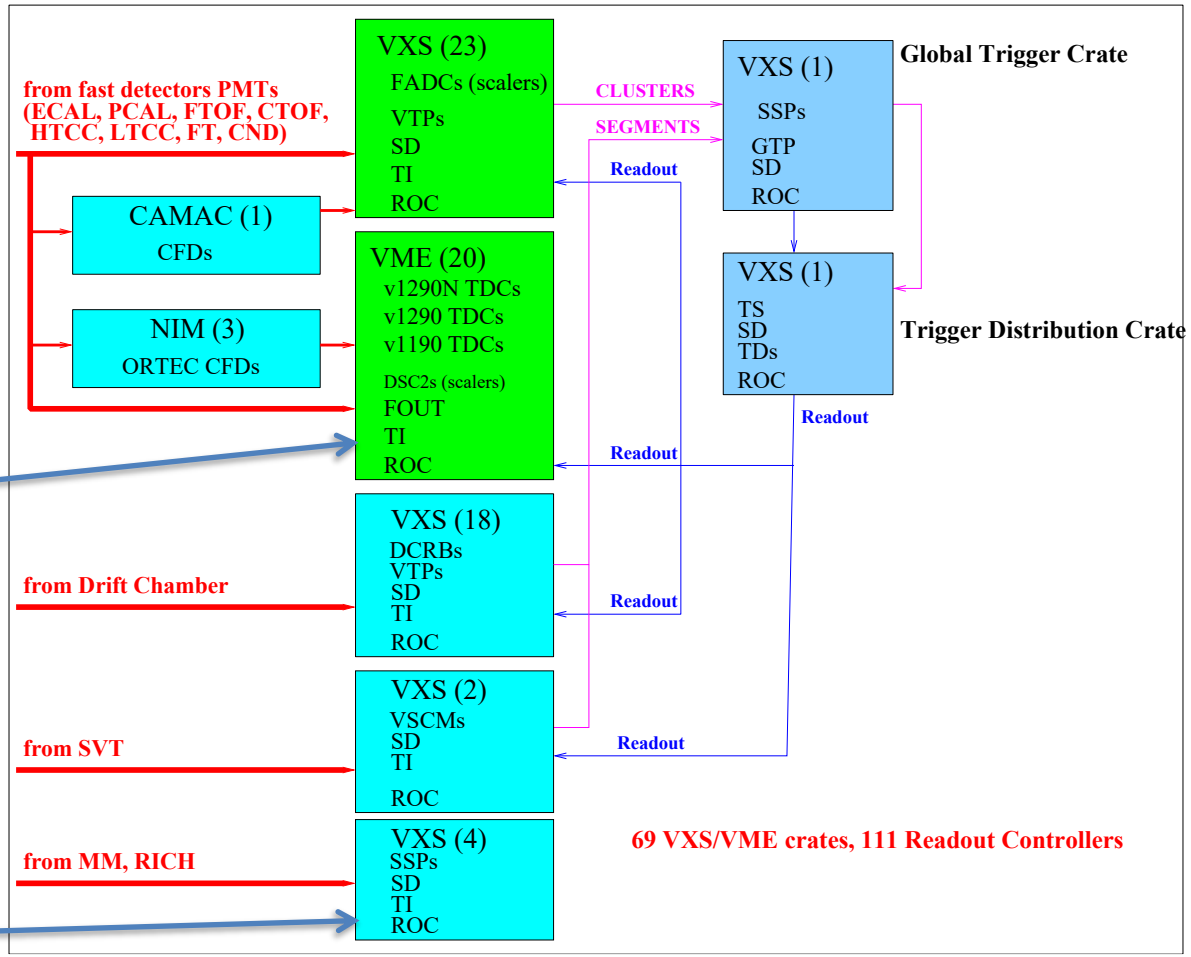
CLAS12 front-end upgrade for 100kHz (current event rate 30kHz)

uWELL readout

Replace CAEN with JLAB vfTDCs

MM readout based on SAMPA ASIC

VME to VTP readout



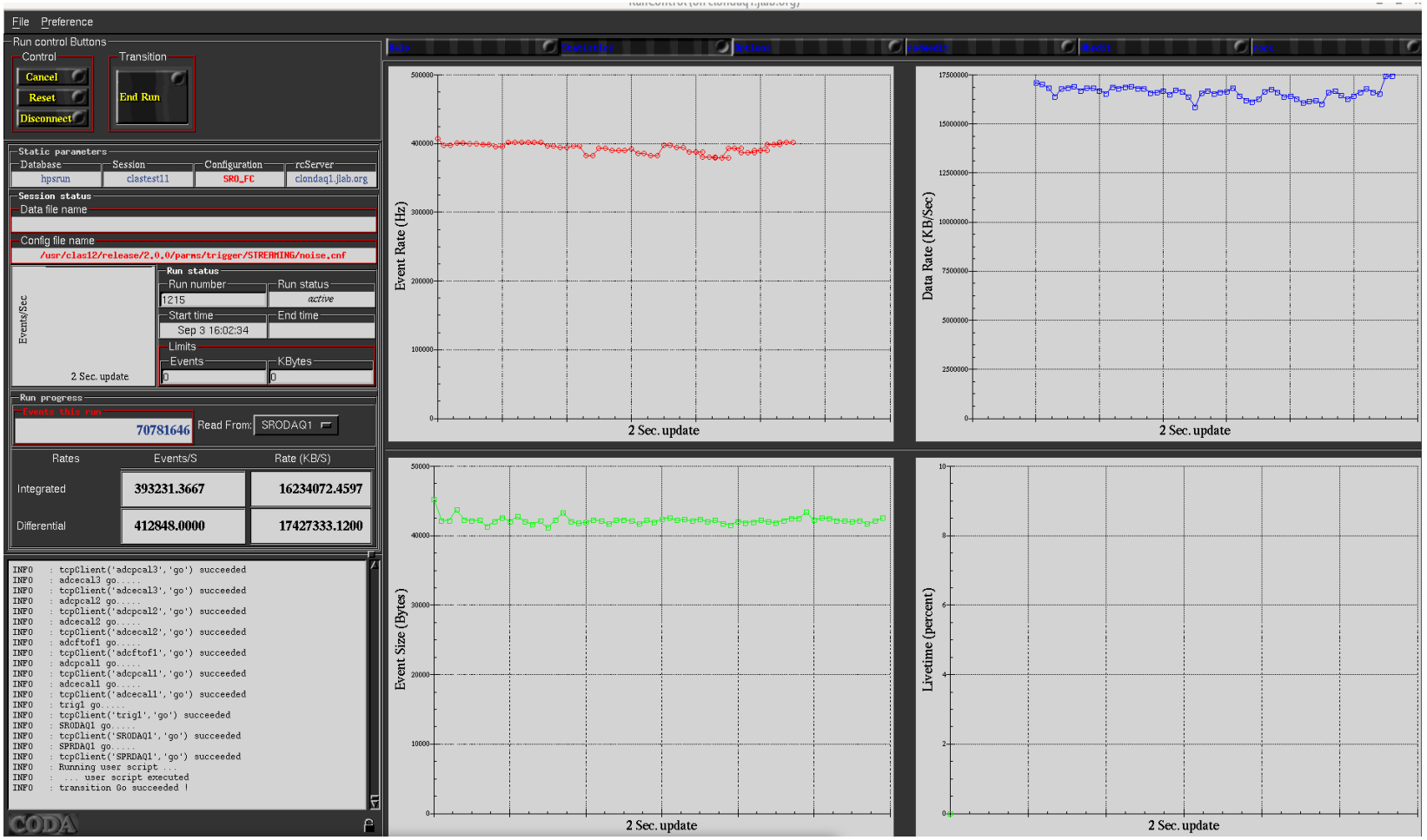
Currently running DAQ-related projects for hi-lumi

- CAEN TDC replacement by JLAB vfTDC boards
- SAMPA for MM (Harsh Purwar)
- VMM3 for uRWELL (Ben Raydo)
- VTP as VME readout replacement for triggered DAQ
- Streaming DAQ: existing front-end boards firmware upgrade and back-end software development

CLAS12 Streaming Readout

- It will be needed to use streaming mode if required event rate will exceed 100kHz (may not happens because of detector limitations and/or L1 trigger system improvements)
- After all upgrades complete, CLAS12 front-end electronics will be ready for the streaming DAQ operation
- CLAS12 streaming DAQ development under way, 39 crates connected allowing full scale testing, aiming for the data rate on the level of 50GByte/sec

18 crates/36 streams (all FC FADCs)



Conclusion

- CLAS12 front-end upgrade is in progress, with the purpose to increase event rate up to 100kHz with existing triggered mode for hi-lumi experiments, and to make system compatible with streaming mode operation in future
- Streaming DAQ development underway, it can be needed by CLAS12 if event rate exceeds 100kHz
- Critical parts are Sampa- and VMM3-based readout boards development, and existing boards firmware upgrade for streaming DAQ compatibility
- CLAS12 online network and computing infrastructures undergo constant upgrades, it is adequate for the high luminosity running