PXIE Ion Source & LEBT Controls Status

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Primary Control is ACNET

- Parameter Page
- Synoptic Displays
- Data Logging
- Fast Time Plot
- Alarms
- Central Database
- Java

High Voltage Rack

- Filament PS
- Arc PS
- Plasma Electrode PS
- Extraction Electrode PS
- Extraction Electrode Modulator
- HRM
- Networked Outlet Strip for remote power cycle

Low Voltage Rack

- Two steering magnet power supplies
- HV bias PS
- Media converters (event clock, network, PS control)
- HRM
  - Power Supply status & control
- PLC (Steve Hays)
  - HVPS ramp generation
  - Status/Control level shift
  - Water interlocks
  - Redundant status from LCW PLC
  - Interlock coordination, contactor control

HRM

- General Data Acquisition and Power supply control
  - 64 16 bit ADCs, 10KHz asynchronous sampling
  - 8 16 bit DACs
  - 64 digital I/O bits for status and control
  - 8 programmable triggers
- Copper or Fiber Optic serial link to VME
- Sample & Hold Chassis for pulsed operation

Clock Generator

- Identical to TCLK, except:
  - Event encoding, decoding and transmission is based on 9 MHz (9.02778)
- 16 Events per clock module
- Rep-Rate Generator for dedicated event rates:

  60Hz, 10Hz, 5Hz, 2Hz, 1Hz, 0.5Hz, 0.1Hz
- “Beam” Event triggered by extraction electrode modulator
- Synchronization with 9 MHz from LLRF Master Oscillator
- Subset of TCLK events encoded for console application support

Timer Module

- Clock event decoder
- 8 independent timer outputs
  - Delay, width, and event reference
  - 16 bit registers
  - Selectable timebase (9MHz, 1MHz, 100KHz, 10KHz)
  - External trigger
- 9 MHz, 3 MHz, 1MHz outputs (derived from 9 MHz carrier)

Beam Line Power Supplies

- Solenoid Magnets
  - D/A and current read back via HRM
- Trim Magnets
  - V474 VME Quad Power Supply Controller
    - Four 16 bit DAC outputs
    - Four bytes of status
    - On/Off/Reset control

PLC

- LCW
  - Monitor flows, temperatures, pressures
  - Status Permit (redundant) to Ion Source interlocks
- Hydrogen
  - Flow monitor at bottle and at Ion Source
  - Flow control at Ion Source
  - Remote power cycle (recovery from spark induced glitch)

LCW Chiller Skid

- Commercial Skid, Filtrine
- Remote Monitoring
  - Temperatures
  - Pressures
- Local Control

Operations

- PXIE Beam Size (BILL Marsh)
  - Control/Scan Parameters
  - Measurement parameters
  - Calculations
- Arc Stabilization FSM (Linden Carmichael)
  - Maintain stable beam current
- Protection FSM (Linden Carmichael)
  - Monitor selected parameters
  - to be expanded
- Turn On/Turn Off Sequencer
- Water flow monitoring (more redundant protection), HRM/VME
  - Set Power Supply D/A to zero on water flow fault
- Two active PXIE consoles in control room

In Progress…

- Vacuum PLC Controls
  - Turbo Pumps
    - Status, Speed, Current
  - Ion Pumps
    - Status, control, pressure read back
  - Vacuum Gauges
    - Ion Gauge, Convectron Gauge
    - On/Off Control
    - Vacuum pressure read back
  - Vacuum Valves
    - Status, Control

In Progress

- LEBT Modulator/Chopper Testing
- ACNET interface to Extraction Electrode Modulator
  - Mode, Pulse width, Frequency
- RFQ RF Amplifier & Circulator Commissioning
  - PLC (Dave Peterson)
    - LCW Temperature, Flow
  - HRM Sample & Hold
    - Drive, Forward, and Reflected Powers