

Primary Beamline Radio-Activated Water (RAW) Preliminary Design Review

Target Hall (TH) and Absorber Hall (AH) Controls

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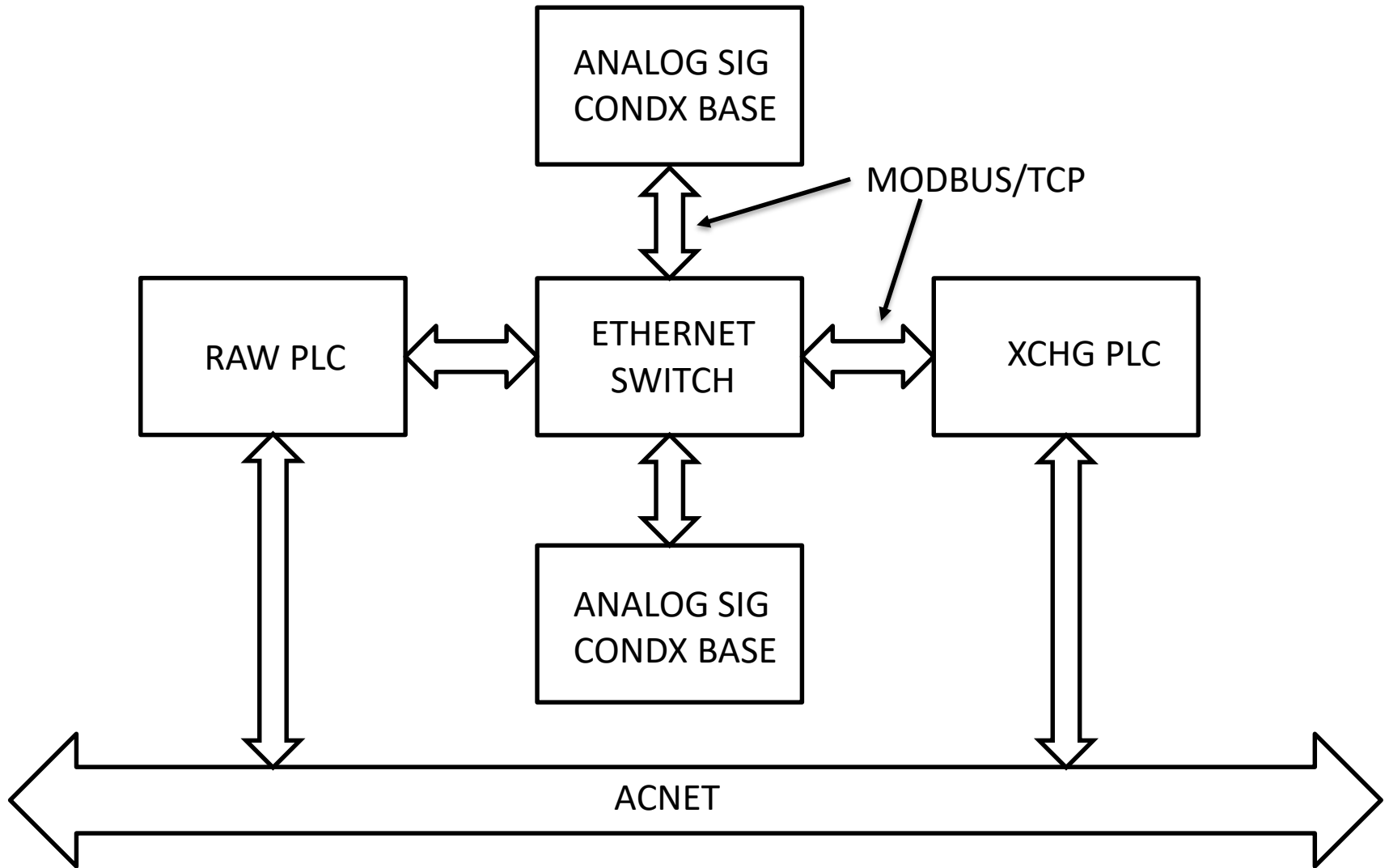
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RAW System - Preliminary Design Review

TH and AH RAW Controls

- Four PLC systems total
 - TH RAW and Intermediate
 - TH RAW Exchange
 - AH RAW and Intermediate
 - AH RAW Exchange
- Separate exchange PLCs can be operated and serviced without affecting beam operations
- Radiation-tolerant instrumentation on RAW skids requires adding signal conditioners on many PLC analog inputs

TH & AH RAW Controls – System Configuration



TH & AH RAW Controls – TH RAW PLC

- Services six skids:
 - TH Intermediate skid
 - Target RAW skid
 - Target Shielding Pile RAW skid
 - Horn A RAW skid
 - Horn B RAW skid
 - Horn C RAW skid
- Six separate temperature loop controllers
 - Serviceability
 - Ability to change loop parameters without impacting the PLC
- 2 meter wide Rittal floor cabinet

TH and AH RAW Controls – TH Intermediate and RAW PLC

- 222 total I/O channels
 - 38 mV strain gauge pressures
 - 18 mV magnetic pulse flow
 - 14 Pt RTD
 - 94 conventional 4-20 mA inputs
 - Compare to NuMI THSR PLC which services 280 channels
- Local HMI panel
- Flow switches on water lines supplying the target chase
 - Summation is a direct input to the permit system
 - Sum box also drives PLC inputs for ACNET readout

TH and AH RAW Controls – TH Exchange PLC

- 83 total I/O
 - 31 ch conventional 4-20 mA analog inputs
 - 52 ch digital outputs mostly command motorized valves
- Queries TH RAW PLC over private network for fill/drain limits
- HMI control panel at barrelling station
- 2 meter wide Rittal floor cabinet will have space for future additions

TH and AH RAW Controls – AH Intermediate and RAW PLC

- 63 total I/O channels
 - 8 mV strain gauge pressures
 - 4 mV magnetic pulse flow
 - 5 Pt RTD
 - 33 conventional 4-20 mA inputs
- 2 meter wide Rittal floor cabinet houses RAW and Exchange PLCs
- Local HMI panel

TH and AH RAW Controls – AH Exchange PLC

- 28 total I/O, no rad-tolerant analog
- Low-end PLC
- Queries AH RAW PLC over private network for fill/drain limits
- HMI control panel at barrelling station
- Shares cabinet with AH RAW

TH and AH RAW Controls – Bill-Of-Material Cost Summary

- August 2013 estimate:
 - No allowance for rad-tolerant instrumentation and Horn C
 - 5 TH skids @ \$6435 = \$32,175
 - 3 AH skids @ \$6435 = \$19,305
 - \$51,480

- February 2020 estimate:
 - TH RAW and Exchange \$35,400
 - AH RAW and Exchange \$15,800
 - \$51,200