55.G2 Divertor thermocouples

Functional breakdown

M.Salmic

Outline

- Signal chain
- FPGA functions
- Configuration objects
- CODAC communication
- Compliance matrix

COSYLAB

01 Global (GLB)

- + 0101 PBS 47 Plasma Control System (PCS)
- + 0102 PBS 26 Cooling Water System (CWS)

02 Data Acquisition (DAQ)

- + 0202 Analog to Digital Conversion (ADC)

03 Data Processing (DPC)

- + 0301 Measurement (MES)
- + 0303 Statistics (STA)
- + 0304 Control (CTR)

04 System Management (SYS)

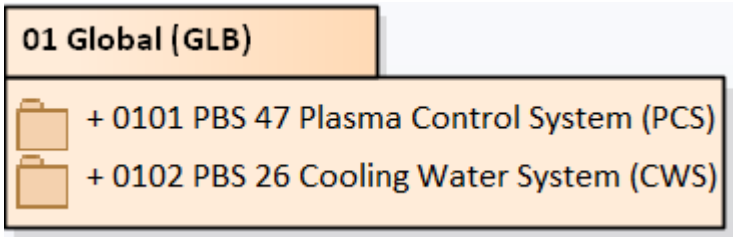
- + 0401 Cubicles (CUB)
- + 0402 Fast Controller CPU (PCF)
- + 0403 Fast Controller IO Chassis – cRIO (PXI)
- + 0404 Fast Controller IO Boards (FIO)

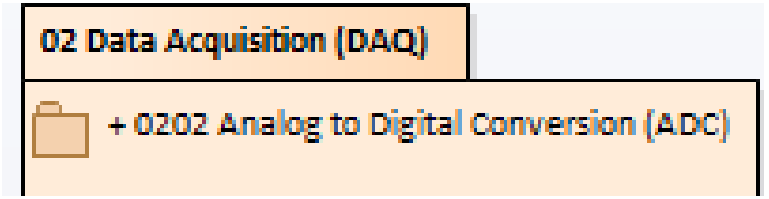
05 Operations (OPR)

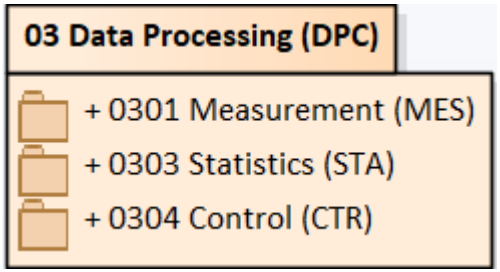
- + 0501 Automation (AUT)
- + 0502 Initialization (INT)
- + 0503 Configuration (CFG)

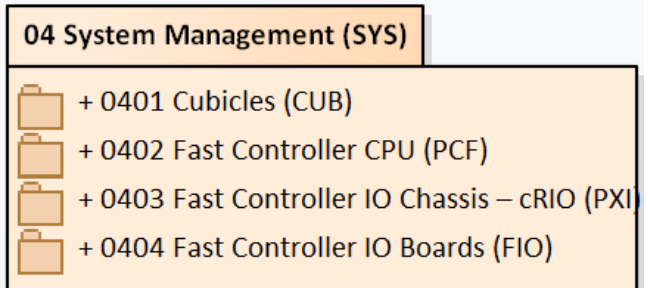
08 Interfaces (INF)

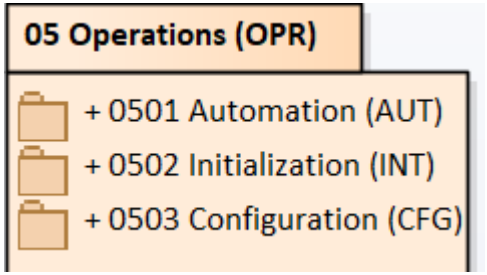
- + 0801 DAN (DN)
- + 0802 SDN (SN)
- + 0803 TCN (TN)
- + 0804 PON (PN)
- + 0805 HMI (HM)
- + 0806 PCIe (PC)

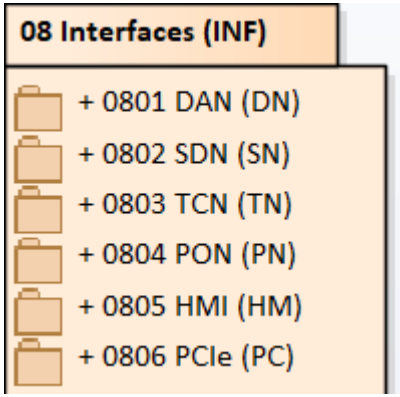






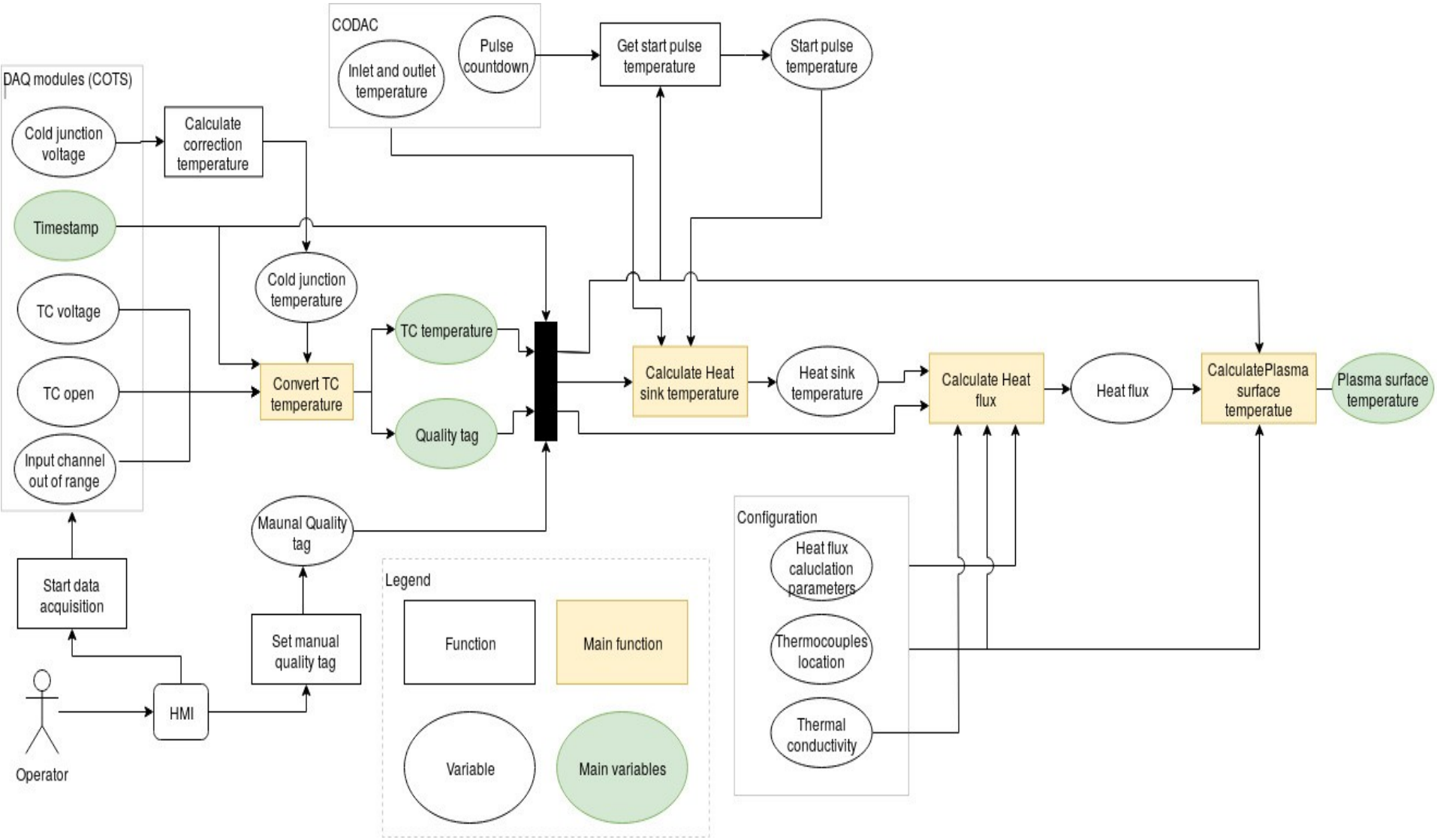






Signal chain

COSYLAB



FPGA functions

- Communication with DAQ modules
  - TC voltage
  - CJC voltage
  - Open TC
  - Channel out of range
  - Module properties
  - Conversion time configuration
- Timestamping
  - Acquiring value from DAQ modules
  - Attaching a timestamp
  - Clock

Configuration objects

- Heat flux parameters (set during commisioning)
- Thermocouples location (set during commisioning)
- Sampling rates
  - During pulses
  - Between pulses
- Start temperature limit
- Thermal conductivity
- Connectivity configuration
  - IP addresses, buffers, ports

CODAC communication

- PCS
  - Thermocouple temperature
  - Plasma surface temperature
    - Temperature
    - Timestamp
    - Quality tag
  - Timing
    - ITER time synchronization
    - Pulse start countdown
- Cooling water system
  - Heatsink inlet temperature
  - Heatsink outlet temperature

Compliance matrix

- Most system specific requirements are covered by data acquisition and processing functions
- Most of the common PCDH requirements are covered by Operations and System management functions
- Because some of the requirements are so vague they can be covered by either any function or in other case by none.
- For the FDR this will have to be resolved