ebg MedAustron

cosylab
CONTROL SYSTEM LABORATORY

Power Converter Controller Overview

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… on behalf of Cosylab team

the best people make cosylab

Outline

- …CWO-1
- PCC
  - overview
  - detailed architecture
- operational view (run, cycles, events)
- architecture design / implementation
  - PXI + controller + FlexRIO
  - FlexRIO adapter board
  - FED
  - link to PCo controller board
  - link diagnostic
- CWO-2…

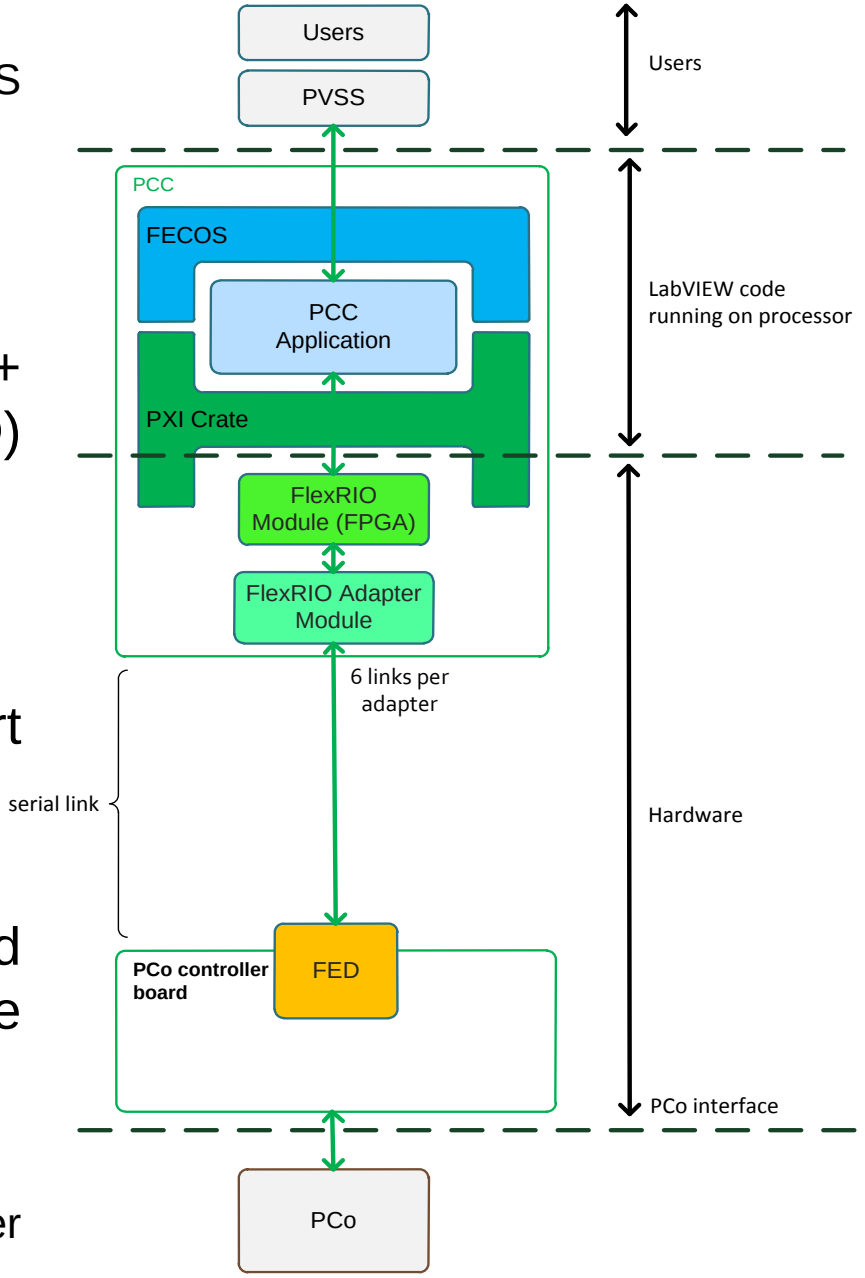
PCC activities in CWO-1

- studied & refined requirements (simplified☺)
  - providing support to define PCo I/F
- moved reqs. to EA model (traceability)
- made high-level architecture design
- did a step further to allow better architectural decisions (CWO-2)
  - optical link prototype (protocol)

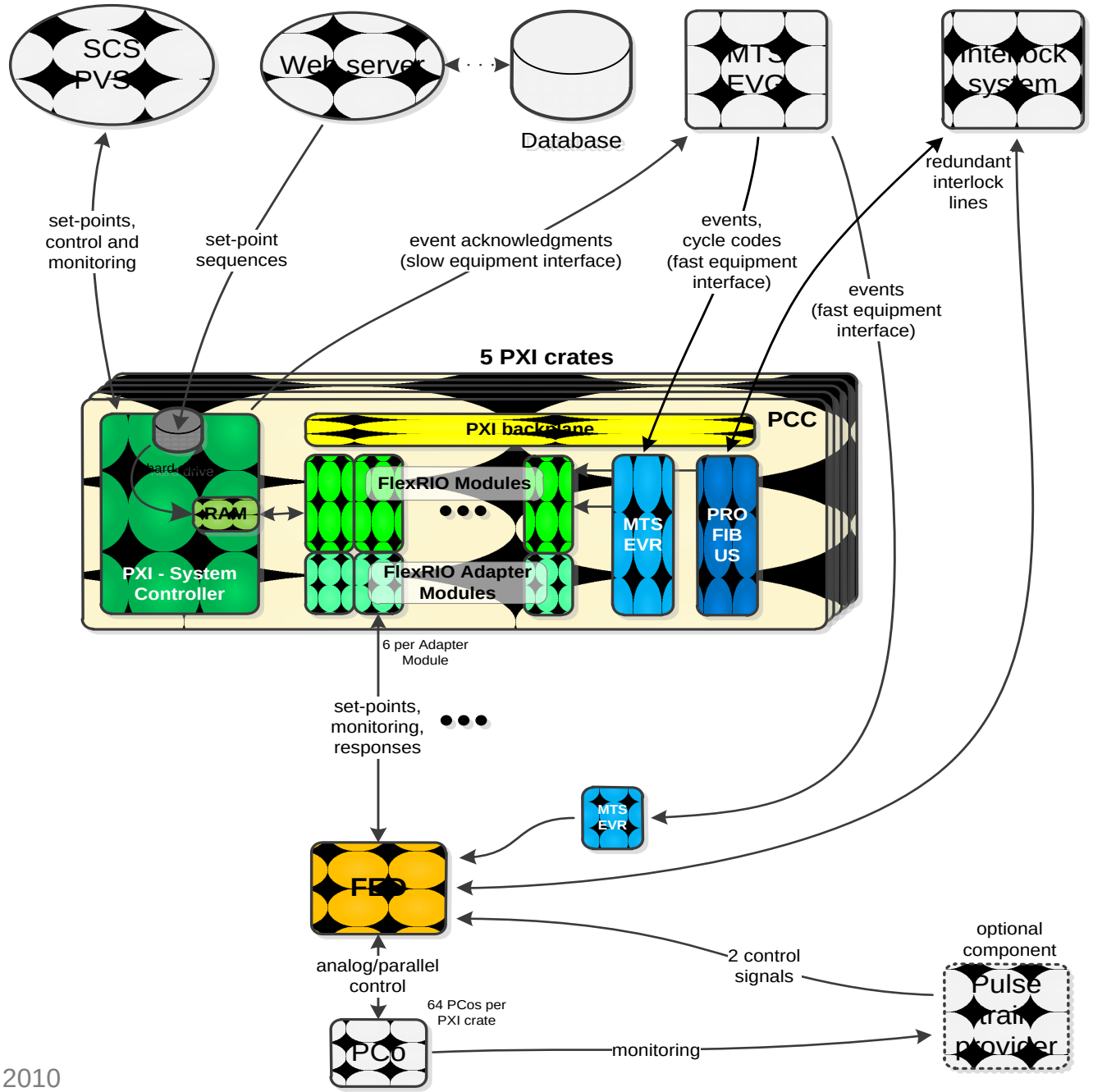
PCC - overview

- prepare set-points and commands
- process data in hard real-time
- make sure everybody gets it @ the same time (1µs)
- provide data and commands to PCo (directly or controller board)

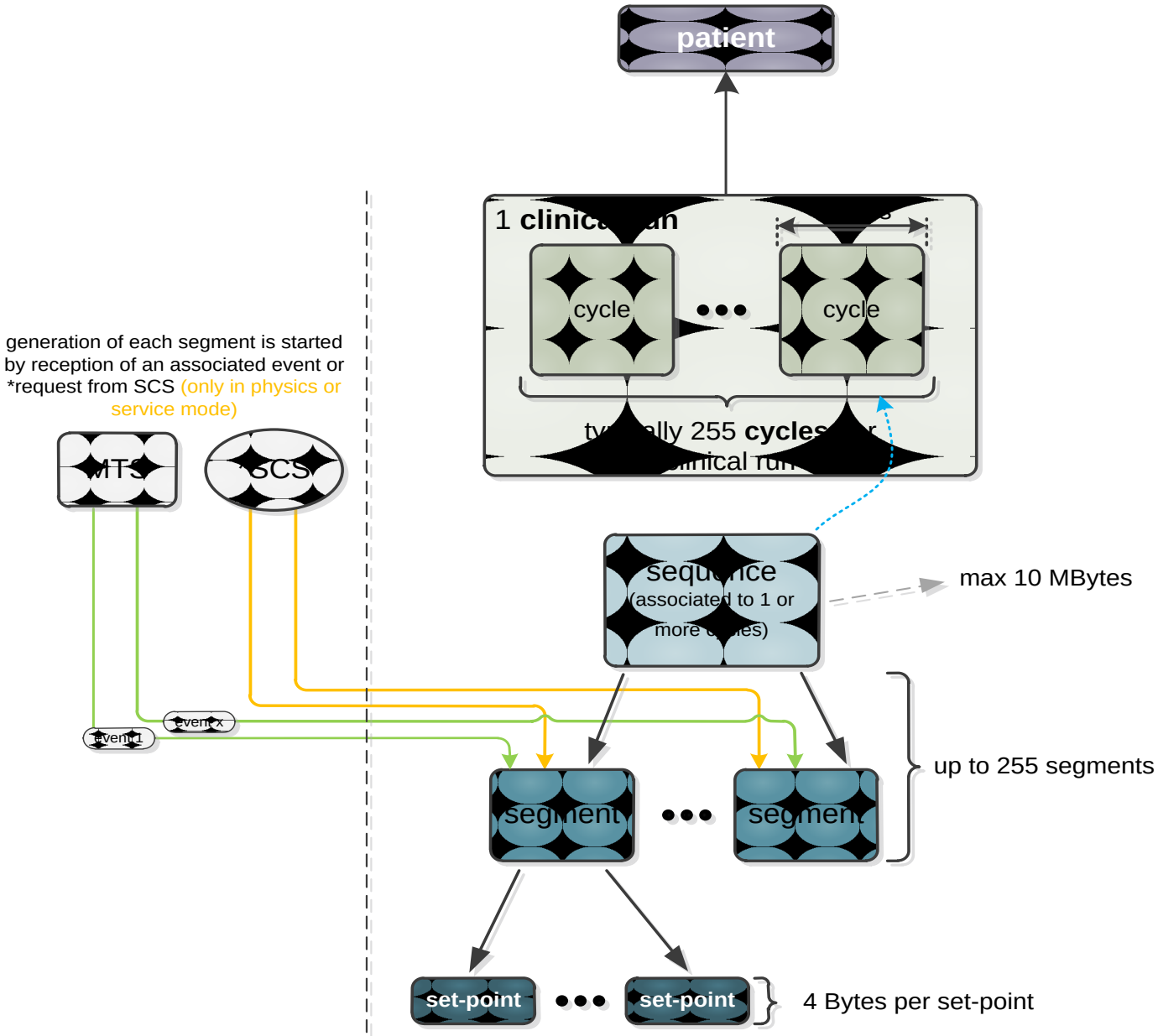
- CS
1. PCC (LVRT+ FlexRIO)
2. transport
3. front end device
- power converter



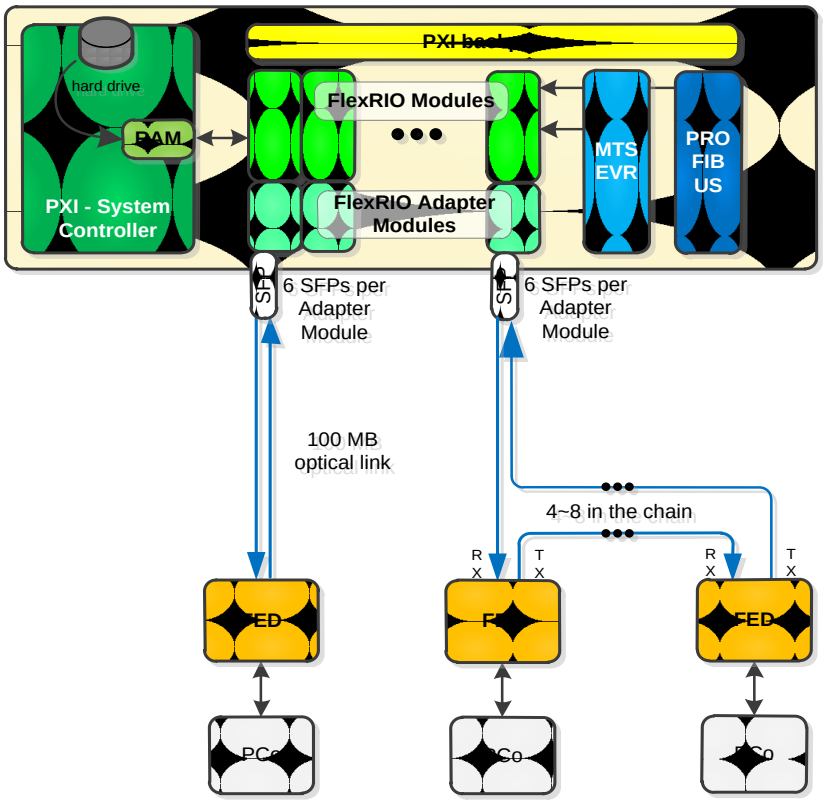
PCC - detailed

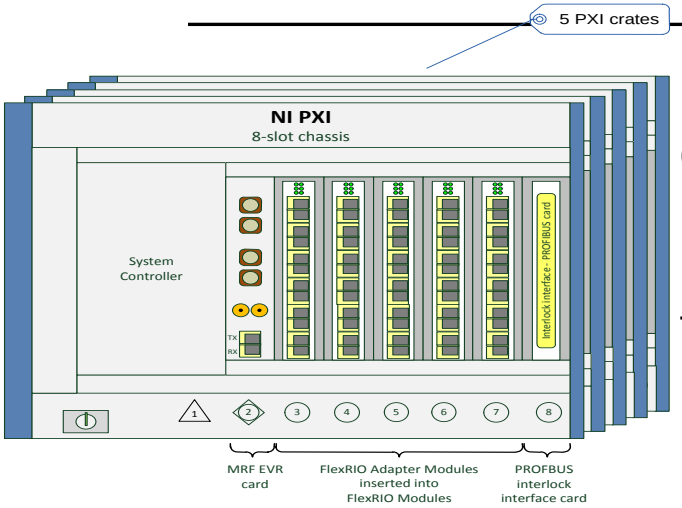


Operational view



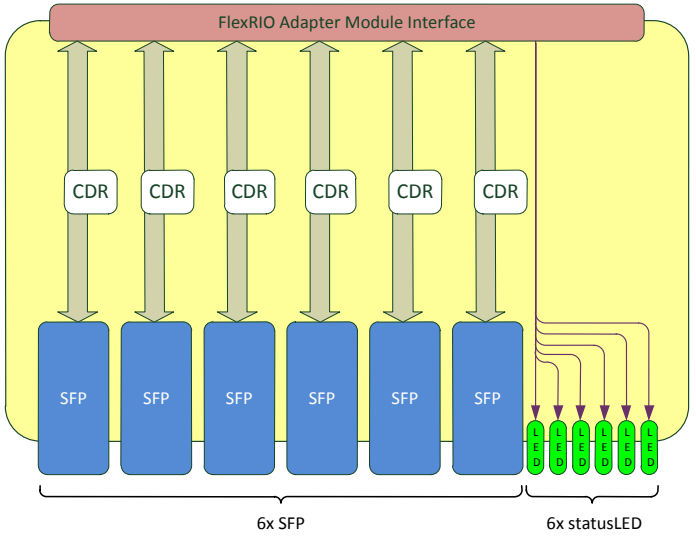
Implementation





PXI + controller + FlexRIO

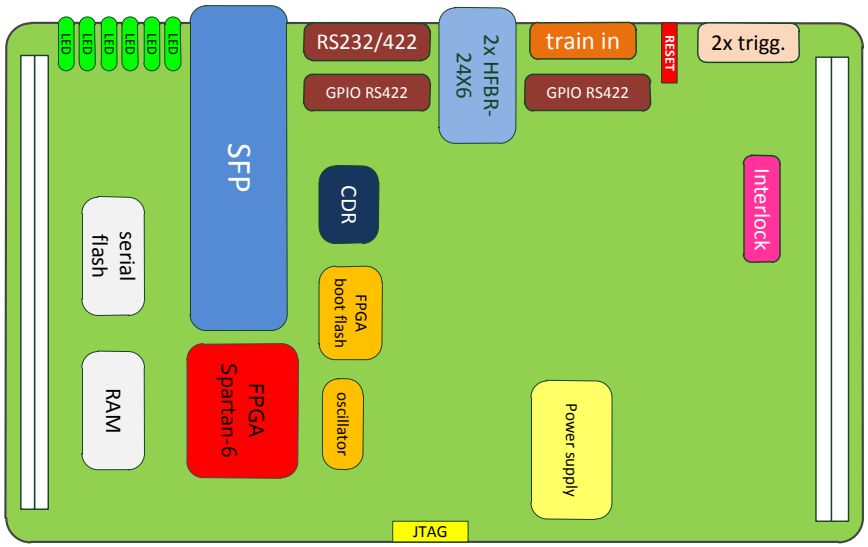
flexibility (CS)
real-time performance



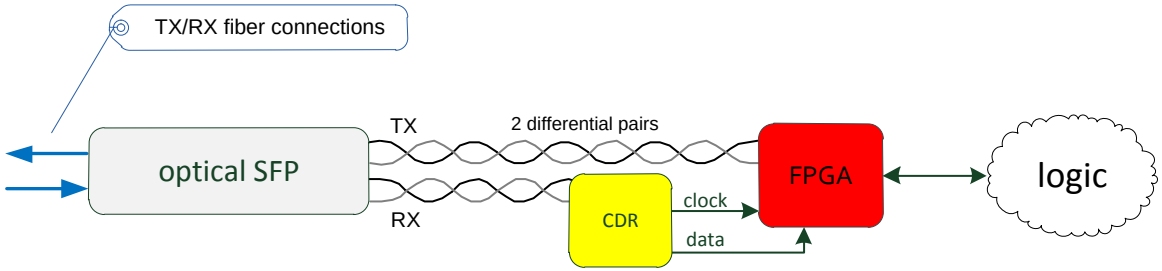
FlexRIO adapter module

Front End Device – FED

- standardized IF to
  - PCo analogue controller board (piggyback)
  - PCo with serial I/F
- optical isolation
- bandwidth (100MB/s)

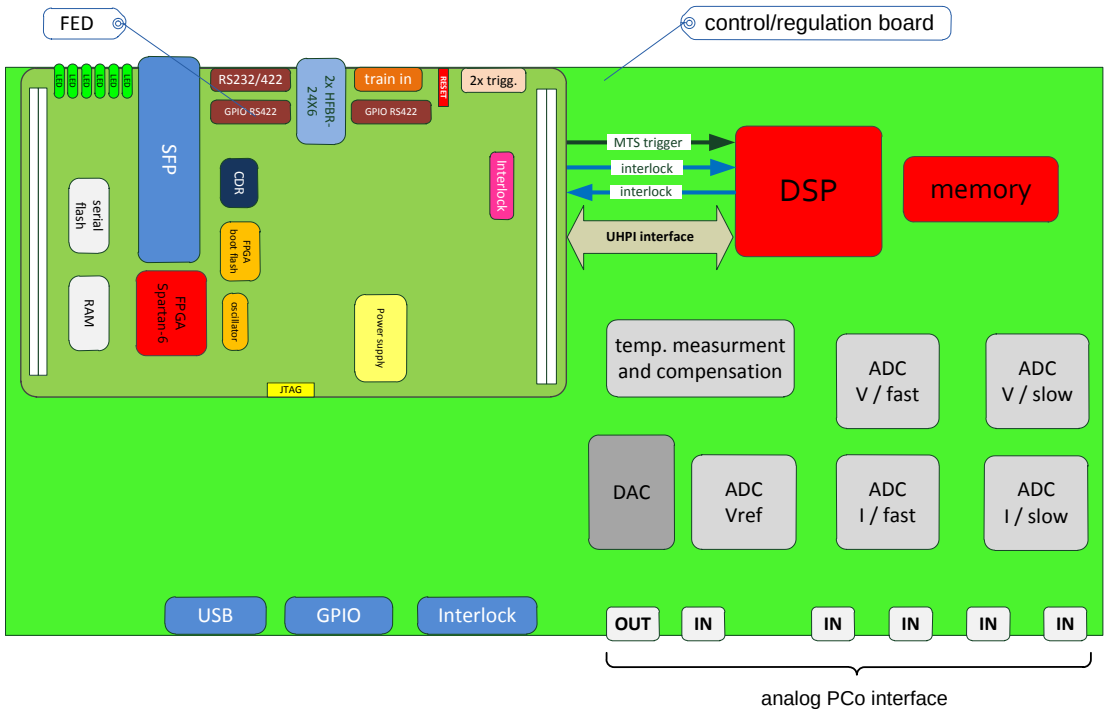


- set-point values
  - hard real-time
- + commands
  - lower priority



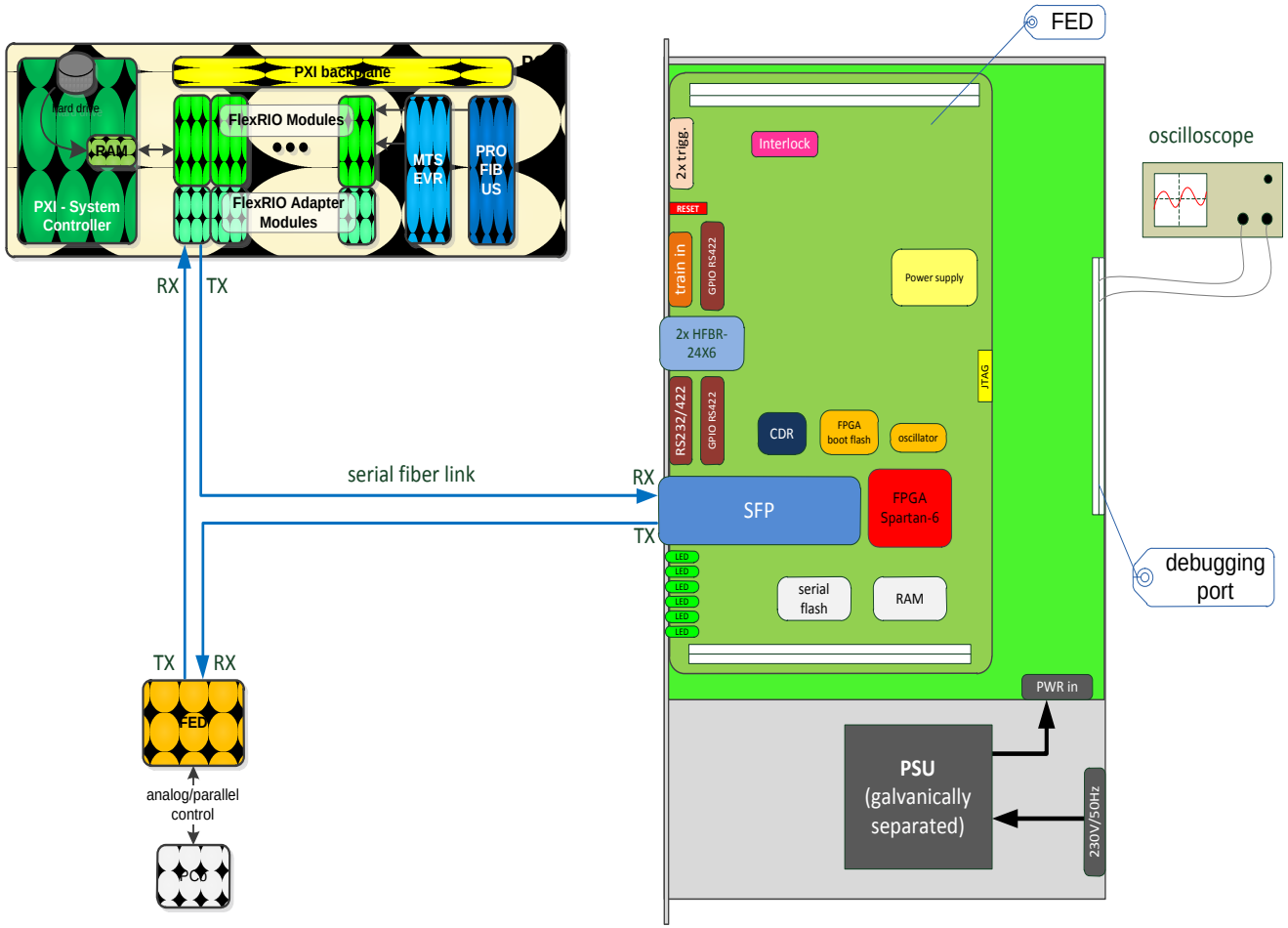
PCC controller board

- interface to analogue controller board DSP
  - piggyback
  - memory mapped



conceptual design

Link diagnostics



CWO-2

- define FED-DSP communication I/F
- finalize requirements and architecture design for PCC and FED
- pre-production FlexRIO adapter module
- pre-production FED with base board
  - to be used by other teams
- PCC FECOS component (not final version)
  - data compression algorithm