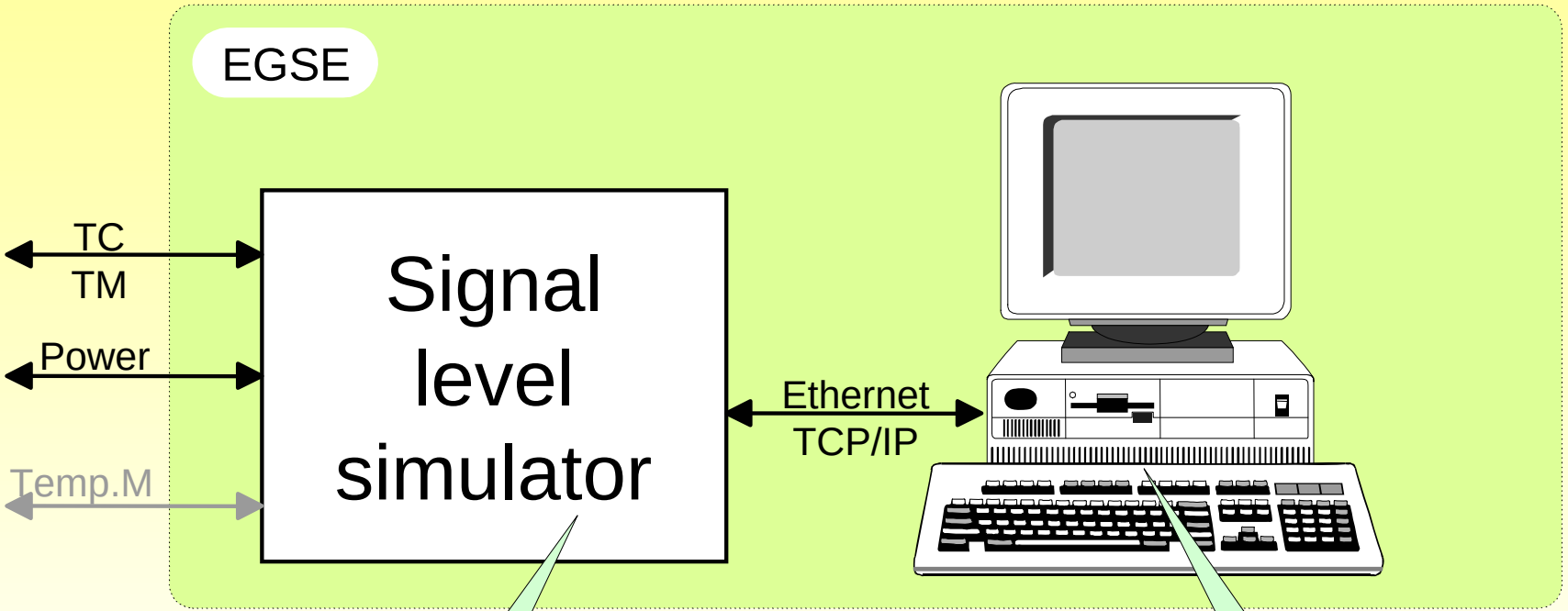
Electrical Ground Support Equipment for PICAM/SERENA/Spacecraft (EGSE/SIS)

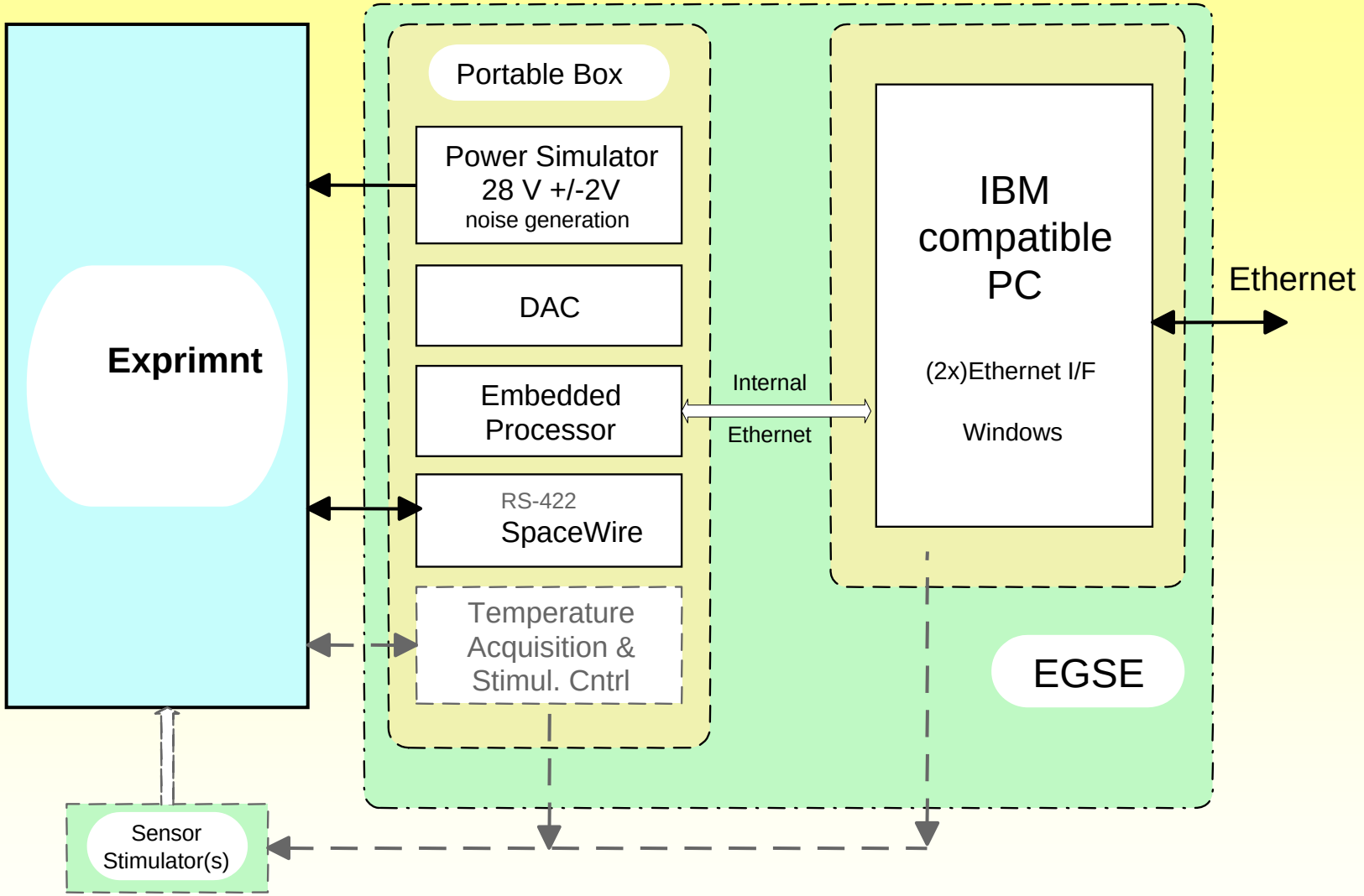
General Block Diagram



Simulators/Interfaces:
- Data Comm. Interfaces
- Power System Simulator
- Temperature Monitoring

Graphical User Interface
- -Control **TC**
- -Data Visualisation**TM**
- -Archiving

EGSE for PWC at ISS



TM/TC function simulation (SpaceWire)
S/C power simulation
monitor and control functions

Boards in the low level sim.box

1. Embedded Processor (PCM3370F)
   - Intel Celeron 400 MHz
   - Standard PC's IFs (inc. RS-422)

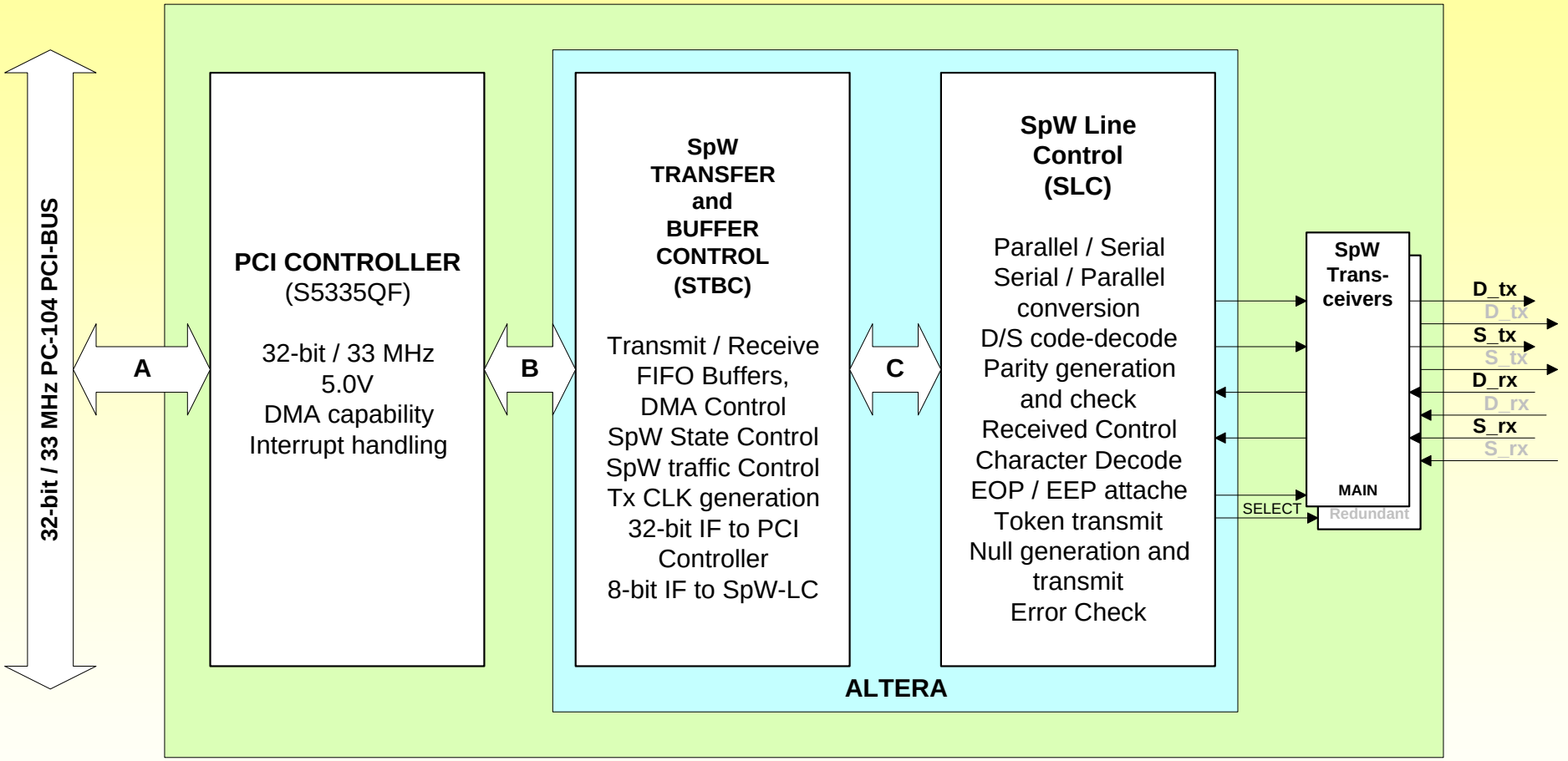
     PP (to PSS),

     PS2, VGA (for debugging),

     Ethernet (to Control PC User Interface)
2. Digital Analog Converter (2 channels)

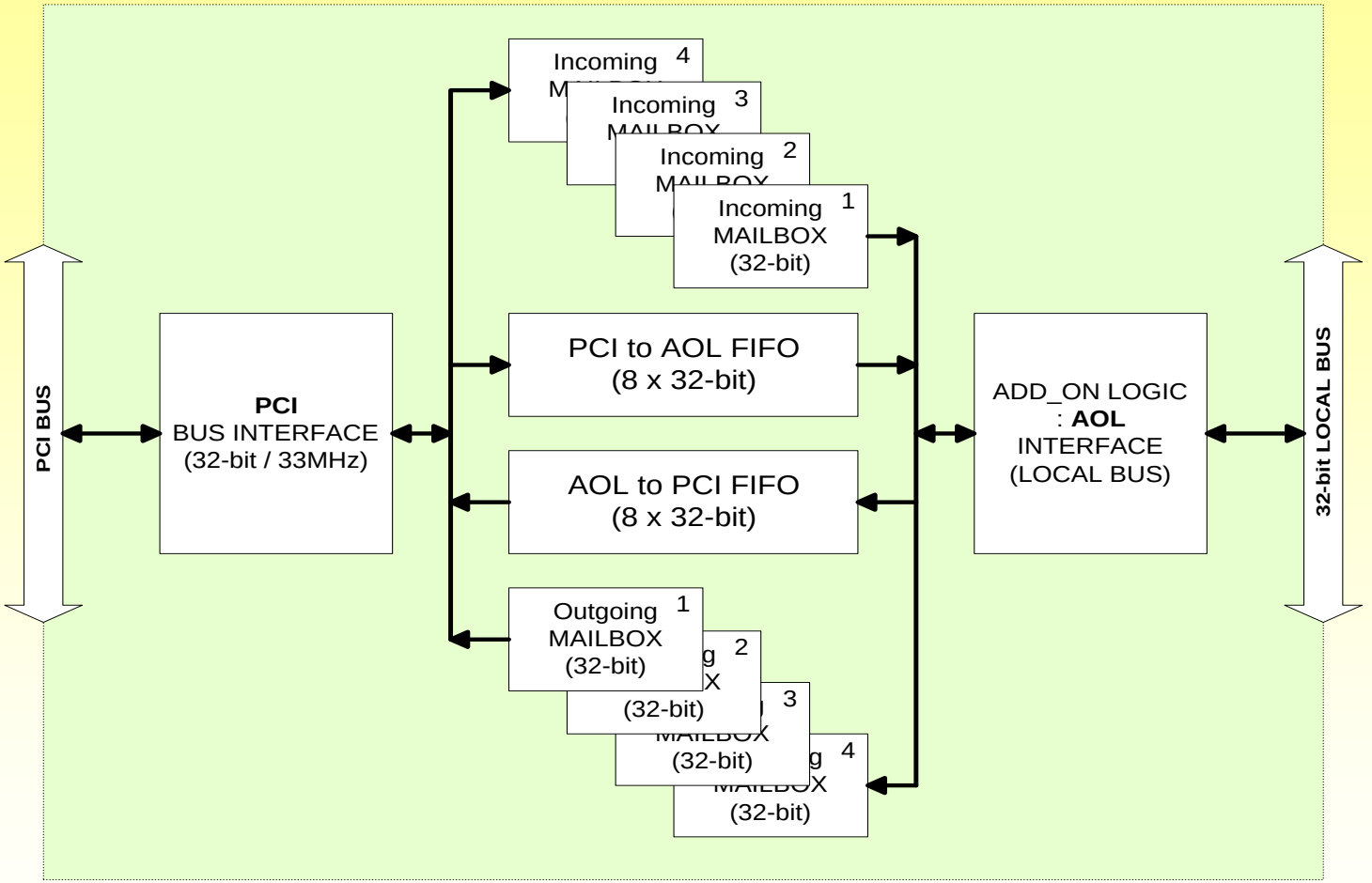
   Pulses and noise generation (for the PSS)
3. SpaceWire Interface (own development)
4. The PSS has a box inside the EGSE housing
5. Temperature monitoring IF

SpaceWire Interface



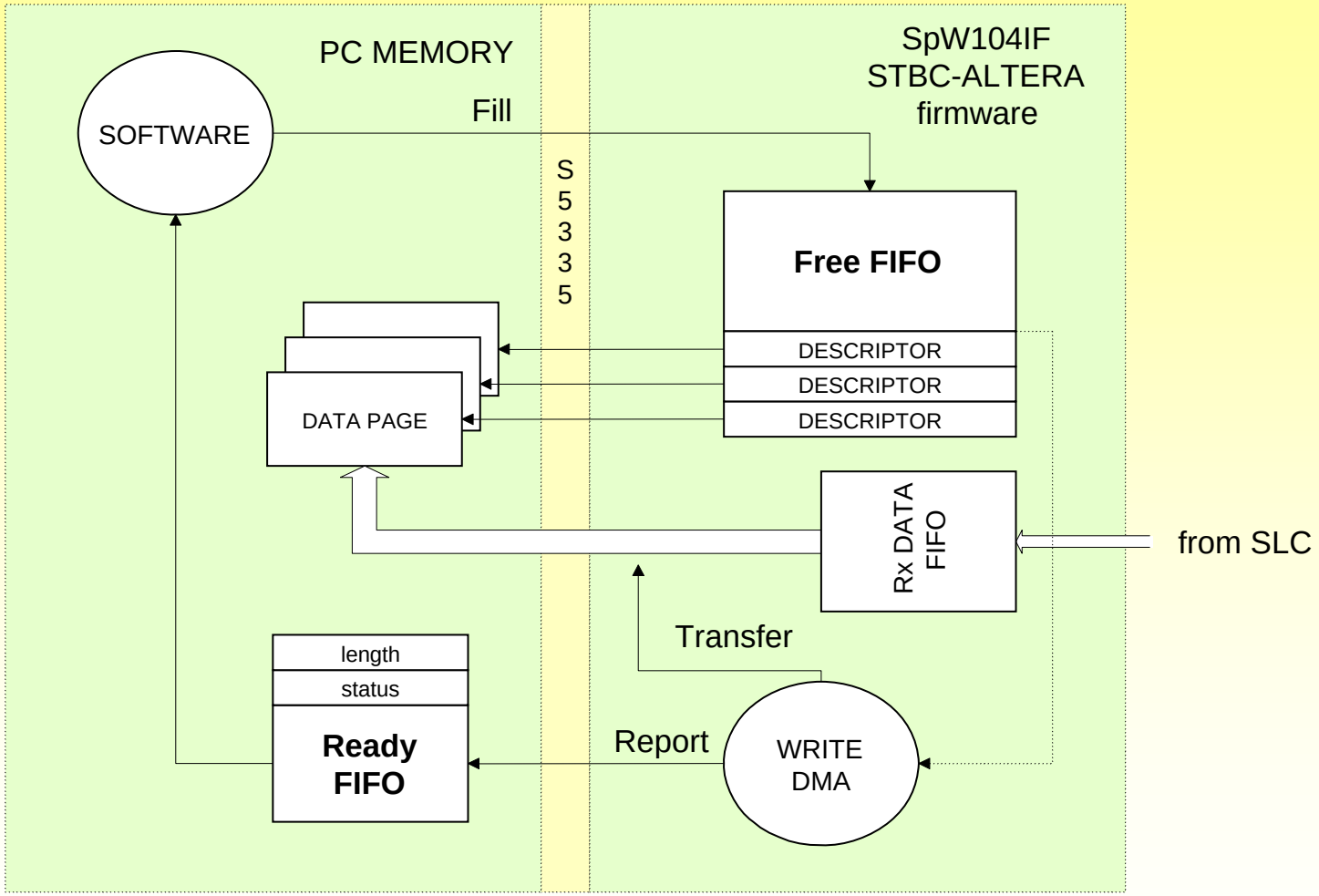
Internal Functional block diagram

SpaceWire IF for EGSE



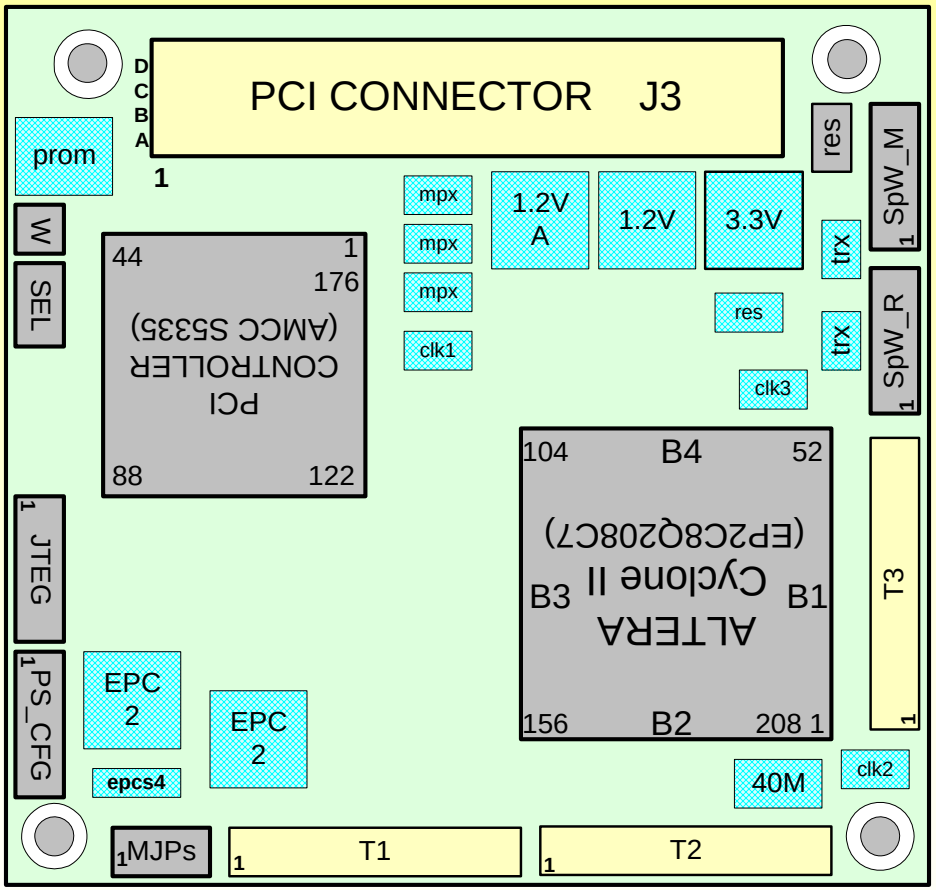
PCI controller Data paths

SpaceWire IF for EGSE



Receive Data flow

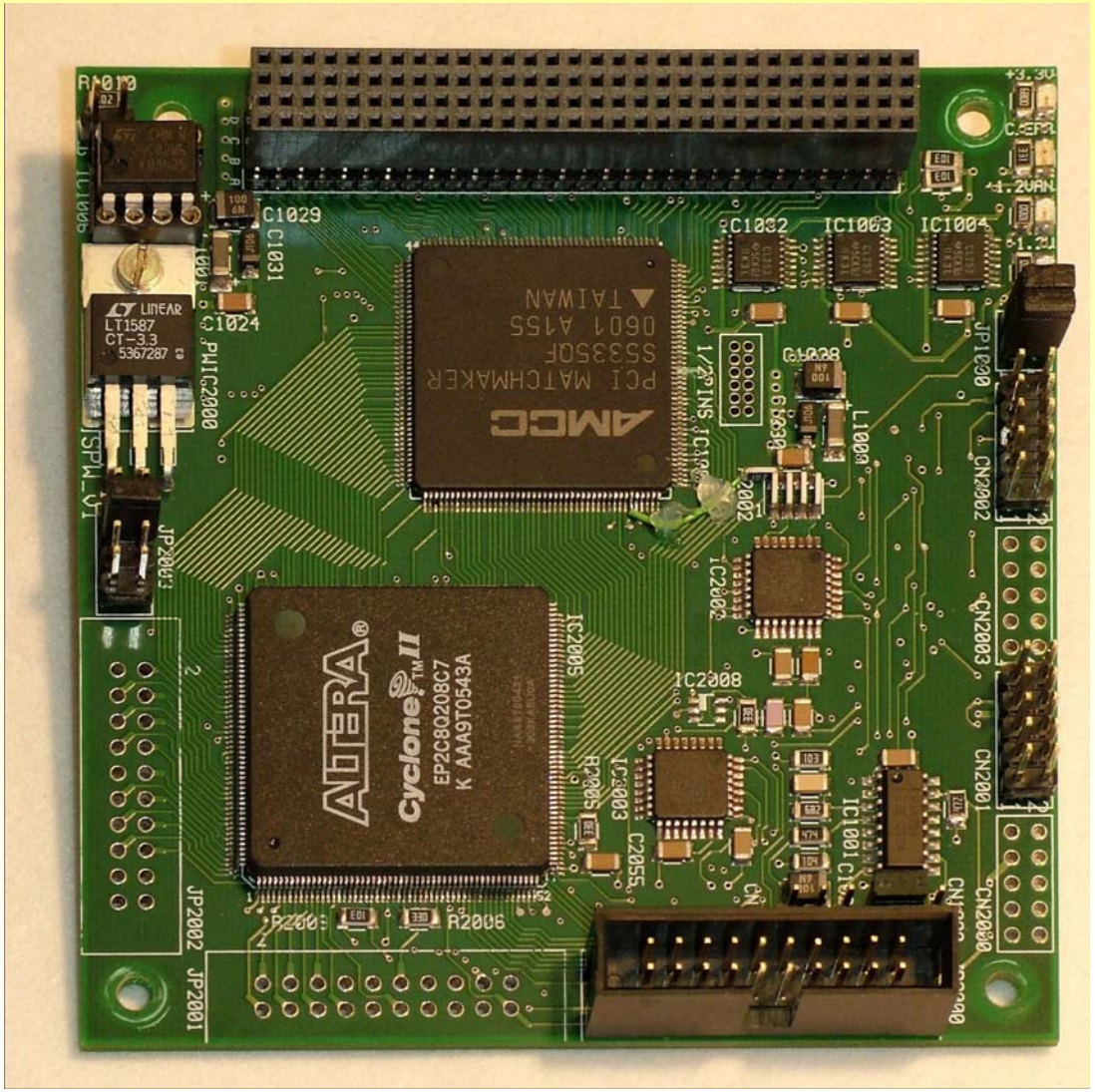
SpaceWire IF for SIS



SpW104IF Component Layout

(The blue ICs are on the soldering side of the board)

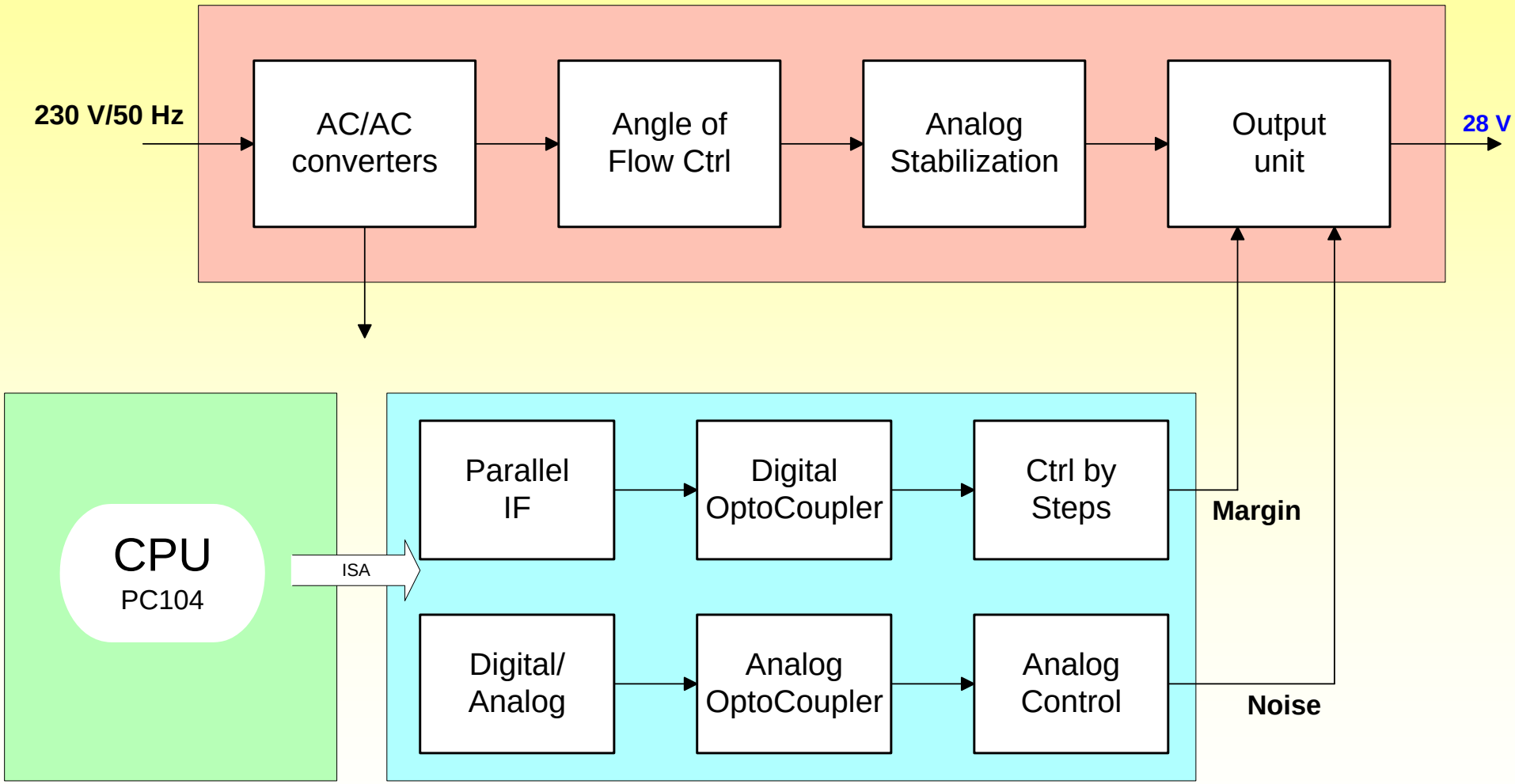
SpaceWire IF for EGSE



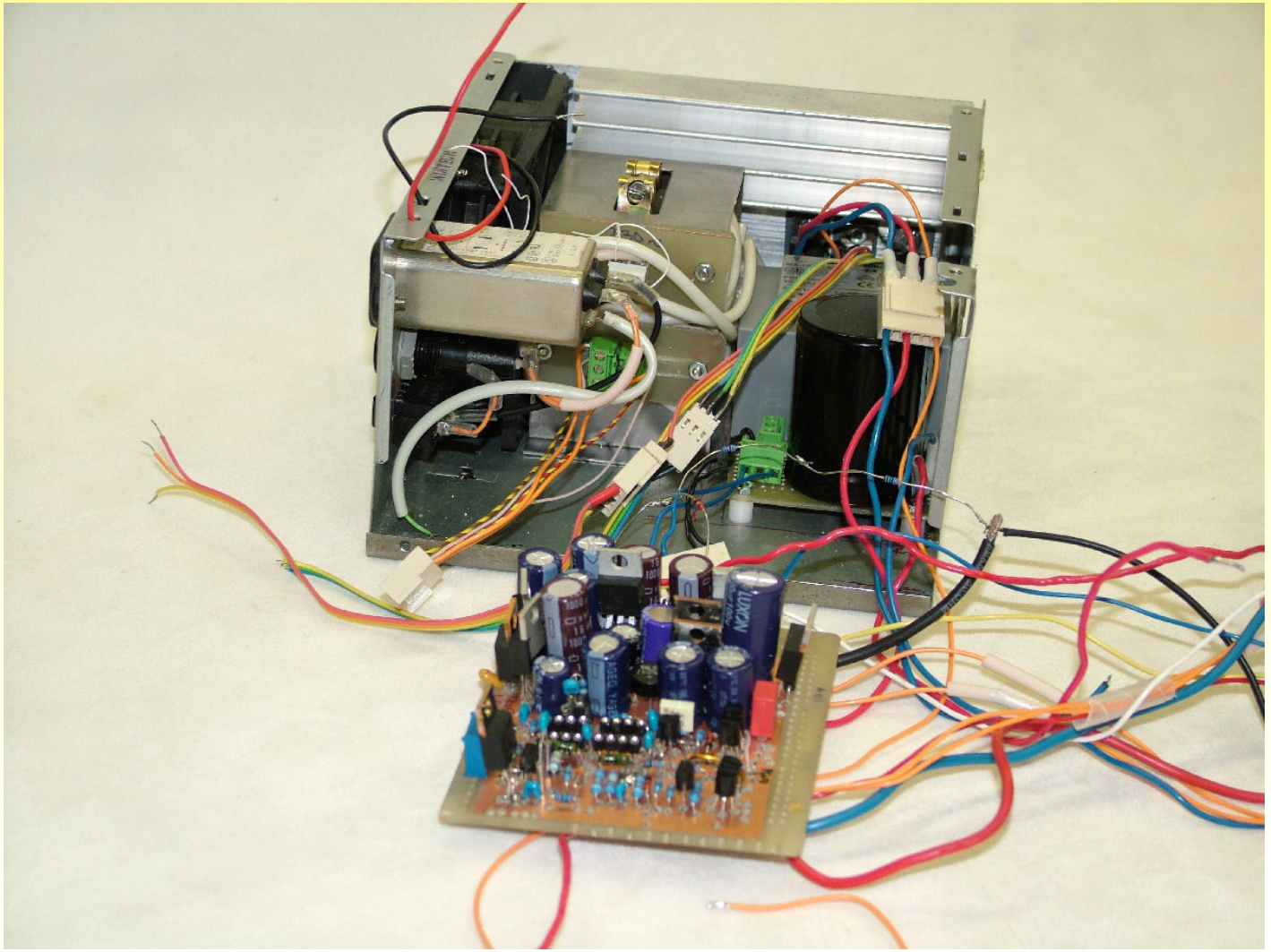
SpaceWire Interface status

- Two boards manufactured
- Board level test has finished, FPGAs debugged
  - 200 Mbit/sec
- Real communication test has started (between two boards)

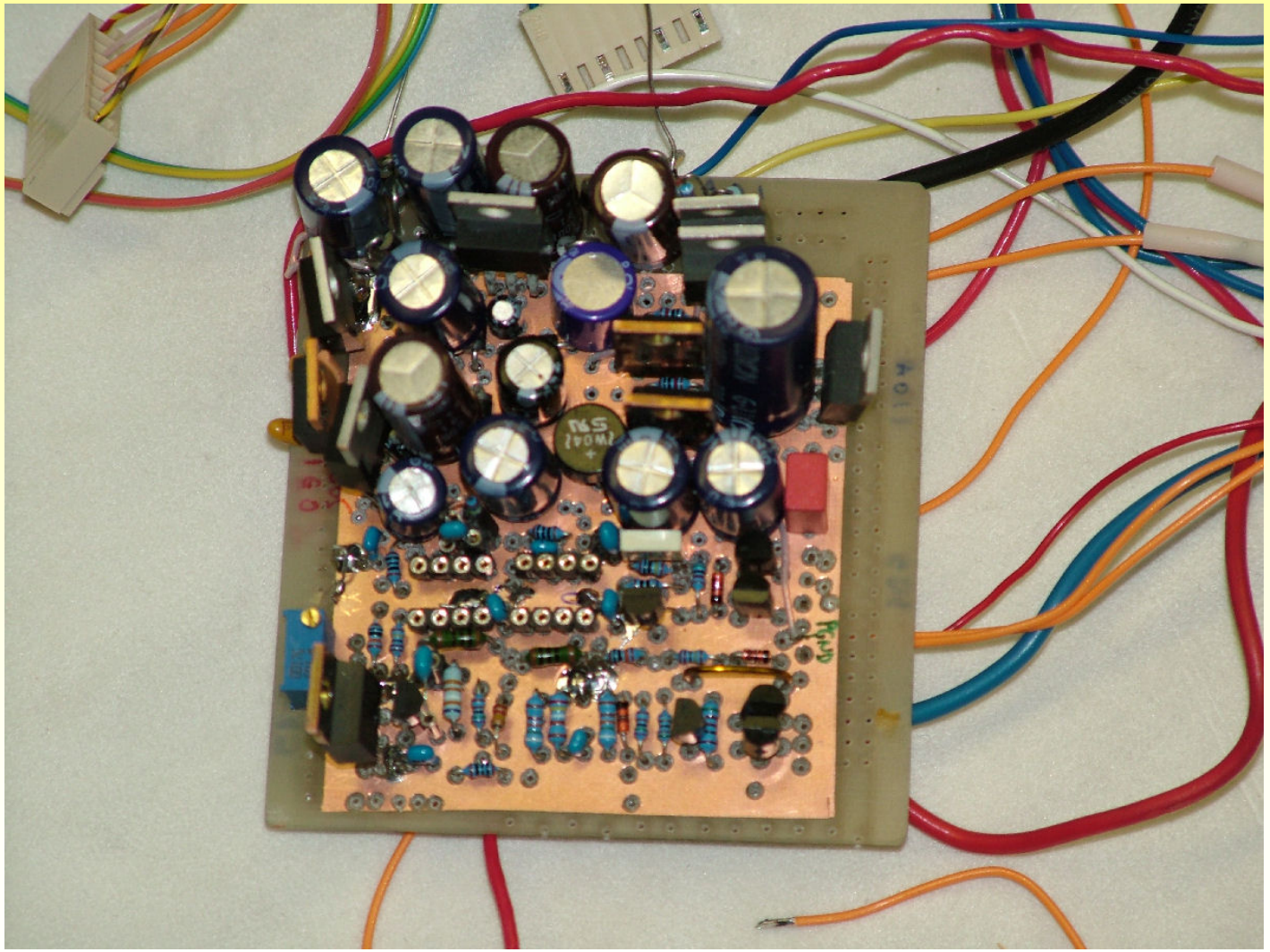
PSS functional block diagram



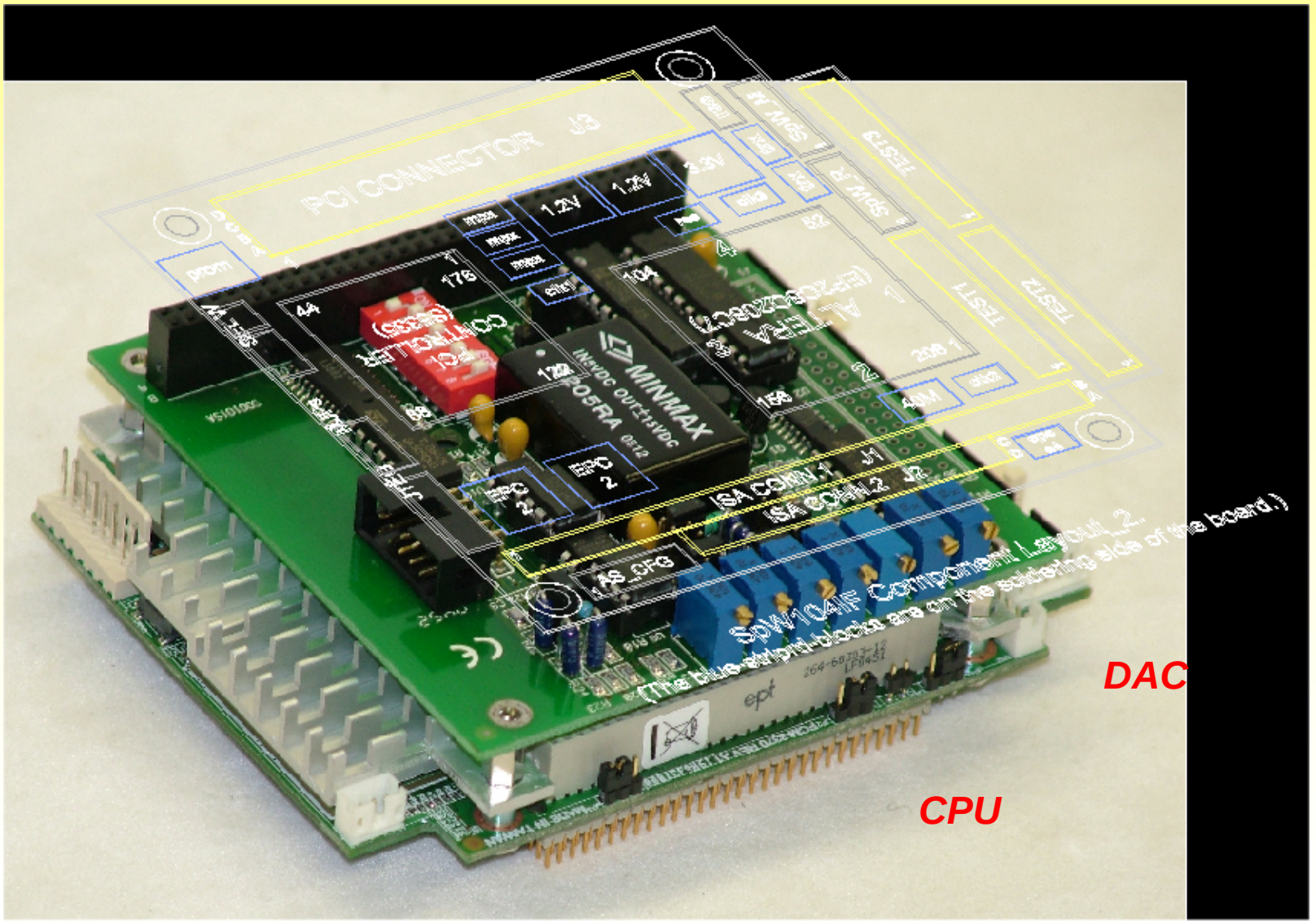
Power System Simulator



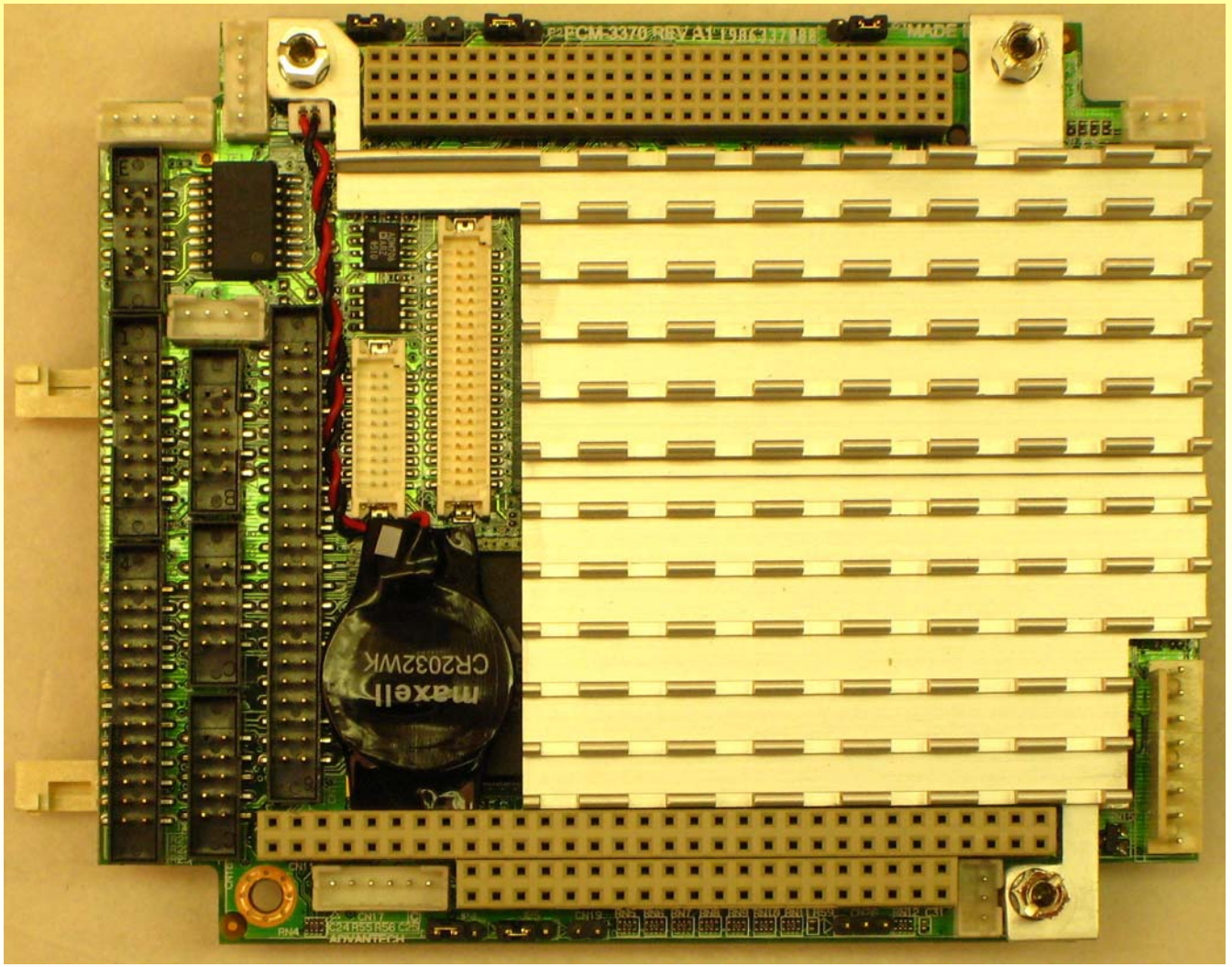
PSS



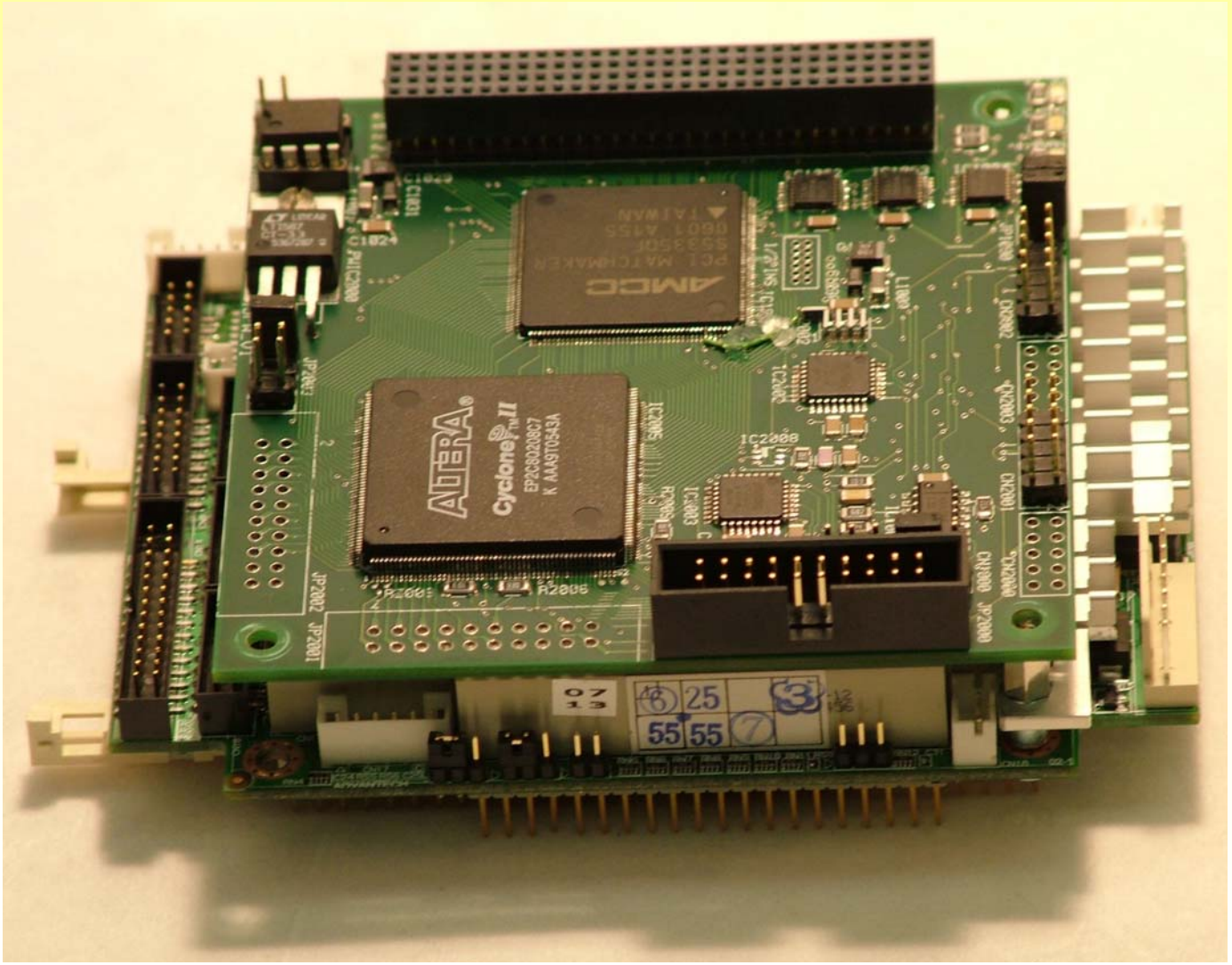
Control Logic Cards in the EGSE



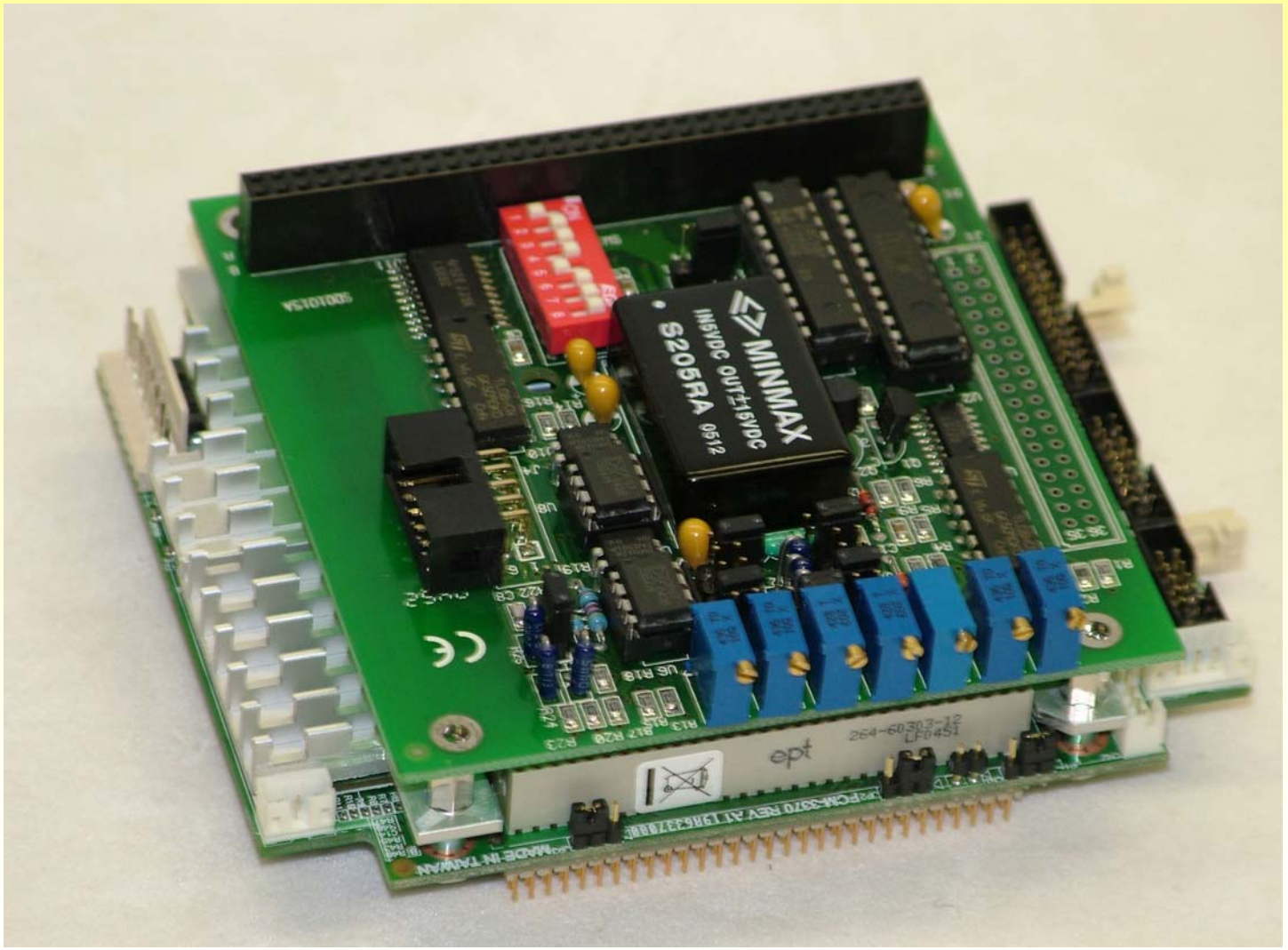
Processor for EGSE



SpaceWire IF & Processor



DAC & Processor



Signal level S/C Interface Simulator

Software 1

- Software for the Embedded processor
  - Real-Time Multitasking embedded Linux
  - User Tasks development is ongoing

- User Interface on PC, under Windows
  - National Instr. dev. environment (C language)
  - Two threads:
    1. TM receiving,
    2. TM Visualization & Generation of Control TCs
  - Incremental delivery

Software 2

- **Visualisation**
  - HK decoding on the base of external text files, it will convert HK TM bit stream to readable physical values
    - linear conversation y = aX + b,
    - conversation by interpolating between tables' values
- **Commanding**
  - Interactive control by buttons
  - Batch programming by external file (XML syntactic)
- TM structure definition TBD by PI team
- TC stucture definition TBD by PI team