

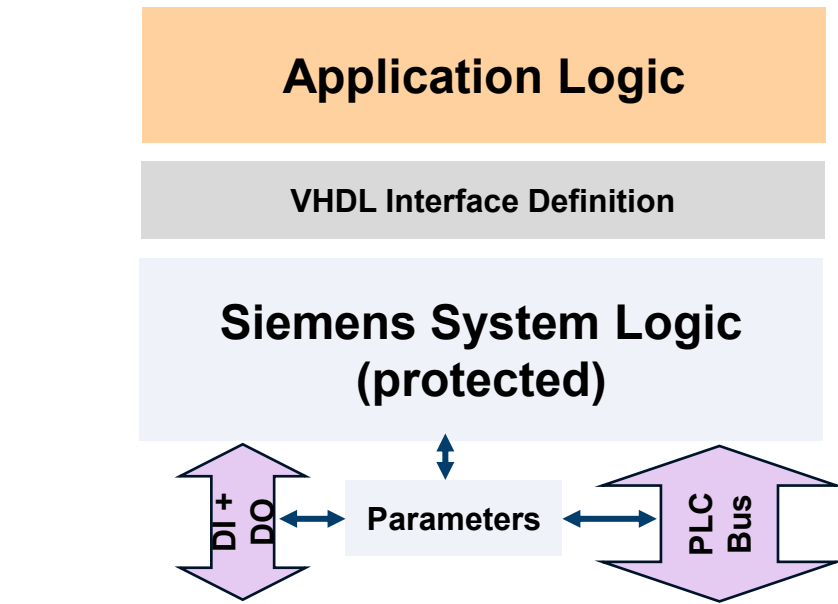
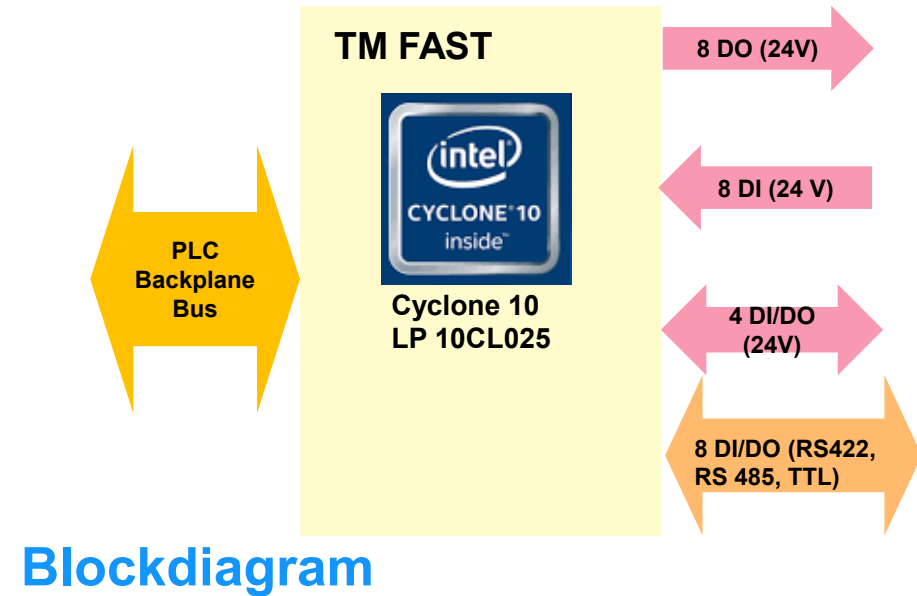
APPLICATION OF THE FPGA COPROCESSOR TM FAST FOR SIEMENS S7-1500 PLCS IN NEUTRON SCATTERING

27.5.26 | HARALD KLEINES

SIEMENS TM FAST

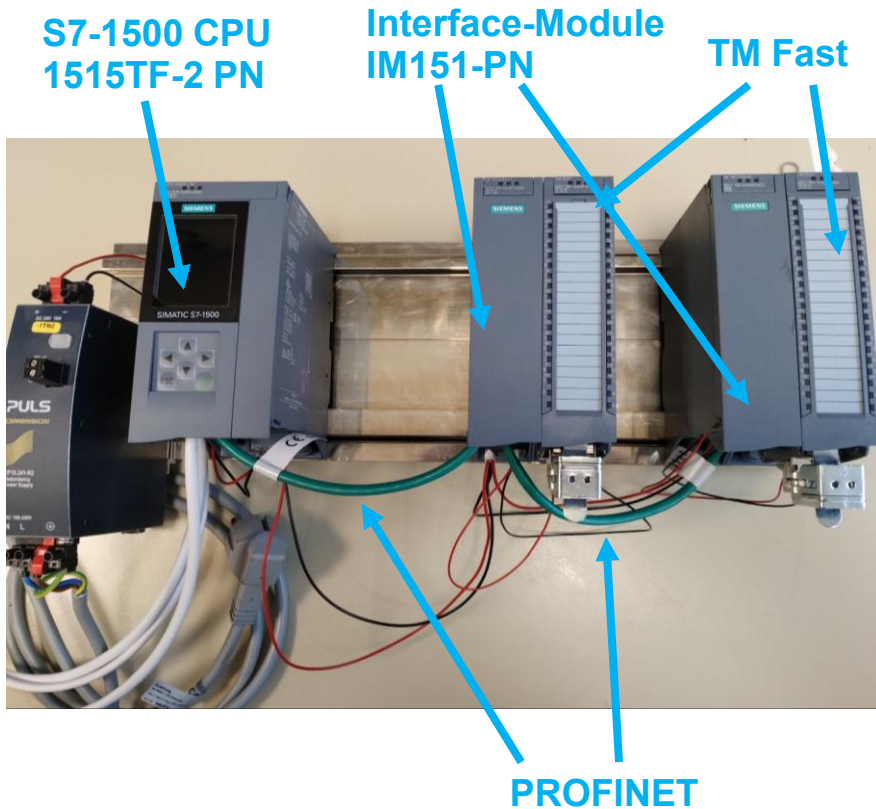


- FPGA coprocessor for the S7-1500
- Central or decentral (ET 200MP) configuration
- Supports **isochronous mode**
=> suitable for motion applications
- 24 V IOs: 200 kHz
- 5 V IOs
 - RS485/RS422: 2 MHz
 - TTL: 200 kHz
 - Signal type, direction, termination, delay configurable in FPGA code



FPGA Code Architecture

Test / Development System



Application 1: SSI Encoder Readout

- Nanotec stepper motor with SSI Encoder
- SSI Frame
 - Length 51 bit
 - Position value 33 bit
- Not supported by Siemens SSI module
- Open-source SSI VHDL code from Siemens
=> Code modification



Application 2: ^3He Neutron Proportional Counter Readout

- Count rate: order of 100 kHz
- Dead time: order of 1 μs
- Classical solution:
 - CPCI Counter board
- Avoid CPCI?
- Non-time-resolved mode: Performance of TM Fast ok
- Time-resolved mode:
 - Data width of TM Fast too short to get detector data out
 - But: Performance is ok for neutron monitor tubes



CPCI Counter module

