Easy-to-integrate PROFINET Controller subsystem for FPGAs

- Subsystem includes an optimized Industrial Ethernet switch IP core and a CPU IP core running the PROFINET controller protocol stack
- No porting of the PROFINET stack required – just load the prepared executable
- Memory interface with comprehensive API library for the controller application
- Verified with official PROFINET test bundle of PI organization

Suitable for factory automation, process control and safety applications

- Fast operation by cut-through-switching and DMA transfer of i/o data
- Support of Fast Startup, Simple Device Replacement and System Redundancy
- Support of PA Profile devices and of Dynamic Reconfiguration
- Subsystem can serve as Black Channel for PROFIsafe applications

Cyber security features included

- Switch IP core with integrated firewall functions
- Netload Class III
- Tested with Achilles

Integration of PROFINET into Industrial Controllers using Intel FPGA

PROFINET Controller for Intel FPGA
PROFINET Controller for Intel FPGA

Technical Data

IP Core configuration
- Switch IP Core with 2 external ports and 1 internal port
- 1 Nios II IP core for processing the protocol
- DPRAM interface to application processor (FPGA-internal or external)

Supported FPGA families
Cyclone III, Cyclone IV GX, Cyclone IV E, Cyclone V, Cyclone V SoC, Cyclone 10 LP, MAX 10

Switch Clock
125 MHz

Functionality
- PROFINET Controller according to specification V2.4, Conformance Class B
- Netload Class III • Fast Startup • Simple device replacement • LLDP • MRP • SNMP support
- Dynamic Reconfiguration (Configuration in Run) • I/O data consistency for up to 1440 bytes

Optional Functionality
- additional PROFINET Device functionality
- PROFINET Controller according to specification V2.4, Conformance Class C (IRT)
- MRPD • System redundancy (S2)

Capacity
- Configurable parameters:
  - Number of PROFINET devices per controller instance: recommended max. 127
  - Number of ARs per controller instance: max 255
  - Number of SR-ARs per controller instance: max 255
  - Number of modules/submodules per AR: no limit, 8 kBytes I/O data per device
  - Number of IOCRs per AR: default 4
  - Number of IOCRs per controller instance: max 1024
  - Total size of I/O data per controller instance: up to 1024 x 1440 bytes
  - Size of record data item: max. 8 kbytes for one record

  Memory requirements:
  - Recommended RAM size (code + data): 32 Mbytes

Performance
- Shortest allowed cycle time: 250 µs
- Number of IOCRs at 1 ms cycle time: limited only by 100% Ethernet bandwidth

Scope of Delivery

IP / Logic
- Complete PROFINET Controller subsystem
- Supplementary IP cores
- Sample application FPGA design

Software
- Loadable protocol software including eCos operating system
- API library

Order Numbers

Please contact us for details
PROFINET Controller for Intel FPGAs
We are happy to discuss your particular requirements and adequate licensing options with you.

Additional Products and Services

Please contact us for details
RTEM2 – PROFINET Controller communication board. Network Interface Module for PROFINET controllers
SIA-YY-012501 Integration workshop for implementing PROFINET controller based on Intel FPGAs
SIA-YY-012503 Integration support provided by e-mail or phone

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