ECS-PCIe/FPGA
PCI Express® EtherCAT® Slave Interface

Convert your PCI Express System into an EtherCAT Slave Device
- Add EtherCAT Slave (ECS) functionality to your PC
- The EtherCAT Slave Controller address space is directly mapped to the PCI Express address space.

Simple Configuration and Rapid Application Development
- Easy configuration by esd's EtherCAT Master or other masters
- Sample EtherCAT Slave Information File (ESI file in XML format) is provided
- esd's EtherCAT Slave API library and sample code for rapid application development are included

Bus Master Support
- The FPGA contains Bus Master DMA support to offload the CPU from copying the output process image data into the host memory. This is utilized by the esd EtherCAT Slave Stack.

Customization on Request
- 20 of the LVTTL I/Os can be configured as 10 I/Os with 2.5 V level LVDS
- Other customized configurations are available on request.

ECS-PCIe/FPGA-LP

EtherCAT Slave Interface for PCI Express
The ECS-PCIe/FPGA is an EtherCAT Slave Controller board designed for the PCI Express bus. It utilizes a Beckhoff IP-core which is implemented in an Altera® FPGA and configured for 8 FMMUs, 8 Sync Managers, 60 kB DPRAM and 64 bit Distributed Clocks.

The FPGA connects between the PCI Express bus and the two Ethernet interfaces on the front panel.

Versatile Application
Because of this simple hardware topology and the use of a "soft" controller the design offers a maximum of flexibility.

The PCI Express system can act as an I/O node. An EtherCAT master can use several EtherCAT protocols like CoE, FoE and EoE to communicate with this EtherCAT slave device.

SYNC/Latch I/Os and Share I/Os
Via pin header connectors equipped on the ECS-PCIe/FPGA 36 3.3 V LVTTL I/Os are available, including the signals from the EtherCAT Slave Controller: 2x Sync and 2x Latch for system synchronization.

Software Support
Device drivers for Windows® and Linux® with documentation and EtherCAT slave examples are included in the scope of delivery.
Drivers for other operating systems, especially real-time operating systems, are available on request.

Related Products
The EtherCAT Slave card is also available in PCI Express low profile form factor (ECS-PCIe/FPGA-LP).
For Compact PCI® Serial, XMC and PMC systems similar boards are available (ECS-CPCIs-FPGA, ECS-XMC/FPGA, ECS-PMC/FPGA).
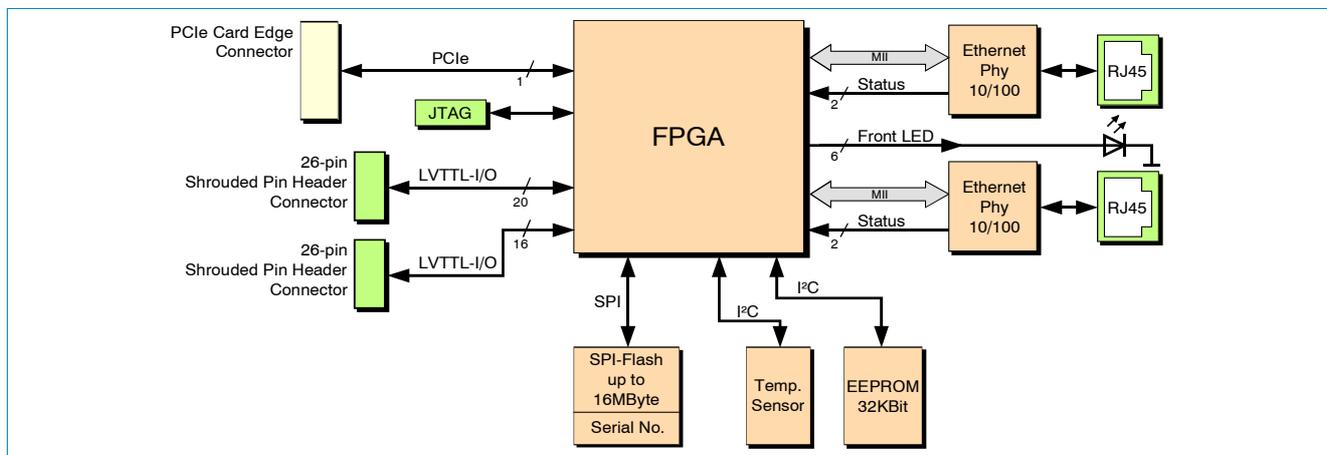
Technical Specifications:

PCI Express Interface:	
PCIe endpoint	FPGA
PCIe port	According to PCI Express Specification R1.0a
Lanes	One Lane PCI Express Link
Form factor	Standard and low profile version available
Connectors	PCI Express card edge, JTAG pin header, 2x 26-pin shrouded pin header

EtherCAT Slave Controller:	
ECS controller	Beckhoff IP Core integrated in FPGA + 2x MII Phy (Micrel KSZ8081MNX)
ECS interface	2x RJ45, 100BASE-TX, 100 Mbit/s, according to IEEE 802.3, electrically isolated
LEDs	Error, Run, Link/Activity per channel, 2x User LEDs

General:	
Supply voltage	3.3 V DC from PCI Express connectors
Power consumption	P_{MAX} = 3 W
Ambient temperature	Operational: 0...65 °C
Relative humidity	Max. 90 % (non-condensing)
Dimensions [mm]	120 mm x 68,9 mm x 14 mm without front panel (length x width x height)
Weight	80 g (full hight)

Order Information:		
Designation		Order No.
ECS-PCIe/FPGA	PCIe EtherCAT card, incl. driver, ECS-Stack as binary and manual for Windows and Linux	E.1106.02
ECS-PCIe/FPGA-LP	Low profile version	E.1106.04