

# ECS-PCIe/1100

## EtherCAT® Slave Interface for PCs

- Make your PC an EtherCAT slave node
- PCIe port designed according to PCI EXPRESS® Specification R1.0a
- ET1100 ESC address space is directly mapped to the PCIe address space
- Configuration by EtherCAT master. A sample device description file (ESI file in XML format) is provided.
- esd EtherCAT slave API library and sample code for application development

### Simple EtherCAT Slave Interface for PCs

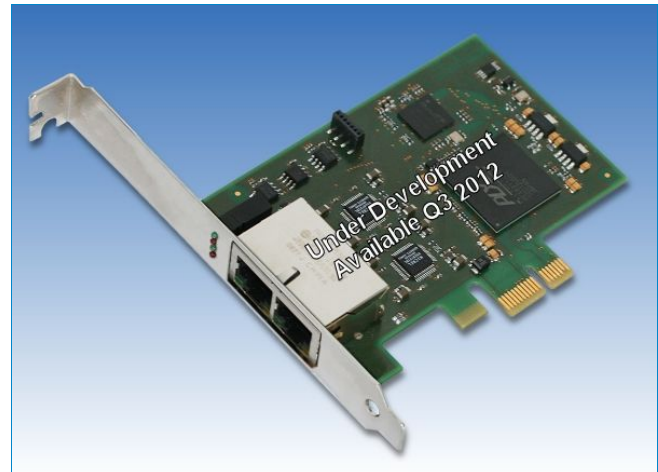
The ECS-PCIe/1100 is a PC board designed for PCI EXPRESS slots. It features an EtherCAT slave interface using the Ethernet physical layer via two RJ45 Ethernet sockets.

The board uses the ET1100 EtherCAT slave controller (ESC) ASIC that comes with 8 kbytes memory and 8 EtherCAT sync managers. The ET1100 ESC address space is directly mapped to the PCI EXPRESS address space.

### Applications

The ECS-PCIe/1100 integrates any PC into an EtherCAT network and makes it an EtherCAT slave node. The PC can act as I/O node. An EtherCAT master can use several EtherCAT protocols like CoE, FoE and EoE to communicate with this EtherCAT slave node.

EtherCAT®

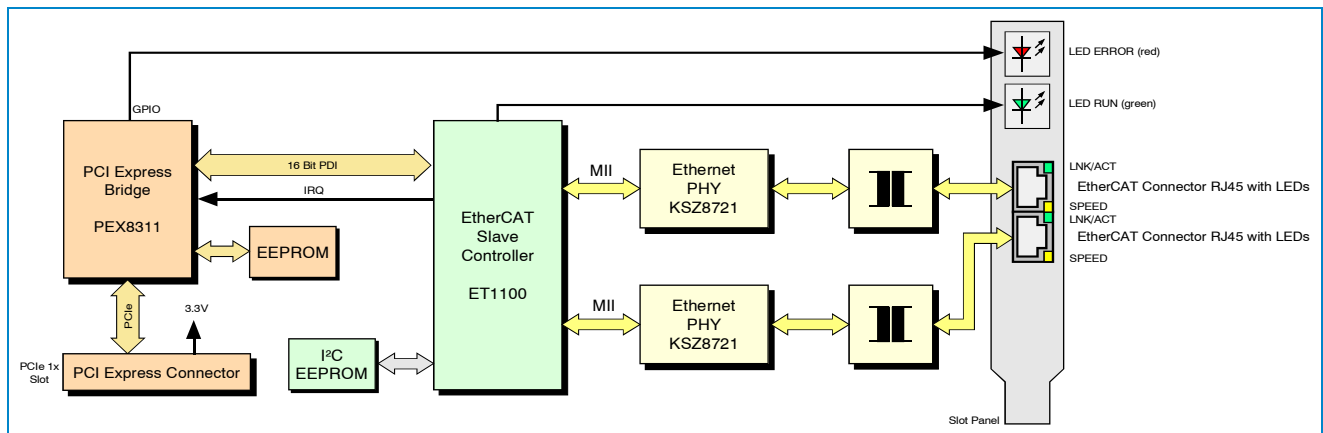


### Configuration and protocols

Configuration is done through the EtherCAT master. A sample device description file (ESI) is provided.

### 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 realtime-OS, are available on request.



### Technical Specifications:

PCI EXPRESS Interface:	
PCIe endpoint	PLX PEX8311
PCIe port	According to PCI EXPRESS Specification R1.0a
Link width	1x
Connector	PCIe card edge connector
EtherCAT Slave Controller (ESC) :	
ESC ASIC	ET1100
ESC interface	2x RJ45, 100BASE-TX, 100 Mbit/s, according to IEEE 802.3, electrically isolated
LEDs	Error, Run, Link/Activity

General:	
Supply voltage	3.3V via PCIe
Ambient temperature	Operational: 0...50° C
Relative humidity	Max. 90 % (non-condensing)
Dimensions [mm]	96 mm x 70 mm (low profile PCIe)
Weight	55 g
Order Information:	
Designation	Order No.
ECS-PCIe/1100	PCI EXPRESS® board with EtherCAT slave controller ET1100, incl. EtherCAT slave driver for Windows and Linux on CD E.1100.02

# EtherCAT Slave Stack



## Easy and Fast EtherCAT® Slave Device Development

- The EtherCAT Slave Stack provides in combination with an EtherCAT slave controller (ESC) all services for an EtherCAT compliant communication according to IEC 61158 / ETG.1000.
- Written in ANSI-C optimized for embedded targets with respect to performance and resource usage.
- Available as binary version for various operating systems or as source code tested on different target architectures (x86, PowerPC™, ARM®) with and without operating system.
- An API based interface provides a clear separation between application and stack which makes a later change to an updated stack revision or different hardware easy.
- All protocol complexity and hardware dependance is hidden. The developer can concentrate on application development which significantly reduce the time to market.
- The cross-platform API allows an early application development (with ECS-PCIe/1100 on Windows®/Linux®) before the target slave device hardware is available.
- The stack comes with a comprehensive manual and a sample application which makes a good starting point for the application.

## Mailbox Protocols

- Supports CoE, EoE, FoE and VoE
- CoE includes 'SDO Information Service', 'Segmented SDO Service', dynamic PDO assignment and dynamic PDO configuration.
- EoE with callback for completely assembled frame (from EtherCAT) and a simple function to inject an Ethernet frame into the EtherCAT slave stack which handles fragmentation etc..
- FoE by callback for each data chunk etc..
- VoE by simple callback for each mailbox packet of that type.

## Object Dictionary

- Comprehensive support for object dictionary and process data - application just accesses the objects and stack handles almost everything, e.g. updates when they are PDO mapped, automatically.
- Dynamic dictionary, completely changeable during runtime.
- Entries can also be created without data pointer, i.e. data is dynamically acquired during the SDO access.
- With automatic handling of important entries, such as PDOs and PDO assignment objects.
- Callbacks for important events, e.g. before and after SDO Download, etc..

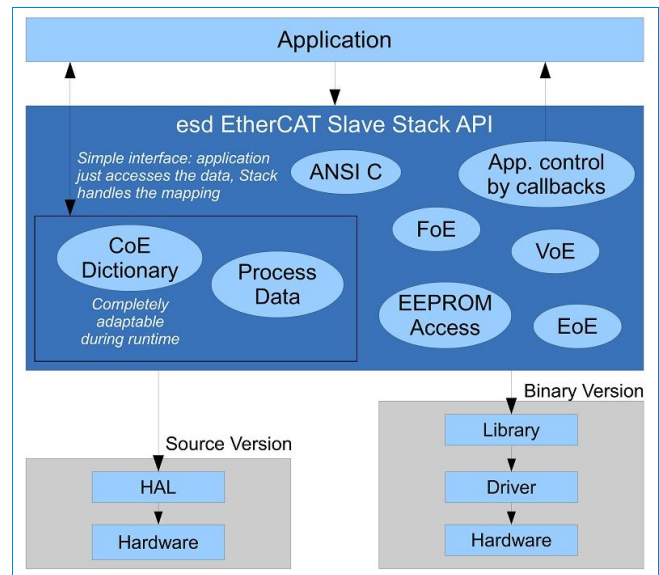
### General:

Header files:	ANSI C
Build:	Includes sample makefiles for gcc and project files for Visual Studio 10

### Source Code Version:

Language:	Completely written in ANSI C
Other:	Little/big endian compatible
Resource usage*:	RAM: approx. 5 kB (BSS/DATA/Heap) + 2 kB (Stack) ROM: approx. 15 kB (CODE/CONST)

\*EtherCAT slave application with 64 byte process data, CoE with 'SDO Information Service' support and approx. 30 objects total. (No EoE etc.)  
Target: ARM Cortex™-M3, 20 kB RAM total, FreeRTOS™



Overview

## Other Features

- Includes functions to read/write ESC's EEPROM.
- ESC can be used in polling or IRQ mode.
- Supports multiple ESC by one application.
- Each version of the stack is tested for compliance by using the latest EtherCAT Conformance Test Tool.
- The source code version allows compile time adaption of several features to optimize the resource usage.
- Source code version is based on a well defined Hardware Abstraction Layer (HAL) to adapt the stack to the target hardware with as little effort as possible.

## Additional Services (not scope of delivery)

- General EtherCAT technology seminars. If requested, the seminar can also be held on-site.
- Detailed introduction to the EtherCAT slave stack code with the possibility to adapt the code to the target device.
- Technical consulting before and during the development phase of the EtherCAT slave device. Our customers will benefit from our years of experience in EtherCAT hardware and software development.