



EtherCAT Example

This example shows how to read and write IDN's with ServoDrive over EtherCAT. Another example shows how to read and write SDO's with CAN over EtherCAT as well as downloading a firmware file with File over EtherCAT.

Product description

ServoDrive over EtherCAT

This example shows how to read and write IDN's with ServoDrive over EtherCAT. As hardware a Rexroth IndraDrive is used. It is also possible to switch the device to another one which uses ServoDrive over EtherCAT.

Several startup parameters can be set as device configuration. These parameters are called IDN's for devices using ServoDrive over EtherCAT. For each IDN the name, attribute, unit, minimum, maximum and value can be set as number or byte array with a maximum of four bytes.

File over EtherCAT

This example shows how to read and write SDO's with CAN over EtherCAT as well as downloading a firmware file with File over EtherCAT. It is also demonstrated how to get information about the master and slaves, like the number of active slaves or the state of the slave. As hardware two analog terminals with CAN over EtherCAT are used. The File over EtherCAT functions are implemented theoretically, without hardware.

For device configuration several startup parameters can be set. For devices which use CAN over EtherCAT an index and sub index is used for each parameter. For each parameter it is possible to read or write the value as number or byte array with a maximum of four bytes.

More information

ServoDrive over EtherCAT

Several startup parameters can be set as device configuration. These parameters are called IDN's for devices using ServoDrive over EtherCAT. For each IDN the name, attribute, unit, minimum, maximum and value can be set as number or byte array with a maximum of four bytes.

Two startup parameters are already set at the beginning. Look at the "startup parameters" tab on the device. The "slave" tab shows the EtherCAT address which is used to select the device. In the "EtherCAT_Master" device under the "Master" tab the correct source address, where the device is connected must be set.

SoE: First the program has to wait for the EtherCAT master to be ready. Afterwards the IDN number 32 is read from device 1001 which was already set at startup. Additionally an IDN is written to the device and afterwards it is read again once as UINT value and as byte array. It is possible to read the name, attribute, unit, minimum, maximum and value of an IDN. Use the specific value at "byElem" for that. The "byDrive" value is not set, because the used device only has one. The index of the EtherCAT master is set at "usiCom" and the address in "uiDevice". Depending on the device, the timeout must be set high enough.

Line	Idn	Name	Value	Bitlength	Abort if error	Jump to line if error	Next line	Comment
1	S-0-0001	NC cycle time	4000	16	<input type="checkbox"/>	<input type="checkbox"/>	0	NC cycle time
2	S-0-0032	Operation mode	11	16	<input type="checkbox"/>	<input type="checkbox"/>	0	Operation mode

File over EtherCAT

For device configuration several startup parameters can be set. For devices which use CAN over EtherCAT an index and sub index is used for each parameter. For each parameter it is possible to read or write the value as number or byte array with a maximum of four bytes.

Parameters for EL4132 and EL3142 are set before startup. By double click on one of these devices the "Startup parameters" tab is shown. One is already set and with the "New" button, more can be selected. The "Slave" tab shows the EtherCAT address which is later used for selecting the device. In the "EtherCAT_Master" device under the "Master" tab the correct source address, where the device is connected must be set.

CoE: First the program has to wait for the EtherCAT master to be ready. Afterwards the parameter from device 1002 which is already set is read in a byte array and as dword. Additionally a parameter of four bytes is written and read afterwards. A parameter larger than four bytes is also written in this example. So far only the parameter values are used, but it is also possible to read the complete entry into a byte array. These values are device specific. All function blocks contain an "udiSdoAbort" variable. If an operation is canceled, this variable returns an abort code. The error to this code can be found in the CANOpen Spec.

FoE: This function demonstrates a way how to download a fictional firmware with File over EtherCAT. After the EtherCAT master is ready, memory for the complete firmware will be allocated. Then the specific slave is set to boot mode to download the firmware. When the download is finished, the memory will be released. The upload function has no direct relation to the firmware example it shall only demonstrate how the instance is called.

Device EL3142 EL4132

Slave Process Data Startup parameters EtherCAT I/O Mapping Status Information

Address
 AutoInc Address: -2
 EtherCAT Address: 1003

Additional
 Enable Expert Settings
 Optional

Distributed Clock
 Select DC: FreeRun/SM-Synchron
 enable 4000 Sync Unit Cycle (µs)

Sync0:
 Enable Sync 0
 Sync Unit Cycle [] Cycle Time (µs)
 User Defined 0 Shift Time (µs)

Sync1:
 Enable Sync 1
 Sync Unit Cycle [] Cycle Time (µs)
 User Defined 0 Shift Time (µs)



Device EL3142 EL4132

Slave Process Data Startup parameters EtherCAT I/O Mapping Status Information

Line	Index/Subindex	Name	Value	Bitlength	Abort if error	Jump to line if error	Next line	Comment
..... 1	16#801F:16#00	AI Vendor data Ch.2	0	32	<input type="checkbox"/>	<input type="checkbox"/>	0	

General information

Manufacturer:

3S-Smart Software Solutions GmbH
 Memminger Strasse 151
 87439 Kempten
 Germany

Support:

<https://support.codesys.com>

Item:

EtherCAT Example

Item number:

000008

Sales:

CODESYS Store

<https://store.codesys.com>

Included in delivery:

CODESYS Package with example projects

System requirements and restrictions

System Requirements and Restrictions

Programming System	CODESYS Development System V3.5.6.0 or higher
Target System	CODESYS Control V3.5.6.0 or higher
Supported Platforms / Devices	All <p>Notice: Use the project 'Device Reader' to find out the supported features of your device. 'Device Reader' is available for free in the CODESYS Store.</p>
	<p>ServoDrive over EtherCAT</p> <p>Rexroth IndraDrive Basic Cs (or any other device which uses ServoDrive over EtherCAT).</p> <p>To run the example with a CoDeSys Control Win V3 the WinPcap library must be installed (for a free download look at winpcap.org).</p> <p>Add the component "Component.5=SysEthernet" into "~\3SCoDeSys\GatewayPLC\CoDeSysControl.cfg".</p>
Additional Requirements	<p>File over EtherCAT</p> <p>EtherCAT Beckhoff EK 1100</p> <p>EL4132 2-channel analog output terminal -10...+10 V, 16 bits</p> <p>EL3142 2-channel analog supply terminal 0...20 mA, single-ended, 16 bits</p> <p>In the example a CoDeSys Control Win V3 is used, but it should run everywhere, where the EtherCAT master runs.</p> <p>In order to understand abort codes, when an error occurs, the CANOpen Spec is needed.</p> <p>To run the example with a CoDeSys Control Win V3 the WinPcap library must be installed (for a free download look at winpcap.org).</p> <p>Add into "~\3S CoDeSys\GatewayPLC\CoDeSysControl.cfg" the component "Component.5=SysEthernet"</p>
Restrictions	•
Licensing	No license required

System Requirements and Restrictions

Required Accessory •

Note: Not all CODESYS features are available in all territories. For more information on geographic restrictions, please contact sales@codesys.com.

Note: Technical specifications are subject to change. Errors and omissions excepted. The content of the current online version of this document applies.