

Projekt: PR_0002_27_Ethernet/IP

Title:

SD3-Ethernet/IP-Example

Version: V1.1

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1. Ethernet/IP

The SIEB & MEYER AG drive system SD3 supports Ethernet/IP communication on standard ethernet networking. The Ethernet/IP device driver is running in Linux user space thread. There is no hard realtime available.

The functionality is implemented in a plugIn module named 'CEthernetIP'.

1.1. Activating the Ethernet/IP PlugIn

The ,Ethernet/IP'-plugIn have to be added to your configuration by editing the configuration file.

Enter edit menu.



Add 'CEthernetIP' plugin from device.

Plugins				
📲 Add 🛛 📲 Add from device	\mu Add user plugin	🔀 Remove		
Name	Priority	Version		
1 🚢 CDevCTRL	80	1.0		
2 🚢 CEthernetIP	5	1.0		

Write configuration to drive.

1.2. Parameter Setup

If you want to use the ,*CEthernetIP*'-plugIn, you have to activate it and set the necessary parameters in parameter file.

First you have to select the right device. '*eth0*' activates the integrated ethernet port. '*eth1*' the ethernet port on the option module '*036310047A3*' or '*036310048A4*'.

🛐 InitialisationParams						_
<filter></filter>	Ø	+	•	•	[InitialisationParams - Drive] Ethernet-IP	
Name		Eth	ernet-	IP		
AnalogInput AnalogOutput Option-A Option-B VoltageFrequencyControl Study KOLLMORGEN_AKM2 Ethernet-IP DeviceControl		E	thernet	t-IP EVICE	eth0	

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The network settings for 'eth0' are already done in the ,DRIVEMASTER-3' network settings menu.

If you use the 'eth1' device additional settings have to be done.

*InitialisationParams		
<filter></filter>	(Initialis	ationParams - Drive] Ethernet-IP
Name	Ethernet-IP	
OutputStage	*Ethernet-IP	
Control		
Digital-Encoder-1		ath1
Digital-Encoder-2	LIP_DEVICE	
	EIP_MODE	configure from device
DigitalOutput	EIP IP	0.0.0.0
AnalogInput	_	
🚇 AnalogOutput	EIP_MASK	255.255.0.0
Option-A	EIP_NAMESERVER	0.0.0.0
Option-B		
	EIP_NAPIESERVERZ	0.0.0
KOLLMORGEN AKM2	EIP_DOMAIN	siebmeyer.org
Ethernet-IP	EIP GATEWAY	0.0.0.0
DeviceControl		

After setting the parameters you have to download the configuration and restart the software.

1.3. Interfacing to Ethernet/IP

The PLC interfaces to the drive by reading and writing data objects. Therefor the custom software has to publish class and assembly instances. The information about the published instances will be stored in an XML-file.

The file will be created automatically while creating a new object dictionary. The default filename is *'EthernetIP_Configuration.xml*'. You should add this file to the configuration file list.

1.3.1. Creating own class and assembly instances

The PLC interfaces to the drive by reading and writing data objects. Therefore the custom software has to write some code in the custom plugin. You can use the '**CEthernetIP_Example**' plugin to see how it works. This example defines

- an input assembly, 16 bytes, instance id 101
- an output assembly, 16 bytes, instance id 102
- an config assembly, 16 bytes, instance id 103
- an parameter class instance, 16 bytes, class id 116, instance id 1
- and an result class instance, 16 bytes, class id 117, instance id 1

Look at the 'writeObjectDictionary' function.

else if(aBlockName == cACTUAL)
{

^{//--} try to get Ethernet/IP plugIn

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piCEthernetIP = (CEthernetIP *)piCModuleLoader->getPlugInHandle("CEthernetIP");

... creating your shared memory objects

//-- write Ethernet-IP configuration if(piCEthernetIP != NULL) writeEthernetIP_Configuration();

}

The function "will build up some EthernetIP class instances form the shared memory objects. The used functions will know the data types of the shared memory objects. For 'structure' types build an byte array overlay for the published structures.

See '*writeEthernetIP_Configuration()*' as an example.

The used object ids like '*eParamsAll*' are defined by the programmer while creating a new object dictionary.

NT::u32 CEthernetIP_Example::writeEthernetIP_Configuration() { NT::u32 result = DERR::eERR_None; int ClassId = CEthernetIP::cBaseClass; InstanceIndex; int //-- create classes ---//-- parameter array -----//-- create class piCEthernetIP->appendClass(ClassId, "MY_PARAMS"); //-- create instance InstanceIndex = piCEthernetIP->appendInstance(ClassId); //-- add attributes piCEthernetIP->appendAttribute(ClassId, InstanceIndex, eParamsAll, 0, 0); ClassId++; //-- results ------//-- create class piCEthernetIP->appendClass(ClassId, "MY_RESULTS"); //-- create instance InstanceIndex = piCEthernetIP->appendInstance(ClassId); //-- add attributes piCEthernetIP->appendAttribute(ClassId, InstanceIndex, eResultsAll, 0, 0); ClassId++: //-- create assembly instances -----//-- create class piCEthernetIP->appendClass(CEthernetIP::cAssemblyClass, "assembly"); //-- create instance, Target to Host InstanceIndex = piCEthernetIP->appendInstance(CEthernetIP::cAssemblyClass, 101); //-- add attribute piCEthernetIP->appendAttribute(CEthernetIP::cAssemblyClass, InstanceIndex, eOPDO_all, 0, 0);

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// create instance, Host to	Target			
InstanceIndex = piCEthern // add attribute piCEthernetIP->appendAtt	etIP->appendInstance(C ribute(CEthernetIP::cAs	<pre>SethernetIP::cAssembly semblyClass, Instancel</pre>	yClass, 102); Index, eIPDO all. 0, 0):	

// create instance, Host to Target InstanceIndex = piCEthernetIP->appendInstance(CEthernetIP::cAssemblyClass, 103); // add attribute piCEthernetIP->appendAttribute(CEthernetIP::cAssemblyClass, InstanceIndex, eConfigAll, 0, 0);
// activate assembly piCEthernetIP->setActiveAssemblyInstances(101, 102, 103);

// save file	
--------------	--

piCEthernetIP->saveToFile();

	return	result;
}		

1.4. Ethernet/IP explorer example

For first steps you can download an Ethernet/IP-explorer from 'SOURCEFORGE'.

https://sourceforge.net/projects/enipexplorer/

Select the 'Functions/Open Interface' menu and enter your IP-address ('172.16.10.133' for this example).

Ethe	rnet/IP Exp	olorer							
File	Functions	Options	Help						
Devices	Local Inter	rface		× –					
	IP address								
	172.16	•	[
		. 1							
	0	ĸ	Cancel	l					

Now you should see your drive.



Select the 'Assembly #4' tag in the selection tree.



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Select the 'Functions/Add Instance' menu and add your assembly instances 101 to 103.



Select the 'Functions/Implicit Messaging ' menu.

Select the 'Assembly #4, Instance #101, Attribute #3' and move it with left mouse key pressed to the right 'input' window.

Select the 'Assembly #4, Instance #102, Attribute #3' and move it with left mouse key pressed to the middle 'output window.

Select the 'Assembly #4, Instance #103, Attribute #3' and move it with left mouse key pressed to the left 'configuration' window.

Implicit Messaging with	h 17	72.16.5.8 4	I - SIEB & ME	EYEI	R A	G. SD3				_ 🗆	x
□ ldentity #1		Configuration Node 4.103.3		5	Output (0->T) Node 4.102.3			Input (T->0) Node 4.101.3			
Instance #1		ld Status DecodedN	3 OnLine	-		ld Status DecodedN	3 OnLine	•	ld Status Decoded!	3 OnLine	-
Attribute #3	•	RawData	Byte[]-Array			RawData	Byte[]-Array		RawData	Byte[]-Array	
Attribute #3	ŀ	[0]	0			[0] [1]	0		[0] [1]	0 140	
Attribute #3		[2]	0			[2]	0		[2]	0	

Press the 'Forward Open' button.

Now you should see the cyclic data exchange.

The 'EthernetIP_Example' plugIn will increment byte-1 inside the input window and copy byte-0 from the output window to byte-0 of the input window.

The 'EthernetIP-Explorer' is a little buggy and would not remember your selection.

The 'Explicit Message' function will not work correctly. So you could not read/write the example classes 116/117.

1.5. The ,GDS' File

SIEB & MEYER AG delivers an basic 'GDS'-file. The customer has to adapt it if new assembly and class instance has be added.

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