

AP10

**RSLogix™ 5000 EtherNet/IP™
Add-On Instruction via
Anybus® Communicator™**

Software Description



Table of contents

1	General Notes.....	3
1.1	Trademarks	3
1.2	Liability	3
1.3	Limitations	3
1.4	Requirements	3
1.5	Versions Overview	4
1.6	List of Abbreviations	4
2	Setup of Anybus® Communicator™	5
2.1	ABC Configuration File	5
2.2	TCP/IP Configuration	5
2.3	ABC Cycle Time	6
3	I/O Configuration in the Scanner	7
3.1	I/O Configuration with RSLogix™ 5000 Version 19 or Lower	7
3.1.1	Add New Module to the Hardware Configuration	7
3.2	I/O Configuration with RSLogix™ 5000 Version 20 or Higher	10
3.2.1	Register the EDS File for ABC	10
3.2.2	Add New Module to the Hardware Configuration	10
4	Software Configuration	12
4.1	Import the SIKO AP10 Add-On Instruction	12
4.2	Call the AOI SIKO_AP10 Cyclically in the User Program	13
4.3	Setup Add-On Instruction Parameters	14
4.3.1	SIKO_AP10	14
4.3.2	DC_OutputBuffer	14
4.3.3	DC_AbcOutputRegister	15
4.3.4	DC_AbcStartByteOut	15
4.3.5	DC_InputBuffer	15
4.3.6	DC_AbcInputRegister	15
4.3.7	DC_AbcStartByteIn	15
4.3.8	nNodeId	16
4.4	AOI Call After Configuration	16
4.5	Software Example	17
4.5.1	Data Exchange	17
4.5.2	Parameter Access	17
4.5.3	Read Parameters	17
4.5.4	Write Parameters	17
4.5.5	Copy Parameters from Read to Write	17
4.5.6	S-Commands	17
4.5.7	Counter Value	18
4.5.8	Error Codes	20

1 General Notes

1.1 Trademarks

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EtherNet/IP™ is a trademark of ODVA, Inc.

1.2 Liability

SIKO GmbH assumes no warranty whatsoever regarding topicality, correctness, completeness or quality of the information or software products provided. All liability claims against SIKO GmbH referring to material or immaterial damages caused by using or not using the information or software provided or by using erroneous or incomplete information or software are always excluded.

1.3 Limitations

The Add-On Instruction and its function were tested on a CompactLogix® 1769-L16ER. The module was programmed using RSLogix™ 5000 version V20.01.00 (CPR 9 SR 5).

The configuration file and its function were tested on an Anybus® Communicator™ AB7007. The file was setup using Anybus® Configuration Manager - Communicator RS232/422/485 version v.4.4.1.3 (Win 2000/XP/Vista/7).

1.4 Requirements

- Basic knowledge of handling and programming Allen-Bradley® systems.
- Familiarity with EtherNet/IP™.
- Basic knowledge of setup and handling Anybus® Communicator™
- Familiarity with Anybus® Configuration Manager

1.5 Versions Overview

This manual is related to

- AP10 firmware version ≥ 1.06
- Add-On Instructions "SIKO_AP10_RSLV19-01-00_V5-0-1.L5X"
- Add-On Instructions "SIKO_AP10_RSLV20-01-00_V5-0-1.L5X"
- Anybus® configuration file "SIKO_EIP_31-SN5_pattern.cfg"
- Anybus® Communicator™ file "005A000C004D0300.EDS"

1.6 List of Abbreviations

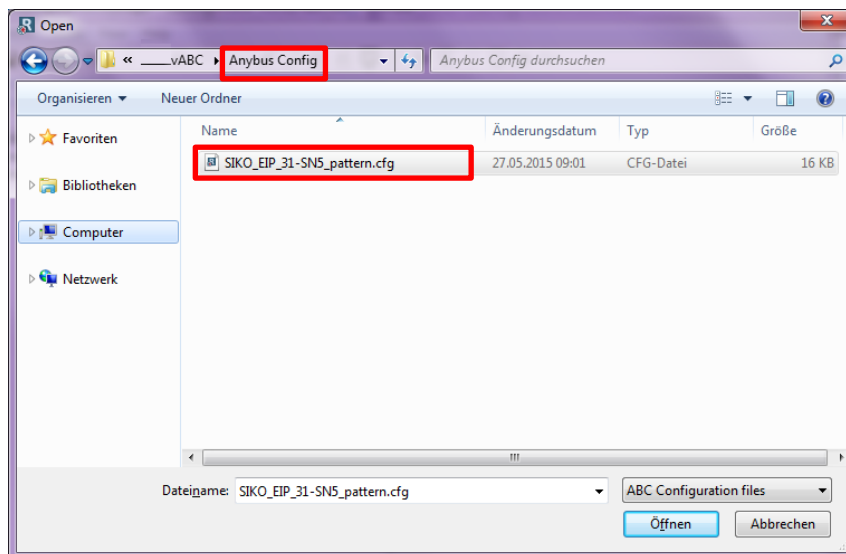
EIP	EtherNet/IP™	ABC	Anybus® Communicator™
SW	Status Word	ACM	Anybus® Configuration Manager
CW	Control Word	AOI	Add-On Instruction

2 Setup of Anybus® Communicator™

Please note, that the Anybus® configuration file is designed for a flexible SIKONETZ-5 participant numbers of minimum 1 to maximum 31. Only the TCP/IP configuration has to be modified according to your network requirements. Please consider an IP Address modification when reading further on.

2.1 ABC Configuration File

Start ACM and select configuration file “SIKO_EIP_31-SN5_pattern.cfg” from the folder “Anybus Config”.

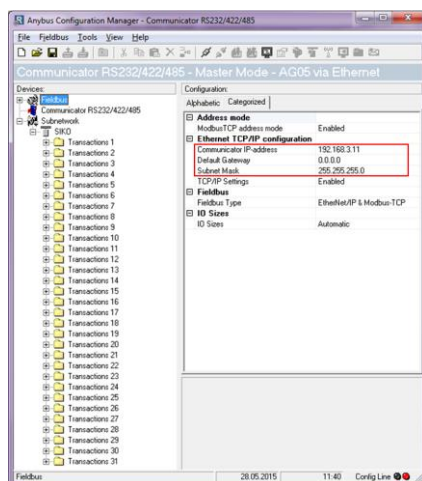


2.2 TCP/IP Configuration

NOTICE

The IP settings in this example can cause serious network problems under certain circumstances. If you are in doubt about the correct IP settings for your network, ask your system administrator for assistance.

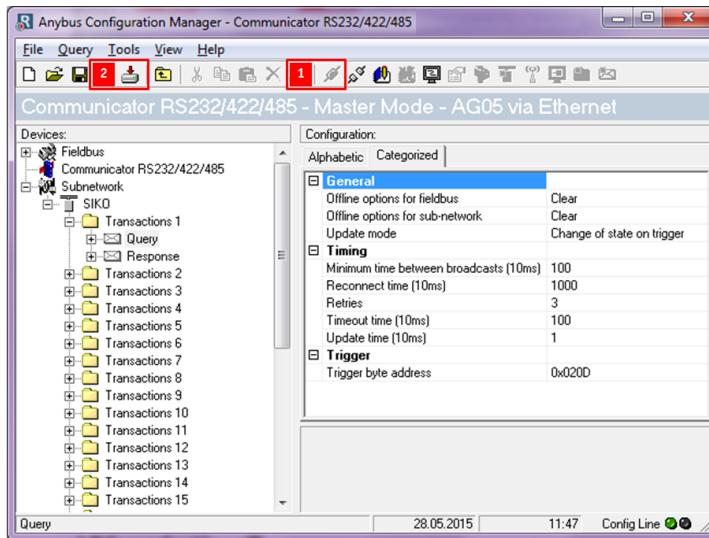
Modify TCP/IP configuration if necessary.



1. Press “Connect” to go online with the ABC.

2. Press “download to the ABC”.

You should have the following view:



2.3 ABC Cycle Time

Each transaction consists of “Query” and “Response”. The minimum time for a used transaction is about ≥ 10 ms. Each Subnetwork cycle has an overhead of about ≥ 100 ms.

Since the plc cycle time is asynchronous with ABC cycle time the AOI integrates a trigger instead of checksum to the SIKONETZ-5 structure. When a master telegram is completed by the AOI the trigger will be incremented. The corresponding transaction will be updated by change of state on trigger and exchanges the trigger with checksum byte before the SIKONETZ-5 telegram is send into subnetwork.

The subnetwork reply is checked and checksum byte is exchanged with incremented trigger byte before the telegram is send to plc by ABC. The AOI will wait until a valid slave telegram is responded before sending a new telegram. Due to it the minimum time between update cycle amounts to ≥ 110 ms minimum. Please consider this for time critical applications!

3 I/O Configuration in the Scanner

From software version 20 onwards, EDS files are used for the I/O configuration.

Up to and including software version 19, the I/O configuration is carried out without EDS files.

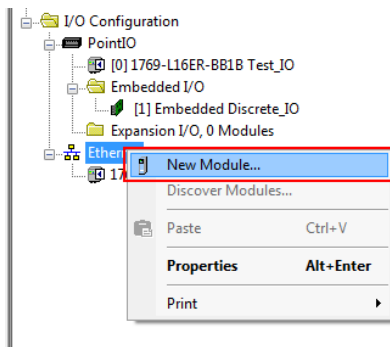
3.1 I/O Configuration with RSLogix™ 5000 Version 19 or Lower

3.1.1 Add New Module to the Hardware Configuration

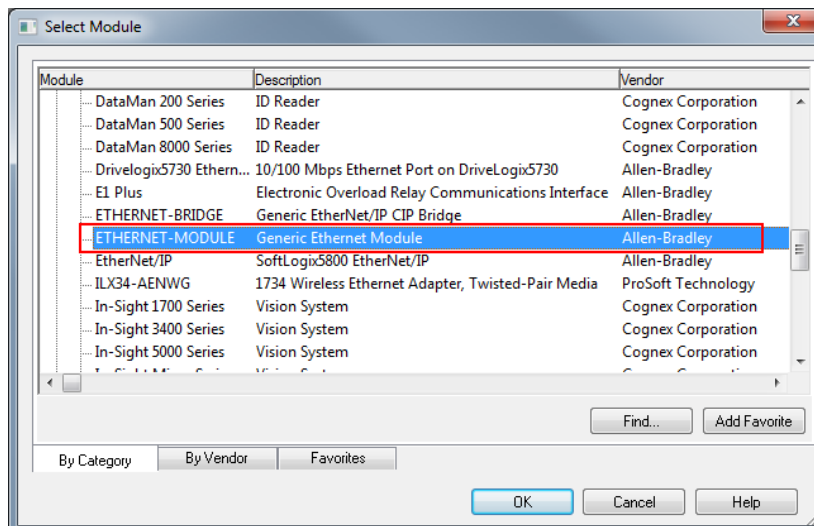
NOTICE

The IP settings in this example can cause serious network problems under certain circumstances. If you are in doubt about the correct IP settings for your network, ask your system administrator for assistance.

1. Right-click on "Ethernet" and execute "New Module..." command from the context menu.



2. Open "Communications" and select "ETHERNET-MODULE / Generic Ethernet Module".



3. Complete the selection with "OK".

4. Enter the module settings:

The 'New Module' dialog box is shown with the following settings:

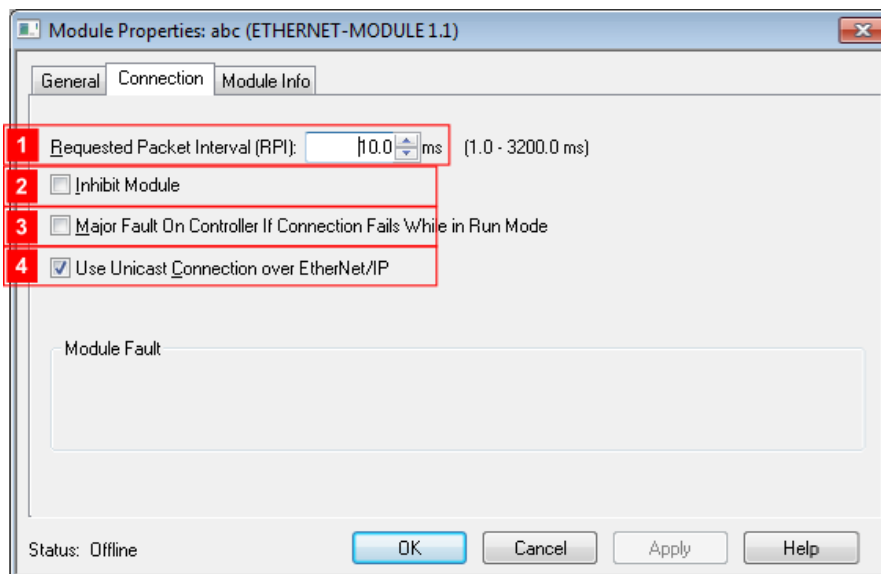
- Type: ETHERNET-MODULE Generic Ethernet Module
- Vendor: Allen-Bradley
- Parent: Local
- 1 Name: Anybus
- Description: (empty)
- 2 Comm Format: Data - SINT
- Address / Host Name:
 - 3 IP Address: 192 . 168 . 3 . 11
 - Host Name: (empty)
- Connection Parameters:

	Assembly Instance:	Size:	
4 Input:	100	314	(8-bit)
5 Output:	150	314	(8-bit)
6 Configuration:	1	0	(8-bit)
- Status Input: (empty)
- Status Output: (empty)
- ☒ Open Module Properties
- Buttons: OK, Cancel, Help

Settings	Description
1. Name	Name of device, in this example we use "Anybus"
2. Comm Format	Data format for the assembly object instances: "Data – SINT"
3. IP Address	IP address of the Ethernet-Module.
4. Input	Assembly object instance input: "100" with size "314"
5. Output	Assembly object instance output: "150" with size "314"
6. Configuration	Assembly object instance configuration: "1" with size "0"

5. Complete the settings with "OK". Now the module properties window appears.

6. Go to the tab “Connection” and set further properties.



Settings	Description	Value
1. Requested Packet Interval	The RPI time specifies the intervals for the I/O data exchange between adapter and scanner. Supported RPI: 1 ... 3200 ms	“10.0”
2. Inhibit Module	Check/clear this box to inhibit/uninhibit your connection to the module. Inhibiting the module causes the connection to the module to be broken.	“clear”
3. Major Fault On Controller If Connection Fails While in Run Mode	Check this box to configure the controller so that failure of the connection to this module causes a major fault on the controller.	“clear”
4. Use Unicast Connection over EtherNet/IP	Select between Unicast and Multicast for EtherNet/IP connections.	“check”

7. Complete the settings with “OK”.

The I/O configuration is now complete.

The corresponding tags will then be created in the controller tags of the project.

The screenshot shows the 'Controller Tags' dialog for a V19 example controller. The 'Scope' is 'Test_AddOn_AF' and 'Show' is 'All Tags'. The following table represents the data shown in the dialog:

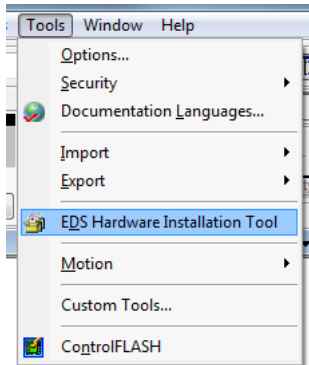
Name	Base Tag	Data Type	Description
+ Anybus:C		AB:ETHERNET_MODULE:C:0	
- Anybus:I		AB:ETHERNET_MODULE_SINT_314Bytes:I:0	
+ Anybus:I.Data		SINT[314]	
- Anybus:O		AB:ETHERNET_MODULE_SINT_314Bytes:O:0	
+ Anybus:O.Data		SINT[314]	

8. Save the I/O configuration.

3.2 I/O Configuration with RSLogix™ 5000 Version 20 or Higher

3.2.1 Register the EDS File for ABC

1. Start “EDS Hardware Installation Tool” and use the EDS wizard to register the EDS file “005A000C004D0300.EDS”.

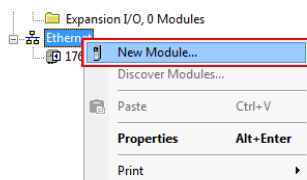


3.2.2 Add New Module to the Hardware Configuration

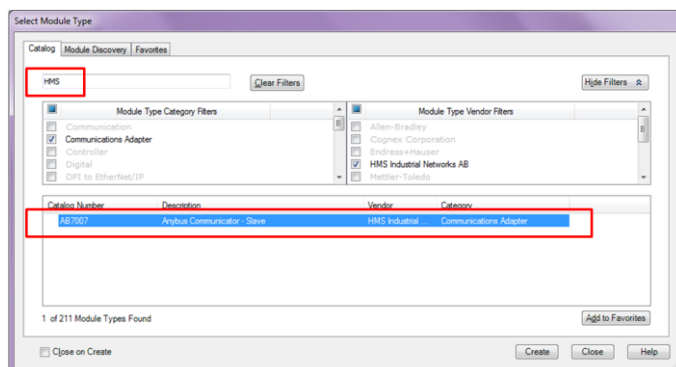
NOTICE

The IP settings in this example can cause serious network problems under certain circumstances. If you are in doubt about the correct IP settings for your network, ask your system administrator for assistance.

1. Right-click on “Ethernet” and execute “New Module...” command from the context menu (The View could differ depending on used hardware).

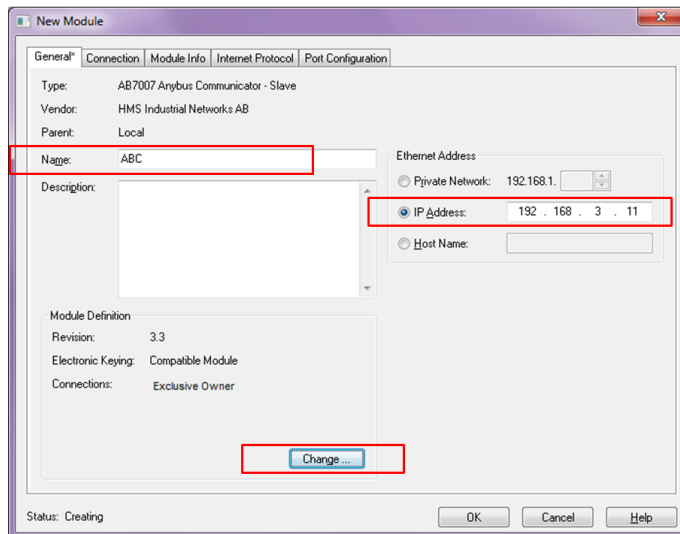


2. Search for “HMS” in the catalog.

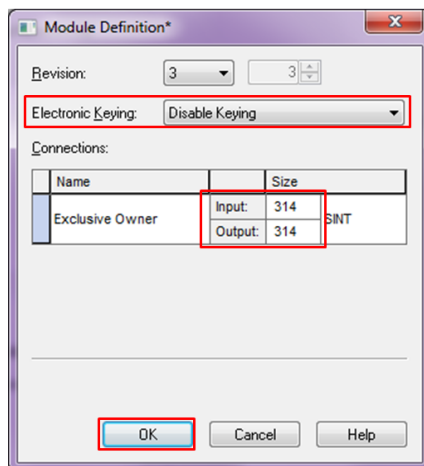


3. Choose catalog number “AB7007”.
4. Execute “Create” command.

5. Enter "Name" of device, for example "ABC".
6. Setup "Ethernet Address" of the ABC (assign IP address via ACM to setup address)




7. Open "Change ..."



8. Choose "Electronic Keying" "Disable Keying"
9. Change "Input" and "Output" size to "314" "SINT".
10. Confirm settings as well as warning with "OK".

The I/O configuration is now complete.

The corresponding tags will then be created in the controller tags of the project.

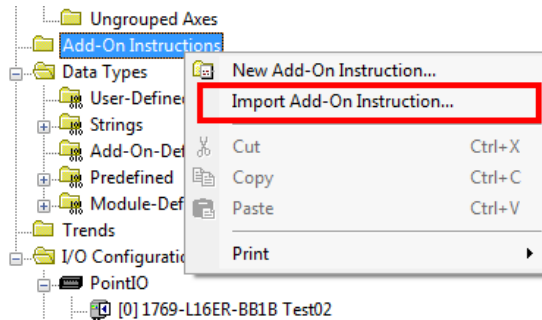
Scope:  Test_AddOn_AF		Show: All Tags		
	Name	Alias For	Base Tag	Data Type
	ABC:I			_005A:AB7007_85E5B736:I:0
	ABC:I.ConnectionFaulted			BOOL
	ABC:I.Data			SINT[314]
	ABC:O			_005A:AB7007_0C170748:O:0
	ABC:O.Data			SINT[314]

11. Save the I/O configuration.

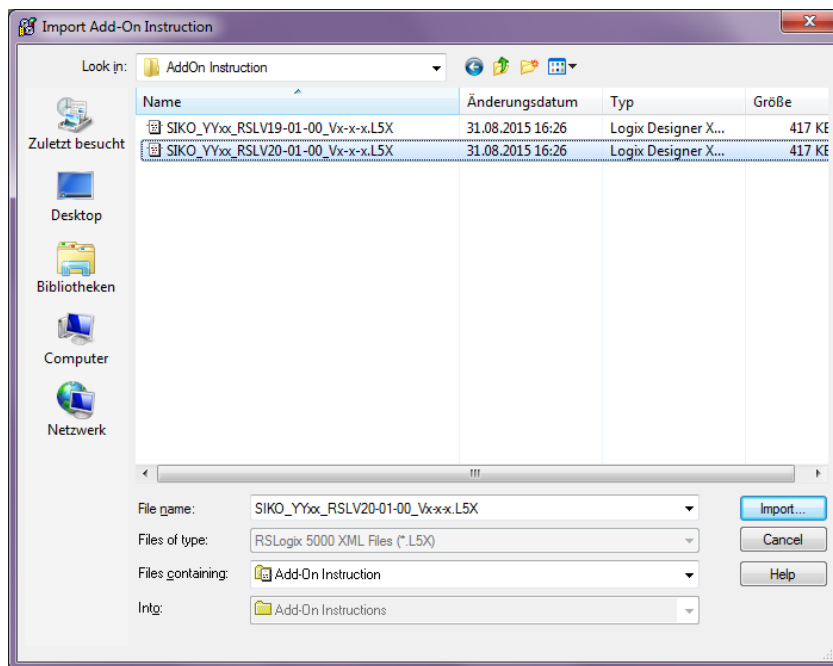
4 Software Configuration

4.1 Import the SIKO AP10 Add-On Instruction

1. Right-click on "Add-On Instructions" folder inside the controller organizer.
2. Execute command "Import Add-On Instruction..."



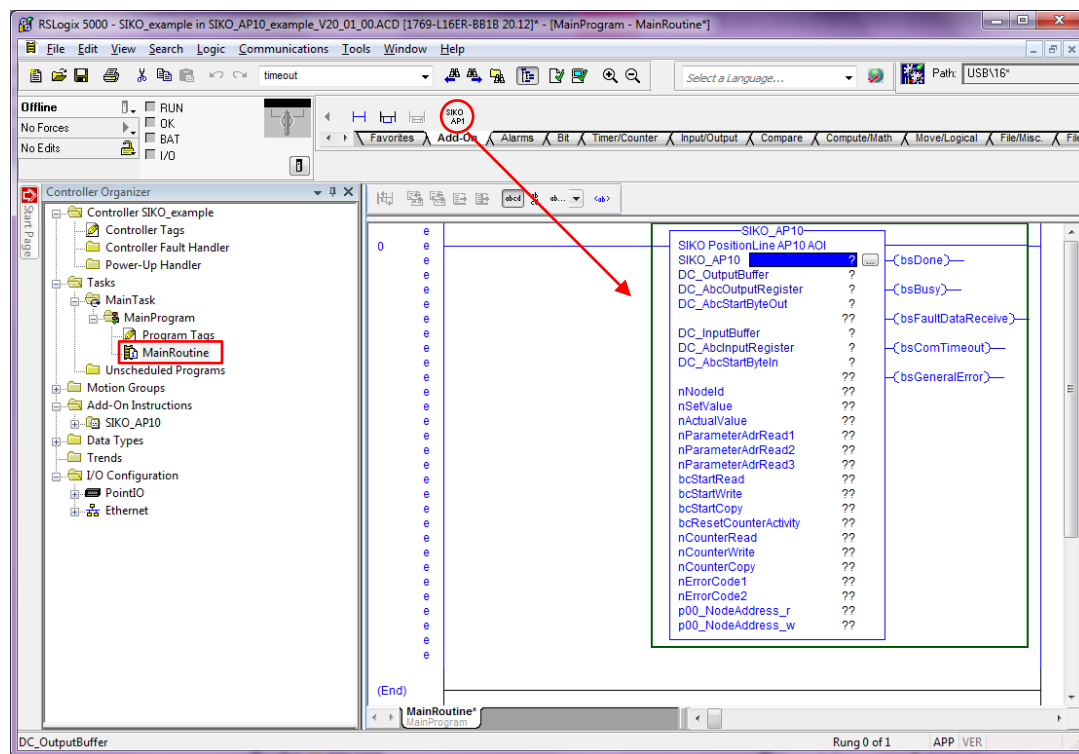
3. For RSLogix™ 5000 V19 choose file "SIKO_AP10_RSLV19-01-00_V5-0-1.L5X" or for RSLogix™ 5000 V20 choose file "SIKO_AP10_RSLV20-01-00_V5-0-1.L5X" from the folder "AddOn Instruction".



4. Execute "Import..." command.

4.2 Call the AOI SIKO_AP10 Cyclically in the User Program.

1. Double-click on "MainRoutine" folder.
2. Go to language element toolbar.
3. Choose tab "Add-On".
4. Drag add-on "SIKO_AP10".
5. Drop add-on at rung "0".



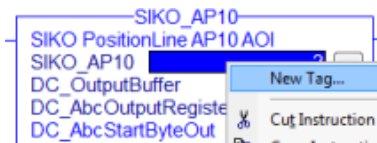
4.3 Setup Add-On Instruction Parameters

After inserting the Add-On Instruction, you'll have to assign the various parameters of the module.

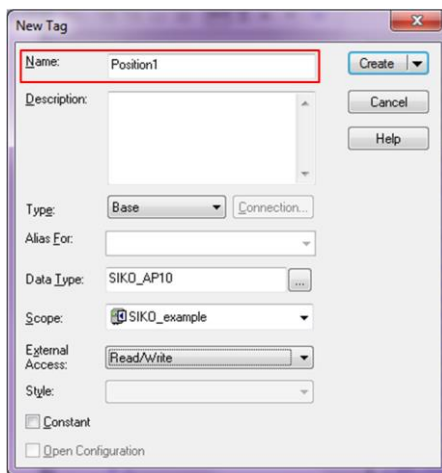
4.3.1 SIKO_AP10

Description: Module instance name

1. Create new tag by right-clicking on interrogation mark on the right side of "SIKO_AP10".
2. Execute "New Tag..." command.



3. Enter the name of the new tag, for example "Position1".



4. Confirm setting with "Create".

4.3.2 DC_OutputBuffer

Description: Buffer for protocol output transfer

1. Create new tag by pressing "Ctrl + W".
2. Enter the name of the new tag, for example "Position1_CW".
3. Confirm setting with "Create".

4.3.3 DC_AbcOutputRegister

Description: Data output register from ABC

1. Create new entering by double-click "?".
2. Select drop-down menu.
3. Select "ABC:0" by double-click.
4. Confirm setting with "ENTER".

4.3.4 DC_AbcStartByteOut

Description: Address of ABC memory field for outgoing data

1. Create new entering by double-click "?".
2. Enter the number of the field in decimal format. First no. is "204". A further AP10 will start 10 Byte higher, i. e. "214", "224" and so on.
3. Confirm setting with "ENTER".

4.3.5 DC_InputBuffer

Description: Buffer for protocol input transfer

1. Create new tag by "Ctrl + W".
2. Enter the name of the new tag, for example "Position1_SW".
3. Confirm setting with "Create".

4.3.6 DC_AbcInputRegister

Description: Data input register from ABC

1. Create new entering by double-click "?".
2. Select drop-down menu.
3. Select "ABC:I" by double-clicking.
4. Confirm setting with "ENTER".

4.3.7 DC_AbcStartByteIn

Description: Address of ABC memory field for incoming data

1. Create new entering by double-click "?".
2. Enter the number of the field in decimal format. First no. is "4". A further AP10 will start 10 Byte higher, i. e. "14", "24" and so on.
3. Confirm setting with "ENTER".

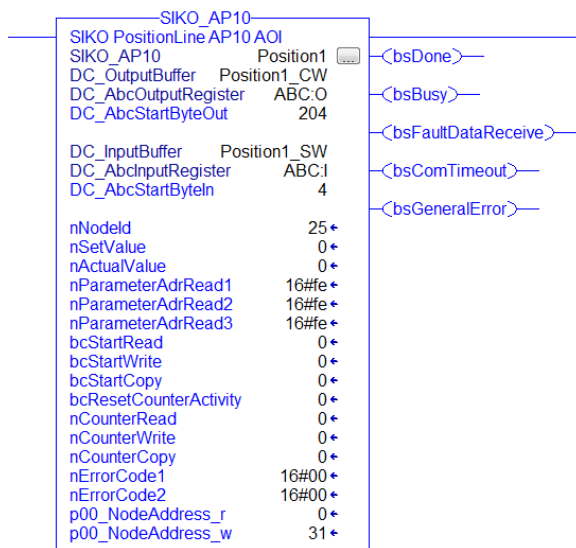
4.3.8 nNodeId

Description: nNodeId is the temporary node address of each SIKONETZ-5 participant.

1. Create new entering by double-click “?”.
2. Enter the node address, for example “25”.
3. Confirm setting with “ENTER”.

NOTE: Before writing the parameters adjust parameter p00_NodeAddress_w accordingly!

4.4 AOI Call After Configuration



4.5 Software Example

4.5.1 Data Exchange

The AOI is designed to send or receive in alternation the "nSetValue" (Write, Parameter: 0xFF "Set Point 2") or the "nActualValue" (Read, Parameter: 0xFE "Actual Position") respectively, while no specific parameter access is active.

With the "nParameterAdrRead1", "nParameterAdrRead2" and "nParameterAdrRead3" further parameter can be included in the data read cycle. With default value 0xFE the inclusion is disabled.

NOTE: If "bsFaultDataReceive" is indicated the complete data exchange is stopped, while Control and Status Word are still updated! A missing or not responding subnetwork participant is indicated by "bsComTimeout" (0,5sec. + time set in parameter 0x02 Bus Timeout).

4.5.2 Parameter Access

The present module contains the parameter data in addition to the process data (CW/SW). Parameters that can be changed (read/write) exist in programming as actual value (_r) and as target value (_w) as well. Furthermore, it is differentiated between pure read parameters (only indicated as actual value) and pure write parameters (only indicated as target value).

A rising edge must be applied either to the "bcStartRead" or to the "bcStartWrite" input on the module described here in order to enable a read or write process of one of the variables.

4.5.3 Read Parameters

If a rising edge is applied to the "bcStartRead" input, then all parameters will be read and can be used for further programming. If counter read value is not reset to "0" the read cycle was interrupted by read failure. This indicates to a communication failure.

4.5.4 Write Parameters

If a rising edge is applied to the "bcStartWrite" input of the module, then all parameters will be transferred to the module. If counter write value is not reset to "0" the write cycle was interrupted by a write failure. This indicates to a communication failure or parameter value is beyond range of value accepted by AP10.

4.5.5 Copy Parameters from Read to Write

If a rising edge is applied to the "bcStartCopy" input of the module, then all actual values (_r) are copied to their corresponding target values (_w).

4.5.6 S-Commands

After executing a S-Command a read cycle is been triggered to refresh all actual values (_r).

4.5.7 Counter Value

Count read value	Count write value	Name	Value range (dec)	Default
	1	0xA8 Programming Mode On/Off	0 ... 1	0
1	2	0x00 Note address	0 ... 31	31
2	3	0x01 Baud rate	0 ... 2	1
3	4	0x02 Bus Timeout	0 ... 20	20
4	5	0x03 Response parameter to a setpoint write access	0 ... 2	0
5	6	0x04 Keys enable time: Configuration start delay	1 ... 60	5
6	7	0x05 Key function enable1: Calibration enable	0 ... 1	1
7	8	0x06 LED flashing	0 ... 1	0
8	9	0x07 LED3 (green right)	0 ... 1	1
9	10	0x08 LED2 (red left)	0 ... 1	1
10	11	0x09 LED1 (green left)	0 ... 1	1
11	12	0x0A Decimal places	0 ... 4	0
12	13	0x0B Display divisor (ADI)	0 ... 3	0
13	14	0x0C Direction indicators (CW, CCW)	0 ... 2	0
14	15	0x0D Display orientation	0 ... 1	0
15	16	0x0E Configuration programming mode	0 ... 1	0
16	17	0x1B Counting direction	0 ... 1	0
17	18	0x1C Resolution per revolution	1 ... 65535	880
18	19	0x1E Offset value	-9999 ... 9999	0
19	20	0x1F Calibration value	-999999 ... 999999	0
20	21	0x20 Target window1 (near field)	0 ... 9999	5
21	22	0x21 Positioning type (loop type)	0 ... 2	0
22	23	0x22 Loop length	0 ... 9999	0
23	24	0x28 Operating mode	0 ... 3	0
24	25	0x30 Display in the 2nd row	0 ... 1	0
25	26	0x31 Target window2 (extended)	0 ... 9999	0
26	27	0x32 Target window2 visualization	0 ... 1	0
27	28	0x33 Application of the display divisor (ADI application)	0 ... 1	0
28	29	0x34 Formation of the differential value	0 ... 1	0
29	30	0x35 Key function enable2: Incremental measurement enable	0 ... 1	1
30	31	0x39 LED4 (red right)	0 ... 1	1
31	32	0x3A LCD backlight flashing	0 ... 1	0
32	33	0x3B LCD backlight white	0 ... 1	1

Count read value	Count write value	Name	Value range (dec)	Default
33	34	0x3C LCD backlight red	0 ... 1	1
34	35	0x3D Key function enable3: Configuration enable via keyboard	0 ... 1	1
35	36	0x3E Acknowledgement settings	0 or 2	0
36	37	0x3F Indication factor	0 ... 8	0
37		0x63 Battery voltage		0
38		0x65 Device identification		0
39		0x67 Software version		0
40		0x80 Number of errors		0
41		0x81 Error 01		0
42		0x82 Error 02		0
43		0x83 Error 03		0
44		0x84 Error 04		0
45		0x85 Error 05		0
46		0x86 Error 06		0
47		0x87 Error 07		0
48		0x88 Error 08		0
49		0x89 Error 09		0
50		0x8A Error 10		0
51		0x96_00 Input Errors		0
52		0x96_01 Input Errors Index 1		0
53		0x96_02 Input Errors Index 2		0
54		0x96_03 Input Errors Index 3		0
55		0x96_04 Input Errors Index 4		0
56		0x96_05 Input Errors Index 5		0
57		0x96_06 Input Errors Index 6		0
58		0x96_07 Input Errors Index 7		0
59		0x96_08 Input Errors Index 8		0
60		0x96_09 Input Errors Index 9		0
61		0x96_10 Input Errors Index 10		0
	38	0xA7 Execute Calibration	0 ... 1	0
	39	0xAA FreezeAV	0 ... 1	0
62		0xC5 ADC values of the sensor		0
63		0xCF Period counter		0
64	40	0xD0 Response delay	0 ... 20	0
	41	0xD2 Auto Id Assignment	1 ... 31	0
65		0xFA System Status word		0
66	42	0xFB Setpoint1	-2.147.483.648 ... 2.147.483.647	0
67		0xFC Differential value		0

Count read value	Count write value	Name	Value range (dec)	Default
68		0xFE Position value		0
69		0xFF Setpoint2		0
	43	0xA0 System Command	1, 2, 5, 7 or 9	0

4.5.8 Error Codes

If a communication error occurs, there is an error code present at the outputs "nErrorCode1" and "nErrorCode2". Please refer to the AP10 manual (keyword: error codes) for a complete description of these error codes.