Bihl + Wiedemann

Automatisierungstechnik

AS-Interface 3.0 Scanner for ALLEN-BRADLEY CompactLogix and MicroLogix 1500

User manual

AS-i 3.0 specification

Revision date: 2012-01-11

Subject to modifications without notice.
Generally, this manual refers to products
without mentioning existing patents,
utility models, or trademarks.
The absence of any such references does
not indicate that a product is patent-free.

Flosswoerthstr. 41
D-68199 Mannheim

Bihl + Wiedemann
Automatisierungstechnik

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Conformity Statement

according to 89/336/EEC and 73/23/EEC

Bihl+Wiedemann GmbH, Mannheim, Germany, hereby declares under its sole responsibility that the products mentioned below are according to the listed harmonized standards or normative documents and (where neccessary) a competent body has been released.

Item no.	Description
BWU1416	AS-Interface 3.0 Scanner for ALLEN-BRADLEY CompactLogix and MicroLogix 1500

Applied harmonized Standards: Applied national standards or normative documents:	EN 50 295 Prüfungsordnung für AS-i Master

Manufacturer:

Bihl+Wiedemann GmbH
Flosswoerthstrasse 41
68199 Mannheim
Germany

Date: 15.04.02

Bernhard Wiedemann

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1. Symbol catalog

Information!

This symbol indicates important information.

Attention!

This symbol warns of a potential failure. Non-compliance may lead to interruptions of the device, the connected peripheral systems, or plant, potentially leading to total malfunctioning.

Warning!

This symbol warns of an imminent danger. Non-compliance may lead to personal injuries that could be fatal or result in material damages and destruction.

1.1 Abbreviations

Information!

Additional information can be found in section <Glossary>.

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2. General

2.1 Product information

This system manual applies to the following Bihl+Wiedemann GmbH equipment:

AS-Interface 3.0 Scanner for ALLEN-BRADLEY CompactLogix and MicroLogix 1500	**BWU1416**

Tab. 2-1.

2.2 AS-i specification 3.0

The AS-i 3.0 devices already fulfil the AS-i specification 3.0.

The previous specifications (2.1 and 2.0) are supported as well.

Advanced Diagnostics

Diagnostics, which go far beyond the standard diagnostics facilitate the simple detection of the occasionally occurring configuration errors and further irritations towards the AS-i communication. So in case of an error the down time of machines can be minimized or you can initiate preventive maintenance.

Commissioning and monitoring

Commissioning, debugging and setting up of the AS-i parameters can also be accomplished with the use of push-buttons on the frontside of the gateway, the display and the LEDs. It is also possible to do the configuration with the software "AS-i Control Tools".

2.3 Conformity statement

The AS-Interface 3.0 Scanner for ALLEN-BRADLEY CompactLogix and MicroLogix 1500 has been developed and manufactured in accordance with the applicable european standards and directives.

Information!

The corresponding conformity statement can be found at the very beginning of this system manual.

2.4 Certification according to DIN EN ISO 9001 : 2000

The manufacturer of the product possesses a certified quality assurance system in accordance with ISO 9001.

Information!

The current certificate can be viewed in internet:
http://www.bihl-wiedemann.de

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3. Safety

3.1 Intended use

Warning!

This symbol warns of a possible danger. The protection of operating personnel and the system against possible danger is not guaranteed if the control interface unit is not operated in accordance to its intended use.

3.2 General safety information

Warning!

Safety and correct functioning of the device cannot be guaranteed if any operation other than described in this operation manual is performed. Connecting the equipment and conducting any maintenance work under power must exclusively be performed by appropriately qualified personnel. In case a failure cannot be eliminated, the device must be taken out of operation and inadvertently operation must be prevented. Repair work must be performed by the manufacturer only. Additions or modifications to the equipment are not permitted and will void the warranty.

Information!

The operator is responsible for the observation of local safety standards.

3.2.1 Disposal

Information!

Electronic waste is hazardous waste. Please comply with all local ordinances when disposing this product!

The device does not contain batteries that need to be removed before disposing it.

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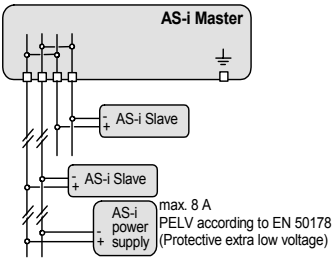
4. Description

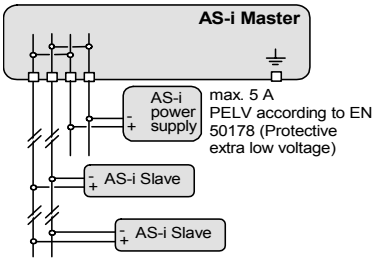
4.1 LED Indicators

Indicator	Color	Description
PWR	green	Gateway power
U ASI	green	AS-i Cable sufficiently powered
AS-i act.	green	Normal operation active
Fault	red	Configuration error
OK	green	PLC in Run mode
prg enable	green	Automatic addressing enable
prj mode	yellow	Configuration mode

4.2 Connection of the AS-i Scanner

4.2.1 Connection samples for the AS-i power supply:





Attention!

In the wiring schemes above the current through the AS-i master must not exceed 5 A.

4.3 Display and Operating Elements

4.3.1 LEDs of the Single Masters

PWR The master's power supply is sufficient.

FAULT Configuration error
At least one configured slave is missing, at least one detected slave is not projected or for at least one projected and detected slave the actual configuration data does not match the nominal configuration data.

U ASI The AS-i circuit is sufficiently powered.

AS-i act. Normal operation active.

OK PLC in Run mode

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PWR	The master's power supply is sufficient.
prg enable	Automatic address programming enabled. Exactly one slave is missing in protected operating mode. The slave can be replaced by another slave of the same type with address zero. The master addresses the new slave to the faulty address and thus eliminates the configuration error.
prj mode	The AS-i master is in configuration mode.

4.3.2 Push-Buttons

mode	Switching between configuration mode and protected operating mode and saving the current AS-i configuration as the nominal configuration.
set	Selecting and assigning the address to a slave.

The detailled operation is described in chap. <Operating the AS-i Scanner>.

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5. Configuration

5.1 I/O Data Interpretation

5.1.1 Input Data Array

The input data array consist of 53 words.

Words 0 to 15 contain the input data of binary AS-Interface slaves; words 16 to 52 contain the response data of the command interface 1 and 2 and the corresponding tittle bars (f.e.: First command interface" and "Second command interface"). See also further description in the separat manual "AS-i 3.0 Command interface".

These bytes of data are as follows:

word	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}
0	flags				slave 1/1A				slave 2/2A				slave 3/3A			
	F3	F2	F1	F0	D3	D2	D1	D0	D3	D2	D1	D0	D3	D2	D1	D0
1	slave 4/4A				slave 5/5A				slave 6/6A				slave 7/7A			
2	slave 8/8A				slave 9/9A				slave 10/10A				slave 11/11A			
3	slave 12/12A				slave 13/13A				slave 14/14A				slave 15/15A			
4	slave 16/16A				slave 17/17A				slave 18/18A				slave 19/19A			
5	slave 20/20A				slave 21/21A				slave 22/22A				slave 23/23A			
6	slave 24/24A				slave 25/25A				slave 26/26A				slave 27/27A			
7	slave 28/28A				slave 29/29A				slave 30/30A				slave 31/31A			
8	reserved				slave 1B				slave 2B				slave 3B			
9	slave 4B				slave 5B				slave 6B				slave 7B			
10	slave 8B				slave 9B				slave 10B				slave 11B			
11	slave 12B				slave 13B				slave 14B				slave 15B			
12	slave 16B				slave 17B				slave 18B				slave 19B			
13	slave 20B				slave 21B				slave 22B				slave 23B			
14	slave 24B				slave 25B				slave 26B				slave 27B			
15	slave 28B				slave 29B				slave 30B				slave 31B			
16	command								T	result						
17	response parameter byte 1								response parameter byte 2							
18	response parameter byte 3								response parameter byte 4							
19	response parameter byte 5								response parameter byte 6							
20	response parameter byte 7								response parameter byte 8							
21	response parameter byte 9								response parameter byte 10							
22	response parameter byte 11								response parameter byte 12							
23	response parameter byte 13								response parameter byte 14							
24	response parameter byte 15								response parameter byte 16							
25	response parameter byte 17								response parameter byte 18							
26	response parameter byte 19								response parameter byte 20							
27	response parameter byte 21								response parameter byte 22							
28	response parameter byte 23								response parameter byte 24							

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word	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}
29	response parameter byte 25								response parameter byte 26							
30	response parameter byte 27								response parameter byte 28							
31	response parameter byte 29								response parameter byte 30							
32	response parameter byte 31								response parameter byte 32							
33	response parameter byte 33								response parameter byte 34							
34	command								T	result						
35	response parameter byte 1								response parameter byte 2							
36	response parameter byte 3								response parameter byte 4							
37	response parameter byte 5								response parameter byte 6							
38	response parameter byte 7								response parameter byte 8							
39	response parameter byte 9								response parameter byte 10							
40	response parameter byte 11								response parameter byte 12							
41	response parameter byte 13								response parameter byte 14							
42	response parameter byte 15								response parameter byte 16							
43	response parameter byte 17								response parameter byte 18							
44	response parameter byte 19								response parameter byte 20							
45	response parameter byte 21								response parameter byte 22							
46	response parameter byte 23								response parameter byte 24							
47	response parameter byte 25								response parameter byte 26							
48	response parameter byte 27								response parameter byte 28							
49	response parameter byte 29								response parameter byte 30							
50	response parameter byte 31								response parameter byte 32							
51	response parameter byte 33								response parameter byte 34							
52	response parameter byte 35								response parameter byte 36							

Flags	
F0	ConfigError
F1	APF
F2	PeripheryFault
F3	ConfigurationActive

ConfigError: 0 = ConfigOK, 1 = ConfigError
APF: 0 = AS-i-Power OK, 1 = AS-i-Power Fail
PeripheryFault: 0 = PeripheryOK, 1 = PeripheryFault
ConfigurationActive: 0 = ConfigurationActive, 1 = ConfigurationInactive

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5.1.2 Output Data Array

The output data array consist of 53 words.

Words 0 to 15 contain the output data of binary AS-Interface slaves; words 16 to 52 contain the request data of the command interface 1 and 2 and the corresponding tittle bars (f.e.: First command interface" and "Second command interface"). See also further description in the separat manual "AS-i 3.0 Command interface".

These bytes of data are as follows:

word	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}
0	flags				slave 1/1A				slave 2/2A				slave 3/3A			
	F3	F2	F1	F0	D3	D2	D1	D0	D3	D2	D1	D0	D3	D2	D1	D0
1	slave 4/4A				slave 5/5A				slave 6/6A				slave 7/7A			
2	slave 8/8A				slave 9/9A				slave 10/10A				slave 11/11A			
3	slave 12/12A				slave 13/13A				slave 14/14A				slave 15/15A			
4	slave 16/16A				slave 17/17A				slave 18/18A				slave 19/19A			
5	slave 20/20A				slave 21/21A				slave 22/22A				slave 23/23A			
6	slave 24/24A				slave 25/25A				slave 26/26A				slave 27/27A			
7	slave 28/28A				slave 29/29A				slave 30/30A				slave 31/31A			
8	reserved				slave 1B				slave 2B				slave 3B			
9	slave 4B				slave 5B				slave 6B				slave 7B			
10	slave 8B				slave 9B				slave 10B				slave 11B			
11	slave 12B				slave 13B				slave 14B				slave 15B			
12	slave 16B				slave 17B				slave 18B				slave 19B			
13	slave 20B				slave 21B				slave 22B				slave 23B			
14	slave 24B				slave 25B				slave 26B				slave 27B			
15	slave 28B				slave 29B				slave 30B				slave 31B			
16	command								T	–	circuit					
17	request parameter byte 1								request parameter byte 2							
18	request parameter byte 3								request parameter byte 4							
19	request parameter byte 5								request parameter byte 6							
20	request parameter byte 7								request parameter byte 8							
21	request parameter byte 9								request parameter byte 10							
22	request parameter byte 11								request parameter byte 12							
23	request parameter byte 13								request parameter byte 14							
24	request parameter byte 15								request parameter byte 16							
25	request parameter byte 17								request parameter byte 18							
26	request parameter byte 19								request parameter byte 20							
27	request parameter byte 21								request parameter byte 22							
28	request parameter byte 23								request parameter byte 24							
29	request parameter byte 25								request parameter byte 26							
30	request parameter byte 27								request parameter byte 28							
31	request parameter byte 29								request parameter byte 30							

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word	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}
32	request parameter byte 31								request parameter byte 32							
33	request parameter byte 33								request parameter byte 34							
34	command								T	–	circuit					
35	request parameter byte 1								request parameter byte 2							
36	request parameter byte 3								request parameter byte 4							
37	request parameter byte 5								request parameter byte 6							
38	request parameter byte 7								request parameter byte 8							
39	request parameter byte 9								request parameter byte 10							
40	request parameter byte 11								request parameter byte 12							
41	request parameter byte 13								request parameter byte 14							
42	request parameter byte 15								request parameter byte 16							
43	request parameter byte 17								request parameter byte 18							
44	request parameter byte 19								request parameter byte 20							
45	request parameter byte 21								request parameter byte 22							
46	request parameter byte 23								request parameter byte 24							
47	request parameter byte 25								request parameter byte 26							
48	request parameter byte 27								request parameter byte 28							
49	request parameter byte 29								request parameter byte 30							
50	request parameter byte 31								request parameter byte 32							
51	request parameter byte 33								request parameter byte 34							
52	request parameter byte 35								request parameter byte 36							

Flags	
F0	Off-line
F1	LOS-master-bit
F2	→ ConfigurationMode
F3	→ ProtectedMode

Off-Line: 0 = OnLine, 1 = Off-Line
LOS-master-bit 0 = Off-Line by ConfigError deactivated
1 = Off-Line by ConfigError activated

A rising edge of the "LOS master bit" effects that all bits in the LOS are set. A falling edge effects that all bits are reset.

A rising edge of F2 and F3 switch the master to the desired mode.

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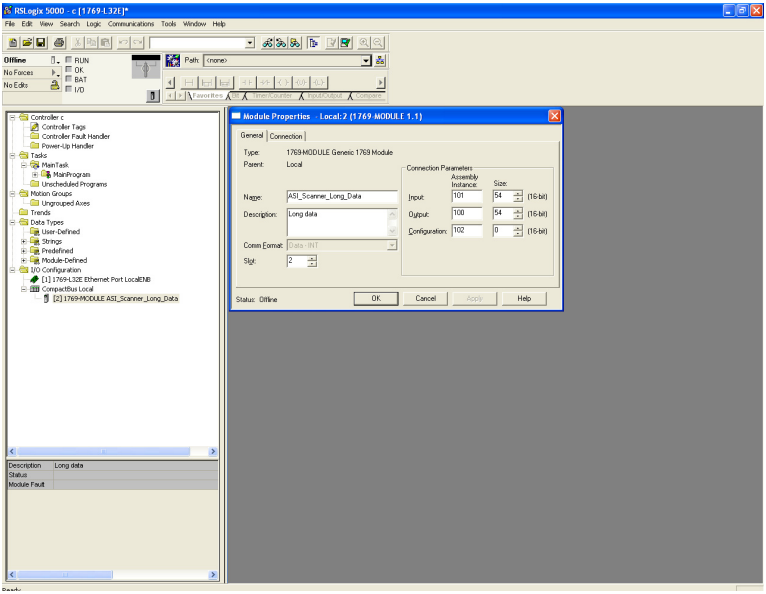
5.2 Swap IO

Swap IO is another way to organise IO data in the backplane of the scanner.

This will change the high and low byte postion and should help users to get the informations in the common way.

To switch the „swapped byte - first configure the data length to 54 words:



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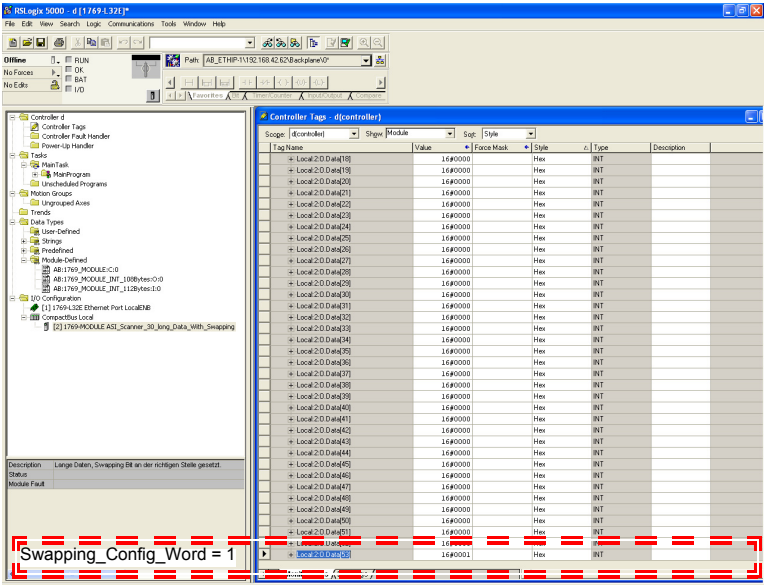
Depending on, whether we want to swap data or not, we make the following setting:

In order to swap data: Refer to the output word with Index 53 (word number 54!) in the following screenshot.

Information!

If the parameter "Swapping_Config_Word" is e.g. set to "1" (odd), the swapping is active!



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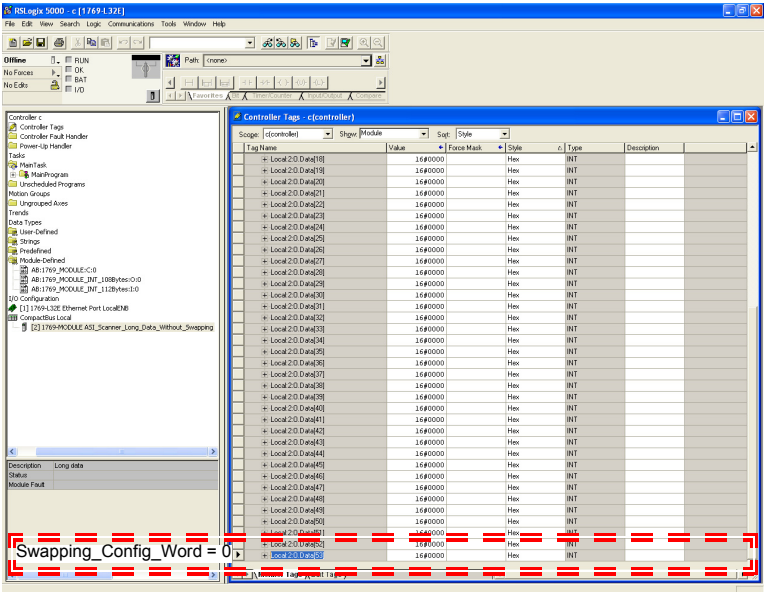
Without swapping – refer to the output word with Index 53 (word number 54!) in the following screenshot.

Information!

If the parameter "Swapping_Config_Word" is e.g. set to "0" (even), the swapping is not active!



Information!

If you want to switch from 54 word length configuration of the I/O data to a shorter value (<=53) you have to make a Power Cycle between the two Downloads of the short configuration. After „Power CYCLE“ and the second download the new configuration is active!

5.2.1 ADDITIONAL INFORMATION

These information helps the user to specify the moment after which the input data is valid. It is relevant ONLY in case of long data configuration (54 words).

Explanation:

The user should choose an arbitrary number BIGGER THAN 1 (> 1), that he writes in the output data with the index 53 - the so called „Swapping_Config_Word“. When he writes an even number he will deactivate the swapping. Writing an odd number, he will activate the swapping. When the chosen number has been mirrored in the input data word 53, the user will know that the incoming input data is from now on valid.

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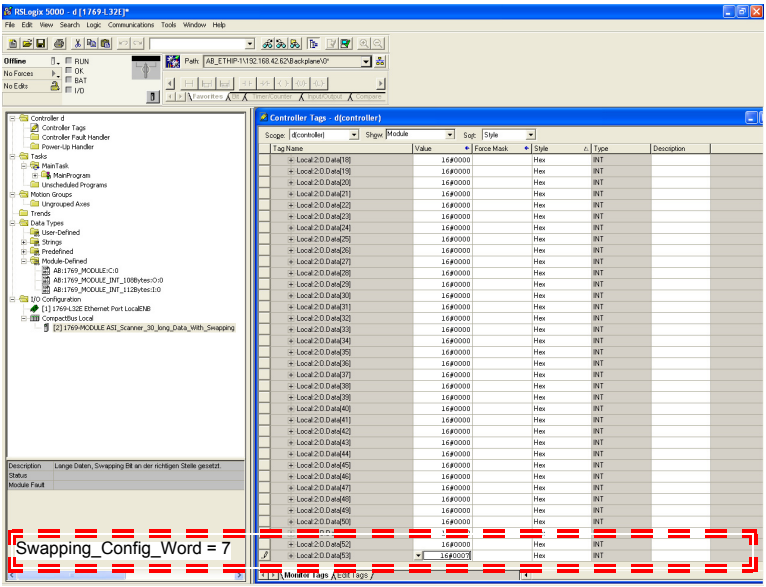
Example:

Let us assume we have chosen the number 6. Writing 6 in the swapping_config_word we will not activate the swapping. We will have to wait to read 6 in the input word with Index 53 in order to accept the incoming data as valid. Before that we will ignore the incoming data. In order to activate the swapping we will have to choose an odd number, for example 7, in the swapping_config_word. That's why we will have to wait to read 7 in the input word with Index 53 in order to accept the incoming data as valid. Before that we will ignore the incoming data. (please, see the pictures below).

Pictures:

- ☐ Write 7 in the output data.



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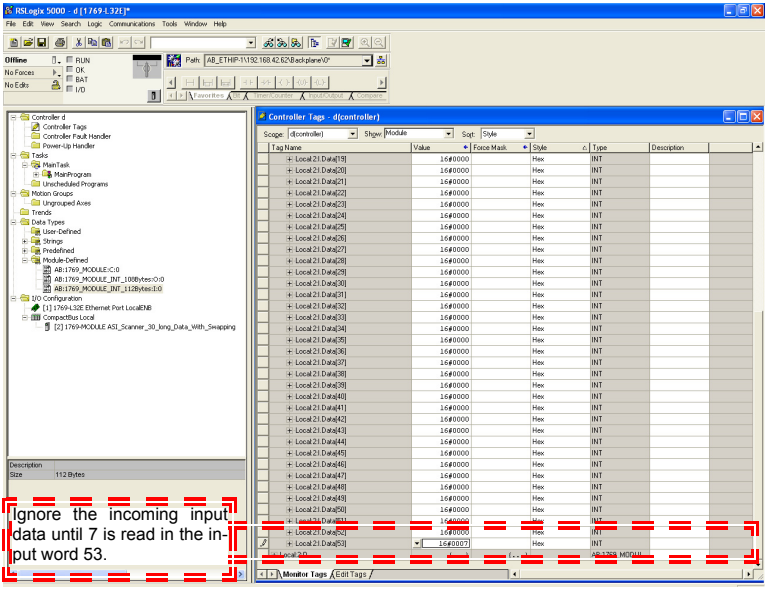
- ☐ Ignore the incoming input data until 7 is read in the input word 53.



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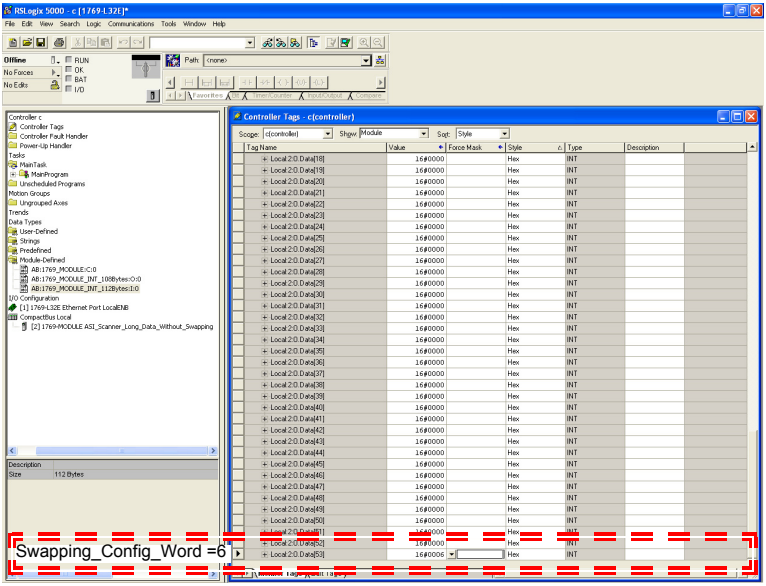
- ☐ Write 6 in the output data.



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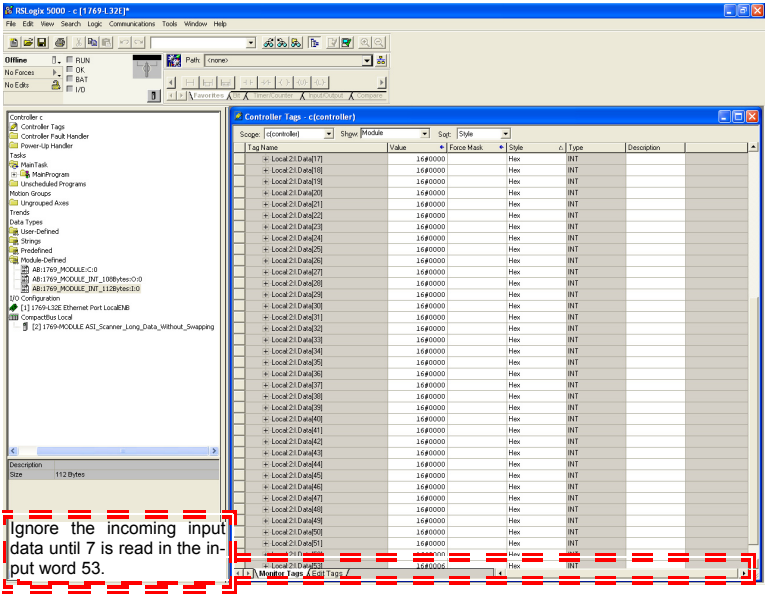
- Ignore the incoming input data until 6 is read in the input word 53.



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6. Operating the AS-i Scanner

6.1 Master Start-Up

After starting up, all segments of the figure display and all LEDs light up for approximately one second (self-test). Afterwards, the LC display the condition of their respective flags. The LC display shows the state of the master:

40: Offline Phase
The AS-i master initializes - there is no data communication happening on theAS-i.

Attention!

If the AS-i circuit is insufficiently powered ("U AS-i" does not light up) or there is no communication relationship between the master and the AS-i/gateway.

41: Detection Phase
Start-up phase, in which the system looks for slaves located on the AS-i. The master remains in the detection phase until it finds at least one slave.

42[1]: Activation Phase
End of the start-up operation when the parameters are transmitted to all connected and recognized slaves. This enables access to the AS-i slaves' data connections.

43[2]: Start of Normal Operation
The AS-i master can exchange data with all active slaves. It transmits management messages and looks for and activates newly connected slaves. During normal operation, the system keeps the maximum cycle time of 5 milliseconds.

6.2 Configuration Mode

The configuration mode serves to configure the AS-i circuit.

Attention!

In the configuration mode, all recognized slaves are activated even when the desired and actual configurations do not match.

Pressing the "" button for at least five seconds switches the gateway to configuration mode. While in configuration mode, the yellow "" LED lights up.

If the display is empty, no slaves have been connected to the AS-i circuit.In configuration mode, all recognized slaves are activated except for slave zero. The AS-i master is in normal operation. Data exchange between the AS-i master and all AS-i slaves has been detected by the master, regardless of whether the detected AS-i slaves have been projected before.

Attention!

When delivered the device is in configuration mode.

1. Activation phase and the start of normal operation maybe so short that the numbers can not be seen in the display.
2. Activation phase and the start of normal operation maybe so short that the numbers can not be seen in the display.

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6.3 Protected Operating Mode

Information!

Unlike the configuration mode, the protected mode allows data exchange between the AS-i master and the projected AS-i slaves only.

Attention!

If there is no communication between the host and the AS-I master, the AS-i master clears the output data of all slaves.

6.3.1 Switching to Protected Operating Mode

The configuration mode can be left by pressing the "" button.

Pressing the button shortly:
Exits the configuration mode without saving the current AS-i configuration.

Pressing the button for more than five seconds:
Exits the configuration mode and projects the actual AS-i configuration. Simultaneously the actual AS-i configuration is stored as nominal configuration in the EEPROM.

Information!

If the system detects an AS-i slave with address zero on the AS-i, it can not leave the configuration mode.

In the protected operating mode, only AS-i slaves which are projected and whose actual configurations match the nominal configurations will be activated.

6.3.2 Configuration Errors in Protected Operating Mode

As long as there is no configuration error, the numeric display is turned off while in protected operating mode. Otherwise, the address with the faulty assignment is displayed. A faulty assignment occurs when a slave has been recognized or projected but cannot be activated.

If there are more than one faulty assignments the one that was first detected is displayed. Pressing the "" button shortly displays the next higher faulty address.

Shortly appearing configuration errors are stored in the device (advanced AS-i diagnosis). The last error that occurred can be displayed by pressing the "" button. If a short AS-i power failure is responsible for the configuration error the display will show a "39".

6.4 Assigning an AS-i Address in Configuration Mode

AS-i can be put into operation in a very comfortable manner by using the Windows software AS-i Control Tools (adressing directly or with the the AS-i address assistant, see chap. <Windows Software AS-i Control Tools>) (addressing directly or with the AS-i address assistant).

Furthermore, a handheld addressing device can be used.

If you have neither a PC nor a hand held addressing device, address assigning of the AS-i slaves is also possible with the AS-i/DeviceNetgateway using the pushbuttons.

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To assign a slave with an address unequal zero to a different address unequel zero, please follow the following instructions in reverse order:

6.4.1 Assigning a Slave Address

(assigning an available address to a slave with address zero)

In configuration mode, the addresses of all detected slaves are displayed in succession. To display the next higher available operating address, press the "" button shortly. Each time you press the "" button, the next available address is displayed.

Choose the displayed address as your target address by pressing the "" button for more than five seconds. The address display flashes. The master is ready for programming; pressing the "" button again addresses the connected slave with address zero to the target (flashing address).

Any errors will be displayed by their error codes according to chap. <Appendix: Codes indicated by the Display>. Otherwise, the detected slaves are displayed again as described in chap. <Configuration Mode>.

Information!

Only slaves with address 0 can get a new address by the master.

Attention!

There must not be two AS-i slaves with the same adrress on the AS-i circuit, since this would cause malfunctions.

6.4.2 Erasing the Slave Address

(assigning address zero to a detected slave)

In configuration mode, the addresses of all recognized slaves are displayed in succession. By pressing the "" button repeatedly, the master will display the next available address. Pressing the button more than five seconds while the address of a detected slave is displayed, this slave will get the address zero and the display will show "0".

When you release the button, the display continues to display the detected slaves.

6.5 Programming the Address in Case of Configuration Errors

6.5.1 Automatic Address Assignment

Information!

One of AS-i's major advantages is the automatic address assignment. If a slave fails, it can be replaced by another one of the same type with the address zero. The master will detect the replacement and automatically address the new slave with the address of the faulty one.

For automatic programming, the following requirements must be met:

1. The AS-i master must be in the protected operating mode.
2. The "Auto_Address_Assign"[1] release flag must be set.
3. Only one of the projected slaves may not be detected.

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If these requirements are met, the AS-i master's "" LED lights up and a slave with address zero will be automatically be assigned to the operating address of the missing slave. The "Automatic Address Assignment" can be activated and deactivated with the software "AS-i Control Tools".

Information!

Only slaves with address 0 can get a new address by the master, since this would cause malfunctions.

Attention!

If the two slaves have different configuration data, i.e. are not of the same type as far as AS-i is concerned, the automatic address assignment will not be carried out.

6.5.2 Manual Address Assignment

Information!

If several slaves fail, they cannot be replaced automatically by the AS-i master. These addresses have to be set manually. If this should not be done with the host interface (using the AS-i Control Tools) or with a handheld addressing device, the slave addresses can also be changed by using the push-buttons and the LC display of the device.

In protected operating mode, wrong assignments are displayed as errors (see chap. <Protected Operating Mode>). By pressing the "" button all faulty assignments will be displayed in succession. By pressing the "" button for more than five seconds the currently displayed address will be selected as a potential target address, and the display starts to flash.

If the faulty slave was previously replaced by a slave with address zero, the new slave can now be programmed for the blinking address by pressing the "" key again. As a requirement, the new slave's configuration data must match the configuration data for the flashing address.

After the address has been successfully set, the next faulty assignment is displayed and the address assignment can be carried out again. Otherwise, the system displays an error code (see also chap. <Appendix: Codes indicated by the Display>). When all faulty assignments are eliminated, the display will be empty.

6.6 Error Messages

Attention!

The system displays error codes for error messages that do not point to faulty assignments on the AS-i circuit. The code numbers are larger than 50 and therefore outside the slave address range. These codes are described in the appendix (see chap. <Appendix: Codes indicated by the Display>*).*

1. By deleting the flag "Auto_Address_Assign", the user can deactivate "automatic addressing".

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7. Reference List

7.1 Manual: “AS-i 3.0 Command Interface“

This Manual contains a detailed description of the AS-i 3.0 Command Interface.

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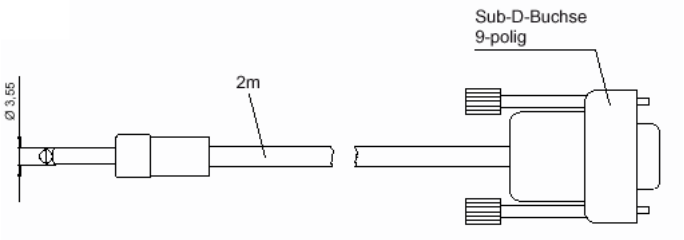
8. Commissioning Tools and Accessories

The AS-i circuit on the AS-i master can be put into operation with the comfortable Windows software "AS-i Control Tools" (art. no. BW1203).

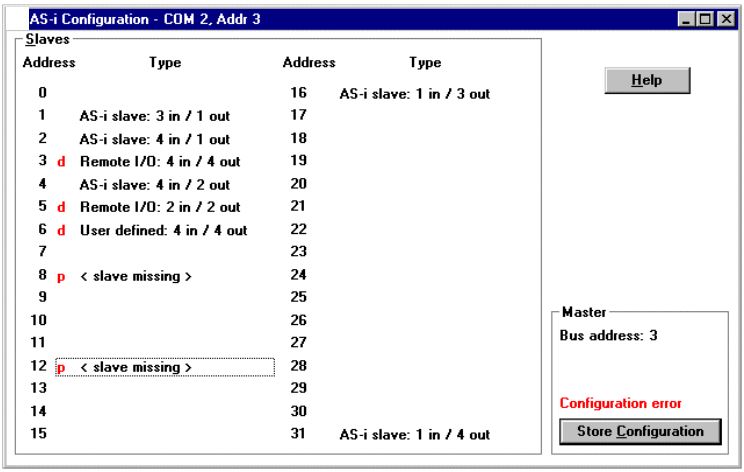
8.1 Serial Cable

The software package communicates with the AS-i master via a serial cable (art. no. BW1417).



8.2 Windows Software AS-i Control Tools

4. Start the AS-i Control Tools.
5. Call the command Master | New.
6. Choose DeviceNet as protocol.
7. Do the appropriate settings.
8. Call the command Master | AS-i configuration.
   The AS-i configuration editor will be started. All detected and projected AS-i slaves are displayed in this window.



9. Click on a slave entry to open the dialog box slave configuration. Changing a slave address, setting AS-i parameters or AS-i configuration data is possible here. Additionally, inputs and outputs can be tested.

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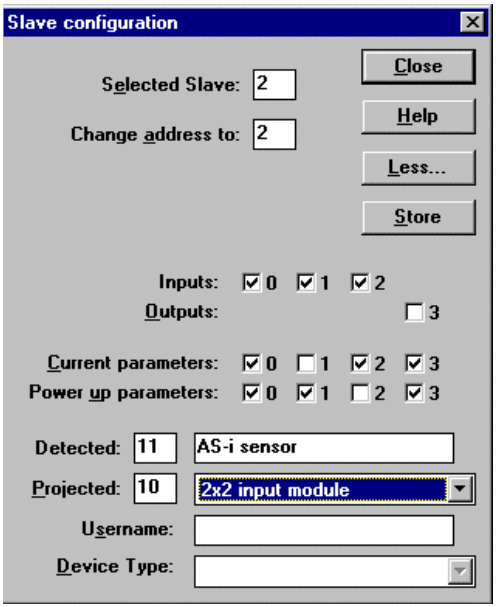

A very easy approach to configure the AS-i circuit is connecting each AS-i slave to the line and setting the AS-i slave address one after the other. After that press the button “Store configuration” to adopt the detected AS-i circuit to the AS-i master as projected data.

Furthermore you can use the **AS-i Address Assistant**. This tool automatically changes the address of an AS-i slave to the desired address after connecting the slave to the AS-i line. The desired AS-i configuration can be created ooffline before and then be stored to a file. When building up the plant you only have to connect the AS-i slaves to the AS-i line one after the other.

Further descriptions to all features of the software can be obtained from the integrated help.

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9. Appendix: Codes indicated by the Display

In the basic state of the configuration mode, the display shows the addresses of all detected slaves at a rate of two per second one after the other. A blank display indicates that the *LDS* is empty, no slaves were detected.

In the basic state of the protected operating mode, the display is either blank or displays the address of a faulty assignment (see chap. <Configuration Errors in Protected Operating Mode>).

During manual address programming, the slave address display has a different meaning (see chap. <Assigning an AS-i Address in Configuration Mode> and chap. <Programming the Address in Case of Configuration Errors>).

All displayed numbers bigger than 31 which can not be interpreted as a slave address are status or error messages of the master. They have the following meanings:

39	Advanced AS-i diagnostics: After pressing the 'set'-button a short-time AS-i power failure occured.
40	The AS-i master is in offline phase.
41	The AS-i master is in detection phase.
42	The AS-i master is in activation phase.
43	The AS-i master starts the normal operating mode.
70	Hardware error: The AS-i master's EEPROM cannot be written.
72	Hardware error: The PIC processor does not respond.
73	Hardware error: The PIC processor does not respond.
74	Checksum error in the EEPROM.
75	Error in the internal RAM.
76	Error in the external RAM.
80	Error while attempting to exit the configuration mode: A slave with address zero exists.
81	General error while changing a slave address.
82	The front panel operation is blocked. Until repowering-up the device can only be accessed from the host via the interface.
83	Program reset of the AS-i Control programm: The AS-i Control programm is being read out of EEPROM and copied into the RAM.
88	Display test while starting up the AS-i master
90	Error while changing a slave address in protected operating mode: No slave with address 0 existing.
91	Error while changing slave address: Target address is already used.
92	Error while changing slave address: New address could not be set.

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93	Error while changing slave address: New address could only be stored volatilely in the slave.
94	Error while changing the slave address in protected operating mode: Slave has wrong configuration data.
95	Error while changing slave address in protected operating mode: The configuration error was caused by a superfluous slave (instead of a missing slave).

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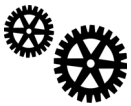
10. Appendix: Installation/Commissioning Instructions

Dokumentation AS-i-Master/Scanner (**deutsch**): Art.-Nr. **BW1496**



Zubehör Art.-Nr. BW1563/Accessories art. no. BW1563/
Accessoires no. d'art. BW1563/Accessori no. di art. BW1563/
Accesorios no. del art. BW1563

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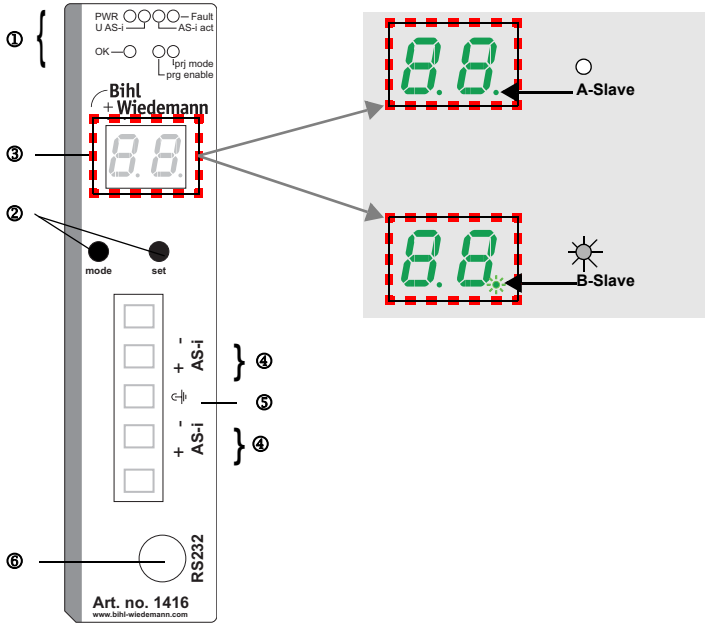
10.1 Front view and connections



① LED-Statusanzeige
② Tasten für Handbedienung
③ LED-Anzeige
④ AS-Interface®-Anschluss
⑤ Erde
⑥ RS232-Anschluss

① Visualizzazione a LED
② Pulsanti per le impostazioni manuali
③ Indicazione LED
④ Collegamento interfaccia AS-Interface®
⑤ Terra
⑥ Collegamento RS232

① LED status display
② Buttons for hand operation
③ LED display
④ AS-interface® connection
⑤ Earth
⑥ RS232 connection

① LED visualización
② Teclas para accionamiento manual
③ Indicación LED
④ Conexión AS-Interface®
⑤ Tierra
⑥ Conexión RS232

① Afficheur d'état DEL
② Boutons pour commande manuelle
③ Afficheur LED
④ Connexion AS-Interface®
⑤ Terre
⑥ Raccordement RS232

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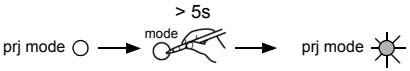
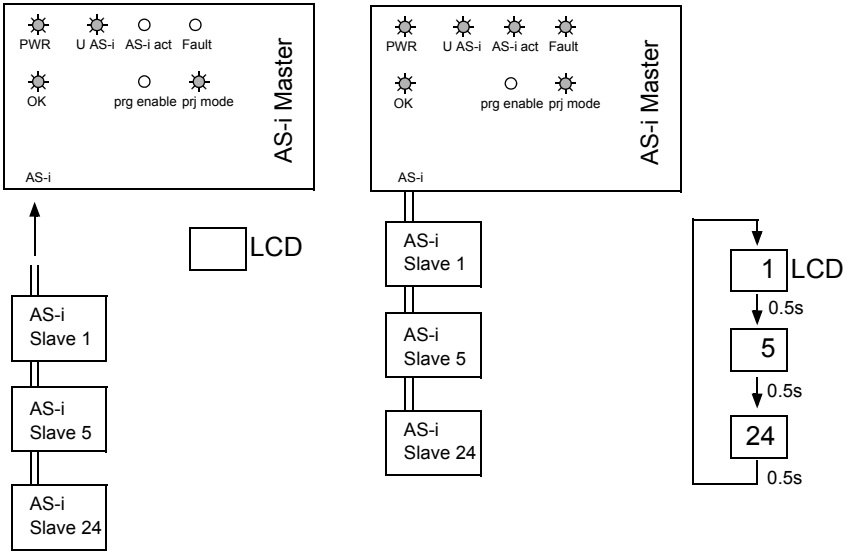
10.2 Startup

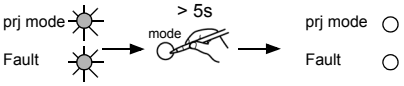
10.2.1 Switch to configuration mode



10.3 Connect AS-i Slaves



10.4 Store AS-i Configuration



LCD

Konfiguration O.K.
Configuration O.K.
Configuration O.K.
Configurazione O.K.
Configuración O.K.

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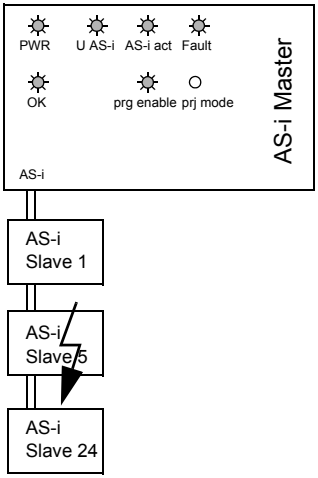
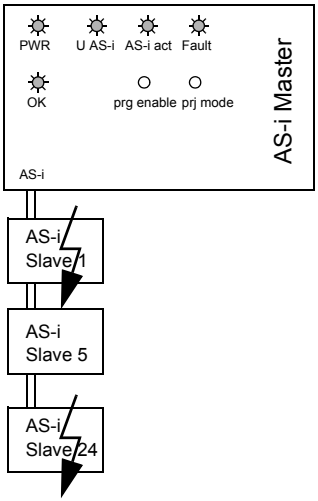
10.5 Error tracing

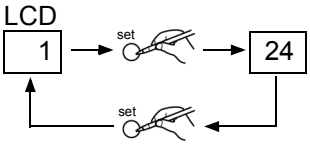
10.5.1 Incorrect slaves (one error)



5 LCD

10.5.2 Incorrect Slaves (multiple errors)





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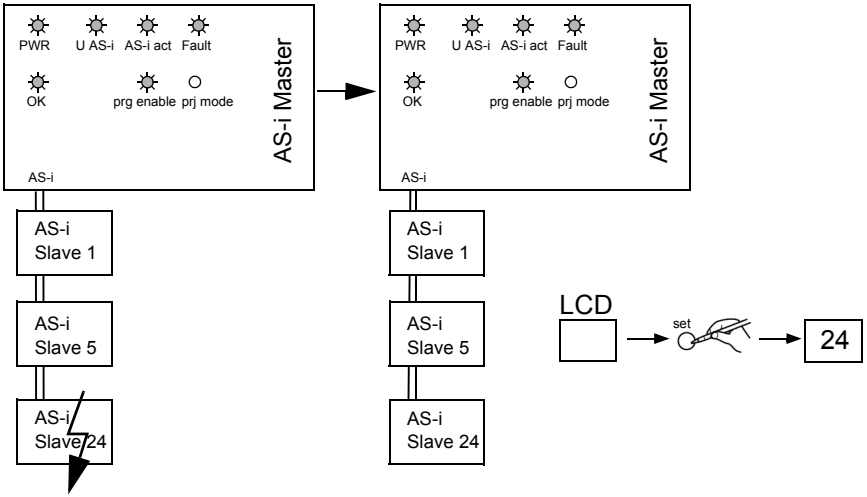
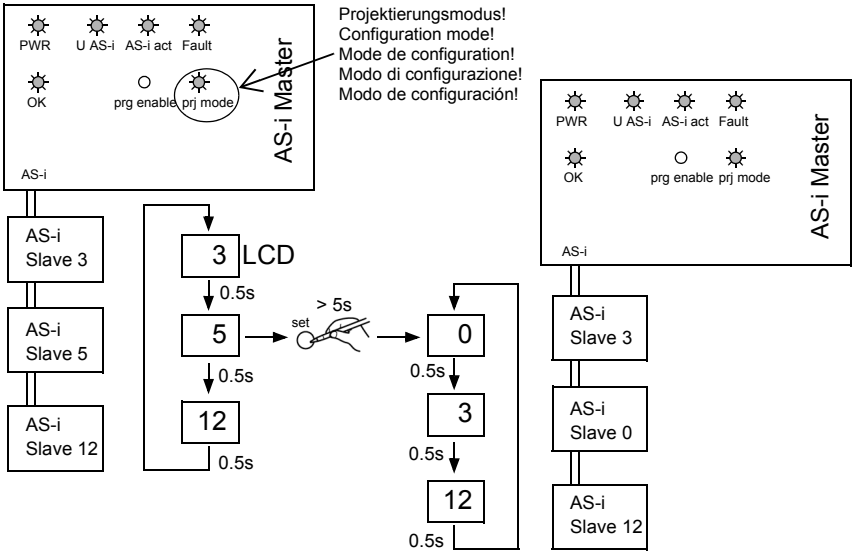
10.5.3 Error Display (last error)



10.6 Addressing
Delete Slave Address 5



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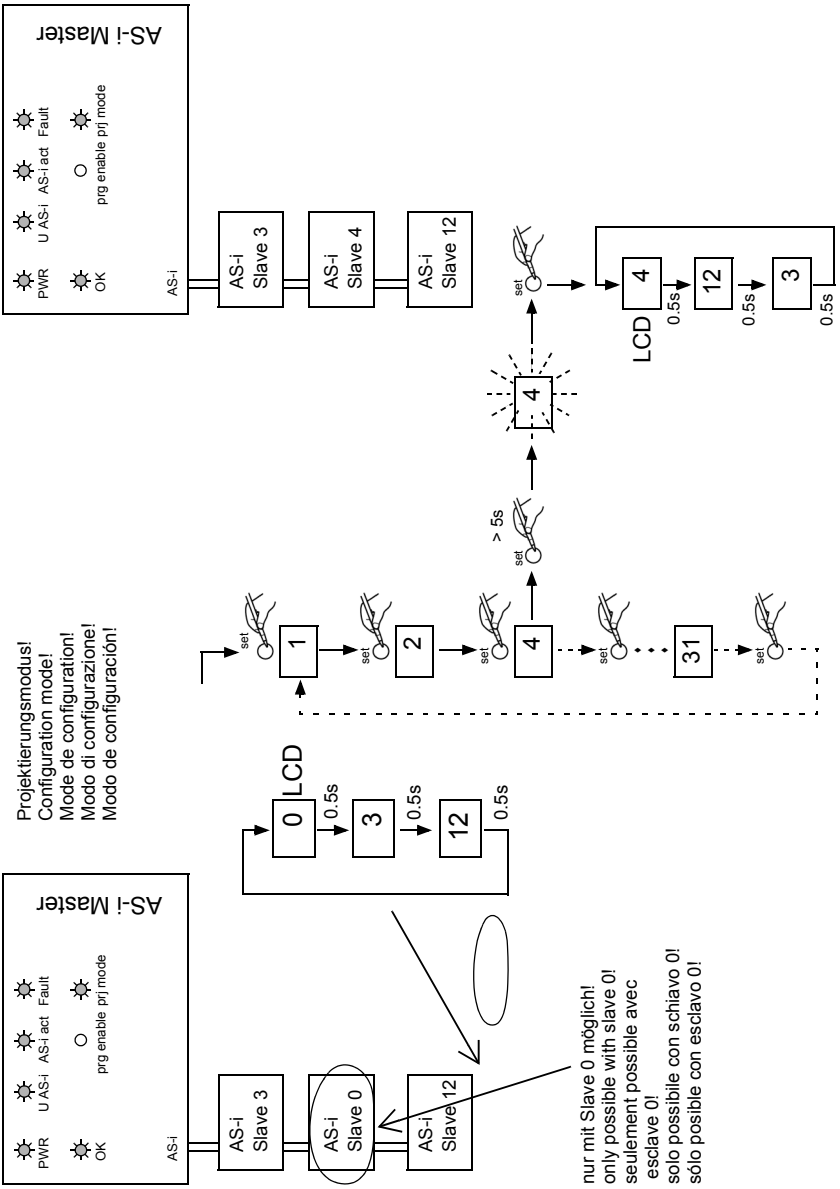
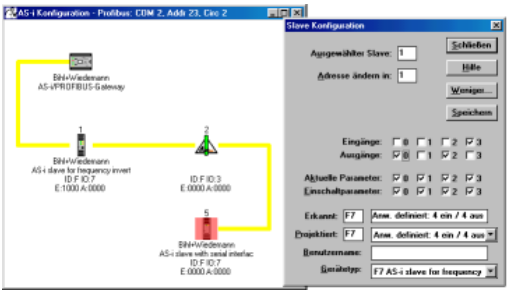
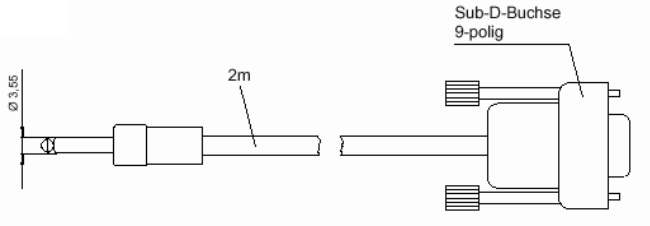
10.6.1 Program Slave 0 to Address 4



10.7 Accessories

10.7.1 Software "AS-i Control Tools" with serial transmission cord for Allen-Bradley AS-i Master, art. no. BW1563





10.7.2 Example programs

Download:	http://www.bihl-wiedemann.de/deutsch/download.htm
Download:	http://www.bihl-wiedemann.de/englisch/download.htm
Téléchargement:	http://www.bihl-wiedemann.de/englisch/download.htm
Trasferimento diretta:	http://www.bihl-wiedemann.de/englisch/download.htm
Transferencia directa:	http://www.bihl-wiedemann.de/englisch/download.htm

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11. Appendix: Putting the AS-Interface Scanner into Operation with CompactLogix

This chapter shows exemplary the putting into operation of the AS-Interface Master/Scanner BWU1416 for Allen Bradley CompactLogix with the software RSLogix 5000 version 13.15 and the 1769-L32E CompactLogix5332E Controller.

- ☐ Download the example "AS-Interface-Scanner for Allen-Bradley CompactLogix" from the download area of the Bihl+Wiedemann website and unzip the files.

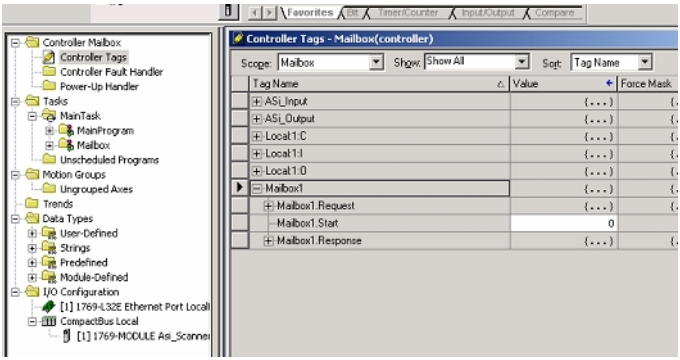
Information!

This example can be found in the download area of http://www.bihl-wiedemann.com under Software - Examples: AS-Interface Master/Gateway/Link/Scanner - AS-Interface-Scanner for Allen-Bradley CompactLogix.

- ☐ Start the software RSLogix 5000.
- ☐ Open the file Module.acd.

⇒ This sample file contains a program that shows how to use the mailbox.

- ☐ Look at the description of the controller tags, where you find the tags mailbox1. Here you can edit Mailbox commands. How is written in the Mbx0Main routine of the program mailbox.



⇒ You find some other examples:

C02_RD_WR.ACD, C03_Get_LAS.ACD, C04_READ_IDI.ACD, C05_GET_DELTA.ACD, C06_GET_TECA.ACD, C07_SET_LOS.ACD, C08_GET_LOS.ACD, C09_GET_LCS.ACD, C10_GET_LPF.ACD.
The task **MainProgram** of these examples, shows you, how to use some commands of the mailbox with help of the task **Mbx0Main**.

DataExchange.ACD.
This sample file contains a very simple program, that shows how to read and write digital AS-Interface inputs and outputs.

- ☐ If your AS-Interface Scanner is not mounted in slot 1, you can change this setting.

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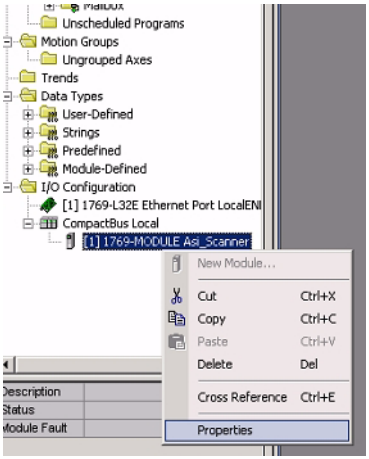
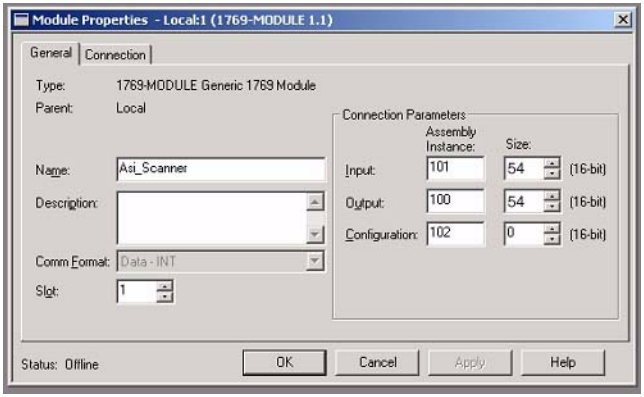
- Click with the right mouse-button in the Controller Organizer window on [1] 1769-MODULE Asi_Scanner and choose **Properties**.





- if you use another controller type than the 1769-L32E CompactLogix5332E, you can change the controller type.

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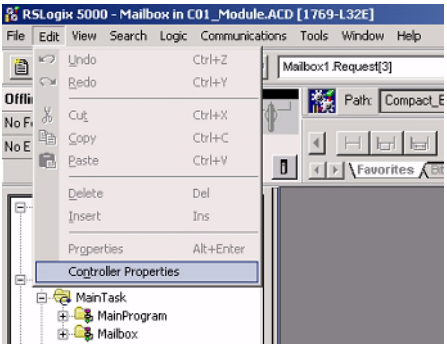
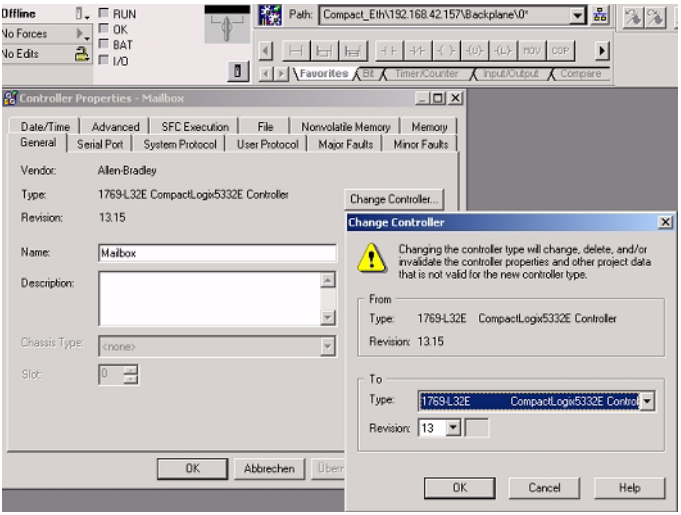
- Execute the command **Edit | Controller** Properties then press **Change Type**.





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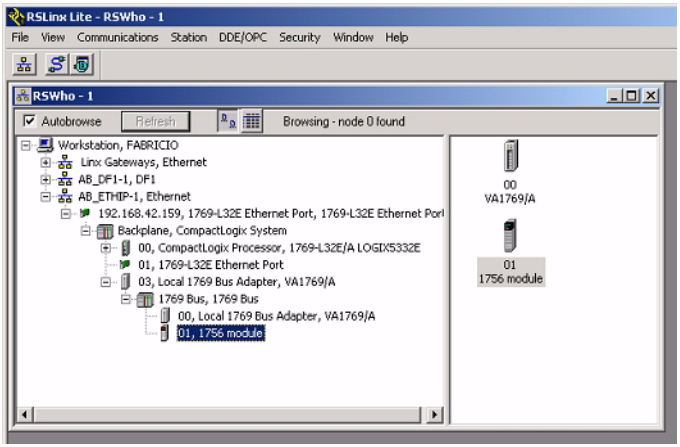
- ☐ Adjust the communication settings by using the program **RSLinx**:



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12. Appendix: Putting the AS-i Scanner into Operation with MicroLogix

This chapter shows exemplary the putting into operation of the AS-i Master/Scanner BWU1416 for Allen Bradley MicroLogix with the software RSLogix 500 version 5.50.00 and the MicroLogix 1500 LSP Series C Controller.

1. Download the example "AS-Interface-Scanner for Allen-Bradley MicroLogix" from the download area of the Bihl+Wiedemann GmbH website and unzip the files.

Information!

This example can be found in the download area of http://www.bihl-wiedemann.com under Software - Examples: AS-Interface Master/Gateway/Link/Scanner - AS-Interface-Scanner for Allen-Bradley MicroLogix.

2. Start the software RSLogix 500.
3. Open the file D02_RD_WR_1.RSS.
   This sample file contains a program that shows how to use the mailbox with the mailbox-commands RD_7X_IN and WR_7X_OUT.
   (The scanner reads the values of an analog-input slave and writes the values to an analog-output slave.)
4. You find some other examples:
   - D03_Get_LAS.RSS, D04_READ_IDI.RSS, D05_GET_DELTA.RSS, D06_GET_TECA.RSS, D07_SET_LOS.RSS, D08_GET_LOS.RSS, D09_GET_LCS.RSS, D10_GET_LPF.RSS.
   - D01_Module.RSS.
     (This program is the base-module of the further programs and you can use it for your own mailbox commands, if you like.)

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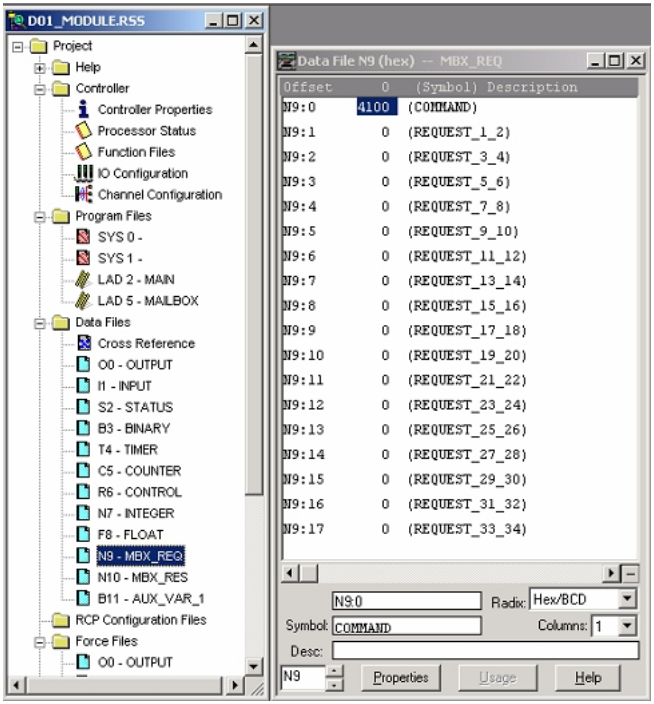
- E.g.: Write a mailbox command (READ_IDI; 41#h) in the data file N9-MBX_REQ.



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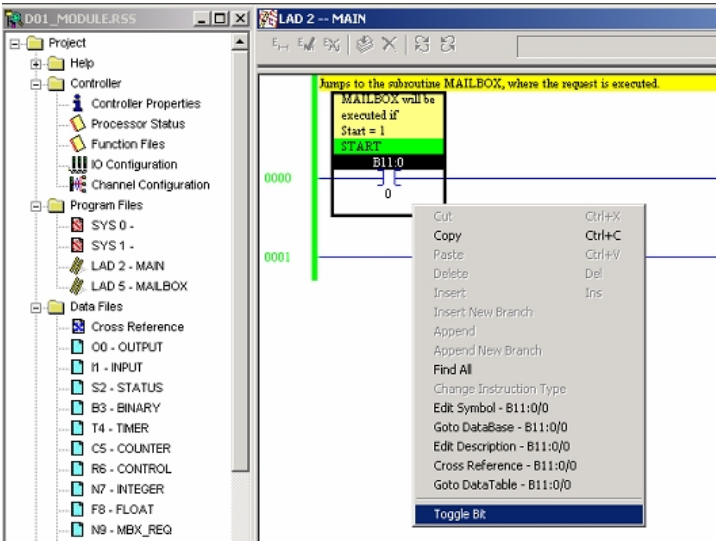
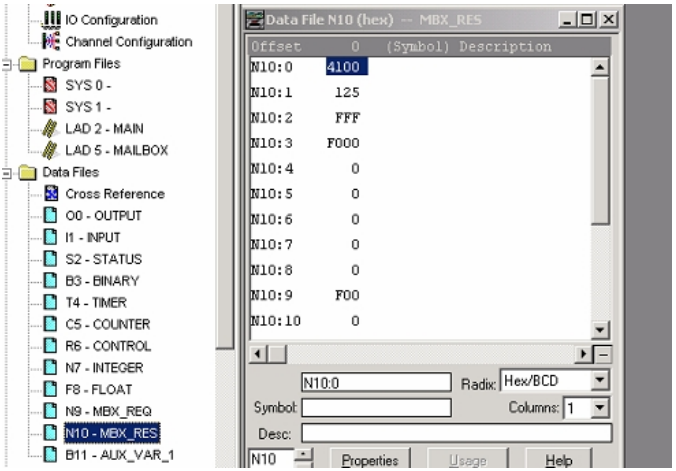
- Toggle the "Start" bit in the program file "LAD 2 - MAIN".



- Look after the issue in the data file "N-10MBX_REQ".



- DataExchange.RSS
  This sample file contains a very simple program that shows how to read and write digital AS-Interface inputs and outputs.

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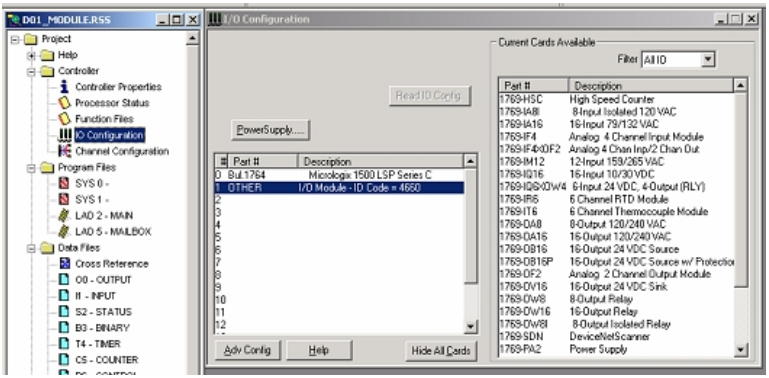
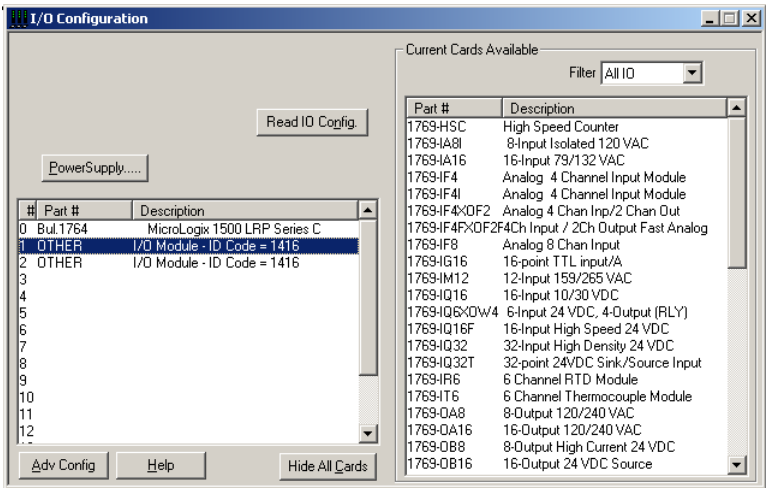
5. If your AS-Interface Scanner is not mounted in slot 1, you can change this setting.

a. CompactLogix setup
In the project tree, double click "IO Configuration". Then drag and drop the module with ID-Code 4660 to another slot number.



b. MicroLogix setup
In the project tree, double click "IO Configuration". Then drag and drop the module with ID-Code 1416 to another slot number.



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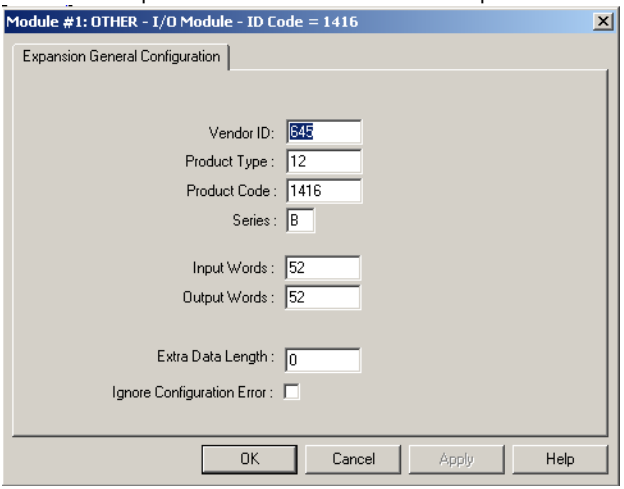
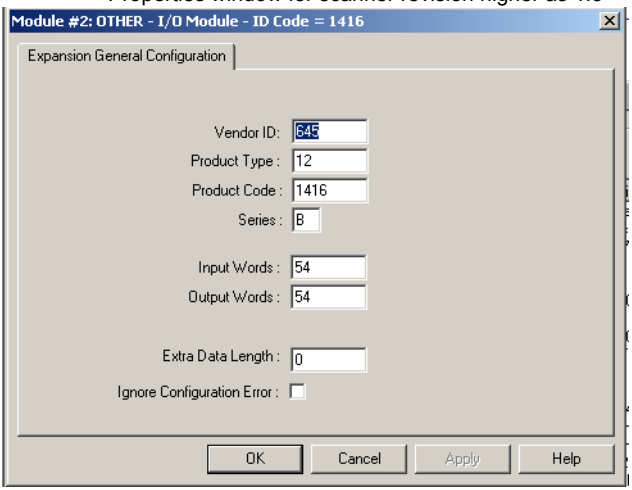
- Properties window for scanner revision prior to 1.3



- Properties window for scanner revision higher as 1.3



3. If you use another controller type than the Micrologix 1500 LSP, you can change the controller type. In the project view double click on "Controller Properties". Click on the flag "Controller Communications" and then on the button "Who Active ...".

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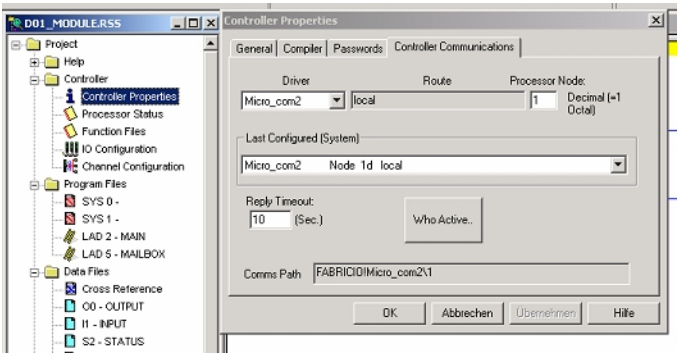

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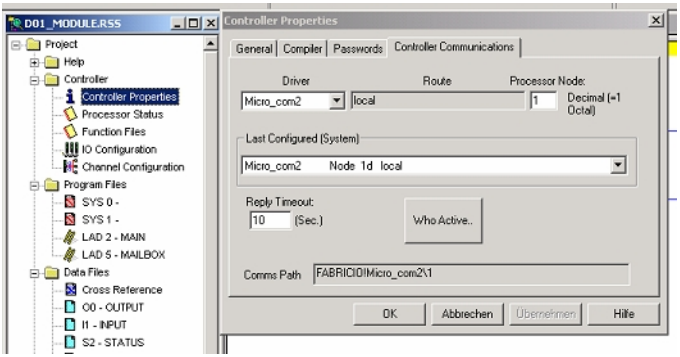
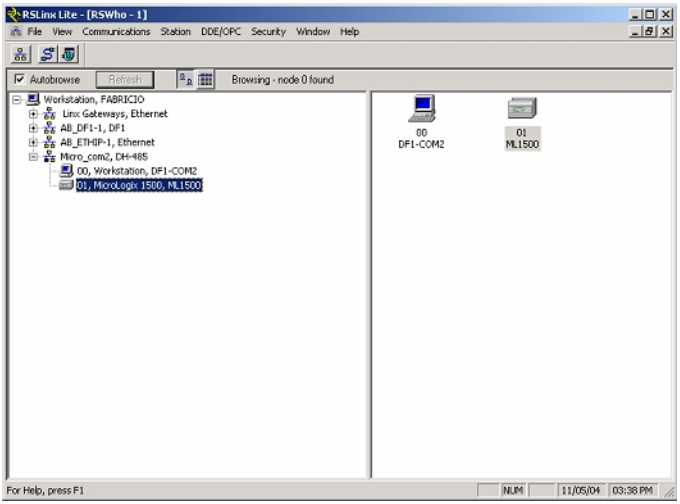
4. Choose your controller.



5. Adjust the communication settings by using the program RSLinx:



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13. Your opinion is important to us!

Please give us an opportunity to hear your suggestions, wishes and criticisms regarding this Manual.

We read every note or comment, no matter how small, and incorporate them into the documentation whenever possible.

Fill out the form on the following page and fax it to us or send your remarks, suggestions for improvement etc. to the following address:

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My opinion of the manual

Design	Yes	Partly	No
Is the table of contents clearly laid out?	☐	☐	☐
Are the illustrations/graphics comprehensible/meaningful?	☐	☐	☐
Are the text explanations for the illustrations sufficient?	☐	☐	☐
Does the quality of the images meet your expectations?	☐	☐	☐
Does the pagination encourage rapid finding of information?	☐	☐	☐

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Automatisierungstechnik

Content	Yes	Partly	No
Are the formulations/technical terms understandable?	☐	☐	☐
Are the examples relevant?	☐	☐	☐
Is the Manual easy to handle?	☐	☐	☐
Is there important information missing? If yes, explain.	☐	☐	☐

Comments:

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