Bihl + Wiedemann

Automatisierungstechnik

AS-Interface Master/Scanner

for ALLEN-BRADLEY

ControlLogix

User Manual

Bihl + Wiedemann
Automatisierungstechnik

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Declaration of Conformity

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.

Specification: AS-Interface Scanner for ALLEN-BRADLEY ControlLogix 1500

Article-no.: BWU1488

Applied harmonized standards:

EN50295 (AS-i Complete Specification)

Applied national standards or normative documents:

Prüfungsordnung für AS-i Master

Manufacturer: Bihl+Wiedemann GmbH

Date: 01.05.03 Bernhard Wiedemann

issue date 22.12.2006

1 The Symbols Used

Warning

This symbol warns the user of possible danger. Not following this warning can lead to personal injury or death and/or destruction of the equipment.

Attention

This symbol warns the user of a possible failure. Not following this warning can lead to total failure of the device or any other connected equipment.

Note

This symbol draws the user's attention to important information.

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2 Safety

2.1 Intended Use

Warning

The protection of operating personnel and the system against possible danger is not guaranteed if the control interface unit is not operated in accordance with its intended use.
The device may only be operated by appropriately qualified personnel in accordance with this operating manual.

2.2 General Safety Information

Warning

Safety and correct functioning of the device cannot be guaranteed if any operation other than that described in this operation manual is performed.
Connecting the equipment and any maintenance work to be carried out with voltage applied to the equipment must exclusively be performed by appropriately qualified electrotechnical personnel.
In case a failure cannot be repaired, the device must be taken out of operation and kept from inadvertently being put back into operation. Repair work is to be carried out by the manufacturer only. Additions or modifications to the equipment are not allowed and will void the warranty.

Note

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

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3 General Information

This operating instruction holds for the following device of the Bihl+Wiedemann GmbH:

AS-i Scanner for ALLEN-BRADLEY ControlLogix Article no. BWU1488

New AS-i Specification 2.1

The Scanner for ALLEN-BRADLEY ControlLogix already fulfil the new AS-i Specification 2.1. This means:

- Up to 62 AS-Interface slaves can be connected per 1 AS-i network
- The transfer of analog signals via AS-i is integrated in the masters
- All further functions of the new specification as e.g. the diagnosis of the AS-i peripheral fault are implemented.

Advanced Diagnostics

Diagnostics, which go far beyond the standard diagnostics facilitate the simple detection of the occassionally occuring 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, configuration and debugging on the AS-i circuit can be done as for all the Bihl+Wiedemann masters, with the four push-buttons, the LCD display and the LEDs of the device. It is also possible to do the configuration with the software "AS-i Control Tools".

Accessories

Software "AS-i Control Tools" with serial transmission cord for Allen-Bradley AS-i Master (Article no. BW1563)

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4 Description

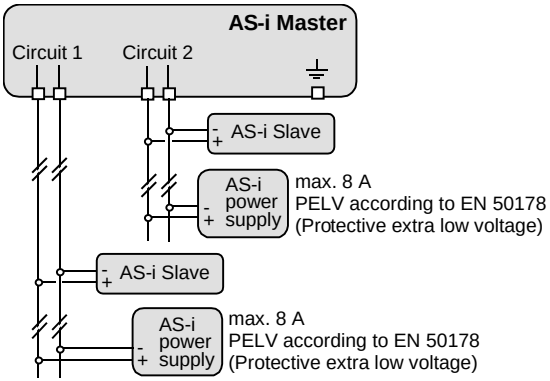
4.1 LED Indicators

Indicator	Color	Description
PWR	green	AS-i Master power
OK	green/red	PLC mode
SYS		Connection to PLC
AS-i	green/red	Communication and control information
AS-i act.	green	Normal operation active
prg enable	green	Automatic addressing enable
prj mode	yellow	Configuration mode

4.2 Connection of the AS-i Scanner

Connection samples for the AS-i power supply:

Warning



Attention

In the wiring schemes above the current through the connector must not exceed 8 A.

4.3 Display and Operating Elements

4.3.1 LEDs of the Double Masters

PWR	The master's power supply is sufficient.	
OK	red:	internal fault, self test
	flashing red:	communication fault
	green:	OK, PLC in run mode
	flashing green:	OK, PLC in program mode or no PLC

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SYS	green: A connection to a PLC exists off: No connection to a PLC
AS-i	Communication and control information green: AS-i is OK flashing green: AS-i is OK, Config Mode selected off: AS-i is not sufficently powered flashing red: Peripheral Fault This LED blinks if there is at least one periphery fault at one AS-i slave in the AS-i network. If there are configuration errors as well as periphery faults, only configuration error is displayed. red: Config error At least one configured slave is missing, or 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.
AS-i act.	Normal operation active.
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 chapter 6.

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5 Configuration

5.1 I/O Data Interpretation

5.1.1 Input Data Array

The input data array consist of 50 words for scanner revisions prior to 1.3 and 50 or 244 words for revision 1.3 (ID 11607) and up.

These words 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}
circuit 1:																
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			
circuit 2:																
16	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
17	slave 4/4A				slave 5/5A				slave 6/6A				slave 7/7A			
18	slave 8/8A				slave 9/9A				slave 10/10A				slave 11/11A			
19	slave 12/12A				slave 13/13A				slave 14/14A				slave 15/15A			
20	slave 16/16A				slave 17/17A				slave 18/18A				slave 19/19A			
21	slave 20/20A				slave 21/21A				slave 22/22A				slave 23/23A			
22	slave 24/24A				slave 25/25A				slave 26/26A				slave 27/27A			
23	slave 28/28A				slave 29/29A				slave 30/30A				slave 31/31A			
24	reserved				slave 1B				slave 2B				slave 3B			
25	slave 4B				slave 5B				slave 6B				slave 7B			
26	slave 8B				slave 9B				slave 10B				slave 11B			
27	slave 12B				slave 13B				slave 14B				slave 15B			
28	slave 16B				slave 17B				slave 18B				slave 19B			

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

For revision 1.3 (ID11607) and up, the input data array may be extended by additional 194 words:

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}
second mailbox																
50	command (mirrored)								T	result						
51	response parameter byte 1								response parameter byte 2							
52	response parameter byte 3								response parameter byte 4							
53	response parameter byte 5								response parameter byte 6							
54	response parameter byte 7								response parameter byte 8							
55	response parameter byte 9								response parameter byte 10							
56	response parameter byte 11								response parameter byte 12							
57	response parameter byte 13								response parameter byte 14							
58	response parameter byte 15								response parameter byte 16							
59	response parameter byte 17								response parameter byte 18							
60	response parameter byte 19								response parameter byte 20							
61	response parameter byte 21								response parameter byte 22							
62	response parameter byte 23								response parameter byte 24							
63	response parameter byte 25								response parameter byte 26							

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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}
64	response parameter byte 27								response parameter byte 28							
65	response parameter byte 29								response parameter byte 30							
66	response parameter byte 31								response parameter byte 32							
67	response parameter byte 33								response parameter byte 34							
analog input data circuit 1, slaves 10 … 31																
68	slave 10, channel 1															
69	slave 10, channel 2															
70	slave 10, channel 3															
71	slave 10, channel 4															
72	slave 11, channel 1															
73	slave 11, channel 2															
…	…															
150	slave 30, channel 3															
151	slave 30, channel 4															
152	slave 31, channel 1															
153	slave 31, channel 2															
154	slave 31, channel 3															
155	slave 31, channel 4															
analog input data circuit 2, slaves 10 … 31																
156	slave 10, channel 1															
157	slave 10, channel 2															
158	slave 10, channel 3															
159	slave 10, channel 4															
160	slave 11, channel 1															
161	slave 11, channel 2															
…	…															
238	slave 30, channel 3															
239	slave 30, channel 4															
240	slave 31, channel 1															
241	slave 31, channel 2															
242	slave 31, channel 3															
243	slave 31, channel 4															

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

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PeripheryFault: 0 = PeripheryOK, 1 = PeripheryFault
ConfigurationActive: 0 = ConfigurationActive, 1 = ConfigurationInactive

5.1.2 Output Data Array

The output data array consist of 50 words for scanner revisions prior to 1.3 and 50 or 244 words for revision 1.3 (ID 11607) and up.

These words 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
circuit 1:																
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			
circuit 2:																
16	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
17	slave 4/4A				slave 5/5A				slave 6/6A				slave 7/7A			
18	slave 8/8A				slave 9/9A				slave 10/10A				slave 11/11A			
19	slave 12/12A				slave 13/13A				slave 14/14A				slave 15/15A			
20	slave 16/16A				slave 17/17A				slave 18/18A				slave 19/19A			
21	slave 20/20A				slave 21/21A				slave 22/22A				slave 23/23A			
22	slave 24/24A				slave 25/25A				slave 26/26A				slave 27/27A			
23	slave 28/28A				slave 29/29A				slave 30/30A				slave 31/31A			
24	reserved				slave 1B				slave 2B				slave 3B			
25	slave 4B				slave 5B				slave 6B				slave 7B			
26	slave 8B				slave 9B				slave 10B				slave 11B			
27	slave 12B				slave 13B				slave 14B				slave 15B			
28	slave 16B				slave 17B				slave 18B				slave 19B			
29	slave 20B				slave 21B				slave 22B				slave 23B			

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

For revision 1.3 (ID11607) and up, the input data array may be extended by additional 194 words:

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}
second mailbox																
50	command (mirrored)								T	result						
51	response parameter byte 1								response parameter byte 2							
52	response parameter byte 3								response parameter byte 4							
53	response parameter byte 5								response parameter byte 6							
54	response parameter byte 7								response parameter byte 8							
55	response parameter byte 9								response parameter byte 10							
56	response parameter byte 11								response parameter byte 12							
57	response parameter byte 13								response parameter byte 14							
58	response parameter byte 15								response parameter byte 16							
59	response parameter byte 17								response parameter byte 18							
60	response parameter byte 19								response parameter byte 20							
61	response parameter byte 21								response parameter byte 22							
62	response parameter byte 23								response parameter byte 24							
63	response parameter byte 25								response parameter byte 26							
64	response parameter byte 27								response parameter byte 28							

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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}
65	response parameter byte 29								response parameter byte 30							
66	response parameter byte 31								response parameter byte 32							
67	response parameter byte 33								response parameter byte 34							
analog output data circuit 1, slaves 10 … 31																
68	slave 10, channel 1															
69	slave 10, channel 2															
70	slave 10, channel 3															
71	slave 10, channel 4															
72	slave 11, channel 1															
73	slave 11, channel 2															
…	…															
150	slave 30, channel 3															
151	slave 30, channel 4															
152	slave 31, channel 1															
153	slave 31, channel 2															
154	slave 31, channel 3															
155	slave 31, channel 4															
analog output data circuit 2, slaves 10 … 31																
156	slave 10, channel 1															
157	slave 10, channel 2															
158	slave 10, channel 3															
159	slave 10, channel 4															
160	slave 11, channel 1															
161	slave 11, channel 2															
…	…															
238	slave 30, channel 3															
239	slave 30, channel 4															
240	slave 31, channel 1															
241	slave 31, channel 2															
242	slave 31, channel 3															
243	slave 31, channel 4															

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

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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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6 Operating the AS-i

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.

If the AS-i circuit is insufficiently powered ("U AS-i" does not light up).

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.

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

Pressing the "mode" button for at least five seconds switches to configuration mode. While in configuration mode, the yellow "prj mode" 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

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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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.

6.3 Protected Operating Mode


Note

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 "mode" 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.


Note

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 "set" 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 "set" button.

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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

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 "set" button shortly. Each time you press the "set" button, the next available address is displayed.

Choose the displayed address as your target address by pressing the "set" button for more than five seconds. The address display flashes. The master is ready for programming; pressing the "set" 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 chapter 9. Otherwise, the detected slaves are displayed again as described in chapter 6.2.

Note

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 "set" 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.

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6.5 Programming the Address in Case of Configuration Errors

6.5.1 Automatic Address Assignment

Note

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.

If these requirements are met, the AS-i master's "**prg enable**" 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".

Note

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

Note

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 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 chapter 6.3). By pressing the "set" button all faulty assignments will be displayed in succession. By pressing the "set" 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 "set" key again. As a requirement, the new slave's configuration data must match the configuration data for the flashing address.

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

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 (chapter 9). When all faulty assignments are eliminated, the display will be empty.

6.6 Error Messages

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, chapter 9.

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7 Command Interface

7.1 Construction

If an AS-i slave is addressed in a command or in a response, the address is structured as shown below

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	command							
2	T	–	circuit					
3	request parameter byte 1							
…	…							
36	request parameter byte 34							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	command							
2	T	result						
3	response parameter byte 1							
…	…							
36	response parameter byte 34							

Command byte and T-bit are always part of the response. This way the same command of the command interface can be used two twice repeatedly, possibly with different parameters.

The execution of a command interface is declined, if the command interface is too small.

Circuit = 0 If an AS-i gateway with one AS-i master or the master 1 of an AS-i gateway with 2 masters should be choosen.

Circuit = 1 If master 2 of a double master should be chosen.

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7.1.1 List of all Commands

Values for command				
command	**value**	**meaning**	**Req Len**	**Res Len**
RD_7X_IN	50_{16}	Read 1 7.3-slave in.data	3	10
WR_7X_OUT	51_{16}	Write 1 7.3-slave out.data	11	2
RD_7X_OUT	52_{16}	Read 1 7.3-slave out.data	3	10
RD_7X_IN_X	53_{16}	Read 4 7.3-slaves in.data	3	34
WR_7X_OUT_X	54_{16}	Write 4 7.3-slaves out.data	35	2
RD_7X_OUT_X	55_{16}	Read 4 7.3-slaves out.data	3	34
WR_74_PARAM	$5A_{16}$	Write S-7.4-slave parameter	≥6	2
RD_74_PARAM	$5B_{16}$	Read S-7.4-slave parameter	4	≥3
RD_74_ID	$5C_{16}$	Read S-7.4-slave ID string	4	≥3
RD_74_DIAG	$5D_{16}$	Read S-7.4-slave diagnosis string	4	≥3
GET_LISTS	30_{16}	Get LDS, LAS, LPS, Flags	2	29
GET_FLAGS	47_{16}	Get_Flags	2	5
GET_DELTA	57_{16}	Get list of config. diff.	2	10
GET_LCS	60_{16}	Get LCS	2	10
GET_LAS	45_{16}	Get_LAS	2	10
GET_LDS	46_{16}	Get_LDS	2	10
GET_LPF	$3E_{16}$	Get_LPF	2	10
GET_LOS	61_{16}	GET_LOS	2	10
SET_LOS	62_{16}	SET_LOS	10	2
GET_TECA	63_{16}	Get transm.err.counters	2	34
GET_TECB	64_{16}	Get transm.err.counters	2	34
GET_TEC_X	66_{16}	Get transm.err.counters	4	≥3
SET_OP_MODE	$0C_{16}$	Set_Operation_Mode	3	2
STORE_CDI	07_{16}	Store_Actual_Configuration	2	2
READ_CDI	28_{16}	Read_Actual_Configuration	3	4
SET_PCD	25_{16}	Set_Permanent_Config	5	2
GET_PCD	26_{16}	Get_Permanent_Config	3	4
SET_LPS	29_{16}	SET_LPS	11	2
GET_LPS	44_{16}	Get_LPS	2	10
STORE_PI	04_{16}	Store_Actual_Parameter	2	2
WRITE_P	02_{16}	Write_Parameter	4	3
READ_PI	03_{16}	Read_Parameter	3	3
SET_PP	43_{16}	Set_Permanent_Parameter	4	2
GET_PP	01_{16}	Get_Permanent_Parameter	3	3
SET_AAE	$0B_{16}$	Set_Auto_Address_Enable	3	2
IDLE	00_{16}	No order	2	2

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Values for command				
command	**value**	**meaning**	**Req Len**	**Res Len**
READ_IDI	41_{16}	Read IDI	2	36
WRITE_ODI	42_{16}	Write_ODI	34	2
READ_ODI	56_{16}	Read ODI	2	34
SLAVE_ADDR	$0D_{16}$	Change_Slave_Address	4	2
WRITE_XID1	$3F_{16}$	Write_Extended_ID-Code_1	3	2
SET_OFFLINE	$0A_{16}$	Set_Offline_Mode	3	2
SET_DATA_EX	48_{16}	Set_Data_Exchange_Active	3	2
BUTTONS	75_{16}	Disable pushbuttons	3	2
FP_PARAM	$7D_{16}$	„Functional Profile“ Param.	≥3	≥2
FP_DATA	$7E_{16}$	„Functional Profile“ Data	≥3	≥2
INVERTER	$7C_{16}$	Configure Inverter Slaves	12	4

7.1.2 Values for Results

Values for result			
	value	place	meaning
OK	00_{16}	–	execution without fault
HI_NG	11_{16}	HI	general fault
HI_OPCODE	12_{16}	HI	illegal value in command
HI_LENGTH	13_{16}	HI	length of the command interface is too short
HI_ACCESS	14_{16}	HI	no access right
EC_NG	21_{16}	EC	general fault
EC_SND	22_{16}	EC	"slave (source addr) not detected"
EC_SD0	23_{16}	EC	"slave 0 detected"
EC_SD2	24_{16}	EC	"slave (target addr) not decteced"
EC_DE	25_{16}	EC	"delete error"
EC_SE	26_{16}	EC	"set error"
EC_AT	27_{16}	EC	"address temporary"
EC_ET	28_{16}	EC	"extended ID1 temporary"
EC_RE	29_{16}	EC	"read (extended ID1) error"

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7.2 Commands of the Command Interface

7.2.1 Analog Data

7.2.1.1 Overview of the Commands

Values for command				
command	value	meaning	Req Len	Res Len
RD_7X_IN	50_{16}	Read 1 7.3-slave in.data	3	10
WR_7X_OUT	51_{16}	Write 1 7.3-slave out.data	11	2
RD_7X_OUT	52_{16}	Read 1 7.3-slave out.data	3	10
RD_7X_IN_X	53_{16}	Read 4 7.3-slaves in.data	3	34
WR_7X_OUT_X	54_{16}	Write 4 7.3-slaves out.data	35	2
RD_7X_OUT_X	55_{16}	Read 4 7.3-slaves out.data	3	34
WR_74_PARAM	$5A_{16}$	Write S-7.4-slave parameter	≥6	2
RD_74_PARAM	$5B_{16}$	Read S-7.4-slave parameter	4	≥3
RD_74_ID	$5C_{16}$	Read S-7.4-slave ID string	4	≥3
RD_74_DIAG	$5D_{16}$	Read S-7.4-slave diagnosis string	4	≥3

7.2.1.2 Read 1 7.3-Slave in.Data (RD_7X_IN)

With this command, the four 16 bit channels of an AS-i input slave according to the slave profile 7.3 can be read.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	50_{16}							
2	T	–	circuit					
3	–		0	slave address				

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	50_{16}							
2	T	result						
3	channel 1, high byte							
…	…							
10	channel 4, low byte							

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7.2.1.3 Write 1 7.3-Slave out.Data (WR_7X_OUT)

With this command, the four 16 bit channels of an AS-i output slave according to the slave profile 7.3 can be written.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	51_{16}							
2	T	–	circuit					
3	–		0	slave address				
4	channel 1, high byte							
…	…							
11	channel 4, low byte							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	51_{16}							
2	T	result						

7.2.1.4 Read 1 7.3-Slave out.Data (RD_7X_OUT)

With this command, the four 16 bit channels of an AS-i output slave according to the slave profile 7.3 can be read out of the AS-i master.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	52_{16}							
2	T	–	circuit					
3	–		0	slave address				

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	52_{16}							
2	T	result						
3	channel 1, high byte							
…	…							
10	channel 4, low byte							

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7.2.1.5 Read 4 7.3-Slave in.Data (RD_7X_IN_X)

With this command, the four 16 bit channels of 4 AS-i input slaves with succesive addresses according to slave profile 7.3 can be read.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	53_{16}							
2	T	–	circuit					
3	–		0	1st slave address				

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	53_{16}							
2	T	result						
3	1st slave, channel 1, high byte							
…	…							
34	4th slave, channel 4, low byte							

7.2.1.6 Write 4 7.3-Slave out.Data (WR_7X_OUT_X)

With this command the four 16 bit channels of four AS-i output slaves with succesive addresses according to slave profile 7.3 can be written.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	54_{16}							
2	T	–	circuit					
3	–		0	1st slave address				
4	1st slave, channel 1, high byte							
…	…							
35	4th slave, channel 4, low byte							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	54_{16}							
2	T	result						

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7.2.1.7 Read 4 7.3-Slave out.Data (RD_7X_OUT_X)

With this command, the four 16 bit channels of four AS-i output slaves with successive addresses according to slave profile 7.3 can be read.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	55_{16}							
2	T	–	circuit					
3	–		0	1st slave address				

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	55_{16}							
2	T	result						
3	1st slave, channel 1, high byte							
…	…							
34	4th slave, channel 4, low byte							

7.2.1.8 WR_74_PARAM

With this function the parameter string of a slave according to profile S-7.4 is written. Since the string can be longer than the command interface, it will partly be written into the buffer and then be transferred to the slave.

n is the length of the part of the string which should be written into the buffer from index i on.

If i ≡ 0, then the string is being transferred to the slave.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$5A_{16}$							
2	T	–	circuit					
3	slave address							
4	i							
5	n							
6	buffer btye i							
…	…							
n+5	buffer byte i+n-1							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$5A_{16}$							
2	T	results						

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7.2.1.9 RD_74_PARAM

With this function the parameter string according to profile S-7.4 is being read. Since the string can be longer than the command interface, it is written into the buffer. The content of the buffer can read in parts from index i.

The first byte of the buffer is the length of the read string.

If i ≡ 0, the string is being read from the slave, otherwise the function responses out of the memory; the data can be read consistently.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$5B_{16}$							
2	T	–	circuit					
3	slave address							
4	i							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$5B_{16}$							
2	T	result						
3	buffer byte i							
…	…							
n+2	buffer byte i+n-1							

7.2.1.10 RD_74_ID

With this function the ID string of a slave according to profile S-7.4 is is being read. Since the string can be longer than the command interface, it is written into the buffer. The content of the buffer can read in parts from index i.

The first byte of the buffer is the length of the read string.

If i ≡ 0, the string is being read from the slave, otherwise the function responses out of the memory, the data can be read consistently.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$5C_{16}$							
2	T	–	circuit					
3	slave address							
4	i							

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Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$5C_{16}$							
2	T	result						
3	buffer byte i							
…	…							
n+2	buffer byte i+n-1							

7.2.1.11 RD_74_DIAG

With this function the diagnosis string of a slave according to profile S-7.4 is being read. Since the string can be longer than the command interface, it is written into the buffer. The content of the buffer can be read in parts from index i.

The first byte of the buffer indicates the length of the read string.

If i ≡ 0, the string is being read from the slave, otherwise the function responses out of the memory, the data can be read consistently.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$5D_{16}$							
2	T	–	circuit					
3	slave address							
4	i							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$5D_{16}$							
2	T	result						
3	buffer byte i							
…	…							
n+2	buffer byte i+n-1							

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7.2.2 Diagnosis Data

7.2.2.1 Overview of the Commands

Values for command				
Command	value	meaning	Req Len	Res Len
GET_LISTS	30_{16}	Get LDS, LAS, LPS, Flags	2	29
GET_FLAGS	47_{16}	Get_Flags	2	5
GET_DELTA	57_{16}	Get list of config. diff.	2	10
GET_LCS	60_{16}	Get LCS	2	10
GET_LAS	45_{16}	Get_LAS	2	10
GET_LDS	46_{16}	Get_LDS	2	10
GET_LPF	$3E_{16}$	Get_LPF	2	10
GET_LOS	61_{16}	GET_LOS	2	10
SET_LOS	62_{16}	SET_LOS	10	2
GET_TECA	63_{16}	Get transm.err.counters	2	34
GET_TECB	64_{16}	Get transm.err.counters	2	34
GET_TEC_X	66_{16}	Get transm.err.counters	4	≥3

7.2.2.2 Get Lists and Flags (Get_LPS, Get_LAS, Get_LDS, Get_Flags) (GET_LISTS)

With this call, the following entries are read out of the AS-i master:

- The list of active AS-i slaves (LAS)
- The list of detected AS-i slaves (LDS)
- The list of projected AS-i slaves (LPS)
- The flags according to the AS-i slave specification

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	30_{16}							
2	T	-	circuit					

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Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	30_{16}							
2	T	result						
3	7A	6A	5A	4A	3A	2A	1A	0A
…	LAS							
10	31B	30B	29B	28B	27B	26B	25B	24B
11	7A	6As	5A	4A	3A	2A	1A	0A
…	LDS							
19	31B	30B	29B	28B	27B	26B	25B	24B
20	7A	6As	5A	4A	3A	2A	1A	0A
…	LPS							
26	31B	30B	29B	28B	27B	26B	25B	24B
27	–							Pok
28	OR	APF	NA	CA	AAv	AAs	S0	Cok
29	–					AAe	OL	DX

Pok Periphery_Ok
S0 LDS.0
AAs Auto_Address_Assign
AAv Auto_Address_Available
CA Configuration_Active
NA Normal_Operation_Active
APF APF
OR Offline_Ready
Cok Config_Ok
AAe Auto_Address_Enable
OL Offline
DX Data_Exchange_Active

7.2.2.3 Get Flags (GET_FLAGS)

With this call, the following entry is read out of the AS-i master: The flags according to the AS-i slave specification.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	47_{16}							
2	T	–	circuit					

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Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	47_{16}							
2	T	response						
3	–							Pok
4	OR	APF	NA	CA	AAv	AAs	S0	Cok
5	–					AAe	OL	DX

Pok Periphery_Ok
This flag is set when no AS-i slave is signaling a peripheral fault.

S0 LDS.0
This flag is set when an AS-i slave with address 0 exists.

AAs Auto_Address_Assign
This flag is being set when the automatic address programming is possible (in other words, AUTO_ADDR_ENABLE = 1; no "incorrect" slave connected to the AS-i).

AAv Auto_Address_Available
This flag is set when the automatic address programming can be executed, exactly one AS-i slave is currently out of operation.

CA Configuration_Active
The flag is set in configuration mode and reset in protected mode.

NA Normal_Operation_Active
This flag is set when the AS-i master is in normal operation.

APF AS-i Power Fail
This flag is set when the voltage on the AS-i cable is too low.

OR Offline_Ready
The flag is set when the offline phase is active.

Cok Config_Ok
This flag is set when the desired (configured) and actual configuration match.

AAe Auto_Address_Enable
This flag indicates whether the automatic address programming is enabled (bit = 1) or disabled (bit = 0) by the user.

OL Offline
This flag is set when the mode should be changed to OFFLINE or when this mode has already been reached.

DX Data_Exchange_Active
If the "Data_Exchange_Active" flag is set, the data exchange between AS-i master and slaves is available in the data exchange phase. If this bit is not set the data exchange is not available. The read ID telegrams are transmitted to the slave.
The bit is set if the AS-i master enters the offline phase.

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7.2.2.4 Get Delta List (GET_DELTA)

The delta list contains the list of slave addresses with configuration errors.

In protected mode it is calculated as follows:

$$slave \in \Delta \mid (slave \in LDS \vee slave \in LPS) \otimes slave \in LAS$$

Because in configuration mode LAS and LPS are identical, therefore those slaves are additionally to be registered out of the LAS, for which the entries in CDI and PCD are different.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	57_{16}							
2	T	0	circuit					

Response (if O ≡ 0)								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	57_{16}							
2	T	result						
3	7A	6A	5A	4A	3A	2A	1A	–
…	…							
10	31B	30B	29B	28B	27B	26B	25B	24B

Response (if O ≡ 1)								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	57_{16}							
2	T	result						
3	0	1A	2A	3A	4A	5A	6A	7A
…	…							
10	24B	25B	26B	27B	28B	29B	30B	31B

$$slave \in \Delta \mid \begin{array}{c} (slave \in LDS \vee slave \in LDS) \otimes slave \in LAS \\ \vee \\ slave \in LAS \wedge (CDI[slave] \neq PCD[slave]) \end{array}$$

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7.2.2.5 Get List of Corrupted Slaves (GET_LCS)

The LCS contains the history of the delta list.

With this call, the List of Corrupted Slaves (*LCS*) is read out of the AS-i master.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	60_{16}							
2	T	-	circuit					

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	60_{16}							
2	T	result						
3	7A	6A	5A	4A	3A	2A	1A	0A
…	…							
10	31B	30B	29B	28B	27B	26B	25B	24B

7.2.2.6 Get List of Activated Slaves (GET_LAS)

With this call, the following entry is read out of the AS-i master: The list of activated slaves (*LAS*).

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	45_{16}							
2	T	O	circuit					

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	45_{16}							
2	T	result						
3	7A	6A	5A	4A	3A	2A	1A	0A
…	…							
10	31B	30B	29B	28B	27B	26B	25B	24B

7.2.2.7 Get List of Detected AS-i slaves (GET_LDS)

With this call, the following entry is read out of the AS-i master: The list of detected AS-i slaves (*LDS*).

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	46_{16}							
2	T	-	circuit					

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Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	46_{16}							
2	T	result						
3	7A	6A	5A	4A	3A	2A	1A	0A
…	…							
10	31B	30B	29B	28B	27B	26B	25B	24B

7.2.2.8 Get list of peripheral faults (GET_LPF)

With this call, the list of peripheral faults (*LPF*) signaled by the AS-i slaves is read out from the AS-i master. The LPF is updated cyclically by the AS-i master. If and when an AS-i slave signals faults of the attached peripherals (for example broken wire) can be found in the description of the AS-i slave.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$3E_{16}$							
2	T	-	circuit					

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$3E_{16}$							
2	T	result						
3	7A	6A	5A	4A	3A	2A	1A	0A
…	…							
10	31B	30B	29B	28B	27B	26B	25B	24B

7.2.2.9 Get List of Offline Slaves (GET_LOS)

With this call, the list of slaves causing the offline phase when a configuration error occurs in being read out (List of Offline Slaves, *LOS*).

The user can choose the reaction of the master when a configuration error occurs. The master can be switched off line when an important slave causes a configuration error; less important slaves can send an error to the host, AS-i however will not be switched offline.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	61_{16}							
2	T	-	circuit					

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Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	61_{16}							
2	T	result						
3	7A	6A	5A	4A	3A	2A	1A	0A
…	…							
10	31B	30B	29B	28B	27B	26B	25B	24B

7.2.2.10 Set List of Off-line Slaves (SET_LOS)

With this call, the list of slaves causing the offline phase when a configuration error occurs in being defined (List of Offline Slaves, *LOS*).

The user can choose the reaction of the master when a configuration error occurs. The master can be switched offline when an important slave causes a configuration error; less important slaves can send an error to the host, AS-i however will not be switched offline.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	62_{16}							
2	T	-	circuit					
3	7A	6A	5A	4A	3A	2A	1A	0A
…	…							
10	31B	30B	29B	28B	27B	26B	25B	24B

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	62_{16}							
2	T	result						

7.2.2.11 Get transm.err.counters (GET_TECA)

With this call the error counters of all single slaves/A-slaves can be read (see chapter 7).

With every reading out of the counts, the error counters will be restarted.

The counts are being read out via the corresponding host interface and will be deleted with every read access. The counter´s value is limited to 254. 255 will cause a counter overflow.

The counts could be independent of the counters, which are displayed in the display of the gateway.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	63_{16}							
2	T	–	circuit					

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Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	63_{16}							
2	T	result						
3	APF							
4	slave 1A							
…	…							
34	slave 31A							

7.2.2.12 Get transm.err.counters (GET_TECB)

With this call, the counts of the error counters for B-slaves are being read out (see chapter 7).

With every reading out of the counts, the error counters will be restarted.

The counts are being read out via the corresponding host interface and will be deleted with every read access. The counter´s value is limited to 254. 255 will cause a counter overflow.

The counts could be independent of the counters, which are displayed in the display of the gateway.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	64_{16}							
2	T	–	circuit					

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	64_{16}							
2	T	result						
3	APF							
4	slave 1B							
…	…							
34	slave 31B							

7.2.2.13 GET_TEC_X

Beginning with a definite slave address, the counts of the n error counters are being read out with this call.

With every reading out the counts, the error counters will be restarted.

The counts are being read out via the correspondending host interface and will be deleted with every read access. The counter´s value is limited to 254. 255 will cause a counter overflow.

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The counts could be independent of the counters, which are displayed in the display of the gateway.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	66_{16}							
2	T	–	circuit					
3	1. slave address							
4	number of counters							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	66_{16}							
2	T	result						
3	counter 1							
…	…							
n	counter n - 2							

7.2.2.14 Functional profiles

Further diagnosis functions for "Safety at Work" and for availability vice versa for warnings of integrated sensors are explained detailed in the chapter "Functional profiles" (chapter 7.2.3).

7.2.3 Functional profiles

7.2.3.1 "Safety at Work" List 1

Function: 00_{16}

List of "safety-directed input slaves" ("AS-Interface Safety at Work"), whose safety function is released.

Safety-directed input slaves have the profile S-7.B or S-0.B (IO = 0 or 7, ID = B, see chapter 7.2.4.4: Read Actual Configuration).

The "Safety at Work" list 1 is a bit list which contains a bit for each possible slave address (1 - 31). This list is written in the bytes 5 until 8 in the response of the command of the command interface. Additionally, the reponse contains the ec-flags of the AS-Interface master in the bytes 3 and 4 (see chapter 7.2.2.3: "Get Flags").

The bits of the "Safety at Work" list 1 are set if the safety function of the slave is activated (e.g. emergency button pressed). The bit is only set at security slaves when both contacts are released, otherwise the bits have the value 0. "Normal" (non-security) slaves also have the value 0.

Since the security monitor is also being activated if a security slave is missing or if the AS-i circuit is shut off (offline active), the ec-flags will also be transmitted. It is sufficient however to monitor the group error message Cok (configuration error). As long as no configuration error, the list of the "safety-directed input slaves" can be used.

Configured safety slaves which are not available, and available slaves sending a wrong coder order, will not be entered in this list.

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With the bit "O", the sequence of the bits within the "Safety at Work" list 1 can be chosen.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$7E_{16}$							
2	T	-	circuit					
3	00_{16}							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$7E_{16}$							
2	T	result						
3	–							Pok
4	OR	APF	NA	CA	AAv	AAs	S0	Cok
5	7	6	5	4	3	2	1	-
…	…							
8	31	30	29	28	27	26	25	25

Cok Config_Ok
S0 LDS.0
AAs Auto_Address_Assign
AAv Auto_Address_Available
CA Configuration_Active
NA Normal_Operation_Active
APF APF
OR Offline_Ready
Pok Periphery_Ok

Example for O ≡ 0:

Configuration OK,
periphery OK (no peripheral fault,
2 safety slaves with released safety function,
AS-Inferface addresses 4 and 10
1 safety slave with unreleased safety function,
AS-Inferface address 5.

Reponse: 7E 00 01 25 10 04 00 00

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7.2.3.2 byte 5 **"Safety at Work" Monitor Diagnosis**

Function: 02_{16}

Since the "Safety at Work" monitor can make more than 32 Byte diagnosis data, these must be read with several command interface calls. The byte 5 declares the start index in the field of the diagnosis data.

If the start index is 0, new data is fetched from the monitor. Otherwise, the function will respond out of the memory; the data can be read consistently.

Enhanced Diagnostics

Since the "Safety at Work“ monitor diagnosis is longer than the maximum size of the command interface, it must be read with several adjacent requests.

The byte 5 (‘index’) declares the start index in the array of diagnostic data. If this start index ist 0, the whole diagnosis is fetched from the monitor and stored to an internal buffer. Otherwise, the AS-i Master will respond out of the internal buffer. Thus, even though several requests are neccessary to read the whole buffer, data integrity is maintained.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$7E_{16}$							
2	T	Len	Sort	circuit				
3	02_{16}							
4	slave address							
5			start	index				

ED Size of the diagnostics array (enhanced diagnostics)

Sort Safety monitor’s diagnosis style

If "ED" is set, the monitor diagnostics array is set up for 64 devices (safety monitor with "*enhanced function range*" selected). Else, the monitor diagnostics array is set up for 32 devices only (version 1 safety monitor or monitor with "*basic function range*" selected).

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"Sort" is to be set if the safety monitor's AS-i diagnosis is set to "*all devices*". It is to be reset if "*sorted by OSSD*" is selected in the safety monitor configuration.

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$\overline{7E}_{16}$							
2	T	result						
3	diagnosis byte #index+0							
4	diagnosis byte #index+1							
…	…							
n	diagnosis byte #index+n-3							

The diagnosis array is set up as follows::::

Safety Monitor Diagnosis Array "*basic function range*" and "*sorted by OSSD*"								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
0	00_{16}							
1	state of monitor							
2	state of OSSD1							
3	state of OSSD2							
4	number of devices not green, OSSD1							
5	number of devices not green, OSSD2							
6	device index 32, OSSD1							
7	color of device 32, OSSD1							
8	device index 33, OSSD1							
9	color of device 33, OSSD1							
…	…							
68	device index 63, OSSD1							
69	color of device 63, OSSD1							
70	device index 32, OSSD2							
71	color of device 32, OSSD2							
…	…							
132	device index 63, OSSD2							
133	color of device 63, OSSD2							

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Safety Monitor Diagnosis Array "*enhanced function range*" and "*sorted by OSSD*"								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
0	00_{16}							
1	state of monitor							
2	state of OSSD1							
3	state of OSSD2							
4	number of devices not green, OSSD1							
5	number of devices not green, OSSD2							
6	device index 32, OSSD1							
7	color of device 32, OSSD1							
8	device index 33, OSSD1							
…	…							
133	color of device 95, OSSD1							
134	device index 32, OSSD2							
…	…							
261	color of device 95, OSSD2							

Safety Monitor Diagnosis Array "*basic function range*" and "*all devices*"								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
0	00_{16}							
1	state of monitor							
2	state of OSSD1							
3	state of OSSD2							
4	number of devices not green							
5	—							
6	device index 32							
7	color of device 32							
8	device index 33							
9	color of device 33							
…	…							
68	device index 63							
69	color of device 63							
70	device index 32							
71	assignment of device 32 to OSSD							
…	…							
132	device index 63							
133	assignment of device 63 to OSSD							

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Safety Monitor Diagnosis Array "*enhanced function range*" and "*all devices*"								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
0	00_{16}							
1	state of monitor							
2	state of OSSD1							
3	state of OSSD2							
4	number of devices not green							
5	—							
6	device index 32							
7	color of device 32							
8	device index 33							
…	…							
133	color of device 95							
134	device index 32, OSSD2							
…	…							
261	assignment of device 95 to OSSD							

See the ” Safety at Work“ monitor documenation for a description of the codes used for monitor state, OSSD state, device colors and assigments to OSSDs.

7.2.3.3 Integrated AS-i Sensors: Warnings

Function: 03_{16}

List of integrated AS-i sensors according to profile S-1.1 (without extended addressing) or profile S-3.A.1(with extended addressing), by which the input data bit D1 ("Warning") being deleted.

For creating of this list CDI and IDI are used only. Integrated AS-i slaves which are projected but not existing therefore are not entered here.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$7E_{16}$							
2	T	-	circuit					
3	03_{16}							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$7E_{16}$							
2	T	result						
3	7A	6A	5A	4A	3A	2A	1A	0
…	…							
10	31B	30B	29B	28B	27B	26B	25B	24B

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7.2.3.4 Integrated AS-i Sensors: Availability

Function: 04_{16}

List of the integrated slaves according to profile S-1.1 whose input data bits D2 ("Availability") are deleted.

For creating this list, CDI and IDI are used only. Integrated AS-i slaves which are projected but not existing therefore are not entered here.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$7E_{16}$							
2	T	-	circuit					
3	04_{16}							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$7E_{16}$							
2	T	result						
3	7	6	5	4	3	2	1	0
…	…							
6	31	30	29	28	27	26	25	24

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7.2.4 Configuration of the AS-i Master

7.2.4.1 Overview of the Commands

Values for command				
comamnd	value	meaning	Req Len	Res Len
SET_OP_MODE	$0C_{16}$	Set_Operation_Mode	3	2
STORE_CDI	07_{16}	Store_Actual_Configuration	2	2
READ_CDI	28_{16}	Read_Actual_Configuration	3	4
SET_PCD	25_{16}	Set_Permanent_Config	5	2
GET_PCD	26_{16}	Get_Permanent_Config	3	4
SET_LPS	29_{16}	SET_LPS	11	2
GET_LPS	44_{16}	Get_LPS	2	10
STORE_PI	04_{16}	Store_Actual_Parameter	2	2
WRITE_P	02_{16}	Write_Parameter	4	3
READ_PI	03_{16}	Read_Parameter	3	3
SET_PP	43_{16}	Set_Permanent_Parameter	4	2
GET_PP	01_{16}	Get_Permanent_Parameter	3	3
SET_AAE	$0B_{16}$	Set_Auto_Adress_Enable	3	2

7.2.4.2 Set Operation Mode (SET_OP_MODE: Set_Operation_Mode)

This call switches between configuration mode and protected mode.

In protected mode, only AS-i slaves entered in the LPS and whose expected and actual configurations match, are being activated.

In other words: The slaves are being activated if the I/O configuration and the ID codes of the detected AS-i slaves are identical to the configured values.

In configuration mode, all detected AS-i slaves (except for AS-i slave "0") are activated. This also applies to AS-i slaves for which there are differences between the expected and actual configuration.

The “OPERATION MODE” bit is stored permanently; in other words, it is retained after a cold/warm restart.

When you change from configuration mode to protected mode, the AS-i master will do a warm restart (change to the offline phase followed by a change to the online mode).

Note

If an AS-i slave with address "0" is entered in the LDS, the AS-i master cannot change from configuration mode to protected mode.

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Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$0C_{16}$							
2	T	–	circuit					
3	operation mode							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$0C_{16}$							
2	T	result						

Meaning of bit operation mode:

0 = protected mode
1 = configuration mode

7.2.4.3 Store Actual Configuration (STORE_CDI)

With this call, the (actual) configuration data (I/O configuration, ID code, extended ID1 code and extended ID2 code) of all AS-i slaves are stored permanently in the EEPROM as the (expected) configuration data. The list of activated AS-i slaves (*LAS*) is adopted in the list of permanent AS-i slaves (*LPS*).

When this command is executed, the AS-i master changes to the offline phase and then changes back to the normal mode (warm restart on the AS-i master).

This command can only be executed in the configuration mode.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	07_{16}							
2	T	–	circuit					

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	07_{16}							
2	T	result						

7.2.4.4 Read Actual Configuration (READ_CDI)

With this call, the following configuration data of an addressed AS-i slave obtained by the AS-i master on the AS-Interface are read.

- I/O configuration
- ID code
- Extended ID1 code
- Extended ID2 code

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The configuration data are specified by the manufacturer of the AS-i slave.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	28_{16}							
2	T	–	circuit					
3	–		B	slave address				

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	28_{16}							
2	T	result						
3	xID2				xID1			
4	ID				I0			

Meaning of bit B:

B = 0 Single AS-i slave or A-slave

B = 1 B-slave

7.2.4.5 Set Permanent Configuration (SET_PCD)

This call sets the following configuration data for the addressed AS-i slave:

- I/O configuration
- ID code
- Extended ID1 code
- Extended ID2 code

The configuration data are stored permanently on the EEPROM of the AS-i master and are used as the expected configuration by the AS-i master in the protected mode. The configuration data are specified by the manufacturer of the AS-i slave.

If the addressed AS-i slave does not support an extended ID code 1/2, the value F_{hex} must be specified.

When this command is executed, the AS-i master changes to the offline phase and then changes back to the normal mode (warm restart).

This command can only be executed in the configuration mode.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	25_{16}							
2	T	–	circuit					
3	–		B	slave address				
4	xID2				xID1			
5	ID				I0			

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Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	25_{16}							
2	T	result						

Meaning of bit B:

B = 0 Single AS-i slave or A-slave

B = 1 B-slave

7.2.4.6 Get Extended Permanent Configuration (GET_PCD)

This call reads the following configuration data (configured data) of an addressed AS-i slave stored on the EEPROM of the AS-i master:

- I/O configuration
- ID code
- Extended ID1 code
- Extended ID2 code

The configuration data are specified by the manufacturer of the AS-i slave.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	26_{16}							
2	T	–	circuit					
3	–		B	slave address				

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	26_{16}							
2	T	result						
3	xID2				xID1			
4	ID				I0			

Meaning of bit B:

B = 0 Single AS-i slave or A-slave

B = 1 B-slave

7.2.4.7 Set List of Projected Slaves (SET_LPS)

With this call, the list of configured AS-i slaves is transferred for permanent storage in the EEPROM of the master.

When this command is executed, the AS-i master changes to the offline phase and then changes back to the normal mode (warm restart).

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This command can only be executed in the configuration mode.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	29_{16}							
2	T	-	circuit					
3	00_{16}							
4	7A	6A	5A	4A	3A	2A	1A	–
…	…							
11	31B	30B	29B	28B	27B	26B	25B	24B

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	29_{16}							
2	T	result						

7.2.4.8 Get List of Projected Slaves (GET_LPS)

With this call, the following entry is read out of the AS-i master: The list of projected AS-i slaves (*LPS*).

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	44_{16}							
2	T	-	circuit					

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	44_{16}							
2	T	result						
3	7A	6A	5A	4A	3A	2A	1A	0A
…	…							
10	31B	30B	29B	28B	27B	26B	25B	24B

7.2.4.9 Store Actual Parameters (STORE_PI)

With this call, the configured parameters stored on the EEPROM are overwritten with the current, permanently stored (actual) parameters; in other words, the current parameters of all AS-i slaves are stored.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	04_{16}							
2	T	–	circuit					

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Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	04_{16}							
2	T	result						

7.2.4.10 Write Parameter (WRITE_P)

The AS-i slave parameter value transferred with the command is passed on to the addressed AS-i slave.

The parameter is stored in the AS-i master only temporarily and is not stored as a configured parameter in the EEPROM!

The AS-i slave transfers its current parameter value in the response (parameter echo). This can deviate from the value that has just been written according to the AS-i master specification.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	02_{16}							
2	T	–	circuit					
3	–		B	slave address				
4	–				parameter			

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	02_{16}							
2	T	result						
3	–				slave response			

Meaning of bit B:

B = 0 Single AS-i slave or A-slave
B = 1 B-slave

7.2.4.11 Read Parameter (READ_PI: Read_Parameter)

This call returns the current parameter value (actual parameter) of an AS-i slave sent by the AS-i master. This value must not be confused with the parameter echo that is supplied by the AS-i slave as a response to the write_p job.

This command can not be used for a directly reading of an AS-i parameter out of an AS-i slave.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	03_{16}							
2	T	–	circuit					
3	–		B	slave address				

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Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	03_{16}							
2	T	result						
3	–				PI			

Meaning of bit B:

B = 0 Single AS-i slave or A-slave

B = 1 B-slave

7.2.4.12 Set_Permanent_Parameter (SET_PP)

With this call, a parameter value for the specified AS-i slave is configured. The value is stored permanently in the EEPROM of the gateway.

The configured parameter value is transferred only when the AS-i slave is activated after turning on the power supply on the AS-i master.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	43_{16}							
2	T	–	circuit					
3	–		B	slave address				
4	–				PP			

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	43_{16}							
2	T	result						

7.2.4.13 Get_Permanent_Parameter (GET_PP)

With this call, a slave-specific parameter value stored on the EEPROM of the AS-i master is read.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	01_{16}							
2	T	–	circuit					
3	–		B	slave address				

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	01_{16}							
2	T	result						
3	–				PP			

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Meaning of bit B:

B = 0 Single AS-i slave or A-slave

B = 1 B-slave

7.2.4.14 Set Auto Address Enable (SET_AAE)

This call can enable or disable the "automatic address programming" function.

The AUTO_ADDR_ENABLE bit is stored permanently; in other words, it is retained after a warm/hot restart on the AS-i master.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$0B_{16}$							
2	T	–	circuit					
3	Auto_Address_Enable							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$0B_{16}$							
2	T	result						

7.2.5 Other Commands

7.2.5.1 Overview of the Commands

Value for command				
command	value	meaning	Req Len	Res Len
IDLE	00_{16}	No request	2	2
READ_IDI	41_{16}	Read IDI	2	36
WRITE_ODI	42_{16}	Write_ODI	34	2
READ_ODI	56_{16}	Read ODI	2	34
SLAVE_ADDR	$0D_{16}$	Change_Slave_Address	4	2
WRITE_XID1	$3F_{16}$	Write_Extended_ID-Code_1	3	2
SET_OFFLINE	$0A_{16}$	Set_Off-Line_Mode	3	2
SET_DATA_EX	48_{16}	Set_Data_Exchange_Active	3	2
BUTTONS	75_{16}	Disable Pushbuttons	3	2
FP_PARAM	$7D_{16}$	„Functional Profile“ Param.	≥3	≥2
FP_DATA	$7E_{16}$	„Functional Profile“ Data	≥3	≥2
INVERTER	$7C_{16}$	Configure Inverter Slaves	12	4

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7.2.5.2 IDLE

When the value of "command" is zero, no request will be fulfilled.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	00_{16}							
2	T	–	circuit					

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	00_{16}							
2	T	result						

7.2.5.3 Read Input Data Image (READ_IDI)

With this call, the input data values of all AS-i slaves are read out of the AS-i master in addition to the cyclic data exchange. Though the command READ_IDI transmits all execution control flags (byte 3 and byte 4).

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	41_{16}							
2	T	–	circuit					

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	41_{16}							
2	T	result						
3	–							Pok
4	OR	APF	NA	CA	AAv	AAs	s0	Cok
5	–				slave 1A			
6	slave 2A				slave 3A			
…	…							
36	slave 30B				slave 31B			

Pok Periphery_Ok
S0 LDS.0
AAs Auto_Address_Assign
AAv Auto_Address_Available
CA Configuration_Active
NA Normal_Operation_Active
APF APF
OR Offline_Ready
Cok Config_Ok

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7.2.5.4 Write Output Data Image (WRITE_ODI)

With this call the output data values of all AS-i slaves are written in additon to the cyclic data exchange.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	42_{16}							
2	T	–	circuit					
3	–				slave 1A			
4	slave 2A				slave 3A			
…	…							
34	slave 30B				slave 31B			

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	42_{16}							
2	T	result						

7.2.5.5 Read Output Data Image (READ_ODI)

With this call, the output data values of all AS-i slaves is being read out of the AS-i master.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	56_{16}							
2	T	–	circuit					

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	56_{16}							
2	T	result						
3	–				slave 1A			
	slave 2A				slave 3A			
…	…							
34	slave 30B				slave 31B			

7.2.5.6 Change Slave Address (SLAVE_ADDR)

With this call, the AS-i address of an AS-i slave can be modified.

This call is mainly used to add a new AS-i slave with the default address "0" to the AS-Interface. In this case, the address is changed from "AS-i slave address old" = 0 to "AS-i slave address new".

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This change can only be made when the following conditions are fulfilled:

1. An AS-i slave with “AS-i slave address old” exists.
2. If the old AS-i slave address is not equal to 0, an AS-i slave with address "0" cannot be connected at the same time.
3. The "AS-i slave address new" must have a valid value.
4. An AS-i slave with "AS-i slave address new" must not exist.

Note

When the AS-i slave address is changed, the AS-i slave is not reset, in other words, the output data of the AS-i slave are retained until new data are received at the new address.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$0D_{16}$							
2	T	–	circuit					
3	–		B	source address				
4	–		B	target address				

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$0D_{16}$							
2	T	result						

Meaning of bit B:

B = 0 Single AS-i slave or A-slave
B = 1 B-slave

7.2.5.7 Write AS-i Slave Extended ID1 (WRITE_XID1)

With this call, the extended ID1 code of an AS-i slave with address "0" can be written directly via the AS-i cable. The call is intended for diagnostic purposes and is not required in the normal master mode.

The AS-i master passes the extended ID1 code on to the AS-i slave without any plausibility check.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$3F_{16}$							
2	T	–	circuit					
3	–				xID1			

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Response								
Byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$3F_{16}$							
2	T	result						

7.2.5.8 Set Offline Mode (SET_OFFLINE)

This call switches between online and offline mode.

The online mode is the normal operating state for the AS-i master. The following jobs are processed cyclically:

- During the data exchange phase, the fields of the output data are transferred to the slave outputs for all AS-i slaves in the LAS. The addressed AS-i slaves submit the values of the slave inputs to the master when the transfer was free of errors.
- This is followed by the inclusion phase in which existing AS-i slaves are searched and newly added AS-i slaves are entered in the LDS or LAS.
- In the management phase, jobs by the user such as writing parameters are executed.

In the offline mode, the processes jobs by the user only. (Jobs that involve the immediate addressing of an AS-i slave are rejected with an error). There is no cyclic data exchange with the AS-i slaves.

When offline, the AS-i circuit is in a safe state.

The OFFLINE = TRUE bit is not permanently stored; in other words, following a cold/warm restart, the AS-i master is once again in the online mode.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$0A_{16}$							
2	T	–	circuit					
3	Off-Line							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$0A_{16}$							
2	T	result						

The master changes to the offline phase, if there is a 1 written in byte 3.

The master will change to online mode if there is a 0 written in byte 3.

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7.2.5.9 Release Data Exchange (SET_DATA_EX)

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	48_{16}							
2	T	–	circuit					
3	Data_Exchange_Active							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	48_{16}							
2	T	result						

7.2.5.10 BUTTONS

With this call, the use of the buttons can be enabled/disabled.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	75_{16}							
2	T	–	circuit					
3	ButtonsDisabled							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	75_{16}							
2	T	result						

7.2.5.11 FP_PARAM

This command is used for parametrization of "functional profiles".

The content of the request and response bytes depends on the called function (see chapter 7.2.3).

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$7D_{16}$							
2	T	–	circuit					
3	function							
4	request byte 1							
…	…							
n	request byte n-3							

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Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$7D_{16}$							
2	T	result						
3	response byte 1							
…	…							
n	response byte n-2							

7.2.5.12 FP_DATA

This command is used for the data exchange with "functional profiles".

The content of the request and response bytes depends on the called function (see chapter 7.2.3).

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$7E_{16}$							
2	T	–	circuit					
3	function							
4	request byte 1							
…	…							
n	request byte n-3							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$7E_{16}$							
2	T	result						
3	reponse byte 1							
…	…							
n	response byte n-2							

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7.2.5.13 INVERTER

With this call, an AS-i slave for frequency inverters is switched from cyclical mode to the transmission mode of four 16 bit values, in order to operate again with the selected AS-i destination parameter.

Request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$7C_{16}$							
2	T	–	circuit					
3	slave address							
4	destination parameter							
5	value 1, high byte							
6	value 1, low byte							
7	value 2, high byte							
8	value 2, low byte							
9	value 3, high byte							
10	value 3, low byte							
11	value 4, high byte							
12	value 4, low byte							

Response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	$7C_{16}$							
2	T	result						

7.3 Command Interface Examples

You can find actual command interface examples in the download area of the homepage of Bihl+Wiedemann.

7.3.1 Reading analog Input Values

Command RD_7X_IN: Reading of analog input values.

Meaning of the bytes:

Request: RD_7X_IN	
Byte 1	50_{hex} (RD_7X_IN)
Byte 2	00_{hex} (master 1, single master)
Byte 3	$1D_{hex}$ (slave address 29)
Byte 4	00_{hex}
…	…
Byte	00_{hex}

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Response	
Byte 1	00_{hex} (or old values)
Byte 2	00_{hex} (or old values)
Byte 3	00_{hex} (or old values)
Byte 4	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

The call of the command interaface has not been answered with the valid values since the toggle bit has not been set.

Set of toggle bit:

Request	
Byte 1	50_{hex}
Byte 2	80_{hex} (toggle bit, result)
Byte 3	$1D_{hex}$ (slave address 29)
Byte 4	00_{hex}
…	…
Byte	00_{hex}

Result: See chapter 7.1.2 "Values for Results"

Response	
Byte 1	50_{hex}
Byte 2	80_{hex} (toggle bit, master1)
Byte 3	analog channel 1 high $byte_{hex}$
Byte 4	analog channel 1 low $byte_{hex}$
Byte 5	analog channel 2 high $byte_{hex}$
Byte 6	analog channel 2 low $byte_{hex}$
Byte 7	analog channel 3 high $byte_{hex}$
Byte 8	analog channel 3 low $byte_{hex}$
Byte 9	analog channel 4 high $byte_{hex}$
Byte 10	analog channel 4 low $byte_{hex}$
Byte 11	00_{hex} not used
Byte	00_{hex} not used

To get the input data again, the T-bit has to be reset again.

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7.3.2 Store current Configuration to the AS-i Master

1. Switch master to configuration mode
2. Write the current slave configuration to the master
3. Switch master to protected mode
4. Wait until master is in normal (protected) operation mode

Byte Management

1. Switch master to config mode

Request: SET_OP_MODE	
Byte 1	$0C_{hex}$ (SET_OP_MODE)
Byte 2	00_{hex} (T = 0, master 1, single master)
Byte 3	01_{hex} (= config mode)
Byte 4	00_{hex}
…	…
Byte	00_{hex}

Response	
Byte 1	00_{hex} (or old values)
Byte 2	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

No result because toggle bit = 0.

Set the Toggle Bit:

Request: SET_OP_MODE	
Byte 1	$0C_{hex}$ (SET_OP_MODE)
Byte 2	80_{hex} (T = 1, master 1, single master)
Byte 3	01_{hex} (= config mode)
Byte 4	00_{hex}
…	…
Byte	00_{hex}

Response	
Byte 1	$0C_{hex}$
Byte 2	80_{hex} (T = 1, result = 0)
Byte 3	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

Master is now in configuration mode.

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Result = 0 ⇒ No error, for other result codes see chapter 7.1.2 "Values for Results".

2. Write the actual slave configuration to the master

Request: STORE_CDI	
Byte 1	07_{hex} (STORE_CDI)
Byte 2	00_{hex} (T = 0, master 1, single master)
Byte 3	00_{hex}
…	…
Byte	00_{hex}

Response	
Byte 1	00_{hex} (or old values)
Byte 2	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

No result because toggle bit = 0.

Set the toggle bit:

Request: STORE_CDI	
Byte 1	07_{hex} (STORE_CDI)
Byte 2	80_{hex} (T = 0, master 1, single master)
Byte 3	00_{hex}
…	…
Byte	00_{hex}

Response	
Byte 1	00_{hex}
Byte 2	80_{hex} (T = 1, result = 0)
Byte 3	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

The current configuration data has been written.

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3. Set master to protected mode

Request: SET_OP_MODE	
Byte 1	$0C_{hex}$ (SET_OP_MODE)
Byte 2	00_{hex} (T = 0, master 1, single master)
Byte 3	00_{hex} (= protected mode)
Byte 4	00_{hex}
…	…
Byte	00_{hex}

Response	
Byte 1	00_{hex} (or old values)
Byte 2	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

No result because toggle bit = 0.

Set the toggle bit:

Request: SET_OP_MODE	
Byte 1	$0C_{hex}$ (SET_OP_MODE)
Byte 2	80_{hex} (T = 1, master 1, single master)
Byte 3	00_{hex} (= protected mode)
Byte 4	00_{hex}
…	…
Byte	00_{hex}

Response	
Byte 1	$0C_{hex}$
Byte 2	80_{hex} (T = 1, result = 0)
Byte 3	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

The master has now been ordered to switch to protected mode. It must being watited until the master is switching in this operation mode.

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4.Wait until master is in normal operation mode (and protected mode)

Reading out the flags until NA (Normal Operation Active) has been set.

Request: GET_FLAGS	
Byte 1	47_{hex} (GET_FLAGS)
Byte 2	00_{hex} (T = 0, master 1, single master)
Byte 3	00_{hex}
…	…
Byte	00_{hex}

Response	
Byte 1	00_{hex} (or old values)
Byte 2	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

No result because toggle bit = 0.

Setting the toggle bit:

Request: GET_FLAGS	
Byte 1	47_{hex} (GET_FLAGS)
Byte 2	00_{hex} (T = 0, master 1, single master)
Byte 3	00_{hex}
Byte 4	00_{hex}
…	…
Byte	00_{hex}

Response								
Byte 1	47_{hex}							
Byte 2	80_{hex} (T = 1, result = 0)							
Byte 3	-	-	-	-	-	-	-	POK
Byte 4	OR	APF	NA	CA	AAv	AAs	S0	COK
Byte 5						AAe	OL	DX
Byte 6	00_{hex}							
…								
Byte	00_{hex}							

The flag NA has to be set before the application is started. In case it is not set, the flags have to be read out until this flag has been set to 1.

The flag NA indicates that the master is in normal operation mode.

Normal operation mode is necessary to run the application safely.

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7.3.3 Store new Configuration for all Slaves

1. Switch master in configuration mode
2. Write slave configuration to master
3. Write new list of projected slaves (*LPS*)
4. Write permanent parameter (*PP*) to master
5. Switch master to protected mode
6. Wait until master is in normal operation Mode (and protected mode)

Byte Management

1. Set master in config mode

Request: SET_OP_MODE	
Byte 1	$0C_{hex}$ (SET_OP_MODE)
Byte 2	00_{hex} (T = 0, master 1, single master)
Byte 3	01_{hex} (= config mode)
Byte 4	00_{hex}
…	…
Byte	00_{hex}

Response	
Byte 1	00_{hex} (or old values)
Byte 2	00_{hex} (or old values)
Byte 3	00_{hex} (or old values)
Byte 4	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

No result because toggle bit = 0.

Set the toggle bit:

Request: SET_OP_MODE	
Byte 1	$0C_{hex}$ (SET_OP_MODE)
Byte 2	80_{hex} (T = 1, master 1, single master)
Byte 3	01_{hex} (= config mode)
Byte 4	00_{hex}
…	…
Byte	00_{hex}

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Response	
Byte 1	$0C_{hex}$
Byte 2	80_{hex} (T = 1, result = 0)
Byte 3	00_{hex} (or old values)
Byte 4	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

The master is now in configuration mode.

Result: See chapter 7.1.2 "Values for Results".

2. Write single configuration to master

Writing a configuration of an AS-i slave to the master.

For example:

Analog input 4 CH at address 4 (Slave datasheet)
ID: 3_{hex}
ID2: E_{hex}
IO: 7_{hex}
ID1: F_{hex}

Request: SET_PCD	
Byte 1	25_{hex} (SET_PCD)
Byte 2	00_{hex} (T = 0, master 1, single master)
Byte 3	04_{hex} (slave address to write to master)
Byte 4	EF_{hex} (ID + IO to configurate)
Byte 5	37_{hex} (xID2 + xID1 to configurate)
Byte 6	00_{hex}
…	…
Byte	00_{hex}

Response	
Byte 1	00_{hex} (or old values)
Byte 2	00_{hex} (or old values)
Byte 3	00_{hex} (or old values)
Byte 4	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

No result because toggle bit = 0.

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Set the toggle bit:

Request: SET_PCD	
Byte 1	$0C_{hex}$ (SET_PCD)
Byte 2	80_{hex} (T = 1, master 1, single master)
Byte 3	04_{hex} (slave address to write to master)
Byte 4	EF_{hex} (ID + IO to configurate)
Byte 5	37_{hex} (ID + IO to configurate)
Byte 6	00_{hex}
…	…
Byte	00_{hex}

Response	
Byte 1	25_{hex}
Byte 2	80_{hex} (T = 1, result = 0)
Byte 3	00_{hex} (or old values)
Byte 4	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

The single slave configuration for the analog module is written.

This command must be repeated for all 31 A-slaves and all 31 B-slaves. If you don't connect a slave to an address, write F_{hex} for ID, IO, ID1, ID2.

3. Write new list of projected slaves

Write the complete LPS of your AS-i circuit.

Every bit in the LPS corresponds to one slave after the following scheme:

Byte0/Bit 0: slave 0/0A - can not be set!
Byte1/Bit 1: slave 1/1A
...
Byte3/Bit 7: slave 31/31A
Byte4/Bit 0: slave 0B - can not be set!
Byte4/Bit 1: slave 1B
...

Byte7/Bit 7: slave 31B
The slave is projected if the bit is set.

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Example above: Analog module at address 4 ⇒ Set bit 4/byte 0:

Request: SET_LPS	
Byte 1	29_{hex} (SET_LPS)
Byte 2	00_{hex} (T = 0, master 1, single master)
Byte 3	00_{hex}
Byte 4	10_{hex} (LDS byte 0)
Byte 5	00_{hex} (LDS byte 1)
…	…
Byte 11	00_{hex} (LDS byte 7)
Byte	00_{hex}

Response	
Byte 1	00_{hex} (or old values)
Byte 2	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

No result because toggle bit = 0.

Setting the toggle bit:

Request: SET_LPS	
Byte 1	29_{hex}
Byte 2	80_{hex} (T = 1, master 1, single master)
Byte 3	00_{hex}
Byte 4	10_{hex} (LDS byte 0)
Byte 5	00_{hex} (LDS byte 1)
…	…
Byte 11	00_{hex} (LDS byte 7)
Byte	00_{hex}

Response	
Byte 1	29_{hex}
Byte 2	80_{hex} (T = 1, result = 0)
Byte 3	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

The new list of protected slaves (LPS) is written.

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4. Write permanent parameter (power on parameter) to master

Example as above:Analog module at address 4 with PP = 07_{hex}

Request: SET_PP	
Byte 1	43_{hex} (SET_PP)
Byte 2	00_{hex} (T = 0, master 1, single master)
Byte 3	04_{hex} (slave address to write to master)
Byte 4	07_{hex} (PP to write (use low nibble))
Byte 5	00_{hex} (LDS byte 1)
…	…
Byte	00_{hex}

Response	
Byte 1	00_{hex} (or old values)
Byte 2	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

No result because toggle bit = 0

Setting the toggle bit:

Request: SET_PP	
Byte 1	43_{hex} (SET_PP)
Byte 2	80_{hex} (T = 0, master 1, single master)
Byte 3	04_{hex} (slave address to write to master)
Byte 4	07_{hex} (PP to write (use low nibble)
Byte 5	00_{hex}
…	…
Byte	00_{hex}

Response	
Byte 1	43_{hex}
Byte 2	80_{hex} (T = 1, Result = 0)
Byte 3	00_{hex}
…	…
Byte	00_{hex}

The permanent parameter for the analog module is written.

This command must be repeated for all 31 A-slaves and all 31 B-slaves. If you don't connect a slave to an address, write the default value to the master (F_{hex}) as a permanent parameter.

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5. Switch Master to Protected Mode

Request: SET_OP_MODE	
Byte 1	$0C_{hex}$ (SET_OP_MODE)
Byte 2	00_{hex} (T = 0, master 1, single master)
Byte 3	00_{hex} (= protected mode)
Byte 4	00_{hex}
…	…
Byte	00_{hex}

Response	
Byte 1	00_{hex} (or old values)
Byte 2	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

No result because toggle bit = 0.

Setting the toggle bit:

Request: SET_OP_MODE	
Byte 1	$0C_{hex}$ (SET_OP_MODE)
Byte 2	80_{hex} (T = 1, master 1, single master)
Byte 3	00_{hex} (= protected mode)
Byte 4	00_{hex}
…	…
Byte	00_{hex}

Response	
Byte 1	$0C_{hex}$
Byte 2	80_{hex} (T = 1, result = 0)
Byte 3	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

The master has now been ordered to switch to protected mode.

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6. Wait until master is in normal (protected) operation mode

Read out the flags, until the NA (Normal Operation Active) has been set.

Request: GET_FLAGS	
Byte 1	47_{hex} (GET_FLAGS)
Byte 2	00_{hex} (T = 0, master 1, single master)
Byte 3	00_{hex}
…	…
Byte	00_{hex}

Response	
Byte 1	00_{hex} (or old values)
Byte 2	00_{hex} (or old values)
…	…
Byte	00_{hex} (or old values)

No result because toggle bit = 0.

Setting the toggle bit:

Request: GET_FLAGS	
Byte 1	47_{hex} (GET_FLAGS)
Byte 2	00_{hex} (T = 0, master 1, single master)
Byte 3	00_{hex}
Byte 4	00_{hex}
…	…
Byte	00_{hex}

Response								
Byte 1	47_{hex}							
Byte 2	80_{hex} (T = 1, result = 0)							
Byte 3	-	-	-	-	-	-	-	POK
Byte 4	OR	APF	NA	CA	AAv	AAs	S0	COK
Byte 5						AAe	OL	DX
Byte 6	00_{hex}							
…								
Byte	00_{hex}							

The flag NA has to be set before the application is started. In case it is not set, the flags have to be read out until this flag has been set to 1.

The flag NA indicates that the master is in normal operation mode.

Normal operation mode is necessary to run the application safely.

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The flag NA indicates that the master is in the normal operating mode which is necessary for the application to run safely.

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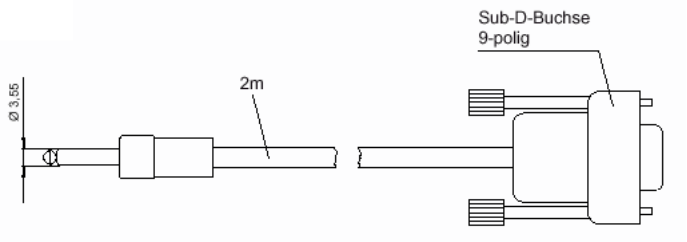
8 Commissioning Tools and Accessories

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

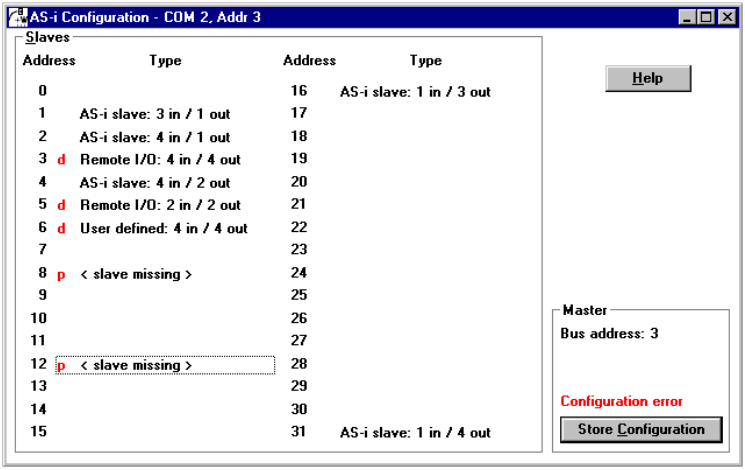
The software package communicates with the AS-i master via a serial cable (art. no. BW1417).



8.2 Windows Software AS-i Control Tools

The Windows software AS-i Control Tools enables you to configure the AS-i circuit in a very comfortable manner.

1. Start the AS-i Control Tools.
2. Call the command Master | New.
3. Choose Rockwell as protocol.
4. Do the appropriate settings.
5. 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.



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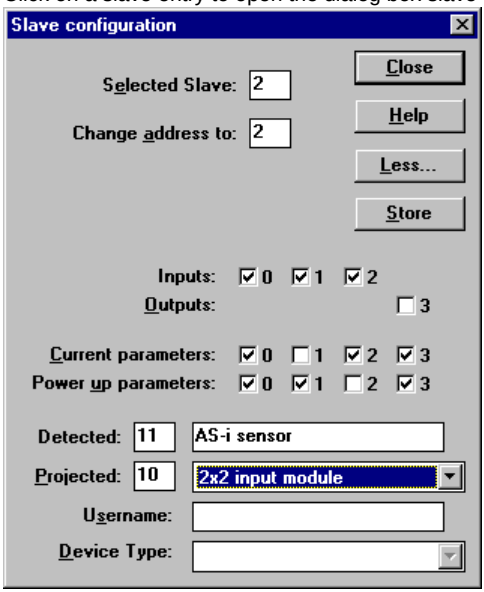
6. Click on a slave entry to open the dialog box slave configuration.



Changing a slave address, setting AS-i parameters or AS-i configuration data is possible here. Additionally, inputs and outputs can be tested.

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 chapter 6.3.2).

During manual address programming, the slave address display has a different meaning (see chapter 6.4 and 6.5).

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.
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 or if the key switch is set to run turn it to program.
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.
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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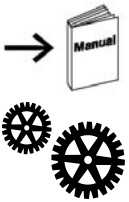
10 Appendix: Installation/Commissioning Instructions

AS-i-Master/Scanner Art.-No. BWU1488



Dokumentation AS-i-Master/Scanner (**deutsch**):
Art.-Nr. **BW1556**

http://www.bihl-wiedemann.de/deutsch/download.htm

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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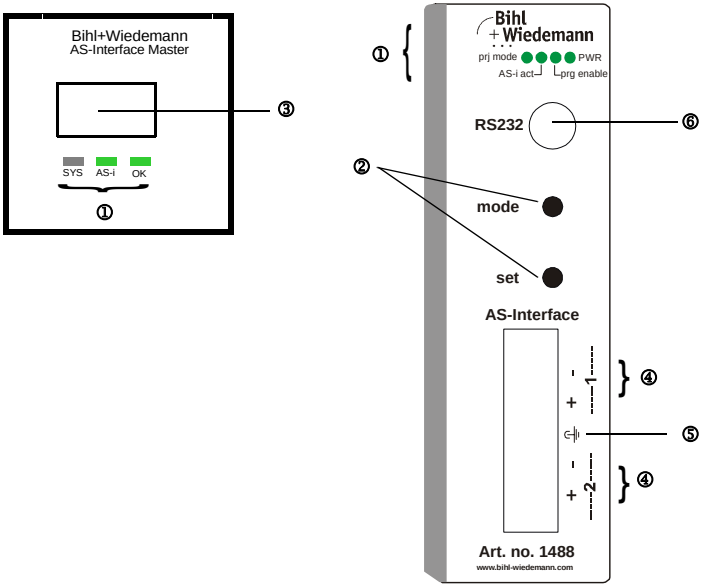
Front view and connections



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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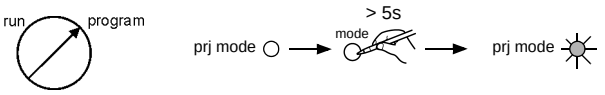
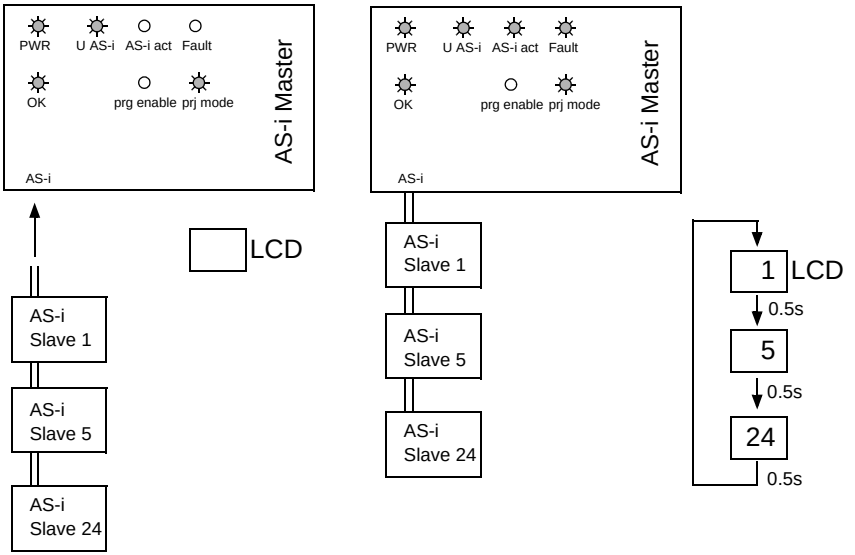
1. Startup

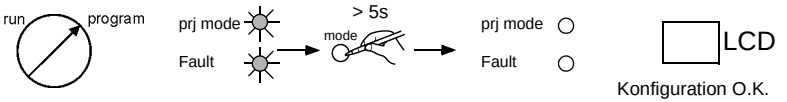
1.1 Switch to configuration mode



1.2 Connect AS-i Slaves



1.3 Store AS-i Configuration



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

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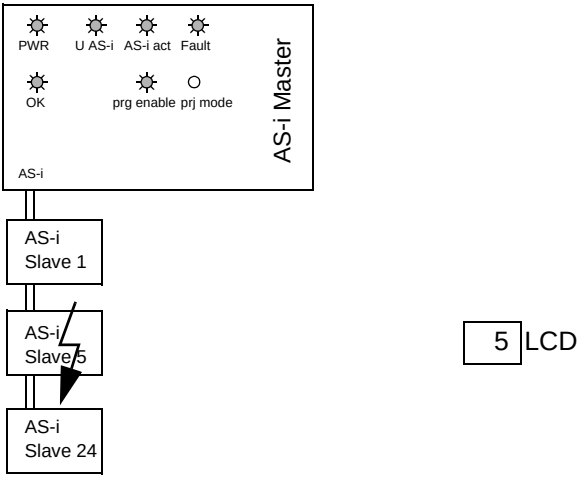
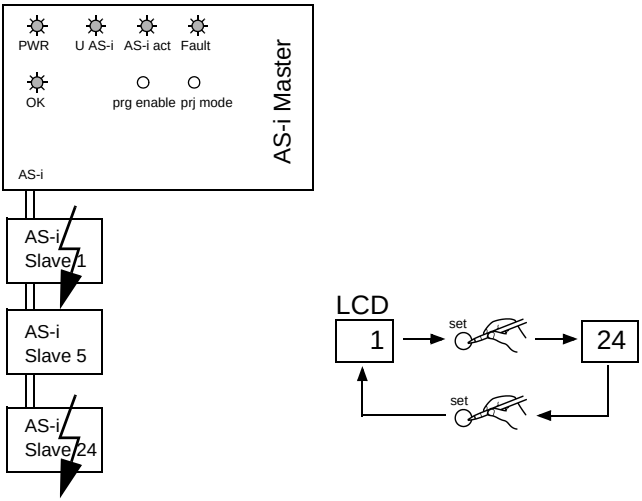
2. Error tracking

2.1 Incorrect slaves (one error)



2.2 Incorrect Slaves (multiple errors)



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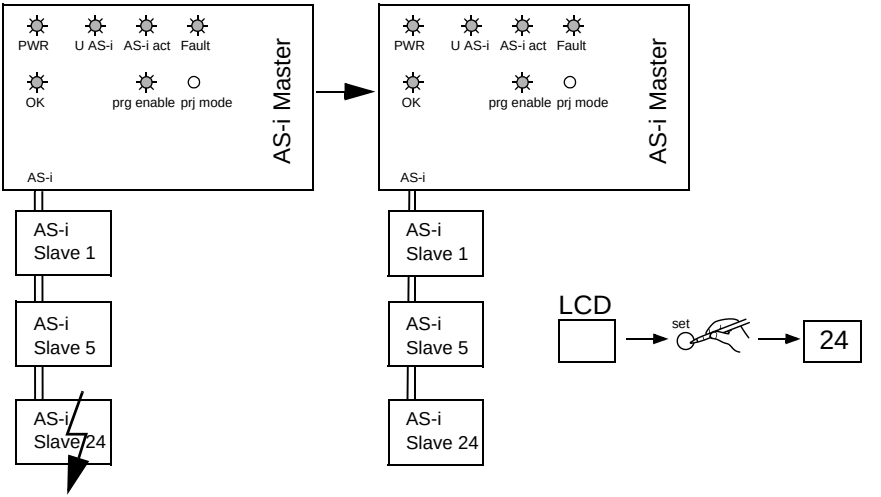
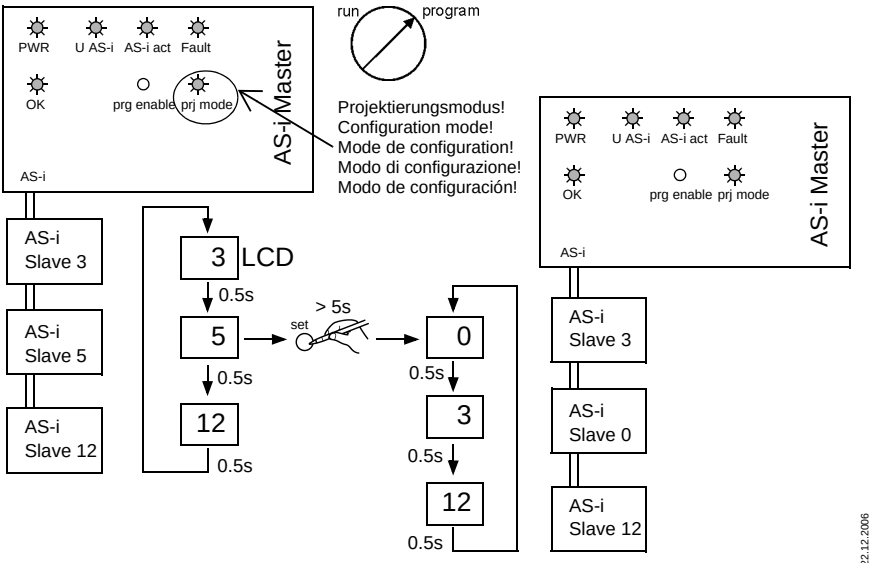
2.3 Error Display (last error)



3. Addressing

3.1 Delete Slave Address 5



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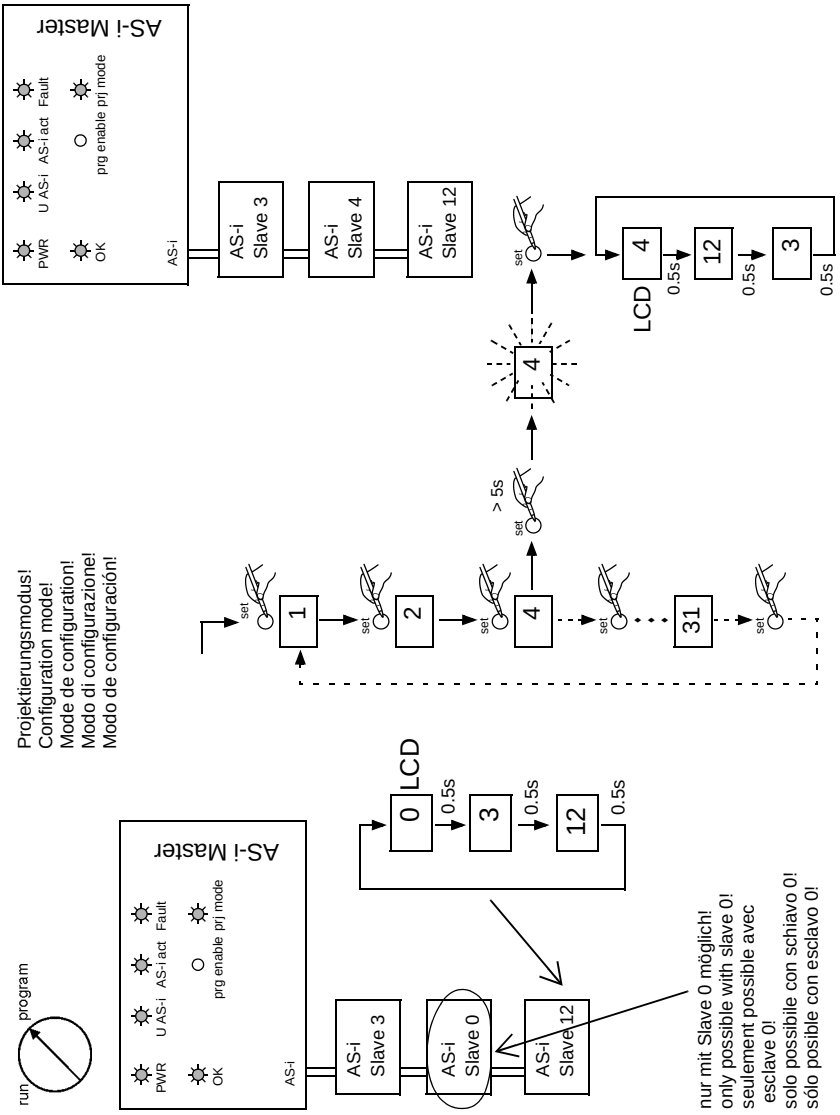
3.2 Program Slave 0 to Address 4



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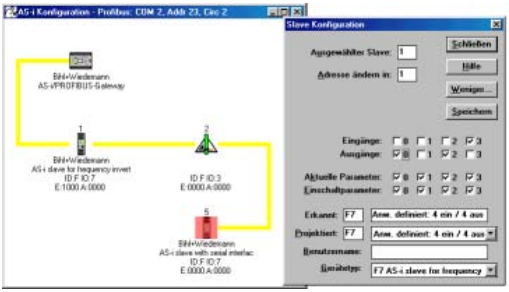
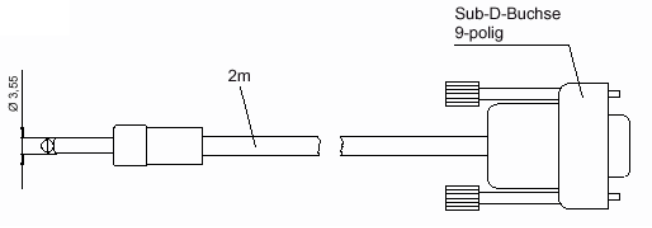
4. Accessories

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





4.2 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
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4.3 AS-i Power Supply 4A art. no BW1649

http://www.bihl-wiedemann.de/deutsch/catalog/1649.htm

4.4 AS-i circuit extension

AS-i Tuner BWU1648
http://www.bihl-wiedemann.de/englisch/catalog/16441648.htm

AS-i Bus Termination BWU1644
http://www.bihl-wiedemann.de/englisch/catalog/16441648.htm

AS-i Repeater IP20 BWU1460
http://www.bihl-wiedemann.de/englisch/catalog/1460.htm

AS-i Repeater IP65 BWU1273
http://www.bihl-wiedemann.de/englisch/catalog/1273.htm

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

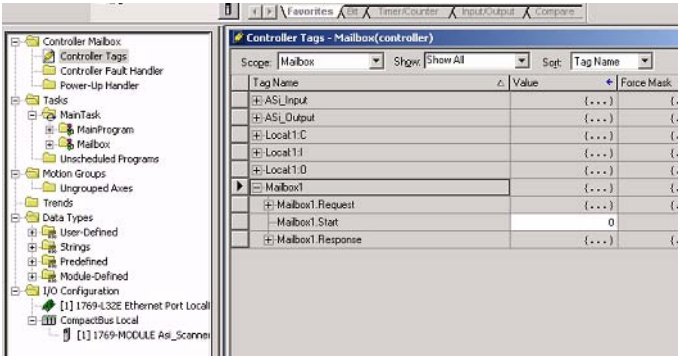
This chapter shows examplarily the putting into operation of the AS-Interface Master/Scanner BWU1488 for Allen Bradley ControlLogix with the software RSLogix 5000 version 11.11.00 and the 1769-L20 1756-L55 ControlLogix5555 Controller.

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

1.2 Start the software RSLogix 5000.

1.3 Open the file Module.acd. This sample file contains a program that shows how to use the 2 mailboxes.

1.4 Look at the description of the controller tags, where you find the tags mailbox1/2. Here you can edit Mailbox commands. How is written in the Mbx0Main routine of the program mailbox.



1.5 You find some other examples:

1.5.1 A02_RD_WR.ACD, A03_Get_LAS.ACD, A04_READ_IDI.ACD, A05_GET_DELTA.ACD, A06_GET_TECA.ACD, A07_SET_LOS.ACD, A08_GET_LOS.ACD, A09_GET_LCS.ACD, A10_GET_LPF.ACD.

The task MainProgram of these examples, show you, how to use some commands of the mailbox with help of the task Mbx0Main.

1.5.2 DataExchange.ACD.
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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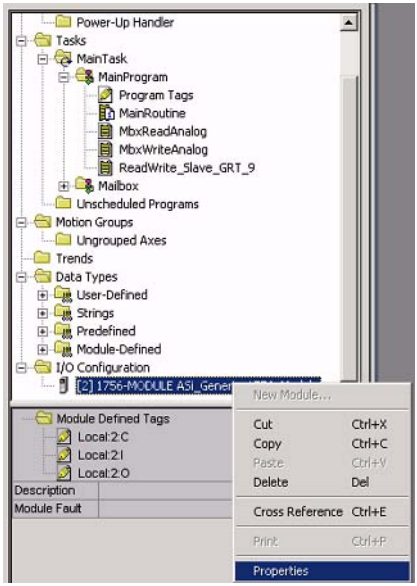
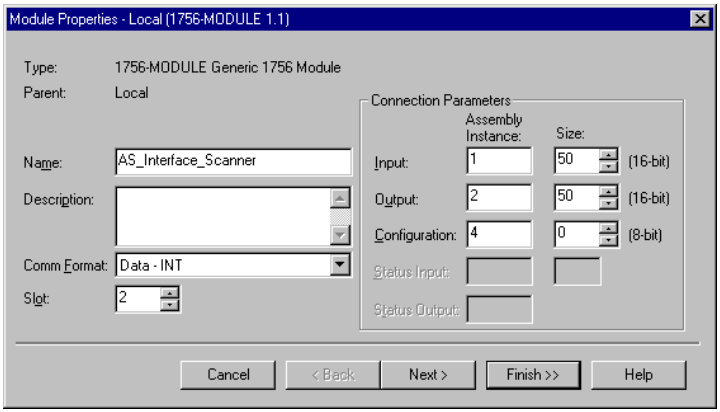
2. If your AS-Interface Scanner is not mounted in slot 2, you can change this setting.
   Click with the right mouse-button in the Controller Organizer window on [2] 1756 MODULE ASi_Generic_1756_Module and choose Properties.



Properties window for scanner revisions prior to 1.3



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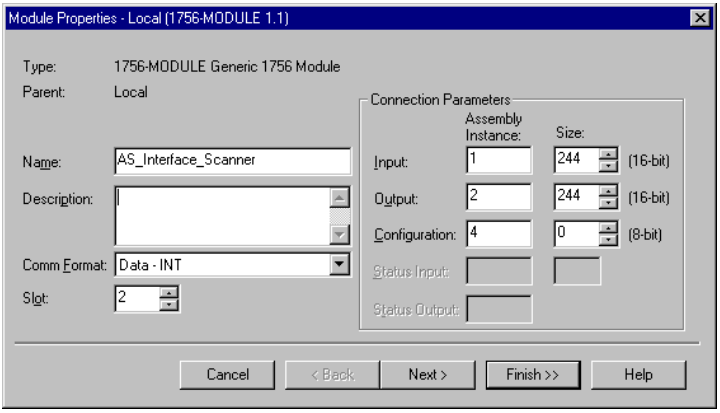
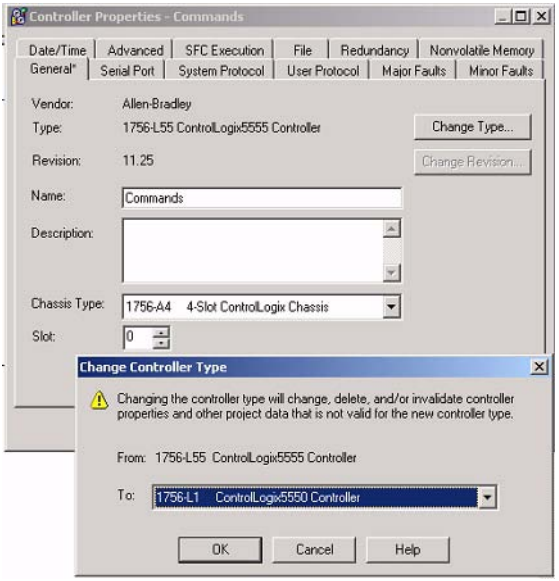
Properties window for scanner revisions higher as 1.3:



3. if you use another controller type than the 1756-L55 ControlLogix5555 Controller, you can change the controller type. Execute the command Edit | Controller Properties then press Change Type.



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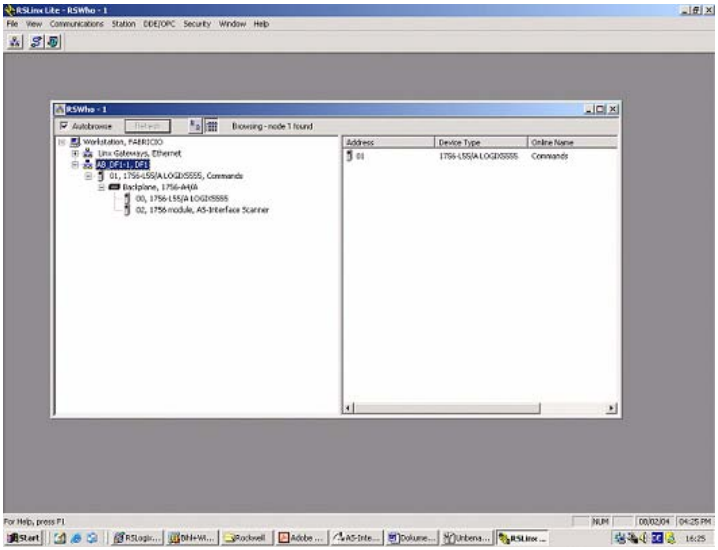
4. Adjust the communication settings by using the program RSLinx:



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