ifm electronic

Supplementary device manual

AS-i controller$_e$ with Profibus DPV1

ecomat300

AC1355, AC1356

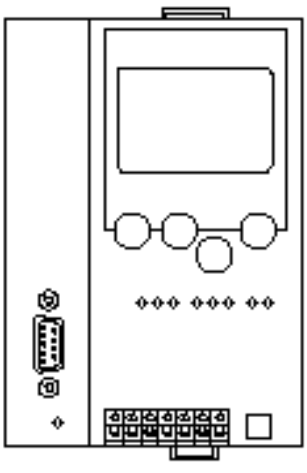
AC1365, AC1366

AS-i master profile: M4

Firmware: from version RTS 3.0 onwards

Target: from V.15 onwards

for CoDeSys® from version 2.3 onwards



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Contents

1 On this manual

In this chapter you will find an overview of the following points:

- What do the symbols and formats stand for?
- What devices are described in this manual?
- How is this manual structured?

1.1 What do the symbols and formats stand for?

The following symbols or pictograms depict different kinds of remarks in this manual:

⚠ DANGER

Death or serious irreversible injuries are *to be expected*.

⚠ WARNING

Death or serious irreversible injuries *may* result.

⚠ CAUTION

Slight reversible *injuries may* result.

NOTICE

Property damage is to be expected or possible.

NOTE

The "i" in the square gives *important* information to help you handle the product or this manual correctly.

► …	Request for action
> …	Reaction of device or software
→ ...	stands for "see"
abc	Cross-reference (Link)
[…]	[Designation] of key, signalling lamp, button, menu item .... For several menu items to be selected consecutively we write: [1st step] > [2nd step] > [3rd step]
ABC	DESIGNATION of parameters (inputs, outputs, flags, function blocks)
`Abc`	`Designation` of files and directories are written in `monospace` font
●	LED lit
○	LED off
✶	LED flashes

1.2 What devices are described in this manual?

This manual describes the AS-i device family controllere of **ifm electronic gmbh**.

- with AS-i master profile M4
- with AS-i version 3.0 masters
- with a firmware from version RTS 2.2 onwards
- with the target from V.15 onwards.

In the "programming manual CoDeSys® 2.3" more information about the use of the programming system "CoDeSys for Automation Alliance" is given. This manual can be downloaded free of charge from **ifm**'s website at:
→ www.ifm.com> Select country/language > [Service] > [Download] > [Bus system AS-interface]

Description of the Ethernet programming interface
→ Separate supplement to this device manual.

1.3 How is this manual structured?

This manual is a combination of different instruction types. It is for beginners and also a reference for advanced users.

How to use this manual:

- To find a certain subject straight away, please use the **table of contents** at the beginning of this manual.
- Using the **table of keywords** at the end of the manual you can quickly find the term you are looking for.
- At the beginning of a chapter we will give you a brief overview of its contents.
- You can find the title of the current chapter in bold in the **header** of each page. Below is the current title of the second order.
- You can find the chapter-related number of the page in the **footer** of each page.

Abbreviations and technical terms
→ Chapter Terms, abbreviations at the end of the manual.

We reserve the right to make alterations which can result in a change of contents of the manual. You can find the current version on **ifm's** website at:
→ www.ifm.com > Select country/language > [Service] > [Download] > [Bus system AS-interface]

Nobody is perfect. Send us your suggestions for improvements to this manual and you will receive a little gift from us to thank you.

1.4 Overview: where is what?

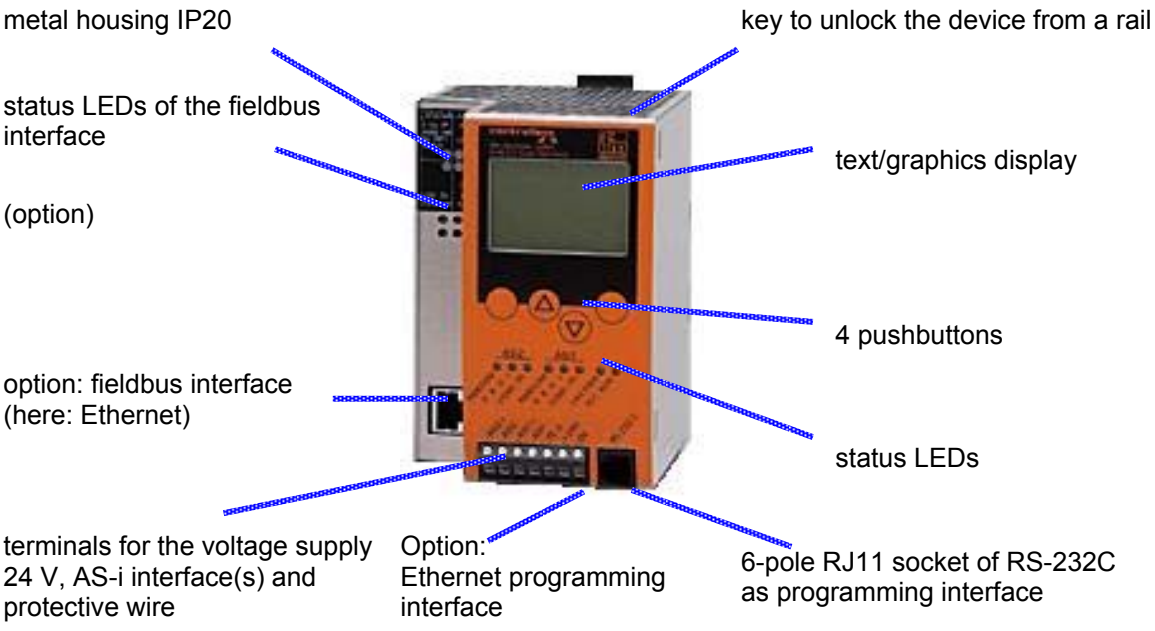


Figure: overview controller$_e$

2 Safety instructions

In this chapter you will find general safety instructions such as:

- General rules
- Required previous knowledge
- Safety instructions for mounting and installation
- When are you allowed to use this device and when not?

2.1 General

→ separate basic instructions of the device manual

No characteristics are warranted with the information, notes and examples provided in this manual. The drawings, representations and examples imply no responsibility for the system and no application-specific particularities.

The manufacturer of the machine/equipment is responsible for ensuring the safety of the machine/equipment.

⚠ WARNING

Property damage or bodily injury possible when the notes in this manual are not adhered to!
ifm electronic assumes no liability for this.

► The acting person must have read and understood the safety instructions and the corresponding chapters of this manual before performing any work on or with this device.

► The acting person must be authorised to work on the machine/equipment.

2.2 What previous knowledge is required?

This manual is for persons with knowledge of control technology and PLC programming with IEC 61131-3 as well as the CoDeSys® software.

Knowledge of the fieldbus Profibus DPV1 is a prerequisite.
Profibus user organisation → http://www.profibus.com/
Connection and parameter settings of the Profibus host → its manuals.

The manual is intended for persons authorised to install, connect and set up the controllere according to the EMC and low voltage directives. The controllers must be installed and put into operation by a qualified electrician.

In case of malfunctions or uncertainties please contact the manufacturer.

2.3 Functions and features

→ basic instructions of the device manual

3 System requirements

3.1 Information concerning the device

→ separate basic instructions of the device manual

3.2 Information concerning the software

→ separate basic instructions of the device manual

3.3 Required accessories

Basic functions → separate basic instructions of the device manual

For configuration and programming you also need:

- the software "CoDeSys for Automation Alliance ™" version 2.3 or higher (→ CD)
- in case of direct connection of the controller$_e$ to a PC with Ethernet interface (LAN):
  a *cross-over* CAT5 Ethernet patch cable with RJ45 plug on both sides:
  2 m art. no. EC2080
  5 m art. no. E30112
- In case of connection of the controller$_e$ to a PC with Ethernet interface (LAN) via a hub or switch:
  a common CAT5 Ethernet patch cable with RJ45 plug on both sides
- In case of direct connection of the controller$_e$ to a PC with serial interface:
  Programming cable art. no. E70320

4 Getting started

4.1 Connection

- ► Connect the functional earth
- ► Connect the yellow AS-i cable for every master
- ► Connect the 24 V supply
- ► Connect the Profibus cable to the fieldbus master

4.2 Set up the AS-i master

- ► Connect the addressed AS-i slaves to the yellow AS-i cable
- ► Apply voltage
- ► If correctly addressed slaves are connected:
  controllere menu [Config All] (→ basic manual)
- ► If no slave is connected:
  controllere menu [Easy Startup](→ basic manual)

4.3 Set up Profibus DPV1

- ► Controllere menu "Fieldbus Setup": set the Profibus address
  (→ page 7-1, chapter ‘Set the parameters of the fieldbus interface in the controllere’)
- ► Copy the GSD file from the **ifm** CD (folder "gateway") to the suitable directory of the corresponding fieldbus configuration program
- ► Define the I/O areas and the system behaviour in the fieldbus configuration program
- ► Save the configuration
- ► Transfer the configuration to the DPV1 master
- ► Start the DPV1 master

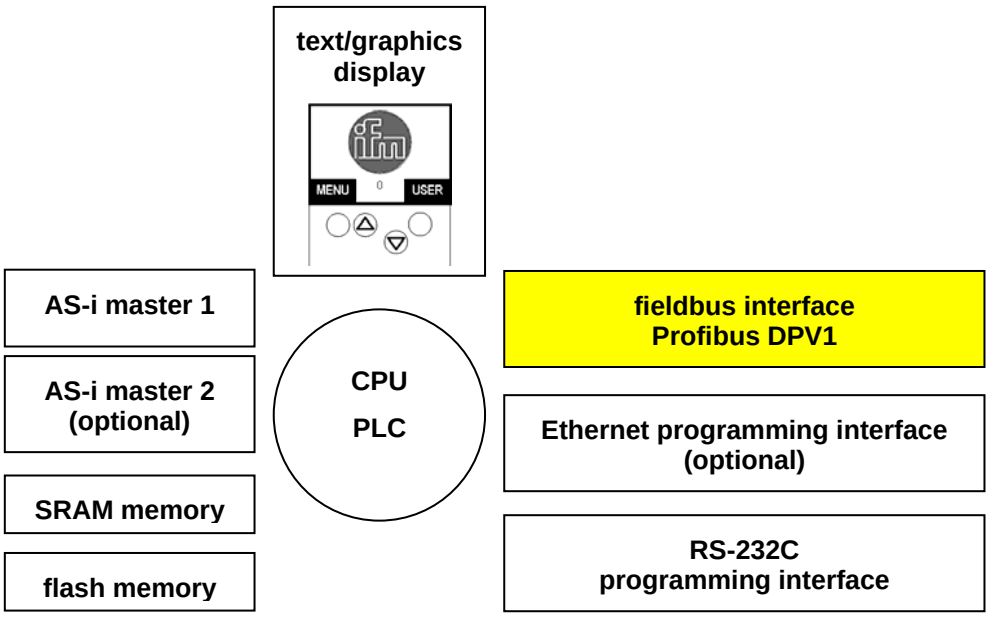
5 Function

Basic functions → separate basic instructions of the device manual

Ethernet programming interface → separate complementary device manual

5.1 Data management

The controllere consists of different units:



This manual exclusively describes the following subject:

- The optional **fieldbus interface** Profibus DP operates independently and exchanges data with the central system via a "Dual port RAM" interface .

For the AS-i controllers with Profibus interface the data management of Profibus DP is handled in the operating system (firmware) of the device. A special driver in the PLC user program in the controllere is not required. In the mode Run/Stop the digital and analogue output data is not transferred to the outputs of the AS-i slaves. Therefore this data must be recopied in the PLC user program of the controllere.

More information concerning the addresses and assignment to the Profibus modules → chapter 7, Set-up.

5.2 Status LED for the fieldbus

For Profibus DP there is only one red LED [Bus Failure].

LED		Description
●	lights	When response monitoring (watchdog) active: no Profibus connection
○	off	When response monitoring (watchdog) active: Profibus connection ok OR: master switched off OR: response monitoring (watchdog) deactivated
✶	flashes 2 Hz	device error → message text in text/graphics display

5.3 Which operating modes are there for the PLC in the controllere?

Operating mode	Description	Behaviour via DPV1 / fieldbus
Run	PLC program start > The PLC program stored in the controllere is processed. > LED [PLC RUN] lit	Via DPV1, data can be written to AS-i slaves in the controllere application program: Mapping of the PLC address ranges %IB4.512…%IB4.639 %IW4.320…%IW4.639
Stop	PLC program stop > The PLC program stored in the controllere is stopped. > LED [PLC RUN] flashes	
Gateway	Controllere as gateway > LED [PLC RUN] goes out	Fieldbus has exclusive write access for the AS-i outputs. DPV1 has no access here! The timeouts for the analogue and digital AS-i outputs only work in the operating mode gateway. There is no timeout monitoring for the other data areas written via DPV1.

NOTE

During changes to the PLC program or to the slaves the PLC program should be stopped to avoid malfunctions.

NOTE

In devices with Profibus and Ethernet programming interface, DPV1 is not considered as fieldbus but as interface for operation and configuration.

6 Menu

NOTE

In this manual the menu texts are all in English.
Basic functions → separate basic instructions of the device manual

6.1 Main menu [Quick Setup]

Quick setting of the AS-i and fieldbus parameters, reading of the parameter data (password level 1 required). Details → page 12-6, chapter Read fieldbus parameters

Menu tree	Explanation
Quick Setup Fieldbus Setup	> Display of the current fieldbus address ► Change of the fieldbus address using the buttons [▲] or [▼] ► After pressing [OK]: > Controllere is set to the baud rate set in the Profibus DP master. ► Always after pressing [OK]: > Display of the data stored in the fieldbus master via the data packets for communication with the AS-i controllere: • Digital inputs in the fieldbus master of single or A slaves on AS-i master 1 • Digital outputs in the fieldbus master to single or A slaves on AS-i 1 • Digital inputs in the fieldbus master of single or A slaves on AS-i master 2 • Digital outputs in the fieldbus master to single or A slaves on AS-i 2 • Digital inputs in the fieldbus master of B slaves on AS-i master 1 • Digital outputs in the fieldbus master to B slaves on AS-i 1 • Digital inputs in the fieldbus master of B slaves on AS-i master 2 • Digital inputs in the fieldbus master of B slaves on AS-i master 2 • Analogue multiplex inputs in the fieldbus master • Analogue multiplex outputs in the fieldbus master • Fieldbus data command channel • Fieldbus data PLC inputs in the fieldbus master • Fieldbus data PLC outputs in the fieldbus master • Analogue inputs in the fieldbus master of AS-i master 1 • Analogue outputs in the fieldbus master on AS-i master 1 • Analogue inputs in the fieldbus master of AS-i master 2

Menu tree	Explanation
	• Analogue outputs in the fieldbus master on AS-i master 2 • Fieldbus data diagnosis • Fieldbus master command channel • Digital inputs in the fieldbus master of single or A slaves on AS-i master 1 (cycle starts again) ► Cancel with [ESC]

6.2 Main menu [Fieldbus Setup]

Setting of fieldbus parameters, reading of parameter data (password level 1 required).
Details → page 12-6, chapter Read fieldbus parameters

Menu tree	Explanation
Fieldbus Setup	> Display of the current fieldbus address ► Change of the fieldbus address using the keys [▲] / [▼] ► After pressing [OK]: > Controllere is set to the baud rate set in the Profibus DP master. ► Always after pressing [OK]: > Display of the data stored in the fieldbus master via the data packets for communication with the AS-i controllere: • Digital inputs in the fieldbus master of single or A slaves on AS-i master 1 • Digital outputs in the fieldbus master on single or A slaves on AS-i master 1 • Digital inputs in the fieldbus master of single or A slaves on AS-i master 2 • Digital outputs in the fieldbus master on single or A slaves on AS-i master 2 • Digital inputs in the fieldbus master of B slaves on AS-i master 1 • Digital outputs in the fieldbus master on B slaves on AS-i master 1 • Digital inputs in the fieldbus master of B slaves on AS-i master 2 • Digital outputs in the fieldbus master on B slaves on AS-i master 2 • Analogue multiplex inputs in the fieldbus master • Analogue multiplex outputs in the fieldbus master • Fieldbus data command channel • Fieldbus data PLC inputs in the fieldbus master • Fieldbus data PLC outputs in the fieldbus master • Analogue inputs in the fieldbus master of AS-i master 1

Menu tree	Explanation
	• Analogue outputs in the fieldbus master on AS-i master 1 • Analogue inputs in the fieldbus master on AS-i master 2 • Analogue outputs in the fieldbus master on AS-i master 2 • Fieldbus data diagnosis • Fieldbus master command channel • Digital inputs in the fieldbus master of single or A slaves on AS-i master 1 (cycle starts again) ► Cancel with [ESC]

7 Set-up

This chapter shows you how to get the Profibus interface started quickly.

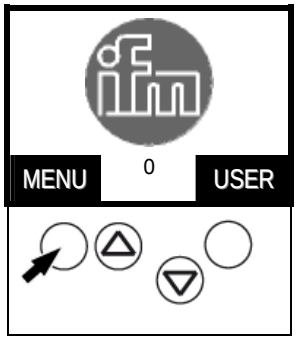
7.1 Parameter setting of the controllere

7.1.1 Parameter setting of slaves in the controllere

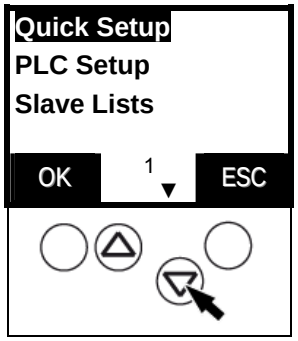
Set the parameters of the slaves in the AS-i controllere as described in the basic device manual.

7.1.2 Set the parameters of the fieldbus interface in the controllere

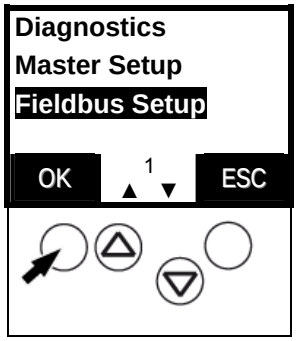
[Menu] > [Fieldbus Setup] > Choose address > [OK]

1. 

► Press [MENU]

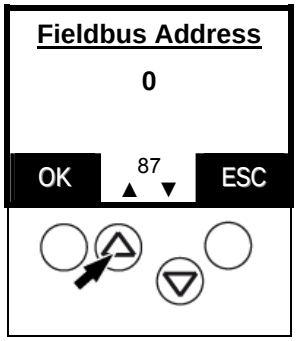
2. 

► Scroll to [Fieldbus Setup] with [▼]

3. 

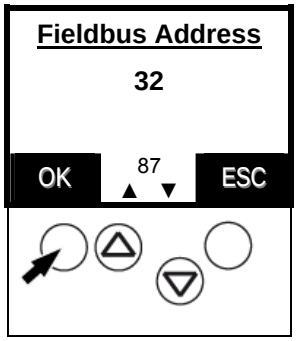
► Select [Fieldbus Setup] with [**OK**].

4.



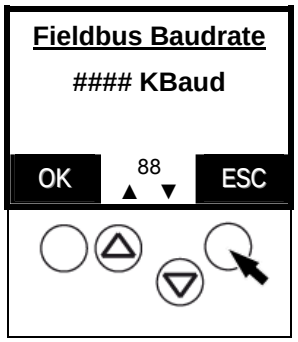
► Scroll to the requested address with [▲] / [▼].

5.



► Save the fieldbus address with [OK].

6.



> If there is communication with the fieldbus master:
display of negotiated baud rate

► Acknowledge with [OK].

> If there is no communication with the fieldbus master:
display value not defined

► Cancel with [ESC].

7.2 Connect the controllere to the Profibus host

► Connect the Profibus cable to the controllere.

7.3 Parameter setting of the Profibus host

NOTE

Refer to the description of the Profibus interface on the host
(host = fieldbus master = in most cases higher-level PLC)

GSD file

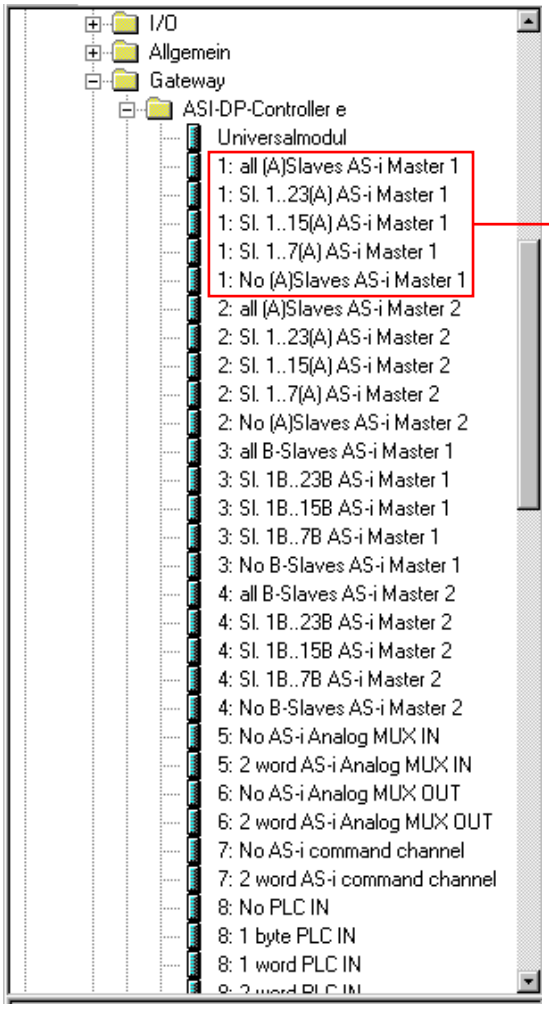
(GSD = **G**eneral **S**tation **D**escription) The GSD file `ifm604D8.gsd` on the **ifm** CD contains different possible definitions (indications of lengths) for each of the 12 modules, adapted to the controllere. → Hardware catalogue of the Profibus configuration software in the gateway folder.

► Copy this file to the suitable directory of the corresponding fieldbus configuration program (→ its description).

Programming software

The data of the controllere or the connected AS-i systems to be transferred can be defined (by indicating the length of up to 12 modules) in the programming software for the Profibus DP master system (host).

You can select from these definitions for parameter setting in the host:



Example for module 1:

There is a choice of 5 entries:

- all single and A slaves on AS-i master 1 (length = 16 bytes)
- single and A slaves with the addresses 1(A)...23(A) on AS-i master 1 (length = 12 bytes)
- single and A slaves with the addresses 1(A)...15(A) on AS-i master 1 (length = 8 bytes)
- single and A slaves with the addresses 1(A)...7(A) on AS-i master 1 (length = 4 bytes)
- no single or A slaves on AS-i master 1 (length = 0 bytes)

If the parameters for a smaller number of slaves than indicated in the selection point are to be set, you have created free reserve in the host.

Example:

5 single and/or A slaves are connected to the AS-i master 1.

You have selected on the host:
"single and A slaves with the addresses 1(A)...7(A) on AS-i master 1"

You have then created an address area reserve of 1 byte in the host which is not used for the time being. The first 3 bytes of the reserved address area are used to exchange data.

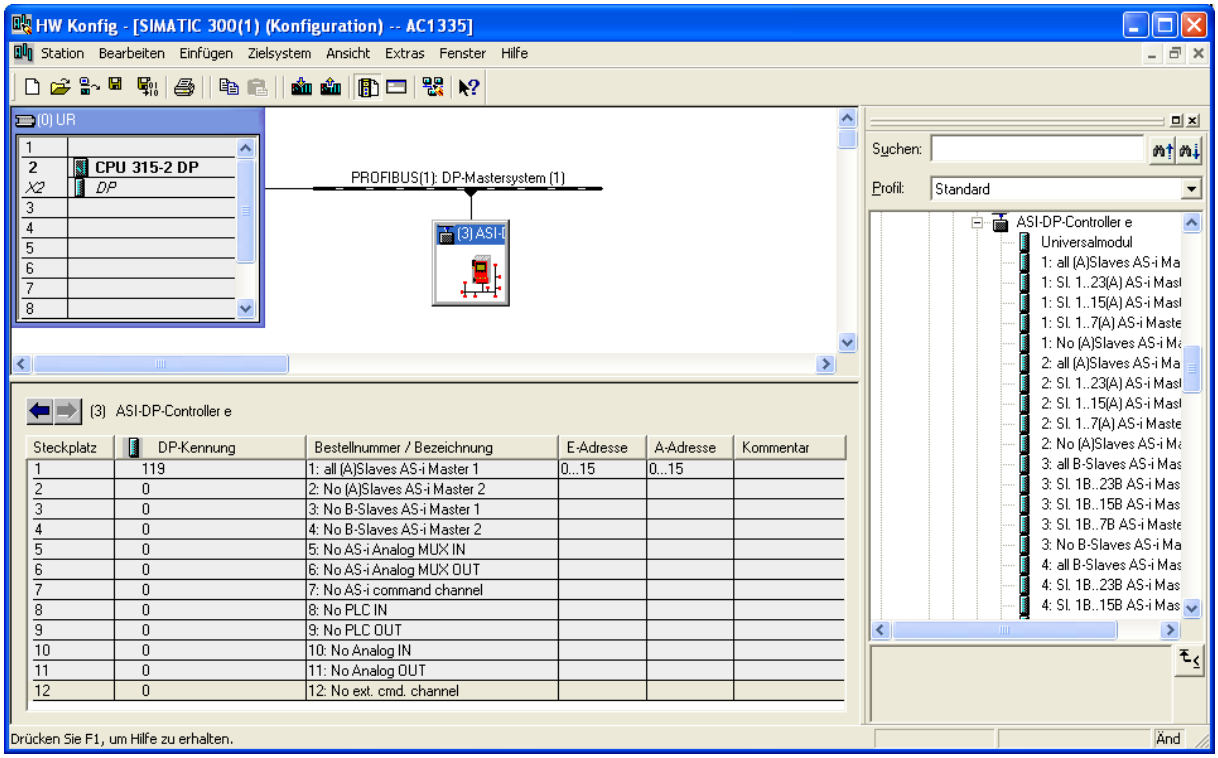
7.3.1 Assigning the addresses of the inputs/outputs to the host "locations"

For Profibus DP, virtual locations in the host are assigned to the inputs/outputs addressed via AS-i.

> **NOTE**
>
> Addressing of CTT2 and CTT3 slaves → separate basic instructions of the device manual and there → chapter "Use of analogue channels in the controllere depending on the slave profile" and → chapter "Data distribution of slaves to the M4 controllere"

Digital inputs / outputs

1st example:
Siemens S7 with AS-i controllere as gateway. The digital inputs/outputs on the AS-i controllere are assigned to the host as bytes 0...15.

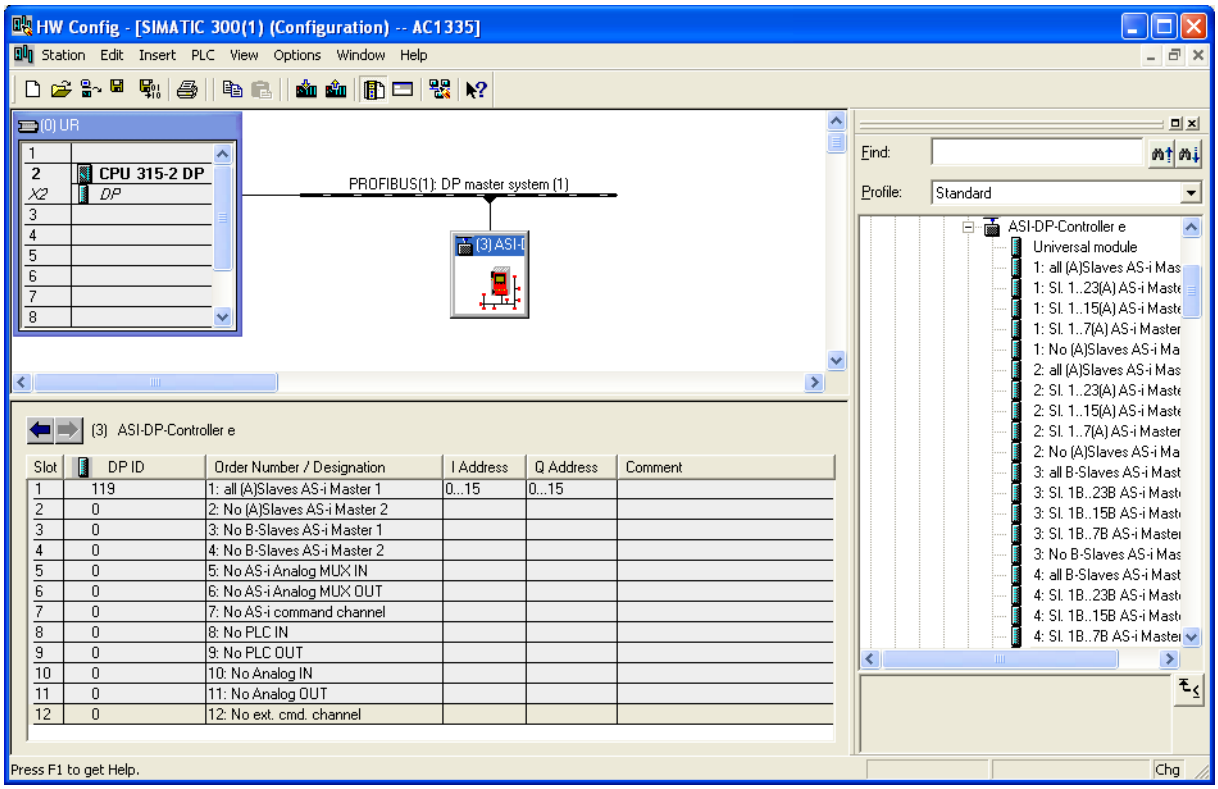


In this constellation, how are the IEC addresses distributed to the inputs and outputs of the slaves? → next page

Digital inputs and outputs of the slaves at start address 0

Start address	Bits 7...4				Bits 3...0			
0	**(Slave 0) reserved for master flags**				**Slave 1**			
	Reserved	Conf. Err.	No Slave	PF.Err	D3	D2	D1	D0
	0 .7	0 .6	0 .5	0 .4	0 .3	0 .2	0 .1	0 .0
1	**Slave 2**				**Slave 3**			
	D3	D2	D1	D0	D3	D2	D1	D0
	1 .7	1 .6	1 .5	1 .4	1 .3	1 .2	1 .1	1 .0
2	**Slave 4**				**Slave 5**			
	D3	D2	D1	D0	D3	D2	D1	D0
	2 .7	2 .6	2 .5	2 .4	2 .3	2 .2	2 .1	2 .0
3	**Slave 6**				**Slave 7**			
	D3	D2	D1	D0	D3	D2	D1	D0
	3 .7	3 .6	3 .5	3 .4	3 .3	3 .2	3 .1	3 .0
4	**Slave 8**				**Slave 9**			
	D3	D2	D1	D0	D3	D2	D1	D0
	4 .7	4 .6	4 .5	4 .4	4 .3	4 .2	4 .1	4 .0
5	**Slave 10**				**Slave 11**			
	D3	D2	D1	D0	D3	D2	D1	D0
	5 .7	5 .6	5 .5	5 .4	5 .3	5 .2	5 .1	5 .0
6	**Slave 12**				**Slave 13**			
	D3	D2	D1	D0	D3	D2	D1	D0
	6 .7	6 .6	6 .5	6 .4	6 .3	6 .2	6 .1	6 .0
7	**Slave 14**				**Slave 15**			
	D3	D2	D1	D0	D3	D2	D1	D0
	7 .7	7 .6	7 .5	7 .4	7 .3	7 .2	7 .1	7 .0
8	**Slave 16**				**Slave 17**			
	D3	D2	D1	D0	D3	D2	D1	D0
	8 .7	8 .6	8 .5	8 .4	8 .3	8 .2	8 .1	8 .0
9	**Slave 18**				**Slave 19**			
	D3	D2	D1	D0	D3	D2	D1	D0
	9 .7	9 .6	9 .5	9 .4	9 .3	9 .2	9 .1	9 .0
10	**Slave 20**				**Slave 21**			
	D3	D2	D1	D0	D3	D2	D1	D0
	10 .7	10 .6	10 .5	10 .4	10 .3	10 .2	10 .1	10 .0
11	**Slave 22**				**Slave 23**			
	D3	D2	D1	D0	D3	D2	D1	D0
	11 .7	11 .6	11 .5	11 .4	11 .3	11 .2	11 .1	11 .0
12	**Slave 24**				**Slave 25**			
	D3	D2	D1	D0	D3	D2	D1	D0
	12 .7	12 .6	12 .5	12 .4	12 .3	12 .2	12 .1	12 .0
13	**Slave 26**				**Slave 27**			
	D3	D2	D1	D0	D3	D2	D1	D0
	13 .7	13 .6	13 .5	13 .4	13 .3	13 .2	13 .1	13 .0
14	**Slave 28**				**Slave 29**			
	D3	D2	D1	D0	D3	D2	D1	D0
	14 .7	14 .6	14 .5	14 .4	14 .3	14 .2	14 .1	14 .0
15	**Slave 30**				**Slave 31**			
	D3	D2	D1	D0	D3	D2	D1	D0
	15 .7	15 .6	15 .5	15 .4	15 .3	15 .2	15 .1	15 .0

2nd example:
Siemens S7 with AS-i controllere as gateway. The digital inputs/outputs on the AS-i controllere are assigned to the host as bytes 65...80.



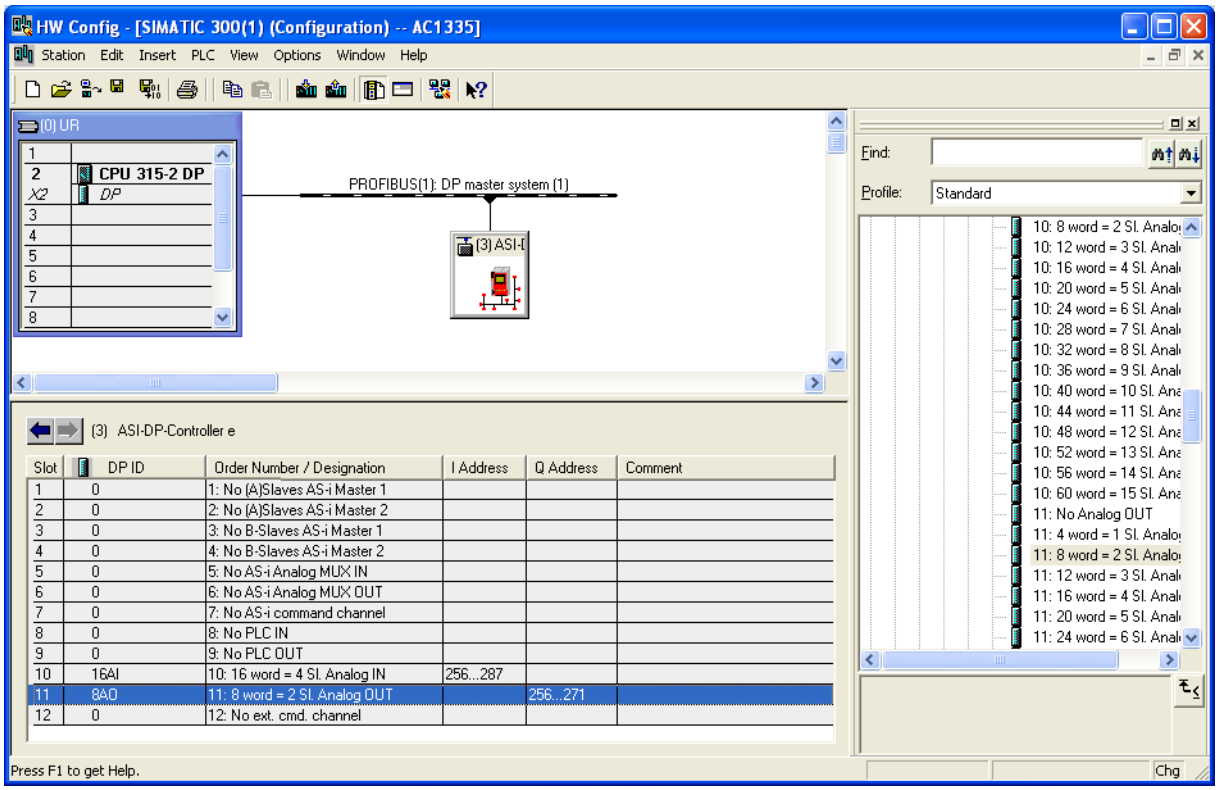
In this constellation, how are the IEC addresses distributed to the inputs and outputs of the slaves? → next page

Digital inputs and outputs of the slaves at start address 65

Start address	Bits 7...4				Bits 3...0			
65	**(Slave 0) reserved for master flags**				**Slave 1**			
	Reserve	Conf. Err.	NoSlave	PF.Err	D3	D2	D1	D0
	65 .7	65 .6	65 .5	65 .4	65 .3	65 .2	65 .1	65 .0
66	**Slave 2**				**Slave 3**			
	D3	D2	D1	D0	D3	D2	D1	D0
	66 .7	66 .6	66 .5	66 .4	66 .3	66 .2	66 .1	66 .0
67	**Slave 4**				**Slave 5**			
	D3	D2	D1	D0	D3	D2	D1	D0
	67 .7	67 .6	67 .5	67 .4	67 .3	67 .2	67 .1	67 .0
68	**Slave 6**				**Slave 7**			
	D3	D2	D1	D0	D3	D2	D1	D0
	68 .7	68 .6	68 .5	68 .4	68 .3	68 .2	68 .1	68 .0
69	**Slave 8**				**Slave 9**			
	D3	D2	D1	D0	D3	D2	D1	D0
	69 .7	69 .6	69 .5	69 .4	69 .3	69 .2	69 .1	69 .0
70	**Slave 10**				**Slave 11**			
	D3	D2	D1	D0	D3	D2	D1	D0
	70 .7	70 .6	70 .5	70 .4	70 .3	70 .2	70 .1	70 .0
71	**Slave 12**				**Slave 13**			
	D3	D2	D1	D0	D3	D2	D1	D0
	71 .7	71 .6	71 .5	71 .4	71 .3	71 .2	71 .1	71 .0
72	**Slave 14**				**Slave 15**			
	D3	D2	D1	D0	D3	D2	D1	D0
	72 .7	72 .6	72 .5	72 .4	72 .3	72 .2	72 .1	72 .0
73	**Slave 16**				**Slave 17**			
	D3	D2	D1	D0	D3	D2	D1	D0
	73 .7	73 .6	73 .5	73 .4	73 .3	73 .2	73 .1	73 .0
74	**Slave 18**				**Slave 19**			
	D3	D2	D1	D0	D3	D2	D1	D0
	74 .7	74 .6	74 .5	74 .4	74 .3	74 .2	74 .1	74 .0
75	**Slave 20**				**Slave 21**			
	D3	D2	D1	D0	D3	D2	D1	D0
	75 .7	75 .6	75 .5	75 .4	75 .3	75 .2	75 .1	75 .0
76	**Slave 22**				**Slave 23**			
	D3	D2	D1	D0	D3	D2	D1	D0
	76 .7	76 .6	76 .5	76 .4	76 .3	76 .2	76 .1	76 .0
77	**Slave 24**				**Slave 25**			
	D3	D2	D1	D0	D3	D2	D1	D0
	77 .7	77 .6	77 .5	77 .4	77 .3	77 .2	77 .1	77 .0
78	**Slave 26**				**Slave 27**			
	D3	D2	D1	D0	D3	D2	D1	D0
	78 .7	78 .6	78 .5	78 .4	78 .3	78 .2	78 .1	78 .0
79	**Slave 28**				**Slave 29**			
	D3	D2	D1	D0	D3	D2	D1	D0
	79 .7	79 .6	79 .5	79 .4	79 .3	79 .2	79 .1	79 .0
80	**Slave 30**				**Slave 31**			
	D3	D2	D1	D0	D3	D2	D1	D0
	80 .7	80 .6	80 .5	80 .4	80 .3	80 .2	80 .1	80 .0

Analogue inputs/outputs

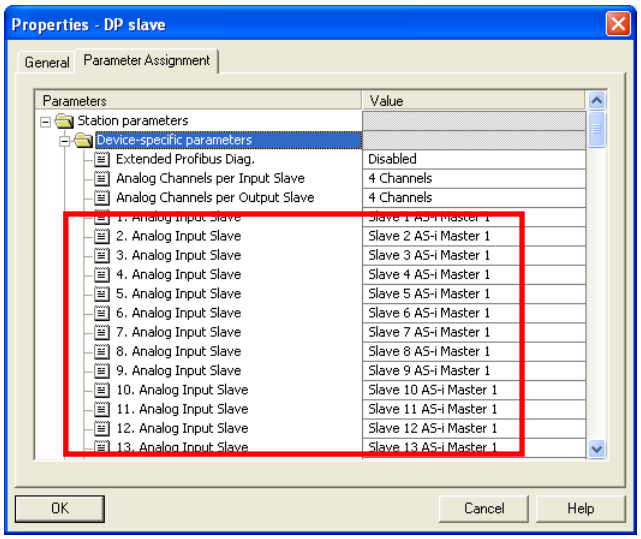
1st example:
Siemens S7 with AS-i controllere as gateway.
The analogue inputs on the AS-i controllere are assigned to the host as bytes 256...287 (32 bytes = 16 words). The analogue outputs on the AS-i controllere are assigned to the host as bytes 256...271 (16 bytes = 8 words).



The order of the shown analogue slaves can be explicitly defined via parameters in the Profibus configuration.

► To adapt the parameters, double-click on the controllere symbol.

► Change to the tab [Parameter Assignment] in the window which appears.
See figure:



In this constellation, how are the IEC addresses distributed to the inputs and outputs of the slaves? The following tables show the correlation between start address and AS-i slave address (preset parameters):

Analogue inputs

Start address [bytes]	Slave address*	Channel number
256	1	1
258		2
260		3
262		4
264	2	1
266		2
268		3
270		4
272	3	1
274		2
276		3
278		4
280	4	1
282		2
284		3
286		4

* The slave address can be freely assigned via the Profibus parameter data!

Analogue outputs

Start address [bytes]	Slave address	Channel number
256	1	1
258		2
260		3
262		4
264	2	1
266		2
268		3
270		4

* The slave address can be freely assigned via the Profibus parameter data!

Analogue inputs and outputs of the slaves at start address ###

SORRY - in work - SORRY

7.3.2 Assign PLC addresses to the Profibus modules

What are "Profibus modules"? These are entries in a parameter setting database of the programming software for the Profibus DP master system (host). There you assign the individual "modules" to the virtual "locations".

Locations are address areas for certain functions.

Modules are placeholders for certain address quantities within these areas.

The following IEC addresses are the designations for the PLC addresses in the controller:

IEC address area		Description	Data flow AS-i host	DP module
from	to			
%IB1.1	%IB1.31	master 1, slaves 1A...31A, digital inputs	→	1 input
%IB2.1	%IB2.31	master 2, slaves 1A...31A, digital inputs	→	2 inputs
%IB11.1	%IB11.31	master 1, slaves 1B...31B, digital inputs	→	3 input
%IB12.1	%IB12.31	master 2, slaves 1B...31B, digital inputs	→	4 input
%IW21.1.x	%IW21.31.x	master 1, slaves 1...31, analogue inputs x = channel*)	→	5 and 10
%IW22.1.x	%IW22.31.x	master 2, slaves 1...31, analogue inputs x = channel *)	→	5 and 10
%IW0.0	%IW0.63	DP outputs for signal preprocessing	←	9
%IB0.128	%IB0.143	DP outputs for master1, slaves 1A...31A, digital outputs	←	1 output
%IB0.144	%IB0.159	DP outputs for master1, slaves 1B...31B, digital outputs	←	3 output
%IB0.160	%IB0.175	DP outputs for master2, slaves 1A...31A, digital outputs	←	2 output
%IB0.176	%IB0.191	DP outputs for master 2, slaves 1B...31B, digital outputs	←	4 output
%IW0.96	%IW0.219	DP outputs for master 1, slaves 1...31, analogue outputs	←	11
%IW0.224	%IW0.347	DP outputs for master 2, slaves 1...31, analogue outputs	←	11
%IB0.704	%IB0.719	DP parameters for master 1, slaves 1A...31A, parameter data	←	DP parameters
%IB0.720	%IB0.735	DP parameters for master 1, slaves 1B...31B, parameter data	←	DP parameters
%IB0.736	%IB0.751	DP parameters for master 2, slaves 1A...31A, parameter data	←	DP parameters
%IB0.752	%IB0.767	DP parameters for master 2, slaves 1B...31B, parameter data	←	DP parameters
%QB1.1	%QB1.31	master 1, slaves 1A...31A, digital outputs	→	–
%QB2.1	%QB2.31	master 2, slaves 1A...31A, digital outputs	→	–

IEC address area		Description	Data flow AS-i host	DP module
from	to			
%QB11.1	%QB11.31	master 1, slaves 1B...31B, digital outputs	→	–
%QIB12.1	%QB12.31	master 2, slaves 1B...31B, digital outputs	→	–
%QW21.1.x	%QW21.31.x	master 1, slaves 1...31, analogue outputs x = channel *)	→	–
%QW22.1.x	%QW22.31.x	master 2, slaves 1...31, analogue outputs x = channel *)	→	–
%QW0.0	%QW0.63	signal preprocessing outputs for DP data	→	8

*) Channel numbers:
x = 0 → analogue channel 1
x = 1 → analogue channel 2
x = 2 → analogue channel 3
x = 3 → analogue channel 4

The following device behaviour is defined:

a) 1 channel per I/O slave

Word no.	AS-i master no.	Slave no.	Channel
1	1	1	1
2		2	
3		3	
…		…	
30		30	
31	2	1	
32		2	
33		3	
…		…	
60		30	

b) 2 channels per I/O slave

Word no.	AS-i master no.	Slave no.	Channel
1	1	1	1
2			2
3		2	1
4			2
…			…
59		30	1
60			2

NOTE

All outputs will be reset when changing to the PLC operating mode "Stop"!
analogue outputs = 0,
digital outputs = FALSE

7.3.3 Define Profibus DP modules

The text of the different options of the modules always starts with the module number (→ photo page 7-3, section Programming software). So all options in the module list of the hardware catalogue starting with "1:" are options of the first module in the device definition.

The first module for example defines the number of binary I/O data bytes of single or A slaves of AS-i master 1 in the controller which are to be transferred to the Profibus master via Profibus DP.

NOTE

The maximum data length of all 12 modules must not exceed 152 input bytes and 152 output bytes.

Example: Siemens S7

(3) ASI-DP-Controller e

Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	119	1: all (A)Slaves AS-i Master 1	256...271	256...271	
2	0	2: No (A)Slaves AS-i Master 2			
3	113	3: Sl. 1B..7B AS-i Master 1	272...275	272...275	
4	0	4: No B-Slaves AS-i Master 2			
5	2AX	5: 2 word AS-i Analog MUX IN	276...279	276...279	
6	2AX	6: 2 word AS-i Analog MUX OUT	280...283	280...283	
7	179	7: 4 byte AS-i command channel	284...287	284...287	
8	2AI	8: 2 word PLC IN	288...291		
9	4AO	9: 4 word PLC OUT		288...295	
10	8AI	10: 8 word = 2 Sl. Analog IN	292...307		
11	12AO	11: 12 word = 3 Sl. Analog OUT		296...319	
12	Ext. Command channel				

For the advanced Profibus DP user it is also possible to use length codes other than those indicated as long as the maximum lengths of the modules are not exceeded.

Module 1: Binary inputs/outputs of single / A slaves of AS-i master 1

Contents Binary inputs and outputs of single or A slaves of AS-i master 1

Length 0...16 bytes I/O (if not used: length = 0)

Byte no.	Bits 4...7	Bits 0...3
1	flags master 1	slave1(A)
2	slave2(A)	slave3(A)
3	slave4(A)	slave5(A)
4	slave6(A)	slave7(A)
5	slave8(A)	slave9(A)
6	slave10(A)	slave11(A)
7	slave12(A)	slave13(A)
8	slave14(A)	slave14(A)
9	slave16(A)	slave15(A)
10	slave18(A)	slave19(A)
11	slave20(A)	slave21(A)
12	slave22(A)	slave23(A)
13	slave24(A)	slave25(A)
14	slave26(A)	slave27(A)
15	slave28(A)	slave29(A)
16	slave30(A)	slave31(A)

The flags in the first input byte contain status information of the AS-i master 1:

Bit 7	Bit 6	Bit 5	Bit 4
PLC running in the controllere	Configuration error in the AS-i circuit	AS-i master offline	Periphery fault

The flags in the first output byte contain control information of the AS-i master 1:

Bit 7	Bit 6	Bit 5	Bit 4
Reserved	Reserved	Reset of the stored diagnostic data	Activate transfer of the stored diagnostic data

If bit 4 of the control information is TRUE, the controllere transmits the stored periphery faults and configuration errors in the device-specific diagnosis. The flags remain TRUE even if the fault is no longer present. Bit 5 in the control information resets this information.

Module 2: Binary inputs/outputs of single / A slaves of AS-i master 2

Contents Binary inputs and outputs of single or A slaves of AS-i master 2

Length 0...16 bytes I/O (if not used: length = 0)

Byte no.	Bits 4...7	Bits 0...3
1	flags master 2	slave1(A)
2	slave2(A)	slave3(A)
3	slave4(A)	slave5(A)
4	slave6(A)	slave7(A)
5	slave8(A)	slave9(A)
6	slave10(A)	slave11(A)
7	slave12(A)	slave13(A)
8	slave14(A)	slave14(A)
9	slave16(A)	slave15(A)
10	slave18(A)	slave19(A)
11	slave20(A)	slave21(A)
12	slave22(A)	slave23(A)
13	slave24(A)	slave25(A)
14	slave26(A)	slave27(A)
15	slave28(A)	slave29(A)
16	slave30(A)	slave31(A)

The flags in the first input byte contain status information of AS-i master 2:

Bit 7	Bit 6	Bit 5	Bit 4
PLC running in the controllere	Configuration error in the AS-i circuit	No AS-i slave detected	Periphery fault

The flags in the first output byte contain control information of the AS-i master 2:

Bit 7	Bit 6	Bit 5	Bit 4
Reserved	Reserved	Reset of the stored diagnostic data	Activate transfer of the stored diagnostic data

If bit 4 of the control information is TRUE, the controllere transmits the stored periphery faults and configuration errors in the device-specific diagnosis. The flags remain TRUE even if the fault or error is no longer present. Bit 5 in the control information resets this information.

Module 3: Binary inputs/outputs of B slaves of AS-i master 1

Contents Binary inputs and outputs of B slaves of the AS-i master 1

Length 0...16 bytes I/O (if not used: length = 0)

Byte no.	Bits 4...7	Bits 0...3
1	reserved	slave1B
2	slave2B	slave3B
3	slave4B	slave5B
4	slave6B	slave7B
5	slave8B	slave9B
6	slave10B	slave11B
7	slave12B	slave13B
8	slave14B	slave14B
9	slave16B	slave15B
10	slave18B	slave19B
11	slave20B	slave21B
12	slave22B	slave23B
13	slave24B	slave25B
14	slave26B	slave27B
15	slave28B	slave29B
16	slave30B	slave31B

Module 4: Binary inputs/outputs of B slaves of AS-i master 2

Contents Binary inputs and outputs of B slaves of AS-i master 2

Length 0...16 bytes I/O (if not used: length = 0)

Byte no.	Bits 4…7	Bits 0…3
1	reserved	slave1B
2	slave2B	slave3B
3	slave4B	slave5B
4	slave6B	slave7B
5	slave8B	slave9B
6	slave10B	slave11B
7	slave12B	slave13B
8	slave14B	slave14B
9	slave16B	slave15B
10	slave18B	slave19B
11	slave20B	slave21B
12	slave22B	slave23B
13	slave24B	slave25B
14	slave26B	slave27B
15	slave28B	slave29B
16	slave30B	slave31B

Module 5: Analogue inputs of AS-i master

Contents Multiplexed analogue inputs of AS-i master 1 and 2

Length 2-word consistent I/O (if not used: length = 0)

DP master request (only 1 word)

Bit:	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word																
1st	MM		X	SSSSS					0	0	0	0	0	0	CC	

Legend

MM	2 bits	Master no.	1...2
X	1 bit	Slave type	0 = single or A slave 1 = B slave
SSSSS	5 bits	Slave no.	1…31_{dec}
CC	2 bits	Channel no.	0...3_{dec}

Calculation of the more significant byte (MMXSSSSS):

(slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Controllere response (2 words, first word copy of the request):

Bit:	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word																
1st	MM		X	SSSSS					E4	E3	E2	E1	0	0	CC	
2nd	Analogue value, INTEGER															

Legend

MM	2 bits	Master no.	1...2
X	1 bit	Slave type	0 = single or A slave 1 = B slave
SSSSS	5 bits	Slave no.	1…31_{dec}
E1	1 bits	Error no. of the response	0 = ok 1 = value invalid (of slave)
E2	1 bits	Error no. of the response	0 = ok 1 = overflow
E3	1 bits	Error no. of the response	0 = ok 1 = no analogue slave found
E4	1 bits	Error no. of the response	0 = ok 1 = protocol fault
CC	2 bits	Channel no.	0...3_{dec}

Module 6: Analogue outputs of AS-i master

Contents Multiplexed analogue outputs of AS-i master 1 and 2

Length 2-word consistent I/O (if not used: length = 0)

NOTE

If analogue outputs are also triggered in module 11, the value written in module 6 is overwritten with the data of module 11.

DP master request (2 words)

Bit:	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word																
1st	MM		X	SSSSS					0	0	0	V	0	0	CC	
2nd	Analogue value, INTEGER															

Legend

MM	2 bits	Master no.	1...2
X	1 bits	Slave type	0 = single or A slave 1 = B slave
SSSSS	5 bits	Slave no.	$1…31_{dec}$
V	1 bits	Switch off the channel	1 = TRUE → switch off the channel, master transmits "invalid"
CC	2 bits	Channel no.	0…3

Calculation of the more significant byte (MMXSSSSS):

(slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Controller response (2 words, copy of the request):

Bit:	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word																
1st	MM		X	SSSSS					E4	E3	E2	E1	0	0	CC	
2nd	Analogue value, INTEGER															

Legend

MM	2 bits	Master no.	1...2
X	1 bits	Slave type	0 = single or A slave 1 = B slave
SSSSS	5 bits	Slave no.	$1…31_{dec}$
E1	1 bits	Error no. of the response	0 = not used
E2	1 bits	Error no. of the response	0 = ok 1 = protocol error (timeout)
E3	1 bits	Error no. of the response	0 = ok 1 = no analogue slave found
E4	1 bits	Error no. of the response	0 = ok 1 = protocol fault
CC	2 bits	Channel no.	0...3

Module 7: Command channel

Contents: Command channel
→ page 8-1, chapter DP module 7: Command channel

Length: 4-byte consistent I/O (if not used: length = 0)

IMPORTANT: For the query read only the required bytes. Unused bytes can contain information of previous queries.

DP master request (4 bytes)

Bit	7	6	5	4	3	2	1	0
Byte								
1	Command no.							
2	MM		X	SSSSS				
3	→ Tables starting on the next page							
4	→ Tables starting on the next page							

Calculation (MMXSSSSS):

(slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Controllere response (4 bytes, copy of the request)

Bit	7	6	5	4	3	2	1	0
Byte								
1	D7	D6	Command no.					
2	MM		X	SSSSS				
3	→ Tables starting on the next page							
4	→ Tables starting on the next page							

Legend

D7	1 bit	Error code	0 = no error occurred 1 = error occurred during command processing
D6	1 bit	Command code	0 = command processed, buffer response valid 1 = command being processed, channel occupied
MM	2 bits	Master no.	1...2
X	1 bit	Slave type	0 = single or A slave 1 = B slave
SSSSS	5 bits	Slave no.	1…31_{dec}

The commands are only executed if the command number (the first byte) changes. If the same command is to be executed with different data several times (e.g. read slave lists), the operating mode "continuous command" must first be selected for the data transfer. This is done with the command 62.

Overview of the commands in the DP module 7

Com no.	Description	Byte 2	Byte 3	Byte 4
1	► read master flags	MM000000	0	–
	> response:	MM000000	master flags → page 8-2	
2	► change operating mode	MM000000	AS-i master preset operating mode	–
	> response:	MM000000	AS-i master current operating mode	–
3	► read current slave configuration	MMXSSSSS	–	–
	> response:	MMXSSSSS	slave configuration data	
4	► read projected slave configuration	MMXSSSSS	–	–
	> response:	MMXSSSSS	slave configuration data	
5	► change projected slave configuration	MMXSSSSS	slave configuration data	
	> response:	MMXSSSSS	slave configuration data	
6	► read slave parameters	MMXSSSSS	–	–
	> response:	MMXSSSSS	projected parameters	current parameters
7	► change projected slave parameters (default parameters)	MMXSSSSS	projected parameters	–
	> response:	MMXSSSSS	projected parameters	–
8	► read LAS	MMXSSSSS	–	–
	> response:	MMXSSSSS	slave addresses from address group	
9	► read LDS	MMXSSSSS	–	–
	> response:	MMXSSSSS	slave addresses from address group	
10	► read LPF	MMXSSSSS	–	–
	> response:	MMXSSSSS	slave addresses from address group	
11	► read LPS	MMXSSSSS	–	–
	> response:	MMXSSSSS	slave addresses from address group	
12	reserved	–	–	
13	► read telegram error counter	MMXSSSSS	–	–
	> response:	MMXSSSSS	error counter	
14	► read configuration error counter	MM000000	–	–
	> response:	MM000000	error counter	
15	► read AS-i cycle counter	MM000000	–	–
	> response:	MM000000	current count value of the cycle counter	

Com no.	Description	Byte 2	Byte 3	Byte 4
16	► change current slave parameters	MMXSSSSS	parameters	–
	> response:	MMXSSSSS	reflected parameters	–
17, 18	reserved	–	–	–
19	► config all	MM000000	–	–
	> response:	MM000000	status	–
20	reserved	–	–	–
21	► save configuration in flash	MM000000	–	–
	> response:	MM000000	–	–
22	► reset telegram error counter	MMXSSSSS	–	–
	> response:	MMXSSSSS	–	–
23	► address slave	MMXSSSSS	00XSSSSS	–
	> response:	MMXSSSSS	–	–
62	► operating mode "continuous command“	0	preset command mode	0 = deactivate 1 = activate
	> response:	0	current command mode	0 = deactivated 1 = activated
63	► no operation command without function	–	–	–
	> response:	–	–	–

Module 8: data transfer between Profibus DP master and PLC in the controllere

Contents	Field for the data transfer between the Profibus DP master system and the PLC functions in the controllere
Length	0...64-word inputs (if not used: length = 0)

Module 9: data transfer between PLC in the controllere and Profibus DP master

Contents	Field for the data transfer between the PLC functions in the controllere and the Profibus DP master system
Length	0...64-word outputs (if not used: length = 0)

Module 10: parallel analogue inputs

Contents — Parallel analogue inputs of up to 30 AS-i slaves, 1/2/4 words per AS-i slave; the slave number and the number of analogue channels can be defined by Profibus DP parameters.

Data length = 4 words	(preset) All 4 channels of a total of up to 15 slaves on master 1 and 2 are transmitted.
	Selection of the slaves to be transmitted via Profibus DP device parameters (→ chapter Device-specific Profibus DP parameters, page 7-25)
Data length = 2 words	From slave 1 (of up to 30 slaves) on master 1 onwards, the channels 1 and 2 are transmitted.
Data length = 1 word	From slave 1 (of up to 30 slaves) on master 1 and 2 onwards, channel 1 is transmitted.

Length — 0...60-word inputs (if not used: length = 0)

Module 11: parallel analogue outputs

Contents — Parallel analogue outputs of up to 30 AS-i slaves, 1/2/4 words per AS-i slave; the slave number and the number of analogue channels can be defined by Profibus DP parameters.

Data length = 4 words	(preset) All 4 channels on a total of up to 15 slaves on master 1 and 2 are transmitted.
	Selection of the slaves to be transmitted via Profibus DP device parameters (→ chapter Device-specific Profibus DP parameters, page 7-25)
Data length = 2 words	On slave 1 (up to 30 slaves) on master 1, the channels 1 and 2 are transmitted.
Data length = 1 word	On slave 1 (up to 30 slaves) on master 1 and 2 , channel 1 is transmitted.

Length — 0...60-word outputs (if not used: length = 0)

NOTE

If analogue outputs are also triggered in module 6, the value written in module 6 is overwritten with the data of module 11.

Module 12: Extended command channel

Contents	Extended command channel
Length	2...18-word consistent inputs/outputs (if not used: length = 0)

NOTE

In some controllers larger consistent data fields cannot be processed in the direct I/O address area; special function calls are then required.

7.4 Device-specific Profibus DP parameters

With up to 100 bytes of the device-specific Profibus parameters the addresses of the analogue input slaves and analogue output slaves to be transferred in parallel can be defined and the parameters of the connected AS-i slaves can be set.

7.4.1 Device-specific Profibus DP parameters (example)

Byte	Parameter [hex]	Description
1	80	fixed device parameters
2	00	
3	00	
4	00	
5	AE	fixed value: start of the analogue input addresses
6 … 20	42 …	slaves 2, 4, 6, 8,...30 of master 1
21	AA	fixed value: start of the analogue output addresses
22 … 36	41 …	slaves 1, 3, 5, 7,...29 of master 1
37	2F	bit 5 = TRUE activates the extended diagnosis of the AS-i system via Profibus DP
	1F	bit 4 = TRUE activates the AS-i parameter download
37 … 100	1F … FF	predefined parameters of the AS-i slaves

Slave addresses in the Profibus parameter bytes 6…20 and 22...36

Bit:	7	6	5	4	3	2	1	0
	MM		X	SSSSS				

Legend

MM	2 bits	Master no.	1…2
X	1 bit	Slave type	0 = single or A slave 1 = B slave
SSSSS	5 bits	Slave no.	1…31_{dec}

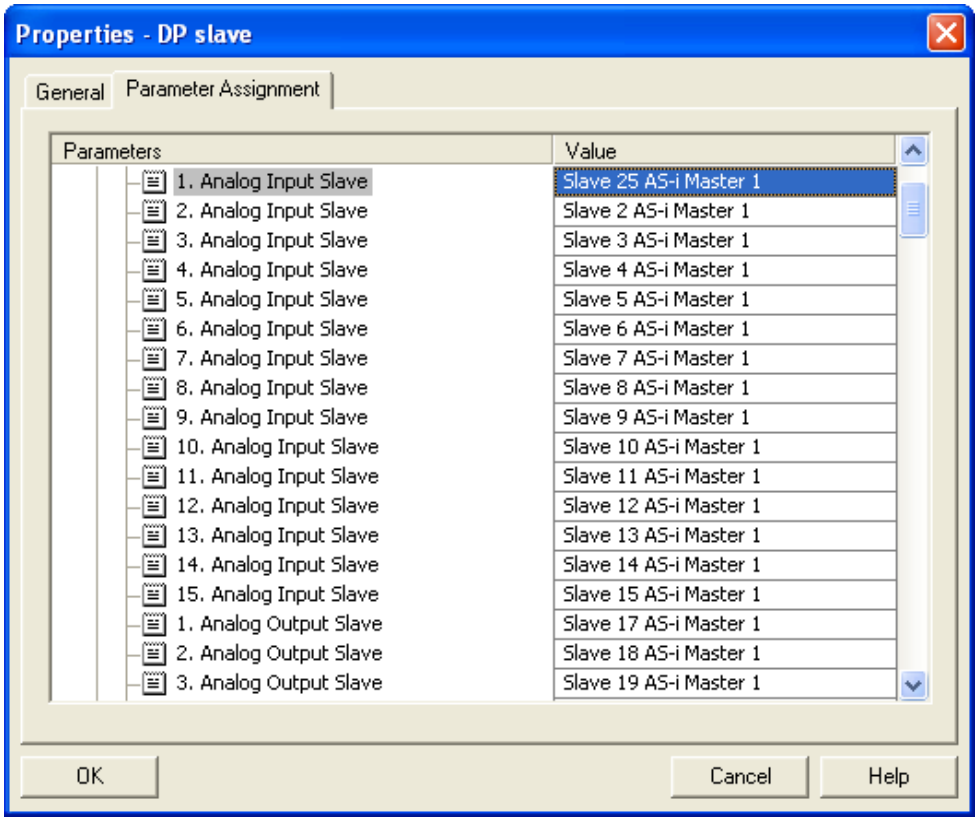
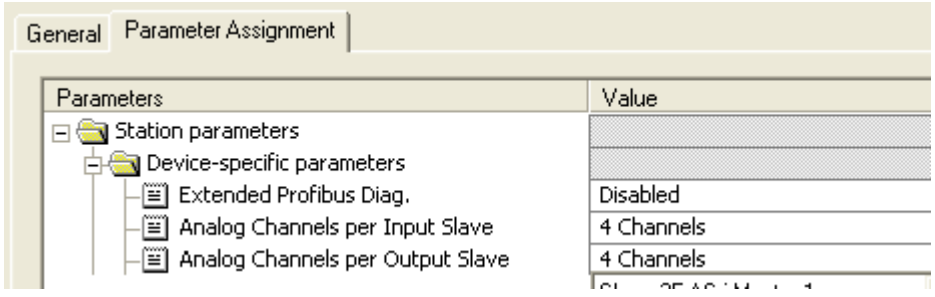
Calculation of the more significant byte (MMXSSSSS):

(slave no.) + (master no. * 64_{dec}) + (32_{dec}, if B slave)

Examples:	Master 1	Slave 3(A)	1*64 + 3	= 67_{dec}	= 43_{hex}
	Master 2	Slave 5(A)	2*64 + 5	= 133_{dec}	= 85_{hex}
	Master 1	Slave 1B	1*64 + 1 + 32	= 97_{dec}	= 61_{hex}
	Master 1	Slave 28(A)	1*64 + 28	= 92_{dec}	= $5C_{hex}$

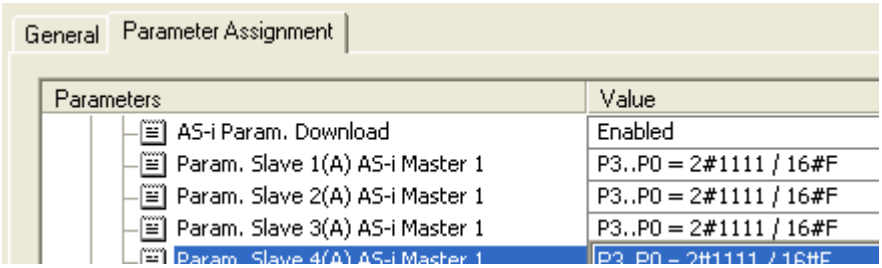
7.4.2 Definitions in the GSD file

The definitions in the GSD file (GSD = **G**eneral **S**tation **D**escription) enable easy access to the device parameters if this is supported by the configuration tool of the Profibus DP master:

Example Siemens Step 7	
Byte 37 Bit 5 = TRUE	

If the parameter "Extended Profibus Diag." is set to "Enabled", the controllere transmits the extended diagnostic data described in the next section. This data generates a DP request for a diagnosis in case of an error state in the controllere. Therefore for a Siemens PLC OB82 must be programmed to react to this state, otherwise the PLC stops.

For "Disabled" (default) the controller$_e$ only transmits the standard diagnosis. An AS-i error state has no direct effect on the Profibus DP but must then be monitored otherwise by the PLC (using the bits 4..7 in the first byte or via the command channel).

Byte 37 Bit 4 = TRUE	

7.5 Finish set-up

System behaviour

► Define the system behaviour in the fieldbus configuration program, e.g. watchdog etc.

► Save the configuration

► Transfer the configuration to the DP master

Start

► Start the DP master

If there is communication on the fieldbus:

> The menu [Fieldbus Setup] in the controller$_e$ successively shows the settings configured in the DP master.

If watchdog activated:

> LED [Bus Failure] goes out.

8 DP module 7: Command channel

→ page 7-21, table Overview of the commands in the DP module 7

8.1 List of commands in module 7

Command number		Description	→ page
decimal	Hexa-decimal		
01	01	read master flags	8-2
02	02	change operating mode	8-3
03	03	read current slave configuration	8-4
04	04	read projected slave configuration	8-5
05	05	change projected slave configuration	8-6
06	06	read slave parameters	8-7
07	07	change projected slave parameters (default parameters)	8-8
08	08	read LAS (list of active slaves)	8-9
09	09	read LDS (list of detected slaves)	8-11
10	0A	read LPF (list of slaves with periphery fault)	8-12
11	0B	read LPS (list of projected slaves)	8-13
12	0C	- reserved -	–
13	0D	read telegram error counter	8-14
14	0E	read configuration error counter	8-15
15	0F	read AS-i cycle counter	8-16
16	10	change current slave parameters	8-17
17	11	reserved	–
18	12	reserved	–
19	13	Config all	8-18
20	14	reserved	–
21	15	save configuration in flash	8-19
22	16	reset telegram error counter	8-20
23	17	address slave	8-21
62	3E	operating mode "continuous command“	8-22
63	3F	no operation command without function	8-23

8.2 Module 7, command 1: read master flags

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	01_{hex}						
2	MM		0						MM = master no. (1…2)
3	0								not used
4	0								not used

Response from controller

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	0						D6 = command code D7 = error code → page 7-20, table at the bottom
2	0								
3	→ table at the bottom								
4	→ table at the bottom								

master flags

Byte	Bit	If bit D6 = TRUE, then:
3	0	periphery of all connected slaves is ok (no periphery fault)
	1	automatic addressing is enabled
	2	exchange of data with the slaves is active
	3...7	reserved
4	0	AS-i configuration ok
	1	a slave 0 is detected
	2	automatic addressing is enabled
	3	automatic addressing is active
	4	configuration mode active
	5	normal mode is active
	6	AS-i voltage error has occurred
	7	offline phase completed

8.3 Module 7, command 2: change operating mode

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	02_{hex}						
2	MM		0						MM = master no. (1…2)
3	0 = protected mode 1 = configuration mode								not used
4	0								not used *)

Response from controller

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	02_{hex}						D6 = command code D7 = error code → page 7-20, table at the bottom
2	copy of the request								
3	copy of the request								
4	0								not used *)

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.4 Module 7, command 3: read current slave configuration

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	03_{hex}						MM = master no. (1…2) X = slave type (0…1) 0 = standard / A slave 1 = B slave
2	MM		X	SSSSS					SSSSS = slave no. ($0…31_{dec}$)
3	0								not used *)
4	0								not used *)

Response from controller

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	03_{hex}						D6 = command code D7 = error code → page 7-20, table at the bottom
2	copy of the request								
3	extended ID code 2				extended ID code 1				
4	ID code				IO configuration				

Example: read current slave configuration of slave 7B on AS-i master 1

Request of DP master

Byte no.	Value [hex]	Description
1	03	03 = command 3
2	67	(slave no. **7**) + (master no. **1 * 64**) + (**32**, if B slave) = 103_{dec} = **67**$_{hex}$
3	00	not used *)
4	00	not used *)

Response from controller

Byte no.	Value [hex]	Description
1	03	copy of the request
2	67	copy of the request
3	EF	E = extended ID code 2 F = extended ID code 1
4	03	0 = ID code 3 = IO configuration

(corresponds to slave profile S 3.0.E = 2I/2O module with periphery fault detection)

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.5 Module 7, command 4: read projected slave configuration

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0
1	0	0	04_{hex}					
2	MM		X	SSSSS				
3	0							
4	0							

MM = master no. (1…2)

X = slave type (0…1)
0 = standard / A slave
1 = B slave

SSSSS = slave no. ($0…31_{dec}$)

not used *)

not used *)

Response from controller

Bit / Byte	7	6	5	4	3	2	1	0
1	D7	D6	0					
2	0							
3	extended ID code 2				extended ID code 1			
4	ID code				IO configuration			

D6 = command code
D7 = error code
→ page 7-20, table at the bottom

Example: Read projected slave configuration of slave 16(A) on AS-i master 1

Request of DP master

Byte no.	Value [hex]	Description
1	04	04 = command 4
2	50	(slave no. **16**) + (master no. **1 * 64**) + (32, if B slave) = 80_{dec} = **50_{hex}**
3	00	not used *)
4	00	not used *)

Response from controller

Byte no.	Value [hex]	Description
1	00	
2	00	
3	EF	E = extended ID code 2 F = extended ID code 1
4	37	3 = ID code 7 = IO configuration

(corresponds to slave profile S 7.3.E = analogue input module with 4 inputs)

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.6 Module 7, command 5: change projected slave configuration

Structure

Request of DP master

Bit	7	6	5	4	3	2	1	0
Byte								
1	0	0	05_{hex}					
2	MM		X	SSSSS				
3	extended ID code 2				extended ID code 1			
4	ID code				IO configuration			

MM = master no. (1…2)

X = slave type (0…1)
0 = standard / A slave
1 = B slave

SSSSS = slave no. (0…31_{dec})

Response from controller

Bit	7	6	5	4	3	2	1	0
Byte								
1	D7	D6	05_{hex}					
2	copy of the request							
3	copy of the request							
4	copy of the request							

D6 = command code
D7 = error code
→ page 7-20, table at the bottom

Example: change projected slave configuration of slave 1(A) on master 2

Request of DP master

Byte no.	Value [hex]	Description
1	05	05 = command 5
2	81	(slave no. **1**) + (master no. **2 * 64**) + (32, if B slave) = 129_{dec} = $\mathbf{81}_{hex}$
3	6F	6 = extended ID code 2 F = extended ID code 1
4	37	3 = ID code 7 = IO configuration

Response from controller

Byte no.	Value [hex]	Description
1	05	copy of the request
2	81	copy of the request
3	6F	copy of the request
4	37	copy of the request

8.7 Module 7, command 6: read slave parameter

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0
1	0	0	06_{hex}					
2	MM		X	SSSSS				
3	0							
4	0							

MM = master no. (1…2)

X = slave type (0…1)
0 = standard / A slave
1 = B slave

SSSSS = slave no. ($0…31_{dec}$)

not used *)

not used *)

Response from controller

Bit / Bytes	7	6	5	4	3	2	1	0
1	D7	D6	0					
2	0							
3	projected parameter							
4	current parameter							

D6 = command code
D7 = error code
→ page 7-20, table at the bottom

Example: Read slave parameter of slave 2(A) on AS-i master 1

Request of DP master

Byte no.	Value [hex]	Description
1	06	06 = command 6
2	42	(slave no. **2**) + (master no. **1 * 64**) + (32, if B slave) = 66_{dec} = $\mathbf{42}_{hex}$
3	00	not used *)
4	00	not used *)

Response from controller

Byte no.	Value [hex]	Description
1	00	
2	00	
3	03	projected parameter
4	0F	current parameter

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.8 Module 7, command 7: change projected slave parameters

> **NOTE**
>
> The projected parameters can only be changed if the AS-i master operates in the configuration mode. Activation → page 8-3

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	07_{hex}						MM = master no. (1…2) X = slave type (0…1) 0 = standard / A slave 1 = B slave
2	MM		X	SSSSS					SSSSS = slave no. ($0…31_{dec}$)
3	projected parameter								
4	0								not used *)

Response from controller

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	0						D6 = command code D7 = error code → page 7-20, table at the bottom
2	0								
3	copy of the request								
4	0								not used *)

Example: change projected slave parameters of slave 7B on AS-i master 1

Request of DP master

Byte no.	Value [hex]	Description
1	07	07 = command 7
2	87	(slave no. **7**) + (master no. **1 * 64**) + (**32**, if B slave) = 135_{dec} = **87**$_{hex}$
3	0F	projected parameter
4	00	not used *)

Response from controller

Byte no.	Value [hex]	Description
1	00	
2	00	
3	0F	copy of the request
4	00	not used *)

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.9 Module 7, command 8: read LAS (list of active slaves)

Slave group

The 2 feedback bytes can only give information about max. 16 slaves. Therefore the slaves are divided in 4 groups (→ following table).

When querying the slave lists any slave number from the requested slave group is to be indicated.

	Byte 3								Byte 4							
Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Group																
1	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0 *
2	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
3	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res
4	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

*) LAS and LPS have no slave 0, therefore this bit is set to 0!

Structure

Request of DP master

Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	
Byte									
1	0	0	08_{hex}						MM = master no. (1…2) X = slave type (0…1) 0 = standard / A slave 1 = B slave
2	MM		X	SSSSS					SSSSS = slave no. ($0…31_{dec}$)
3	0								not used *)
4	0								not used *)

Response from controllere

Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	
Byte									
1	D7	D6	08_{hex}						D6 = command code D7 = error code → page 7-20, table at the bottom
2	copy of the request								
3	→ table above								provides the addresses of the active slaves in this address group
4	→ table above								

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

Example → next page

Example: Read LAS (list of active slaves) of slave group 1 on master 1

Request of DP master

Byte no.	Value [hex]	Description
1	08	08 = command 8
2	42	(slave no. **2**) → group 1 + (master no. **1 * 64**) + (32, if B slave) = 66_{dec} = **42_{hex}**
3	00	not used *)
4	00	not used *)

Response from controller

Byte no.	Value [hex]	Description
1	08	copy of the request
2	42	copy of the request
3	03_{hex} = 00000011_{bin}	→ table page 8-9 group 1: slave 8(A) is active slave 9(A) is active
4	FE_{hex} = 11111110_{bin}	→ table page 8-9 group 1: slaves 1(A) to 7(A) are active

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.10 Module 7, command 9: read LDS (list of detected slaves)

The 2 feedback bytes can only give information about max. 16 slaves. Therefore the slaves are divided into 4 groups (→ table page 8-9).

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	09_{hex}						MM = master no. (1…2) X = slave type (0…1) 0 = standard / A slave 1 = B slave
2	MM		X	SSSSS					SSSSS = slave no. ($0…31_{dec}$)
3	0								not used *)
4	0								not used *)

Response from controllere

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	0						D6 = command code D7 = error code → page 7-20, table at the bottom
2	0								
3	→ table page 8-9								provides the addresses of the detected slaves in this address group
4	→ table page 8-9								

Example: Read LDS (list of detected slaves) of slave group 3 on AS-i master 2

Request of DP master

Byte no.	Value [hex]	Description
1	09	09 = command 9
2	A5	(slave no. **5**) → group 3 + (master no. **2 * 64**) + (**32**, if B slave) = 165_{dec} = **$A5_{hex}$**
3	00	not used *)
4	00	not used *)

Response from controllere

Byte no.	Value [hex]	Description
1	00	
2	00	
3	03_{hex} = 00000011_{bin}	→ table page 8-9 group 3: slaves 8B and 9B were detected
4	FE_{hex} = 11111110_{bin}	→ table page 8-9 group 3: slaves 1B to 7B were detected

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.11 Module 7, command 10_{dec} ($0A_{hex}$): read LPF (list of slaves with periphery fault)

The 2 feedback bytes can only give information about max. 16 slaves. Therefore the slaves are divided into 4 groups (→ table page 8-9).

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	$0A_{hex}$						MM = master no. (1…2) X = slave type (0…1) 0 = standard / A slave 1 = B slave
2	MM		X	SSSSS					SSSSS = slave no. ($0…31_{dec}$)
3	0								not used *)
4	0								not used *)

Response from controllere

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	$0A_{hex}$						D6 = command code D7 = error code → page 7-20, table at the bottom
2	copy of the request								
3	→ table page 8-9								provides the addresses of the slaves with periphery fault in this address group
4	→ table page 8-9								

Example: Read LPF (list of slaves with periphery fault) of slave group 2 on AS-i master 1

Request of DP master

Byte no.	Value [hex]	Description
1	0A	0A = command10
2	54	(slave no. **20**) → group 2 + (master no. **1 * 64**) + (32, if B slave) = 84_{dec} = $\mathbf{54}_{hex}$
3	00	not used *)
4	00	not used *)

Response from controllere

Byte no.	Value [hex]	Description
1	0A	copy of the request
2	54	copy of the request
3	02_{hex} = 00000010_{bin}	→ table page8-9 group 2: slave 26(A) signals periphery fault
4	20_{hex} = 00100000_{bin}	→ table page 8-9 group 2: slave 21(A) signals periphery fault

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.12 Module 7, command 11_{dec} ($0B_{hex}$): read LPS (list of projected slaves)

The 2 feedback bytes can only give information about max. 16 slaves. Therefore the slaves are divided into 4 groups (→ table page 8-9).

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	$0B_{hex}$						MM = master no. (1…2) X = slave type (0…1) 0 = standard / A slave 1 = B slave
2	MM		X	SSSSS					SSSSS = slave no. ($0…31_{dec}$)
3	0								not used *)
4	0								not used *)

Response from controllere

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	$0B_{hex}$						D6 = command code D7 = error code → page 7-20, table at the bottom
2	copy of the request								
3	→ table page 8-9								provides the addresses of the projected slaves in this address group
4	→ table page 8-9								

Example: Read LPS (list of projected slaves) of slave group 2 on AS-i master 1

Request of DP master

Byte no.	Value [hex]	Description
1	0B	0B = command 11
2	54	(slave no. **20**) → group 2 + (master no. **1 * 64**) + (32, if B slave) = 84_{dec} = $\mathbf{54}_{hex}$
3	00	not used *)
4	00	not used *)

Response from controllere

Byte no.	Value [hex]	Description
1	0B	copy of the request
2	54	copy of the request
3	02_{hex} = 00000010_{bin}	→ table page 8-9 group 2: slave 26(A) is projected
4	FE_{hex} = 11111110_{bin}	→ table page 8-9 group 2: slaves 17(A) to 23(A) are projected

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.13 Module 7, command 13_{dec} ($0D_{hex}$): read telegram error counter

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	$0D_{hex}$						MM = master no. (1…2) X = slave type (0…1) 0 = standard / A slave 1 = B slave
2	MM		X	SSSSS					SSSSS = slave no. ($0…31_{dec}$)
3	0								not used *)
4	0								not used *)

Response from controllere

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	$0D_{hex}$						D6 = command code D7 = error code → page 7-20, table at the bottom
2	copy of the request								
3	error counter high byte								provides the number of errors during the exchange of data between the slave and the master since power on or reset
4	error counter low byte								

Example: read telegram error counter of slave 1 on AS-i master 1

Request of DP master

Byte no.	Value [hex]	Description
1	0D	0D = command 13
2	41	(slave no. **1**) + (master no. **1 * 64**) + (32, if B slave) = 65_{dec} = **41_{hex}**
3	00	not used *)
4	00	not used *)

Response from controllere

Byte no.	Value [hex]	Description
1	0D	copy of the request
2	41	copy of the request
3	00	error counter = 0020_{hex} = 0032_{dec} → Since the last power-on of the controllere or reset of the counter 32 faulty telegrams have occurred during data exchange.
4	20_{hex} = 32_{dec}	

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.14 Module 7, command 14_{dec} ($0E_{hex}$): read configuration error counter

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	$0E_{hex}$						
2	MM		0						MM = master no. (1…2)
3	0								not used *)
4	0								not used *)

Response from controller

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	$0E_{hex}$						D6 = command code D7 = error code → page 7-20, table at the bottom
2	copy of the request								
3	error counter high byte								provides the number of configuration errors of the master since power on or reset
4	error counter low byte								

Example: read configuration error counter on AS-i master 2

Request of DP master

Byte no.	Value [hex]	Description
1	0E	0E = command 14
2	80	(master no. **2 * 64**) = 128_{dec} = **80_{hex}**
3	00	not used *)
4	00	not used *)

Response from controller

Byte no.	Value [hex]	Description
1	0E	copy of the request
2	80	copy of the request
3	00	error counter = 0003_{hex} = 0003_{dec} →Since the last power-on of the controller or the reset of the counter, 3 configuration errors have occurred.
4	03	

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.15 Module 7, command 15_{dec} ($0F_{hex}$): read AS-i cycle counter

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	$0F_{hex}$						MM = master no. (1…2)
2	MM		0						
3	0								not used *)
4	0								not used *)

Response from controller

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	$0F_{hex}$						D6 = command code D7 = error code → page 7-20, table at the bottom
2	copy of the request								
3	cycle counter high byte								provides the number of AS-i cycles of the master since power on
4	cycle counter low byte								

Example: Read AS-i cycle counter of AS-i master 1

Request of DP master

Byte no.	Value [hex]	Description
1	0F	0F = command 15
2	40	(master no. **1 * 64**) = 64_{dec} = **40_{hex}**
3	00	not used *)
4	00	not used *)

Response from controller

Byte no.	Value [hex]	Description
1	0F	copy of the request
2	40	copy of the request
3	04	cycle counter = $04CA_{hex}$ = 1226_{dec} → since the last power-on of the controller, 1226 cycles have elapsed in the AS-i master 1
4	CA	

By carrying out several measurements the number of cycles per time unit can be measured.

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.16 Module 7, command 16_{dec} (10_{hex}): change current slave parameters

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	10_{hex}						MM = master no. (1…2) X = slave type (0…1) 0 = standard / A slave 1 = B slave
2	MM		X	SSSSS					SSSSS = slave no. ($0…31_{dec}$)
3	preset value parameter								
4	0								not used *)

Response from controller

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	10_{hex}						D6 = command code D7 = error code → page 7-20, table at the bottom
2	copy of the request								
3	feedback value parameter								feedback value can be different from preset value
4	0								not used *)

Example: Change slave parameter of slave 7 on AS-i master 1 to the value "F"

Request of DP master

Byte no.	Value [hex]	Description
1	10	10 = command 16
2	47	(slave no. **7**) + (master no. **1 * 64**) + (32, if B slave) = 71_{dec} = **47_{hex}**
3	0F	preset value parameter
4	00	not used *)

Response from controller

Byte no.	Value [hex]	Description
1	10	copy of the request
2	47	copy of the request
3	0F	feedback value can be different from preset value
4	00	not used *)

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.17 Module 7, command 19_{dec} (13_{hex}): config. all

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	13_{hex}						MM = master no. (1…2)
2	MM		0						
3	0								not used *)
4	0								not used *)

Response from controller

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	13_{hex}						D6 = command code D7 = error code → page 7-20, table at the bottom
2	copy of the request								
3	status								
4	0								not used *)

Example: Config all on AS-i master 1

Request of DP master

Byte no.	Value [hex]	Description
1	13	13 = command 19
2	40	(master no. **1 * 64**) = 64_{dec} = **40_{hex}**
3	00	not used *)
4	00	not used *)

Response from controller

Byte no.	Value [hex]	Description
1	13	copy of the request
2	40	copy of the request
3	80	status
4	00	not used *)

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.18 Module 7, command 21_{dec} (15_{hex}): save configuration in flash

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	15_{hex}						MM = master no. (1…2)
2	MM		0						
3	0								not used *)
4	0								not used *)

Response from controller

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	15_{hex}						D6 = command code D7 = error code → page 7-20, table at the bottom
2	copy of the request								
3	0								not used *)
4	0								not used *)

Example: Save AS-i configuration in flash for AS-i master 1

Request of DP master

Byte no.	Value [hex]	Description
1	15	15 = command 21
2	40	(master no. **1 * 64**) = 64_{dec} = **40_{hex}**
3	00	not used *)
4	00	not used *)

Response from controller

Byte no.	Value [hex]	Description
1	15	copy of the request
2	40	copy of the request
3	00	not used *)
4	00	not used *)

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.19 Module 7, command 22_{dec} (16_{hex}): reset telegram error counter of a slave

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	16_{hex}						MM = master no. (1…2) X = slave type (0…1) 0 = standard / A slave 1 = B slave
2	MM		X	SSSSS					SSSSS = slave no. ($0…31_{dec}$)
3	0								not used *)
4	0								not used *)

Response from controller

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	16_{hex}						D6 = command code D7 = error code → page 7-20, table at the bottom
2	copy of the request								
3	0								not used *)
4	0								not used *)

Example: reset telegram error counter of slave 7(A) on AS-i master 2

Request of DP master

Byte no.	Value [hex]	Description
1	16	16 = command 22
2	87	(slave no. **7**) + (master no. **2 * 64**) + (32, if B slave) = 135_{dec} = **87_{hex}**
3	00	not used *)
4	00	not used *)

Response from controller

Byte no.	Value [hex]	Description
1	16	copy of the request
2	87	copy of the request
3	00	not used *)
4	00	not used *)

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.20 Module 7, command 23_{dec} (17_{hex}): address slave

IMPORTANT: The controller must be in the configuration mode.

Structure

Request of DP master

Bit	7	6	5	4	3	2	1	0	
Byte									MM = master no. (1…2) X = slave type (0…1) 0 = standard / A slave 1 = B slave
1	0	0	17_{hex}						
2	MM		X	SSSSS					SSSSS = slave no. ($0…31_{dec}$)
3	new slave address								
4	0								not used *)

Response from controller

Bit	7	6	5	4	3	2	1	0	
Byte									
1	D7	D6	17_{hex}						D6 = command code D7 = error code → page 7-20, table at the bottom
2	copy of the request								
3	copy of the request								
4	error message								Error codes → page 9-5

Example: address slave 2B on AS-i master 1 to 7B

Request of DP master

Byte no.	Value [hex]	Description
1	17	17 = command 23
2	62	(slave no. **2**) + (master no. **1 * 64**) + (**32**, if B slave) = 98_{dec} = $\mathbf{62}_{hex}$
3	07	new slave address 7B
4	00	not used *)

Response from controller in case of an error

Byte no.	Value [hex]	Description
1	17	copy of the request
2	62	copy of the request
3	07	new slave address
4	14	Error codes → page 9-5 here: error: master is in the wrong operating mode

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

8.21 Module 7, command 62_{dec} ($3E_{hex}$): operating mode "continuous command“

If the "continuous" mode is active, the current command is transferred in every cycle.

> **NOTE**
>
> The continuous mode influences the behaviour of the controllere. The mode should only be used for read commands.

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	$3E_{hex}$						
2	0								
3	01_{hex}								changes the mode
	0								reads the current status
4	01_{hex}								commands are carried out cyclically
	0								commands are only carried out if the command number changes

Response from controllere

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	$3E_{hex}$						D6 = command code D7 = error code → page 7-20, table at the bottom
2	0								
3	copy of the request								
4	copy of the request								

Example: Activate the operating mode "continuous command"

Request of DP master

Byte no.	Value [hex]	Description
1	3E	3E = command 62
2	00	
3	01	changes the mode
4	01	commands are carried out cyclically

Response from controllere

Byte no.	Value [hex]	Description
1	3E	copy of the request
2	47	copy of the request
3	01	copy of the request
4	01	copy of the request

8.22 Module 7, command 63_{dec} ($3F_{hex}$): no operation command without function

Structure

Request of DP master

Bit / Byte	7	6	5	4	3	2	1	0	
1	0	0	$3F_{hex}$						
2	0								not used *)
3	0								not used *)
4	0								not used *)

Response from controller

Bit / Byte	7	6	5	4	3	2	1	0	
1	D7	D6	$3F_{hex}$						D6 = command code D7 = error code → page 7-20, table at the bottom
2	copy of the request								
3	copy of the request								
4	copy of the request								

Example: no operation command

Request of DP master

Byte no.	Value [hex]	Description
1	3F	3F = command 63
2	00	not used *)
3	00	not used *)
4	00	not used *)

Response from controller

Byte no.	Value [hex]	Description
1	3F	copy of the request
2	00	copy of the request
3	00	copy of the request
4	00	copy of the request

*) **IMPORTANT:** For the query read only the required bytes. Unused bytes can contain information of previous queries.

9 DP module 12: Extended command channel

The extended command channel serves for exchange of data between the AS-i controller and the Profibus host (PLC).

NOTE

In some controllers larger consistent data fields cannot be processed in the direct I/O address area. Then, special function calls are required.

9.1 List of extended commands in module 12

Command number		Description	→ page
decimal	hexa-decimal		
00	00	no execution of a command	9-6
01	01	write parameters to a connected AS-i slave	9-7
03	03	adopt and store currently connected AS-i slaves in the configuration	9-9
04	04	list of projected AS-i slaves (LPS)	9-11
05	05	set the operating mode of the AS-i master	9-13
06	06	readdress a connected AS-i slave	9-15
07	07	set the auto address mode of the AS-i master	9-17
09	09	change the extended ID code 1 in the connected AS-i slave	9-18
10…20	0A…14	force analogue data transfer directly to / from 3 AS-i slaves in each case	9-20
21	15	read the ID string of an AS-i slave with profile S-7.4	9-25
26	1A	read AS-i master version	9-28
28	1C	deactivation of the slave reset when changing to the protected mode	9-29
31	1F	one-time execution of the "Extended safety monitor protocol" in the "Safety at Work" monitor	9-30
33	21	read the diagnosis string of an AS-i slave with profile S-7.4	9-35
34	22	read the parameter string of an AS-i slave with the profile S-7.4	9-37
35	23	write the parameter string of an AS-i slave with the profile S-7.4	9-38
36	24	*Available from master profile M4 onwards:* acyclic standard read call for an AS-i slave with CTT2 profile (S-7.5.5, S-7.A.5 or S-B.A.5)	9-40
37	25	*Available from master profile M4 onwards:* acyclic standard write call of an AS-i slave with CTT2 profile (S-7.5.5, S-7.A.5 or S-B.A.5)	9-44
38	26	*Available from master profile M4 onwards:* acyclic manufacturer-specific read call of an AS-i slave with CTT2 profile (S-7.5.5, S-7.A.5 or S-B.A.5)	9-47
39	27	*Available from master profile M4 onwards:* acyclic manufacturer-specific write call of an AS-i slave with CTT2 profile (S-7.5.5, S-7.A.5 or S-B.A.5)	9-51
50	32	read current configuration of slaves 0(A)...15(A)	9-55
51	33	read current configuration of slaves 16(A)...31(A)	9-56
52	34	read current configuration of slaves 1B...15B	9-57
53	35	read current configuration of slaves 16B...31B	9-58
54	36	read current parameters of a connected AS-i slaves	9-59
55	37	read current slave lists	9-61

Command number		Description	→ page
decimal	**hexa-decimal**		
56	38	read projected configuration of slaves 1(A)...15(A)	9-63
57	39	read projected configuration of slaves 16(A)...31(A)	9-64
58	3A	read projected configuration of slaves 1B...15B	9-65
59	3B	read projected configuration of slaves 16B...31B	9-66
96	60	store data non-volatilely in the flash memory of the controllere	9-67
97	61	carry out various settings in the controllere	9-68
102	66	read the status of controllere display	9-69
105	69	read the device properties of the controllere	9-71

9.2 Data structure

Length: 2...18-word consistent inputs/outputs (if not used: length = 0)
The word 2 is reserved for 7.4 commands (if not used: word = 0).

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M	user ID					command number							
2	R	R	A/B	slave address					R	R	R	length				
3…18	command data															

Response from controller$_e$ (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E	B	M	reflected user ID					reflected command number							
2	TG	L32	slave address					F	R	R	R	length				
3…18	command data															

Legend

Name	Description
A/B	Bit for addressing A or B slaves A/B=0: A slave (or standard slave) A/B=1: B slave (addition of 20_{hex} or 32_{dec} to the slave address)
B	Busy bit B=0: command executed, response in the buffer is valid B=1: command in process, channel is used
E	Error bit E=0: no error detected E=1: error occurred during execution of the command
F	Error bit F=0: no error detected during command execution 7.4 F=1: error occurred during command execution 7.4
L32	Number of parameter bytes = 32_{dec} L32=0: number of bytes to be sent < 32_{dec} L32=1: number of bytes to be sent = 32_{dec}
Length	5 bits for the number of data bytes ($0…16_{dec}$) DP master: data bytes to be sent controller$_e$: data bytes received
M	AS-i master bit M=0: AS-i master 1 M=1: AS-i master 2
R	reserved
Slave address	5 bits for AS-i slave address ($0…31_{dec}$) (reflected by the controller$_e$)
TG	Toggle Value changes for each command execution
User ID	5 bits for user ID ($0…31_{dec}$) (reflected by the controller$_e$)

User ID

NOTE

If a command is to be executed, the user ID must be changed! Changing the command number does not start the execution.

If a command is to be executed several times, the user ID must be changed accordingly, e.g. by counting up. Counting up should not take place until the preceding command has been completed (bit D14 = 0).

1st word, bit 14	0 = command executed, response in the buffer is valid 1 = command in process, channel is used
1st word, bit 15	0 = no error detected 1 = error occurred during command execution

9.3 Error codes in the module 12

Value [hex]	Description
01	no slave response or: master is in the offline mode when calling the command
02	no slave with the old address found
03	slave with address 0 connected
04	no slave with the new address found
05	error when deleting the old address
06	error when reading the IO configuration
07	error when writing the new address or the extended ID code 1
08	new address could only be saved temporarily
09	extended ID code 1 could only be saved temporarily
0A	slave is not in LAS
0B	parameter or address invalid
0C	faulty S-7.4 protocol sequence
0D	S-7.4 protocol aborted (timeout)
0E	invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
0F	AS-i slave has completed the S-7.4 string
10	AS-i S-7.4 no longer connected (no longer in LAS)
11	another S-7.4 transfer to the addressed AS-i slave is already active
12	the previous segmented S-7.4 transfer was not completed
13	invalid S-7.4 data length
14	master is in the wrong operating mode or invalid S-7.4 command
16	timeout during command processing
17	wrong slave profile or slave not in LAS master is not in the normal mode
20	the command could not be processed within the specified time
E0...EF	error detected by AS-i slave; note error code CTT2 (see below)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

9.4 CTT2 error code in module 12

Value [hex]	Description
00	no error
01	invalid index
02	invalid length
03	command not implemented
04	occupied, command could not be completed in the specified time
05	command was not acknowledged

9.5 Module 12, extended command 0: no execution of a command

Request of DP master

Word no.	Value [hex]	Description
1	0800	08 = user ID changes e.g. to 8 00 = command number 0
2…18	0000	not used

Response from controllere (gateway)

Word no.	Value [hex]	Description
1	0800	08 = reflected user ID 8 00 = reflected command number 0
2…18	0000	not changed

9.6 Module 12, extended command 1: write parameters to a connected AS-i slave

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0	0	M 0/1	user ID					command number = 01_{hex}							
2	reserved = 0								reserved = 0							
3	0								0	0	A/B 0/1	slave address				
4	0								parameter value to be written							
5…18	ignored															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0901	M=0: AS-i master 1 09 = user ID changes e.g. to 9 01 = command number 1
2	0000	reserved
3	0024	slave address 4B (for B slaves: bit 5 = 1 → add 20_{hex} to the address)
4	000F	parameter value to be written

Response from controllere (gateway) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 01_{hex}							
2	reserved = 0								reserved = 0							
3	0								parameter value read back							
4…18	not changed															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	**0**901	M=0: AS-i master 1 09 = reflected user ID 9 01 = reflected command number 1
2	0000	reserved
3	000F	parameter value read back
4…18	0000	not changed

Response from controllere (gateway) in case of an error

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B=0	M 0/1	reflected user ID					reflected command number = 01_{hex}							
2	reserved = 0								reserved = 0							
3	0								Error code							
4…18	ignored															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	**8**901	E=1: fault occurred during execution of the command M=0: AS-i master 1 89 = reflected user ID 9 01 = reflected command number 1
2	0000	reserved
3	000A	error code $0A_{hex}$ = slave not in the LAS

Possible error codes

Value [hex]	Description
01	no slave response or: master is in the offline mode when calling the command
0A	slave is not in LAS
0B	parameter or address invalid
14	master is in the wrong operating mode Here: master is not in the normal mode

9.7 Module 12, extended command 3: adopt and store connected AS-i slaves in the configuration

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = 03 $_{hex}$ = 03 $_{dec}$							
2…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0C03	M=0: AS-i master 1 0C = user ID changes e.g. to 12 03 = command number 3
2…18	0000	not used

Response from controllere (gateway) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 03$_{hex}$							
2…18	not changed															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0C03	M=0: AS-i master 1 0C = reflected user ID 12 03 = reflected command number 3
2	0000	not changed

Response from controller (gateway) in case of an error

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B=0	M 0/1	reflected user ID					reflected command number = 03_{hex}							
2	reserved = 0															
3	0								error code							

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	1C03	E=1: fault occurred during execution of the command M=0: AS-i master 1 xC = reflected user ID 12 03 = reflected command number 3
2	0000	reserved
3	0014	error code 14_{hex} = master is in wrong operating mode

Possible error codes

Value [hex]	Description
14	master is in the wrong operating mode here: master is not in the normal mode

9.8 Module 12, extended command 4: write LPS

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = 04 $_{hex}$ = 04 $_{dec}$							
2	reserved = 0															
3	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res.
4	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
5	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
6	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
7…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0204	M=0: AS-i master 1 02 = user ID changes e.g. to 2 04 = command number 4
2	0000	reserved
3	001E	slaves 1(A) to 5(A) *) are to be projected $001E_{hex}$ = 0000 0000 0001 1110_{bin}
4	8000	slave 31(A) *) is to be projected 8000_{hex} = 1000 0000 0000 0000_{bin}
5	0002	slave 1B *) is to be projected
6	0001	slave 16B *) is to be projected

Response from controllere (gateway) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 04_{hex}							
2…18	not changed															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	**0**204	M=0: AS-i master 1 02 = reflected user ID 2 04 = reflected command number 4
2…18	0000	not changed

Response from controllere (gateway) in case of an error

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B=0	M 0/1	reflected user ID					reflected command number = 04_{hex}							
2	reserved = 0															
3	0								error code							
4…18	ignored															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	**8**204	E=1: fault occurred during execution of the command M=0: AS-i master 1 82 = reflected user ID 2 04 = reflected command number 4
2	0000	reserved
3	0014	error code 14_{hex} = master in wrong operating mode

Possible error codes

Value [hex]	Description
14	master is in the wrong operating mode here: master is not in configuration mode

9.9 Module 12, extended command 5: set the operating mode of the AS-i master

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = 05 $_{hex}$ = 05 $_{dec}$							
2	reserved = 0								reserved = 0							
3	0								0							Mod
4…18	not used															

Legend → page 9-3 and

Mod	set the operating mode of the AS-i master Mod=0: activate protected mode Mod=1: activate configuration mode

Example:

Word no.	Value [hex]	Description
1	0105	M=0: AS-i master 1 01 = user ID changes e.g. to 1 05 = command number 5
2	0000	reserved
3	000**0**	activate protected mode
	000**1**	activate configuration mode

Response from controller (gateway) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 05$_{hex}$							
2…18	not changed															

Example:

Word no.	Value [hex]	Description
1	**0**105	M=0: AS-i master 1 01 = reflected user ID 1 05 = reflected command number 5
2…18	0000	not changed

Response from controller (gateway) in case of an error

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B=0	M 0/1	reflected user ID					reflected command number = 05_{hex}							
2	reserved = 0								reserved = 0							
3	0								error code							
4…18	ignored															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	**8**105	E=1: fault occurred during execution of the command M=0: AS-i master 1 01 = reflected user ID 1 05 = reflected command number 5
2	0000	reserved
3	0003	error code 03_{hex} = slave with the address 0 connected

Possible error codes

Value [hex]	Description
03	slave with the address 0 is connected

9.10 Module 12, extended command 6: readdress a connected AS-i slave

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					Command number = 06_{hex} = 06_{dec}							
2	reserved = 0								reserved = 0							
3	0								0	0	A/B 0/1	old slave address				
4	0								0	0	A/B 0/1	new slave address				
5…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0806	M=0: AS-i master 1 08 = user ID changes e.g. to 8 06 = command number 6
2	0000	reserved
3	0029	old slave address 9B (for B slaves: bit 5 = 1→ add 20_{hex} to the address)
4	000B	new slave address 11A

Response from controller (gateway) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 06_{hex}							
2…18	not changed															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	**0**806	M=0: AS-i master 1 08 = reflected user ID 8 06 = reflected command number 6
2…18	0000	not changed

Response from controller (gateway) in case of an error

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B=0	M 0/1	reflected user ID					reflected command number = 06_{hex}							
2	reserved = 0								reserved = 0							
3	0								error code							
4…18	ignored															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	**8**806	E=1: fault occurred during execution of the command M=0: AS-i master 1 88 = reflected user ID 8 06 = reflected command number 6
2	0000	reserved
3	0003	error code 03_{hex} = slave with the address 0 connected

Possible error codes

Value [hex]	Description
01	no slave response or: master is in the offline mode when calling the command
02	no slave with the old address found
03	slave with address 0 connected
04	no slave with the new address found
05	error when deleting the old address
06	error when reading the IO configuration
07	error when writing the new address or the extended ID code 1
08	new address could only be saved temporarily
09	extended ID code 1 could only be saved temporarily
0B	parameter or address invalid
14	master is in the wrong operating mode here: master is not in the normal mode

9.11 Module 12, extended command 7: set the auto address mode of the AS-i master

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = 07 $_{hex}$ = 07 $_{dec}$							
2	reserved = 0								reserved = 0							
3	0								0							Mod
4…18	not used															

Legend → page 9-3 and

Mod	Mode slave reset Mod=0: offline phase when changing over to the protected mode Mod=1: no offline phase when changing over to the protected mode

Example:

Word no.	Value [hex]	Description
1	0407	M=0: AS-i master 1 04 = user ID changes e.g. to 4 07 = command number 7
2	0000	reserved
3	000**0**	automatic addressing deactivated
	000**1**	automatic addressing possible

Response from controller (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 07$_{hex}$							
2…18	not changed															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0407	M=0: AS-i master 1 04 = reflected user ID 4 07 = reflected command number 7
2…18	0000	not changed

9.12 Module 12, extended command 9: change extended ID code 1 in the AS-i slave

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = 09 $_{hex}$ = 09 $_{dec}$							
2	reserved = 0								reserved = 0							
3	0								0	0	A/B 0/1	slave address				
3	0								0				new extended ID code 1			
4…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0F09	M=0: AS-i master 1 0F = user ID changes e.g. to 15 09 = command number 9
2	0000	reserved
3	0011	slave address 17(A) → 11_{hex} (for B slaves: bit 5 = 1 → add 20_{hex} to the address)
4	0008	new extended ID code 1 = 8

Response from controllere (gateway) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 09$_{hex}$							
2…18	not changed															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	**0**F09	M=0: AS-i master 1 0F = reflected user ID 15 09 = reflected command number 9
2	0000	not changed

Response from controllere (gateway) in case of an error

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B=0	M 0/1	reflected user ID					reflected command number = 09_{hex}							
2	reserved = 0								reserved = 0							
3	0								error code							
4…18	ignored															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	**8**F09	E=1: fault occurred during execution of the command M=0: AS-i master 1 8F = reflected user ID 15 09 = reflected command number 9
2	0000	reserved
3	0007	error code 07_{hex} = error when writing the new address or the extended ID code 1 here: slave does not support the extended ID code 1

Possible error codes

Value [hex]	Description
01	no slave response or: master is in the offline mode when calling the command
02	no slave with the old address found
03	slave with address 0 connected
07	error when writing the new address or the extended ID code 1
09	extended ID code 1 could only be saved temporarily
0B	parameter or address invalid

9.13 Module 12, extended command 10...20$_{dec}$ (0A...14$_{hex}$): force analogue data transfer directly to / from 3 AS-i slaves in each case

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = 0A...14$_{hex}$ = 10...20$_{dec}$							
2	reserved = 0								reserved = 0							
3	output data AS-i slave 1(A), channel 0															
4	output data AS-i slave 1(A), channel 1															
5	output data AS-i slave 1, channel 2 or output data AS-i slave 1B, channel 0															
6	output data AS-i slave 1, channel 3 or output data AS-i slave 1B, channel 1															
7	reserved = 0								O3	V3	O2	V2	O1	V1	O0	V0
8	output data AS-i slave 2(A), channel 0															
9	output data AS-i slave 2(A), channel 1															
10	output data AS-i slave 2, channel 2 or output data AS-i slave 2B, channel 0															
11	output data AS-i slave 2, channel 3 or output data AS-i slave 2B, channel 1															
12	reserved = 0								O3	V3	O2	V2	O1	V1	O0	V0
13	output data AS-i slave 3(A), channel 0															
14	output data AS-i slave 3(A), channel 1															
15	output data AS-i slave 3, channel 2 or output data AS-i slave 3B, channel 0															
16	output data AS-i slave 3, channel 3 or output data AS-i slave 3B, channel 1															
17	reserved = 0								O3	V3	O2	V2	O1	V1	O0	V0
18	not used															

Legend → page 9-3 and

V0…V3	Valid Vx=0: data invalid Vx=1: data valid Output data must be valid (V=1) to be enabled in the AS-i slave!
O0...O3	Overflow Ox=0: data are in the valid range Ox=1: data are in the invalid range (especially in case of input modules, when the measuring range is not reached or exceeded)

Example request of DP master:

Word no.	Value [hex]	Description
1	090A	M=0: AS-i master 1 09 = user ID changes e.g. to 9 0A = command number 10
2	0000	reserved
3	0169	output data AS-i slave 1, channel 0
4	0202	output data AS-i slave 1, channel 1
5	0395	output data AS-i slave 1, channel 2
6	1033	output data AS-i slave 1, channel 3
7	0055	overflow and valid bits for AS-i slave 1: 55_{hex} = 0101 0101_{bin} O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
8	2009	output data AS-i slave 2, channel 0
9	2202	output data AS-i slave 2, channel 1
10	0195	output data AS-i slave 2, channel 2
11	1022	output data AS-i slave 2, channel 3
12	0055	overflow and valid bits for AS-i slave 2: 55_{hex} = 0101 0101_{bin} O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
13	3339	output data AS-i slave 3, channel 0
14	1102	output data AS-i slave 3, channel 1
15	1953	output data AS-i slave 3, channel 2
16	1234	output data AS-i slave 3, channel 3
17	0055	overflow and valid bits for AS-i slave 3: 55_{hex} = 0101 0101_{bin} O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1

Response from controllere (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 0A...14_{hex}							
3	input data or reflected output data AS-i slave 1(A), channel 0															
4	input data or reflected output data AS-i slave 1(A), channel 1															
5	input data or reflected output data AS-i slave 1, channel 2 or input data or reflected output data AS-i slave 1B, channel 0															
6	input data or reflected output data AS-i slave 1, channel 3 or input data or reflected output data AS-i slave 1B, channel 1															
7	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0
8	input data or reflected output data AS-i slave 2(A), channel 0															
9	input data or reflected output data AS-i slave 2(A), channel 1															
10	input data or reflected output data AS-i slave 2, channel 2 or input data or reflected output data AS-i slave 2B, channel 0															
11	input data or reflected output data AS-i slave 2, channel 3 or input data or reflected output data AS-i slave 2B, channel 1															
12	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0
13	input data or reflected output data AS-i slave 3(A), channel 0															
14	input data or reflected output data AS-i slave 3(A), channel 1															
15	input data or reflected output data AS-i slave 3, channel 2 or input data or reflected output data AS-i slave 3B, channel 0															
16	input data or reflected output data AS-i slave 3, channel 3 or input data or reflected output data AS-i slave 3B, channel 1															
17	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0
18	not changed															

Legend → page 9-3 and

OVA	channel-independent data valid flag of the A slave / standard slave: OVA=0: the last valid data transfer took place more than 3.5 s ago (TT1) or: the slave has not received new output values (CTT2...5) OVA=1: within max. 3 seconds the slave requests new data (CTT1) or: the slave has received new output values (CTT2...5)
OVB	channel-independent data valid flag of the B slave (from master profile M4 onwards): OVB=0: the slave has not received new output values OVB=1 slave has received new output values **Note:** valid only for reflected output data
TVA	channel-independent data valid flag of the A slave / standard slave: TVA=0: transmission error or timeout occurred TVA=1: analogue data transfer under way
TVB	channel-independent transmission valid flag of the B slave (from master profile M4 onwards): TVB=0: transmission error or timeout occurred TVB=1: analogue data transfer under way **Note:** since this flag evaluates the data transfer cycle which was last completed the response is delayed by up to 140 ms

more → next page

from master profile M4 onwards:

TIA [1])	TIx=0: slave sends input data as value (15-bit length, with sign) TIx=1: slave sends input data as bit pattern (16-bit length, without sign)
TIB [2])	
TOA [1])	TOx=0: slave receives output data as value (15-bit length, with sign) TOx=1: slave receives output data as bit pattern (16-bit length, without sign)
TOB [2])	

[1]) for A slave or standard slave
[2]) for B slave

Example response from controllere (gateway):

Word no.	Value [hex]	Description
1	096F	01 = reflected user ID 9, 6F = command status is "ready" (no fault)
2	000A	0A = reflected command number 10
3	3169	slave 1 is a 4-channel input slave: input data AS-i slave 1, channel 0
4	2202	input data AS-i slave 1, channel 1
5	1395	input data AS-i slave 1, channel 2
6	0033	input data AS-i slave 1, channel 3
7	0255	overflow and valid bits for AS-i slave 1: 0255_{hex} = 0000 0010 0101 0101_{bin} TVA = 1, OVA = 0, O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
8	2229	slave 2 is a 2-channel input slave: input data AS-i slave 2, channel 0
9	2332	input data AS-i slave 2, channel 1
10	7FFF	no valid value for channel 2
11	7FFF	no valid value for channel 3
12	0205	overflow and valid bits for AS-i slave 2: 0205_{hex} = 0000 0010 0000 0101_{bin} TVA = 1, OVA = 0, O3 = 0, V3 = 0, O2 = 0, V2 = 0, O1 = 0, V1 = 1, O0 = 0, V0 = 1
13	3339	slave 3 is a 4-channel input slave: output data AS-i slave 3, channel 0
14	1102	output data AS-i slave 3, channel 1
15	1953	output data AS-i slave 3, channel 2
16	1234	output data AS-i slave 3, channel 3
17	0255	overflow and valid bits for AS-i slave 3: 0255_{hex} = 0000 0010 0101 0101_{bin} TVA = 1, OVA = 0, O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1

Assignment command numbers 10...20 ←→slave addresses

Command number		Slaves		
Decimal	Hexa-decimal			
10	0A	1	2	3
11	0B	4	5	6
12	0C	7	8	9
13	0D	10	11	12
14	0E	13	14	15
15	0F	16	17	18
16	10	19	20	21
17	11	22	23	24
18	12	25	26	27
19	13	28	29	30
20	14	31	–	–

9.14 Module 12, extended command 21_{dec} (15_{hex}): read ID character string of an AS-i slave with the profile 7.4

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = 15 hex = 21 dec							
2	R	R	R	slave address					R	R	number of data bytes to be sent (here = 0)					
3…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0215	M=0: AS-i master 1 02 = user ID changes e.g. to 2 15 = command number 21
2	0300	03 = slave address 3(A)

Response from controller (gateway) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 15_{hex}							
2	TG	R	slave address					0	R	R	number of data bytes to be received					
3	I/O	2D	DT-Start			DT-Count			Mux field			E type				
4	number of parameters to be read								EDT Read			reserved		Diag		reserved
5	EDT Write		reserved						number of parameters to be written							
6	device-specific information								manufacturer identification							
7…16	device-specific information								device-specific information							
17	reserved								number of bytes received							
18	reserved															

Legend → page 9-3 and

TG	toggle length: 1 bit permitted values: 0…1 value changes for each execution of the command
I/O	direction of data for the devices with E type ≠ 3 length: 1 bit permitted values: 0…1 0 = input 1 = output
2D	double data transfer (redundancy) possible length: 1 bit permitted values: 0...1 0 = simple data transfer 1 = double data transfer
DT-Start	start triple (information for the driver in the master)
DT-Count	number of data triples (information for the driver in the master)

Mux field	number of multiplexed data words length: 3 bits permitted values: 0…3 number = Mux field + 1
E type	characterises the slave concerning functionality and data structure length: 5 bits permitted values: 0…31_{dec} 0 = reserved 1 = transferred values are measured values 2 = transferred values are 16 digital bit values 3 = normal operation in 4-bit mode (4I/4O) 4…31_{dec} = reserved
number of parameters to be read	number of bytes which can be read as parameter character string length: 8 bits permitted values: 0…219_{dec} 0 = no parameter character string readable 1…219_{dec} = number of bytes
EDT Read	reserved for later profiles
diag	slave supports the 7.4 diagnostic character string length: 1 bit permitted values: 0...1 0 = diagnostic character string is not supported 1 = diagnostic character string is supported
EDT Write	reserved for later profiles
number of parameters to be written	number of bytes which can be written as parameter character string length: 8 bits permitted values: 0…219_{dec} 0 = no parameter character string readable 1…219_{dec} = number of bytes
manufacturer identification	defined manufacturer number assigned by AS-International
device-specific information	as an option further bytes for manufacturer-specific device description

Response from controllere in the normal case:

Word no.	Value [hex]	Description
1	**0**215	M=0: AS-i master 1 02 = reflected user ID 2 15 = reflected command number 21
2	**0**604	slave address shifted 1 bit to the left→ 3 * 2 = 6 4-byte ID data
	8604	same as above, the most significant bit (TG) changes after each execution
3	2D01	1st word of the ID character string of slave 3(A)
4	0203	2nd word of the ID character string of slave 3(A)
…	…	…
17	0008	the received ID character string is 8 bytes long
18	0000	reserved

Response from controllere (gateway) in case of an error

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B=0	M 0/1	reflected user ID					reflected command number = 15_{hex}							
2	reserved = 0								reserved = 0							
3	0								error code							
4…18	ignored															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	**8**215	E=1: error during command execution M=0: AS-i master 1 x2 = reflected user ID 2 15 = reflected command number 21
2	0000	reserved
3	0014	error code 14_{hex} = master in wrong operating mode here: master is not in the normal mode

Possible error codes

Value [hex]	Description
0C	faulty S-7.4 protocol sequence
0D	S-7.4 protocol aborted (timeout)
0E	invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
0F	AS-i slave has completed the S-7.4 string
10	AS-i S-7.4 no longer connected (no longer in LAS)
11	another S-7.4 transfer to the addressed AS-i slave is already active
12	the previous segmented S-7.4 transfer was not completed
13	invalid S-7.4 data length
14	invalid S-7.4 command

9.15 Module 12, extended command 26_{dec} ($1A_{hex}$): read AS-i master version

Request of DP master

Word no.	Value [hex]	Description
1	131A	M=0: AS-i master 1 13 = user ID changes e.g. to 19 1A = command number 26

Response from controller (gateway)

Word no.	Value [hex]	Description	
1	131A	M=0: AS-i master 1 13 = reflected user ID 19 1A = reflected command number 26	
2	0000	reserved	
3	0100	controller with 1 master	
	0200	controller with 2 masters	
4	0000	place before the decimal point of the version	→ version = 0.237A
5	237A	place after the decimal point of the version	

9.16 Module 12, extended command 28_{dec} ($1C_{hex}$): deactivate the slave reset when changing to the protected mode

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = $1C_{hex}$ = 28_{dec}							
2	reserved = 0								reserved = 0							
3	0								0							Mod
4…18	not used															

Legend → page 9-3 and

Mod	Mode offline phase when changing over to the protected mode: Mod=0: YES → slave reset Mod=1: NO → no slave reset

Example:

Word no.	Value [hex]	Description
1	041C	M=0: AS-i master 1 04 = user ID changes e.g. to 4 1C = command number 28
2	0000	reserved
3	000**0**	offline phase when changing over to the protected mode
	000**1**	no offline phase when changing over to the protected mode

Response from controller (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = $1C_{hex}$							
2…18	not changed															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	041C	M=0: AS-i master 1 04 = reflected user ID 4 1C = reflected command number 28
2…18	0000	not changed

9.17 Module 12, extended command 31_{dec} ($1F_{hex}$): one-time execution of the "Extended safety monitor protocol" in the "Safety at work" monitor

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	0	0	0	user ID					command number = $1F_{hex}$ = 31_{dec}							
2	reserved = 0								reserved = 0							
3	sub command								0	0	0	slave address				
4…16	not used															
17	field number								data length							
18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	071F	07 = user ID changes e.g. to 07, 1F = command number 31
2	0000	reserved
3	001E	00 = sub command 00 = one-time execution of the "Extended safety monitor protocol" in the "Safety at Work" monitor 1E = slave address 30 of the safety monitor
4…16	0000	not used
17	0000	00xx = field number = 0 xx00 = data length = 0
18	0000	not used

Response from controllere (gateway) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M=0	reflected user ID					reflected command number = $1F_{hex}$							
2	reserved = 0								reserved = 0							
3	sub command								0	0	0	slave address				
4	LEDs OSSD 2				LEDs OSSD 1				data call 1				data call 0			
5	OSSD2 not green								OSSD1 not green							
6	1st colour output circuit 1								1st module address output circuit 1							
7	2nd colour output circuit 1								2nd module address output circuit 1							
8	3rd colour output circuit 1								3rd module address output circuit 1							
9	4th colour output circuit 1								4th module address output circuit 1							
10	5th colour output circuit 1								5th module address output circuit 1							
11	6th colour output circuit 1								6th module address output circuit 1							
12	1st colour output circuit 2								1st module address output circuit 2							
13	2nd colour output circuit 2								2nd module address output circuit 2							
14	3rd colour output circuit 2								3rd module address output circuit 2							
15	4th colour output circuit 2								4th module address output circuit 2							
16	5th colour output circuit 2								5th module address output circuit 2							
17	6th colour output circuit 2								6th module address output circuit 2							
18	field number = 0/1								0#00							

Legend → page 9-3 and (→ next pages)

Description of the different fields:

Word no. 4:

LEDs OSSD 1				LEDs OSSD 2				Description
15	14	13	12	11	10	9	8	
0	0	0	0	0	0	0	0	green: contacts of the output circuits closed
0	0	0	1	0	0	0	1	yellow: start-up / restart disable active
0	0	1	0	0	0	1	0	yellow flashing or red contacts of the output circuits open
0	0	1	1	0	0	1	1	red flashing: error on the level of the monitored AS-i components
0	1	x	x	0	1	x	x	reserved (x = any value)

Data call 1				Data call 0				Description
7	6	5	4	3	2	1	0	
0	0	0	0	0	0	0	0	protective operation; everything OK (output circuits which are not available, not configured or dependent are indicated as OK)
0	0	0	1	0	0	0	1	protective operation, output circuit 1 off
0	0	1	0	0	0	1	0	protective operation, output circuit 2 off
0	0	1	1	0	0	1	1	protective operation, both output circuits off
0	1	0	0	0	1	0	0	configuration operation: power on
0	1	0	1	0	1	0	1	configuration operation
0	1	1	0	0	1	1	0	not reserved / not defined
0	1	1	1	0	1	1	1	configuration operation: fatal device error, RESET or replacement of devices required
1	x	x	x	1	x	x	x	no current diagnosis information available, please wait

Word no. 5:

OSSD2 not green			OSSD1 not green			Description
15…12	11	10...8	7…4	3	2...0	
reserved	0	0	reserved	0	0	no modules - responses of the data calls in the words 6..17 are not relevant
reserved	0	1...6	reserved	0	1...6	number of modules which are not green
reserved	0	7	reserved	0	7	more than 6 modules are not green

Word no. 6...17:

1st to 6th module address output circuit 1/2:
Indicates the index of the module of the configuration. The module address which was defined in the program ASIMON is indicated.

1st to 6th colour output circuit 1/2:

3	2	1	0	Description
0	0	0	0	green, continuous
0	0	0	1	green, flashing
0	0	1	0	yellow, continuous
0	0	1	1	yellow, flashing
0	1	0	0	red, continuous
0	1	0	1	red, flashing
0	1	1	0	grey, off

Example ("Safety at work" monitor has not switched):

Word no.	Value [hex]	Description
1	071F	07 = reflected user ID 7 1F = reflected command number 31
2	0000	reserved
3	001E	00 = reflected sub command 0 1E = AS-i slave address 30
4	0000	green: contacts of the output circuits closed
5	0000	both output circuits green
6…17	xxxx	not relevant because 5th word = 0000
18	0100	field number = 1

Example ("Safety at work" monitor has switched):

Word no.	Value [hex]	Description
1	071F	07 = reflected user ID 7 1F = reflected command number 31
2	0000	reserved
3	001E	00 = reflected sub command 0 1E = AS-i slave address 30
4	0211	0xxx = output circuit 2 green x2xx = output circuit 1 red; → word 5 xx11 = protective operation, output circuit 1 off (in both data calls)
5	0003	result from 4th word = OSSD2 green; OSSD1 not green 03 = provides 3 modules which are not green
6	0421	module 33 (21) red, continuous (04)
7	0422	module 34 (22) red, continuous (04)
8	0423	module 35 (23) red, continuous (04)
9…11	xxxx	not relevant because low byte of 5th word = 03→ 3 modules relevant
12…17	xxxx	not relevant, because high byte of 5th word = 00: green → no module relevant
18	0100	field number = 1

Response from controller (gateway) in case of an error

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B=0	M=0	reflected user ID					reflected command number = $1F_{hex}$							
2	reserved = 0								reserved = 0							
3	0								error code							
4…18	ignored															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	871F	E=1: error during command execution 07 = reflected user ID 7 1F = reflected command number 31
2	0000	reserved
3	0011	error code 11_{hex} → no slave with the profile S-7.F.F

Possible error codes

Value [hex]	Description
00…02	general errors during command processing
0A…0C	internal protocol error
10	sub command invalid
11	no slave with the profile S-7.F.F on the slave address
16	the protocol mode of the monitor at the address was changed
20	it was not possible to process the command within the specified time
EE	fatal error during command execution

9.18 Module 12, extended command 33_{dec} (21_{hex}): read the diagnostic character string of an AS-i slave with the profile S-7.4

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	S 0/1	M 0/1	user ID					command number = 21 $_{hex}$ = 33 $_{dec}$							
2	reserved = 0								reserved = 0							
3	R	R	R	slave address					R	R	R	data length				
4…18	not used															

Legend → page 9-3 and

Data length	5 bits for data length (1...31_{dec} bytes ID data)

Example:

Word no.	Value [hex]	Description
1	0721	command only requests 1 data packet M=0: AS-i master 1 07 = user ID changes e.g. to 7 21 = command number 33
2	0301	03 = slave address 3 01 = data length = 1 byte ID data

Response from controller (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	S 0/1	M 0/1	reflected user ID					reflected command number = 21_{hex}							
2	TG	R	slave address					F=0	R	R	number of bytes to be received					
3	diagnostic character string 1								diagnostic character string 0							
4…16	diagnostic character strings 2…27															
17	diagnostic character string 29								diagnostic character string 28							
18	reserved															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0721	M=0: AS-i master 1 07 = reflected user ID 7 21 = reflected command number 33
2	**0**608 or **8**608	x6 = slave address 3 shifted 1 bit to the left → 3 * 2 = 6 08 = 8 bytes ID data The most significant bit (TG) changes depending on the version
3	2D01	1st word of the diagnostic character string of slave 3
4	0203	2nd word of the diagnostic character string of slave 3
5	1122	3rd word of the diagnostic character string of slave 3
6	3344	4th word of the diagnostic character string of slave 3
7…18	0000	reserved

Note: The control bytes defined in profile 7.4 with follow and valid bits are filtered out by the system.

9.19 Module 12, extended command 34_{dec} (22_{hex}): read parameter character string of an AS-i slave with the profile S-7.4

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	S 0/1	M 0/1	user ID					command number = 22 $_{hex}$ = 34 $_{dec}$							
2	reserved = 0								reserved = 0							
3	R	R	R	slave address					R	R	R	data length				
4…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0822	0xxx = command only requests 1 data packet M=0: AS-i master 1 08 = user ID changes e.g. to 8 22 = command number 34
2	0300	03 = slave address 3 00 = data length = 0

Response from controller$_e$ (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	S 0/1	M 0/1	reflected user ID					reflected command number = 21$_{hex}$							
2	TG	R	slave address					F=0	R	R	number of bytes to be received					
3	parameter character string 1								parameter character string 0							
4…16	parameter character string 2...27															
17	parameter character string 29								parameter character string 28							
18	reserved															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0822	data transfer completed M=0: AS-i master 1 08 = reflected user ID 8 22 = reflected command number 34
2	**0**604 or **8**604	x6 = slave address 3 shifted 1 bit to the left → 3 * 2 = 6 04 = 4 byte ID data the most significant bit (TG) changes after each execution
3	1234	1st word of the parameter character string of slave 3
4	5678	2nd word of the parameter character string of slave 3
5…18	0000	reserved

Note: The control bytes defined in profile 7.4 with follow and valid bits are filtered out by the system.

9.20 Module 12, extended command 35_{dec} (23_{hex}): write parameter character string of an AS-i slave with the profile S-7.4

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	S 0/1	M 0/1	user ID					command number = 23 $_{hex}$ = 35 $_{dec}$							
2	R	R	R	slave address					R	R	number of bytes to be sent					
3	parameter character string 1								parameter character string 0							
4…11	parameter character strings 2...17															
12	parameter character string 19								parameter character string 18							
13…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0923	command only requests 1 data packet M=0: AS-i master 1 09 = user ID changes e.g. to 9 23 = command number 35
2	0304	03 = slave address 3 04 = number of bytes to be sent = 4
3	1AF4	1st word of the parameter character string of slave 3
4	5BB8	2nd word of the parameter character string of slave 3
5…18	0000	not used

Response from controller (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	S 0/1	M 0/1	reflected user ID					reflected command number = 23_{hex}							
2	R	R	slave address					F=0	R	R	number of bytes to be sent					
3…18	not changed															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0923	S=0: data transfer completed M=0: AS-i master 1 x9 = reflected user ID 9 23 = reflected command number 35
2	**0**604 or **8**604	06 = slave address shifted by 1 bit to the left → 3 * 2 = 6 04 = 4 bytes ID data to be sent the most significant bit (TG) changes after each execution
3…18	0000	not changed

NOTE

- The number of bytes to be sent must be divisible by 2 since the system always transmits only multiples of 2 bytes in the S7.4 protocol.
- The control bytes defined in profile 7.4 with follow and valid bits are completed by the system. Therefore, without segmentation, this command is limited to 20 bytes of parameter data. Larger data volumes must be divided into segments.

9.21 Module 12, acyclic command 36 $_{dec}$ (24_{hex}): standard read call of an AS-i slave with CTT2 profile (S-7.5.5, S-7.A.5 or S-B.A.5)

– available from master profile M4 onwards –

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	S 0/1	M 0/1	user ID					command number = 24 $_{hex}$ = 36 $_{dec}$							
2	R	R	A/B 0/1	slave address					reserved = 0							
3	number of bytes to be read								Index							
4…18	not used															

Legend → page 9-3 and

Index	Pointer to the page to be read Length: 1 byte Permitted values: 0…255$_{dec}$ (0…FF$_{hex}$) Description: → data sheet of the addressed CTT2 slave
Number of bytes to be read	Number of bytes to be read Length: 1 byte Permitted values: 1…32$_{dec}$ (01…20$_{hex}$) Description: → data sheet of the addressed CTT2 slave

Example:

Word no.	Value [hex]	Description
1	0424	M=0: AS-i master 1 04 = user ID changes e.g. to 4, 24 = command number 36
2	0300	03 = slave address 3(A), 00 = reserved
3	0409	in index 9, 4 parameter bytes are to be read

Response from controller (gateway) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	S 0/1	M 0/1	reflected user ID					reflected command number = 24_{hex}							
2	TG	L32	slave address					F=0	reserved							
3	parameter byte 1								parameter byte0							
4…16	parameter bytes 2...27															
17	parameter byte 29								parameter byte 28							
18	parameter byte 31 or number of bytes read								parameter byte 30							

Legend → page 9-3

NOTE

The high byte in the 18th word contains the number of parameter bytes read as long as the number is < 32 (L32 = 0).

If the length is equal to 32 (= maximum possible length), the bit L32 is set and the high byte in the 18th word contains the 32nd parameter byte.

Example:

Word no.	Value [hex]	Description
1	0424	E=0: no error detected M=0: AS-i master 1 04 = reflected user ID 4 24 = reflected command number 36
2	**0**600 or **8**600	x6 = slave address 3 shifted by 1 bit to the left → 3 * 2 = 6 the most significant bit (TG) changes after each execution
3	1234	1st and 2nd parameter byte of index 9 in slave 3(A)
4	5678	3rd and 4th parameter byte of index 9 in slave 3(A)
5	0000	invalid / not used
…	…	…
18	0400	04 = 4-byte parameter string was read

Response from controller$_E$ (gateway) in case of an error (error detected by AS-i master)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B=0	M 0/1	reflected user ID					reflected command number = 24_{hex}							
2	reserved = 0								reserved = 0							
3	0								error code							
4…18	ignored															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	8424	E=1: error during command execution M=0: AS-i master 1 x4 = reflected user ID changes e.g. to 4 24 = reflected command number 36
2	0000	reserved
3	0016	error code 16_{hex} → timeout during command processing
4…18	0000	ignored

Possible error codes

Value [hex]	Description
16	timeout during command processing
17	wrong slave profile or slave not in LAS master is not in the normal mode
E0…EF	error detected by AS-i slave; see error code CTT2 (see below)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from controllere (gateway) in case of an error (error detected by AS-i slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	S 0/1	M 0/1	reflected user ID					reflected command number = 24_{hex}							
2	TG	0	reserved					F=1	reserved							
3	CTT2 error code								error code = E1							
3…18	not changed															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	8424	E=1: error during command execution M=0: AS-i master 1 x4 = reflected user ID changes e.g. to - 24 = reflected command number 36
2	0100 or 8100	F=1: error during command execution the most significant bit (TG) changes after each execution
3	01E1	CTT2 error code 01 = invalid index, → data sheet of the AS-i slave error code E1 = error detected by AS-i slave; CTT2 error
4…18	0000	ignored

Possible CTT2 error codes

Value [hex]	Description
00	no error
01	invalid index
02	invalid length
03	command not implemented
04	occupied, command could not be completed in the specified time
05	command was not acknowledged

9.22 Module 12, acyclic command 37_{dec} (25_{hex}): standard write call of an AS-i slave with CTT2 profile (S-7.5.5, S-7.A.5 or S-B.A.5)

– available from master profile M4 onwards –

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	S 0/1	M 0/1	user ID					command number = 25 $_{hex}$ = 37 $_{dec}$							
2	R	R	A/B 0/1	slave address					reserved = 0							
3	number of bytes to be sent								Index							
4…16	parameter byte 1								parameter byte 0							
17	parameter bytes 2...27															
18	parameter byte 29								parameter byte 28							

Legend → page 9-3 and

Index	Pointer to the page to be read Length: 1 byte Permitted values: $0…255_{dec}$ ($0…FF_{hex}$) Description: → data sheet of the addressed CTT2 slave
number of bytes to be sent	number of bytes to be sent Length: 1 byte Permitted values: $1…30_{dec}$ ($01…1E_{hex}$) Description: → data sheet of the addressed CTT2 slave

Example:

Word no.	Value [hex]	Description
1	0525	M=0: AS-i master 1 05 = user ID changes e.g. to 05 25 = command number 37
2	0300	03 = slave address 3(A)
3	0207	in index 7, 2 parameter bytes are to be written
4	1AF4	both parameter bytes for slave 3(A)
5…18	0000	not used

Response from controller$_e$ (gateway) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	S 0/1	M 0/1	reflected user ID					reflected command number = 25_{hex}							
2	TG	0	reserved					F=0	reserved							
3…18	not changed															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0525	E=0: no error detected M=0: AS-i master 1 05 = reflected user ID changes e.g. to 5 25 = reflected command number 37
2	0000 or 8000	F=0: no error detected the most significant bit (TG) changes after each execution

Response from controller$_e$ (gateway) in case of an error (error detected by AS-i master)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B=0	M 0/1	reflected user ID					reflected command number = 25_{hex}							
2	reserved = 0								reserved = 0							
3	0								error code							
4…18	ignored															

Example:

Word no.	Value [hex]	Description
1	8525	E=1: error during command execution M=0: AS-i master 1 05 = reflected user ID changes e.g. to 5 25 = reflected command number 37
2	0000	reserved
3	0016	error code 16_{hex} → timeout during command processing

Possible error codes

Value [hex]	Description
16	timeout during command processing
17	wrong slave profile or slave not in LAS or master is not in the normal mode
E0...EF	error detected by AS-i slave; note error code CTT2 (see below)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from controller$_E$ (gateway) in case of an error (error detected by AS-i slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B=0	M 0/1	reflected user ID					reflected command number = 25_{hex}							
2	TG	0	reserved					F=1	reserved							
3	CTT2 error code								error code = $E1_{hex}$							
4…18	ignored															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	8525	E=1: error during command execution M=0: AS-i master 1 05 = reflected user ID changes e.g. to 5 25 = reflected command number 37
2	0100 or 8100	F=1: error during command execution the most significant bit (TG) changes after each execution
3	01E1	CTT2 error code 01 = invalid index, → data sheet of the AS-i slave error code E1 = error detected by AS-i slave; CTT2 error

Possible CTT2 error codes

Value [hex]	Description
00	no error
01	invalid index
02	invalid length
03	command not implemented
04	used; it was not possible to complete the command in the specified time
05	command was not acknowledged

9.23 Module 12, acyclic command 38_{dec} (26_{hex}): manufacturer-specific read call of an AS-i slave with CTT2 profile (S-7.5.5, S-7.A.5 or S-B.A.5)

– available from master profile M4 onwards –

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	S 0/1	M 0/1	user ID					command number = 26 hex = 38 dec							
2	R	R	A/B 0/1	slave address					reserved = 0							
3	number of bytes to be read								Index							
4…18	not used															

Legend → page 9-3 and

Index	Pointer to the page to be read Length: 1 byte Permitted values: $0…255_{dec}$ ($0…FF_{hex}$) Description: → data sheet of the addressed CTT2 slave
Number of bytes to be read	Number of bytes to be read Length: 1 byte Permitted values: $1…32_{dec}$ ($01…20_{hex}$) Description: → data sheet of the addressed CTT2 slave

Example:

Word no.	Value [hex]	Description
1	0626	M=0: AS-i master 1 06 = user ID changes e.g. to 6 26 = command number 38
2	0300	03 = slave address 3(A)
3	0409	in index 9, 4 parameter bytes are to be read

Response from controllere (gateway) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	S 0/1	M 0/1	reflected user ID					reflected command number = 26_{hex}							
2	TG	L32	reserved					F=0	reserved							
3	parameter byte 1								parameter byte 0							
4…16	parameter bytes 2...27															
17	parameter byte 29								parameter byte 28							
18	parameter byte 31 or number of bytes read								parameter byte 30							

Legend → page 9-3

NOTE

The high byte in the 18th word contains the number of parameter bytes read as long as the number is < 32 (L32 = 0).

If the length is 32 (= maximum possible length), the bit L32 is set and the high byte in the 18th word contains the 32nd parameter byte.

Example:

Word no.	Value [hex]	Description
1	0626	E=0: no error detected M=0: AS-i master 1 06 = reflected user ID changes e.g. to 6 26 = reflected command number 38
2	0000 or 8000	L32=0: number of parameter bytes < 32_{dec} F=0: no error the most significant bit (TG) changes after each execution
3	1234	1st and 2nd parameter byte of index 9 in slave 4
4	5678	3rd and 4th parameter byte of index 9 in slave 4
5…17	0000	invalid / not used
18	0400	4-byte parameter string was read

Response from controller$_e$ (gateway) in case of an error (error detected by AS-i master)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B=0	M 0/1	reflected user ID					reflected command number = 26_{hex}							
2	reserved = 0								reserved = 0							
3	0								error code							
4…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	8626	E=1: error during command execution M=0: AS-i master 1 06 = reflected user ID changes e.g. to 6 26 = reflected command number 38
2	0000	reserved
3	0016	error code 16_{hex} → timeout during command processing

Possible error codes

Value [hex]	Description
16	timeout during command processing
17	wrong slave profile or slave not in LAS master is not in the normal mode
E0...EF	error detected by AS-i slave; note error code CTT2 (see below)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from controller$_e$ (gateway) in case of an error (error detected by AS-i slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B=0	M 0/1	reflected user ID					reflected command number = 26_{hex}							
2	TG	0	reserved					F=1	reserved							
3	CTT2 error code								error code = $E1_{hex}$							
4…18	ignored															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	8626	E=1: error during command execution M=0: AS-i master 1 06 = reflected user ID changes e.g. to 6 26 = reflected command number 38
2	0100 or 8100	F=1: error during command execution the most significant bit (TG) changes after each execution
3	01E1	CTT2 error code 01 = invalid index, → data sheet of the AS-i slave error code E1 = error detected by AS-i slave; CTT2 error

Possible CTT2 error codes

Value [hex]	Description
00	no error
01	invalid index
02	invalid length
03	command not implemented
04	used; it was not possible to complete the command in the specified time
05	command was not acknowledged

9.24 Module 12, acyclic command 39_{dec} (27_{hex}): manufacturer-specific write call of an AS-i slave with CTT2 profile (S-7.5.5, S-7.A.5 or S-B.A.5)

– available from master profile M4 onwards –

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	S 0/1	M 0/1	user ID					command number = 27 $_{hex}$ = 39 $_{dec}$							
2	R	R	A/B 0/1	slave address					reserved = 0							
3	number of bytes to be sent								Index							
4	parameter byte 1								parameter byte 0							
5…17	parameter bytes 2...27															
18	parameter byte 29								parameter byte 28							

Legend → page 9-3 and

Index	Pointer to the page to be read Length: 1 byte Permitted values: $0…255_{dec}$ ($0…FF_{hex}$) Description: → data sheet of the addressed CTT2 slave
Number of bytes to be sent	Number of bytes to be sent Length: 1 byte Permitted values: $1…30_{dec}$ ($01…1E_{hex}$) Description: → data sheet of the addressed CTT2 slave

Example:

Word no.	Value [hex]	Description
1	0727	M=0: AS-i master 1 07 = user ID changes e.g. to 7 27 = command number 39
2	0300	03 = slave address 3(A)
3	0207	in index 7, 2 parameter bytes are to be written
4	1AF4	both parameter bytes for slave 3(A)
5…18	0000	not used

Response from controller (gateway) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	S 0/1	M 0/1	reflected user ID					reflected command number = 27_{hex}							
2	TG	0	reserved					F=0	reserved							
3…18	not changed															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0727	E=0: no error detected M=0: AS-i master 1 07 = reflected user ID changes e.g. to 7 27 = reflected command number 39
2	0000 or 8000	the most significant bit (TG) changes after each execution

Response from controller$_E$ (gateway) in case of an error (error detected by AS-i master)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B=0	M 0/1	reflected user ID					reflected command number = 27_{hex}							
2	reserved = 0								reserved = 0							
3	0								error code							
4…18	not changed															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	876B	E=1: error during command execution M=0: AS-i master 1 07 = reflected user ID changes e.g. to 7 27 = reflected command number 39
2	0000	reserved
3	0016	error code 16_{hex} → timeout during command processing

Possible error codes

Value [hex]	Description
16	timeout during command processing
17	wrong slave profile or slave not in LAS master is not in the normal mode
E0...EF	error detected by AS-i slave; see error code CTT2 (see below)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from controller$_E$ (gateway) in case of an error (error detected by AS-i slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=1	B=0	M 0/1	reflected user ID					reflected command number = 27_{hex}							
2	TG	0	reserved					F=1	reserved							
3	CTT2 error code								error code = $E1_{hex}$							
4…18	not changed															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	076B	E=1: error during command execution M=0: AS-i master 1 07 = reflected user ID changes e.g. to 7 27 = reflected command number 39
2	0100 or 8100	F=1: error during command execution, the most significant bit (TG) changes after each execution
3	01E1	CTT2 error code 01 = invalid index, → data sheet of the AS-i slave error code E1 = error detected by AS-i slave; CTT2 error

Possible CTT2 error codes:

Value [hex]	Description
00	no error
01	invalid index
02	invalid length
03	command not implemented
04	used; it was not possible to complete the command in the specified time
05	command was not acknowledged

9.25 Module 12, extended command 50_{dec} (32_{hex}): read current configuration of AS-i slaves 0(A)...15(A)

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = 32 $_{hex}$ = 50 $_{dec}$							
2	reserved = 0								reserved = 0							
3…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0232	M=0: AS-i master 1 x2 = user ID changes e.g. to 2 32 = command number 50

Response from controller (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 32_{hex}							
2	reserved = 0								reserved = FF_{hex}							
3	Slave 0(A): ID2				Slave 0(A): ID1				Slave 0(A): ID code				Slave 0(A): IO config.			
4	Slave 1(A): ID2				Slave 1(A): ID1				Slave 1(A): ID code				Slave 1(A): IO config.			
5…17	…				…				…				…			
18	Slave 15(A): ID2				Slave 15(A): ID1				Slave 15(A): ID code				Slave 15(A): IO config.			

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0232	M=0: AS-i master 1 2 = reflected user ID changes e.g. to 2 32 = reflected command number 50
2	00FF	reserved
3	FFFF	Current configuration slave 0(A) ID2 = F, ID1 = F, ID = F, IO = F → slave is not present
4	EF03	Current configuration slave 1(A) ID2 = E, ID1 = F, ID = 0, IO = 3
…	…	…
18	EF37	Current configuration slave 15(A) ID2 = E, ID1 = F, ID = 3, IO = 7

9.26 Module 12, extended command 51_{dec} (33_{hex}): read current configuration of AS-i slaves 16(A)...31(A)

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = 33 $_{hex}$ = 51 $_{dec}$							
2	reserved = 0								reserved = 0							
3…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0333	M=0: AS-i master 1 x3 = user ID changes e.g. to 3 33 = command number 51

Response from controller$_e$ (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 33_{hex}							
2	reserved = 0								reserved = FF_{hex}							
3	Slave 16(A): ID2				Slave 16(A): ID1				Slave 16(A): ID code				Slave 16(A): IO config.			
4	Slave 17(A): ID2				Slave 17(A): ID1				Slave 17(A): ID code				Slave 17(A): IO config.			
5…17	…				…				…				…			
18	Slave 31(A): ID2				Slave 31(A): ID1				Slave 31(A): ID code				Slave 31(A): IO config.			

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0333	M=0: AS-i master 1 03 = reflected user ID changes e.g. to 3 33 = reflected command number 51
2	00FF	reserved
3	FFFF	Current configuration slave 16(A) ID2 = F, ID1 = F, ID = F, IO = F → slave is not present
4	EF03	Current configuration slave 17(A) ID2 = E, ID1 = F, ID = 0, IO = 3
…	…	…
18	EF37	Current configuration slave 31(A) ID2 = E, ID1 = F, ID = 3, IO = 7

9.27 Module 12, extended command 52_{dec} (34_{hex}): read current configuration of the AS-i slaves 1B...15B

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = 34 $_{hex}$ = 52 $_{dec}$							
2	reserved = 0								reserved = 0							
3…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0434	M=0: AS-i master 1 04 = user ID changes e.g. to 4 34 = command number 52

Response from controller (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 34_{hex}							
2	reserved = 0								reserved = FF_{hex}							
3	not used = FF_{hex}								not used = FF_{hex}							
4	Slave 1B: ID2				Slave 1B: ID1				Slave 1B: ID code				Slave 1B: IO config.			
5	Slave 2B: ID2				Slave 2B: ID1				Slave 2B: ID code				Slave 2B: IO config.			
6…17	…				…				…				…			
18	Slave 15B: ID2				Slave 15B: ID1				Slave 15B: ID code				Slave 15B: IO config.			

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0434	M=0: AS-i master 1 x04 = reflected user ID changes e.g. to 4 34 = reflected command number 52
2	00FF	reserved
3	FFFF	not used → slave 0B is not possible
4	EF03	current configuration of slave 1B ID2 = E, ID1 = F, ID = 0, IO = 3
…	…	…
18	EF37	current configuration of slave 15B ID2 = E, ID1 = F, ID = 3, IO = 7

9.28 Module 12, extended command 53_{dec} (35_{hex}): read current configuration of the AS-i slaves 16B...31B

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = 35_{hex} = 35_{dec}							
2	reserved = 0								reserved = 0							
3…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0535	M=0: AS-i master 1 05 = user ID changes e.g. to 5 35 = command number 53

Response from controller (gateway):

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 35_{hex}							
2	reserved = 0								reserved = FF_{hex}							
3	Slave 16B: ID2				Slave 16B: ID1				Slave 16B: ID code				Slave 16B: IO config.			
4	Slave 17B: ID2				Slave 17B: ID1				Slave 17B: ID code				Slave 17B: IO config.			
5…17	…				…				…				…			
18	Slave 31B: ID2				Slave 31B: ID1				Slave 31B: ID code				Slave 31B: IO config.			

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0535	M=0: AS-i master 1 05 = reflected user ID changes e.g. to 5 35 = reflected command number 53
2	00FF	reserved
3	FFFF	current configuration of slave 16B ID2 = F, ID1 = F, ID = F, IO = F → slave is not present
4	EF03	current configuration of slave 17B ID2 = E, ID1 = F, ID = 0, IO = 3
…	…	…
18	EF37	current configuration of slave 31B ID2 = E, ID1 = F, ID = 3, IO = 7

9.29 Module 12, extended command 54_{dec} (36_{hex}): read current parameters of the connected AS-i slaves

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = 36_{hex} = 54_{dec}							
2…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0636	M=0: AS-i master 1 06 = user ID changes e.g. to 6 36 = command number 54

Response from controller (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 36_{hex}							
2	reserved = 0								reserved = FF_{hex}							
3	Param. Slave 4(A)								Param. Slave 3(A)				Param. Slave 2(A)			Param. Slave 1(A)
4	Param. Slave 8(A)								Param. Slave 7(A)				Param. Slave 6(A)			Param. Slave 5(A)
5	Param. Slave 12(A)								Param. Slave 11(A)				Param. Slave 10(A)			Param. Slave 9(A)
6	Param. Slave 16(A)								Param. Slave 15(A)				Param. Slave 14(A)			Param. Slave 13(A)
7	Param. Slave 20(A)								Param. Slave 19(A)				Param. Slave 18(A)			Param. Slave 19(A)
8	Param. Slave 24(A)								Param. Slave 23(A)				Param. Slave 22(A)			Param. Slave 21(A)
9	Param. Slave 28(A)								Param. Slave 27(A)				Param. Slave 26(A)			Param. Slave 25(A)
10	Param. Slave 1B								Param. Slave 31(A)				Param. Slave 30(A)			Param. Slave 29(A)
11	Param. Slave 5B								Param. Slave 4B				Param. Slave 3B			Param. Slave 2B
12	Param. Slave 9B								Param. Slave 8B				Param. Slave 7B			Param. Slave 6B
13	Param. Slave 13B								Param. Slave 12B				Param. Slave 11B			Param. Slave 10B
14	Param. Slave 17B								Param. Slave 16B				Param. Slave 15B			Param. Slave 14B
15	Param. Slave 21B								Param. Slave 20B				Param. Slave 19B			Param. Slave 18B
16	Param. Slave 25B								Param. Slave 24B				Param. Slave 23B			Param. Slave 22B
17	Param. Slave 29B								Param. Slave 28B				Param. Slave 27B			Param. Slave 26B
18	not used								not used				Param. Slave 31B			Param. Slave 30B

Example:

Word no.	Value [hex]	Description
1	0636	M=0: AS-i master 1 06 = reflected user ID changes e.g. to 6 36 = reflected command number 54
2	00FF	reserved
3	4321	current parameters of slave 1(A) to slave 4(A): 1 = slave 1(A), 2 = slave 2(A), 3 = slave 3(A), 4 = slave 4(A)
4	8765	current parameters of slave 5(A) to slave 8(A): 5 = slave 5(A), 6 = slave 6(A), 7 = slave 7(A), 8 = slave 8(A)
…	…	…
9	6543	current parameters of slave 29(A) to slave 1B: 3 = slave 29(A), 4 = slave 30(A), 5 = slave 31(A), 6 = slave 1B
…	…	…
17	FE98	current parameters of slave 26(B) to slave 29B: 8 = slave 26B, 9 = slave 27B, E = slave 28B, F = slave 29B
18	0098	current parameters of slave 30B to slave 31B: 8 = slave 30B, 9 = slave 31B

9.30 Module 12, extended command 55_{dec} (37_{hex}): read current AS-i slave lists

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = 37_{hex} = 55_{dec}							
2…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0737	M=0: AS-i master 1 07 = user ID changes e.g. to 7 37 = command number 55

Response from controllere (gateway)

Bit / Word	–	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	–	E=0	B=0	M 0/1	reflected user ID					reflected command number = 37_{hex}							
2		reserved = 0								reserved = FF_{hex}							
3	**LAS**	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res.
4		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
5		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
6		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
7	**LDS**	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0(A)
8		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
9		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
10		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
11	**LPF**	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res.
12		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
13		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
14		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
15	**LPS**	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res.
16		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
17		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
18		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0737	M=0: AS-i master 1 x07 = reflected user ID changes e.g. to 7 37 = reflected command number 55
2	00FF	reserved
3	0102*	LAS slaves 0(A) up to 15(A): here: slaves 1(A) and 8(A) are active
4	8001**	LAS slaves 16(A) to 31(A): here: slaves 16(A) and 31(A) are active
5	0102*	LAS slaves 0B to 15B: here: slaves 1B and 8B are active
6	8001**	LAS slaves 16B to 31B: here: slaves 16B and 31B are active
7	0102*	LDS slaves 0 to 15(A): here: slaves 1(A) and 8(A) are detected
8	8001**	LDS slaves 16(A) to 31(A): here: slaves 16(A) and 31(A) are detected
9	0102*	LDS slaves 0B to 15B: here: slaves 1B and 8B are detected
10	8001**	LDS slaves 16B to 31B: here: slaves 16B and 31B are detected
11	0102*	LPF slaves 0(A) to 15(A): here: periphery fault of slaves 1(A) and 8(A)
12	8001**	LPF slaves 16(A) to 31(A): here: periphery fault of slaves 16(A) and 31(A)
13	0102*	LPF slaves 0B to 15B: here: periphery fault of slaves 1B and 8B
14	8001**	LPF slaves 16B to 31B: here: periphery fault of slaves 16B and 31B
15	0102*	LPS slaves 0(A) to 15(A): here: slaves 1(A) and 8(A) are projected
16	8001**	LPS slaves 16(A) to 31(A): here: slaves 16(A) and 31(A) are projected
17	0102*	LPS slaves 0B to 15B: here: slaves 1B and 8B are projected
18	8001**	LPS slaves 16B to 31B: here: slaves 16B and 31B are projected

*) 0102_{hex} = 0000 0001 0000 0010_{bin}

**) 8001_{hex} = 1000 0000 0000 0001_{bin}

9.31 Module 12, extended command 56_{dec} (38_{hex}): read projected configuration of the AS-i slaves 0(A)...15(A)

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = 38_{hex} = 56_{dec}							
2…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0238	M=0: AS-i master 1 02 = user ID changes e.g. to 2 38 = command number 56

Response from controllere (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 38_{hex}							
2	reserved = 0								reserved = FF_{hex}							
3	not used = FF_{hex}								not = FF_{hex}							
4	Slave 1(A): ID2				Slave 1(A): ID1				Slave 1(A): ID code				Slave 1(A): IO config.			
5…17	…				…				…				…			
18	Slave 15(A): ID2				Slave 15(A): ID1				Slave 15(A): ID code				Slave 15(A): IO config.			

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0238	M=0: AS-i master 1 02 = reflected user ID changes e.g. to 2 38 = reflected command number 56
2	00FF	reserved
3	FFFF	not used → projected slave 0(A) is not possible
4	EF03	projected configuration of slave 1(A) ID2 = E, ID1 = F, ID = 0, IO = 3
…	…	…
18	EF37	projected configuration of slave 15(A) ID2 = E, ID1 = F, ID = 3, IO = 7

9.32 Module 12, extended command 57_{dec} (39_{hex}): read projected configuration of the AS-i slaves 16(A)...31(A)

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = 39_{hex} = 57_{dec}							
2…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0339	M=0: AS-i master 1 03 = user ID changes e.g. to 3 39 = command number 57

Response from controllere (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = 39_{hex}							
2	reserved = 0								reserved = FF_{hex}							
3	Slave 16(A): ID2				Slave 16(A): ID1				Slave 16(A): ID code				Slave 16(A): IO config.			
4	Slave 17(A): ID2				Slave 17(A): ID1				Slave 17(A): ID code				Slave 17(A): IO config.			
5…17	…				…				…				…			
18	Slave 31(A): ID2				Slave 31(A): ID1				Slave 31(A): ID code				Slave 31(A): IO config.			

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0339	M=0: AS-i master 1 03 = reflected user ID changes e.g. to 3 39 = reflected command number 57
2	00FF	reserved
3	FFFF	projected configuration of slave 16(A) ID2 = F, ID1 = F, ID = F, IO = F → slave is not present
4	EF03	projected configuration of slave 17(A) ID2 = E, ID1 = F, ID = 0, IO = 3
…	…	…
18	EF37	projected configuration of slave 31(A) ID2 = E, ID1 = F, ID = 3, IO = 7

9.33 Module 12, extended command 58_{dec} ($3A_{hex}$): read projected configuration of the AS-i slaves 1B...15B

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = $3A_{hex}$ = 58_{dec}							
2…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	043A	M=0: AS-i master 1 04 = user ID changes e.g. to 4 3A = command number 58

Response from controllere (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = $3A_{hex}$							
2	reserved = 0								reserved = FF_{hex}							
3	not used = FF_{hex}								not used = FF_{hex}							
4	Slave 1B: ID2				Slave 1B: ID1				Slave 1B: ID code				Slave 1B: IO config.			
5	Slave 2B: ID2				Slave 2B: ID1				Slave 2B: ID code				Slave 2B: IO config.			
6…17	…				…				…				…			
18	Slave 15B: ID2				Slave 15B: ID1				Slave 15B: ID code				Slave 15B: IO config.			

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	043A	M=0: AS-i master 1 04 = reflected user ID changes e.g. to 4 3A = reflected command number 58
2	00FF	reserved
3	FFFF	not used → slave 0B is not possible
4	EF03	projected configuration of slave 1B ID2 = E, ID1 = F, ID = 0, IO = 3
…	…	…
18	EF37	projected configuration of slave 15B ID2 = E, ID1 = F, ID = 3, IO = 7

9.34 Module 12, extended command 59_{dec} ($3B_{hex}$): read projected configuration of the AS-i slaves 16B...31B

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	M 0/1	user ID					command number = $3B_{hex}$ = 59_{dec}							
2…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	053B	M=0: AS-i master 1 05 = user ID changes e.g. to 5 3B = command number 59

Response from controllere (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	M 0/1	reflected user ID					reflected command number = $3B_{hex}$							
2	reserved = 0								reserved = FF_{hex}							
3	Slave 16B: ID2				Slave 16B: ID1				Slave 16B: ID code				Slave 16B: IO config.			
4	Slave 17B: ID2				Slave 17B: ID1				Slave 17B: ID code				Slave 17B: IO config.			
5…17	…				…				…				…			
18	Slave 31B: ID2				Slave 31B: ID1				Slave 31B: ID code				Slave 31B: IO config.			

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	053B	M=0: AS-i master 1 05 = reflected user ID changes e.g. to 5 3B = reflected command number 59
2	00FF	reserved
3	FFFF	projected configuration of slave 16B ID2 = F, ID1 = F, ID = F, IO = F → slave is not present
4	EF03	projected configuration of slave 17B ID2 = E, ID1 = F, ID = 0, IO = 3
…	…	…
18	EF37	projected configuration of slave 31B ID2 = E, ID1 = F, ID = 3, IO = 7

9.35 Module 12, extended command 96_{dec} (60_{hex}): save data non-volatilely in the flash memory of the controllere

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	R	user ID					command number = 60_{hex} = 96_{dec}							
2	reserved = 0								reserved = 0							
3	0								area number							
4…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0965	09 = user ID changes e.g. to 9, 60 = command number 96
2	0000	reserved
3	0002	area number: 02 = save the configuration of AS-i master 1 non-volatilely 03 = save the configuration of AS-i master 2 non-volatilely

Response from controllere (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	R	reflected user ID					reflected command number = 60_{hex}							
2	reserved = 0								reserved = 0							
3	0								reflected area number							
4…18	not changed															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0960	09 = reflected user ID changes e.g. to 9, 60 = reflected command number 96
2	0000	reserved
3	0002	reflected area number 02 = save the configuration of AS-i master 1 non-volatilely

9.36 Module 12, extended command 97_{dec} (61_{hex}): carry out various settings in the controllere

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	R	user ID					command number = 61_{hex} = 97_{dec}							
2	reserved = 0								reserved = 0							
3	0								command number							
4	parameters (according to command number)															
5…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0861	08 = user ID changes e.g. to 8, 61 = command number 97
2	0000	reserved
3	0010	command number 10_{hex} = changes the operating mode of the PLC (corresponding parameters → word 4) Further command numbers: 12_{hex} = reset all slave error counters 13_{hex} = reset configuration error counter 14_{hex} = reset AS-i cycle error counter
4	0002	Parameters; here for command number 10: 0000_{hex} = activates the gateway mode 0001_{hex} = stops the PLC 0002_{hex} = sets the operation mode of the PLC to RUN

Response from controllere (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	R	reflected user ID					reflected command number = 61_{hex}							
2…18	reserved															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0861	08 = reflected user ID changes e.g. to 8, 61 = reflected command number 97

9.37 Module 12, extended command 102_{dec} (66_{hex}): retrieve the status of the controllere display

Request of DP master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	R	user ID					command number = 66_{hex} = 102_{dec}							
2	reserved = 0								reserved = 0							
3	0								command number = 01_{hex}							
4	parameters (according to command number)															
5…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0766	07 = user ID changes e.g. to 7, 66 = command number 102
2	0000	reserved
3	0001	command number, here: 01 = retrieves the display status further command numbers: 02 = jump to menu screen 0 03 = jump to user menu screen A1

Response from controllere (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	R	reflected user ID					reflected command number = 66_{hex}							
2	reserved = 0								reserved = 0							
3	buttons pressed															
4	activated menu area															
5	process error occurred															
6	currently displayed menu screen															
7	activated system language															
8…18	reserved															

Legend → page 9-3 and

Word	Value [hex]	Description	
3 = buttons pressed	0001	left button pressed	combinations possible by adding the values
	0002	button [▲] is pressed	
	0004	button [▼] is pressed	
	0008	right button pressed	
4 = active menu area	00A0	system menu is active	
	00A1	user menu is active	
	00AE	process error display is active (E10...E30)	
	00AF	system error display is active (acknowledgement required)	
5 = process error occurred	0000	no process error	
	0001	process error occurred	
6 = currently displayed menu screen	xxxx	number of the current menu screen	
7 = activated system language	0000	display of menus in English	
	0001	display of menus in the second system language (e.g. German)	

Example:

Word no.	Value [hex]	Description
1	0766	07 = reflected user ID changes e.g. to 7, 66 = reflected command number 102
2	0000	reserved
3	0001	01 = reflected command number
4	0008	08 = right button pressed
5	00A0	A0 = system menu active
6	0001	01 = process error occurred
7	001B	001B = menu screen 27 "Quick Setup" is displayed
8	0000	00 = display of menus in English

9.38 Module 12, extended command 105_{dec} (69_{hex}): read the device properties of the controllere

Request of DP master:

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	R	R	R	user ID					command number = 69_{hex} = 105_{dec}							
2…18	not used															

Legend → page 9-3

Example:

Word no.	Value [hex]	Description
1	0669	06 = user ID changes e.g. to 6, 69 = command number 105

Response from controllere (gateway)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	E=0	B=0	R	reflected user ID					reflected command number = 69_{hex}							
2	reserved = 0								reserved = 0							
3	2M	DP	EN	reserved					PLC mode							
4	0								fieldbus type							
5	0								flash memory type							
6	hardware version															
7	RTS firmware version number															
8	RTS firmware release number															
9	AS-i master 1 firmware version number															
10	AS-i master 1 firmware release number															
11	AS-i master 2 firmware version number															
12	AS-i master 2 firmware release number															
13	Linux kernel version															
14	Linux ramdisk version															
15…18	reserved															

Legend → page 9-3 and

2M	0_{bin}	device with 1 AS-i master
	1_{bin}	device with 2 AS-i masters
DP	0_{bin}	fieldbus interface Profibus DP(V1) not available
	1_{bin}	fieldbus interface Profibus DP is available
EN	0_{bin}	device without Ethernet programming interface
	1_{bin}	device without Ethernet programming interface
PLC mode	01_{hex}	PLC is in the RUN mode
	02_{hex}	PLC is in the STOP mode
	04_{hex}	PLC stops at the breakpoint
	08_{hex}	gateway mode
fieldbus type	01_{hex}	Anybus Profibus DP
	04_{hex}	Anybus CANopen
	05_{hex}	Anybus DeviceNet
	09_{hex}	Anybus Ethernet IT
	$0A_{hex}$	Anybus Ethernet/IP
	$0B_{hex}$	ifm Profibus DP
	$0C_{hex}$	no fieldbus module detected

Example:

Word no.	Value [hex]	Description
1	0669	06 = reflected user ID changes e.g. to 6, 69 = reflected command number 105
2	0000	reserved
3	4008	40_{hex} = 0100 0000_{bin} 2M = 0 → with one AS-i master, DP = 1 → Profibus DP controller, EN = 0 → without Ethernet programming interface, PLC mode 08_{hex} = gateway; signal preprocessing is not used
4	000B	0B = fieldbus interface "ifm Profibus DP" used
5	0002	flash memory type
6	1000	hardware version
7	0002	1st part of the RTS firmware number 02.218B: RTS firmware version number = 02
8	218B	2nd part of the RTS firmware number 02.218B: RTS firmware release number = 218B
9	0000	1st part of the firmware number 0.238A for AS-i master 1: AS-i master 1 firmware version number = 0
10	238A	2nd part of the firmware number 0.238A for AS-i master 1: AS-i master 1 firmware release number = 238A
11	0000	1st part of the firmware number 0.238A for AS-i master 2: AS-i master 2 firmware version number = 0
12	238A	2nd part of the firmware number 0.238A for AS-i master 2: AS-i master 2 firmware release number = 238A
13	0196	Linux kernel version: 0196_{hex} = 406_{dec}
14	0A6E	Linux ramdisk version: $0A.6E_{hex}$ = 10.110_{dec}

10 Acyclic services for Profibus DPV1

10.1 Description

A main focus of the Profibus power stage DPV1 is the additionally available acyclic data transfer. Field devices can be assigned parameters and calibrated during operation, and acknowledged alarm messages are made possible. The transfer of the acyclic data is carried out in parallel to the cyclic data transfer, but with a low priority.

There is read or write access via virtual slots and indexes. Via slots and indexes, access to data blocks of up to 244 bytes is possible. With Siemens Step7, slot 0 is always assigned to the device itself and can always be addressed.

- The controller$_e$ supports acyclic data transfer with DPM1 and DPM2 masters.
- The access to parts of the data block in slot 0 is only possible by reducing the length. The offset of the data is always 0 bytes for all data fields when access is made via slot 0 and index.
- In case of a data length of 0, the entire length of the slot is returned. An error code is not returned in case of length 0.
- So, the M1 master flags can only be read in conjunction with the M1 digital inputs.
- In case of access via slot 0, index 10, the projected parameters (PP) can only be written in conjunction with the projected configuration data (PCD).
- Given that the Profibus FDT scheme (FDT = **F**ield **D**evice **T**ool) only allows access without length indication, the controller$_e$ shortens the data blocks always to the maximum data length intended for the slot/index. If the requested data length exceeds 160 bytes (= max. intended length in the controller$_e$), it is also reduced to the length of the requested data block.

⚠ WARNING

Danger due to outputs which are not switched off when the AS-i master or the AS-i connection fails!

For acyclic services, no cyclic repetition of the command is intended for system-related reasons. There is no watchdog for acyclic services.

► Always start dangerous movements by means of **cyclic** services!

10.2 Services for acyclic data transfer between DPM1 master and slave

The connection-oriented data transfer is carried out via an MS1 connection. This is established in DPM1 and is very closely linked to the connection for the cyclic data transfer. It can only be used by the master which has set and also configured the corresponding slave.

Read	The master reads a data block of the slave.
Write	The slave writes a data block to the master.

10.3 Services for acyclic data transfer between DPM2 master and slave

The connection-oriented data transfer is carried out via an MS2 connection. This is established by DPM2 prior to start of the acyclic data transfer by means of the service `Initiate`. Then the connection can be used for the services `Read` and `Write`. Termination of the connection is carried out accordingly. A slave can maintain several active MS2 connections at the same time, only limited by the resources available in the slave.

Initiate / Abort	Establishment or termination of a connection for acyclic data transfer between DPM2 and the slave.
Read	The master reads a data block of the slave.
Write	The slave writes a data block to the master.

10.4 DPV1 addresses in slot 0 for access via PLC

Access always as from byte 0

DPV1 addresses in slot 0			Contents	Access r = read w = write	Size [words]	IEC addresses
Index	Byte no. from	Byte no. to				
0	0	63	M1 digital slave inputs	r	32	%IB1.1…%IB1.31 %IB11.1…%IB11.31
	64	67	M1 master flags	r	2	%IW31.240…%IW31.241
1	0	149	M1 analogue slave inputs	r	75	%IW21.1.0…%IW21.15.4
2	0	159	M1 analogue slave inputs	r	80	%IW21.16.0…%IW21.31.4
3	0	127	M1 current configuration data	r	64	%IW31.0…%IW31.63
4	0	31	M1 current parameters	r	16	%IW31.64…%IW31.79
	32	39	M1 LAS	r	4	%IW31.80…%IW31.83
	40	47	M1 LDS	r	4	%IW31.84…%IW31.87
	48	55	M1 LPF	r	4	%IW31.88…%IW31.91
	56	63	M1 LPS	r	4	%IW31.92…%IW31.95
5	0	127	M1 projected configuration data	r	64	%IW31.96…%IW31.159
6	0	31	M1 reflected parameters	r	16	%IW31.160…%IW31.175
	32	155	M1 slave error counter	r	62	%IW31.176…%IW31.237
	156	157	M1 configuration error counter	r	1	%IW31.238
	158	159	M1 AS-i cycle counter	r	1	%IW31.239
7	0	63	M1 digital slave outputs	r/w	32	%QB1.1…%QB1.31 %QB11.1…%QB11.31
	64	67	M1 reserved		2	–
8	0	149	M1 analogue slave outputs	r/w	75	%QW21.1.0…%QW21.15.4
9	0	159	M1 analogue slave outputs	r/w	80	%QW21.16.0…%QW21.31.4
10	0	127	M1 projected configuration data	r/w	64	%QW31.0…%QW31.63
	128	159	M1 projected parameters	r/w	16	–
11	0	37	M1 command channel request	r/w	19	–
12	0	37	M1 command channel response	r	19	–
16	0	63	M2 digital slave inputs	r	32	%IB2.1…%IB2.31 %IB12.1…%IB12.31
	64	67	M2 master flags	r	2	%IW32.240…%IW32.241
17	0	149	M2 analogue slave inputs	r	75	%IW22.1.0…%IW22.15.4
18	0	159	M2 analogue slave inputs	r	80	%IW22.16.0…%IW22.31.4
19	0	127	M2 current configuration data	r	64	%IW32.0…%IW32.63
20	0	31	M2 current parameters	r	16	%IW32.64…%IW32.79
	32	39	M2 LAS	r	4	%IW32.80…%IW32.83
	40	47	M2 LDS	r	4	%IW32.84…%IW32.87
	48	55	M2 LPF	r	4	%IW32.88…%IW32.91
	56	63	M2 LPS	r	4	%IW32.92…%IW32.95
21	0	127	M2 projected configuration data	r	64	%IW32.96…%IW32.159

DPV1 addresses in slot 0			Contents	Access r = read w = write	Size [words]	IEC addresses
Index	Byte no. from	Byte no. to				
22	0	31	M2 reflected parameters	r	16	%IW32.160…%IW32.175
	32	155	M2 slave error counter	r	62	%IW32.176…%IW32.237
	156	157	M2 configuration error counter	r	1	%IW32.238
	158	159	M2 AS-i cycle counter	r	1	%IW32.239
23	0	63	M2 digital slave outputs	r/w	32	%QB2.1…%QB2.31 %QB12.1…%QB12.31
	64	67	M2 reserved		2	–
24	0	149	M2 analogue slave outputs	r/w	75	%QW22.1.0…%QW22.15.4
25	0	159	M2 analogue slave outputs	r/w	80	%QW22.16.0…%QW22.31.4
26	0	127	M2 projected configuration data	r/w	64	%QW32.0…%QW32.63
	128	159	M2 projected parameters	r/w	16	–
27	0	37	M2 command channel request	r/w	19	–
28	0	37	M2 command channel response	r	19	–
32	0	127	Input data of the fieldbus	r/w	64	%IW0.0…%IW0.63
33	0	127	Output data to the fieldbus	r	64	%QW0.0…%QW0.63
34	0	127	Extended data to the controllere PLC	r/w	64	%IW4.0…%IW4.63
35	0	127	Extended data to the controllere PLC	r/w	64	%IW4.64…%IW4.127
36	0	127	Extended data to the controllere PLC	r/w	64	%IW4.128…%IW4.191
37	0	127	Extended data to the controllere PLC	r/w	64	%IW4.192…%IW4.255
38	0	127	Extended data from the controllere PLC	r	64	%QW4.0…%QW4.63
39	0	127	Extended data from the controllere PLC	r	64	%QW4.64…%QW4.127
40	0	127	Extended data from the controllere PLC	r	64	%QW4.128…%QW4.191
41	0	127	Extended data from the controllere PLC	r	64	%QW4.192…%QW4.255

10.5 Examples

10.5.1 Examples DPV1 reading

DPV1 master request			Received data DPV1 master	
Slot	**Index**	**Length**	**Data field**	**Data length [bytes]**
0	0	0	M1 digital slave inputs %IB1.1…%IB11.31	64
0	0	2	M1 digital slave inputs %IB1.1…%IB1.2	2
0	0	60	M1 digital slave inputs %IB1.1…%IB11.27	60
0	3	0	M1 current configuration data %IW31.0…%IW31.63	128
0	3	6	M1 current configuration data %IW31.0…%IW31.2	6

10.5.2 Examples DPV1 writing

DPV1 master request			Received data DPV1 slave	
Slot	**Index**	**Length**	**Data field**	**Data length [bytes]**
0	7	2	M1 digital slave outputs %QB1.1…%QB1.2	2
0	8	10	M1 analogue slave outputs %QW21.1.0…%QW21.1.5	10
0	11	12	M1 command channel request	12

10.6 DPV1 error messages

10.6.1 DPV1 error code application

Error byte 1 [hex]	Description
A0	Read error
A1	Write error
A2	Module failure
A8	Version conflict
A9	Feature not supported
AA	User specific

10.6.2 DPV1 error codes data access

Error byte 1 [hex.]	Description
B0	Invalid index
B1	Write length error
B2	Invalid slot
B3	Type conflict
B4	Invalid area
B5	Status conflict
B6	Access denied
B7	Invalid range
B8	Invalid parameter
B9	Invalid type
BA…BF	User specific

10.6.3 DPV1 error codes device

Error byte 1 [hex]	Description
C0	Read constrain conflict
C1	Write constrain conflict
C2	Resource busy
C3	Resource unavailable
C8	User specific

10.6.4 DPV1 error codes application-specific

Error byte 2 [hex]	Description
0	Reserved
1	Reserved
2	Reserved
3	Reserved

10.6.5 DPV1 function 58 "Reason codes"

Reason code [hex]	Description
10	–
11	Sequence error
12	Invalid request PDU received
13	Timeout of the connection
14	Invalid response PDU received
15	Invalid service from USER
16	Send_Timeout requested was too small
17	Invalid additional address information
18	Waiting for FDL_DATA_REPLY.con

11 The DPV1 command channel

11.1 Overview of the commands in the DPV1 command channel

Command number		Description	→ page
decimal	hexadecimal		
0	00	no execution of a command	11-4
1	01	write parameters to a connected AS-i slave	11-5
3	03	adopt and store currently connected AS-i slaves in the configuration	11-7
4	04	list of projected AS-i slaves (LPS)	11-9
5	05	set the operating mode of the AS-i master	11-11
6	06	readdress connected AS-i slave	11-13
7	07	set the auto address mode of the AS-i master	11-15
9	09	change the extended ID code 1 in the connected AS-i slave	11-16
10...20	0A...14	force analogue data transfer directly to/from 3 AS-i slaves in each case	11-18
21	15	read the ID string of an AS-i slave with profile S-7.4	11-23
28	1C	deactivation of the slave reset when changing to the protected mode	11-26
31	1F	one-time execution of the "Extended safety monitor protocol" in the "Safety at work" monitor	11-27
33	21	read the diagnosis string of an AS-i slave with profile S-7.4	11-32
34	22	read the parameter string of an AS-i slave with profile S-7.4	11-34
35	23	write the parameter string of an AS-i slave with profile S-7.4	11-36
36	24	acyclic standard read call of an AS-i slave with CTT2 profile (S-7.5.5, S-7.A.5 or S-B.A.5) – *available from master profile M4 onwards* –	11-38
37	25	acyclic standard write call of an AS-i slave with CTT2 profile (S-7.5.5, S-7.A.5 or S-B.A.5) – *available from master profile M4 onwards* –	11-42
38	26	acyclic manufacturer-specific read call of an AS-i slave with CTT2 profile (S-7.5.5, S-7.A.5 or S-B.A.5) – *available from master profile M4 onwards* –	11-45
39	27	acyclic manufacturer-specific write call of an AS-i slave with CTT2 profile (S-7.5.5, S-7.A.5 or S-B.A.5) – *available from master profile M4 onwards* –	11-49
50	32	read current configuration of AS-i slaves 0(A)...15(A)	11-53
51	33	read current configuration of AS-i slaves 16(A)...31(A)	11-54
52	34	read current configuration of AS-i slaves 1B...15B	11-55
53	35	read current configuration of AS-i slaves 16B...31B	11-56
54	36	read current parameters of a connected AS-i slave	11-57
55	37	read current AS-i slaves	11-59
56	38	read projected configuration of the AS-i slaves 1(A)...15(A)	11-64
57	39	read projected configuration of the AS-i slaves 16(A)...31(A)	11-62
58	3A	read projected configuration of the AS-i slaves 1B...15B	11-63
59	3B	read projected configuration of the AS-i slaves 16B...31B	11-64
96	60	save data non-volatilely in the flash memory of the controllere	11-65
97	61	carry out various settings in the controllere	11-66
102	66	read the status of controllere display	11-67
105	69	read the device properties of the controllere	11-69

Syntax and examples (values in hexadecimal representation) → on the following pages.

In the DPV1 address space a command channel with a length of 19 words is defined for each AS-i master. A DPV1 master operates as host system.

DPV1 addresses			Contents	Access r = read w = write	Size [Words]
Start		End			
dec	hex	dec			
4794	12BA	4812	master 1 command channel request	r / w	19
4813	12CD	4831	master 1 command channel response	r	19
8890	22BA	8908	master 2 command channel request	r / w	19
8909	22CD	8927	master 2 command channel response	r	19

The commands are always triggered by the DPV1 master by means of a corresponding entry in its output data area. The controller$_e$ responds then in the input data area of the host system.

11.2 Syntax

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request							
2	reserved for string transfers								command number							
3...18	command data															
19	0															

NOTE

If a command is to be executed, the value 65_{hex} must be entered in the command request. Changing the command number does not start the execution. If a command is to be executed several times, the user ID must be changed accordingly, e.g. by counting up. Before starting a command it should be verified in the command status whether the previous command has been completed.

Response from controller$_e$ (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status							
2	reserved for string transfers								reflected command number							
3...18	command data															
19	0															

command status

The command status indicates the status of the command channel:

Value [hex]	Description
65	command request by the host
6A	command is being processed
6B	command aborted due to an error
6C	abort after timeout during command processing
6D	command completed, but response data not yet consistent
6E	unknown command
6F	command completed, response buffer is valid

Legend

Name	Description
A/B	Bit for addressing A or B slaves A/B=0: A slave (or standard slave) A/B=1: B slave (addition of 20_{hex} or 32_{dec} to the slave address)
B	Busy bit B=0: command executed, response in the buffer is valid B=1: command in process, channel is used
E	Error bit E=0: no error detected E=1: fault occurred during execution of the command
F	Error bit F=0: no error detected during command execution 7.4 F=1: fault occurred during command execution 7.4
L32	Number of parameter bytes = 32_{dec} L32=0: number of bytes to be sent < 32_{dec} L32=1: number of bytes to be sent = 32_{dec}
Length	5 bits for the number of data bytes ($0…16_{dec}$) DP master: data bytes to be sent controller$_e$: data bytes received
M	AS-i master bit M=0: AS-i master 1 M=1: AS-i master 2
R	reserved
Slave address	5 bits for AS-i slave address ($0…31_{dec}$) (reflected by the controller$_e$)
TG	toggle bit value changes for each command execution
User ID	5 bits for user ID ($0…31_{dec}$) (reflected by the controller$_e$)

11.3 DPV1 command 0_{dec} (00_{hex}): no execution of a command

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	0								command number = 00_{hex} = 0_{dec}							
3…19	ignored								ignored							

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0365	03 = user ID changes e.g. to 3 65 = command request
2	0000	00 = command number 0
3…18	0000	not used

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	reserved								reflected command number = 00_{hex}							
3…19	ignored								ignored							

Example:

Word no.	Value [hex]	Description
1	036F	03 = reflected user ID changes e.g. to 3 6F = command status is "ready" (no fault)
2	0000	00 = reflected command number 0
3…18	0000	not changed

11.4 DPV1 command 1_{dec} (01_{hex}): write parameters to a connected AS-i slave

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	0								command number = 01 $_{hex}$ = 1 $_{dec}$							
3	ignored										A/B	AS-i slave address				
4	ignored												parameter value to be written			
5…19	ignored															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0965	09 = user ID changes e.g. to 9 65 = command request
2	0001	01 = command number 1
3	0024	slave address 4B (for B slave: addition of 20_{hex} or 32_{dec} to the slave address)
4	0003	parameter value to be written

Response from controllere (DPV1 slave) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 01_{hex}							
3	ignored														parameter value read back	
4…17	ignored															
18…19	reserved															

Example:

Word no.	Value [hex]	Description
1	096F	09 = reflected user ID changes e.g. to 9 6F = command status is "ready" (no fault)
2	0001	01 = reflected command number 1
3	0003	parameter value read back; might differ from the value to be written

Response from controllere (DPV1 slave) in case of an error

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6B_{hex}$							
2	ignored								reflected command number = 01_{hex}							
3	00								error code							

Example:

Word no.	Value [hex]	Description
1	096B	09 = reflected user ID changes e.g. to 9 6B = error during command execution
2	0001	01 = reflected command number 1
3	000A	error code 0A → slave is not in LAS

Possible error codes

Error code	Name	Description
01	NOK	no slave response or master is in the offline mode when calling the command
0A	NA	the slave is not in the LAS
0B	ID	parameter or address invalid
14	IC	master is not in the normal mode

11.5 DPV1 command 3_{dec} (03_{hex}): adopt and store currently connected AS-i slaves in the configuration

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	ignored								command number = 03_{hex} = 3_{dec}							
3…19	ignored															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0C65	0C = user ID changes e.g. to 12 65 = command request
2	0003	03 = command number 3
3…18	0000	not used

Response from controller (DPV1 slave) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 03_{hex}							
3…19	ignored															

Example:

Word no.	Value [hex]	Description
1	0C6F	0C = reflected user ID changes e.g. to 12 6F = command status is "ready" (no fault)
2	0003	03 = reflected command number 3
3…18	0000	not changed

Response from controllere (DPV1 slave) in case of an error

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6B_{hex}$							
2	00								reflected command number = 03_{hex}							
3	00								error code							
4…19	ignored															

Example:

Word no.	Value [hex]	Description
1	0C6B	0C = reflected user ID changes e.g. to 12 6B = error during command execution
2	0003	03 = reflected command number 3
3	0014	error code $14_{hex} \rightarrow$ master is not in the normal mode
4…18	0000	not changed

Possible error codes

Error code	Name	Description
14	IC	master is not in the normal mode

11.6 DPV1 command 4_{dec} (04_{hex}): change the list of projected AS-i slaves (LPS)

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 04 $_{hex}$ = 4 $_{dec}$							
3	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res
4	31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
5	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res
6	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
7…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0265	02 = user ID changes e.g. to 2 65 = command request
2	0004	04 = command number 4
3	003E	003E $_{hex}$ = 0000 0000 0011 1110_{bin} slaves 1(A) to 5(A) are to be projected
4	8000	8000_{hex} = 1000 0000 0000 0000_{bin} slave 31(A) is to be projected
5	0002	0002_{hex} = 0000 0000 0000 0010_{bin} slave 1B is to be projected
6	0001	0001_{hex} = 0000 0000 0000 0001_{bin} slave 16B is to be projected

Response from controller (DPV1 slave) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 04_{hex}							

Example:

Word no.	Value [hex]	Description
1	026F	02 = reflected user ID changes e.g. to 2 6F = command status is "ready" (no fault)
2	0004	04 = reflected command number 4

Response from controllere (DPV1 slave) in case of an error

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word																
1	reflected user ID								command status = $6B_{hex}$							
2	00								reflected command number = 04_{hex}							
3	ignored								error code							

Example:

Word no.	Value [hex]	Description
1	026B	02 = reflected user ID changes e.g. to 2 6B = error during command execution
2	0004	04 = reflected command number 4
3	0014	error code 14_{hex} → master not in the configuration mode

Possible error codes

Error code	Name	Description
14	IC	master is not in the configuration mode

11.7 DPV1 command 5_{dec} (05_{hex}): set the operating mode of the AS-i master

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 05 $_{hex}$ = 5 $_{dec}$							
3	ignored								operating mode							
4…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0165	01 = user ID changes e.g. to 1 65 = command request
2	0005	05 = command number 5
3	0001	operating mode: 00 = activate protected mode 01 = activate configuration mode

Response from controller (DPV1 slave) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 05_{hex}							

Example:

Word no.	Value [hex]	Description
1	016F	01 = reflected user ID changes e.g. to 1 6F = command status is "ready" (no fault)
2	0005	05 = reflected command number 5

Response from controllere (DPV1 slave) in case of an error

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word																
1	reflected user ID								command status = $6B_{hex}$							
2	00								reflected command number = 05_{hex}							
3	ignored								error code							

Example:

Word no.	Value [hex]	Description
1	016B	01 = reflected user ID changes e.g. to 1 6B = error during command execution
2	0005	05 = reflected command number 5
3	0003	error code 03_{hex} → slave with address 0 connected

Possible error codes

Error code	Name	Description
03	SD0	slave with address 0 connected

11.8 DPV1 command 6_{dec} (06_{hex}): readdress a connected AS-i slave

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 06 $_{hex}$ = 6 $_{dec}$							
3	ignored										A/B	old slave address				
4	ignored										A/B	new slave address				
5…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0865	08 = user ID changes e.g. to 8 65 = command request
2	0006	06 = command number 6
3	0029	old slave address 9B (B slave: addition of 20_{hex} or 32_{dec} to the slave address)
4	000B	new slave address 11A

Response from controller (DPV1 slave) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 06_{hex}							

Example:

Word no.	Value [hex]	Description
1	086F	08 = reflected user ID changes e.g. to 8 6F = command status is "ready" (no fault)
2	0006	06 = reflected command number 6

Response from controllere (DPV1 slave) in case of an error

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word																
1	reflected user ID								command status = $6B_{hex}$							
2	00								reflected command number = 06_{hex}							
3	ignored								error code							

Example:

Word no.	Value [hex]	Description
1	086B	08 = reflected user ID changes e.g. to 8 6B = error during command execution
2	0006	06 = reflected command number 6
3	0003	error code 03_{hex} → slave with address 0 connected

Possible error codes

Error code	Name	Description
01	NOK	no slave response or: master is in the offline mode when calling the command
02	SND	no slave with the old address found
03	SD0	slave with address 0 connected
04	SD2	no slave with the new address found
05	DE	error when deleting the old address
06	RE	error when reading the IO configuration
07	SE	error when writing the new address or the extended ID code 1
08	AT	new address could only be saved temporarily
09	ET	extended ID code 1 could only be saved temporarily
0B	ID	parameter or address invalid
14	IC	master is not in the normal mode

11.9 DPV1 command 7_{dec} (07_{hex}): set the auto address mode of the AS-i master

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 07 $_{hex}$ = 7 $_{dec}$							
3	ignored								automatic addressing							
4…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0465	04 = user ID changes e.g. to 4 65 = command request
2	0007	07 = command number 7
3	0001	automatic addressing 00 = is deactivated 01 = is possible

Response from controller (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 07_{hex}							

Example:

Word no.	Value [hex]	Description
1	046F	04 = reflected user ID changes e.g. to 4 6F = command status is "ready" (no fault)
2	0007	07 = reflected command number 7

11.10 DPV1 command 9_{dec} (09_{hex}): change the extended ID code 1 in the connected AS-i slave

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 09 $_{hex}$ = 9 $_{dec}$							
3	ignored										A/B	slave address				
4	ignored								new "Extended ID code 1"							
5…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0F65	0F = user ID changes e.g. to 15 65 = command request
2	0009	09 = command number 9
3	0011	11 = slave address 17(A)
4	0008	new "Extended ID code 1" = 8

Response from controller (DPV1 slave) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 09_{hex}							

Example:

Word no.	Value [hex]	Description
1	0F6F	0F = reflected user ID changes e.g. to 15 6F = command status is "ready" (no fault)
2	0009	09 = reflected command number 9

Response from controllere (DPV1 slave) in case of an error

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word																
1	reflected user ID								command status = $6B_{hex}$							
2	00								reflected command number = 09_{hex}							
3	00								error code							

Example:

Word no.	Value [hex]	Description
1	0F6B	0F = reflected user ID changes e.g. to 15 6B = error during command execution
2	0009	09 = reflected command number 9
3	0007	error code 07_{hex} → slave does not support the extended ID code

Possible error codes

Error code	Name	Description
01	NOK	no slave response or master is in the offline mode when calling the command
02	SND	no slave with the address found
03	SD0	slave with address 0 connected
07	SE	error when writing the extended ID code 1
09	ET	extended ID code 1 could only be saved temporarily
0B	ia	address is invalid or: 2 slaves with address 0 detected

11.11 DPV1 command 10...20$_{dec}$ (0A...14$_{hex}$): force analogue data transfer directly to / from 3 AS-i slaves in each case

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65$_{hex}$							
2	00								command number = 0A…14$_{hex}$ = 10...20$_{dec}$							
3	output data AS-i slave 1(A), channel 0															
4	output data AS-i slave 1(A), channel 1															
5	output data AS-i slave 1, channel 2 or output data AS-i slave 1B, channel 0															
6	output data AS-i slave 1, channel 3 or output data AS-i slave 1B, channel 1															
7	00								O3	V3	O2	V2	O1	V1	O0	V0
8	output data AS-i slave 2(A), channel 0															
9	output data AS-i slave 2(A), channel 1															
10	output data AS-i slave 2, channel 2 or output data AS-i slave 2B, channel 0															
11	output data AS-i slave 2, channel 3 or output data AS-i slave 2B, channel 1															
12	00								O3	V3	O2	V2	O1	V1	O0	V0
13	output data AS-i slave 3(A), channel 0															
14	output data AS-i slave 3(A), channel 1															
15	output data AS-i slave 3, channel 2 or output data AS-i slave 3B, channel 0															
16	output data AS-i slave 3, channel 3 or output data AS-i slave 3B, channel 1															
17	00								O3	V3	O2	V2	O1	V1	O0	V0
18…19	reserved															

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V0…V3	Valid Vx=0: data invalid Vx=1: data valid Output data must be valid (V=1) to be enabled in the AS-i slave!
O0...O3	Overflow Ox=0: data are in the valid range Ox=1: data are in the invalid range (especially in case of input modules, when the measuring range is not reached or exceeded)

Example:

Word no.	Value [hex]	Description
1	0165	01 = user ID changes e.g. to 1 65 = command request
2	000A	0A = DPV1 command number 10
3	0169	output data AS-i slave 1, channel 0
4	0202	output data AS-i slave 1, channel 1
5	0395	output data AS-i slave 1, channel 2
6	1033	output data AS-i slave 1, channel 3
7	0055	overflow and valid bits for AS-i slave 1: 55_{hex} = 0101 0101_{bin} O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
8	2009	output data AS-i slave 2, channel 0
9	2202	output data AS-i slave 2, channel 1
10	0195	output data AS-i slave 2, channel 2
11	1022	output data AS-i slave 2, channel 3
12	0055	overflow and valid bits for AS-i slave 2: 55_{hex} = 0101 0101_{bin} O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
13	3339	output data AS-i slave 3, channel 0
14	1102	output data AS-i slave 3, channel 1
15	1953	output data AS-i slave 3, channel 2
16	1234	output data AS-i slave 3, channel 3
17	0055	overflow and valid bits for AS-i slave 3: 55_{hex} = 0101 0101_{bin} O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								DPV1 command status = $6F_{hex}$							
2	00								reflected DPV1 command number = $0A...14_{hex}$							
3	input data or reflected output data AS-i slave 1(A), channel 0)															
4	input data or reflected output data AS-i slave 1(A), channel 1															
5	input data or reflected output data AS-i slave 1, channel 2 or input data or reflected output data AS-i slave 1B, channel 0															
6	input data or reflected output data AS-i slave 1, channel 3 or input data or reflected output data AS-i slave 1B, channel 1															
7	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0
8	input data or reflected output data AS-i slave 2(A), channel 0															
9	input data or reflected output data AS-i slave 2(A), channel 1															
10	input data or reflected output data AS-i slave 2, channel 2 or input data or reflected output data AS-i slave 2B, channel 0															
11	input data or reflected output data AS-i slave 2, channel 3 or input data or reflected output data AS-i slave 2B, channel 1															
12	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0
13	input data or reflected output data AS-i slave 3(A), channel 0															
14	input data or reflected output data AS-i slave 3(A), channel 1															
15	input data or reflected output data AS-i slave 3, channel 2 or input data or reflected output data AS-i slave 3B, channel 0															
16	input data or reflected output data AS-i slave 3, channel 3 or input data or reflected output data AS-i slave 3B, channel 1															
17	TIB	TOB	TIA	TOA	TVB	OVB	TVA	OVA	O3	V3	O2	V2	O1	V1	O0	V0

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OVA	Channel-independent data valid flag of the A slave / standard slave: OVA=0: the last valid data transfer took place more than 3.5 s ago (TT1) or: the slave has not received new output values (CTT2...5) OVA=1: within max. 3 seconds the slave requests new data (CTT1) or: the slave has received new output values (CTT2...5)
OVB	Channel-independent data valid flag of the B slave (from master profile M4 onwards): OVB=0: the slave has not received new output values slave has received new output values **Note:** valid only for reflected output data
TVA	Channel-independent transmission valid flag of the A slave / standard slave: TVA=0: transmission error or timeout occurred TVA=1: analogue data transfer under way
TVB	Channel-independent transmission valid flag of the B slave (from master profile M4 onwards): TVB=0: transmission error or timeout occurred TVB=1: analogue data transfer under way **Note:** since this flag evaluates the data transfer cycle which was last completed the response is delayed by up to 140 ms

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from master profile M4 onwards:

TIA [1])	TIx=0: slave sends input data as value (15-bit length, with sign) TIx=1: slave sends input data as bit pattern (16-bit length, without sign)
TIB [2])	
TOA [1])	TOx=0: slave receives output data as value (15-bit length, with sign) TOx=1: slave receives output data as bit pattern (16-bit length, without sign)
TOB [2])	

[1]) for A slave or standard slave
[2]) for B slave

DPV1 command number		**slaves**		
decimal	hexadecimal			
10	0A	1	2	3
11	0B	4	5	6
12	0C	7	8	9
13	0D	10	11	12
14	0E	13	14	15
15	0F	16	17	18
16	10	19	20	21
17	11	22	23	24
18	12	25	26	27
19	13	28	29	30
20	14	31	–	–

Example:

Word no.	Value [hex]	Description
1	016F	01 = reflected user ID 1 6F = command status is "ready" (no fault)
2	000A	0A = reflected DPV1 command number 10
3	3169	slave 1 is a 4-channel input slave: input data AS-i slave, channel 0
4	2202	input data AS-i slave 1, channel 1
5	1395	input data AS-i slave 1, channel 2
6	0033	input data AS-i slave 1, channel 3
7	0255	overflow and valid bits for AS-i slave 1: 0255_{hex} = 0000 0010 0101 0101_{bin} TVA = 1, OVA = 0, O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1
8	2229	slave 2 is a 2-channel input slave: input data AS-i slave 2, channel 0
9	2332	input data AS-i slave 2, channel 1
10	7FFF	no valid value for channel 2
11	7FFF	no valid value for channel 3
12	0205	overflow and valid bits for AS-i slave 2: 0205_{hex} = 0000 0010 0000 0101_{bin} TVA = 1, OVA = 0, O3 = 0, V3 = 0, O2 = 0, V2 = 0, O1 = 0, V1 = 1, O0 = 0, V0 = 1
13	3339	slave 3 is a 4-channel input slave: output data AS-i slave 3, channel 0
14	1102	output data AS-i slave 3, channel 1
15	1953	output data AS-i slave 3, channel 2
16	1234	output data AS-i slave 3, channel 3
17	0255	overflow and valid bits for AS-i slave 3: 0255_{hex} = 0000 0010 0101 0101_{bin} TVA = 1, OVA = 0, O3 = 0, V3 = 1, O2 = 0, V2 = 1, O1 = 0, V1 = 1, O0 = 0, V0 = 1

11.12 DPV1 command 21_{dec} (15_{hex}): read ID string of an AS-i slave with the profile S-7.4

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	0	0	0	AS-i slave address					command number = 15_{hex} = 21_{dec}							
3…19	ignored															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0265	02 = user ID changes e.g. to 2 65 = command request
2	0315	03 = slave address 3 15 = command number 21

Response from controllere (DPV1 slave) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	TG	S	AS-i slave address					F	reflected command number = 15_{hex}							
3	I/O	2D	DT-Start			DT-Count			Mux field			E type				
4	number of parameters to be read								EDT Read			reserved		Diag		reserved
5	EDT Write		reserved						number of parameters to be written							
6	device-specific information								manufacturer identification							
7…16	device-specific information								device-specific information							
18	reserved								number of bytes received							
19	reserved															

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Mux field	Number of multiplexed data words Length: 3 bits Permitted values: 0...3 Description: number = Mux field + 1
E type	Characterises the slave concerning functionality and data structure Length: 5 bits Permitted values: 0... 31_{dec} Description: 0 = reserved 1 = transferred values are measured values 2 = transferred values are 16 digital bit values 3 = normal operation in 4-bit mode (4E/4A) 4...31_{dec} = reserved

I/O	Direction of data for the devices with E type <> 3 Length: 1 bits Permitted values: 0/1 Description: 0 = input 1 = output
Number of parameters to be read	Number of bytes which can be read as parameter string Length: 8 bits Permitted values: 0...219_{dec} Description: 0 = no parameter string readable 1...219_{dec} = number of bytes
Number of parameters to be written	Number of bytes which can be written as parameter string Length: 8 bits Permitted values: 0…219_{dec} Description: 0 = no parameter string readable 1…219_{dec} = number of bytes
2D	Double data transfer possible (→ redundancy) Length: 1 bit Permitted values: 0/1 Description: 0 = simple data transfer
DT-Start	Start triple (information for the driver in the master)
DT-Count	Number of data triples (information for the driver in the master)
EDT Read	Reserved for later profiles
EDT Write	Reserved for later profiles
Diag	Slave supports the 7.4 diagnosis string Length: 1 bit Permitted values: 0/1 Description: 0 = diagnosis string is not supported 1 = diagnosis string is supported
Manufacturer identification	Defined manufacturer number assigned by AS-International
Device-specific information	As an option more bytes for the manufacturer-specific device description

Example:

Word no.	Value [hex]	Description
1	026F	02 = reflected user ID 2 6F = command status is "ready" (no fault)
2	0615 or 8615	06_{hex} = 00**00 011**0_2 → slave address = 3 15_{hex} = reflected command number 21_{dec} the most significant bit TG changes after each execution
3	2D01	1st word of the ID string of slave 3
4	0203	2nd word of the ID string of slave 3
…	…	…
17	0008	in this case the unit sends an ID string of 8-byte length

Response from controllere (DPV1 slave) in case of an error

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6B_{hex}$							
2	00								reflected command number = 15_{hex}							
3	00								error code							

Example:

Word no.	Value [hex]	Description
1	026B	02 = reflected user ID 2 6B = error during command execution
2	0015	15 = reflected command number 21
3	0014	error code 14_{hex} → master is not in the normal mode

Possible error codes

Value [hex]	Description
0C	faulty S-7.4 protocol sequence
0D	S-7.4 protocol aborted (timeout)
0E	invalid AS-i slave address for the S-7.4 protocol (e.g. B slaves)
0F	AS-i slave has completed the S-7.4 string
10	AS-i S-7.4 no longer connected (no longer in LAS)
11	to this AS-i slave another S-7.4 transfer is already active
12	previous segmented S-7.4 transfer not yet completed
13	invalid S-7.4 data length
14	invalid S-7.4 command

11.13 DPV1 command 28_{dec} ($1C_{hex}$): deactivate the slave reset when changing to the protected mode

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = $1C_{hex}$ = 28_{dec}							
3	ignored								with / without offline phase							
4…19	ignored															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0465	04 = user ID changes e.g. to 4 65 = command request
2	001C	1C = command number 28
3	0001	offline phase when changing over to the protected mode: 00 = YES → slave reset 01 = NO → no slave reset

Response from controller (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = $1C_{hex}$							

Example:

Word no.	Value [hex]	Description
1	046F	04 = reflected user ID 4 6F = command status is "ready" (no fault)
2	001C	1C = reflected command number 28

11.14 DPV1 command 31_{dec} ($1F_{hex}$): one-time execution of the "Extended safety monitor protocol" in the "Safety at Work" monitor

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = $1F_{hex}$ = 31_{dec}							
3	sub command								0	0	0	AS-i slave address(1...31_{dec})				
4…17	see sub command															
18	field number (00 / 01)								data length = 00							

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0765	07 = user ID changes e.g. to 7 65 = command request
2	001F	1F = command number 31
3	001E	sub command 00_{hex} = one-time execution of the "Extended safety monitor protocol" in the "Safety at work" monitor with the address 30_{dec} ($1E_{hex}$)

Response from controllere (DPV1 slave) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = $1F_{hex}$							
3	sub command = 0								0	0	0	AS-i slave address				
4	LEDs OSSD 2				LEDs OSSD 1				data call 1				data call 0			
5	OSSD2 not green								OSSD1 not green							
6	1st colour output circuit 1								1st module address output circuit 1							
7	2nd colour output circuit 1								2nd module address output circuit 1							
8	3rd colour output circuit 1								3rd module address output circuit 1							
9	4th colour output circuit 1								4th module address output circuit 1							
10	5th colour output circuit 1								5th module address output circuit 1							
11	6th colour output circuit 1								6th module address output circuit 1							
12	1st colour output circuit 2								1st module address output circuit 2							
13	2nd colour output circuit 2								2nd module address output circuit 2							
14	3rd colour output circuit 2								3rd module address output circuit 2							
15	4th colour output circuit 2								4th module address output circuit 2							
16	5th colour output circuit 2								5th module address output circuit 2							
17	6th colour output circuit 2								6th module address output circuit 2							
18	field number = 0/1								00							

Description of the different fields:

Word no. 4:

LEDs OSSD 1				LEDs OSSD 2				Description
15	14	13	12	11	10	9	8	
0	0	0	0	0	0	0	0	green: contacts of the output circuits closed
0	0	0	1	0	0	0	1	yellow: startup / restart disable active
0	0	1	0	0	0	1	0	yellow flashing or red: contacts of the output circuits open
0	0	1	1	0	0	1	1	red flashing: error on the level of the monitored AS-i components
0	1	x	x	0	1	x	x	reserved (x = any value)

data call 1				data call 0				Description
7	6	5	4	3	2	1	0	
0	0	0	0	0	0	0	0	protective operation; everything OK (output circuits which are not available, not configured or dependent are indicated as OK)
0	0	0	1	0	0	0	1	protective operation, output circuit 1 off
0	0	1	0	0	0	1	0	protective operation, output circuit 2 off
0	0	1	1	0	0	1	1	protective operation, both output circuits off
0	1	0	0	0	1	0	0	configuration operation: power on
0	1	0	1	0	1	0	1	configuration operation
0	1	1	0	0	1	1	0	not reserved / not defined
0	1	1	1	0	1	1	1	configuration operation: fatal device error, RESET or replacement of devices required
								no current diagnosis information available, please wait

Word no. 5:

OSSD2 not green			OSSD1 not green			Description
15…12	11	10...8	7…4	3	2...0	
reserved	0	0	reserved	0	0	no module - responses of the data calls in the words 6..17 are not relevant
reserved	0	1...6	reserved	0	1...6	number of modules which are not green
reserved	0	7	reserved	0	7	more than 6 modules are not green

Word no. 6...17:

1st to 6th module address output circuit 1/2:
Indicates the index of the module of the configuration. The module address which was defined in the program ASIMON is indicated.

1st to 6th colour output circuit 1/2:

3	2	1	0	Description
0	0	0	0	green, continuous
0	0	0	1	green, flashing
0	0	1	0	yellow, continuous
0	0	1	1	yellow, flashing
0	1	0	0	red, continuous
0	1	0	1	red, flashing
0	1	1	0	grey, off

Example ("Safety at work" monitor has not switched):

Word no.	Value [hex]	Description
1	076F	07 = reflected user ID 7 6F = command status is "ready" (no fault)
2	001F	1F = reflected command number 31
3	001E	00 = reflected sub command 0 1E = AS-i slave address 30
4	0000	green: contacts of the output circuits closed
5	0000	both output circuits green
6…17	xxxx	not relevant because 5th word = 0000
18	0100	field number = 1

Example ("Safety at work" monitor has switched):

Word no.	Value [hex]	Description
1	076F	07 = reflected user ID 7 6F = command status is "ready" (no fault)
2	001F	1F = reflected command number 31
3	001E	00 = reflected sub command 0 1E = AS-i slave address 30
4	0211	0xxx = output circuit 2 green x2xx = output circuit 1 red xx11 = protective operation, output circuit 1 off (in both data calls)
5	0003	result of 4th word = OSSD2 green; OSSD1 not green 03_{hex} = provides 3 modules which are not green
6	0421	module 33_{dec} (21_{hex}) red, continuous (04)
7	0422	module 34_{dec} (22_{hex}) red, continuous (04)
8	0423	module 35_{dec} (23_{hex}) red, continuous (04)
9…11	xxxx	not relevant because low byte of 5th word = 03→ 3 modules relevant
12…17	xxxx	not relevant, because high byte of 5th word = 00: green → no module relevant
18	0100	field number = 1

Response from controllere (DPV1 slave) in case of an error

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word																
1	reflected user ID								command status = $6B_{hex}$							
2	00								reflected command number = $1F_{hex}$							
3	00								error code							

Example:

Word no.	Value [hex]	Description
1	076B	07 = reflected user ID 7 6B = error during command execution
2	001F	1F = reflected command number 31
3	0011	error code 11_{hex} →no slave with the profile S-7.F.F

Possible error codes

Value [hex]	Description
00…02	general errors during command processing
0A…0C	internal protocol error
10	sub command invalid
11	no slave with the profile S-7.F.F on the slave address
16	the protocol mode of the monitor at the address was changed
20	it was not possible to process the command within the specified time
EE	fatal error during command execution

11.15 DPV1 command 33_{dec} (21_{hex}): read diagnosis string of an AS-i slave with the profile S-7.4

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	reserved = 0			AS-i slave address					command number = 21_{hex} = 33_{dec}							
3…17	ignored															
18	field number (00 / 01)								number of bytes to be read							

Legend → page 11-3 and

field number	??

Example:

Word no.	Value [hex]	Description
1	0765	07 = user ID changes e.g. to 7 65 = command request
2	0321	slave address = 3(A), 21 = command number 33
3…17	0000	reserved
18	??08	?? = field number 08 = read 8 bytes diagnostic data

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	TG	S	AS-i slave address					F	reflected command number = 21_{hex}							
3	diagnosis string 1								diagnosis string 0							
4…16	diagnosis strings 2...27															
17	diagnosis string 29								diagnosis string 28							
18	00								number of bytes received							

Legend → page 11-3

NOTE

The control bytes defined in profile 7.4 with follow byte and valid byte are filtered out by the system.

Example:

Word no.	Value [hex]	Description
1	076F	07 = reflected user ID 7 6F = command status is "ready" (no fault)
2	0621 or 8621	S=0 → last sequence, 06_{hex} = 00**00 011**0_2 → slave address = 3(A), 21_{hex}= reflected command number 33_{dec} the most significant bit TG changes after each execution
3	2D01	1st word of the diagnosis data of slave 3(A)
4	0203	2nd word of the diagnosis data of slave 3(A)
5	1122	3rd word of the diagnosis data of slave 3(A)
6	3344	4th word of the diagnosis data of slave 3(A)
…	…	…
18	0008	8 bytes diagnosis data

11.16 DPV1 command 34_{dec} (22_{hex}): read the parameter string of an AS-i slave with the profile S-7.4

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	reserved = 0			AS-i slave address					command number = 22_{hex} = 34_{dec}							
3…17	ignored															
18	field number (00 / 01)								number of bytes to be read							

Legend → page 11-3 and

field number	??

Example:

Word no.	Value [hex]	Description
1	0865	08 = user ID changes e.g. to 8 65 = command request
2	0322	03 = slave address 3 22 = command number 34
3…17	0000	reserved
18	??04	?? = field number 04 = read 4 bytes parameter data

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	TG	S	AS-i slave address					F	reflected command number = 22_{hex}							
3	parameter string 1								parameter string 0							
4…16	parameter strings 2...27															
17	parameter string 29								parameter string 28							
18	00								number of bytes received							

Legend → page 11-3

> **NOTE**
> The control bytes defined in profile 7.4 with follow byte and valid byte are filtered out by the system.

Example:

Word no.	Value [hex]	Description
1	086F	08 = reflected user ID 8 6F = command status is "ready" (no fault)
2	0622 or 8622	06_{hex} = 00**00 011**0_2 → slave address = 3(A), 22_{hex} = reflected command number 34_{dec} the most significant bit TG changes after each execution
3	1234	1st word of the parameter string of slave 3(A)
4	5678	2nd word of the parameter string of slave 3(A)
…	…	…
18	0004	4-byte parameter string was read

11.17 DPV1 command 35_{dec} (23_{hex}): write parameter string of an AS-i slave with the profile S-7.4

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	R	S	R	AS-i slave address					command number = 23_{hex} = 35_{dec}							
3	parameter string 1								parameter string 0							
4…16	parameter strings 2...27															
17	parameter string 29								parameter string 28							
18	field number (00 / 01)								number of bytes to be sent (rest is ignored)							

Legend → page 11-3 and

field number	??

Example:

Word no.	Value [hex]	Description
1	0965	09 = user ID changes e.g. to 9 65 = command request
2	0323	03 = slave address = 3(A), 23 = command number 35
3	1AF4	1st word of the parameter string for slave 3(A)
4	5BB8	2nd word of the parameter string for slave 3(A)
…	…	…
18	0004	00 = field number 0 04 = send 4 bytes parameter data

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	TG	S	AS-i slave address					F	reflected command number = 23_{hex}							
3...18	00								00							

Legend → page 11-3

NOTE

The number of bytes to be sent must be divisible by 2 since the system always transmits only multiples of 2 bytes in the S7.4 protocol.

The control bytes defined in profile 7.4 with follow bit and valid bit are automatically added by the system. Therefore, without segmentation, this command is limited to 20 bytes of parameter data. Larger data volumes must be divided into several segments.

Example:

Word no.	Value [hex]	Description
1	096F	09 = reflected user ID 9 6F = command status is "ready" (no fault)
2	0623 or 8623	$x6_{hex}$ = xx**00 011**0_2 → slave address = 3(A), 23_{hex} = reflected command number 35_{dec} the most significant bit TG changes after each execution

11.18 DPV1 command 36_{dec} (24_{hex}): acyclic standard read call of an AS-i slave with CTT2 profile (S-7.5.5, S-7.A.5 or S-B.A.5)

– available from master profile M4 onwards –

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	0	0	A/B	AS-i slave address					command number = 24_{hex} = 36_{dec}							
3	number of bytes to be read								index							
4…17	ignored															
18…19	reserved															

Legend → page 11-3 and

Index	Pointer to the page to be read Length: 1 byte Permitted values: $0…255_{dec}$ ($0…FF_{hex}$) Description: → Data sheet of the addressed CTT2 slaves
Number of bytes to be read	Number of bytes to be read Length: 1 byte Permitted values: $1…32_{dec}$ ($01…20_{hex}$) Description: → Data sheet of the addressed CTT2 slaves

Example:

Word no.	Value [hex]	Description
1	0465	04 = user ID changes e.g. to 4 65 = command request
2	0324	03 = slave address 3(A), 24 = command number 36
3	0409	in index 9, 4 parameter bytes are to be read

Response from controllere (DPV1 slave) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	TG	L32	reserved					F=0	reflected command number = 24_{hex}							
3	parameter byte 1								parameter byte 0							
4…16	parameter bytes 2...27															
17	parameter byte 29								parameter byte 28							
18	parameter byte 31 or number of bytes read								parameter byte 30							

Legend → page 11-3

NOTE

The high byte in the 18th word contains the number of parameter bytes read as long as the number is < 32 (L32 = 0).
If the length is 32 (= maximum possible length), the bit L32 is set and the high byte in the 18th word contains the 32nd parameter byte.

Example:

Word no.	Value [hex]	Description
1	046F	04 = reflected user ID 4 6F = command status is "ready" (no fault)
2	0024 or 8024	L32=0 → net length < 32 24 = reflected command number 36 the most significant bit TG changes after each execution
3	1234	1st and 2nd parameter byte of index 9 in slave 3(A)
4	5678	3rd and 4th parameter byte of index 9 in slave 3(A)
5…17	0000	invalid / not used
18	0400	04 = 4-byte parameter string was read

Response from controllere (DPV1 slave) in case of an error (error detected by AS-i master)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6B_{hex}$							
2	TG	reserved							reflected command number = 24_{hex}							
3	00								error code							

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	046B	04 = reflected user ID 4 6B = error during command execution
2	0024 or 8024	24 = reflected command number 36 the most significant bit TG changes after each execution
3	0016	error code 16_{hex} → timeout during command processing

Possible error codes

Value [hex]	Description
16	timeout during command processing
17	wrong slave profile or slave not in LAS master is not in the normal mode
E0...EF	error detected by AS-i slave; see error code CTT2 (see below)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from controller (DPV1 slave) in case of an error (error detected by AS-i slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6B_{hex}$							
2	TG	0	reserved					F=1	reflected command number = 24_{hex}							
3	CTT2 error code								error code = $E1_{hex}$							

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	046B	04 = reflected user ID 4 6B = error during command execution
2	0124 or 8124	F=1: error during command execution 24 = reflected command number 36 the most significant bit TG changes after each execution
3	01E1	CTT2 error code 01_{hex} = invalid index, → data sheet of the AS-i slave error code $E1_{hex}$ = error detected by AS-i slave; CTT2 error

Possible CTT2 error codes:

Value [hex]	Description
00	no error
01	invalid index
02	invalid length
03	command not implemented
04	used; it was not possible to complete the command in the specified time
05	command was not acknowledged

11.19 DPV1 command 37_{dec} (25_{hex}): acyclic standard write call of an AS-i slave with CTT2 profile (S-7.5.5, S-7.A.5 or S-B.A.5)

– available from master profile M4 onwards –

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	0	0	A/B	AS-i slave address					command number = 25_{hex} = 37_{dec}							
3	number of bytes to be sent								index							
4	parameter byte 1								parameter byte 0							
5…17	parameter bytes 2...27															
18	parameter byte 29								parameter byte 28							
19	reserved															

Legend → page 11-3 and

Index	Pointer to the page to be read Length: 1 byte Permitted values: 0…255_{dec} (0…FF_{hex}) Description: → Data sheet of the addressed CTT2 slave
Number of bytes to be sent	Number of bytes to be sent Length: 1 byte Permitted values: 1…30_{dec} (01…$1E_{hex}$) Description: → Data sheet of the addressed CTT2 slave

Example:

Word no.	Value [hex]	Description
1	0565	user ID changes e.g. to 05_{hex}, 65 = command request
2	0325	03 = slave address 3(A), 25 = command number 37
3	0207	in index 7, 2 parameter bytes are to be written
4	1AF4	both parameter bytes for slave 3(A)

Response from controllere (DPV1 slave) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	TG	0	reserved					F=0	reflected command number = 25_{hex}							

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	056F	05 = reflected user ID 5 6F = command status is "ready" (no fault)
2	0025 or 8025	25 = reflected command number 37 the most significant bit TG changes after each execution

Response from controllere (DPV1 slave) in case of an error (error detected by AS-i master)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6B_{hex}$							
2	TG	reserved							reflected command number = 25_{hex}							
3	00								error code							

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	056B	05 = reflected user ID 5 6B = error during command execution
2	0025 or 8025	25 = reflected command number 37 the most significant bit TG changes after each execution
3	0016	error code 16_{hex} → timeout during command processing

Possible error codes

Value [hex]	Description
16	timeout during command processing
17	wrong slave profile or slave not in LAS master is not in the normal mode
E0...EF	error detected by AS-i slave; see error code CTT2 (see below)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from controllere (DPV1 slave) in case of an error (error detected by AS-i slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6B_{hex}$							
2	TG	0	reserved					F=1	reflected command number = 25_{hex}							
3	CTT2 error code								error code = $E1_{hex}$							

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	056B	05 = reflected user ID 5 6B = error during command execution
2	0125 or 8125	x1 = error during command execution 25 = reflected command number 37 the most significant bit TG changes after each execution
3	01E1	CTT2 error code01_{hex} = invalid index, → data sheet of the AS-i slave error code $E1_{hex}$ = error detected by AS-i slave; CTT2 error

Possible CTT2 error codes

Value [hex]	Description
00	no error
01	invalid index
02	invalid length
03	command not implemented
04	used; it was not possible to complete the command in the specified time
05	command was not acknowledged

11.20 DPV1 command 38_{dec} (26_{hex}): acyclic manufacturer-specific read call of an AS-i slave with CTT2 profile (S-7.5.5, S-7.A.5 or S-B.A.5)

– available from master profile M4 onwards –

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	reserved = 0		A/B	AS-i slave address					command number = 26_{hex} = 38_{dec}							
3	number of bytes to be read								index							
4…17	ignored															
18…19	reserved															

Legend → page 11-3 and

Index	Pointer to the page to be read Length: 1 byte Permitted values: $0…255_{dec}$ ($0…FF_{hex}$) Description: → Data sheet of the addressed CTT2 slave
Number of bytes to be read	Number of bytes to be read Length: 1 byte Permitted values: $1…32_{dec}$ ($01…20_{hex}$) Description: → Data sheet of the addressed CTT2 slave

Example:

Word no.	Value [hex]	Description
1	0665	06 = user ID changes e.g. to 6 65 = command request
2	0326	slave address 3(A), 26 = command number 38
3	0409	in index 9, 4 parameter bytes are to be read

Response from controllere (DPV1 slave) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	TG	L32	reserved					F=0	reflected command number = 26_{hex}							
3	parameter byte 1								parameter byte 0							
4…16	parameter bytes 2...27															
17	parameter byte 29								parameter byte 28							
18	parameter byte 31 or number of bytes read								parameter byte 30							

Legend → page 11-3

> **NOTE**
>
> The high byte in the 18th word contains the number of parameter bytes read as long as the number is < 32 (L32 = 0).
> If the length is 32 (= maximum possible length), the bit L32 is set and the high byte in the 18th word contains the 32nd parameter byte.

Example:

Word no.	Value [hex]	Description
1	066F	06 = reflected user ID 6 6F = command status is "ready" (no fault)
2	0026 or 8026	$0x_{hex}$ / $8x_{hex}$ → L32 = 0 → number of parameter bytes < 32 26 = reflected command number 38 the most significant bit TG changes after each execution
3	1234	1st and 2nd parameter byte of index 9 in slave 4
4	5678	3rd and 4th parameter byte of index 9 in slave 4
5…17	0000	invalid / not used
18	0400	4-byte parameter string was read

Response from controllere (DPV1 slave) in case of an error (error detected by AS-i master)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6B_{hex}$							
2	TG	reserved							reflected command number = 26_{hex}							
3	00								error code							

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	066B	06 = reflected user ID 6 6B = error during command execution
2	0026 or 8026	26 = reflected command number 38 the most significant bit TG changes after each execution
3	0016	error code 16_{hex} → timeout during command processing

Possible error codes

Value [hex]	Description
16	timeout during command processing
17	wrong slave profile or slave not in LAS or master is not in the normal mode
E0...EF	error detected by AS-i slave; see error code CTT2 (see below)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from controllere (DPV1 slave) in case of an error (error detected by AS-i slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6B_{hex}$							
2	TG	0	reserved					F=1	reflected command number = 26_{hex}							
3	CTT2 error code								error code = $E1_{hex}$							

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	066B	06 = user ID 6 6B = error during command execution
2	0126 or 8126	x1 = error during command execution, 26 = reflected command number 38 the most significant bit TG changes after each execution
3	01E1	CTT2 error code 01_{hex} = invalid index, → data sheet of the AS-i slave error code $E1_{hex}$ = error detected by AS-i slave; CTT2 error

Possible CTT2 error codes

Value [hex]	Description
00	no error
01	invalid index
02	invalid length
03	command not implemented
04	used; it was not possible to complete the command in the specified time
05	command was not acknowledged

11.21 DPV1 command 39_{dec} (27_{hex}): acyclic manufacturer-specific write call of an AS-i slave with CTTS profile (S-7.5.5, S-7.A.5 or S-B.A.5) (S-7.5.5, S-7.A.5 or S-B.A.5)

– available from master profile M4 onwards –

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	0	0	A/B	AS-i slave address					command number = 27_{hex} = 39_{dec}							
3	number of bytes to be sent								index							
4	parameter byte 0								parameter byte 1							
5…17	parameter bytes 2...27															
18	parameter byte 28								parameter byte 29							
19	reserved															

Legend → page 11-3 and

Index	Pointer to the page to be read Length: 1 byte Permitted values: $0…255_{dec}$ ($0…FF_{hex}$) Description: → Data sheet of the addressed CTT2 slave
Number of bytes to be sent	Number of bytes to be sent Length: 1 byte Permitted values: $1…30_{dec}$ ($01…1E_{hex}$) Description: → Data sheet of the addressed CTT2 slave

Example:

Word no.	Value [hex]	Description
1	0765	07 = user ID changes e.g. to 7, 65 = command request
2	0327	slave address 3(A) 27 = command number 39
3	0207	in index 7, 2 parameter bytes are to be written
4	1AF4	both parameter bytes for slave 3(A)

Response from controllere (DPV1 slave) in the normal case

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	TG	0	reserved					F=0	reflected command number = 27_{hex}							

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	076F	07 = reflected user ID 7 6F = command status is "ready" (no fault)
2	0027 or 8027	27 = reflected command number 39 the most significant bit TG changes after each execution

Response from controllere (DPV1 slave) in case of an error (error detected by AS-i master)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6B_{hex}$							
2	TG	reserved							reflected command number = 27_{hex}							
3	00								error code							

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	076B	07 = reflected user ID 7 6B = error during command execution
2	0027 or 8027	27 = reflected command number 39 the most significant bit TG changes after each execution
3	0016	error code 16 → timeout during command processing

Possible error codes

Value [hex]	Description
16	timeout during command processing
17	wrong slave profile or slave not in LAS or master is not in the normal mode
E0...EF	error detected by AS-i slave; see error code CTT2 (see below)
F0	invalid CTT2 command
F1	invalid CTT2 response
F2	7.5 data length longer than 30 bytes

Response from controllere (DPV1 slave) in case of an error (error detected by AS-i slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6B_{hex}$							
2	TG	0	reserved					F=1	reflected command number = 27_{hex}							
3	CTT2 error code								error code = $E1_{hex}$							

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	076B	07 = reflected user ID 7 6B = error during command execution
2	0127 or 8127	x1 = error during command execution, 27 = reflected command number the most significant bit TG changes after each execution
3	01E1	error code 01 = invalid index, → data sheet of the AS-i slave error code E1 = error detected by AS-i slave; CTT2 error

Possible CTT2 error codes

Value [hex]	Description
00	no error
01	invalid index
02	invalid length
03	command not implemented
04	used; it was not possible to complete the command in the specified time
05	command was not acknowledged

11.22 DPV1 command 50_{dec} (32_{hex}): read current configuration of AS-i slaves 0(A)...15(A)

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 32_{hex} = 50_{dec}							
3…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0265	02 = user ID changes e.g. to 2 65 = command request
2	0032	32 = command number 50

Response from controller (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 32_{hex}							
3	slave0(A), ID2				slave0(A), ID1				slave0(A), ID code				slave0(A), IO conf.			
4	slave1(A), ID2				slave1(A), ID1				Slave1(A), ID code				Slave1(A), IO conf.			
5...17	...				...				...				...			
18	slave15(A), ID2				slave15(A), ID1				slave15(A), ID code				slave15(A), IO conf.			

Example:

Word no.	Value [hex]	Description
1	026F	02 = reflected user ID 2 6F = command status is "ready" (no fault)
2	0032	32 = reflected command number 50
3	FFFF	current configuration of slave 0(A) : ID2 =F, ID1=F, ID=F and IO=F
4	EF03	current configuration of slave 1(A) ID2 =E, ID1=F, ID=0 and IO=3
…	…	…
18	EF37	current configuration of slave 15(A): ID2 =E, ID1=F, ID=3 and IO=7

11.23 DPV1 command 51_{dec} (33_{hex}): Read current configuration of AS-i slaves 16(A)...31(A)

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 33 $_{hex}$ = 51 $_{dec}$							
3…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0265	02 = user ID changes e.g. to 2 65 = command request
2	0033	33 = command number 51

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 33_{hex}							
3	slave16(A), ID2				slave16(A), ID1				slave16(A), ID code				Slave16(A), IO conf.			
4	slave17(A), ID2				slave17(A), ID1				slave17(A), ID code				slave17(A), IO conf.			
5...17	...				...				...				...			
18	slave31(A), ID2				slave31(A), ID1				slave31(A), ID code				slave31(A), IO conf.			

Example:

Word no.	Value [hex]	Description
1	026F	02 = reflected user ID 2 6F = command status is "ready" (no fault)
2	0033	33 = reflected command number 51
3	FFFF	current configuration of slave 16(A): ID2 =F, ID1=F, ID=F and IO=F
4	EF03	current configuration of slave 17(A) ID2 =E, ID1=F, ID=0 and IO=3
…	…	…
18	EF37	current configuration of slave 31(A): ID2 =E, ID1=F, ID=3 and IO=7

11.24 DPV1 command 52_{dec} (34_{hex}): read current configuration of AS-i slaves 1B...15B

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 34 $_{hex}$ = 52 $_{dec}$							
3…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0265	02 = user ID changes e.g. to 2 65 = command request
2	0034	34 = command number 52

Response from controller (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 34_{hex}							
3	slave1B, ID2				slave1B, ID1				slave1B, ID code				slave1B, IO conf.			
4	slave2B, ID2				slave2B, ID1				slave2B, ID code				slave2B, IO conf.			
5...16	...				...				...				...			
17	slave15B, ID2				slave15B, ID1				slave15B, ID code				slave15B, IO conf.			

Example:

Word no.	Value [hex]	Description
1	026F	02 = reflected user ID 2 6F = command status is "ready" (no fault)
2	0034	34 = reflected command number 52
3	FFFF	current configuration of slave 1B: ID2 =F, ID1=F, ID=F and IO=F
4	EF03	current configuration of slave 2B ID2 =E, ID1=F, ID=0 and IO=3
…	…	…
17	EF37	current configuration of slave 15B: ID2 =E, ID1=F, ID=3 and IO=7

11.25 DPV1 command 53_{dec} (35_{hex}): read current configuration of AS-i slaves 16B...31B

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 35_{hex} = 53_{dec}							
3…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0265	02 = user ID changes e.g. to 2 65 = command request
2	0035	35 = command number 53

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 35_{hex}							
3	slave16B, ID2				slave16B, ID1				slave16B, ID code				slave16B, IO conf.			
4	slave17B, ID2				slave17B, ID1				slave17B, ID code				slave17B, IO conf.			
5...17	...				...				...				...			
18	slave31B, ID2				slave31B, ID1				slave31B, ID code				slave31B, IO conf.			

Example:

Word no.	Value [hex]	Description
1	026F	02 = reflected user ID 2 6F = command status is "ready" (no fault)
2	0035	35 = reflected command number 53
3	FFFF	current configuration of slave 16B: ID2 =F, ID1=F, ID=F and IO=F
4	EF03	current configuration of slave 17B ID2 =E, ID1=F, ID=0 and IO=3
…	…	…
18	EF37	current configuration of slave 31B: ID2 =E, ID1=F, ID=3 and IO=7

11.26 DPV1 command 54_{dec} (36_{hex}): read current parameters of a connected AS-i slave

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 36_{hex} = 54_{dec}							
3…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0665	06 = user ID changes e.g. to 6 65 = command request
2	0036	36 = command number 54

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 36_{hex}							
3	parameters slave4(A)				parameters slave3(A)				parameters slave2(A)				parameters slave1(A)			
4	parameters slave8(A)				parameters slave7(A)				parameters slave6(A)				parameters slave5(A)			
5	parameters slave12(A)				parameters slave11(A)				parameters slave10(A)				parameters slave9(A)			
6	parameters slave16(A)				parameters slave15(A)				parameters slave14(A)				parameters slave13(A)			
7	parameters slave20(A)				parameters slave19(A)				parameters slave18(A)				parameters slave17(A)			
8	parameters slave24(A)				parameters slave23(A)				parameters slave22(A)				parameters slave21(A)			
9	parameters slave28(A)				parameters slave27(A)				parameters slave26(A)				parameters slave25(A)			
10	parameters slave1B				parameters slave31(A)				parameters slave30(A)				parameters slave29(A)			
11	parameters slave5B				parameters slave4B				parameters slave3B				parameters slave2B			
12	parameters slave9B				parameters slave8B				parameters slave7B				parameters slave6B			
13	parameters slave13B				parameters slave12B				parameters slave11B				parameters slave10B			
14	parameters slave17B				parameters slave16B				parameters slave15B				parameters slave14B			
15	parameters slave21B				parameters slave20B				parameters slave19B				parameters slave18B			
16	parameters slave25B				parameters slave24B				parameters slave23B				parameters slave22B			
17	parameters slave29B				parameters slave28B				parameters slave27B				parameters slave26B			
18	not used				not used				parameters slave31B				parameters slave30B			

Example:

Word no.	Value [hex]	Description
1	066F	06 = reflected user ID 6 6F = command status is "ready" (no fault)
2	0036	36 = reflected command number 54
3	4321	parameters of slave 1 [value = 1] to slave 4 [value = 4]
4	8765	parameters of slave 5 [value = 5] to slave 8 [value = 8]
…	…	…
9	6543	slave 29(A) [value = 3], slave 30(A) [value = 4], slave 31(A) [value = 5], slave 1B [value = 6]
…	…	…
17	FE98	parameters of slave 26B [value = 8] to slave 29B [value = F]
18	0098	parameters of slave 30B [value = 8] and slave 31B [value = 9]

11.27 DPV1 command 55_{dec} (37_{hex}): read current AS-i slave lists

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 37_{hex} = 55_{dec}							
3…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0765	07 = user ID changes e.g. to 7 65 = command request
2	0037	37 = command number 55

Response from controller (DPV1 slave)

Bit / Word	––	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	—	reflected user ID								command status = $6F_{hex}$							
2	—	00								reflected command number = 37_{hex}							
3	**LAS**	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res.
4		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
5		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
6		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
7	**LDS**	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0(A)
8		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
9		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
10		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
11	**LPF**	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res.
12		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
13		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
14		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B
15	**LPS**	15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)	7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	res.
16		31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)	23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
17		15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	res.
18		31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B

Example:

Word no.	Value [hex]	Description
1	076F	07 = reflected user ID 7 6F = command status is "ready" (no fault)
2	0037	37 = reflected command number 55
3	0102	LAS slaves 1(A) to 15(A): 0102_{hex} = 0000 0001 0000 0010_2 slaves 1 and 8 are active
4	8001	LAS slaves 16(A) to 31(A): 8001_{hex} = 1000 0000 0000 0001_2 slaves 16(A) and 31(A) are active
5	0102	LAS slaves 1B to 15B: 0102_{hex} = 0000 0001 0000 0010_2 slaves 1B and 8B are active
6	8001	LAS slaves 16B to 31B: 8001_{hex} = 1000 0000 0000 0001_{bin} slaves 16B and 31B are active
7	0102	LDS slaves 0 to 15(A): 0102_{hex} = 0000 0001 0000 0010_{bin} slaves 1(A) and 8(A) are detected
8	8001	LDS slaves 16(A) to 31(A): 8001_{hex} = 1000 0000 0000 0001_{bin} slaves 16(A) and 31(A) are detected
9	0102	LDS slaves 1B to 15B: 0102_{hex} = 0000 0001 0000 0010_{bin} slaves 1B and 8B are detected
10	8001	LDS slaves 16B to 31B: 8001_{hex} = 1000 0000 0000 0001_{bin} slaves 16B and 31B are detected
11	0100	LPF slaves 0 to 15(A): 0100_{hex} = 0000 0001 0000 0000_{bin} periphery fault on slave 8(A) signalled
12	0001	LPF slaves 16(A) to 31(A): periphery fault on slave 16(A) signalled
13	0002	LPF slaves 1B to 15B: periphery fault on slave 1B signalled
14	8000	LPF slaves 16B to 31B: 8000_{hex} = 1000 0000 0000 0000_{bin} periphery fault on slave 31B signalled
15	0102	LPS slaves 1(A) to 15(A): 0102_{hex} = 0000 0001 0000 0010_{bin} slaves 1(A) and 8(A) are projected
16	8001	LPS slaves 16(A) to 31(A): 8001_{hex} = 1000 0000 0000 0001_{bin} slaves 16(A) and 31(A) are projected
17	0102	LPS slaves 1B to 15B: 0102_{hex} = 0000 0001 0000 0010_{bin} slaves 1B and 8B are projected
18	8001	LPS slaves 16B to 31B: 8001_{hex} = 1000 0000 0000 0001_{bin} slaves 16B and 31B are projected

11.28 DPV1 command 56_{dec} (38_{hex}): projected configuration of the AS-i slaves 1(A)...15(A)

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 38_{hex} = 56_{dec}							
3…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0265	02 = user ID changes e.g. to 2 65 = command request
2	0038	38 = command number 56

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 38_{hex}							
3	F_{hex}				F_{hex}				F_{hex}				F_{hex}			
4	slave1(A), ID2				slave1(A), ID1				slave1(A), ID code				slave1(A), IO conf.			
5...17	...				...				...				...			
18	slave15(A), ID2				slave15(A), ID1				slave15(A), ID code				slave15(A), IO conf.			

Example:

Word no.	Value [hex]	Description
1	026F	02 = reflected user ID 2 6F = command status is "ready" (no fault)
2	0038	38 = reflected command number 56
3	FFFF	here not used since slave 0(A) cannot be projected
4	EF03	projected configuration of slave 1(A): ID2 =E, ID1=F, ID=0 and IO=3
…	…	…
18	EF37	projected configuration of slave 15(A): ID2 =E, ID1=F, ID=3 and IO=7

11.29 DPV1 command 57_{dec} (39_{hex}): read projected configuration of the AS-i slaves 16(A)...31(A)

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 39_{hex} = 57_{dec}							
3…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0265	02 = user ID changes e.g. to 2 65 = command request
2	0039	39 = command number 57

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 39_{hex}							
3	slave16(A), ID2				slave16(A), ID1				slave16(A), ID code				slave16(A), IO conf.			
4	slave17(A), ID2				slave17(A), ID1				slave17(A), ID code				slave17(A), IO conf.			
5...17	...				...				...				...			
18	slave31(A), ID2				slave31(A), ID1				slave31(A), ID code				slave31(A), IO conf.			

Example:

Word no.	Value [hex]	Description
1	026F	02 = reflected user ID 2 6F = command status is "ready" (no fault)
2	0039	39 = reflected command number 57
3	FFFF	projected configuration of slave 16(A): ID2 =F, ID1=F, ID=F and IO=F
4	EF03	projected configuration of slave 17(A): ID2 =E, ID1=F, ID=0 and IO=3
…	…	…
18	EF37	projected configuration of slave 31(A): ID2 =E, ID1=F, ID=3 and IO=7

11.30 DPV1 command 58_{dec} ($3A_{hex}$): read projected configuration of the AS-i slaves 1B…15B

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = $3A_{hex}$ = 58_{dec}							
3…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0265	02 = user ID changes e.g. to 2 65 = command request
2	003A	3A = command number 58

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = $3A_{hex}$							
3	F_{hex}				F_{hex}				F_{hex}				F_{hex}			
4	slave1B, ID2				slave1B, ID1				slave1B, ID code				slave1B, IO conf.			
5...17	...				...				...				...			
18	slave15B, ID2				slave15B, ID1				slave15B, ID code				slave15B, IO conf.			

Example:

Word no.	Value [hex]	Description
1	026F	02 = reflected user ID 2 6F = command status is "ready" (no fault)
2	003A	3A = reflected command number 58
3	FFFF	here not used since slave 0B cannot be projected
4	EF03	projected configuration of slave 1B: ID2 =E, ID1=F, ID=0 and IO=3
…	…	…
18	EF37	projected configuration of slave 15B: ID2 =E, ID1=F, ID=3 and IO=7

11.31 DPV1 command 59_{dec} ($3B_{hex}$): read projected configuration of the AS-i slaves 16B…31B

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = $3B_{hex}$ = 59_{dec}							
3…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0265	02 = user ID changes e.g. to 2 65 = command request
2	003B	3B = command number 59

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = $3B_{hex}$							
3	slave16B, ID2				slave16B, ID1				slave16B, ID code				slave16B, IO conf.			
4	slave17B, ID2				slave17B, ID1				slave17B, ID code				slave17B, IO conf.			
5...17	...				...				...				...			
18	slave31B, ID2				slave31B, ID1				slave31B, ID code				slave31B, IO conf.			

Example:

Word no.	Value [hex]	Description
1	026F	02 = reflected user ID 2 6F = command status is "ready" (no fault)
2	003B	3B = reflected command number 59
3	FFFF	projected configuration of slave 16B: ID2 =F, ID1=F, ID=F and IO=F
4	EF03	projected configuration of slave 17B: ID2 =E, ID1=F, ID=0 and IO=3
…	…	…
18	EF37	projected configuration of slave 31B: ID2 =E, ID1=F, ID=3 and IO=7

11.32 DPV1 command 96_{dec} (60_{hex}): save data non-volatilely in the flash memory of the controllere

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 60_{hex} = 96_{dec}							
3	00								area number							
4…19	ignored															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0965	09 = user ID changes e.g. to 9 65 = command request
2	0060	60 = command number 96
3	0002	area number: 02 = save the configuration of AS-i master 1 non-volatilely 03 = save the configuration of AS-i master 2 non-volatilely

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 60_{hex}							
3	00								area number							

Example:

Word no.	Value [hex]	Description
1	096F	09 = reflected user ID 9 6F = command status is "ready" (no fault)
2	0060	60 = reflected command number 96
3	0002	reflected area number 02 = save the configuration of AS-i master 1 non-volatilely

11.33 DPV1 command 97_{dec} (61_{hex}): carry out various settings in the controllere

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 61_{hex} = 97_{dec}							
3	00								command number							
4…19	parameters 1…16															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0865	08 = user ID changes e.g. to 8 65 = command request
2	0061	61 = command number 97
3	0010	Command number: 10 = changes the operating mode of the PLC (corresponding parameters →word 4) Further command numbers: 12 = reset all slave error counters 13 = reset the configuration error counter 14 = reset AS-i cycle error counter
4	0002	Parameters; here for command number 10: 0000 = activates the gateway mode 0001 = stops the PLC 0002 = sets the operation mode of the PLC to RUN

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 61_{hex}							
3...18	00								00							

Example:

Word no.	Value [hex]	Description
1	086F	08 = reflected user ID 8 6F = command status is "ready" (no fault)
2	0061	61 = reflected command number 97

11.34 DPV1 command 102_{dec} (66_{hex}): retrieve the status of the controllere display

Request of DPV1 master

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	user ID								command request = 65_{hex}							
2	00								command number = 66_{hex} = 102_{dec}							
3	00								command number							
4…n	parameter(s) (according to command number)															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0765	07 = user ID changes e.g. to 7 65 = command request
2	0066	66 = command number 102
3	0001	command number, here: 01 = retrieves the display status further command numbers: 02 = jump to menu screen 0 03 = jump to user menu screen A1

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 66_{hex}							
3	00								reflected command number here: 01							
4	buttons pressed															
5	active menu area															
6	process error occurred															
7	currently displayed menu screen															
8	activated system language															
9…18	reserved															

Legend → page 11-3 and

buttons pressed	0001	left button pressed
	0002	button [▲] is pressed
	0004	button [▼] is pressed
	0008	right button is pressed
active menu area	00A0	system menu is active
	00A1	user menu is active
	00AE	process error display is active (E10...E30)
	00AF	system error display is active (acknowledgement required)
process error occurred	0000	no process error
	0001	process error occurred
currently displayed menu screen	xxxx	number of the current menu screen
activated system language	0000	display of menus in English
	0001	display of menus in the second system language (e.g. German)

Example:

Word no.	Value [hex]	Description
1	076F	07 = user ID 7 6F = command status is "ready" (no fault)
2	0066	66 = reflected command number 102
3	0001	01 = reflected command number
4	0008	right button is pressed
5	00A0	system menu is active
6	0001	process error occurred
7	001B	menu screen 27 "Quick Setup" is displayed
8	0000	display of menus in English

11.35 DPV1 command 105_{dec} (69_{hex}): read the device properties of the controllere

Request of DPV1 master

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word																
1	user ID								command request = 65_{hex}							
2	00								command number = 69_{hex} = 105_{dec}							
3…17	ignored															
18…19	reserved															

Legend → page 11-3

Example:

Word no.	Value [hex]	Description
1	0665	06 = user ID changes e.g. to 6 65 = command request
2	0069	69 = command number 105

Response from controllere (DPV1 slave)

Bit / Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	reflected user ID								command status = $6F_{hex}$							
2	00								reflected command number = 69_{hex}							
3	2M	DP	EN	reserved					PLC mode							
4	00								fieldbus type							
5	00								flash memory type							
6	hardware version															
7	RTS firmware version number															
8	RTS firmware release number															
9	AS-i master 1 firmware version number															
10	AS-i master 1 firmware release number															
11	AS-i master 2 firmware version number															
12	AS-i master 2 firmware release number															
13	Linux kernel version															
14	Linux ramdisk version															
15…18	00															

Legend → page 11-3 and

2M	0	device with 1 AS-i master
	1	device with 2 AS-i masters
DP	0	fieldbus interface Profibus DP(V1) not available
	1	fieldbus interface Profibus DP is available
EN	0	device without Ethernet programming interface
	1	device without Ethernet programming interface
PLC mode	01	PLC is in the RUN mode
	02	PLC is in the STOP mode
	04	PLC stops at the breakpoint
	08	gateway mode
Fieldbus type	01	Anybus Profibus DP
	04	Anybus CANopen
	05	Anybus DeviceNet
	09	Anybus Ethernet IT
	0A	Anybus Ethernet/IP
	0B	ifm Profibus DP
	0C	no fieldbus module detected

Example:

Word no.	Value [hex]	Description
1	066F	06 = reflected user ID 6 6F = command status is "ready" (no fault)
2	0069	69 = reflected command number 105
3	4008	40_{hex} = 0100 0000_{bin} 2M = 0 → with one AS-i master, DP = 1 → Profibus DP controllere, EN = 0 → without Ethernet programming interface, PLC mode 08 = gateway; signal preprocessing is not used
4	000B	used fieldbus interface "ifm Profibus DP"
5	0002	flash memory type
6	1000	hardware version
7	0002	1st part of the RTS firmware number 02.218B: RTS firmware version number = 02
8	218B	2nd part of the RTS firmware number 02.218B: RTS firmware release number = 218B
9	0000	1st part of the firmware number 0.238A for AS-i master 1: AS-i master 1 firmware version number = 0
10	238A	2nd part of the firmware number 0.238A for AS-i master 1: AS-i master 1 firmware release number = 238A
11	0000	1st part of the firmware number 0.238A for AS-i master 2: AS-i master 2 firmware version number = 0
12	238A	2nd part of the firmware number 0.238A for AS-i master 2: AS-i master 2 firmware release number = 238A
13	0196	Linux kernel version 0196_{hex} = 406_{dec}
14	0A6E	Linux ramdisk version: $0A.6E_{hex}$ = 10.110_{dec}

12 Additional functions

12.1 AS-i diagnosis via Profibus DP

12.1.1 Digital inputs

The AS-i master status information in the first byte of the digital input data of the single/A slaves contains master flags of the corresponding AS-i system:

Byte 0	Bit 7	Bit 5	Bit 5	Bit 4
	PLC running in the controllere	configuration error in the AS-i circuit	no AS-i slave detected	periphery faults

12.1.2 Digital outputs

The AS-i master control information in the first byte of the digital output data of the single/A slaves controls the stored diagnostic information:

Byte 0	Bit 7	Bit 5	Bit 5	Bit 4
	reserved	reserved	reset of the stored diagnostic data	activate transfer of the stored diagnostic data

If the bits 4 and 5 of the control information (byte 37) are set to 0 (default), the extended diagnosis contains the current system states. If short-time faults are to be detected as well, the controllere can be prompted via bit 4 to store the error states. This storage is reset by bit 5 or by switching off the controllere.

This means if bit 4 is set and a configuration error occurs with a slave, the corresponding bit in the extended device diagnosis remains set even if the slave is correctly detected again.

If - as described in the preceding section - the parameter "Extended Profibus Diag." was set to "Disabled" (byte 37 bit 5 = FALSE), the controllere transmits no extended device-specific diagnostic data. The controllere only transmits the standard diagnostic data which each Profibus DP slave must at least supply (the first 6 bytes).

In some plants, jitters (→ chapter 15, Terms, abbreviations) in the Profibus DP cycle time - which occur for example for diagnostic calls - are not allowed, so that in these cases the plant diagnosis is made via I/O data even if this extends the DP cycle time.

12.1.3 Extended device-specific Profibus DP diagnosis

The extended device-specific Profibus DP diagnosis is activated by setting the Profibus DP parameter byte 37 bit 5 and contains the following status information:

Diagnosis	Byte	Contents	Diagnosis
standard diagnosis	0	station status 1	standard diagnosis
	1	station status 2	
	2	station status 3	
	3	station number DP master	
	4	manufacturer ID (high byte) 04_{hex}	
	5	manufacturer ID (low byte) $D8_{hex}$	
extended diagnosis	6	length of the extended diagnosis (38_{hex})	header of the extended diagnosis
	7	status type: status manufacturer-specific	
	8	slot number (04_{hex})	
	9	0	
	10, 11	master flags	diagnosis AS-i master 1 A and B slaves
	12…19	LDS: list of detected slaves	
	20…27	configuration error	
	28…35	LPF: list of periphery faults	
	36, 37	master flags	diagnosis AS-i master 2 A and B slaves
	38…45	LDS: list of detected slaves	
	46…53	configuration error	
	54…61	LPF: list of periphery faults	

With an activated diagnosis the controllere always generates 62 bytes of diagnostic data even if it is a device with only one master!

12.1.4 Diagnostic master flags (byte 10 / byte 36)

Format of the first byte of the diagnostic master flags, so for byte 10 (AS-i master 1) and byte 36 (AS-i master 2):

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
CTRL	Cerr	Offl	PF	APF	Sl0	ProjM	WdRS232

Legend

CTRL	controller$_e$ PLC in the operating mode RUN
Cerr	AS-i configuration error
Offl	AS-i master offline (no AS-i slave detected)
PF	AS-i periphery fault
APF	AS-i voltage fault
Sl0	AS-i slave with address 0 detected
ProjM	AS-i master in the operating mode projecting
WdRS232	watchdog triggered by the interface RS-232C of the controller$_e$

Format of the slave lists:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
7(A)	6(A)	5(A)	4(A)	3(A)	2(A)	1(A)	0(A)
15(A)	14(A)	13(A)	12(A)	11(A)	10(A)	9(A)	8(A)
23(A)	22(A)	21(A)	20(A)	19(A)	18(A)	17(A)	16(A)
31(A)	30(A)	29(A)	28(A)	27(A)	26(A)	25(A)	24(A)
7B	6B	5B	4B	3B	2B	1B	res.*)
15B	14B	13B	12B	11B	10B	9B	8B
23B	22B	21B	20B	19B	18B	17B	16B
31B	30B	29B	28B	27B	26B	25B	24B

*) slave address 0B is not allowed

12.2 Set the Profibus DP address on the controllere

The controllere provides 2 options to obtain the fieldbus data:

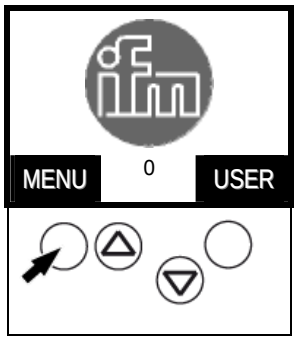
menu [Quick Setup] > [Fieldbus Setup]

or menu [Fieldbus Setup]

The first variant is described below:

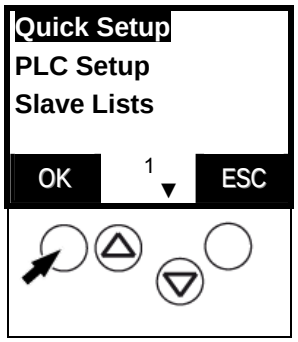
[Menu] > [Fieldbus Setup] > Choose address > [OK]

1.



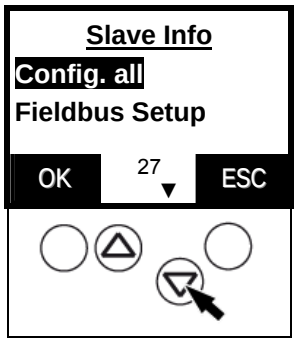
► Press [MENU]

2.



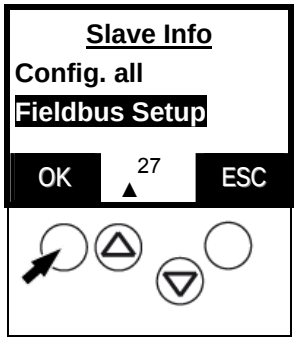
► Select [Quick Setup] with [OK]

3.



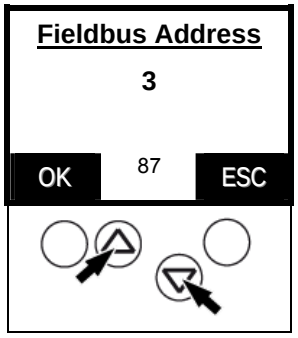
► Scroll to [Fieldbus Setup] with [▼]

4.



► Select [Fieldbus Setup] with [OK]

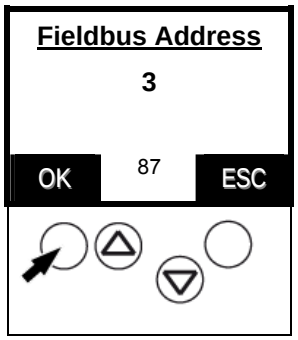
5.



> Display of the first enabled Profibus slave address
0...2 reserved
3…127 first to last Profibus slave address

► Press [▲] / [▼] to scroll to the requested slave address in the Profibus

6.



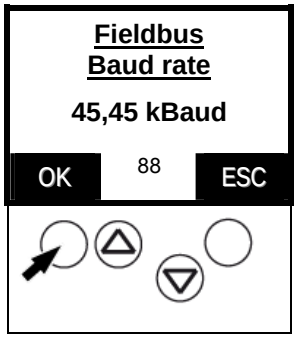
► Press [OK] to select the requested Profibus slave address

Continuation in the next chapter.

12.3 Read fieldbus parameters

Continued from the previous chapter
Displayed values → chapter Device-specific Profibus DP parameters, page 7-25

7.

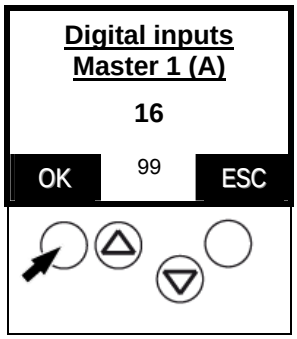


> Continuous display of possible values:
The controllere negotiates the suitable baud rate with the fieldbus master

> Display of determined baud rate value

► Press [OK] to confirm the value

8.



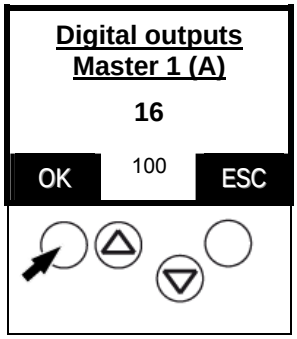
> Here: display that 16 bytes in the fieldbus master were configured for digital inputs in the fieldbus master of single or A slaves on AS-i master 1

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

9.



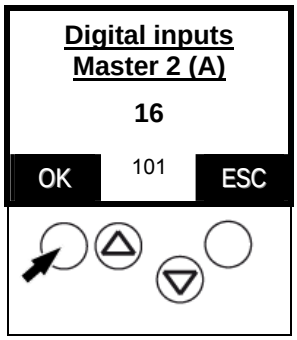
> Here: display that 16 bytes in the fieldbus master were configured for digital outputs in the fieldbus master of single or A slaves on AS-i master 1

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

10.



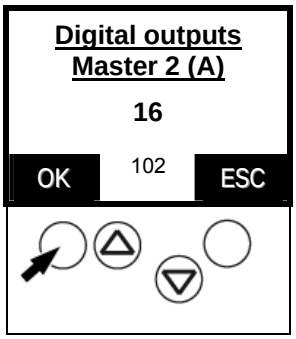
> Here: display that 16 bytes in the fieldbus master were configured for digital inputs in the fieldbus master of single or A slaves on AS-i master 2

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

11.



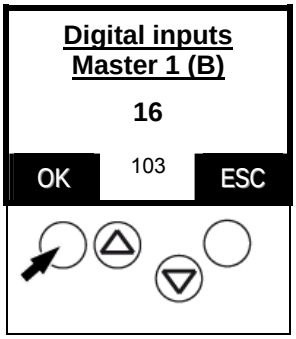
> Here: display that 16 bytes in the fieldbus master were configured for digital outputs in the fieldbus master of single or A slaves on AS-i master 2

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

12.



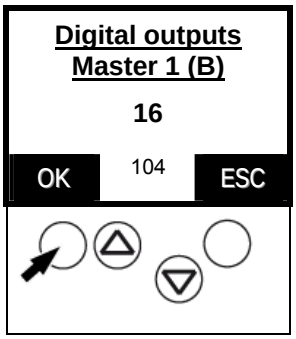
> Here: display that 16 bytes in the fieldbus master were configured for digital inputs in the fieldbus master of B slaves on AS-i master 1

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

13.



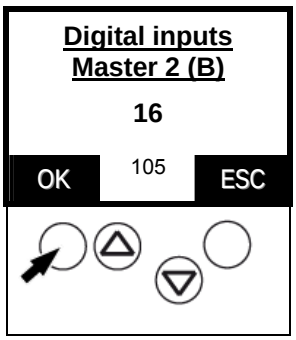
> Here: display that 16 bytes in the fieldbus master were configured for digital outputs in the fieldbus master of B slaves on AS-i master 1

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

14.



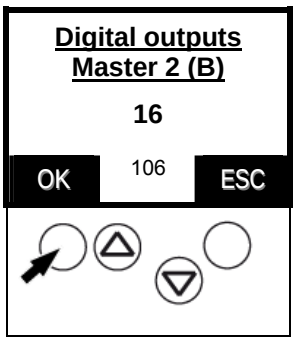
> Here: display that 16 bytes in the fieldbus master were configured for digital inputs in the fieldbus master of B slaves on AS-i master 2

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

15.



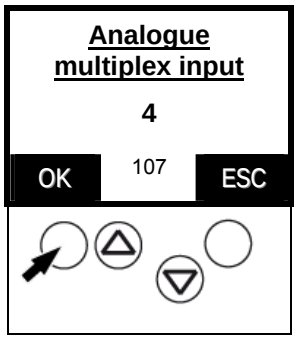
> Here: display that 16 bytes in the fieldbus master were configured for digital outputs in the fieldbus master of B slaves on AS-i master 2

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

16.



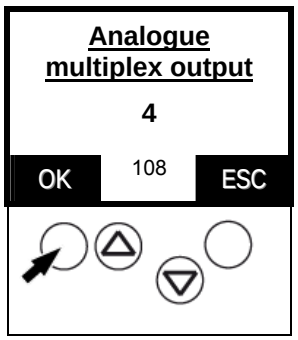
> Here: display that 4 bytes in the fieldbus master were configured for analogue multiplex inputs in the fieldbus master

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

17.



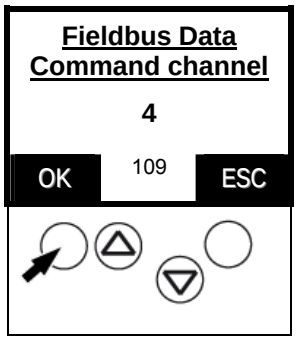
> Here: display that 4 bytes in the fieldbus master were configured for analogue multiplex outputs in the fieldbus master

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

18.



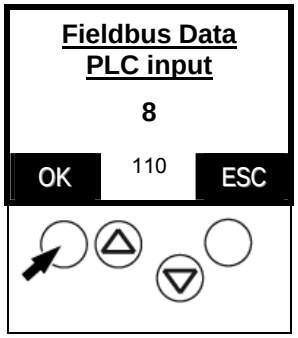
> Here: display that 4 bytes in the fieldbus master were configured for the fieldbus data command channel

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

19.



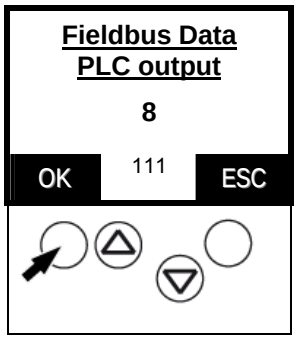
> Here: display that 8 bytes in the fieldbus master were configured for fieldbus data PLC inputs in the fieldbus master

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

20.



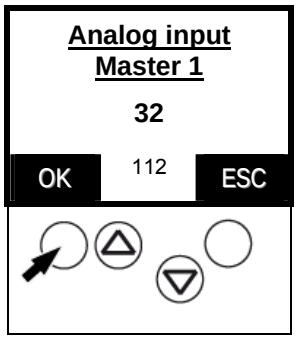
> Here: display that 8 bytes in the fieldbus master were configured for fieldbus data PLC outputs in the fieldbus master

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

21.



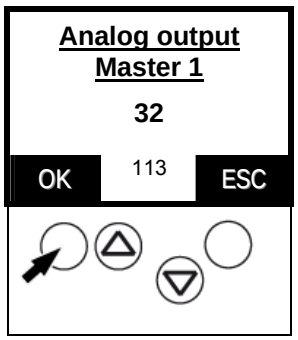
> Here: display that 32 bytes in the fieldbus master were configured for analogue inputs in the fieldbus master AS-i master 1

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

22.



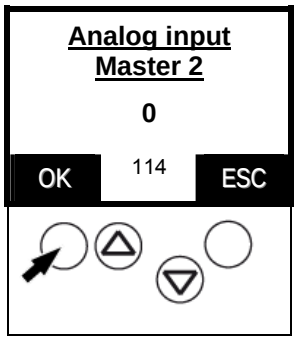
> Here: display that 32 bytes in the fieldbus master were configured for analogue outputs in the fieldbus master on AS-i master 1

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

23.



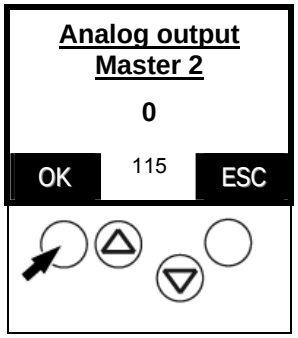
> Here: data not used for Profibus

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

24.



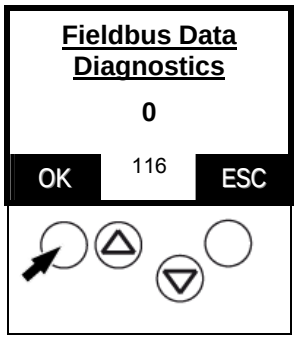
> Here: data not used for Profibus

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

25.



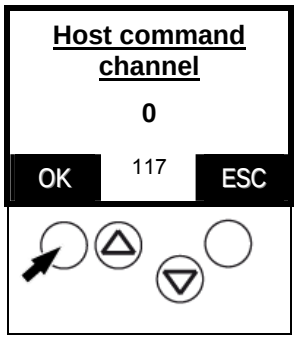
> Here: data not used for Profibus

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

26.



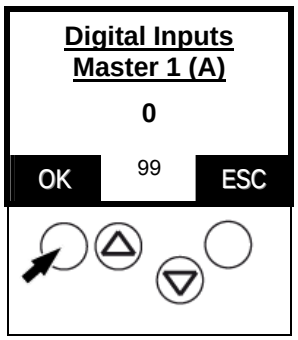
> Here: no data concerning module 12

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

27.



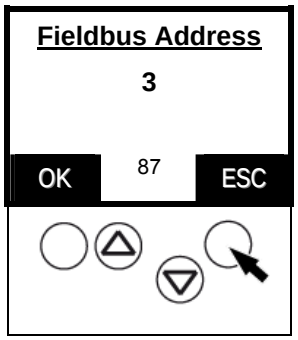
> Repetition of the display series (→ step 8)

► Press [OK] to scroll to the next display

OR:

► [ESC] to return to screen 87 [Fieldbus Address]

28.



► Press [ESC] twice to return to the start screen

12.4 Store system parameters

→ Basic device manual

13 Technical data

13.1 Basic functions

→ separate basic instructions of the device manual

13.2 Profibus DP interface

Baud rate *)	9.6 KBaud to 12 MBaud
Connection	SUB D 9 socket with LED for error indication

*) The fieldbus master and the controller negotiate the baud rate at power on. The fieldbus master determines the value.

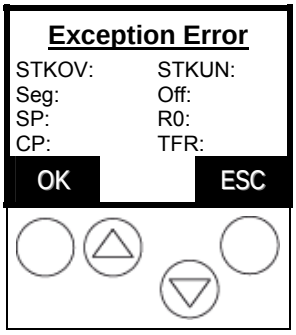
14 Troubleshooting

Basic functions → separate basic instructions of the device manual

14.1 List of errors

Errors	Cause(s)	Remedy
		►
		►
		►
		►
		►
		►

14.2 Hardware error, exception error



> The main processor has detected an exception error

> All current activities are interrupted

► Power the controller off and on again

NOTE

If this error message is shown immediately after power on, the execution of the PLC program can be prevented:

► During power on press the left function key of the device and keep it pressed.

> The PLC program is declared as "non valid", no longer initialised and no longer executed.

Following indications in the TFR register provides details concerning the error cause:

TFR Register															
D15	**D14**	**D13**	**D12**	**D11**	**D10**	**D9**	**D8**	**D7**	**D6**	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**
NMI	STKOF	STKUF	–	–	–	–	–	UNDOPC	–	–	–	PRTFLT	ILLOPA	ILLINA	ILLBUS

Bit	Name	Possible error source
NMI	non maskable interrupt	hardware
STKOF	stack overflow	PLC program / hardware
STKUF	stack underflow	PLC program / hardware
UNDOPC	unknown machine command	PLC program / hardware
PRTFLT	32-bit code error	PLC program / hardware
ILLOPA	invalid access to 16-bit operand	PLC program / hardware
ILLINA	invalid jump address	PLC program / hardware
ILLBUS	invalid access to external bus	hardware

Examples:

TFR 0004 invalid access to 16-bit operand, e.g. by the PLC

TFR 0002 invalid jump address, e.g. by the PLC

15 Terms, abbreviations

A/B slave	→Slave with an A or B being appended to its address number and which may therefore be present twice on the →master.
Address	This is the "name" of the participant in the bus. All participants need a clearly defined address so that the signals can be exchanged without problem.
AS-i	AS-i = **A**ctuator **S**ensor **I**nterface Bus system for the first binary field level.
Acyclic data transfer	The acyclic services are performed parallel in time and in addition to the cyclic process data transfer at a low priority. By means of this, the time influence on high priority cyclic process data transfer is supposed to be kept to a minimum.
Baud	Baud, abbrev.: Bd = unit of measurement for the data transfer speed. Do not confuse baud with "bits per second" (bps, bits/s). Baud indicates the number of changes of state (steps, cycles) per second over a transmission length but it is not defined how many bits per step are transmitted. The name baud can be traced back to the French inventor J. M. Baudot whose code was used for telex machines. 1 MBd = 1024 x 1024 Bd = 1 048 576 Bd
Operating system	Basic program in the device, establishes the connection between the hardware of the device and the user software.
Bus	Serial data transfer of several participants on the same cable.
CAN	CAN = **C**ontroller **A**rea **N**etwork CAN is a priority-controlled fieldbus system for larger data volumes. It is available in different variants, e.g. CANopen, CAN in Automation (CiA) or →DeviceNet. CAN can be used e.g. as a supplier for AS-i over larger distances. Corresponding →gateways are available.
CoDeSys	CoDeSys for Automation Alliance associates companies of the automation industry whose hardware devices are all programmed with the widely used IEC 61131-3 development tool CoDeSys®. CoDeSys® is a registered trademark of 3S – Smart Software Solutions GmbH, Germany.
Controllere	Master in the AS-i bus system of the generation E
DeviceNet	Fieldbus system for larger data volumes based on →CAN technology, requires special cables, complex connection technology. Can be used e.g. as a supplier for AS-i over greater distances. Corresponding →gateways are available.
DHCP	DHCP = **D**ynamic **H**ost **C**onfiguration **P**rotocol = protocol for the dynamic configuration by the →host DHCP is a protocol which offers the dynamic configuration of IP addresses and thus coherent information. The protocol supports the further use of IP-addresses which are only available in a limited number by a centralised management of the address assignment. The participant logs on to a server with this service when it is switched on in a network for the first time. The server assigns a local free →IP address to the participant.

EMC	EMC = **E**lectro **M**agnetic **C**ompatibility According to the EC directive (89/336 EEC) regarding electromagnetic compatibility (short EMC Directive) there are requirements regarding the capacity of electrical and electronic equipment, installations, systems or components to operate satisfactorily in the given electromagnetic environment. The devices must not interfere with their environment and must not be adversely influenced by external electromagnetic interference.
Ethernet	Ethernet is a widely used, manufacturer-independent technology which enables data transfer in the network at a speed of 10 or 100 million bits per second (Mbps). Ethernet belongs to the family of so-called "optimum data transfer" on a non exclusive transmission medium. The concept was developed in 1972 and specified as IEEE 802.3 in 1985.
FE	FE = **f**unctional **e**arth Functional earth is a reference potential which is not connected to protective earth or only connected when special measures are taken. The functional earth serves as equalisation of potential for an ungrounded installation (e.g. →SELV).
Fieldbus	A →bus for industrial applications: mechanically extremely robust and excellent data protection
Firmware	Basic program in the device, virtually the operating system The firmware establishes the connection between the hardware of the device and the user software.
Gateway	Coupler Gateways enable connection of completely different systems. Gateways are used when two incompatible network types are to be connected by converting the protocol of one system to the protocol of the other system. Here: connection between AS-i and higher-level fieldbus systems such as →Profibus DP, →DeviceNet, Interbus-S or other interfaces, e.g. RS-485. The device includes an AS-i master which is directly coupled to the →host interface (e.g. →Profibus DP slave).
GSD	**D**evice **M**aster **F**ile Describes the interface to the device to be connected to the fieldbus. The file is provided on the **ifm** CD (→folder "Gateway").
Host	The controller in the hierarchy above the AS-i master, e.g. a PLC or a processor.
ID	ID = **Id**entifier Name to differentiate the devices / participants connected to a system.
IP address	IP = **I**nternet **P**rotocol The IP address is a number which is necessary to clearly identify an internet participant. For the sake of clarity the number is written in 4 decimal values, e.g. 127.215.205.156.
Jitter	Jitter means a slight fluctuation in accuracy in the transmission cycle when transmitting digital signals. More generally, jitter in transmission technology means an abrupt and undesired change of the signal characteristics.
LAS	**L**ist of **A**ctive **S**laves In this slave list the controller enters the slaves detected as active for this AS-i master.

LDS	**L**ist of **D**etected **S**laves In this slave list the controller$_e$ enters the slaves detected as present for this AS-i master.
LED	LED = **L**ight **E**mitting **D**iode Light-emitting diode, also luminescent diode, an electronic element with a high, coloured luminosity in a small area, with a negligible power dissipation.
LFS	**L**ist of **F**ailed **S**laves In this slave list the controller$_e$ enters the slaves with a projection error on this AS-i master.
LPS	**L**ist of **P**rojected **S**laves In this slave list the controller$_e$ enters the slaves projected for this AS-i master.
MAC ID	MAC = **M**anufacturer's **A**ddress **C**ode = manufacturer's serial number →ID = **Id**entifier Every network card has a MAC address, a clearly defined worldwide unique numerical code, more or less a kind of serial number. Such a MAC address is a sequence of 6 hexadecimal numbers, e.g. "00-0C-6E-D0-02-3F".
Marginalia	Marginal column beside a text used for notes and comments. Because of its outstanding position well suited for quickly finding certain sections in the text.
Master	Handles the complete organisation on the bus. The master decides on the bus access time and polls the → slaves cyclically.
Master-slave communication	AS-i strictly operates to the master-slave principle. The master polls all slaves one after the other in always the same order. Only one master per network line is allowed (→cyclic polling).
MBd	→Baud
DPV1	The DPV1 protocol is a communication protocol based on a → master/slave architecture and was generated by Modicon* in 1979 for communication with its PLCs. In the industry, DPV1 has become a de facto standard. DPV1/TCP is based on →Ethernet TCP/IP. DPV1/TCP ports the protocol defined for the serial interface to TCP. The →IP address clearly identifies each unit a network. Therefore the slave address was used to identify one of several logical units (unit IDs) in a physical device. To do so, extended IP addressing is used. Example: 192.168.83.28.1 means unit ID 1 on IP address 192.168.83.28. *) Modicon passed from AEG to the Schneider group in 1994.
OSSD	OSSD = **O**utput **S**ignal **S**witching **D**evice = output signal of a switching device, here: output signal of an AS-i safety monitor
Password	In the menu [System Setup] in the menu item [Password] the operation can be restricted or enabled. On delivery, the unit is in the user mode. By entering an invalid password (e.g. 1000) all menu items which can change settings are blocked.

PELV	PELV = **P**rotective **E**xtra **L**ow **V**oltage Functional extra low voltage with safe separation, grounded variant of SELV. Extra low voltage with safe separation (grounded variant of SELV). The specification as PELV system to IEC364-4-41 (initially DIN VDE 0100-410:1997-01) covers a measure to protect against direct and indirect contact with dangerous voltages by a "safe separation" between primary and secondary side in the device (e.g. power supply to PELV specification). For this reason no separate PE conductor is required in a PELV system. It is allowed to ground circuits and / or bodies in a PELV system.
Pictograms	Image symbols which convey information by a simplified graphic representation. →page 1-1, chapter What do the symbols and formats stand for?
Polling	to poll = to count votes The controller master fetches the data from every participant in the system successively: master calls participant 1 participant 1 replies with its current data (actual values) master transmits more data (preset values) to participant 1 if needed participant 1 acknowledges receipt of the data etc., the same procedure for all other participants. Cyclical polling: AS-i master cyclically polls the data of all →slaves in the bus (see above). The data is updated in the master after max. 5 ms.→ If A/B slaves are used, the →cycle time can be extended to 10 ms.
Profibus	Fieldbus system for larger data volumes, it requires special cables, complex connection technology. It is available in different variants as Profibus FMS, DP or PA. The Profibus DP can be used as a supplier for AS-i over greater distances. Corresponding →gateways are available.
Profibus FMS	Profibus FMS (**F**ieldbus **M**essage **S**pecification) for networking of controllers. Was replaced by Profibus DP.
Profibus DP	Profibus DP (**D**ecentralised **P**eriphery) to trigger sensors and actuators by a central controller in production technology. In particular the numerous standard diagnostic options are important. More applications are the connection of "distributed intelligence", i.e. networking of several controllers among each other (similar to →Profibus FMS). Data rates up to 12 Mbits/s on twisted two-wire cables and/or fibre optics are possible.
Profibus DPV1	The functional extensions to Profibus DP (in short: DP) provided for in the Profibus standard IEC 61158 complement the cyclic communication functions of Profibus DP by the possibility of acyclic required data transfer.
Profibus PA	Profibus PA (**P**rocess **A**utomation) is used to control field devices by means of a process control system in process technology. This version of PROFIBUS is suited for hazardous areas (Ex zones 0 and 1). Only a small current flows on the bus cables in an intrinsically safe circuit so that even in case of a problem no sparks are produced. The disadvantage of this variant is the slower data transfer rate.

Remanent	Remanent data is protected against data loss in case of power failure. The operating system for example automatically copies the remanent data to a flash memory as soon as the voltage supply falls below a critical value. If the voltage supply is available again, the →operating system loads the remanent data back to the RAM memory. The data in the RAM memory of a controller, however, is volatile and normally lost in case of power failure.
RTS	RTS = **R**un **T**ime **S**ystem Run time systems are basic versions of applications. These minimum versions are supplied with certain products to meet the prerequisites for the execution of the actual product or to be able to look at or use results generated by this product on other processors: making available all routines required to execute a program in a programming language, e.g. interactions with the →operating system, memory requirements, error routines, inputs and outputs.
SELV	SELV = **S**afety **E**xtra **L**ow **V**oltage Active parts integrated in SELV circuits must not be connected to ground or protective conductors of other circuits. They must be safely separated from active parts with higher voltage. SELV circuit = secondary circuit (output voltage) which is rated and protected so that its voltages do not exceed a safe value in case of correct operation (of the power supply) or in case of a single fault (of the power supply). SELV circuits are separated from the input voltage (mains voltage) by double or enhanced insulation. The voltage value must not exceed 60 V DC (or 42.4 V AC).
Single slave	→Slave whose address number may only occur once on the →master.
Slave	Passive participant at the bus, only replies on request of the →master. Slaves have a clearly defined and unique →address in the bus. The following distinction is made: single slaves whose address numbers may only occur once on the →master and A/B slaves with an A or B being appended to their address number which may therefore be present in the →master twice.
Target	The target indicates the target system where the PLC program is to run. The target contains the files (drivers) required for programming and parameter setting.
Unit ID	→DPV1
Watchdog	In general the term watchdog is used for a component of a system which watches the function of other components. If a possible malfunction is detected, this is either signalled or suitable program branchings are activated. The signal or the branchings serve as triggers for other co-operating system components which are to solve the problem.
Cycle time	This is the time for one cycle. The following happens: PLC cycle: the PLC program performs one complete run. AS-i cycle: all AS-i slaves are updated (5...10 ms).

16 Index

nn-n	The indication of the page where you can find some information about the keyword is written in normal characters.
ii-i	The indication of the page where the keyword is detailed is written in *italics*.