SIEMENS

SIMATIC NET

DP/AS−INTERFACE LINK
Advanced

as of hardware version 1, as of firmware version 2.0

Manual
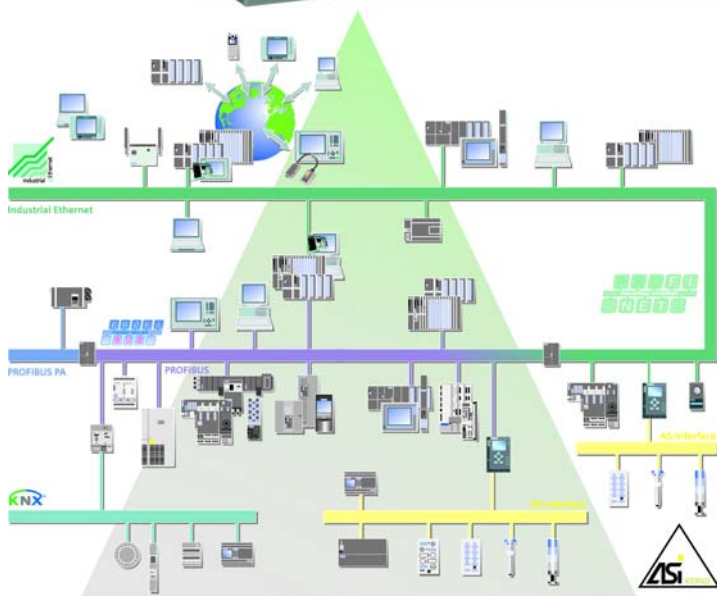
Classification of the Safety-Related Notices

This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning triangle and are marked as follows according to the level of danger:

Danger

indicates that death, severe personal injury **will** result if proper precautions are not taken.

Warning

indicates that death, severe personal injury **can** result if proper precautions are not taken.

Caution

with warning triangle indicates that minor personal injury can result if proper precautions are not taken.

Vorsicht

without warning triangle indicates that damage to property can result if proper precautions are not taken.

Notice

indicates that an undesirable result or status can occur if the relevant notice is ignored.

Note

highlights important information on the product, using the product, or part of the documentation that is of particular importance and that will be of benefit to the user.

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Safety Instructions Regarding your Product

Before you use the product described here, read the safety instructions below thoroughly.

Qualified Personnel

Only **qualified personnel** should be allowed to install and work on this equipment. Qualified persons are defined as persons who are authorized to commission, to ground, and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

Correct Usage of Hardware Products

Note the following:

⚠ **Warning**

This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.

This product can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.

Before you use the supplied sample programs or programs you have written yourself, make certain that no injury to persons nor damage to equipment can result in your plant or process.

EC Notice: Commissioning must not be carried out until it has been established that the machine in which this component is to be installed complies with the conditions of directive 98/37/EC.

Correct Usage of Software Products

Note the following:

⚠ **Warning**

This software may only be used for the applications described in the catalog or the technical description, and only in connection with devices or software products from other manufacturers which have been approved or recommended by Siemens.

Before you use the supplied sample programs or programs you have written yourself, make certain that no injury to persons nor damage to equipment can result in your plant or process.

Prior to Startup

Before putting the product into operation, note the following:

Vorsicht

Prior to startup you must observe the instructions in the relevant documentation. For ordering data of the documentation please refer to the catalogs or contact your local SIEMENS representative.

Preface

Purpose of the Manual

This manual supports you when using the DP/AS-INTERFACE LINK Advanced module, the product name is also shortened to **"DP/AS-i LINK"** in places. It contains information about how PROFIBUS DP masters can address AS-i actuators and AS-i sensors via this module.

What's new?

This issue of the manual includes several corrections.

We recommend the following procedure when ...

... You want an overall picture of the AS-Interface:

– First read the 'AS-Interface Introduction and Basic Information' manual (not part of this documentation package). This contains general information about the **AS-Interface**, abbreviated to **AS-i** in the following chapters.

... You want to set up an AS-i system and include the DP/AS-i LINK:

– You will find the information you require about connecting and operating the DP/AS-i LINK in Chapters 1 and 3.

... You want to know how to operate the DP/AS-i LINK from the point of view of the PROFIBUS DP master:

– Read Chapters 4 – 6 in this manual.

– Chapter 8 explains the command interface.

Initial Situation

To understand this manual, you require the following:

• A working knowledge of PROFIBUS DP

• Knowledge of the manual "AS-Interface Introduction and Basic Information".

Data Medium with GSD file

The accompanying CD contains the GSD file that you require for configuring a DP/AS-i LINK with your DP master (see Section 6.3).

FAQs

You will find FAQs on Siemens AS–i products on the Internet on the Service and Support pages of Industry Automation at the following address:

http://support.automation.siemens.com/WW/view/en/10805888

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Contents

1 Technical Description, Installation Guide, Operation

This chapter...

This chapter explains the performance, installation and basic functions of the master module DP/AS−i LINK.

You will learn the following:

- How to install the DP/AS−i LINK;

- The display and control elements of the DP/AS−i LINK.

1.1 General Notes on Operation – Safety Warnings

⚠ **Warning**

WARNING – EXPLOSION HAZARD: DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

⚠ **Warning**

When used under hazardous conditions (zone 2), devices of the DP/AS-INTERFACE LINK Advanced product line must be installed in an enclosure.

To comply with ATEX95 (previously ATEX100a) EN 60079-15, this enclosure must meet the requirements of at least IP54 in compliance with EN 60529.

⚠ **Warning**

When used under hazardous conditions:

- If the temperature of the cable or wiring entry point exceeds 70°C or the temperature of the connecting terminal on the IE/AS-i LINK exceeds 80 °C, special precautions must be taken:
  If the IE/AS-i LINK is operated at ambient temperatures 50°C to 60°C, only cables with a maximum permitted temperature of at least 80°C may be used.

- Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40%.
  This criterion is fulfilled, if supplies are derived from SELV (Safety Extra Low Voltage), only.

- The IE/AS-i LINK is intended only for vertical installation.

Warning

- "WARNING" – Explosion Hazard – Do not disconnect while circuit is live unless area is known to be non-hazardous.

- "WARNING" – Explosion Hazard – Substitution of components may impair suitability for Class I, Division 2 or Zone 2.

- This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D; Class I, Zone 2, Group IIC or non-hazardous locations.

Caution

When handling and installing the DP/AS–i LINK, make sure that you adhere to the ESD guidelines.

Note

The DP/AS–i LINK can be configured, installed and started up independent of the PROFIBUS installation.

1.2 Application of the Module

DP Slave and AS-Interface Master

The DP/AS-i LINK is both a PROFIBUS DP slave and an AS-Interface master at the same time:

- The DP/AS-INTERFACE LINK Advanced connects the actuator-sensor interface with PROFIBUS DP.

- Using the DP/AS-i LINK, you can access the inputs and outputs of the AS-i slaves from PROFIBUS DP. Depending on the slave type, you can access binary values or analog values.

The following AS-i slaves can be used:

- Standard slaves / analog slaves

- Slaves with the extended addressing mode

- Slaves with data transfer mechanisms complying with the AS-i specification V3.0 – Combined Transaction Type (CTT) 1–5.
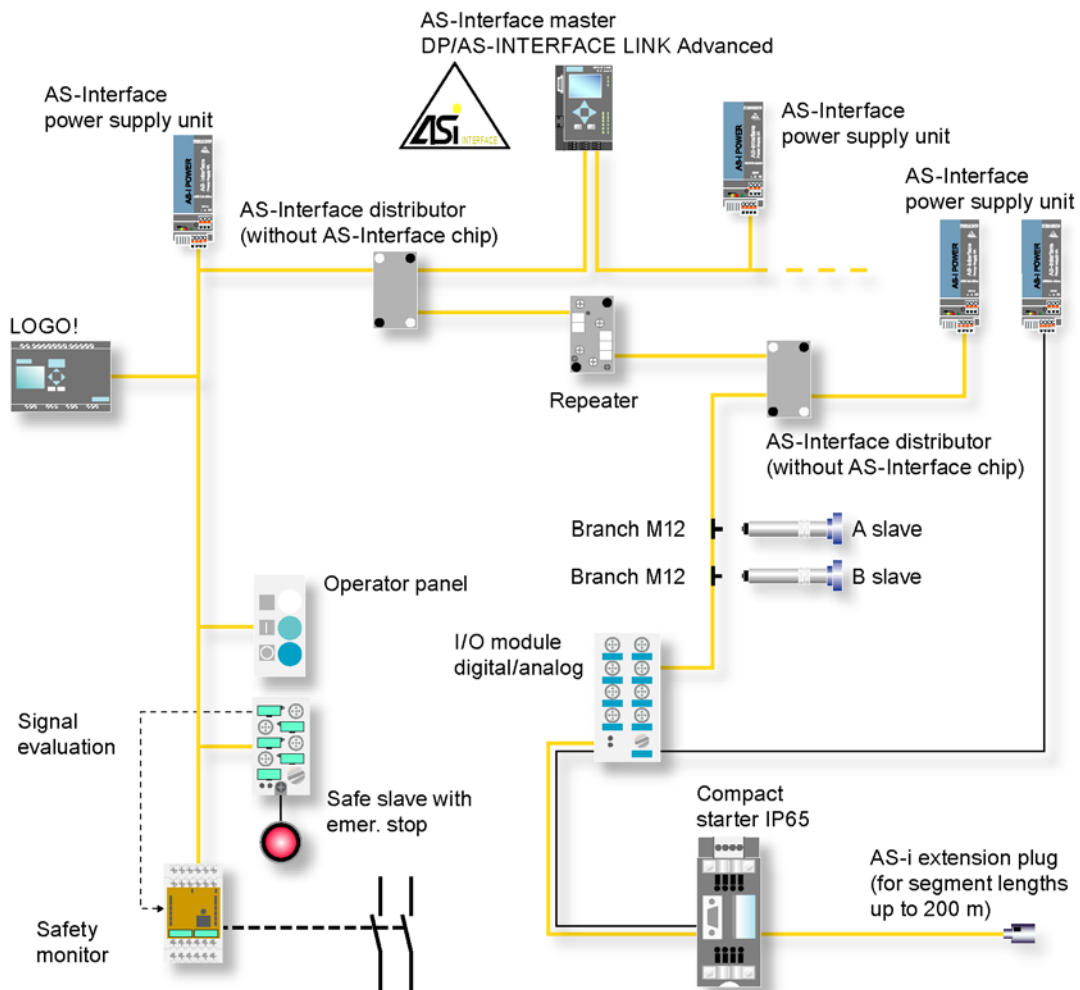
Figure 1-1   Example of a System Setup with the DP/AS–INTERFACE LINK Advanced (double master)

Features

The DP/AS-i 50 170) and AS-Interface master (complying with the AS-Interface specification V3.0 according to EN 50 295) and allows transparent data access to the AS-Interface from PROFIBUS DP.

PROFIBUS DP masters complying with DPV0 or DPV1 can exchange data with the underlying AS-Interface slaves cyclically, DP masters with acyclic services complying with DPV1 can also make AS-i master calls (parameters, diagnostics).

Apart from the digital I/O data, analog data is also stored quickly in the cyclic I/O area of an S7-300/400 CPU (no separate communication block call necessary).

The DP/AS-i LINK is available as a single or double master (applications with large numbers of slaves –> doubles the configuration limits).

The complete underlying AS-i line can be configured on an integrated operator display on the DP/AS–i LINK (for example addressing the AS-i slaves, I/O test of all digital and analog slaves).

During operation, the user has detailed diagnostic information available on the display allowing a fault to be localized immediately, when necessary.

The DP/AS-i LINK is equipped with an additional Ethernet port that allows the use of the integrated Web server and firmware updates.

The essential features are as follows:

- Single and double AS-Interface master (complying with AS-Interface specification V3.0) for the connection of 62 AS-Interface slaves per master and integrated analog value transfer

- Integrated ground fault monitoring for the AS-Interface cable

- Convenient diagnostics and commissioning on site using full graphics display or over Web interface with standard browser

- Optimum TIA integration over STEP 7, linking of third-party engineering tools using PROFIBUS type file (GSD)

- Vertical integration (standard Web interface) over Industrial Ethernet

- Power supply from the AS-Interface cable (line 1), therefore no additional power supply necessary, as an alternative, a 24 V DC power supply can be used

- Module replacement without PG by using C-PLUG

Components of the Product

The product DP/AS-i LINK includes the following components:

- DP/AS-INTERFACE LINK Advanced

- Product information for the DP/AS-i LINK

- Data media (documentation; GSD file; etc.)

1.3   Technical Specifications of the Module

The DP/AS-INTERFACE LINK Advanced module has the following technical specifications:

Table 1-1   Technical Specifications

Characteristic	Explanation / Values
AS-i cycle time (The values apply to the maximum possible configuration of the DP/AS-i LINK)	• 5 ms with standard slaves • 10 ms for 62 slaves with the extended addressing mode • 10 ms for inputs according to profile S-7.A.7 • 20 ms for outputs according to profile S-7.A.7 • 40 ms for inputs/outputs according to profile S-7.A.A • 20 ms for fast analog according to profile S-7.A.8 and S-7.A.9 • 5 ms for super fast analog according to profile S-6.0.X
Configuration of the AS-Interface	• using keypad and display on front panel • using STEP 7 • using Web Based Management • using user program (command interface)
Supported AS-i master profiles	M1-M4
Connector for AS-i cable (single and double master)	Via plug-in terminal block (4-pin) Permitted current loading from terminal 1 to terminal 3 or terminal 2 to terminal 4, maximum 3 A
LAN connector (WBM)	RJ-45 (10/100 Mbps)
Connection to PROFIBUS	Via 9-pin D-sub female connector

PROFIBUS address setting	• address range 1 to 126
	• Set using
	  – keypad and display
	  – Web Based Management

Permitted load 5V DC at PROFIBUS connector	max. 70 mA
Data rates supported (transmission rate) on PROFIBUS	• 9.6 Kbps; • 19.2 Kbps; • 45.45 Kbps; • 93.75 Kbps; • 187.5 Kbps; • 500 Kbps; • 1.5 Mbps; • 3 Mbps; • 6 Mbps; • 12 Mbps

Table 1-1   Technical Specifications, (continued)

Characteristic	Explanation / Values
Power supply from the AS-i cable	29.5 to 31.6 VDC
Current consumption from the AS-i cable	max. 250 mA at 30 V
Power consumption	max. 7.5 W
Cable length	max. 100 m
Cable cross-section (AS-i cable)	2×1.5 mm^2 (2×0.8 mm^2)
Optional external power supply unit (plug-in screw contacts 3-pin)	24 VDC (18 – 32 VDC) NEC Class 2 is specified.
Cable cross-section (power supply)	0.5 to 2.5 mm^2
Ambient conditions	
• Operating temperature	0 to 60°C
• Altitude	max. 3000 m above sea level
• Relative humidity	no condensation
• Transportation and storage temperature	−30°C to +70°C
Design	
• Type of protection	IP 20
• Dimensions (W x H x D) in mm	90 x 132 x 85.5
• Weight	approx. 380 g
Receptacle for optional C-PLUG	
Full graphics display and 6 control buttons	128 x 64 pixels

1.4   Approvals

Table 1-2   Description of the Approvals

c−UL−us	UL 508
	CSA C22.2 No. 142
c−UL−us for hazardous locations	UL 1604, UL 2279PT.15 CL. 1, Div. 2 GP.A.B.C.D T4 CL. 1, Zone 2, GP.IIC, T4 CL. 1, Zone 2, AEx nC IIC T4
FM	FM 3611 CL. 1, Div. 2 GP.A.B.C.D T4 CL. 1, Zone 2, GP.IIC. T4 Ta: 0...+60°C
C−TICK	AS/NZS 2064 (Class A)
CE	EN 61000−6−2, EN 61000−6−4 (replaces EN 50081−2)
ATEX Zone 2	EN 60079−15:2005, EN 60079−0:2006 II 3 G EEx nA II T4 KEMA 08 ATEX 0003X

Note

The current approvals are printed on the module.

1.5   Installation Guidelines and Installing the Module

⚠ **Caution**

Noise immunity/grounding

To ensure the immunity of the DP/AS−i LINK, the DP/AS−i LINK, the AS-i power supply unit and the power supply of the DP/AS-i LINK must be grounded according to the regulations.

Notice

If you do not adhere to the EMC directive 2004/108/EC (CE) when setting up systems and devices, this can lead to connection aborts in communication between DP master and the DP/AS−i LINK.

Options

The DP/AS-i LINK has type of protection IP 20.

You can install the DP/AS-i LINK on a normal standard rail (complying with EN 50022).

Ground the DIN rail over as short a distance as possible and with low inductance.

If the rail is installed in a cabinet, make sure that it makes good contact over a large area with the grounded mounting plate.

Installation on a DIN Rail

If you decide to install a module on a DIN rail, please note the following points:

1. The module is placed on the DIN rail from above and then pushed down until the catch at the bottom of the module locks into position.

2. Other modules can be arranged to the left and right of the module.

Removing the Module from the DIN Rail

To remove the module from the DIN rail, follow the procedure below:

1. When removing the module from the DIN rail, the power supply and signal cables must first be removed.

2. After the cables have been disconnected, press down the catch on the base of the device using a screwdriver and pull the module out of the rail towards the top.

Convection

Make sure that you leave at least 5 cm clearance above and below the module to allow heat dissipation.

Only horizontal installation is permitted.

1.6   Front Panel – Access to all Functions

Connection, Display and Control Elements

On the front panel, you have access to all the connection, display and control elements of the DP/AS-i LINK module.

C-PLUG
(optional)

Display

PROFIBUS connector

Keypad
– for AS-i configuration
– for setting the
  PROFIBUS address
– diagnostics

LED LINK
connection to Ethernet
partner

**LAN connector
WBM configuration**
– AS-i configuration
– setting the
  PROFIBUS address
– diagnostics

LED RX/TX
data traffic with
Ethernet partner

**Power supply
connector 24 V**
(optional; as
alternative to supply
over line 1)

Release slider

**AS-i line 1
connector**

**AS-i line 2
connector**
(only with
double master)

**LEDs
DP/AS-i LINK**
SF = system fault
BF = bus fault
ON = power

**LEDs
AS-i line**
SF = system fault AS-i
APF = AS-i power fail
CER = config error
AUP = auto program.
CM = config mode
ON = power

Figure 1-2   Front View of the DP/AS–INTERFACE LINK Advanced

1.7   Connection Elements

1.7.1   Connectors

The DP/AS-i LINK has the following connections:

*   Two separate connectors for the AS-i cable (on double master)
*   One connector for alternative power supply 24 VDC (optional) and protective earth
*   One connection to PROFIBUS (9-pin sub D female connector)
*   One LAN connector (RJ-45)
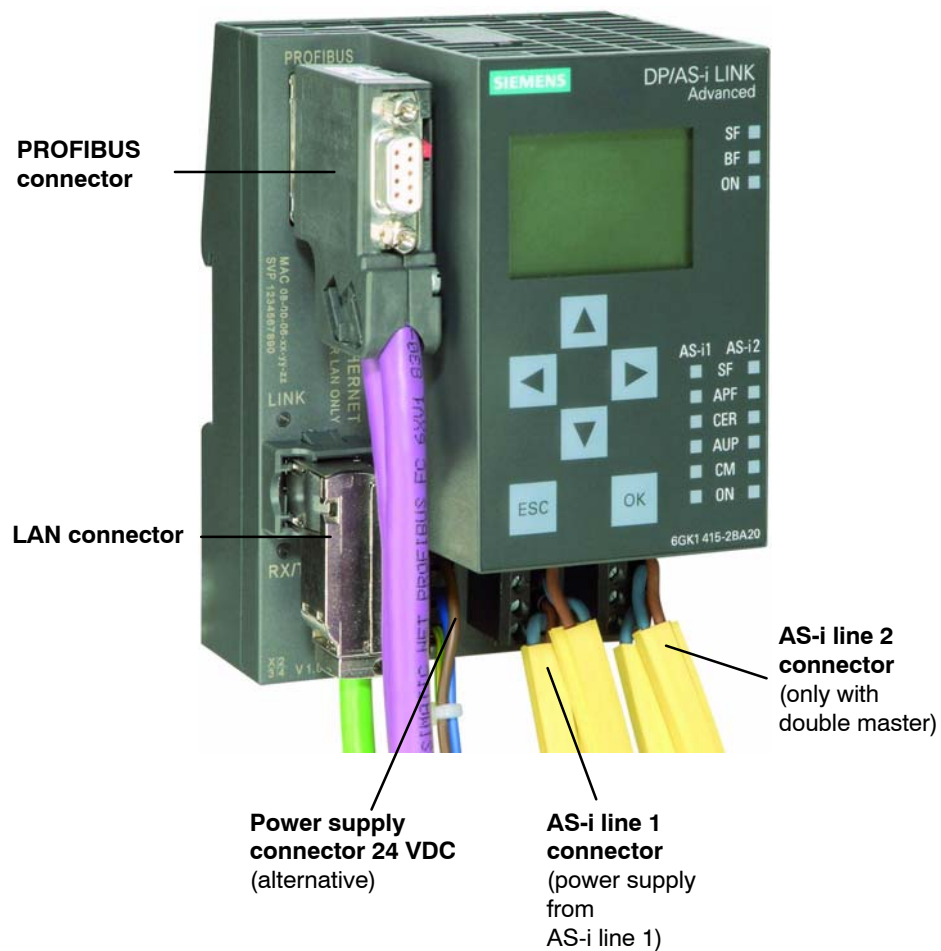
Figure 1-3   Connectors for the AS-i Cable(s) and Power Supply

1.7.2   Connectors for the AS-i Cable(s) and Power Supply

!

Caution

When connecting up the module, keep to the installation guidelines in Section 1.5.

!

Caution

The DP/AS−i LINK must only be connected when the AS-i power supply unit is turned off.

Connectors for the AS-i Cable(s)

The DP/AS-i LINK has two connectors for the AS-i cables (line 1 and line 2). Each is connected over a 4-pin plug with two + and two − contacts that are jumpered internally.

This allows the DP/AS-i LINK to be looped into the AS-i cable.

!

Caution

The permitted current loading of the AS-i connection contacts is 3 A. If this value is exceeded on the AS-i cable, the DP/AS-i LINK must not be looped into the AS-i cable but must be connected with a tap line (only one pair of connectors of the DP/AS-i LINK is used).

Pin assignment of the AS-i line

PIN no. line 1	Signal
1	AS-i 1 +
2	AS-i 1 −
3	AS-i 1 +
4	AS-i 1 −

PIN no. line 2	Signal
1	AS-i 2 +
2	AS-i 2 −
3	AS-i 2 +
4	AS-i 2 −

Pins 1 and 3 and pins 2 and 4 are jumpered internally.

Power Supply from the AS−Interface

Caution

The AS-i power supply unit used and the optional external power supply must provide an extra low voltage safely isolated from the mains supply. This safe isolation can be implemented according to the following requirements:

- VDE 0100 Part 410 = HD 384-4-4 = IEC 364-4-41
  (as functional extra-low voltage with safe isolation) or
- VDE 0805 = EN60950 = IEC 950
  (as safety extra-low voltage SELV) or
- VDE 0106 Part 101

The DP/AS-i LINK can be supplied fully from the AS-Interface (only AS-i line 1). The current consumption from the AS-Interface is $\leqq 250\,\text{mA}$ at 30 V.

As an alternative, the DP/AS-i LINK can be supplied by a separate power supply unit (24 VDC).

Power Supply from external Power Supply

Warning

The device is designed for operation with safety extra−low voltage (SELV). This means that only safety extra−low voltages (SELV) complying with IEC950/EN60950/ VDE0805 may be connected to the power supply terminals.

The power unit for supplying the device must comply with NEC Class 2 as described by the National Electrical Code(r) (ANSI/NFPA 70).

The power of all connected power units in total must correspond to a limited power source (LPS).

Never operate the DP/AS-i LINK with AC current or DC current higher than 32 V.

With a double master, you require a separate power unit each for AS−i line 1 + 2.

If the cable to the external power unit is very long and liable to energy spikes, connect a surge protection element.

Pin assignment of the power supply

PIN no. line 1	Signal
1	Power +
2	Power −
3	PE

Note

Protective earth − PE
DP/AS-i LINK has a connector for protective earth. This connector is required if the integrated ground fault monitoring is used. It should be connected to the PE conductor with as little resistance as possible.

1.7.3 Connection to PROFIBUS DP

Connection to PROFIBUS DP is via a 9-pin D-sub female connector.

⚠ **Warning**

When laying the PROFIBUS DP cable and installing the bus connector, follow the instructions in /5/.

To connect to PROFIBUS DP, bus connectors are available with cable outlets at different angles (0˚, 30˚ and 90˚; recommendation: 30˚). Once again, follow the instructions in /5/.

Pin assignment of the PROFIBUS RS-485 interface

Pin No.	Name	Function
1	n.c.	reserved
2	n.c.	reserved
3	RxD/TxD−P	Data line B
4	RTS	Request to send
5	GND	Ground
6	VCC (5V)	Power supply
7	n.c.	reserved
8	RxD/TxD−N	Data line A
9	n.c.	reserved

1.7.4   LAN Connector

A PC (or network) is connected via an RJ-45 jack (recommendation: 90˚ FC plug). The LAN connector of the DP/AS−i LINK is used, for example, for configuration using Web Based Management and for diagnostics. The DP/AS-i LINK supports autocrossing, in other words, both crossover and straight-through cables can be used.

Pin Assignment of the LAN Connector

Pin No.	Signal
1	RDP
2	RDN
3	TDP
4	n.c.
5	n.c.
6	TDN
7	n.c.
8	n.c.

1.8   C-PLUG (Configuration Plug)

Area of Application

The C-PLUG (order number: 6GK1 900−0AB00) is an optional exchangeable medium for saving the configuration and project engineering data of the basic device (DP/AS-i LINK) and the AS-i slaves.

When powered down, the C-PLUG retains all data permanently. This means that configuration data remains available when a basic device is replaced (module replacement without PG is therefore possible).

The C-PLUG is accessible from the top of the housing.

The DP/AS-i LINK has internal memory for permanent storage of the configuration data of the basic device and the AS-i slaves. Replacing a module without a PG is, however, possible only with the C-PLUG.

Inserting in the C-PLUG Slot

The slot for the C-PLUG is on the top panel of the device.

To insert the C-PLUG, the cover must be removed. The C-PLUG is inserted in the receptacle. The cover must then be replaced and closed correctly.

Notice

The C-PLUG may only be inserted or removed when the power is off!
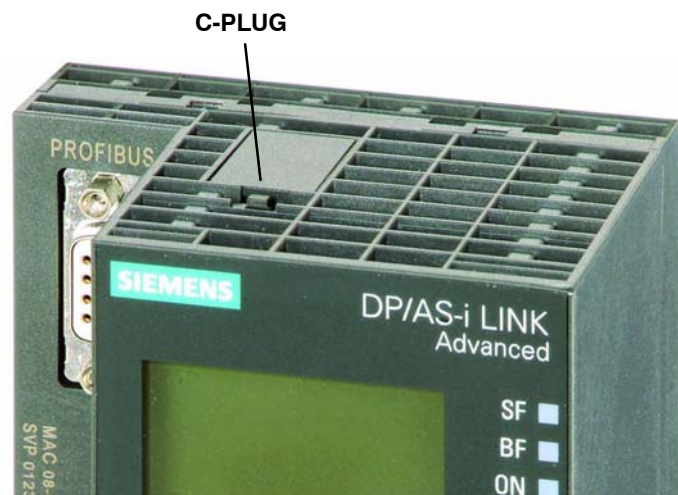
Figure 1-4   Position of the C-PLUG (removing the C-PLUG from the device with a screwdriver)

Function

If an empty C-PLUG (as supplied) is inserted, all the configuration data of the DP/AS-i LINK is written to it when the device starts up. Changes to the configuration during operation are also written automatically to the C-PLUG.

If the C-PLUG is inserted, the basic device automatically uses the configuration data of the C-PLUG. This assumes that the data was written by a compatible device type.

If a fault occurs, the basic device can then be replaced much faster and more simply. If a device needs to be replaced, the C-PLUG is simply taken from the failed component and inserted in the replacement. As soon as it starts up, the replacement automatically has the same device configuration as the failed device.

Notice

If a C-PLUG is inserted when you reset to the factory settings, the factory settings are stored on the C-PLUG !

Using the C-PLUG

When using a C-PLUG, the following situations must be distinguished:

- Inserting an empty C-PLUG
  TheDP/AS-i LINK detects when a C-PLUG is inserted and automatically writes the data of the internal memory to the C-PLUG.

- Inserting the C-PLUG of another device
  If you insert a C-PLUG that is not intended for the DP/AS-i LINK, this can also be used. The DP/AS-i LINK signals an error and changes to the fault state (C-PLUG fault mask (WBM and display)). To clear the fault, the message must be acknowledged. At the same time, this triggers the transfer of the data from the internal memory to the C-PLUG.

- Inserting the C-PLUG of another DP/AS-i LINK
  If a C-PLUG with valid data of a different DP/AS-i LINK is inserted, the device changes to operational (starts up with the data of the C-PLUG). The data from the internal memory is, however, not transferred automatically to the C-PLUG. The transfer must be triggered manually using the keypad and display (or WBM) (Internal memory –> C-PLUG; see Section 4.2). At the next startup, the internal memory is deleted.

1.9   Display and Control Elements

LEDs

The following LED displays are located on the front panel of the DP/AS-i LINK:

Displays of the DP/AS-i LINK

- SF: system fault
- BF: bus fault
- ON

Displays for the AS-i line

- SF = AS-i system fault
- APF = AS-i power fail
- CER = configuration error
- AUP = automatic address programming
- CM = configuration mode
- ON

Meaning of the DP/AS-i LINK LEDs

LED (color)	Status	Meaning
SF(red)	System fault (link)	The LED is lit when: • In the protected mode, a diagnostic interrupt (entering state) was triggered on the DP master. • The DP/AS-i LINK has detected an internal error (for example EEPROM defective).
BF (red)	Bus fault	Indicates errors on PROFIBUS DP. The LED flashes when: • The connection between the DP master and the DP/AS-i LINK module has broken down or the DP master is not active. • The DP/AS-i LINK module was not or was incorrectly configured/assigned parameters by the DP master.
ON (green)		The LED is lit when the DP/AS-i LINK is supplied with power.

Meaning of the AS-i Line LEDs

LED (color)	Status	Meaning
SF(red)	System fault (line)	The LED is lit when: • In protected mode, a diagnostic interrupt (entering state) was triggered on the DP master.
APF (red)	AS-i Power Fail	This indicates that the voltage supplied to the AS-i cable by the AS-i power supply unit is too low or is faulty.
CER (yellow)	Configuration Error	This LED indicates whether the slave configuration detected on the AS-i cable matches the expected configuration on the DP/AS-i LINK. If they do not match, the "CER" LED is lit. The "CER" LED is lit in the following situations: • When a configured AS-i slave does not exist on the AS-i cable (for example failure of the slave). • When an AS-i slave exists on the AS-i cable but it was not previously configured. • When an attached AS-i slave has different configuration data (I/O configuration, ID code) from the slave configured on the DP/AS-i LINK. • When the DP/AS-i LINK is in the offline mode.
AUP (green)	Autoprog available	In the protected mode of the DP/AS-i LINK module, the LED indicates that automatic address programming of an AS-i slave is possible. The automatic address programming makes it much easier to exchange a defective AS-i slave on the AS-i cable (for more detailed information refer to Section 10.1).
CM (yellow)	Configuration Mode	This LED displays the mode of the DP/AS-i LINK. • Indicator on: configuration mode • Indicator off: protected mode The configuration mode is only required for installing and starting up the DP/AS-i LINK. In the configuration mode, the DP/AS-i LINK activates all connected AS-i slaves and exchanges data with them. For more information about the configuration mode, refer to Section 4.1.
ON (green)		The LED is lit when the DP/AS-i LINK exchanges data with the AS-Interface slaves (online mode, see chapter 5.2.14.1 and 8.3.11).

*   Note:
    If you do not use AS-i line 2 with an AS-i double master, you can disable the LED display for this line as follows:
    • Do not configure any slaves for this line in STEP 7
    • Configure an empty line 2 (see Chapter 4) using, for example the display function Act –> Conf)
    • Restart DP, for example by removing and inserting the PROFIBUS cable.

Keypad

The mode can be changed using the control buttons. You configure the underlying AS-i line interacting with the display one again using the control buttons.

The following buttons are located on the front panel of the DP/AS-i LINK:
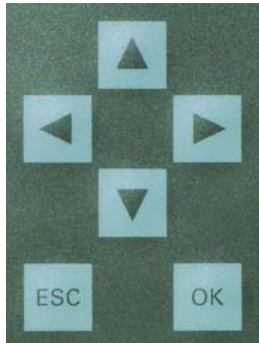
Display

The graphic display has a resolution of 128 x 64 pixels.

You configure the underlying AS-i line using the keypad and following the information on the display. This allows on-site commissioning and diagnostics.

The following display appears after turning on the device or if there has been no input over the keypad for a longer period of time (see Section 4.2).

Figure 1-5   Display – Logo

Note

If a fault occurs during operation, the resulting error message will be displayed even if the Logo was previously displayed.

As soon as any entry is made using the keypad, the main menu appears allowing you to navigate through the menu structure.
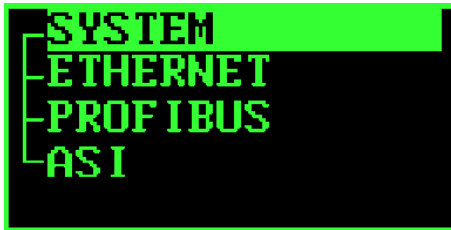
Figure 1-6   Display – Main Menu

If you have selected an entry in the list (displayed inversely), a tooltip will appear after a brief time with further information on the entry (does not occur in the main menu).

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2 Procedure – Configuration

This chapter...

> This chapter provides you with an overview of the steps and procedures involved in configuring the DP/AS–i LINK. You will learn the basic steps leading to commissioning and the configuration options made available to you by the DP/AS–i LINK.

2.1   What to do – an Overview

Preparations up to Commissioning

> Before putting the system into operation, the following independent steps must first be worked through:

DP/AS–INTERFACE LINK Advanced as of hardware version 1, as of firmware version 2.0
Release 03/2008
C79000–G8976–C209–03
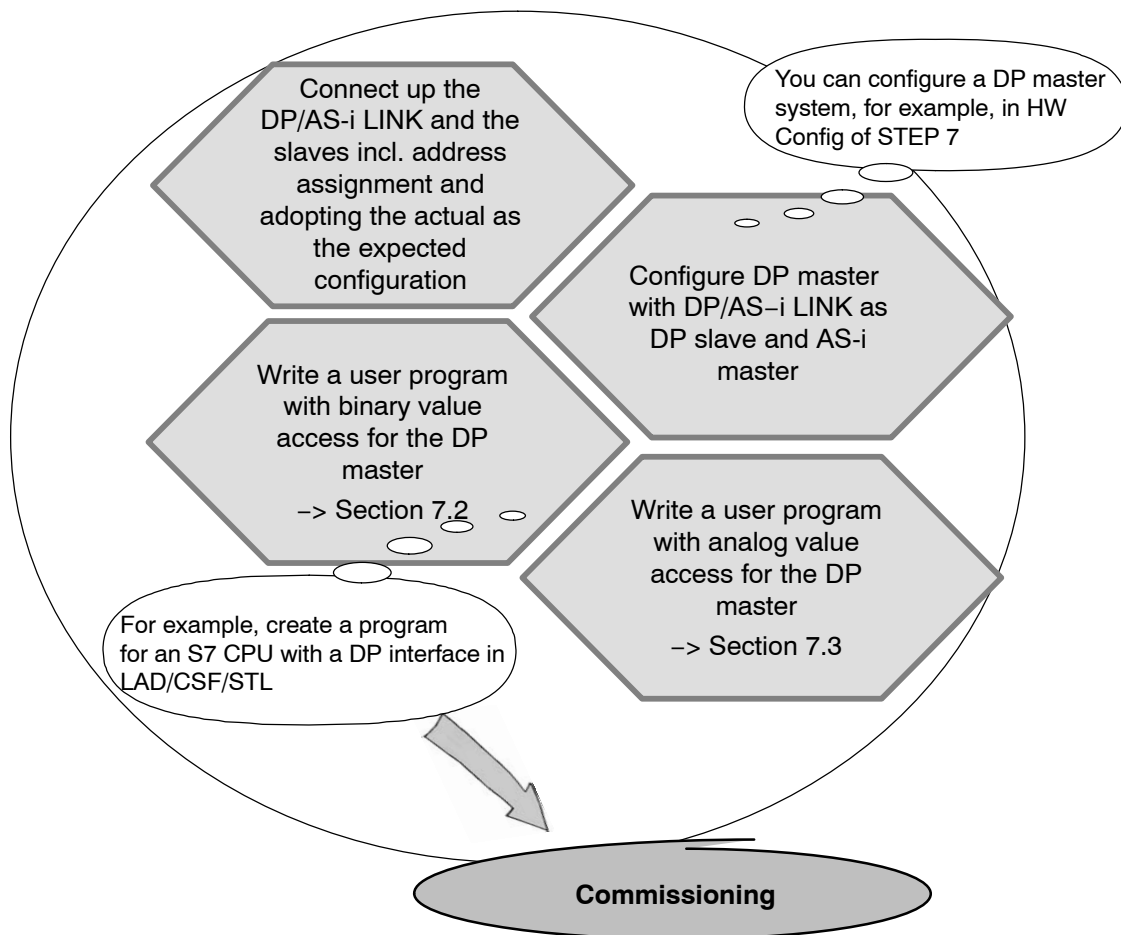
2.2   Configuration Methods

Methods of Configuring the DP/AS−i LINK

There are four basic configuration methods that are described in later chapters.

- Keypad/display (see Chapter 4)
  Configuration/commissioning/diagnostics on-site without further tools

- Web Based Management (WBM) (see Chapter 5)
  Configuration/commissioning/diagnostics on-site with a PG/PC and Internet Browser

- STEP 7 (see Chapter 6)
  Configuration/commissioning/diagnostics with STEP 7

- Command interface (see Chapter 8)
  Configuration/commissioning/diagnostics with a user program

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3 Getting Started – Example of STEP 7

This chapter...

This chapter provides you with the information you will require to commission a DP/AS–i LINK simply and quickly using the keypad and display.

It will familiarize you with the commissioning and basic functions of the master module DP/AS–i LINK.

3.1 Example of Commissioning the DP/AS-i LINK

You want to put a DP/AS–i LINK into operation quickly and with a minimum of effort.

The following example guides you through the individual steps up to the commissioning of a DP/AS–i LINK (single master).

The example is divided into the two following steps:

- Working with the DP/AS–i LINK (no other aids necessary)
- Configuring and programming with the SIMATIC Manager (PG/PC with STEP 7 necessary)

Initial Situation

- The DP/AS–i LINK is installed and connected to the AS-i cable.
- The AS-i power supply unit is connected to the AS-i cable.
- The AS-i slaves are **not** yet connected.
- The slaves to be connected have default address "0" (as supplied).
- You are using STEP 7, V5.4 or higher.

Activity

Working on the DP/AS−i LINK

1. Turn on the AS-i power supply unit to start up the DP/AS−i LINK.

2. Connect the AS-i slaves **one-by-one** to the AS-i cable and assign the required slave address.

   SYSTEM [▼] AS-i line 1 [OK] Lifelist [▼] Change Address [OK]
   Change Slave Address

3. Adopt the actual configuration of the slaves as the desired configuration on the DP/AS−i LINK

   SYSTEM [▼] AS-i line 1 [OK] Lifelist [▼] Act −> Conf [OK] Adopt Act −> Conf
   Result: All the LEDs for the AS-i line on the DP/AS−i LINK are off or green; in other words, all slaves have been included successfully.

4. Assign the PROFIBUS address for the DP/AS−i LINK.

   SYSTEM [▼] PROFIBUS [OK] Info [▼] DP Address [OK] Change Address

5. Connect the DP/AS−i LINK to the master (for example programmable controller) over the PROFIBUS cable.

Configuring and programming with the SIMATIC Manager

6. Create a STEP 7 project on your PG/PC in the SIMATIC Manager and include an S7 station and a DP master system.

7. Open the hardware configuration of this station.

8. Select the required DP/AS−i LINK from the hardware catalog in **PROFIBUS-DP −> DP/AS-i −> DP/AS-i LINK Advanced −> <order number> −> <version>** and drag it to the DP master system.
   Result: The Properties dialog opens.
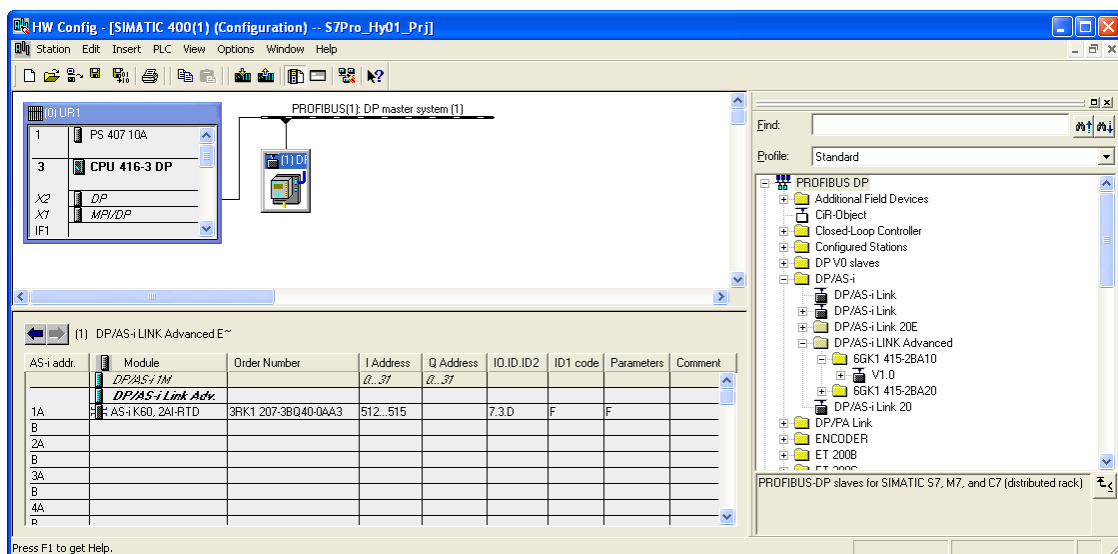
Figure 3-1   Configuration of the DP Master open in HW Config

9. Set the PROFIBUS address of the DP/AS-i LINK in the properties dialog (must match the setting made above on the AS-INTERFACE LINK Advanced) and acknowledge with "OK".
    Result: The DP/AS−i LINK is placed on the DP master system.

10. Select the DP/AS−i LINK (*DP/AS i 1M*) in the list and select the menu command **Edit > Object Properties**.

11. Set the I/O addresses in the "Digital Addresses" tab of the properties dialog and confirm with "OK".

12. Select the menu command **Station > Save and Compile**.

13. Select the menu command **PLC > Download to Module**.

14. Create your user program by accessing the I/O addresses set above. With this setting, the data is exchanged according to the CLASSIC sorting (see Section 7.2.1)

15. Download the program to the programmable controller (PLC).

Result

You have configured the DP/AS−i LINK, created the corresponding STEP 7 configuration and a user program with which you can access the I/O addresses of the AS-i slaves from the programmable controller.

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4 Keypad and Display

This chapter...

This chapter explains how the menus of the DP/AS-i LINK display are structured and how to work with the keypad.

Note

For a detailed description of all parameters and settings, refer to Chapter 5. You will also find further information on the individual functions there.

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Warning

During operation and assuming there is a connection from the DP/AS−i LINK to the DP master, you can change the configuration of the DP/AS−i LINK or write process data of the real process.

The change in the configuration or to process data can trigger unexpected reactions in the process that can lead to death, serious injury or damaged property.

Consider the consequences before you act. Take the following precautions:

- Restrict the ways of accessing the DP/AS−i LINK.
- Assign a secure password for access to Web Based Management.
- Install a physical emergency stop circuit for the machines or the process.

4.1   Configuring and Modes

Meaning of Configuration with the Keypad and Display

This type of configuration allows you to commission the AS-Interface on the DP/AS−i LINK quickly and with little effort.

If you want to configure the AS-Interface using STEP 7 (see Chapter 6), you can skip this chapter except for the assignment of the PROFIBUS address.

Modes

The DP/AS-i LINK has two modes:

- Configuration mode

- Protected mode

Configuration mode

The configuration mode is used during AS-i installation and startup.

You can change the link module from protected mode (productive operation) to configuration mode in the following ways:

- Keypad and display:
  Description in Section 4.4.2

- Web Based Management:
  "AS-i Line" > "Configuration" > "Status" tab > Clear the "Protected mode" check box

- Data record interface:
  Data record $0C_H$ Set_Operation_Mode

In the configuration mode, the DP/AS−i LINK module can exchange data with every AS-i slave connected to the AS-i cable (except for the AS-i slave with address '0'). Any AS-i slaves that are added later are detected immediately by the master and activated and included in the cyclic data exchange.

Protected mode

In protected mode, the DP/AS-i LINK exchanges data only with the configured AS−i slaves.

You enable protected mode by downloading the configuration from the PG to the Link module (HW Config > Download to Module...) or with the three options mentioned in the previous section "Configuration Mode".

On completion of commissioning (see Section 3.1), the DP/AS-i LINK is in "protected mode". As a result, any configured and existing AS-i slaves are activated. The AS-i slave information shown below is then stored in non-volatile memory on the DP/AS−i LINK:

- The addresses

- The ID codes

- The I/O configuration

- The configured parameters

4.2   Buttons and Working in the Menus

Buttons

You make your entries using arrow buttons and the "ESC" and "OK" buttons (illustrated in Section 1.9). The buttons have the following functions:

- "right"/"left" buttons ▶, ◀:
  Navigation within the menu structure and menu lists

- "up"/"down" buttons ▲, ▼:
  – Navigation in the menu structure and menu lists
  – Changing alphanumeric characters

- "ESC" button ESC :
  Exits the current menu (you move up one level in the menu structure)

- "OK" button OK :
  – Opens a follow-on menu or
  – Saves your input

In the description of the menu paths in Section 4.3 and 5, the " > " character stands for pressing the "OK" button and, where necessary, navigating to the required menu entry.

Meaning in the menus

- Changing characters

  You can change the value of alphanumeric characters with the "up"/"down" buttons. Possible values are: a...z, A...Z, 0...9, −, .

  Using the "right"/"left" buttons within a character string, you move to a different character.

- Saving entries

  If you change values by entering alphanumeric characters, you can save them by pressing the "OK" button. You then exit the menu and move up one layer in the menu structure.

- Saving options

  If, on the other hand, you change an option (check box) with the "OK" button, so that a check mark appears or is cleared, the value is already saved and you can exit the menu with the "ESC" button.

  Example:

  AS-i line 1 > Line status >   Protected >
                                                     Autoprog. >
                                                     Offline >

- Navigation in lists (AS-i Line: Lifelist, Error List, Slave Info)

  You can navigate through the lists from one slave to the next with the "up"/"down" or "right" / "left" buttons.

Display

If you make no further entries, the display changes to the "AS-i" logo following a timeout. You can set the timeout time for the display with the following menu path:

SYSTEM > Configuration > Timeouts > Display >

4.3   Menu Structure

The menu structure is similar to the WBM configuration (see Chapter 5) but is more compact due to the display limitations.

If the content of the selected menu is larger than the display, an arrow appears at the top or bottom end.

Note

For more detailed information on individual menu items relating to the function or configuration, refer to Chapter 5.

"SYSTEM" menu

SYSTEM > Configuration > General >   Device name > Change... >
                                          Hardware
                                          Firmware
                                          Boot software
                                          Order number
                                          Serial number
                                          MAC address

SYSTEM > Configuration > I&M > Manufacturer ID
                                    Order ID
                                    Serial number
                                    HW revision
                                    SW revision
                                    Revision counter
                                    Profile ID
                                    Profile type
                                    Version
                                    Supported array
                                    Function tag > enter... >
                                    Location tag > enter... >

SYSTEM > Configuration > Timeouts > Display > enter time... >
                                         Backlighting > enter time... >

SYSTEM > Configuration > Language > select... >

SYSTEM > Reset   > Restart > Run a restart
                        > Clear/reset module > Clear/reset module >
                        > Reset to factory settings > Reset to factory
settings >

SYSTEM > Errors > Error display

SYSTEM > C-PLUG   > Info   (display of the C-PLUG status)
                        > Internal Memory –> C-PLUG > move... >
                        > C-PLUG –> Internal Memory > move... >

SYSTEM > Diagnostic Buffer > Delete Diagnostic Buffer? >

"IND. ETHERNET" menu

IND. ETHERNET > Info   > Eth Port Status >

Link   (physical connection up/down)

Mode   (10/100 Mbps, half duplex/full duplex)

Input bytes   (number of received bytes)

Output bytes   (number of sent bytes)

IND. ETHERNET > IP Parameter >   DHCP >

disabled

MAC address

Device Name

Client ID

Change Client ID

IP > Set IP address

Mask > Set subnet mask

GW > Set gateway

IND. ETHERNET > MAC address > display MAC address

The "PROFIBUS" menu

PROFIBUS > Info > PROFIBUS Info

Master status

Master address

ID Number

Baudrate

DP Config.   (from the "Info" menu with "right"/"left" button)

DP-Param.   (from the "Info" menu with "right"/"left" button)

PROFIBUS > DP Address > Change address

PROFIBUS > DP Glob.Ctrl. >   Sync

Freeze

Clear

PROFIBUS > Error

"AS-i Line" menu

AS-i Line 1 > Lifelist >   (select slave and "OK")

Config.	> Change configuration
Parameter	> Change parameters
Bin. I/O	> Change binary Inputs/outputs
Analog	> Change analog inputs/outputs
Status	
Statistics	> Reset all counters
Statistics	> Reset all counters
String	> Write/Read (string transfer to slave)

AS-i Line 1 > Error list >   (select slave and "OK")

Statistics > Reset error counters
    Slave failure
    Missing frames
    Bad frames

Statistics > Reset error counters
    I/O Error
    protocol error
    Bad master frame

AS-i Line 1 > Statistics > Line statistics
    AS-i power failures
    Short to ground

    Slave failure
    Missing frame
    Bad frame
    Peripheral error
    Protocol error
    Bad master frame

    Reset counters > Reset all counters

AS-i line 1 > Line status >   Protected > enable / disable
                                              Autoprog. > enable / disable
                                              Offline > "Online" / "Offline"

                                              System error (image of line LED "SF")
                                              Config. Error (image of LED "CER")
                                              AS–i Powerfail (image of LED "APF")
                                              Short to ground

AS-i Line 1 > Slave Info >

        Config.   > Change configuration
        Parameter   > Change parameters
        Bin. I/O   > Change binary Inputs/outputs
        Analog   > Change analog inputs/outputs
        Status
        Statistics   > Reset all counters
           Slave Failure
           Missing frames.
           Bad frame
        Statistics   > Reset all counters
           I/O Error
           protocol error
           Bad master frame
        String   > Write/Read (string transfer to slave)

AS-i Line 1 > Change address > Change slave address

AS-i Line 1 > Change ID1 > Set ID1 (only for slave "0")

AS-i Line 1 > Act –> Conf > Adopt Act –> Conf

AS-i Line 1 > Address help > enable/disable

SYSTEM > AS-i Line 2 ...: Structure and use as with AS-i Line 1

With a single master, only "AS-i line" is displayed.

4.4   Examples of Operator Input

4.4.1   Example: Changing the IP Address

Menu structure:

IND. ETHERNET > IP Parameter > DHCP >

<div style="margin-left:2em">

    disabled
    MAC address
    Device Name
    Client ID

    _____

    Change client ID
IP   > Set IP address
Mask > Set subnet mask
GW   > Set gateway

</div>

Procedure

Initial status: The "AS-i" logo is displayed.

1. Press any button.
    Result: The main menu is displayed.

2. Press once ▽ and OK :
    The "IND ETHERNET" > "Info" menu is displayed.

3. Press once ▽ and OK :
    The "IP Parameter" > DHCP "MAC Address" menu is displayed.

    When supplied, DHCP is enabled over the DHCP identification type "MAC address". Disable DHCP as follows.

4. Press once OK :
    The "DHCP" menu is displayed, "MAC address" is selected.

5. Press once △ and OK :
    After a brief time, DHCP is disabled.
    You are once again in the "IP Parameters" > "DHCP" menu and "disabled" is displayed.

6. Press once ▽ and OK :
    The "IP Address" menu is displayed.

7. Navigate with the buttons ◁ and ▷ to the position you require.

8. Use the buttons ▽ and △ to set the required digit.

9. Do the same as described in step 7. and 8. for every other position of the IP address you want to change.

10. Confirm your changes with [OK]
    You exit the menu and move up one level. After a few seconds, the menu shows the changed IP address.

4.4.2   Example: Changing the status
"Protected mode" <−> "Configuration mode"

Menu structure:

AS-i line 1 > Line status >   Protected > enable / disable

Procedure

Initial status: The "AS-i" logo is displayed.

1. Press any button.
   Result: The main menu is displayed, "SYSTEM" is selected.

2. Press three times ▼:
   The "AS-i Line 1" entry is selected.
   (Entry for a single master: "AS-i Line")

3. Press [OK]:
   The "Lifelist" entry is selected.

4. Press three times ▼:
   The "Line status" entry is selected.

5. Press [OK]:
   The "Protected" entry is selected.
   The check box on the right of the row can have the following statuses:

   – Check box selected (with check mark):
     The module is in protected mode.

   – Check box not selected (empty):
     The module is in configuration mode.

   By pressing the button [OK] the module changes to the other mode.

   As soon as you set or clear a check mark, the change is saved.

6. Press [ESC]:
   You return to the menu structure to the "Line status" entry.

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5 Display / WBM Configuration

This chapter...

You will see how to configure the DP/AS−i LINK using one of the two options shown below:

- Keypad and Display

or

- Web Based Management (WBM)

The individual functions are introduced with both optional representations.

Note

At the start of the description of the individual pages, you will find the corresponding command sequences for keypad and display. The command sequences are indicated by the symbol shown on the left.

For some functions in the pages of Web Based Management (WBM), there is no corresponding function when configuring with the display.

Warning

During operation and assuming there is a connection from the DP/AS−i LINK to the DP master, you can change the configuration of the DP/AS−i LINK or write process data of the real process.

The change in the configuration or to process data can trigger unexpected reactions in the process that can lead to death, serious injury or damaged property.

Consider the consequences before you act. Take the following precautions:
- Restrict the ways of accessing the DP/AS−i LINK.
- Assign a secure password for access to Web Based Management.
- Install a physical emergency stop circuit for the machines or the process.

5.1 Web Based Management on the DP/AS−i LINK

5.1.1 WBM: Requirements and Starting Up

Principle

With WBM, the DP/AS−i LINK provides you with various functions that you can use in conjunction with an Internet Browser (for example, Microsoft Internet Explorer, Version 6.0 or higher).

You work with a JavaScript that is stored on the DP/AS−i LINK and loaded by the browser.

To access the DP/AS−i LINK, you enter the IP address of the device in the address box of the browser.

Requirements for Web Based Management

An IP address with a suitable subnet mask must be set on the DP/AS−i LINK (using keypad and display; see Section 4.4).

To be able to access the DP/AS−i LINK using WBM, you require a PC with an Internet Browser. We recommend that you use the Microsoft Internet Explorer, Version 6.0 or higher. As an alternative, other browsers can also be used.

The browser must be capable of JavaScript. The script can only execute if JavaScript is enabled in the browser.

The PC must be connected to the LAN connector of the DP/AS−i LINK and the browser must be running.

Note

With some language settings in Windows, the page refresh with the Internet Explorer does not work correctly in some situations. In this case, the browser must be set so that the newer version of the page is loaded from the server each time it is accessed. In the Internet Explorer, you can activate this option in the "Tools" > "Internet Options" menu > "General" tab by clicking the "Settings" button in the "Temporary Internet Files" group box.

Note

The screenshots shown in this chapter were created with the Microsoft Internet Explorer Version 6.0. If you use other browsers, the WBM pages may appear differently.

Note

Firewall: If a firewall is used, access to the following ports must be allowed:

*   TFTP Port 69 (communication with a TFTP server)
*   http Port 80/TCP (for WBM access)
*   SNMP Port 161/UDP (for SNMP access)
*   SMTP Port 25 (for sending E−mails)
*   Trap Port 162/UDP (for triggering an SNMP trap)
*   SNTP Port 123 (time synchronization)

Starting WBM

To start WBM, enter the following in your Internet browser:

`http://<IP address of the DP/AS−INTERFACE LINK Advanced>`

The WBM starts with the System Configuration page (see Section 5.2.1). You can now read the pages.

To be able to make changes, you must log in.
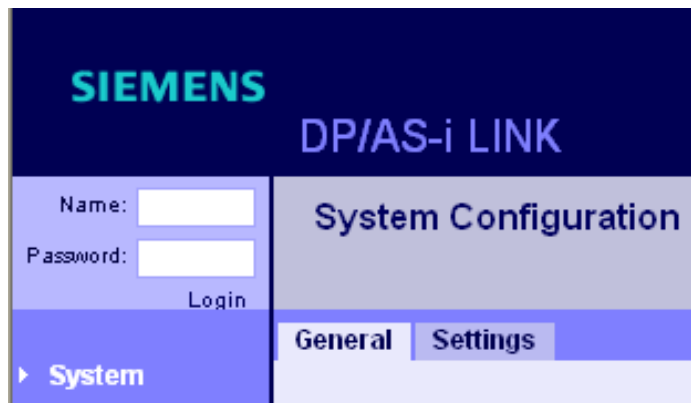
Logging In

Make the following entries in the Start window:

*   Name: "admin"
*   Password: "admin"

Confirm your entries by clicking the "Login" button.

The default for both name and password is "admin". The name cannot be modified.

DP/AS−INTERFACE LINK Advanced as of hardware version 1, as of firmware version 2.0
Release 03/2008
C79000−G8976−C209−03

Notice

For security reasons, change the password. Resetting the device to the factory settings also means resetting the password.

Note

If you do not log in, you will not be able to make changes.

If no input is made for more than 10 minutes (default; can be modified), you will be logged out automatically.

5.1.2 Working with WBM

Buttons

- Refresh
  If you click on this button, current data of the DP/AS−i LINK is requested and displayed.

- Apply
  If you click on this button, configuration data that has been entered is stored on the DP/AS−i LINK or downloaded to the connected slaves.

-
  Print the current view. You can make the print settings with the menu commands "File" > "Print", "File" > "Page Setup" or in "Tools" > "Internet Options" > "Advanced" > "Print".

- Language list box
  Select the required language for the display. The following languages are available:

  - English

  - German

  - French

  - Spanish

  - Italian

Note

Changing configuration data on the DP/AS−i LINK is only possible if you are logged in with the "admin" login.

The "apply" button is active only if changes were made.

Notice

As of firmware version 2.0:
Changes to configuration data are possible if the DP connection is established to the DP master.

With firmware version 1.0, configuration changes are not possible if the DP master is in RUN or the DP master handles the configuration.

To move between the WBM pages, use the navigation on the left and the tabs at the top of the page. Where possible, avoid using the browser "backwards" and "forwards" buttons.

5.2 Configuration and Diagnostics

5.2.1 Navigation "System > System Configuration"

This tab displays the system configuration data. The first boxes are display boxes (read-only) and provide you with general information on the device. In the lower boxes (text boxes), you can specify the parameter settings.

5.2.1.1 General

Keypad/Display

SYSTEM > Configuration > General >   Device name > Change... >
Hardware
Firmware
Boot software
Order number
Serial number
MAC address

WBM: "General" Tab

This tab displays the general device data and you can set various system values.
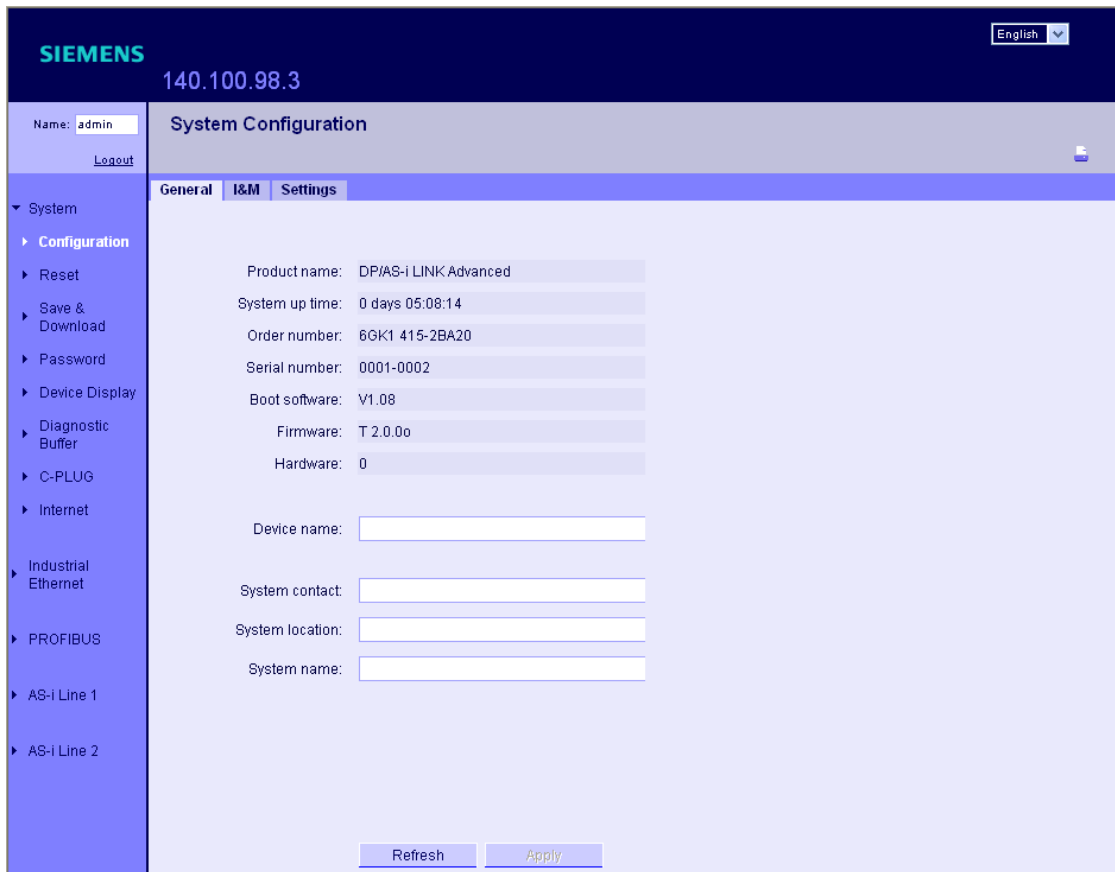
Parameter	Function
Product name	Displays the product name, here DP/AS-i LINK.
System up time	Displays the operating time of the device since the last restart (operating hours counter).
Order number	Displays the order number (MLFB) of the device.
Serial number	Displays the serial number of the device.
Boot software	Here, you can see the version of the boot software. The boot software is used to load new firmware.
Firmware	Displays the firmware version of the device.
Hardware	Displays the hardware version of the device.
Device Name	Enter the device name in this box. The device registers itself with this name, for example during node initialization by the SIMATIC Manager .
System contact	In this box, you enter the name of a contact person responsible for management of the device (SNMP value "sysContact").
System location	Enter a location for device in this box, for example, a room number (SNMP value "sysLocation").
System name	Enter a name for the device in this box (SNMP value "sysName").

5.2.1.2   Identification & Maintenance

Here, you can see various details of the DP/AS-i LINK for information and for maintenance purposes.

You can also assign a plant-specific function tag and location tag for the DP/AS-i LINK.

Keypad/Display

SYSTEM > Configuration > I&M > Manufacturer ID
Order ID
Serial number
HW revision
SW revision
Revision counter
Profile ID
Profile type
Version
Supported array
Function tag > enter... >
Location tag > enter... >

WBM: "I&M" tab (Identification & Maintenance)

Parameter	Meaning
Function tag	Plant designation
Location tag	Location identifier

5.2.1.3   Settings

Here, you can set various times and the language.

Keypad/Display

SYSTEM > Configuration > Timeouts > Display > enter time... >

Backlighting > enter time... >

SYSTEM > Configuration > Language > select... >

WBM: "Settings" Tab

Parameter	Function
Automatic logout	If no operator input is made for the time set here, the operator is automatically logged out.
Go to Start page	If no operator input is made for the time set here, the device display switches to the Start (logo) display.
Turn off backlighting	If no operator input is made for the time set here, the backlighting of the device display is turned off.
Language	Select the language for the device display here.

5.2.2 Navigation "System > Reset"

In this tab, you can restart or reset the DP/AS–i LINK or reset it to the factory settings.

Keypad/Display

SYSTEM > Reset   > Restart > Run a restart

> Clear/reset module > Clear/reset module >

> Reset to factory settings > Reset to factory

settings >

WBM: "Reset" tab

Parameter	Function
Warm restart	Click this button to restart the DP/AS–i LINK. During a restart, the device is reinitialized. This takes approximately 20 seconds.
Clear/reset module	Click this button to reset the module to the factory configuration settings with the exception of the following parameters: • Password • IP address • Subnet mask • Default gateway (IP address of the default router) • DHCP flag • Device Name • System name • System location • System contact The device is automatically restarted.
Resetting to factory settings	Click this button to restore the factory configuration settings. The protected settings are also reset. **Note** The DP/AS–i LINK must be assigned an IP address before it can be accessed again.

5.2.3   Navigation "System > Save & Download"

WBM provides the option of saving configuration information in an external file on your client PC or TFTP server and to download such data from an external file from the PC or TFTP server to the DP/AS–i LINK.

You can also download new firmware from a file from your client PC or a TFTP server.

5.2.3.1   HTTP (Hyper Text Transfer Protocol)

WBM: HTTP tab

Parameter	Function
Configuration File	Here, you can enter the name and, if necessary, the directory path of the configuration file that you want to download to the DP/AS–i LINK or you can save the current configuration information there. As an alternative, you can select the file with the "Browse" button. By clicking the "Save" button, you can save the file on the local computer. By clicking the "Download" button, you can download the configuration from the local computer to the DP/AS–i LINK.
Diagnostic buffer	With "Save", you can save the diagnostic buffer (event log file) on the local computer.
Firmware file	Here, you can enter the name and, if necessary, the directory path of the file from which you want to download the new firmware. As an alternative, you can select the file with the "Browse" button. By clicking the "Save" button, you can save the file on the local computer. By clicking the "Download" button, you can download the file to the DP/AS–i LINK. **Note** A firmware update is possible at any time over the LAN interface (Ethernet). The project engineering data and configuration data on the C-PLUG or in the internal memory remains unchanged and can continue to be used.
Save	Save the firmware file on the PC.
Download	Download the firmware file to the DP/AS–i LINK.

5.2.3.2   TFTP (Trivial File Transfer Protocol)

WBM: TFTP tab

Parameter	Function
TFTP server IP address	IP address of the TFTP server with which you want to exchange data.
TFTP server IP port	Port of the TFTP server over which data exchange is handled.
Configuration File	Name (maximum 255 characters) and, if necessary, the directory path of the configuration file that you want to download to the DP/AS-i LINK or in which you want to save the current configuration information.
Diagnostic buffer	With "Save", you can save the diagnostic buffer (event log file) on the TFTP server.
Firmware file	Here, you can enter the name (maximum 255 characters) and, if necessary, the directory path of the file from which you want to download the new firmware. As an alternative, you can select the file with the "Browse" button. By clicking the "Save" button, you can save the file in the specified directory. By clicking the "Download" button, you can download the file to the DP/AS-i LINK.
Save	Saves the file on the server.
Download	Downloads the file to the DP/AS-i LINK.

5.2.4   Navigation "System > Password"

In this tab, you can change the password.

Note

Default password when supplied: admin

Parameter	Function
Current password	Current password.
New password	New password.
Confirm password	Repeat the new password.

Note

If you have forgotten your password, you can reset to the factory settings in the display of the DP/AS–i LINK and access WBM again with the default password.

5.2.5   Navigation "System > Device Display"

Device display (LED simulation)

The DP/AS−i LINK has several LEDs that provide information on the status of the device and connected slaves. Depending on their location, direct access to the device is not always possible. To help in this situation, WBM provides a simulated display of the LEDs. The meaning of the LEDs is explained in Section 1.9.

This WBM page shows a schematic representation of the DP/AS−i LINK with the LEDs.

Parameter	Function
LEDs	The device displays are described in detail in Section 1.9.
Power supply	Displays the power source: • AS-i line and 24 V • AS-i line or 24 V
Link	The link to the Ethernet port is established.

5.2.6   Navigation "System > Diagnostic Buffer"

In this table, all events are listed in the order in which they arrive. (The latest entry is at the start of the table and the oldest at the end.)

The buttons have the following functions:

- Refresh: Refreshes the diagnostic buffer
  The latest entry is at the highest position.

- Delete: Delete the diagnostic buffer

- Save: Saves the diagnostic buffer in a file

Keypad/Display

SYSTEM > Diagnostic Buffer > Delete Diagnostic Buffer? >

WBM: Diagnostic buffer

No.	Type	Date/Day	Time	Event
1	System	2007/09/11	13:16:52	Time synchronized.
2	Ethernet	2007/09/11	13:16:47	New IP address over DHCP: 140.100.98.3.
3	Ethernet	2007/09/11	13:16:45	Link up on port 1
4	System	2007/09/11	13:16:43	Device has not failed.
5	System	2007/09/11	13:16:38	C-PLUG found and accepted.
6	System	2007/09/11	13:16:37	Cold start performed
7	System	2007/09/11	13:15:45	Error state: No error.
8	PROFIBUS	2007/09/11	13:15:45	DP master online.
9	System	2007/09/11	13:15:43	Error state: error (Profibus Error).
10	PROFIBUS	2007/09/11	13:15:41	DP master offline.
11	System	2007/09/11	13:15:41	Error state: No error.
12	System	2007/09/11	13:15:40	Error state: error (AS-i 1 Error).
13	AS-i 1	2007/09/11	13:15:39	No AS-i config error.
14	System	2007/09/11	13:15:39	Error state: No error.
15	System	2007/09/11	13:15:38	Error state: error (AS-i 1 Error).
16	AS-i 1	2007/09/11	13:15:38	AS-i config error: Missing - 6A;

Parameter	Function
No.	Consecutive number of the entry.
Date/Day	Date of the entry if synchronized, otherwise the time since the last restart is displayed.
Type	Origin/source of the entry.
Time	Time of the entry. **Note** If the DP/AS−i LINK is synchronized with a time server, the current time is displayed otherwise the time since the last restart is displayed.
Event	Display of the diagnostic buffer entry.

5.2.7   Navigation "System > C-PLUG"

Here, you will find information as to whether a C-PLUG exists and whether it is valid for the device. If a valid C-PLUG is inserted, the menu provides information on the configuration data stored on the C-PLUG. You can move the configuration from the internal memory to the C-PLUG and vice versa.

Keypad/Display

SYSTEM > C-PLUG   > Info   (display of the C-PLUG status)
                                    > Internal Memory –> C-PLUG   >   move... >
                                    > C-PLUG –> Internal Memory   >   move... >

After calling the "Move Configuration" function with "OK", you are prompted to confirm this action with "OK".

WBM: C-PLUG

Parameter	Function
C-PLUG status	The status of the C-PLUG is displayed here. The following statuses are possible: • ACCEPTED There is a C-PLUG with a valid and suitable content inserted in the device. • C-PLUG has wrong device group Invalid or incompatible content of the inserted C-PLUG. This status is also shown if a C-PLUG of another device type was inserted. • CRC ERROR A C-PLUG with bad content is inserted. • NOT FOUND There is no C-PLUG inserted in the device.
C-PLUG device group	Specifies the device group of the SIMATIC NET product line that was written to the C-PLUG.
C-PLUG device type	Specifies which SIMATIC NET device type was written to the C-PLUG.
Configuration revision	Specifies the version and configuration structure. This information relates to the configuration options supported by the device. This does not relate to the concrete hardware configuration. This information can change when you run a firmware update.
Type	Shows the type of the C-PLUG file system.
Size	Shows the maximum storage capacity of the C-PLUG file system.
Currently in use	Shows the storage space in use in the C-PLUG file system.
C-PLUG information string	Shows information about the device of the SIMATIC NET the product line that previously used the C-PLUG, for example order number, type designation, version of hardware and software (string display box).
Move configuration	If you are logged on as administrator, you can make the following settings. • Internal Memory –> C-PLUG The configuration in the C-PLUG in the internal memory of the device is moved to the C-PLUG. Use case: The device starts up with a C–PLUG inserted that is not intended for the DP/AS-i LINK or contains an incorrect configuration. The device does not start up and indicates "C-PLUG error" in the display and in WBM (see Figure 5-1). Using the "Internal Memory –> C-PLUG" function either in the display menu or on the WBM page, you can overwrite the content of the C-PLUG with the stored configuration. • C-PLUG –> Internal Memory The configuration in the C-PLUG is moved to the internal memory of the device. There is no automatic restart. Note: After the configuration has been moved, the PROFIBUS interface is disabled permanently. The following two steps are then required: – Turn off the power to the device. – Remove the deleted (empty) C-PLUG from the device. When you turn on the device again without the C–PLUG, it starts up with the configuration in the internal memory. If the deleted C-PLUG remains in the device, the next time you start up, the configuration is moved from the internal memory to the C-PLUG and the device starts with the configuration on the C-PLUG.
Apply	Apply the settings selected in "Move configuration".

Figure 5-1   Message "C-PLUG error"

5.2.8   Navigation "System > Internet"

Information on the Internet

The link brings you to an Internet page with more information on the DP/AS−i LINK.

Parameter	Function
Information on the Internet	This button/link brings you to further information on the Internet at: www.siemens.de/dp_asi_link_advanced

5.2.9   Navigation "Industrial Ethernet > Configuration"

The display menus and the pages of the WBM allow you to set the IP parameters. Here, you can specify whether the DP/AS-i LINK obtains its IP address dynamically or whether you set a fixed address. In the pages of WBM, you can also activate options for accessing the device, such as SNMP.

Basics on Configuring the IP Parameters

If you change an IP parameter, existing Ethernet connections are terminated.

Note

When shipped, SNMP is enabled.

When the device is supplied, DHCP is set via the DHCP identification type "MAC address"; in other words, no IP configuration (IP address, subnet mask and default gateway) is set.

Notice

If the IP address is assigned by a DHCP server, it is possible that the link will not be accessible for brief periods when short IP address lease times (< 5 minutes) elapse.

You will find rules on specifying IP address and subnets in the STEP 7 online help under "IP address".

5.2.9.1   IP Configuration

Keypad/Display

IND. ETHERNET > IP Parameter >   DHCP >
disabled
MAC address
Device Name
Client ID

Change Client ID
IP > Set IP address
Mask > Set subnet mask
GW > Set gateway

The following options are available for configuring the IP parameters:

- DHCP: Assignment of the IP address by a DHCP server

  You can select one of the following settings:

  – disabled: No assignment of the IP address by DHCP server

  – MAC address: Assignment by DHCP server,
    identification of the link using the MAC address

  – Device name: Assignment by DHCP server,
    identification of the link using PROFINET device name (if this is configured)

  – Client ID: Assignment by DHCP server,
    identification of the link using client ID (only if this is configured)

  – Change client ID > Enter client ID and "OK"

Note

If "device name" or "client ID" is set as the identification type, but no name has been assigned, the IP parameters are automatically assigned using the MAC address.

- IP: IP address set manually

- Mask: Setting of a subnet mask

- GW: Setting the gateway when a gateway is used

IND. ETHERNET > MAC address > display MAC address

WBM: "IP Configuration" Tab

Parameter	Function
MAC address	Shows the MAC address of the device.
IP address	IP address of the DP/AS−i LINK. If you make a change here, this is automatically updated in the display. If the selected address is already occupied, the connection to the DP/AS−i LINK is aborted. Enter the previous address in the Internet browser to restore the connection.
Subnet mask	Here, you enter the subnet mask of the DP/AS−i LINK.
Default gateway	Here, you enter the address of the default gateway.
DHCP	Enables/disables the function with which the DP/AS−i LINK searches the network for a DHCP server. If a DHCP server is found, the configuration is set according to the data of the server. You can choose between the following DHCP identification types: • MAC address (default) • Device Name • Client ID

5.2.9.2   Events

WBM: "Events" Tab

On this page, you specify how the DP/AS–i LINK reacts to system events and to which. By selecting the corresponding check box, you specify which events cause which reactions from the DP/AS–i LINK. The following options are available:

- The DP/AS–i LINK sends an E-mail.

- The DP/AS–i LINK triggers an SNMP trap.

- The DP/AS–i LINK saves the event in the diagnostic buffer.

Parameter	Function
E-mail:	Enables/disables the sending of an E-mail when the corresponding event occurs. To use this service, port 25 of the relevant server must be opened.
Trap	Enables/disables the triggering of an SNMP trap when the corresponding event occurs. To use this service, port 162/UDP of the relevant server must be opened.
Diagnostic buffer	Enables/disables the saving of the event in the diagnostic buffer.

The "E-mail" and "SNMP trap" options can only be enabled here if you made the appropriate entries (addresses etc.) on the "Ethernet" page, "E-mail" or "SNMP" tabs earlier (see Section 5.2.9.3 and 5.2.9.4).

Notice

Avoiding message storms

After a message has arrived (event: for example, slave failure), a new message is triggered at the earliest after 3 seconds. If changes occur quickly, intermediate statuses can therefore be lost.

5.2.9.3   E-mail

WBM: "E-Mail" tab − monitoring the network with E-mails

The DP/AS−i LINK provides the option of sending an E-mail when an alarm occurs (for example to the network administrator). The E-mail contains the identification of the sending device, a description of the cause of the alarm in plain language and a time stamp with the system time. This allows simple, central network monitoring for networks with few nodes based on an E-mail system. When E-mail alarm messages arrive, the sender is identified and the browser starts WBM to read out further diagnostic information. The requirements for sending E-mails are as follows:

- The E-mail function on the DP/AS−i LINK is activated and the E-mail address of the recipient is configured.

- The E-mail function is enabled for the relevant event.

- There is an SMTP server in your network that can be reached by the DP/AS−i LINK.

- The IP address of the SMTP server is entered on the DP/AS−i LINK.

Parameter	Function
Enable E-mail	Enables/disables the E-mail function.
Recipient	Here, enter the E-mail address to which the DP/AS−i LINK sends an E-mail if a fault occurs.
SMTP server IP address	Here, enter the IP address of the SMTP server over which the E-mail is sent.
SMTP server IP port	IP port via which the mail is sent.
Sender	Freely selectable sender address of the E-mail.

5.2.9.4   SNMP

WBM: "SNMP" tab − Configuration of SNMP for a DP/AS-i LINK

Note

To be able to access additional AS-i parameters of the DP/AS−i LINK from a central management station, you require a private MIB.

The private MIB is located on the DP/AS−i LINK.

Procedure
Enter the following in the address box of your Internet browser:
`<IP address of the device>/doc/snAsi.mib`
Save the displayed file with **File > Save As...** and select the path, file name and "Text file" as the file type and enter the extension **MIB**.

On this page, you make the basic settings for SNMP.

If an alarm arrives, the DP/AS−i LINK can send traps (alarm messages) to up to two different (network management) stations at the same time. Traps are sent only for events that were specified in the "IP Configuration" / "Events" tab.

Parameter	Function
Enable SNMP	Enables/disables the SNMP function.
SNMP read-only	Enables/disables write-protection for SNMP variables.
Read Community String	Editable display of the user name for read access to SNMP variables.
Write Community String	Editable display of the user name for write access to SNMP variables. Here, you can only make modifications if write protection (SNMP read-only) has been disabled.
Enable traps	Enables/disables the trap function.
IP address	Here, enter the addresses of the stations (SNMP manager no. 1/2) to which the DP/AS−i LINK will send traps (one address is adequate).
Enable	Enable this option to activate the sending of traps to the corresponding stations (SNMP manager no. 1/2).

Notice

For security, change the community strings. Resetting the device also means resetting the password to the factory settings.

5.2.9.5   Time Synchronization

WBM: "Time Synchronization" Tab

In this tab, you can set the method for time synchronization, if you intend to use it.

The time is used for time stamping of the diagnostic events.
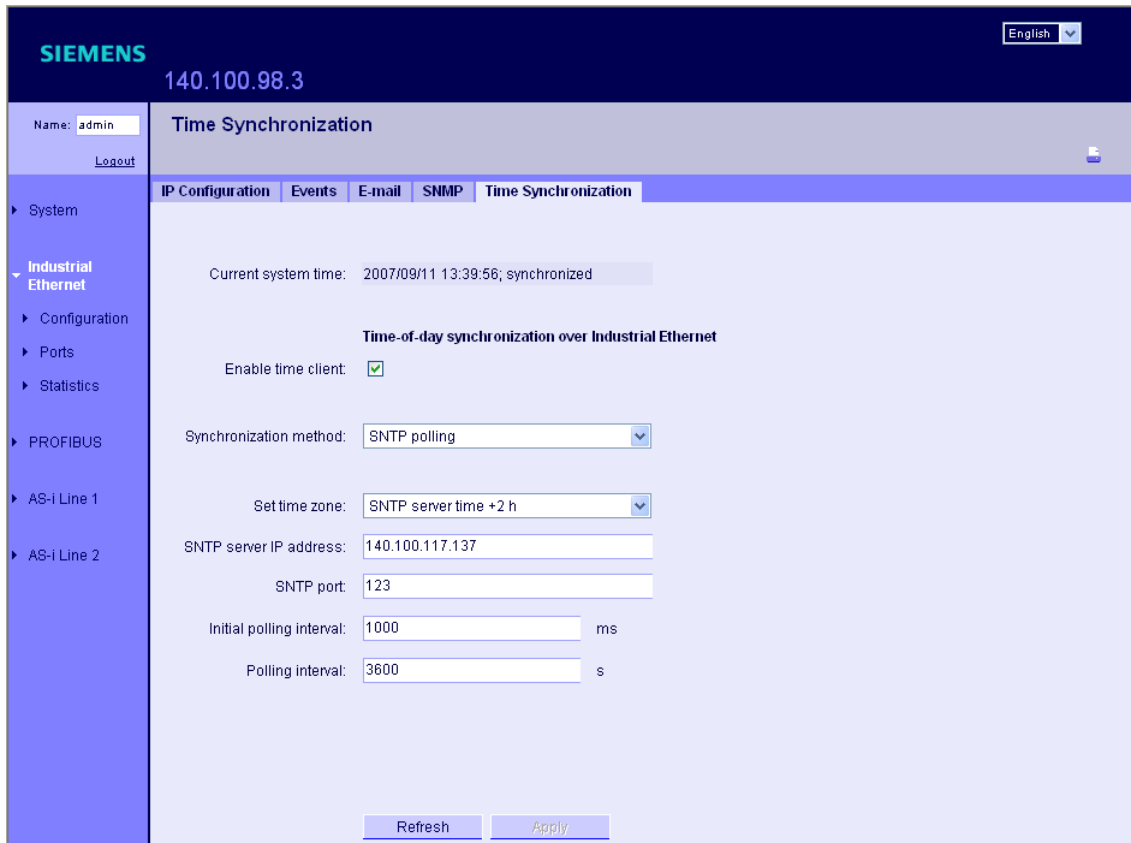
Parameter	Function
Current system time	Here, you specify either the time since the last restart or when synchronizing the current time. If no time is received, "Not synchronized" is also displayed.
Enable time client	Enables/disables the time function.

Parameter	Function
Synchronization method	Here, you can choose from four different protocol types: • SNTP polling (Simple Network Time Protocol) If you select this protocol type, you will need to make further settings: – SNTP server IP address: Here, you set the IP address of the time server. – SNTP port: Here, you set the communication port to the SNTP server. – Initial polling interval: Specifies the wait time in milliseconds before the first poll is sent to the server. – Polling interval: Specifies the interval in seconds at which the time is updated. • SNTP Listening • SIMATIC With this protocol type, any time frames in the network are used for synchronization. If you choose the SIMATIC time transmitter, you do not need to make any further settings. • Manual An input box opens in which you can set the current time. The time is then kept with quartz accuracy. If you turn the device off or reset it, this information is lost and must be set again. Note Time-of-day synchronization over PROFIBUS is not supported.
Set time zone	Select the required time zone.
SNTP server IP address	Here, you enter the IP address of the SNTP server.
SNTP port	Enter the time port here.
Initial polling interval	Enter the value of the initial polling interval. This value is used until a time is received.
Polling interval	Enter the value of the polling interval. This value is used as soon as a time is received.

5.2.10   Navigation "Industrial Ethernet > Ports"

5.2.10.1   Ports

WBM: "Ports" Tab − Port Status

This tab informs you about the current status of the port.

Parameter	Function
Port	Displays the port.
Type	Shows the type of port. On DP/AS−i LINK modules, the port type "TP 100 TX" is available.
Mode	Displays the transmission rate (10 or 100 Mbps) and the transmission method (full duplex (FD) or half duplex (HD)).
Desired Mode	Shows the desired mode • Negotiation
Status	Indicates whether or not the port is enabled.
Desired Status	Shows the desired status of the port. • Enabled
Link	Status of the link to the network: • up The port has a valid link to the network, a link integrity signal is being received.

5.2.10.2   ARP (Address Resolution Protocol Table)

WBM: "ARP" Tab − Address Resolution Protocol Table (ARP)

Here, you can see which IP address is assigned to which MAC address.

Parameter	Function
No.	Displays the index.
MAC address	Displays the MAC address.
IP address	Displays the IP address.
Type	Displays the type.

5.2.11   Navigation "Industrial Ethernet > Statistics"

Counting and evaluating received and sent packets

The DP/AS−i LINK has internal statistics counters (RMON Remote Monitoring) with which counts the number of received and sent packets for the port according to the following criteria:

• Frame length

• Packet type

• Bad packets

This information provides you with an overview of the data traffic and any network problems that might occur.

5.2.11.1   Throughput

WBM: "Throughput" Tab

Parameter	Function
Port	Displays the port. On the DP/AS−i LINK, the port is always 1.
Bytes in	Number of received bytes.
Bytes out	Number of sent bytes.
Packets in	Number of received packets.
Packets out	Number of sent packets.
Utilization	Displays the bus utilization as a percentage (%). If bus utilization is below 1%, there is no display.
Max. Utilization	Displays the peak value of bus utilization as a percentage (%).
Reset	The "Reset" button resets the counters.

5.2.11.2 Packet Type

WBM: "Packet Type" Tab – received packets sorted according to type

The Packet Type Statistics page displays how many frames of the type unicast, multicast, and broadcast were received at each port.

Clicking on the "Reset" button resets this counter. If you click on an entry in the Port column, the "Graphic statistics: Packet Type" page is displayed for the selected port. You then see a configurable graphical representation of the counter value.

Parameter	Function
Port	Displays the port.
Unicast	Number of packets to the unicast recipient address.
Multicast	Number of packets to the multicast recipient address.
Broadcast	Number of packets to the broadcast recipient address.

5.2.11.3 Packet Size

WBM: "Packet Size" Tab – received packets sorted according to length

The page displays how many packets of which size were received.

If you click on an entry, the "Graphic statistics: Packet Size" page is displayed for the selected port. You then see a configurable graphical representation of the counter value.

Parameter	Function
Port	Displays the port.
64	Displays the number of packets with 64 bytes.
65−127	Number of packets with 65−127 bytes.
128−255	Number of packets with 128−255 bytes.
256−511	Number of packets with 256−511 bytes.
512−1023	Number of packets with 512−1023 bytes.
1024−1518	Number of packets with 1024−1518 bytes.

5.2.11.4   Error

WBM: "Error" Tab – counting and evaluation of transmission errors

This tab displays information on any errors that may have occurred and allows diagnostics.

If you click on an entry, the Packet Error Statistics graphic is displayed. You then see a configurable graphical representation of the counter value.

Parameter	Function
Port	Displays the port.
CRC	Number of packets with a valid length but bad checksum.
Undersize	Number of packets that were too short with valid checksum.
Oversize	Number of packets that were too long with valid checksum.
Jabbers	Number of packets that were too long without valid checksum.
Collisions	Number of collisions that occurred.

5.2.12   Navigation "PROFIBUS > Configuration"

In this tab, you enter the PROFIBUS address. The configuration data is also displayed.

5.2.12.1   Configuration

Keypad/Display

PROFIBUS > Info > PROFIBUS Info
                                                 Master status
                                                 Master address
                                                 ID Number
                                                 Baudrate
                       DP Config.   (from the "Info" menu with "right"/"left" button)
                       DP−Param.   (from the "Info" menu with "right"/"left" button)

PROFIBUS > DP Address > Change address

PROFIBUS > DP Glob.Ctrl. >   Sync
                                                   Freeze
                                                   Clear

WBM: "Configuration" Tab

Parameter	Function
DP master address	Displays the DP master address.
DP master status	Displays the DP master status.
Baud rate	Displays the transmission rate.
DP Ident number	Displays the identification number of the DP slave.
PROFIBUS address	Enter the required PROFIBUS address of the DP/AS−i LINK.
DP global control	Display box Shows the status or synchronization status of the DP master: • SYNC • FREEZE • CLEAR

5.2.12.2   Status

Keypad/Display

PROFIBUS >   PROFIBUS Info
             DP Config.
             DP Param.

WBM: "Status" Tab

Parameter	Function
Output data length	Displays the length of output data in bytes
Input data length	Displays the length of input data in bytes
Parameter data	Displays the parameter frame from the DP master
Configuration data	Displays the configuration frame from the DP master

5.2.13   Navigation "AS-i Line 1 > Overview"

Note

All the information in this section apply analogously to AS-i line 2.

On a single master, the line number is omitted.

5.2.13.1   Lifelist

Keypad/Display

AS-i Line 1 > Lifelist > (displays all detected slaves)

Description of use and the follow−on menus in Section 5.2.14.2.

WBM: "Lifelist" Tab

This tab displays all slaves and their properties (color code: see legend in the tab) and any errors.

Parameter	Function
0(A) to 31(A) – 1(B) to 31(B)	Displays the status of slaves 1–31 (slave 0 = reserved). If you have A/B slaves, the status of the B slaves is also shown in the 2nd table.

Note

If you click on the address of a slave in the title row of the table, you open the configuration tab of the slave directly.

5.2.13.2   Error Statistics

Keypad/Display

AS-i Line 1 > Statistics > Line statistics
                                    AS-i power failures
                                    Short to ground

                                    Slave failure
                                    Missing frame
                                    Bad frame
                                    Peripheral error
                                    Protocol error
                                    Bad Master frame (bad master frame)

                                    Reset counters > Reset all counters

WBM: "Error Statistics" Tab

This tab displays the specific errors (number) on the AS-i line.

Parameter	Function
Slave address	Address of the selected slave.
Show	Enables/disables the display of the corresponding error.
AS-i power failures	Displays the number of AS-i power supply failures.
AS-i short to ground	Displays the number of AS-i ground shorts.

Parameter	Function
Error	Shows how many errors of this type occurred (see Section 8.3.33). The following errors are listed: • Slave failure • Missing slave frame • Bad slave frame • Slave I/O error • Slave protocol error • Bad master frame
Quotient	Shows the proportion of a specific error type compared with the total errors as a percentage.
Reset	The "Reset" button resets the counters.

5.2.14 Navigation "AS-i Line 1 > Configuration"

5.2.14.1 Status

Keypad/Display

AS-i line 1 > Line status >

Protected > enable / disable
Autoprog. > enable / disable
Offline > "Online" / "Offline"

System error (image of line LED "SF")
Config. Error (image of LED "CER")
AS−i Powerfail (image of LED "APF")
Short to ground

The functions "Protected" (protected mode or configuration mode), "Autoprog." (autoprogramming) or "Offline" are enabled, if the relevant check box is selected (enable with "OK"). Exit the menu with "ESC" after enabling/disabling the functions.

WBM: "Status" Tab

Parameter	Function
Protected mode	Select the required mode. You can choose between the following modes: • Protected mode • Configuration mode
Automatic address programming (AUP)	Enables/disables automatic address programming. If this option is selected, when you replace a slave, the new slave is given the address of its predecessor.
Offline	Enable this option to switch to offline mode (disabled = online). In "Offline" mode, only the command interface is active; in other words, no AS-i frames are sent.

5.2.14.2   Total Configuration

Keypad / display (only configuration of individual slaves)

AS-i Line 1 > Lifelist >   (select slave and "OK")

Config.	> Change configuration
Parameter	> Change parameters
Bin. I/O	> Change binary Inputs/outputs
Analog	> Change analog inputs/outputs
Status	
Statistics	> Reset all counters
Statistics	> Reset all counters
String	> Write/Read (string transfer to slave)

Select a slave in the "Lifelist" or "Info" menu with the "right" / "left" keys. Pressing "OK" opens the "Config." menu.

or

AS-i Line 1 > Slave Info >

Config.   > Change configuration

From the "Configuration" menu, use the "right"/"left" keys to change to the other menus "Parameters", "Bin. I/O", "Analog" etc. With the "up"/"down" keys, you change to the next slave. The "OK" button opens the follow-on menu in which you can change the values. Exceptions: The "Status" and "Statistics" menus have no display function.

Change the values with the "up"/"down" keys. To transfer the changed values to the slave, press the "OK" button.

Note

Remember that any values changed here will be overwritten by the configured values the next time you restart. This is only the case when the AS-i slaves were configured in STEP 7 / HW Config.

If the default configuration is used in HW Config (empty link without entries in the module table), the values changed here are also valid following a restart.

WBM: "Total Configuration" Tab

The page is divided into two areas and includes all A and B slaves detected on this line:

- Detected
  Here, you can see all the slaves detected on this line including their detected configuration (display boxes).

- Configured
  Here, you can set the configuration data for the slaves.

Parameter	Function
Header row of the table	
–>	Accept configuration data of all slaves
	Click this button if you want to adopt the detected configuration data of all slaves (adopt actual configuration as desired configuration).
Delete	Click this button if you want to delete all entries for all slaves.
Slave rows	
Detected	If the slave is detected, a check mark is set here.
Configured	Enables/disables the "Configured" option. The "–> " button adopts the values of the detected slave.
Slave address	Address of the slave 0A–31A; with A/B slaves also 1B–31B.
Configuration	Configuration data of the slaves
Parameter bits	Parameter bits of the slaves
	In the "Detected" area, you can see the current parameter bits, in the "Configured" area, you can configure the parameter bits. When the AS-i slaves are activated, the configured AS-i parameters are transferred to them.
IO	Display/configuration of the IO code of an AS-i slave
ID	Display/configuration of the ID code of an AS-i slave
ID1	Display/configuration of the extended ID1 code of an AS-i slave
ID2	Display/configuration of the extended ID2 code of an AS-i slave
–> (row-specific)	Accept configuration data of the slave
	Click this button if you want to adopt the detected configuration data of the slave (adopt actual configuration as desired configuration).
Delete (row-specific)	Click this button if you want to delete the information on this slave from the configuration.

Note

The content of the screen is saved on the DP/AS–i LINK only after you click the "Apply" button.

5.2.15   Navigation "AS-i Line 1 > Slaves"

Common Functions

The following drop-down list is included at the top left of all tabs of this page:

◀ | Slave 4(A) ▼ | ▶

Using the drop-down list, you can select the slave whose data you want to view. You can select the slave directly using the drop-down list box or browse with the "right"/"left" arrow keys.

5.2.15.1   Diagnostics

Keypad/Display

AS-i Line 1 > Slave Info >

Config.	> Change configuration
Parameter	> Change parameters
Bin. I/O	> Change binary Inputs/outputs
Analog	> Change analog inputs/outputs
Status	
Statistics	> Reset all counters

    Slave Failure
    Missing frames.
    Bad frame

Statistics   > Reset all counters
    I/O Error
    protocol error
    Bad Master frame (bad master frame)

String   > Write/Read (string transfer to slave)

or

AS-i Line 1 > Error list >   (select slave and "OK")

       Statistics > Reset error counters
          Slave failure
          Missing frames
          Bad frames

       Statistics > Reset error counters
          I/O Error
          protocol error
          Bad master frame

Description of use and the follow–on menus in Section 5.2.14.2.

WBM: "Diagnostics" Tab

This tab displays all the relevant data of the selected slave.
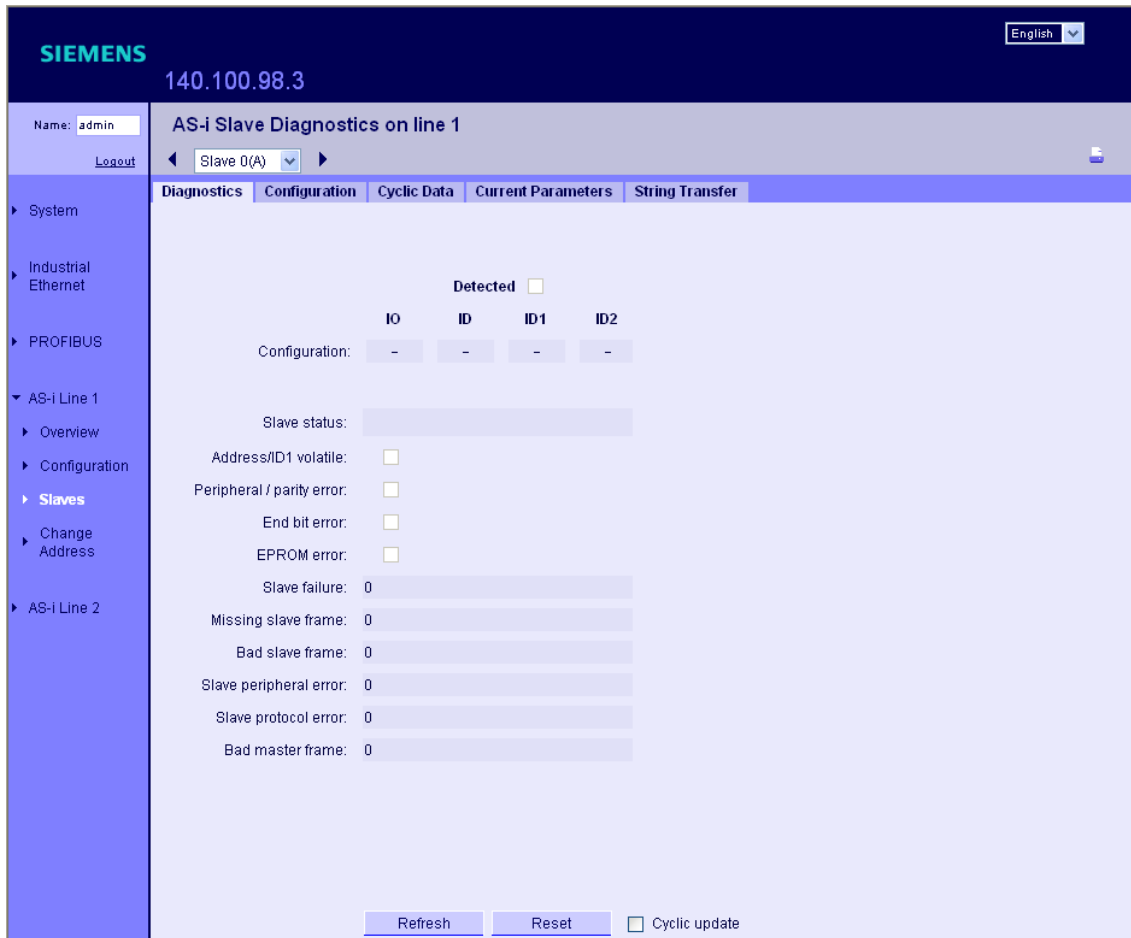
Parameter	Function
Detected	If the slave is detected, a check mark is set here.
IO	Display of the IO code of an AS-i slave
ID	Display of the ID code of an AS-i slave
ID1	Display of the extended ID1 code of an AS-i slave
ID2	Display of the extended ID2 code of an AS-i slave

Parameter	Function
Error	Displays the status currently being signaled by the slave (check mark): • Address/ID1 volatile • I/O / parity error • End bit error • EPROM error Shows how many errors of a type have occurred. The following errors are listed: • Slave failure • Missing slave frame • Bad slave frame • Slave I/O error • Slave protocol error • Bad master frame Some errors occur in tandem (for example slave failure + missing/bad slave frames). Note To find out which error messages the slave supports, refer to the slave data sheets.
Reset	With the "Reset" button, you can reset the error counter of the slave to 0.

5.2.15.2   Configuration

Keypad/Display

AS-i Line 1 > Lifelist >   (select slave and "OK")

　　　　　　　　　　　　　Config.　　　　　　Display / change configuration

Description of use and the follow–on menus in Section 5.2.14.2.

WBM: "Configuration" Tab

This tab displays the slave data. You can also configure the data.

Parameter	Function
Configured	If the slave is configured, a check mark is set here.
IO	Display/configuration of the IO code of an AS-i slave.
ID	Display/configuration of the ID code of an AS-i slave.
ID1	Display/configuration of the extended ID1 code of an AS-i slave.
ID2	Display/configuration of the extended ID2 code of an AS-i slave.

5.2.15.3   Cyclic Data

Keypad/Display

AS-i Line 1 > Lifelist >   (select slave and "OK")

Config.   > Change configuration
Parameter   > Change parameters
Bin. I/O   > Change binary Inputs/outputs
Analog   > Change binary inputs/outputs

WBM: "Cyclic Data" Tab

This tab displays the cyclic input/output data of the AS-i slave. The output data of the slave can also be modified here during commissioning.

Please note that any changes made here remain only until the DP master starts up and are then overwritten by the process output data.

Parameter	Function
Binary inputs	Bit 3 / Bit 2 / Bit 1 / Bit 0
Binary outputs	Enables/disables the following output bits: Bit 3 / Bit 2 / Bit 1 / Bit 0
Analog inputs	Channel 1 / Channel 2 / Channel 3 / Channel 4
Analog outputs	Entry of the value to be written on channel x. Channel 1 / Channel 2 / Channel 3 / Channel 4

5.2.15.4   Current Parameters

Keypad/Display

AS-i Line 1 > Lifelist >   (select slave and "OK")

                             Config.   > Change configuration
                             Parameter   > Change parameters

WBM: "Current Parameters"

You can set the parameter bits in this tab. The parameter echo is returned.

Note that any changes made here remain only until the DP master starts up. There is then a restart with the configured parameter values.

Parameter	Function
Parameter bits	Enables/disables the following parameter bits: Bit 3 / Bit 2 / Bit 1 / Bit 0
Parameter echo	The AS-i slave transfers its current parameter value in the response (parameter echo displayed).

5.2.15.5   String Transfer

Keypad/Display

AS-i Line 1 > Lifelist >   (select slave and "OK")

Config.	> Change configuration
Parameter	> Change parameters
Bin. I/O	> Change binary Inputs/outputs
Analog	> Change analog inputs/outputs
Status	
Statistics	> Reset all counters
Statistics	> Reset all counters
String	> Write/Read (string transfer to slave)

    7.4 Transfer string (with profile 7.4)
      Read ID String (read ID)
      Read Diag. String (read diagnostic data)
      Read Param. String (read parameters)
      Write Param. String (write parameters)
    CTT2 String Transfer (with profile 7.5.5, 7.A.5, B.A.5)
      Write CTT2 String

WBM: "String Transfer" Tab

Commands can be transferred to the slave in this tab. The messages returned by the slave are displayed.

Note

Not all slaves support string transfer.
To find out which functions your slave supports, refer to the data sheets of the slave.

Parameter	Function
Command	You can choose from the following commands: • Read ID String (with profile 7.4) • Read Diag String (with profile 7.4) • Read Param String (with profile 7.4) • Write Param String (with profile 7.4) • Write CTT2 string (with profile 7.5.5, 7.A.5, B.A.5)
Send buffer	Enter the slave data to be sent.
Receive buffer	Display of the received slave data. This box can take up to 220 bytes and line breaks where necessary.

5.2.16 Navigation "AS-i line 1 > Change Address"

Here, you can change the address of a single slave. You are also supported if you want to assign addresses to several slaves.

5.2.16.1 Change Address

Keypad/Display

AS-i Line 1 > Change address > Change slave address

WBM: "Change Address" Tab

In this tab, you can change the address of the selected slave.

Parameter	Function
Old slave address	Select the slave whose address you want to change.
New slave address	Select the new slave address you want to assign to the slave (the free addresses are displayed).

5.2.16.2 Change ID1

Keypad/Display

AS-i Line 1 > Change ID1 > Set ID1 (only for slave "0")

WBM: "Change ID1" Tab

Parameter	Function
Slave address	Displays the slave 0(A). The ID1 code can only be changed for this slave.
ID1	Configuration of the extended ID1 code of an AS-i slave. Note: The ID1 code can only be changed for slave 0(A).

5.2.16.3   Automatic Addressing

Keypad/Display

AS-i Line 1 > Address help > enable/disable

Exiting the "Addressing Help" menu automatically deactivates the addressing help.

WBM: "Automatic Addressing" Tab

Parameter	Function
Automatic addressing	Enables/disables addressing support If you select this option, a new slave added to the AS-i line with AS-i address "0" is assigned the next free address. Disable this option once you have connected all required slaves.

❑

6 Configuration With STEP 7

This chapter...

This chapter explains how to configure the master module DP/AS-i LINK in as a DP slave in STEP 7 or using the GSD file and how to include the AS-i slaves.

⚠ **Warning**

During operation and assuming there is a connection from the DP/AS-i LINK to the DP master, you can change the configuration of the DP/AS-i LINK or write process data of the real process.

The change in the configuration or to process data can trigger unexpected reactions in the process that can lead to death, serious injury or damaged property.

Consider the consequences before you act. Take the following precautions:

- Restrict the ways of accessing the DP/AS-i LINK.
- Assign a secure password for access to Web Based Management.
- Install a physical emergency stop circuit for the machines or the process.

6.1 Configuring the DP/AS-i LINK as a DP Slave on the DP Master

Significance of the Configuration

Communication with the DP/AS-i LINK (as DP slave) differs depending on the device you are using as DP master. To use DP mode, you require a DP configuration for the DP master system.

The following aspects of DP configuration on the DP master are explained in this section:

- The use of the GSD file
- Configuration of a DP master from the SIMATIC S7 device range in STEP 7.
- Configuration of a DP master in STEP 7 using the GSD file.

6.1.1　　General Procedure

Available Configuration Tools

- SIMATIC STEP 7 (SIMATIC S7)
- SIMATIC NCM PC
- Products from other manufacturers

Configuring the DP/AS-i LINK using GSD file

In the following situations, you configure the DP/AS–i LINK by importing the supplied GSD file:

- In STEP 7 versions up to V5.3 SPx
- When using other configuration tools not based on STEP 7
- When using a DP master that does not belong to the SIMATIC S7 system family (for example PC modules)

For DP masters from the SIMATIC S7 system family, there are convenient configuration tools available with STEP 7 V5.4 or higher.

GSD File

The GSD file contains all the necessary information about the DP/AS–i LINK required by the configuration tool (for example STEP 7).

You will find the GSD file on the supplied CD.

You can also obtain the GSD file from the Internet at

http://support.automation.siemens.com/WW/view/de/113250

DIB/BMP File

To allow graphic representation of the DP/AS–i LINK, some configuration tools, for example STEP 7, use bitmap files. These are also supplied on the accompanying CD.

6.2   Configuration in STEP 7: Basic Configuration

Configuring the DP Master System

You take the DP/AS-i LINK (single or double master) from the STEP 7/HW Config hardware catalog just like every other DP slave and insert it in the graphic representation of the DP master system.
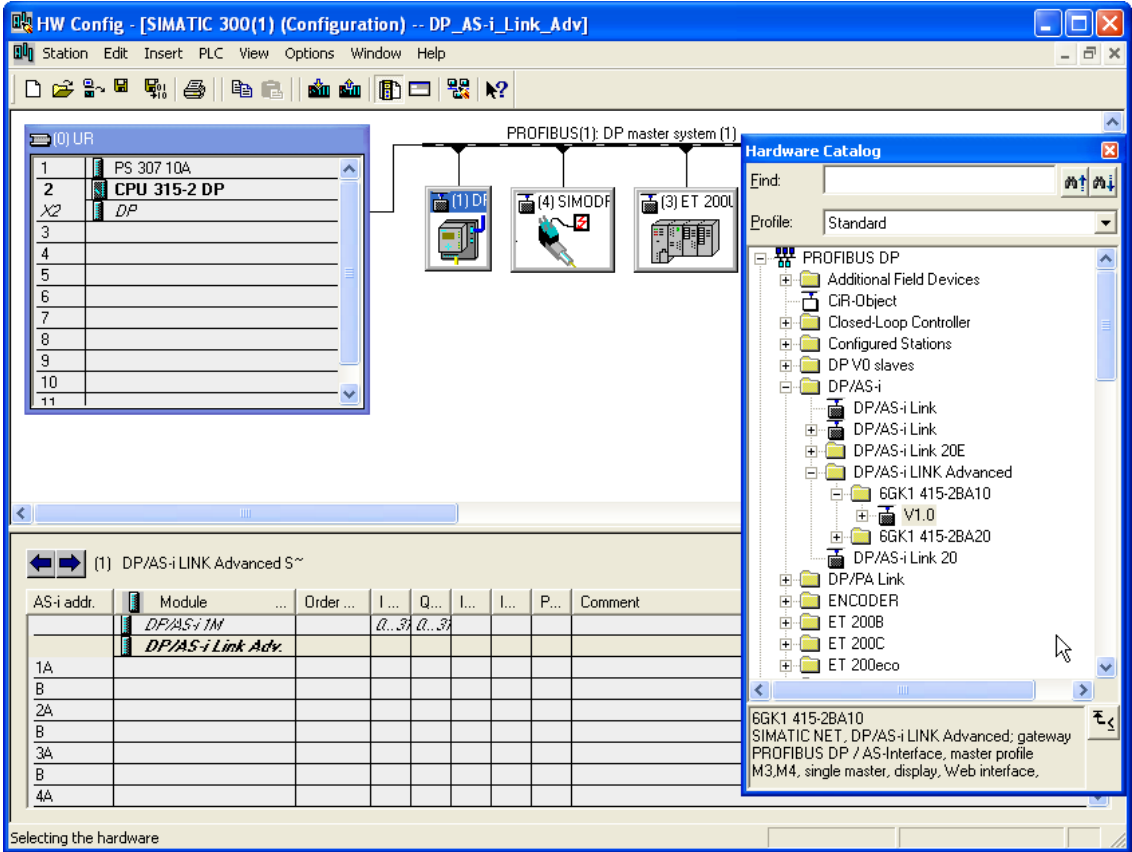
After you have inserted the DP/AS-i LINK as a DP slave, there are still no AS-i slaves to be seen in the detailed view of the station window. In this default setting, the configuration rules for configuration using keypad and display apply initially (see Section 4.1).

For a single master, the configuration table displays one row for the AS-i line (default name: DP/AS-i).

For a double master, two lines are displayed for the AS-i lines (default names: DP/AS-i 1M, DP/AS-i 2M).

Configuring the Properties of the AS-i Line
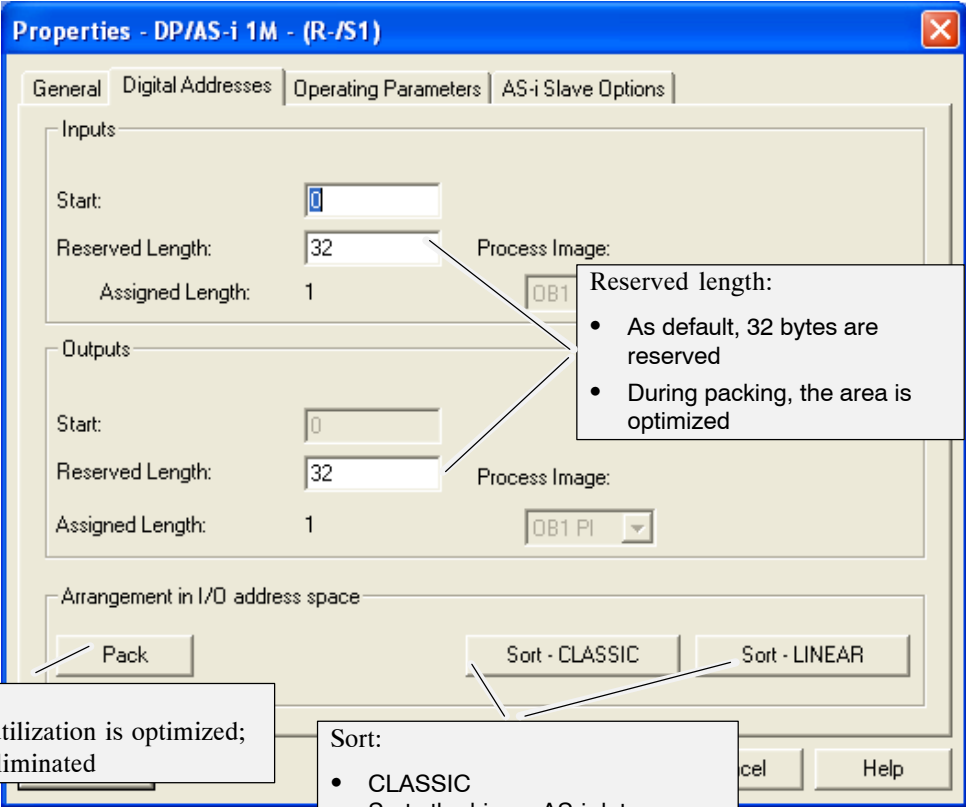
To configure general information, binary addresses and operating parameters of an AS-i line, double-click on the corresponding row of the line. This brings you to the properties dialog of the AS-i line.

- **"General"** tab
  Here, you see the master type and the order number. In the "Name" box, you can assign any name for the AS-i line. In "Comment", you can save any text, for example describing the function of the module.
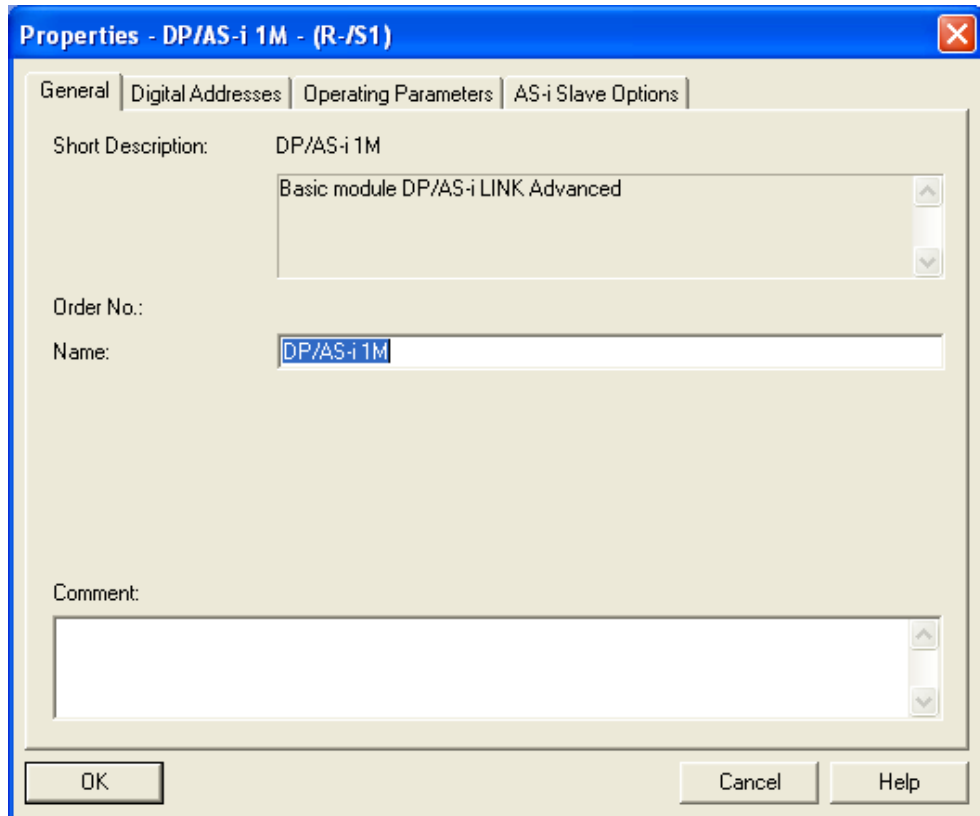
- • "**Digital Addresses**" tab

  To configure the address areas for the binary input and output data of the AS-i slaves, change to the "Digital Addresses" tab.

• **"Operating Parameters"** tab

The diagnostic interrupt can be
selected here for a specific line.
Default: enabled

Automatic address programming
when a slave is replaced:
If an AS-i slave is replaced (due
to fault), the address is program-
med automatically.

If you do not require this functio-
nality, for example for safety
reasons, it can be deselected here.
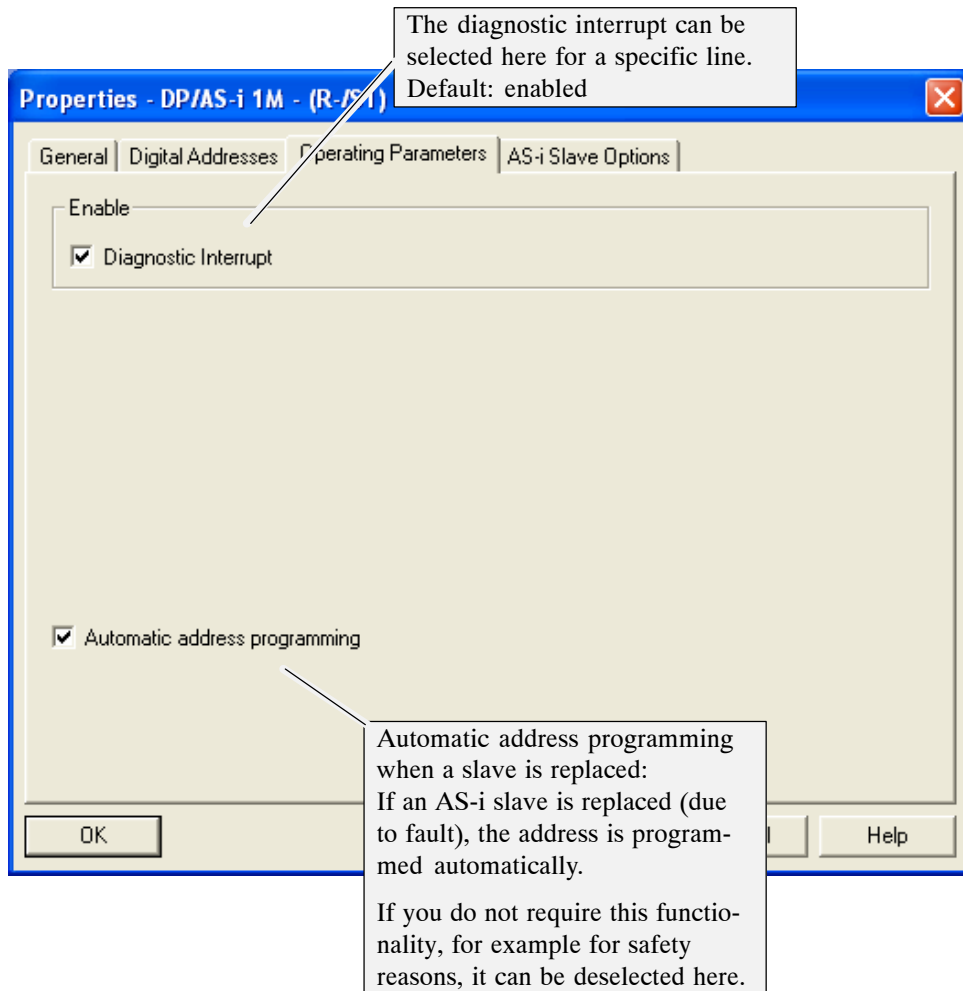
- "**AS-i Slaves Options**" tab
  "Upload to PG" fills in the table with the data of the slaves (see Section 6.2.2).
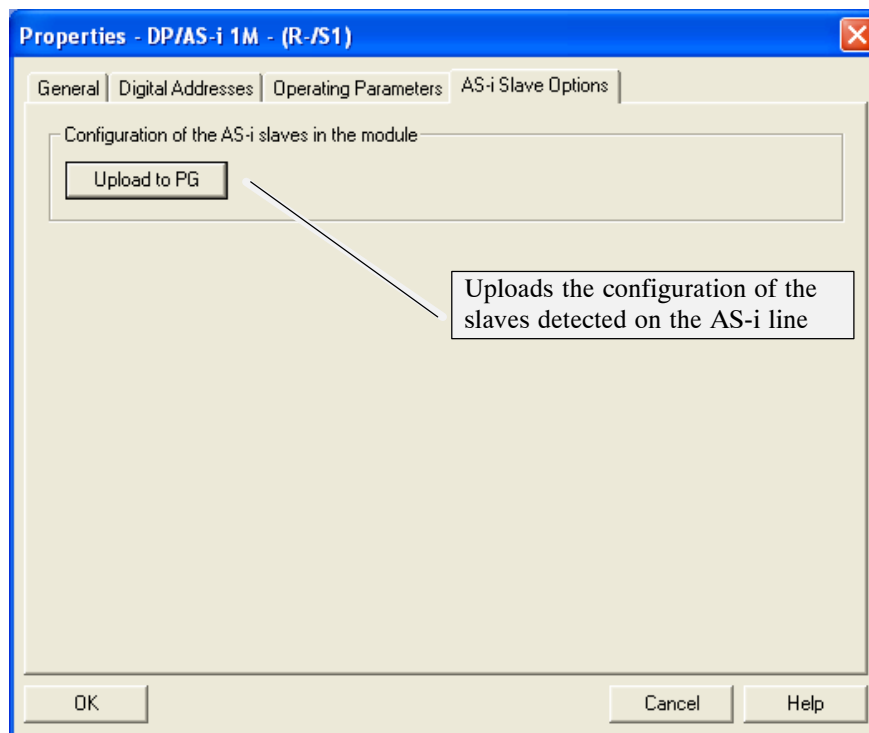
6.2.1   Configuring in STEP 7 − Slave Configuration

Meaning

The settings you have made up to now in the basic configuration are adequate to start up the DP/AS−i LINK with a SIMATIC S7 DP master. All other configuration information relating to the AS-i slaves can then also be stored on the DP/AS−i LINK using the keypad and display or WBM.

Configuring AS-i slaves completely in STEP 7 as described below allows you to adapt the AS-Interface to the I/O address range of SIMATIC S7.

If you want to configure the AS-i slaves in greater detail in STEP 7, follow the instructions below.

Notice

If you configure the AS-i slave project engineering with STEP 7, if there is a configuration already on the DP/AS−i LINK, this will be overwritten during DP startup !

Configuring an AS-i Slave

To set a specific slave configuration, take an AS-i slave from the hardware catalog and insert it in a free line in the detailed view of the station window. This specifies the addresses of the AS-i slaves.

Drag an AS-i slave from the hardware catalog and place it in the required row (the row number corresponds to the AS-i address).

DP/AS−INTERFACE LINK Advanced as of hardware version 1, as of firmware version 2.0
Release 03/2008
C79000−G8976−C209−03
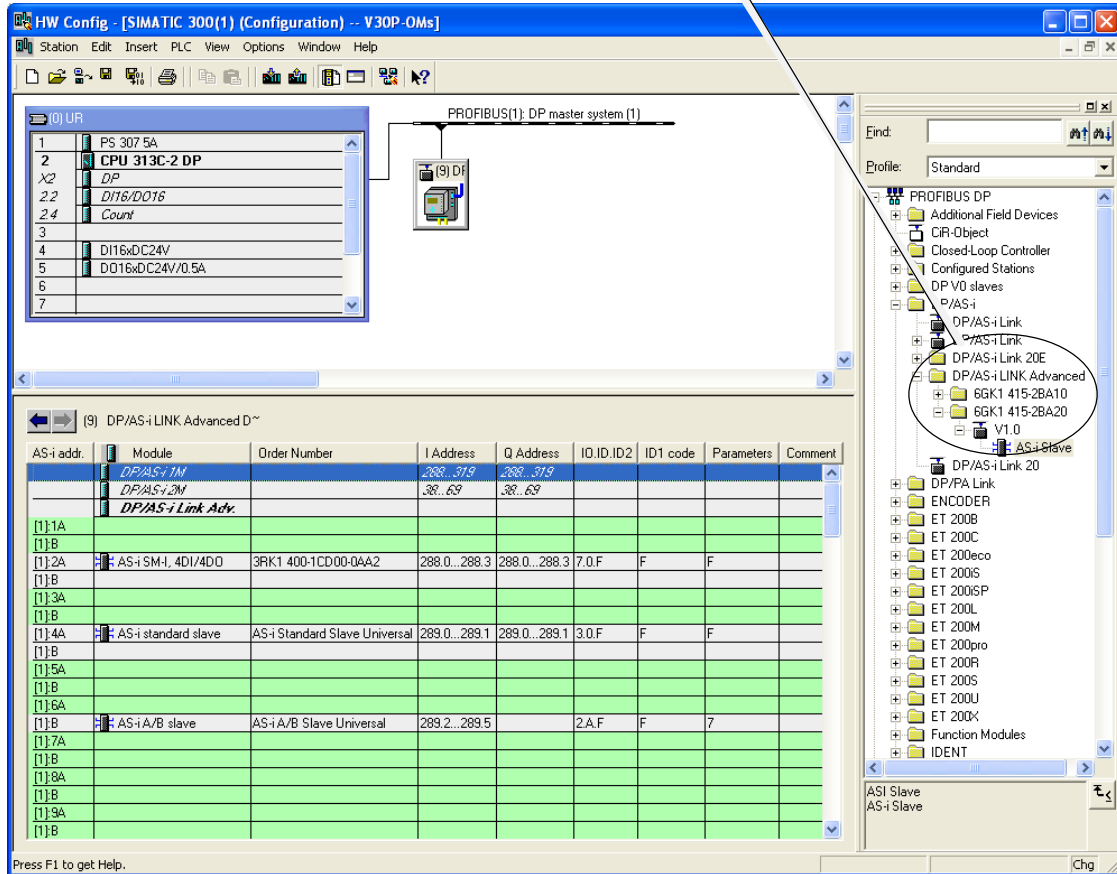
Properties AS-i Slave

By configuring the properties of the AS-i slaves, you can do the following:

- Store general information for the AS-i slaves

- Enter configuration data of the AS-i slaves

- Specify the I/O configuration

- Specify I/O address areas

Two types of slaves must be distinguished:

- Siemens slaves
  already have a parameter assignment (these parameters cannot be edited; the startup parameters can be set in plain language).

- Universal slaves
  All parameters can be edited and must be set according to the manufacturer's instructions (editable IO code, ID code, ID1/2 code).

- Module
  The "Module" drop-down list box opens a list in which you can select universal modules or Siemens modules based on the order number.

- Selection
  The "Selection" button opens the tree structure of the AS-Interface catalog where you can select the required AS-i module just as in the hardware catalog.

- Parameters
  In the "Parameters" group box you can set the startup parameters

  - using check boxes if you have selected universal modules.

  - in plain language if you have selected Siemens modules.

- Digital/analog addresses
  In the "Digital Addresses" group box, you can edit the proposed digital address entries. This also applies to the "Analog addresses" group box, if an analog slave is detected.

Notice

The "Cyclic analog data" check box allows you to enable/disable access to analog data using I/O commands.

If the analog outputs of an AS-i slave are written using acyclic services, the "Cyclic analog data" check box must not be selected.

Note

If you change the name and the order number in the configuration of a slave module, the default name of the slave module will be adopted. To change the name, you will need to open the Properties dialog of the slave module again and change the name.

6.2.2 Uploading the Actual Configuration

Aims

You can upload the current actual configuration over the DP/AS-i LINK to the open STEP 7 project.

The uploaded configuration can be modified (see Section 6.2.1) and saved on the DP master as the desired configuration.

The allows you

- to read in a complex configuration and use it as the basis for further configuration in STEP 7;

- to check the current configuration.

Notice

The uploaded configuration is always the current actual configuration. The actual configuration can differ from the configuration stored on the AS-i master; for example when an AS-i slave is added or removed after project engineering was completed.

The "Upload to PG" function is not possible in some configurations (for example when using the CP 342–5).

Follow the steps below:

Preparation: Creating and downloading the basic configuration:

1. Create a basic configuration by inserting the DP/AS-i LINK in a DP master system of an S7–300 / S7–400 station.

2. Download the basic configuration to the S7 station with HW Config.

How to upload:

3. Select the "AS-i Slaves Options" tab

4. Click the "Upload to PG" button.

   A project engineering configuration on the programming device is overwritten. If the parameter settings of the uploaded slaves differ from the default parameter settings in the hardware catalog, you will be prompted to confirm that you want to adopt these settings.

5. The change to the "Slave Configuration" tab (in the dialog of a slave) to view the actual configuration and edit it if necessary.

6.3   Configuration using a GSD File

Installing the GSD File

1. Open "HW Config" in the SIMATIC Manager.

2. Select the menu command **Options > Install GSD File**.

3. In the "Install GSD Files" dialog, click the "Browse" button to select the path and GSD file you want to install.

4. Select the file in the list and confirm with the "Install" button.

5. Complete the installation by clicking "Close"
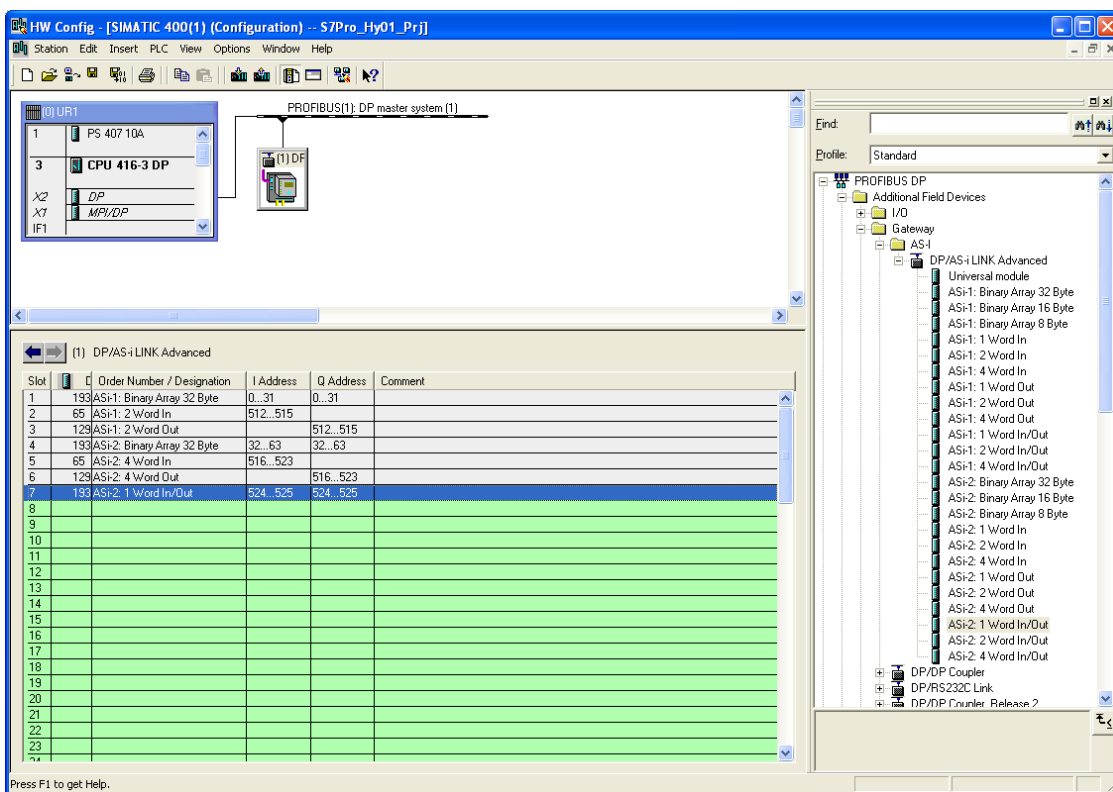
Figure 6-1   Hardware Configuration of the DP/AS-INTERFACE LINK Advanced with GSD File

Configuration

Select the DP/AS-i LINK in the hardware catalog in **PROFIBUS DP > Other field devices > Gateway > AS-i** and place it in the PROFIBUS DP master system.

In the lower part of the screen, you will see the slot representation of the DP slave. The row number here does not correspond to the AS-i address but is the slot number of the DP slave.

- If you want to configure a single master only ASi-1 modules in the "Module" drop-down list box.

- For each AS-i line that you want to use, you must place exactly **one** binary module.

- For each AS-i slave that occupies more than 4 bits (for example analog slaves), you can reserve I/O address space by selecting a suitable "Word" module. (For a two-channel analog input slave, for example, the analog module ASi-1: 2 Word In is suitable).

- For each word module, the address of the assigned AS-i slaves must be specified in the device-specific parameters (properties). As an option, the proposed I/O address can be changed.

Note
- Please note that in addition to configuration using a GSD file, the AS-i project engineering must also be configured using keyboard and display or using WBM.
- The hardware configured in STEP 7 must match the installed hardware.
- When you configure using a GSD file, you can only use the CLASSIC sorting (see Section 7.2.2).

❏

7 Data Exchange between DP Master and AS−i Slave

This chapter...

This chapter contains the information you require to access the AS−Interface from the DP master via the DP/AS−i LINK module.

The chapter explains the transfer of the following:

- Binary values and analog values using the cyclic DP services
- Analog values using the acyclic DP services

7.1   How the Interfaces Work

Accessing the AS-Interface via PROFIBUS DP

The DP master communicates with the AS-i slaves via the DP/AS-i LINK. The AS-i communication objects are mapped in one continuous data area for input data and one for output data in the DP master.

The DP/AS-i LINK operates two interfaces:

1. **Interface to the DP master : PROFIBUS DP**

2. **Interface to the AS-i slaves : AS-Interface**
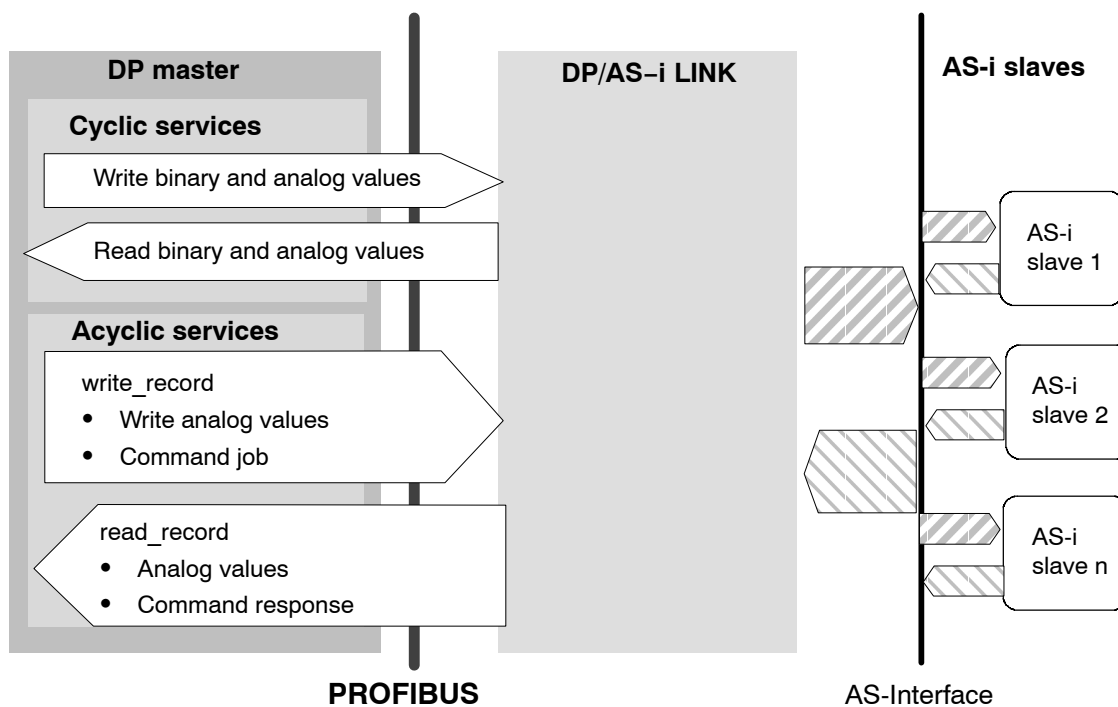
Interface to DP master : PROFIBUS-DP

At the PROFIBUS end, the cyclic services and the acyclic services of PROFIBUS-DP V1 are used:

- Cyclic services
  The cyclic services are used to transfer binary values and analog values.

- Acyclic services of PROFIBUS-DP V1
  These services are known below as read_record and write_record. They are used for the following:

  – The transfer of analog values

  – To operate the command interface

7.2   Transferring AS-i Binary Values

Meaning

This section explains how the binary values of attached AS-i slaves can be accessed by the user program on the DP master.

Interface between the DP Master and DP/AS−i LINK

Via the DP/AS−i LINK, the DP master accesses the binary inputs and outputs of the AS-i slaves in the **cyclic DP mode**. The inputs and outputs of the AS-i slaves are mapped in a continuous data area in the DP master.
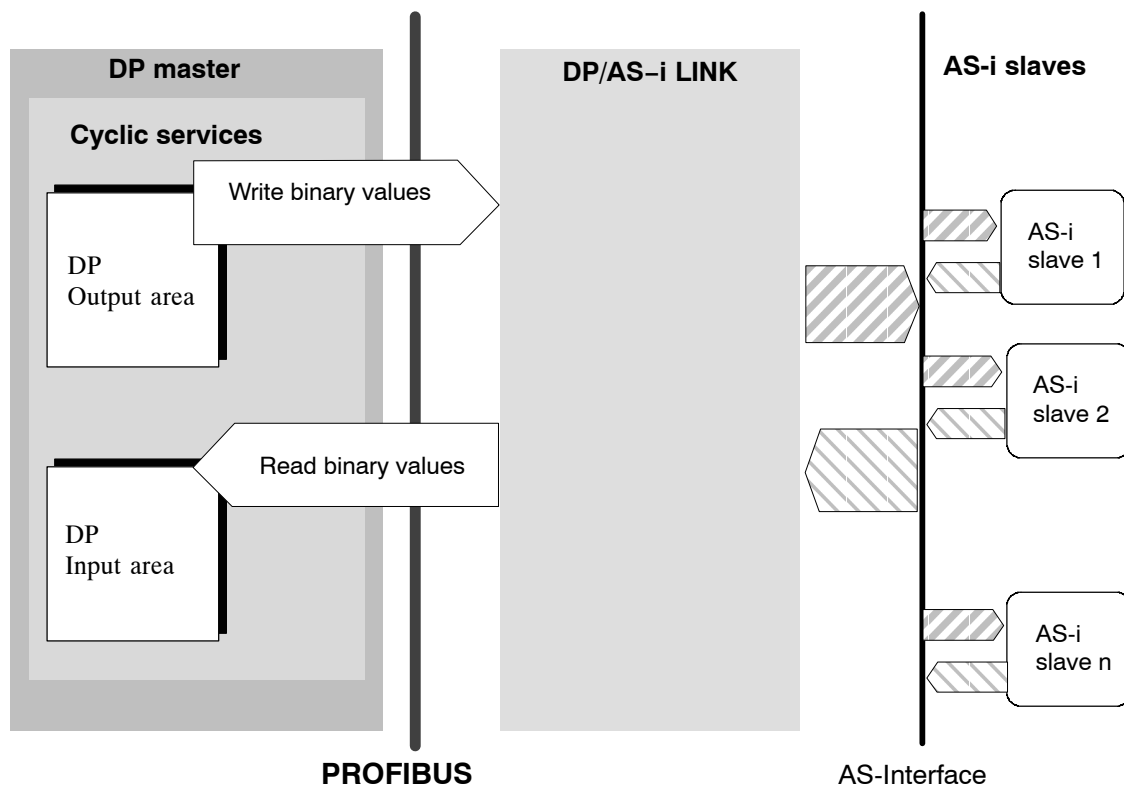
Figure 7-1

From the point of view of the PROFIBUS DP master, the DP/AS-i LINK occupies

- a maximum of 32 input bytes and a maximum of 32 output bytes per line

Addressing these bytes within the DP master (in the user program etc.) depends on the PROFIBUS DP master being used.

You will find examples of this below. For more detailed information, refer to /3/ and the manuals for your PROFIBUS DP master.

7.2.1 Addressing AS-i Slaves

Interface to the AS-i Slaves

The DP/AS−i LINK assigns four bits (a nibble) of input data and four bits of output data to every AS-i slave on the AS-i cable. The PROFIBUS DP master can access this data cyclically.

Addressing the AS-i Input or Output Data on the DP Master

In total, the maximum of 62 AS-i slaves of a line occupy 32 bytes of input data and 32 bytes of output data. The start addresses of the input or output data depend on the configuration of the PROFIBUS DP master.

The assignment of the I/O bits in terms of slave addresses also depends on the configuration.

The following sorting options are possible:

* CLASSIC

* LINEAR

* Packed

7.2.2 Addressing Table CLASSIC (default setting)

The CLASSIC sorting is used:

* always when configuring using a GSD file

* if no AS-i slaves were configured with STEP 7.

Byte Number *)	Bits 7−4	Bit 3−0
m+0	Status Nibble **)	Slave 1 or 1A Bit 3 | Bit 2 | Bit 1 | Bit 0
m+1	Slave 2 or 2A	Slave 3 or 3A
m+2	Slave 4 or 4A	Slave 5 or 5A
m+3	Slave 6 or 6A	Slave 7 or 7A
m+4	Slave 8 or 8A	Slave 9 or 9A
m+5	Slave 10 or 10A	Slave 11 or 11A
m+6	Slave 12 or 12A	Slave 13 or 13A
m+7	Slave 14 or 14A	Slave 15 or 15A
m+8	Slave 16 or 16A	Slave 17 or 17A
m+9	Slave 18 or 18A	Slave 19 or 19A
m+10	Slave 20 or 20A	Slave 21 or 21A
m+11	Slave 22 or 22A	Slave 23 or 23A
m+12	Slave 24 or 24A	Slave 25 or 25A
m+13	Slave 26 or 26A	Slave 27 or 27A
m+14	Slave 28 or 28A	Slave 29 or 29A

Byte Number *)	Bits 7−4	Bit 3−0
m+15	Slave 30 or 30A	Slave 31 or 31A
m+16	reserved	Slave 1B
m+17	Slave 2B	Slave 3B
m+18	Slave 4B	Slave 5B
m+19	Slave 6B	Slave 7B
m+20	Slave 8B	Slave 9B
m+21	Slave 10B	Slave 11B
m+22	Slave 12B	Slave 13B
m+23	Slave 14B	Slave 15B
m+24	Slave 16B	Slave 17B
m+25	Slave 18B	Slave 19B
m+26	Slave 20B	Slave 21B
m+27	Slave 22B	Slave 23B
m+28	Slave 24B	Slave 25B
m+29	Slave 26B	Slave 27B
m+30	Slave 28B	Slave 29B
m+31	Slave 30B Bit 3 | Bit 2 | Bit 1 | Bit 0	Slave 31B Bit 3 | Bit 2 | Bit 1 | Bit 0

*)
m = start address of the input or output data on the DP master

**)
Bits 4−7 in the first byte of the **input** data are known as the status nibble; they are reserved for the command interface of the DP/AS-i LINK (see Section 8.1).
Bits 4−7 in the first byte of the **output** data have no further significance and are also reserved.

Masking I/O Addresses

I/O addresses that are not used in the lower part of the table can be masked during DP configuration (for example in the STEP 7 configuration using the "Reserved Length" parameter (see Section 6.2).

Example (classic sorting):

You are not using any B slaves as AS-i slaves with binary inputs and the highest address of a standard slave is 20; this means that you can set the "Reserved Length" of the input data to 11.

If you use a GSD configuration, you can use the "Binary Array 16" binary module.

Example of a Configuration

Figure 2-2 shows an example of the PROFIBUS DP master addressing four AS-i slaves. In the DP master, the start addresses m = 0 are used for the I/O data.

The bits of existing AS-i slaves relevant for the user program are shown on a gray background. The bits shown on a white background are irrelevant for the user program since no AS-i slaves are assigned here.
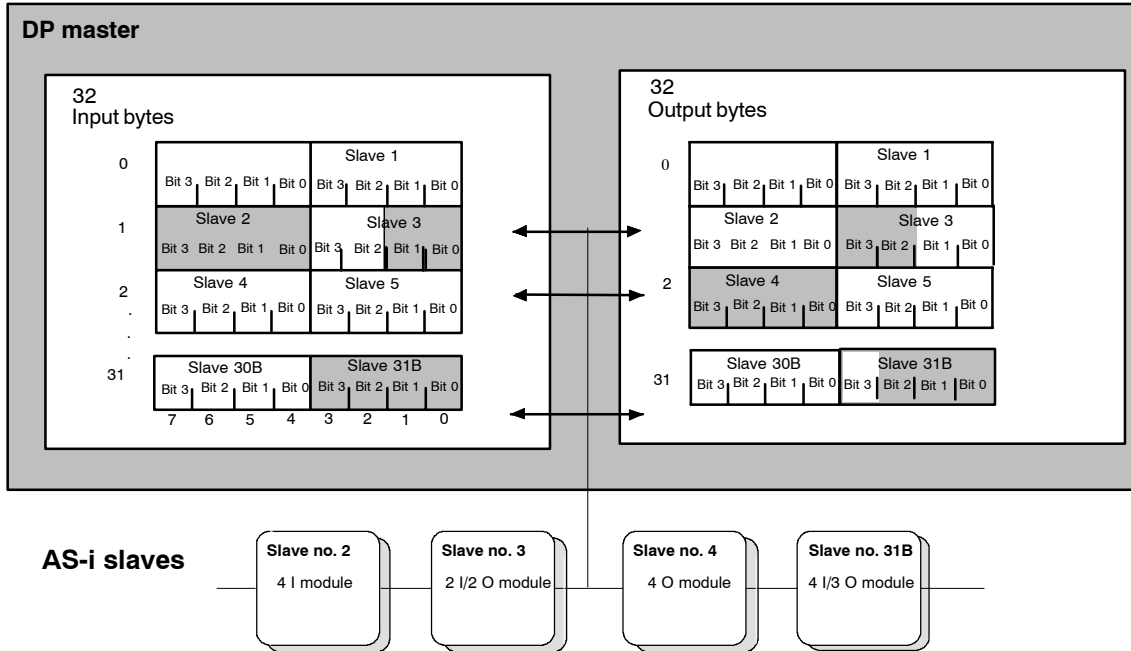
Figure 7-2

In the figure above, for example, the 2I/2O module (AS-i slave number 3 with two inputs and two outputs) occupies bits 0 and 1 in input byte 1 and bits 2 and 3 in output byte 1.

The assignment of the AS-i terminals of the AS-i bus modules to the data bits of the input/output bytes is shown below based on the example of slave number 3:
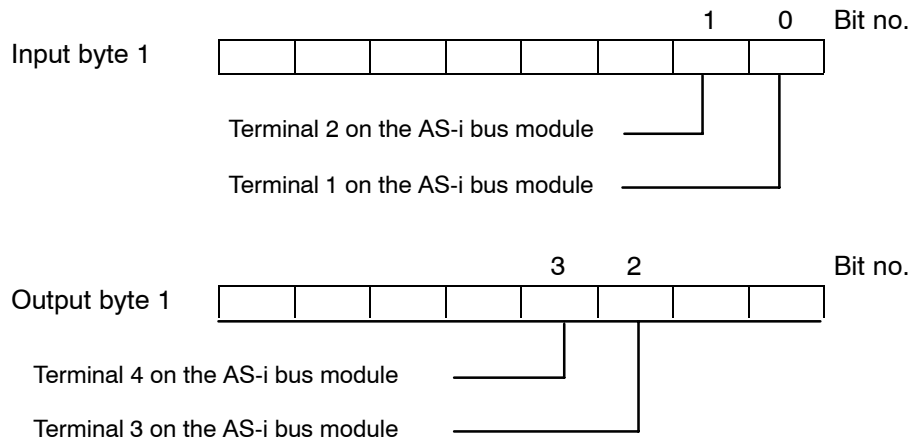
7.2.3   Addressing Table LINEAR

Byte Number *)	Bits 7−4	Bit 3−0
m+0	Status Nibble **)	reserved Bit 3 | Bit 2 | Bit 1 | Bit 0
m+1	Slave 1B	Slave 1 or 1A
m+2	Slave 2B	Slave 2 or 2A
m+3	Slave 3B	Slave 3 or 3A
m+4	Slave 4B	Slave 4 or 4A
m+5	Slave 5B	Slave 5 or 5A
m+6	Slave 6B	Slave 6 or 6A
m+7	Slave 7B	Slave 7 or 7A
m+8	Slave 8B	Slave 8 or 8A
m+9	Slave 9B	Slave 9 or 9A
m+10	Slave 10B	Slave 10 or 10A
m+11	Slave 11B	Slave 11 or 11A
m+12	Slave 12B	Slave 12 or 12A
m+13	Slave 13B	Slave 13 or 13A
m+14	Slave 14B	Slave 14 or 14A
m+15	Slave 15B	Slave 15 or 15A
m+16	Slave 16B	Slave 16 or 16A
m+17	Slave 17B	Slave 17 or 17A
m+18	Slave 18B	Slave 18 or 18A
m+19	Slave 19B	Slave 19 or 19A
m+20	Slave 20B	Slave 20 or 20A
m+21	Slave 21B	Slave 21 or 21A
m+22	Slave 22B	Slave 22 or 22A
m+23	Slave 23B	Slave 23 or 23A
m+24	Slave 24B	Slave 24 or 24A
m+25	Slave 25B	Slave 25 or 25A
m+26	Slave 26B	Slave 26 or 26A
m+27	Slave 27B	Slave 27 or 27A
m+28	Slave 28B	Slave 28 or 28A
m+29	Slave 29B	Slave 29 or 29A
m+30	Slave 30B	Slave 30 or 30A
m+31	Slave 31B Bit 3 | Bit 2 | Bit 1 | Bit 0	Slave 31 or 31A Bit 3 | Bit 2 | Bit 1 | Bit 0

*)
m = start address of the input or output data on the DP master

**)
Bits 4−7 in the first byte of the **input** data are known as the status nibble; they are reserved for the command interface of the DP/AS-i LINK (see Section 8.1).
Bits 4−7 in the first byte of the **output** data have no further significance and are also reserved.

7.2.4   Addressing Table Packed

Using the "Pack" function in the properties dialog of the AS-i line, the address utilization is optimized, in other words, all gaps are eliminated (see Section 6.2).

You can take the addresses directly from the project engineering data.

7.2.5   Special Feature of AS-i Analog Slaves

If you use slaves complying with CTT 1−5, all or some I/O bits may be used for special transfer functions.

The following applies to these protocol bits:

- In the input direction, the DP/AS−i LINK sets the value "0".

- In the output direction, the DP/AS−i LINK ignores the bits.

How to access AS-i analog slaves is described in Section 7.3.

7.2.6   Points to Note About AS-i Safety Slaves

The DP/AS−i LINK sets the input bits

- 0 and 1 = 0 if the contact at F−IN1 is open;

- 0 and 1 = 1 if the contact at F−IN1 is closed;

- 2 and 3 = 0 if the contact at F−IN2 is open;

- 2 and 3 = 1 if the contact at F−IN2 is closed;

7.2.7   Accessing AS-i Binary Data

The DP Master is the Decisive Factor

The way in which you access binary data of the AS-i slaves depends on the DP master you are using. Please refer to the relevant user documentation.

A SIMATIC S7 is the DP master

If you have configured the I/O addresses of the DP/AS-i LINK in the area of the process image, you can access the AS-i bit values using single bit commands.

Example (compare Figure 7-2):

```
A I 1.0          //Connector 1 on AS-i module 3
= Q 1.3          //Connector 4 on AS-i module 3
```

7.3 Transferring AS-i Analog Values

Meaning

This section explains how you can access analog values of attached AS-i slaves in the user program of the DP master.

Notice

The following listings apply only to AS-i slaves that handle analog value transfer according to the AS-i slave profile 7.3, 7.4, 7.5.5, 7.A.5, B.A.5, 7.A.A, 7.A.8, 7.A.9 or 6.0 (Combined Transaction Types CTT 1−5 according to AS-i Specification V3.0).

Analog value transfer according to AS-i slave profile 7.1/7.2 is not supported by the DP/AS-i LINK. In this case, the analog transfer must be implemented by the user program.

Analog Interface between the DP Master and DP/AS-i LINK
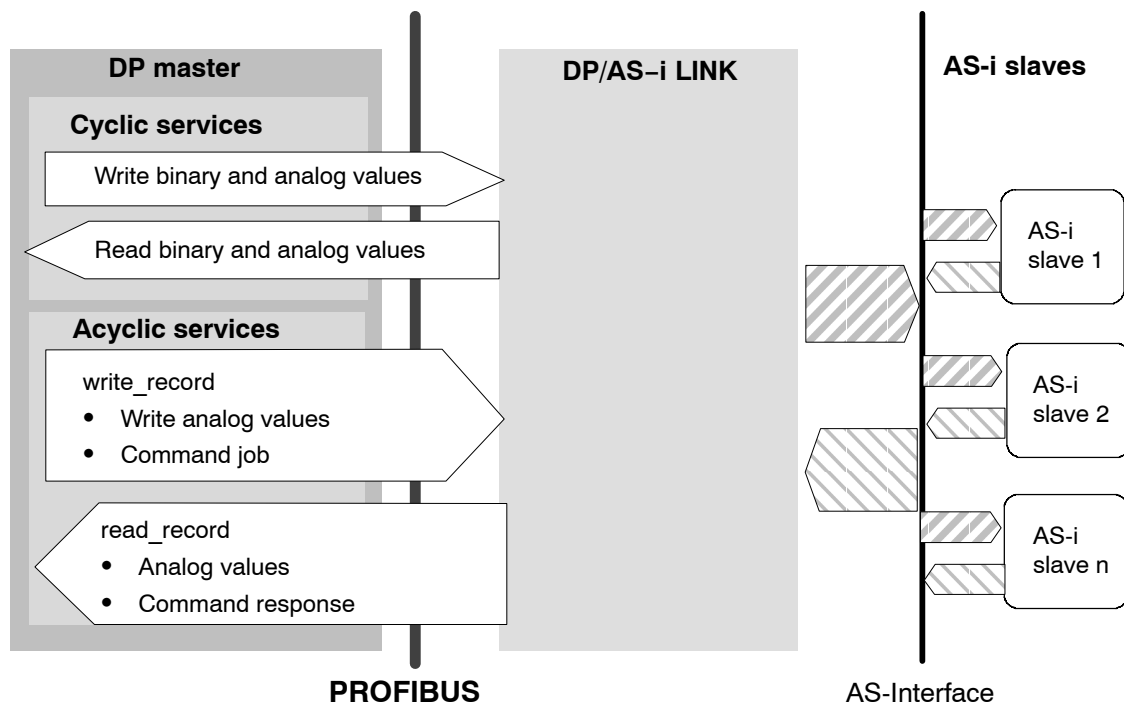
7.3.1   Accessing AS-i Analog Data using I/O Addresses

The DP Master is the Decisive Factor

The way in which you access analog data of the AS-i slaves depends on the DP master you are using. Please refer to the relevant user documentation.

A SIMATIC S7 is the DP master

If you have assigned I/O addresses to the analog slaves in the project engineering, you can access the AS-i analog values with word commands.

Example:
The I/O address 288 is assigned to channel 1 of an analog output slave

```
L 5000        //Load value
T PQW288      //Transfer value to analog output
```

7.3.2   Accessing AS-i Analog Data using Acyclic Services

DP Master with Acyclic Services

The acyclic services complying with the DP standard DP-V1 for PROFIBUS-DP allow special jobs for sending output data to the DP slaves or for receiving input data from the DP slaves as an alternative to cyclic data transfer.

Access to analog data using acyclic services is supported to ensure program compatibility with the DP/AS-i Link 20E and because it is not possible to insert all technically possible slaves.

Access to analog data using acyclic services can also be selected, for example to save I/O address space on the SIMATIC S7.

Notice

Simultaneous access to analog data of a slave using both cyclic and acyclic services is not permitted.

The acyclic services are used for the following with the DP/AS-i LINK:

• Reading/writing analog values

• Command interface (see Section 8)

Calls

Table 7-1

Call	With SIMATIC S7	With the DP programming interface
read_record	SFC 59	dpc*_read
write_record	SFC 58	dpc*_write

Call Parameters

Certain parameters must have values assigned to specify the job. The names of these parameters and the type of parameter setting can vary depending on the type of the DP master.

The following table provides you with an overview of the parameters according to the DP-V1 specification and shows examples of how they are mapped in the parameter assignment of a user program for a SIMATIC S7 CPU and a user program for a PC/programming device in which the SIMATIC NET programming interface is used.

Table 7-2   Parameters for Sending/Receiving

DP-V1	SIMATIC S7 (SFC 58/59)	for PC: DP programming interface (dpc*_read/write)	Meaning
PROFIBUS address	LADDR (the start address of the cyclic input bytes of the DP/AS-i LINK must be specified. The S7 CPU calculates the PROFIBUS address from this information.)	C_Ref	PROFIBUS address of the DP/AS-i Link (DP slave)
	IOID Here, the following fixed value must be entered: B#16#54	–	Fixed value
Slot_number	Is calculated from LADDR; Not an SFC parameter	Slot_number	With DP/AS-i Link: Any value
Index	RECNUM	Index	The DP/AS-i LINK supports the following data record numbers: • 1 Diagnostic data record (reading) • 2 Command interface • 140−147 (analog access)
Length	RECORD Referenced using ANY pointer	Length_s	Length of the input/output data area
Data	RECORD Referenced using ANY pointer	Data_s	Address of the input/output data area
	RET_VAL BUSY		Return parameter for execution check

You will find sample programs for SIMATIC S7 in Section 7.3.4

Job Parameters

Make the parameter settings for the read_record and write_record jobs as described in Section 7.3.1. Access to the analog values is controlled by the following parameters:

- Index:
  Specifies the data record number in which the analog values are stored on the DP/AS-i LINK. How the available data record numbers 140 to 147 are used is explained below.

- Length:
  Specifies the length of the input/output data area; the specified length must be adapted to the data record being used and the address area of the analog slaves. This is explained in greater detail and with examples below.

- Data:
  Specifies the address of the input/output data area in which your user program accesses the analog values or makes the analog values available.

You will find sample calls at the end of this chapter.

Data Consistency

The analog value sent by or to the DP master is always consistent.

Mapping the Analog Values in the Data Records

To access analog values, you can select one of the data records 140 to 147. The data records differ from each other in their length. This allows you to optimize the data area to be reserved in your application if you are using less AS-i analog slaves than the maximum number supported by the interface.

An 8-byte area is used for each slave address to manage 4 analog channels.

Remember that slave address 31 is not used in data record 140.

Table 7-3 below shows which address area in the selectable data records the analog values of which AS-i slave are transferred to. How the analog values of an analog slave are mapped in the address areas is shown in Table 7-4.

The table can be used equally for the analog **input** area and the analog **outpu**t area.

Following the tables, you will find notes explaining how to read the tables.

Table 7-3   Accessing Analog Values using Data Records

AS-i slave address	Start addresses for analog values in the data record							
	DS 140	**DS 141**	**DS 142**	**DS 143**	**DS 144**	**DS 145**	**DS 146**	**DS 147**
1	0							
2	8							
3	16							
4	24							
5	32	0						
6	40	8						
7	48	16						
8	56	24						
9	64	32	0					
10	72	40	8					
11	80	48	16					
12	88	56	24					
13	96	64	32	0				
14	104	72	40	8				
15	112	80	48	16				
16	120	88	56	24				
17	128	96	64	32	0			
18	136	104	72	40	8			
19	144	112	80	48	16			
20	152	120	88	56	24			
21	160	128	96	64	32	0		
22	168	136	104	72	40	8		
23	176	144	112	80	48	16		
24	184	152	120	88	56	24		
25	192	160	128	96	64	32	0	
26	200	168	136	104	72	40	8	
27	208	176	144	112	80	48	16	
28	216	184	152	120	88	56	24	
29	224	192	160	128	96	64	32	0
30	232	200	168	136	104	72	40	8
31		208	176	144	112	80	48	16

Table 7-4   Address Area   for the Analog Values of an AS-i Slave

Byte no. (start address + offset)	Analog value channel
Start address + 0	Channel 1 / high byte
Start address + 1	Channel 1 / low byte
Start address + 2	Channel 2 / high byte
Start address + 3	Channel 2 / low byte
Start address + 4	Channel 3 / high byte
Start address + 5	Channel 3 / low byte
Start address + 6	Channel 4 / high byte
Start address + 7	Channel 4 / low byte

A/B analog slaves occupy only half an address and therefore have a maximum of 2 channels.
The A slaves, in this case, occupy bytes 0–3 and the B slaves bytes 4–7.

Examples / notes on Table 7-3:

1. Configuration: analog slaves have AS-i addresses 1–6

   You use data record 140 and specify 48 as the data record length.

2. Configuration: 1 analog slave with AS-i address 7 is used

   You use data record 141 and specify 24 as the data record length.

3. Configuration: the entire address area for 31 analog slaves is used

   You use data record 140 and specify 224 as the data record length. This covers analog slaves 1–28.

   For the other analog slaves 29–31, you use data record 147 in a second job and specify 24 as the data record length.

4. Configuration: analog slaves are located in the address area 29–31

   You use data record 147 and specify 24 as the data record length.

Mixed Access

5. Configuration: You want to access slaves 1–12 with I/O commands and slaves 13–31 using a data record.

   You use data record 143 for slaves 13–31.

7.3.3   Special Features in Analog Value Transfer

Representation of the Analog Values or Transparent Values

The analog values are interpreted as 16-bit values in two's compliment.

The transparent values are interpreted as two independent bytes.

For further information regarding the range of values, the measurement range and the accuracy please refer to the relevant documentation of the analog slaves.

- The following applies in the input direction:

  - Slaves according to the following profiles return $0x7FFF_H$ as substitute value:
    7.3.4 to 7.3.7
    7.3.B to 7.3.F
    7.4.1 to 7.4.F
    7.A.9
    7.A.8 (ID1 = 6)
    7.A.8 (ID1 = 7)
    7.A.5 and 7.5.5 and B.A.5

  - Slaves according to the following profiles return $0x0000_H$ as substitute value:
    7.3.0 to 7.3.3
    7.3.8 to 7.3.A
    7.A.A
    7.A.8 (ID1 = 3,4,5)
    7.A.5 and 7.5.5 and B.A.5

  - With all other slaves, the assigned analog values are $0x7FFF_H$

- In the output direction:
  If there is a failure or in the "Clear" status of the DP master (corresponds to STOP mode of a PLC), the DP/AS−i LINK sends logic "0" to all slaves.

7.3.4 Programming Examples

Example of Programming for a SIMATIC S7

An analog input value of AS-i analog slave 6 is transferred as an analog output value to AS-i analog slave 9:

Table 7-5

STL	Explanation
`L       DB40.DBW    10`	//Slave 6, input channel 2
`T       DB40.DBW    32`	//Slave 9, output channel 1
`CALL    SFC   59`	//RD_REC
`REQ     :=TRUE`	
`IOID    :=B#16#54`	//Fixed value
`LADDR   :=W#16#120`	//Start of cyclic input data
`RECNUM  :=B#16#8D`	//DS141 (slave 5 and following)
`RET_VAL :=MW130`	//Return parameter
`BUSY    :=M129.0`	//Return parameter
`RECORD  :=P#DB40.DBX 0.0 BYTE 32`	//Receive buffer (slaves 5...8)
`CALL    SFC   58`	//WR_REC
`REQ     :=TRUE`	
`IOID    :=B#16#54`	//Fixed value
`LADDR   :=W#16#120`	//Start of cyclic input data
`RECNUM  :=B#16#8E`	//DS142 (slave 9 and following)
`RECORD  :=P#DB40.DBX 32.0 BYTE 32`	//Send buffer (slaves 9...12)
`RET_VAL :=MW132`	//Return parameter
`BUSY    :=M129.1`	//Return parameter

Note

In SIMATIC S7, the number of simultaneously active read_record and write_record jobs is restricted. The maximum number of jobs depends on the S7 CPU.

If more jobs are triggered, these are terminated with the error 80C3h (temporary lack of resources). The rejected job must then be repeated.

7.4　　PROFIBUS DP Control Commands

The DP/AS-i LINK supports all the control commands defined in the PROFIBUS DP standard:

Table 7-6

Control command	Effect
FREEZE	The values of the binary input data of the AS-i slaves are frozen by the DP/AS-i LINK. The DP/AS-i LINK updates this data once with each further FREEZE.
UNFREEZE	The FREEZE command is canceled.
SYNC	The values of the binary output data are frozen by the DP/AS-i LINK. The DP/AS-i LINK updates this data once with each further SYNC.
UNSYNC	The SYNC command is canceled.
CLEAR	The values of the binary output data passed on by the DP/AS-i LINK to the AS-i slaves are set to '0' by the DP/AS--i LINK.

❑

8 Using the Command Interface

This chapter...

Via the command interface, you can control the response of the AS-i master completely from within your user program.

This chapter contains the information you require to access the command interface of the DP/AS-Interface LINK from your DP master.

Apart from a detailed description of the commands, the two interface variants are explained in detail as follows:

- The command interface of the DP/AS-Interface LINK

- The command interface with SIMATIC S7

8.1   Command Interface of the DP/AS-Interface LINK

Note

A special function block (FC ASI_3422) is available for the AS-i commands in a SIMATIC S7 DP master. This FC handles the command protocol described below independently (see Section 8.2).

You will find FC ASI_3422 in the programming example on the supplied CD.

Significance and Functionality

Via the command interface, you can control the response of the AS-i master completely from within your user program.

AS-i commands are read and written using the acyclic services of PROFIBUS-DP V1. In the user program on the DP master, you use the services read_record and write_record (data record 2).
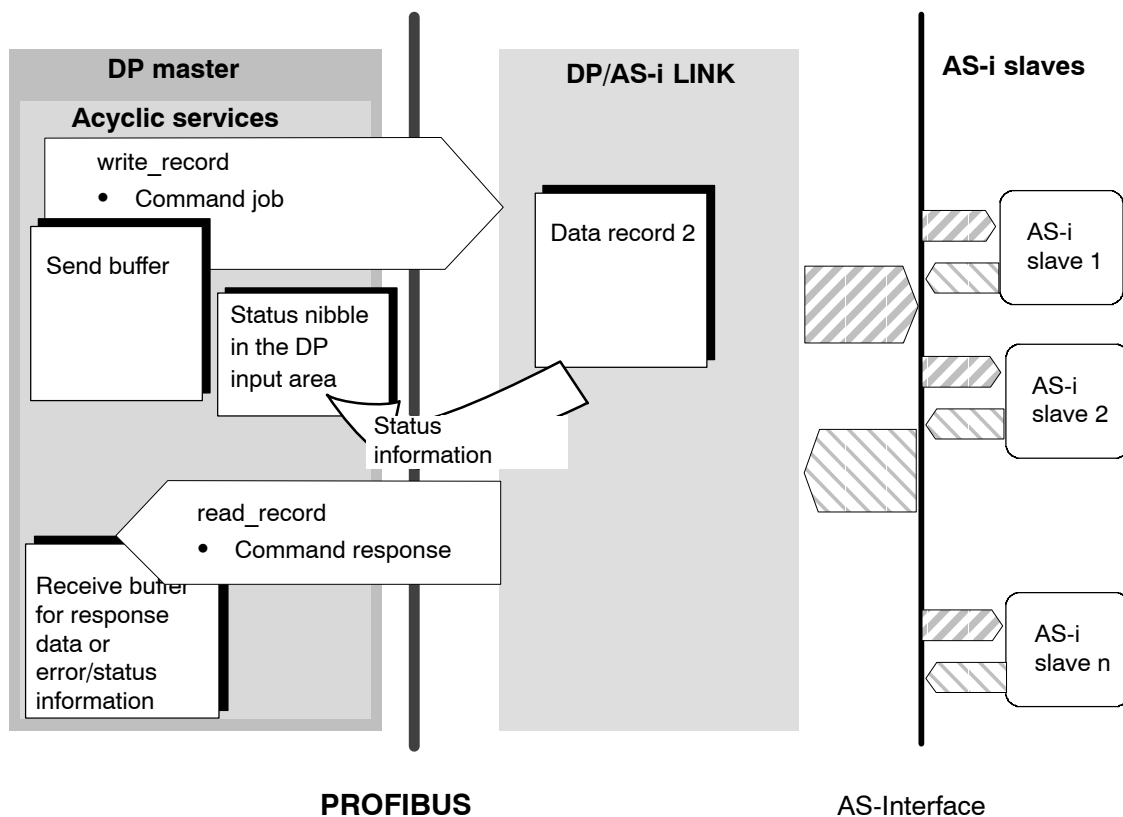
Figure 8-1

Job Parameters

Make the parameter settings for the read_record and write_record jobs as described in Section 7.3.1. Sending the commands is controlled by the following parameters:

- Index:
  Specifies the data record number = 2

- Length:

  - The length of the data sent (with write_record) depends on the command;

  - The length of the data received (with read_record) is indicated by the DP/AS–i LINK using the status nibble.

Commands in the User Program

To work with commands, include the following in your user program:

1. Specify the command call in a send buffer in the user program.

2. Send this job with write_record (record 2) to the DP/AS–i LINK.

3. Following this, query the status of command processing in the input area for binary values (cyclic services – see Section 7.2). The status information is entered in bits 4 to 7 in the reserved first byte of the DP input area (status nibble).

4. Various reactions are possible depending on the result of the status evaluation as shown in the following flowchart (for more detailed information on the meaning of the status nibble, please refer to Table 8-1).

   To complete command processing, you must always sent a read_record job (data record 2) either to obtain further status information or to receive response data.
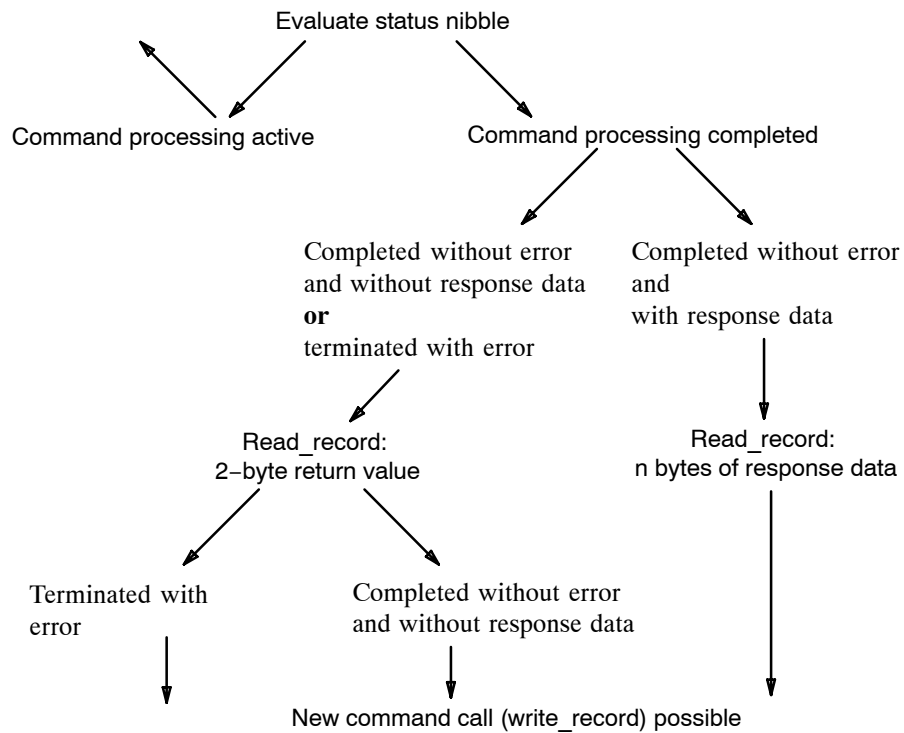
Figure 8-2

Table 8-1   Coding of the Status Nibble

Status nibble (1st byte of the digital input data)				Meaning
Bit 7	Bit 6	Bit 5	Bit 4	
1	0	0	0	Startup ID 1: Following a startup/restart of the AS-i master, the status nibble changes between the values 1000 $_B$ and 1110 $_B$. It is possible to trigger a command with the user program
1	1	1	0	Startup ID 2: Following a startup/restart of the AS-i master, the status nibble changes between the values 1000 $_B$ and 1110 $_B$. It is possible to trigger a command with the user program
1	1	0	0	Reserved for SIMATIC S7 application FC "ASI_3422" It is possible to trigger a command with the user program
0	0	1	0	Command processing active It is not possible to trigger a command with the user program

Table 8-1   Coding of the Status Nibble, continued

Status nibble (1st byte of the digital input data)				Meaning
0	0	0	1	Command processing is completed. With an asynchronous read job, a **2-byte** return value can be fetched by the AS-i master. Two situations must be distinguished: The return value is 0: A command without response data was completed without error The return value is a value **not equal to 0**: The command was terminated **with error**.(See Table 8-3) A new command can be triggered by the user program
0	0	1	1	Command processing was completed without error. Using an asynchronous read job, **1 byte** of response data can be fetched by the AS-i master. A new command can be triggered by the user program
0	1	0	1	Command processing was completed without error. Using an asynchronous read job, **4 bytes** of response data can be fetched by the AS-i master. A new command can be triggered by the user program
0	1	1	1	Command processing was completed without error. Using an asynchronous read job, **14 bytes** of response data can be fetched by the AS-i master. A new command can be triggered by the user program
1	0	0	1	Command processing was completed without error. Using an asynchronous read job, **16 bytes** of response data can be fetched by the AS-i master. A new command can be triggered by the user program
1	0	1	1	Command processing was completed without error. Using an asynchronous read job, **32 bytes** of response data can be fetched by the AS-i master. A new command can be triggered by the user program
1	1	0	1	Command processing was completed without error. Using an asynchronous read job, **56 bytes** of response data can be fetched by the AS-i master. A new command can be triggered by the user program
1	1	1	1	Command processing was completed without error. Using an asynchronous read job, **221 bytes** of response data can be fetched by the AS-i master. A new command can be triggered by the user program
0	1	0	0	Job processing is completed. The response data or the return value of the previous job have already been read by the user. A new command can be triggered by the user program

Example

Based on the following table, you can see how the display in the status nibble changes due to the device state and the command processing in the user program.

Table 8-2

Action	Reaction in the Status Nibble
1. AS-i power supply switched on for the DP/AS−i LINK.	1110_B....1000_B.....1110_B....
2. The user program transfers a command (for example write_parameter) with an asynchronous write job to the DP/AS−i LINK.	0010_B (briefly, depending on the command)
3. The AS-i master completes the command. The return value can be read by the user program.	0001_B
4. The user program reads a 2-byte return value using an asynchronous read job.	0100_B
5. ....further program execution ...	....
6. The user program transfers a command (for example, Get_LPS, Get_LAS, Get_LDS, Get_Flags) with an asynchronous write access to the DP/AS−i LINK.	0010_B (briefly, depending on the command)
7. The AS-i master completes the command without error. The response data can be read by the user program	1011_B
8. The user program reads 32 bytes of response data with an asynchronous read job.	0100_B

Return Value

Error free processing is encoded in the return value of the response buffer. There is an error when value in the status nibble is "completed without error and without response data or terminated with error" (Coding: 0001_H).

Table 8-3   Return Value in the Response Buffer

STATUS	Meaning
0000_H	**Job completed without error**
8381_H	The AS-i slave address is incorrect
8382_H	The AS-i slave is not activated (not in LAS).
8383_H	Error on AS-Interface.
8384_H	Command not permitted in the current status of the AS-i master.
8385_H	An AS-i slave with address 0 exists.
8386_H	The AS-i slave has illegal configuration data (I/O or ID codes).
$83A1_H$	The addressed AS-i slave was not found on the AS-Interface.
$83A2_H$	An AS-i slave with address 0 exists.

Table 8-3   Return Value in the Response Buffer, continued

STATUS	Meaning
83A3$_H$	An AS-i slave with the new address already exists on the AS-Interface.
83A4$_H$	The AS-i slave address cannot be deleted.
83A5$_H$	The AS-i slave address cannot be set.
83A6$_H$	The AS-i slave address cannot be stored permanently.
83A7$_H$	Error reading the extended ID1 code.
83A8$_H$	The target address is not plausible (for example a B slave address was used for a standard slave).
83B1$_H$	A length error has occurred transferring a string.
83B2$_H$	A protocol error has occurred transferring a string.
83F8$_H$	The job number or the job parameter is unknown.
83F9$_H$	The AS-i master has detected an EEPROM error.

Note

Errors that occur during processing of the acyclic services and that are indicated by call parameters such as "Return Value" can be found in the documentation of the relevant programming interface.

8.2   Command Interface for SIMATIC S7

Meaning

In SIMATIC S7, a convenient command interface is available with FC ASI_3422.

By calling FC ASI_3422, you can handle both the transfer of the command and the acceptance of the response data. After it has been called, FC ASI_3422 instigates and handles the write_record and read_record calls independently.

Call Interface

```
                            ASI_3422

      BOOL  ──────  ACT        DONE  ──────  BOOL
      BOOL  ──────  STARTUP    ERROR ──────  BOOL
      WORD  ──────  LADDR
      ANY   ──────  SEND
      ANY   ──────  RECV
      DWORD ──────      STATUS       ──────  DWORD
```
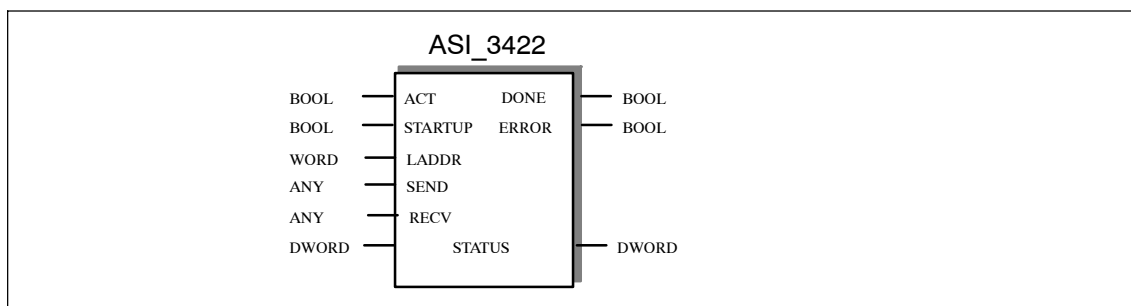
Table 8-4   Formal Parameters

Name	Para Type	Type	Memory Area	Remarks
ACT	I	BOOL	I,Q,M,D,L,constant	As long as ACT = 1, command processing is started provided no other call is being processed.
STARTUP	I	BOOL	I,Q,M,D,L,constant	A CPU startup is indicated to the FC by STARTUP = 1. After the function is run through the first time, STARTUP must be reset by the user.
LADDR	I	WORD	I,Q,M,D,L,constant	Start address of the DP/AS−i LINK in the S7 address area. The module start address is specified during STEP 7 configuration.
SEND	I	ANY	I,Q,M,D,L	Send buffer The parameter references a memory area in which the command must be specified by the user. for example: P#DB20.DBX 20.0 byte 10

Table 8-4   Formal Parameters, continued

Name	Para Type	Type	Memory Area	Remarks
RECV	I	ANY	I,Q,M,D,L	Receive buffer
				This buffer is only relevant for commands that supply response data. The parameter references a memory area in which the command response is stored. The length information in the ANY pointer specified here is irrelevant. The FC itself obtains the length of the response data.
				for example: P#DB30.DBX 20.0 byte 1
DONE	Q	BOOL	Q,M,D,L	DONE = 1 signals 'job completed without error'.
ERROR	Q	BOOL	Q,M,D,L	ERROR = 1 signals 'job terminated with error'.
STATUS	I/Q	DWORD	M,D	1st word: Job status / error code (see Table 8-5);
				For 'job terminated with error', an error code is generated that describes the error in greater detail.
				2nd word: Required by the FC for internal purposes and must **not** be modified.
				Note:
				For FC calls to different AS-i lines, different double words must be used for the STATUS parameter.
				For FC calls to the same AS-i line, the same double word must always be used for the STATUS parameter.

Commands in the User Program

To work with commands, include the following in your user program:

1. In the warm restart branch of your S7 user program, call FC ASI_3422 once with the parameter value STARTUP = TRUE.

2. Specify the command call in a send buffer in the user program. You transfer this send buffer with the SEND call parameter.

3. Depending on the command type you will also require a response buffer. You transfer this response buffer with the RECV call parameter. The response buffer is **not** required for status information on this FC interface.

4. Activate the job with the parameter ACT=1

5. You then query the parameters DONE, ERROR and STATUS. For handling these parameters in the user program, note the signal sequence of the parameters explained below.

Points to Note

- Programs written for the DP/AS-i Link 20e, can continue to be used if the configured logical addresses are adapted.

- If you use the FC interface FC ASI_3422 for command processing, you must not send other commands via the read_record and write_record with data record number 2 at the same time.

- You must use version 2.0 or higher of the FC ASI_3422

- FC ASI_3422 is not reentrant! FC calls must not be programmed in priority classes that can interrupt each other (for example by a call in OB1 **and** in OB35).

- In SIMATIC S7, the number of simultaneously active read_record and write_record jobs is restricted. The maximum number of jobs depends on the S7 CPU.

  If more jobs are triggered, these are terminated with the error 80C3h (temporary lack of resources). The rejected job must then be repeated.

Signal Sequence of the Formal Parameters ACT, DONE, ERROR and STATUS

A command call is started by ACT = 1. During the processing of the job, the first word of STATUS has the value 8181_H. This indicates that a job is being processed. On completion of the job, the user is informed of the result in the DONE or ERROR parameters.

If no error occurred, DONE is set. In jobs involving response data from the DP/AS−i LINK, these are available in the receive buffer specified for RECV. In this case, 0000_H is entered in the first word of STATUS.

If an error occurred, ERROR is set. In this case, no receive data are available from the DP/AS−i LINK for jobs with response data. To identify the error in greater detail, an error code is entered in the first word of STATUS.

The DONE, ERROR and STATUS parameters remain unchanged until the next job is processed.
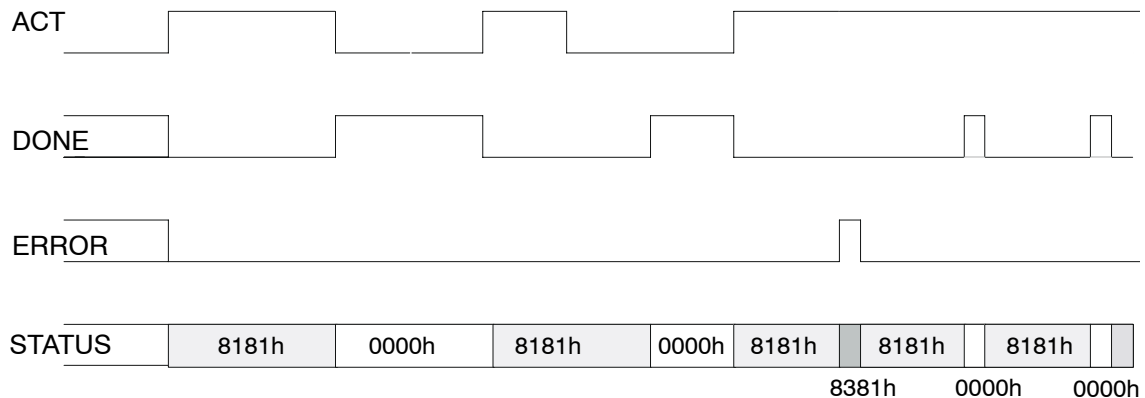
Figure 8-3

Table 8-5   Error Coding

DONE	ERROR	STATUS	Meaning
1	0	0000_H	**Job completed without error**
0	1	8090_H	Address in LADDR invalid
0	1	8092_H	In the ANY reference, a type other than BYTE is specified.
0	1	8093_H	This SFC is not permitted for the module selected with LADDR and IOID. (S7-300 modules are permitted for S7-300, S7-400 modules for S7-400, S7-DP modules for S7-300 and S7-400.)
0	1	$80A0_H$	Negative acknowledgment when reading from AS-i master.
0	1	$80A1_H$	Negative acknowledgment when writing to AS-i master
0	1	$80A2_H$	DP protocol error at Layer 2
0	1	$80A3_H$	DP protocol error involving user interface/user
0	1	$80A4_H$	Communication problems on K bus
0	1	$80B0_H$	AS-i master does not recognize the data record

Table 8-5   Error Coding, continued

DONE	ERROR	STATUS	Meaning
0	1	80B1$_H$	Specified data record length incorrect.
0	1	80B2$_H$	The configured slot is not in use.
0	1	80B3$_H$	Actual module type does not match the expected module type in SDB1
0	1	80C0$_H$	Data record cannot be read.
0	1	80C1$_H$	The specified data record is currently being processed
0	1	80C2$_H$	There are too many jobs pending
0	1	80C3$_H$	Resources occupied (memory)
0	1	80C4$_H$	Communication error
0	1	80C5$_H$	Distributed I/Os not available
0	1	80C6$_H$	Data record transfer aborted due to priority class abort (warm restart or background) of the distributed I/Os.
0	0	8181$_H$	**Job active (no error)**
0	1	8182$_H$	ID following warm restart (STARTUP=TRUE)
0	1	8184$_H$	Data type of the RECV formal parameter illegal
0	1	8381$_H$	The AS-i slave address is incorrect
0	1	8382$_H$	The AS-i slave is not activated (not in LAS).
0	1	8383$_H$	Error on the AS-Interface
0	1	8384$_H$	Command not permitted in the current status of the AS-i master.
0	1	8385$_H$	An AS-i slave with address 0 exists.
		8386$_H$	The AS-i slave has illegal configuration data (I/O or ID codes).
0	1	83A1$_H$	The addressed AS-i slave was not found on the AS-Interface.
0	1	83A2$_H$	An AS-i slave with address 0 exists.
0	1	83A3$_H$	An AS-i slave with the new address already exists on the AS-Interface.
0	1	83A4$_H$	The AS-i slave address cannot be deleted.
0	1	83A5$_H$	The AS-i slave address cannot be set.
0	1	83A6$_H$	The AS-i slave address cannot be stored permanently.
0	1	83A7$_H$	Error reading the extended ID1 code.
0	1	83A8$_H$	The target address is not plausible (for example a B slave address was used for a standard slave).
0	1	83B1$_H$	A length error has occurred transferring a string.
0	1	83B2$_H$	A protocol error has occurred transferring a string according to profile CTT 1...5.
0	1	83F8$_H$	The job number or the job parameter is unknown.

Table 8-5   Error Coding, continued

DONE	ERROR	STATUS	Meaning
0	1	83F9$_H$	The AS-i master has detected an EEPROM error.
0	1	8F22$_H$	Area length area reading a parameter
		8F23$_H$	Area length error writing a parameter
			This error code indicates that a parameter is entirely or partly outside the address area or that the length of a bit array of an ANY parameter cannot be divided by 8.
0	1	8F24$_H$	Area error reading a parameter
		8F25$_H$	Area error writing a parameter
			This error codes indicates that a parameter is located in an area that is illegal for a system function.
0	1	8F28$_H$	Alignment error reading a parameter
		8F29$_H$	Alignment error writing a parameter.
			This error code indicates that the reference to a parameter is a bit address other than 0.
0	1	8F30$_H$	The parameter is in the write-protected global DB
		8F31$_H$	The parameter is in the write-protected instance DB
			This error code indicates that a parameter is located in a write-protected data block.
0	1	8F32$_H$	Parameter contains a DB number that is too high
0	1	8F3A$_H$	The parameter contains the number of a DB that is not loaded
0	1	8F42$_H$	An access error has occurred while the system attempted to read out a parameter from the peripheral area of the inputs.
0	1	8F43$_H$	An access error occurred while the system was attempting to write a parameter to the peripheral area of the outputs
0	1	8F44$_H$	This parameter code indicates that read access to a parameter was denied
0	1	8F45$_H$	This error code indicates that write access to a parameter was denied
0	1	8F7F$_H$	Internal error

8.3   Description of the AS-i Slave Commands

Overview

This section describes the command calls that can be sent by the DP master to the DP/AS−i LINK. With these command calls, the DP/AS-i LINK provides the complete functionality of the master profile M4 of the AS-i master specification. In addition to this, the DP/AS−i LINK can be configured completely by the DP master using command calls.

For the supported commands/functions, refer to the descriptions of the individual jobs, the PICS appendix and the detailed descriptions in /1/ and /2/.

In the PICs, you can only see which commands / functions are supported. The available commands are listed in the table below:

Table 8-6   AS-i Slave Commands

Name	Parameter	Return	Coding
Set_Permanent_Parameter → described in Section 8.3.1	Slave address, parameter		00_H
Get_Permanent_Parameter → described in Section 8.3.2	Slave address	Parameter	01_H
Write_Parameter → described in Section 8.3.3	Slave address, parameter	Parameter echo	02_H
Read_Parameter → described in Section 8.3.4	Slave address	Parameter value	03_H
Store_Actual_Parameters → described in Section 8.3.5			04_H
Store_actual_configuration → described in Section 8.3.6	Slave address, configuration		25_H
Get_Extended_Permanent_Configuration → described in Section 8.3.7	Slave address	Specified configuration	26_H
Store_Actual_Configuration → described in Section 8.3.8			07_H
Read_Extended_Actual_Configuration → described in Section 8.3.9	Slave address	Actual configuration data	28_H
Set_LPS → described in Section 8.3.10	LPS		29_H
Set_Offline_Mode → described in Section 8.3.11	Mode		$0A_H$
Select_Autoprogramming → described in Section 8.3.12	Mode		$0B_H$

Table 8-6   AS-i Slave Commands, (continued)

Name	Parameter	Return	Coding
Set_operation_mode –> described in Section 8.3.13	Mode		0 C $_H$
Change_AS-i_Slave_Address –> described in Section 8.3.14	Address 1, Address 2		0 D $_H$
Get_AS-i_Slave_Status –> described in Section 8.3.15	Slave address	Error record of the AS-i slave	0 F $_H$
Get_LPS, Get_LAS, Get_LDS, Get_Flags –> described in Section 8.3.16		LDS, LAS, LPS, flags	3 0 $_H$
Get_Extended_Total_Configuration –> described in Section 8.3.17		Actual configuration, current parameters, LAS, flags	3 9 $_H$
Store_Extended_Total_Configuration –> described in Section 8.3.18	Total configuration		3 A $_H$
Write_Extended_Parameter_List –> described in Section 8.3.19	Parameter list		3 C $_H$
Read_Extended_Parameter_Echo_List –> described in Section 8.3.20		Parameter echo list	3 3 $_H$
Write_CTT2_request –> described in Section 8.3.21	Slave address CTT2 string	CTT2 string	4 4 $_H$
Read_Version_ID –> described in Section 8.3.22		Version string	1 4 $_H$
Read_AS-i_Slave_ID –> described in Section 8.3.23	Slave address	ID code	1 7 $_H$
Read_AS-i_Slave_Extended_ID1 –> described in Section 8.3.24	Slave address	Extended ID1 code	3 7 $_H$
Write_AS-i_Slave_Extended_ID1 –> described in Section 8.3.25	Extended ID1 code		3 F $_H$
Read_AS-i_Slave_Extended_ID2 –> described in Section 8.3.26	Slave address	Extended ID2 code	3 8 $_H$
Read_AS-i_Slave_I/O –> described in Section 8.3.27	Slave address	I/O configuration	1 8 $_H$
Get_LPF –> described in Section 8.3.28		LPF	3 E $_H$
Write_AS-i_Slave_Parameter_String –> described in Section 8.3.29	Slave address, parameter string		4 0 $_H$
Read_AS-i_Slave_Parameter_String –> described in Section 8.3.30	Slave address	Parameter string	4 1 $_H$
Read_AS-i_Slave_ID_String –> described in Section 8.3.31	Slave address	ID string	4 2 $_H$
Read_AS-i_Slave_Diagnostic_String –> described in Section 8.3.32	Slave address	Diagnostic string	4 3 $_H$

Table 8-6   AS-i Slave Commands, (continued)

Name	Parameter	Return	Coding
Read_AS-i_line_error_counter –> described in Section 8.3.33			4 A $_H$
Read_and_delete_AS-i_line_error_counter –> described in Section 8.3.34			4 B $_H$
Read_AS-i_slave_error_counter –> described in Section 8.3.35	Slave address		4 C $_H$
Read_and_delete_AS-i_slave_error_counter –> described in Section 8.3.36	Slave address		4 D $_H$

General Structure of the Send Buffer

The basic structure of the send buffer for commands is shown below. The bytes only relevant with certain commands are shown on a gray background.

Byte	Meaning
q+0	Command number
q+1	Job data
q+...	Job data

q = start address of the send buffer on the DP master

General Structure of the Receive Buffer

The basic structure of the response buffer is shown below. The bytes only relevant with certain commands are shown on a gray background.

Byte	Meaning
n+0	Response data
n+1	Response data
n+...	Response data

n = start address of the response buffer on the DP master

General Structure of the AS-i Slave Address

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

Bit 7	Bit 6	Bit 5	Bit 4	Bit 0
		S bit	Slave address	
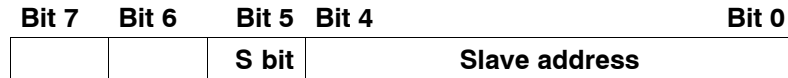
Where the S(elect) bit for selecting the slave type is specified as follows:

- S bit = 0
  Standard AS-i slave or AS-i slave with extended addressing mode in address area A

- S bit = 1
  AS-i slave with extended addressing mode in address area B

8.3.1   Set_Permanent_Parameter

Meaning

With this call, a parameter value for the specified AS-i slave is configured on the DP/AS−i LINK. The value is stored permanently on the DP/AS−i LINK.

The configured parameter is **not** transferred immediately by the DP/AS−i LINK to the AS-i slave. The configured parameter value is only transferred when the AS-i slave is activated after turning on the power supply on the DP/AS−i LINK.

This call is not permitted for AS-i slaves that comply with the AS-i slave standard profile 7.4. For these AS-i slaves, the AS-i master handles the AS-i slave parameter assignment itself. In this case, the configured parameters are always set to F_H.

Note

If you use CPUs from the SIMATIC S7 system as the PROFIBUS DP master, then dependent on the configuration in STEP 7, these may send a complete AS-i slave configuration to the DP/AS−i LINK during the DP startup. Use of the call described here is then generally unnecessary.

Structure of the Job Data in the Send Buffer

Byte	Meaning			
	Bit 7	Bit 4	Bit 3	Bit 0
0	Command number: 00 $_H$			
1	Slave address			
2	irrelevant		Parameter	

8.3.2   Get_Permanent_Parameter

Meaning

With this call, a slave-specific parameter value stored on the DP/AS−i LINK is read.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 01 $_H$
1	Slave address

Structure of the Response Data in the Receive Buffer

Byte	Meaning	
	Bit 7 **Bit 4**	**Bit 3** **Bit 0**
0	reserved	configured parameters

8.3.3   Write_Parameter

Purpose of the Command

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

The parameter is stored on the DP/AS−i LINK only **temporarily** and is not entered as a configured parameter in the EEPROM!

The AS-i slave transfers its current parameter value in the response (parameter echo). This can deviate from the value that has just been written according to the AS-i master specification (/2/). The AS-i slave response is returned as a parameter echo in the response data.

This call is not permitted for AS-i slaves that comply with the AS-i slave standard profile 7.4. For these slaves, the AS-i master handles the AS-i slave parameter assignment itself.

Structure of the Job Data in the Send Buffer

Byte	Meaning			
	Bit 7	Bit 4	Bit 3	Bit 0
0	Command number: 02 $_H$			
1	Slave address			
2	irrelevant		Parameter	

Structure of the Response Data in the Receive Buffer

Byte	Meaning			
	Bit 7	Bit 4	Bit 3	Bit 0
0	reserved		Parameter echo	

8.3.4   Read_Parameter

Meaning

This call returns the current parameter value (actual parameter) of an AS-i slave sent by the DP/AS−i LINK.

This value must not be confused with the parameter echo that is supplied by the AS-i slave as a response to the write_parameter job.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 03 $_H$
1	Slave address

Structure of the Response Data in the Receive Buffer

Byte	Meaning		
	Bit 7	Bit 4	Bit 3 Bit 0
0	reserved		Parameter

8.3.5   Store_Actual_Parameters

Meaning

With this call, the configured parameters stored on the EEPROM are overwritten
with the current, permanently stored (actual) parameters; in other words, the
parameters of all the AS-i slaves are configured.
For AS-i slaves that comply with the AS-i slave standard profile 7.4, the AS-i
master manages the AS-i slave parameter assignment itself. The configured
parameters for these AS-i slaves always have the value F_H.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 04 $_H$

8.3.6   Set_Extended_Permanent_Configuration

Meaning

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

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

The configuration data is stored permanently on the EEPROM of the DP/AS−i LINK and is used as the expected configuration by the AS-i master in the protected mode. The configuration data are specified by the manufacturer of the AS-i slave. The meaning of the configuration data is described in /2/.

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

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

This call is not made in the protected mode.

Note

If you use CPUs from the SIMATIC S7 system as the PROFIBUS DP master, then dependent on the configuration in STEP 7, these may send a complete AS-i slave configuration to the DP/AS−i LINK during the DP startup. Use of the call described here is then generally unnecessary.

Structure of the Job Data in the Send Buffer

Byte	Meaning			
	Bit 7	Bit 4	Bit 3	Bit 0
0	Command number 25 $_H$			
1	Slave address			
2	ID code		I/O configuration	
3	Extended ID1 code		Extended ID2 code	

8.3.7   Get_Extended_Permanent_Configuration

Meaning

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

- I/O configuration

- ID code

- Extended ID1 code

- Extended ID2 code

The configuration data are specified by the manufacturer of the AS-i slave. The meaning of the configuration data is described in /2/.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number 26$_H$
1	Slave address

Structure of the Response Data in the Receive Buffer

Byte	Meaning			
	Bit 7	Bit 4	Bit 3	Bit 0
0	ID code		I/O configuration	
1	Extended ID1 code		Extended ID2 code	
2	reserved			
3	reserved			

8.3.8   Store_Actual_Configuration

Purpose of the Command

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

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

The call is **not** executed in the protected mode

Note

If you use CPUs from the SIMATIC S7 system as the PROFIBUS DP master, then dependent on the configuration in STEP 7, these may send a complete AS-i slave configuration to the DP/AS−i LINK during the DP startup. Use of the call described here is then generally unnecessary.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 07 $_H$

8.3.9   Get_Extended_Actual_Configuration

Purpose of the Command

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

- I/O configuration

- ID code

- Extended ID1 code

- Extended ID2 code

The configuration data are specified by the manufacturer of the AS-i slave. The meaning of the configuration data is described in /2/.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number 28 $_H$
1	Slave address

Structure of the Response Data in the Receive Buffer

Byte	Meaning	
	Bit 7 **Bit 4**	**Bit 3** **Bit 0**
0	ID code	I/O configuration
1	Extended ID1 code	Extended ID2 code
2	reserved	
3	reserved	

8.3.10   Set_LPS

Purpose of the Command

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

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

The call is **not** executed in the protected mode.

Note

If you use CPUs from the SIMATIC S7 system as the PROFIBUS DP master, then dependent on the configuration in STEP 7, these may send a complete AS-i slave configuration to the DP/AS−i LINK during the DP startup. Use of the call described here is then generally unnecessary.

Structure of the Job Data in the Send Buffer

Byte	Meaning							
	Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Command number 29$_H$							
1	00$_H$							
2	0	Slave 1	Slave 2	Slave 3	Slave 4	Slave 5	Slave 6	Slave 7
3	Slave 8	Slave 9	Slave 10	Slave 11	Slave 12	Slave 13	Slave 14	Slave 15
4	Slave 16	Slave 17	Slave 18	Slave 19	Slave 20	Slave 21	Slave 22	Slave 23
5	Slave 24	Slave 25	Slave 26	Slave 27	Slave 28	Slave 29	Slave 30	Slave 31
6	0	Slave 1B	Slave 2B	Slave 3B	Slave 4B	Slave 5B	Slave 6B	Slave 7B
7	Slave 8B	Slave 9B	Slave 10B	Slave 11B	Slave 12B	Slave 13B	Slave 14B	Slave 15B
8	Slave 16B	Slave 17B	Slave 18B	Slave 19B	Slave 20B	Slave 21B	Slave 22B	Slave 23B
9	Slave 2B4	Slave 25B	Slave 26B	Slave 27B	Slave 28B	Slave 29B	Slave 30B	Slave 31B

The bits in the LPS data have the following meaning: 0: AS-i slave not configured
1: AS-i slave configured.

8.3.11   Set_Offline_Mode

Meaning

This call switches between the online and offline mode.

The **online mode** is the normal operating situation for the AS-i master. Here, the following jobs are processed cyclically:

- During the data exchange phase, the fields of the output data are transferred to the slave outputs for all AS-i slaves in the LAS. The addressed AS-i slaves transfer the values of the slave inputs to the master when the transfer was free of errors.

- This is followed by the inclusion phase in which there is a search for the existing AS-i slaves and newly added AS-i slaves are entered in the LDS or LAS.

- In the management phase, jobs from the user such as writing parameters are executed.

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

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

Structure of the Job Data in the Send Buffer

Byte	Meaning		
	Bit 7	**Bit 1**	**Bit 0**
0	Command number: $0A_H$		
1	reserved		Mode (0=online 1=offline)

8.3.12   Select Autoprogramming

Meaning

This call can enable or disable the "automatic address programming" function (see also Section 10.1).

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

Structure of the Job Data in the Send Buffer

Byte	Meaning		
	Bit 7	**Bit 1**	**Bit 0**
0	Command number: $0B_H$		
1	reserved		Value for AUTO_ADDR_ENABLE 1= Automatic address program- ming enabled 0= Automatic address program- ming disabled

8.3.13   Set_Operation_Mode

Purpose of the Command

This call changes the module between the configuration mode and the protected mode.

In the **protected mode**, only AS-i slaves are activated that are entered in the LPS and whose expected and actual configurations match, in other words, when the I/O configuration and ID codes of the detected AS-i slaves are identical to the configured values.

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

The "OPERATION MODE" bit is stored **permanently**; in other words, it is retained following a cold/warm restart.

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

Notice

If an AS-i slave with address 0 is entered in the LDS, the DP/AS−i LINK module cannot change from the configuration mode to the protected mode.

Structure of the Job Data in the Send Buffer

Byte	Meaning		
	Bit 7	**Bit 1**	**Bit 0**
0	Command number: $0C_H$		
1	reserved		Operating mode 0= Protected mode 1=Configuration mode

8.3.14 Change_AS-i_Slave_Address

Purpose of the Command

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

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

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

1. An AS-i slave with "AS-i slave address old" exists.

2. If the old AS-i slave address is not equal to 0, then an AS-i slave with address 0 cannot be connected at the same time.

3. The "AS-i slave address new" must have a valid value.

4. An AS-i slave with "AS-i slave address new" must not exist.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: $0D_H$
1	Slave address old
2	Slave address new

8.3.15   Get_AS-i_Slave_Status

Meaning

With this call, the status register of the addressed AS-i slave can be read out.

Depending on the type of AS-i slave, the flags of the status register have the following meaning:

Status Bit	AS-i slave complying with standard 2.0	AS-i slave complying with standard 2.1
S 0	**Address volatile**	**Address/ID code volatile**
	This flag is set when	
	• the internal slave routine for permanent storage of the AS-i slave address is active. This can take up to 15 ms and must not be interrupted by a further addressing call.	
	• the AS-i internal slave address comparison recognizes that the stored address is not the same as the entry in the address register.	
S 1	**Parity error detected**	**I/O error detected**
	This flag is set when the AS-i slave has recognized a parity error in a received frame since the last "read and delete status" job.	An AS-i slave can set this flag when it has detected and error (for example wire break) in the attached I/Os.
S 2	**End bit error detected**	reserved
	This flag is set when the AS-i slave has recognized an end bit error in a frame since the last "read and delete status" job.	
S 3	**Read error in non-volatile memory**	
	This bit is set when the AS-i slave has detected a read error when reading the non-volatile memory.	

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: $0F_H$
1	Slave address

Structure of the Response Data in the Receive Buffer

Byte	Meaning					
	Bit 7	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0		S 3	S 2	S 1	S 0

8.3.16   Get_LPS, Get_LAS, Get_LDS, Get_Flags

Meaning

With this call, the following entries are read out of the DP/AS−i LINK:

- The list of active AS-i slaves (LAS)

- The list of detected AS-i slaves (LDS)

- The list of permanent AS-i slaves (LPS)

- The flags according to the AS-i slave specification

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 30_H

Structure of the Response Data in the Receive Buffer

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	LAS slave 0	LAS slave 1	LAS slave 2	LAS slave 3	LAS slave 4	LAS slave 5	LAS slave 6	LAS slave 7
1	LAS slave 8	LAS slave 9	LAS slave 10	LAS slave 11	LAS slave 12	LAS slave 13	LAS slave 14	LAS slave 15
2	LAS slave 16	LAS slave 17	LAS slave 18	LAS slave 19	LAS slave 20	LAS slave 21	LAS slave 22	LAS slave 23
3	LAS slave 24	LAS slave 25	LAS slave 26	LAS slave 27	LAS slave 28	LAS slave 29	LAS slave 30	LAS slave 31
4	LAS slave 0B	LAS slave 1B	LAS slave 2B	LAS slave 3B	LAS slave 4B	LAS slave 5B	LAS slave 6B	LAS slave 7B
5	LAS slave 8B	LAS slave 9B	LAS slave 10B	LAS slave 11B	LAS slave 12B	LAS slave 13B	LAS slave 14B	LAS slave 15B
6	LAS slave 16B	LAS slave 17B	LAS slave 18B	LAS slave 19B	LAS slave 20B	LAS slave 21B	LAS slave 22B	LAS slave 23B
7	LAS slave 24B	LAS slave 25B	LAS slave 26B	LAS slave 27B	LAS slave 28B	LAS slave 29B	LAS slave 30B	LAS slave 31B
8	LDS slave 0	LDS slave 1	LDS slave 2	LDS slave 3	LDS slave 4	LDS slave 5	LDS slave 6	LDS slave 7
9	LDS slave 8	LDS slave 9	LDS slave 10	LDS slave 11	LDS slave 12	LDS slave 13	LDS slave 14	LDS slave 15
10	LDS slave 16	LDS slave 17	LDS slave 18	LDS slave 19	LDS slave 20	LDS slave 21	LDS slave 22	LDS slave 23

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
11	LDS slave 24	LDS slave 25	LDS slave 26	LDS slave 27	LDS slave 28	LDS slave 29	LDS slave 30	LDS slave 31
12	LDS slave 0B	LDS slave 1B	LDS slave 2B	LDS slave 3B	LDS slave 4B	LDS slave 5B	LDS slave 6B	LDS slave 7B
13	LDS slave 8B	LDS slave 9B	LDS slave 10B	LDS slave 11B	LDS slave 12B	LDS slave 13B	LDS slave 14B	LDS slave 15B
14	LDS slave 16B	LDS slave 17B	LDS slave 18B	LDS slave 19B	LDS slave 20B	LDS slave 21B	LDS slave 22B	LDS slave 23B
15	LDS slave 24B	LDS slave 25B	LDS slave 26B	LDS slave 27B	LDS slave 28B	LDS slave 29B	LDS slave 30B	LDS slave 31B
16	LPS slave 0	LPS slave 1	LPS slave 2	LPS slave 3	LPS slave 4	LPS slave 5	LPS slave 6	LPS slave 7
17	LPS slave 8	LPS slave 9	LPS slave 10	LPS slave 11	LPS slave 12	LPS slave 13	LPS slave 14	LPS slave 15
18	LPS slave 16	LPS slave 17	LPS slave 18	LPS slave 19	LPS slave 20	LPS slave 21	LPS slave 22	LPS slave 23
19	LPS slave 24	LPS slave 25	LPS slave 26	LPS slave 27	LPS slave 28	LPS slave 29	LPS slave 30	LPS slave 31
20	LPS slave 0B	LPS slave 1B	LPS slave 2B	LPS slave 3B	LPS slave 4B	LPS slave 5B	LPS slave 6B	LPS slave 7B
21	LPS slave 8B	LPS slave 9B	LPS slave 10B	LPS slave 11B	LPS slave 12B	LPS slave 13B	LPS slave 14B	LPS slave 15B
22	LPS slave 16B	LPS slave 17B	LPS slave 18B	LPS slave 19B	LPS slave 20B	LPS slave 21B	LPS slave 22B	LPS slave 23B
23	LPS slave 24B	LPS slave 25B	LPS slave 26B	LPS slave 27B	LPS slave 28B	LPS slave 29B	LPS slave 30B	LPS slave 31B
24	Flag 1							
25	Flag 2							
26	reserved							
27	reserved							
28	reserved							
29	reserved							
30	reserved							
31	reserved							

Meaning of the Bits in Bytes 0 to 23

- Bit = 0 :
  The AS-i slave is **not** activated, detected, or configured

- Bit = 1 :
  The AS-i slave **is** activated, detected, or configured

Flag 1

Bit Number	Meaning
0	OFFLINE_READY
1	APF
2	NORMAL_MODE
3	CONFIG_MODE
4	AUTO_ADDR_AVAIL
5	AUTO_ADDR_ASSI_GN
6	LDS_0
7	CONFIG_OK

Flag 2

Bit Number	Meaning
0	OFFLINE
1	INTERNAL
2	EEPROM_OK
3	AUTO_ADDR_ENABLE
4	PERIPHERY_FAULT
5	Ground short
6	reserved
7	MPO startup

Meaning of the Flags

Flag	Meaning
OFFLINE_READY	The flag is set when the offline phase is active.
APF	This flag is set when the voltage on the AS-i cable is too low.
NORMAL_MODE	This flag is set when the DP/AS−i LINK is in the normal mode. (The flag is set when the CP is in the normal mode.)
CONFIG_MODE	The flag is set in the configuration mode and reset in the protected mode.
AUTO_ADDR_AVAIL	This flag is set when the automatic address programming can be executed (in other words, exactly **one** AS-i slave is currently out of operation).
AUTO_ADDR_ASSIGN	This flag is set when the automatic address programming is possible (in other words, AUTO_ADDR_ENABLE = 1 **and** there is no "incorrect" slave connected to the AS-i Interface).
LDS_0	This flag is set when an AS-i slave exists with address 0.
CONFIG_OK	This flag is set when the desired (configured) and actual configuration match.
OFFLINE	This flag is set when the mode is to changed to OFFLINE or this mode has already been adopted.
EEPROM_OK	This flag is set when the test of the internal EEPROM did not detect any errors.
AUTO_ADDR_ENABLE	This flag indicates whether the automatic address programming is enabled (BIT = 1) or disabled (BIT = 0) by the user.
INTERNAL	This flag is always set.
PERIPHERY_FAULT	This flag is set when at least one AS-i slave is signaling a peripheral fault.
Ground short	The flag is set when there is a short to ground on the AS-i cable.
MPO startup	The "master_power_on_startup" flag is set after the power supply of the AS-i slave master has been turned on. If the master is later changed to OFFLINE, the bit is reset.

8.3.17   Get_Extended_Total_Configuration

Meaning

This command reads the following data from the DP/AS-i LINK:

- The list of active AS-i slaves (LAS) This indicates which of the connected AS-i slaves are activated.

- The current configuration data of the connected AS-i slaves (I/O configuration and ID code).

- The current parameters of the AS-i slaves (actual parameters)

- The current flags.

This command can, for example, be used to find out the configuration of the stations connected to the AS-i cable after installation. The configuration data read in can, if necessary, be changed and saved as the desired configuration on the IE/AS-i LINK with the 'Set_LPS_PCD_PP_Flags' call (see Section 8.3.18).

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 39_H

Structure of the Response Data in the Receive Buffer

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	00_H							
1	00_H							
2	LAS slave 0	LAS slave 1	LAS slave 2	LAS slave 3	LAS slave 4	LAS slave 5	LAS slave 6	LAS slave 7
3	LAS slave 8	LAS slave 9	LAS slave 10	LAS slave 11	LAS slave 12	LAS slave 13	LAS slave 14	LAS slave 15
4	LAS slave 16	LAS slave 17	LAS slave 18	LAS slave 19	LAS slave 20	LAS slave 21	LAS slave 22	LAS slave 23
5	LAS slave 24	LAS slave 25	LAS slave 26	LAS slave 27	LAS slave 28	LAS slave 29	LAS slave 30	LAS slave 31
6	LAS slave 0B	LAS slave 1B	LAS slave 2B	LAS slave 3B	LAS slave 4B	LAS slave 5B	LAS slave 6B	LAS slave 7B
7	LAS slave 8B	LAS slave 9B	LAS slave 10B	LAS slave 11B	LAS slave 12B	LAS slave 13B	LAS slave 14B	LAS slave 15B

Byte	Meaning							
	Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
8	LAS slave 16B	LAS slave 17B	LAS slave 18B	LAS slave 19B	LAS slave 20B	LAS slave 21B	LAS slave 22B	LAS slave 23B
9	LAS slave 24B	LAS slave 25B	LAS slave 26B	LAS slave 27B	LAS slave 28B	LAS slave 29B	LAS slave 30B	LAS slave 31B
10	ID_CODE slave 0				I/O configuration slave 0			
11	Ext ID1 slave 0				Ext ID2 slave 0			
12	ID_CODE slave 1				I/O configuration slave 1			
13	Ext ID1 slave 1				Ext ID2 slave 1			
14	ID_CODE slave 2				I/O configuration slave 2			
15	Ext ID1 slave 2				Ext ID2 slave 2			
16	ID_CODE slave 3				I/O configuration slave 3			
17	Ext ID1 slave 3				Ext ID2 slave 3			
18	ID_CODE slave 4				I/O configuration slave 4			
19	Ext ID1 slave 4				Ext ID2 slave 4			
20	ID_CODE slave 5				I/O configuration slave 5			
21	Ext ID1 slave 5				Ext ID2 slave 5			
22	ID_CODE slave 6				I/O configuration slave 6			
23	Ext ID1 slave 6				Ext ID2 slave 6			
24	ID_CODE slave 7				I/O configuration slave 7			
25	Ext ID1 slave 7				Ext ID2 slave 7			
26	ID_CODE slave 8				I/O configuration slave 8			
27	Ext ID1 slave 8				Ext ID2 slave 8			
28	ID_CODE slave 9				I/O configuration slave 9			
29	Ext ID1 slave 9				Ext ID2 slave 9			
30	ID_CODE slave 10				I/O configuration slave 10			
31	Ext ID1 slave 10				Ext ID2 slave 10			
32	ID_CODE slave 11				I/O configuration slave 11			
33	Ext ID1 slave 11				Ext ID2 slave 11			
34	ID_CODE slave 12				I/O configuration slave 12			
35	Ext ID1 slave 12				Ext ID2 slave 12			
36	ID_CODE slave 13				I/O configuration slave 13			
37	Ext ID1 slave 13				Ext ID2 slave 13			
38	ID_CODE slave 14				I/O configuration slave 14			
39	Ext ID1 slave 14				Ext ID2 slave 14			
40	ID_CODE slave 15				I/O configuration slave 15			
41	Ext ID1 slave 15				Ext ID2 slave 15			
42	ID_CODE slave 16				I/O configuration slave 16			
43	Ext ID1 slave 16				Ext ID2 slave 16			
44	ID_CODE slave 17				I/O configuration slave 17			
45	Ext ID1 slave 17				Ext ID2 slave 17			
46	ID_CODE slave 18				I/O configuration slave 18			
47	Ext ID1 slave 18				Ext ID2 slave 18			
48	ID_CODE slave 19				I/O configuration slave 19			
49	Ext ID1 slave 19				Ext ID2 slave 19			
50	ID_CODE slave 20				I/O configuration slave 20			
51	Ext ID1 slave 20				Ext ID2 slave 20			
52	ID_CODE slave 21				I/O configuration slave 21			

53	Ext ID1 slave 21	Ext ID2 slave 21
54	ID_CODE slave 22	I/O configuration slave 22
55	Ext ID1 slave 22	Ext ID2 slave 22
56	ID_CODE slave 23	I/O configuration slave 23
57	Ext ID1 slave 23	Ext ID2 slave 23
58	ID_CODE slave 24	I/O configuration slave 24
59	Ext ID1 slave 24	Ext ID2 slave 24
60	ID_CODE slave 25	I/O configuration slave 25
61	Ext ID1 slave 25	Ext ID2 slave 25
62	ID_CODE slave 26	I/O configuration slave 26
63	Ext ID1 slave 26	Ext ID2 slave 26
64	ID_CODE slave 27	I/O configuration slave 27
65	Ext ID1 slave 27	Ext ID2 slave 27
66	ID_CODE slave 28	I/O configuration slave 28
67	Ext ID1 slave 28	Ext ID2 slave 28
68	ID_CODE slave 29	I/O configuration slave 29
69	Ext ID1 slave 29	Ext ID2 slave 29
70	ID_CODE slave 30	I/O configuration slave 30
71	Ext ID1 slave 30	Ext ID2 slave 30
72	ID_CODE slave 31	I/O configuration slave 31
73	Ext ID1 slave 31	Ext ID2 slave 31
74	reserved	reserved
75	reserved	reserved
76	ID_CODE slave 1B	I/O configuration slave 1B
77	Ext ID1 slave 1B	Ext ID2 slave 1B
78	ID_CODE slave 2B	I/O configuration slave 2B
79	Ext ID1 slave 2B	Ext ID2 slave 2B
80	ID_CODE slave 3B	I/O configuration slave 3B
81	Ext ID1 slave 3B	Ext ID2 slave 3B
82	ID_CODE slave 4B	I/O configuration slave 4B
83	Ext ID1 slave 4B	Ext ID2 slave 4B
84	ID_CODE slave 5B	I/O configuration slave 5B
85	Ext ID1 slave 5B	Ext ID2 slave 5B
86	ID_CODE slave 6B	I/O configuration slave 6B
87	Ext ID1 slave 6B	Ext ID2 slave 6B
88	ID_CODE slave 7B	I/O configuration slave 7B
89	Ext ID1 slave 7B	Ext ID2 slave 7B
90	ID_CODE slave 8B	I/O configuration slave 8B
91	Ext ID1 slave 8B	Ext ID2 slave 8B
92	ID_CODE slave 9B	I/O configuration slave 9B
93	Ext ID1 slave 9B	Ext ID2 slave 9B
94	ID_CODE slave 10B	I/O configuration slave 10B
95	Ext ID1 slave 10B	Ext ID2 slave 10B
96	ID_CODE slave 11B	I/O configuration slave 11B
97	Ext ID1 slave 11B	Ext ID2 slave 11B
98	ID_CODE slave 12B	I/O configuration slave 12B
99	Ext ID1 slave 12B	Ext ID2 slave 12B
100	ID_CODE slave 13B	I/O configuration slave 13B
101	Ext ID1 slave 13B	Ext ID2 slave 13B
102	ID_CODE slave 14B	I/O configuration slave 14B

103	Ext ID1 slave 14B	Ext ID2 slave 14B
104	ID_CODE slave 15B	I/O configuration slave 15B
105	Ext ID1 slave 15B	Ext ID2 slave 15B
106	ID_CODE slave 16B	I/O configuration slave 16B
107	Ext ID1 slave 16B	Ext ID2 slave 16B
108	ID_CODE slave 17B	I/O configuration slave 17B
109	Ext ID1 slave 17B	Ext ID2 slave 17B
110	ID_CODE slave 18B	I/O configuration slave 18B
111	Ext ID1 slave 18B	Ext ID2 slave 18B
112	ID_CODE slave 19B	I/O configuration slave 19B
113	Ext ID1 slave 19B	Ext ID2 slave 19B
114	ID_CODE slave 20B	I/O configuration slave 20B
115	Ext ID1 slave 20B	Ext ID2 slave 20B
116	ID_CODE slave 21B	I/O configuration slave 21B
117	Ext ID1 slave 21B	Ext ID2 slave 21B
118	ID_CODE slave 22B	I/O configuration slave 22B
119	Ext ID1 slave 22B	Ext ID2 slave 22B
120	ID_CODE slave 23B	I/O configuration slave 23B
121	Ext ID1 slave 23B	Ext ID2 slave 23B
122	ID_CODE slave 24B	I/O configuration slave 24B
123	Ext ID1 slave 24B	Ext ID2 slave 24B
124	ID_CODE slave 25B	I/O configuration slave 25B
125	Ext ID1 slave 25B	Ext ID2 slave 25B
126	ID_CODE slave 26B	I/O configuration slave 26B
127	Ext ID1 slave 26B	Ext ID2 slave 26B
128	ID_CODE slave 27B	I/O configuration slave 27B
129	Ext ID1 slave 27B	Ext ID2 slave 27B
130	ID_CODE slave 28B	I/O configuration slave 28B
131	Ext ID1 slave 28B	Ext ID2 slave 28B
132	ID_CODE slave 29B	I/O configuration slave 29B
133	Ext ID1 slave 29B	Ext ID2 slave 29B
134	ID_CODE slave 30B	I/O configuration slave 30B
135	Ext ID1 slave 30B	Ext ID2 slave 30B
136	ID_CODE slave 31B	I/O configuration slave 31B
137	Ext ID1 slave 31B	Ext ID2 slave 31B
138	reserved	Parameters slave 1
139	Parameters slave 2	Parameters slave 3
140	Parameters slave 4	Parameters slave 5
141	Parameters slave 6	Parameters slave 7
142	Parameters slave 8	Parameters slave 9
143	Parameters slave 10	Parameters slave 11
144	Parameters slave 12	Parameters slave 13
145	Parameters slave 14	Parameters slave 15
146	Parameters slave 16	Parameters slave 17
147	Parameters slave 18	Parameters slave 19
148	Parameters slave 20	Parameters slave 21
149	Parameters slave 22	Parameters slave 23
150	Parameters slave 24	Parameters slave 25
151	Parameters slave 26	Parameters slave 27
152	Parameters slave 28	Parameters slave 29

153	Parameters slave 30	Parameters slave 31
154	reserved	Parameters slave 1B
155	Parameters slave 2B	Parameters slave 3B
156	Parameters slave 4B	Parameters slave 5B
157	Parameters slave 6B	Parameters slave 7B
158	Parameters slave 8B	Parameters slave 9B
159	Parameters slave 10B	Parameters slave 11B
160	Parameters slave 12B	Parameters slave 13B
161	Parameters slave 14B	Parameters slave 15B
162	Parameters slave 16B	Parameters slave 17B
163	Parameters slave 18B	Parameters slave 19B
164	Parameters slave 20B	Parameters slave 21B
165	Parameters slave 22B	Parameters slave 23B
166	Parameters slave 24B	Parameters slave 25B
167	Parameters slave 26B	Parameters slave 27B
168	Parameters slave 28B	Parameters slave 29B
169	Parameters slave 30B	Parameters slave 31B
170	Flag 1	
171	Flag 2	
172	reserved	
...	.....	
218	reserved	

Flag 1

Bit Number	Meaning
0	OFFLINE_READY
1	APF
2	NORMAL_MODE
3	CONFIG_MODE
4	AUTO_ADDR_AVAIL
5	AUTO_ADDR_ASSI_GN
6	LDS_0
7	CONFIG_OK

Flag 2

Bit Number	Meaning
0	OFFLINE
1	INTERNAL
2	EEPROM_OK
3	AUTO_ADDR_ENABLE
4	PERIPHERY_FAULT
5	Ground short
6	reserved
7	MPO startup

The meaning of the flags is the same as for the Get_LPS, Get_LAS, Get_LDS, Get_Flags job.

8.3.18   Store_Extended_Total_Configuration

Meaning

With this call, the required total configuration of the AS interface is transferred to the AS-i master and stored permanently in the EEPROM as the expected configuration. This configures the DP/AS-i LINK.
The following data are transferred:

- The list of configured AS-i slaves specifying the AS-i slaves that can be activated by the AS-i master in the protected mode.

- The list of configuration data specifying the ID codes and I/O configurations the AS-i slaves must have.

- The list of AS-i slave parameters configured on the AS-i master and stored in non-volatile memory. These parameters are transferred to the AS-i slaves when the AS-i master starts up.

- The flags that determine the operating status of the AS-i master following start up.

For AS-i slaves that comply with the standard profile 7.4, the AS-i master manages the parameter assignment itself. The parameter values for slaves complying with standard profile 7.4 specified in the call are ignored by the AS-i master.

If you use CPUs from the SIMATIC S7 system as the PROFIBUS DP master, then dependent on the configuration in STEP 7, these may send a complete AS-i slave configuration to the DP/AS−i LINK during the DP startup. Use of the call described here is then generally unnecessary.

Structure of the Job Data in the Send Buffer

Byte	Meaning							
	Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Command number: 3Ah							
1	00h							
2	LPS slave 0	LPS slave 1	LPS slave 2	LPS slave 3	LPS slave 4	LPS slave 5	LPS slave 6	LPS slave 7
3	LPS slave 8	LPS slave 9	LPS slave 10	LPS slave 11	LPS slave 12	LPS slave 13	LPS slave 14	LPS slave 15
4	LPS slave 16	LPS slave 17	LPS slave 18	LPS slave 19	LPS slave 20	LPS slave 21	LPS slave 22	LPS slave 23
5	LPS slave 24	LPS slave 25	LPS slave 26	LPS slave 27	LPS slave 28	LPS slave 29	LPS slave 30	LPS slave 31
6	reserved	LPS slave 1B	LPS slave 2B	LPS slave 3B	LPS slave 4B	LPS slave 5B	LPS slave 6B	LPS slave 7B
7	LPS slave 8B	LPS slave 9B	LPS slave 10B	LPS slave 11B	LPS slave 12B	LPS slave 13B	LPS slave 14B	LPS slave 15B

Byte	Meaning							
	Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
8	LPS slave 16B	LPS slave 17B	LPS slave 18B	LPS slave 19B	LPS slave 20B	LPS slave 21B	LPS slave 22B	LPS slave 23B
9	LPS slave 24B	LPS slave 25B	LPS slave 26B	LPS slave 27B	LPS slave 28B	LPS slave 29B	LPS slave 30B	LPS slave 31B
10	ID_CODE slave 0				I/O configuration slave 0			
11	Ext ID1 slave 0				Ext ID2 slave 0			
12	ID_CODE slave 1				I/O configuration slave 1			
13	Ext ID1 slave 1				Ext ID2 slave 1			
14	ID_CODE slave 2				I/O configuration slave 2			
15	Ext ID1 slave 2				Ext ID2 slave 2			
16	ID_CODE slave 3				I/O configuration slave 3			
17	Ext ID1 slave 3				Ext ID2 slave 3			
18	ID_CODE slave 4				I/O configuration slave 4			
19	Ext ID1 slave 4				Ext ID2 slave 4			
20	ID_CODE slave 5				I/O configuration slave 5			
21	Ext ID1 slave 5				Ext ID2 slave 5			
22	ID_CODE slave 6				I/O configuration slave 6			
23	Ext ID1 slave 6				Ext ID2 slave 6			
24	ID_CODE slave 7				I/O configuration slave 7			
25	Ext ID1 slave 7				Ext ID2 slave 7			
26	ID_CODE slave 8				I/O configuration slave 8			
27	Ext ID1 slave 8				Ext ID2 slave 8			
28	ID_CODE slave 9				I/O configuration slave 9			
29	Ext ID1 slave 9				Ext ID2 slave 9			
30	ID_CODE slave 10				I/O configuration slave 10			
31	Ext ID1 slave 10				Ext ID2 slave 10			
32	ID_CODE slave 11				I/O configuration slave 11			
33	Ext ID1 slave 11				Ext ID2 slave 11			
34	ID_CODE slave 12				I/O configuration slave 12			
35	Ext ID1 slave 12				Ext ID2 slave 12			
36	ID_CODE slave 13				I/O configuration slave 13			
37	Ext ID1 slave 13				Ext ID2 slave 13			
38	ID_CODE slave 14				I/O configuration slave 14			
39	Ext ID1 slave 14				Ext ID2 slave 14			
40	ID_CODE slave 15				I/O configuration slave 15			
41	Ext ID1 slave 15				Ext ID2 slave 15			
42	ID_CODE slave 16				I/O configuration slave 16			
43	Ext ID1 slave 16				Ext ID2 slave 16			
44	ID_CODE slave 17				I/O configuration slave 17			
45	Ext ID1 slave 17				Ext ID2 slave 17			
46	ID_CODE slave 18				I/O configuration slave 18			
47	Ext ID1 slave 18				Ext ID2 slave 18			
48	ID_CODE slave 19				I/O configuration slave 19			
49	Ext ID1 slave 19				Ext ID2 slave 19			
50	ID_CODE slave 20				I/O configuration slave 20			
51	Ext ID1 slave 20				Ext ID2 slave 20			
52	ID_CODE slave 21				I/O configuration slave 21			
53	Ext ID1 slave 21				Ext ID2 slave 21			

54	ID_CODE slave 22	I/O configuration slave 22
55	Ext ID1 slave 22	Ext ID2 slave 22
56	ID_CODE slave 23	I/O configuration slave 23
57	Ext ID1 slave 23	Ext ID2 slave 23
58	ID_CODE slave 24	I/O configuration slave 24
59	Ext ID1 slave 24	Ext ID2 slave 24
60	ID_CODE slave 25	I/O configuration slave 25
61	Ext ID1 slave 25	Ext ID2 slave 25
62	ID_CODE slave 26	I/O configuration slave 26
63	Ext ID1 slave 26	Ext ID2 slave 26
64	ID_CODE slave 27	I/O configuration slave 27
65	Ext ID1 slave 27	Ext ID2 slave 27
66	ID_CODE slave 28	I/O configuration slave 28
67	Ext ID1 slave 28	Ext ID2 slave 28
68	ID_CODE slave 29	I/O configuration slave 29
69	Ext ID1 slave 29	Ext ID2 slave 29
70	ID_CODE slave 30	I/O configuration slave 30
71	Ext ID1 slave 30	Ext ID2 slave 30
72	ID_CODE slave 31	I/O configuration slave 31
73	Ext ID1 slave 31	Ext ID2 slave 31
74	irrelevant	irrelevant
75	irrelevant	irrelevant
76	ID_CODE slave 1B	I/O configuration slave 1B
77	Ext ID1 slave 1B	Ext ID2 slave 1B
78	ID_CODE slave 2B	I/O configuration slave 2B
79	Ext ID1 slave 2B	Ext ID2 slave 2B
80	ID_CODE slave 3B	I/O configuration slave 3B
81	Ext ID1 slave 3B	Ext ID2 slave 3B
82	ID_CODE slave 4B	I/O configuration slave 4B
83	Ext ID1 slave 4B	Ext ID2 slave 4B
84	ID_CODE slave 5B	I/O configuration slave 5B
85	Ext ID1 slave 5B	Ext ID2 slave 5B
86	ID_CODE slave 6B	I/O configuration slave 6B
87	Ext ID1 slave 6B	Ext ID2 slave 6B
88	ID_CODE slave 7B	I/O configuration slave 7B
89	Ext ID1 slave 7B	Ext ID2 slave 7B
90	ID_CODE slave 8B	I/O configuration slave 8B
91	Ext ID1 slave 8B	Ext ID2 slave 8B
92	ID_CODE slave 9B	I/O configuration slave 9B
93	Ext ID1 slave 9B	Ext ID2 slave 9B
94	ID_CODE slave 10B	I/O configuration slave 10B
95	Ext ID1 slave 10B	Ext ID2 slave 10B
96	ID_CODE slave 11B	I/O configuration slave 11B
97	Ext ID1 slave 11B	Ext ID2 slave 11B
98	ID_CODE slave 12B	I/O configuration slave 12B
99	Ext ID1 slave 12B	Ext ID2 slave 12B
100	ID_CODE slave 13B	I/O configuration slave 13B
101	Ext ID1 slave 13B	Ext ID2 slave 13B
102	ID_CODE slave 14B	I/O configuration slave 14B
103	Ext ID1 slave 14B	Ext ID2 slave 14B

104	ID_CODE slave 15B	I/O configuration slave 15B
105	Ext ID1 slave 15B	Ext ID2 slave 15B
106	ID_CODE slave 16B	I/O configuration slave 16B
107	Ext ID1 slave 16B	Ext ID2 slave 16B
108	ID_CODE slave 17B	I/O configuration slave 17B
109	Ext ID1 slave 17B	Ext ID2 slave 17B
110	ID_CODE slave 18B	I/O configuration slave 18B
111	Ext ID1 slave 18B	Ext ID2 slave 18B
112	ID_CODE slave 19B	I/O configuration slave 19B
113	Ext ID1 slave 19B	Ext ID2 slave 19B
114	ID_CODE slave 20B	I/O configuration slave 20B
115	Ext ID1 slave 20B	Ext ID2 slave 20B
116	ID_CODE slave 21B	I/O configuration slave 21B
117	Ext ID1 slave 21B	Ext ID2 slave 21B
118	ID_CODE slave 22B	I/O configuration slave 22B
119	Ext ID1 slave 22B	Ext ID2 slave 22B
120	ID_CODE slave 23B	I/O configuration slave 23B
121	Ext ID1 slave 23B	Ext ID2 slave 23B
122	ID_CODE slave 24B	I/O configuration slave 24B
123	Ext ID1 slave 24B	Ext ID2 slave 24B
124	ID_CODE slave 25B	I/O configuration slave 25B
125	Ext ID1 slave 25B	Ext ID2 slave 25B
126	ID_CODE slave 26B	I/O configuration slave 26B
127	Ext ID1 slave 26B	Ext ID2 slave 26B
128	ID_CODE slave 27B	I/O configuration slave 27B
129	Ext ID1 slave 27B	Ext ID2 slave 27B
130	ID_CODE slave 28B	I/O configuration slave 28B
131	Ext ID1 slave 28B	Ext ID2 slave 28B
132	ID_CODE slave 29B	I/O configuration slave 29B
133	Ext ID1 slave 29B	Ext ID2 slave 29B
134	ID_CODE slave 30B	I/O configuration slave 30B
135	Ext ID1 slave 30B	Ext ID2 slave 30B
136	ID_CODE slave 31B	I/O configuration slave 31B
137	Ext ID1 slave 31B	Ext ID2 slave 31B
138	reserved	Parameters slave 1
139	Parameters slave 2	Parameters slave 3
140	Parameters slave 4	Parameters slave 5
141	Parameters slave 6	Parameters slave 7
142	Parameters slave 8	Parameters slave 9
143	Parameters slave 10	Parameters slave 11
144	Parameters slave 12	Parameters slave 13
145	Parameters slave 14	Parameters slave 15
146	Parameters slave 16	Parameters slave 17
147	Parameters slave 18	Parameters slave 19
148	Parameters slave 20	Parameters slave 21
149	Parameters slave 22	Parameters slave 23
150	Parameters slave 24	Parameters slave 25
151	Parameters slave 26	Parameters slave 27
152	Parameters slave 28	Parameters slave 29
153	Parameters slave 30	Parameters slave 31

154	reserved	Parameters slave 1B
155	Parameters slave 2B	Parameters slave 3B
156	Parameters slave 4B	Parameters slave 5B
157	Parameters slave 6B	Parameters slave 7B
158	Parameters slave 8B	Parameters slave 9B
159	Parameters slave 10B	Parameters slave 11B
160	Parameters slave 12B	Parameters slave 13B
161	Parameters slave 14B	Parameters slave 15B
162	Parameters slave 16B	Parameters slave 17B
163	Parameters slave 18B	Parameters slave 19B
164	Parameters slave 20B	Parameters slave 21B
165	Parameters slave 22B	Parameters slave 23B
166	Parameters slave 24B	Parameters slave 25B
167	Parameters slave 26B	Parameters slave 27B
168	Parameters slave 28B	Parameters slave 29B
169	Parameters slave 30B	Parameters slave 31B
170	Flag 1	
171	Flag 2	

Flag 1

Bit Number	Meaning
0	OFFLINE_READY
1	APF
2	NORMAL_MODE
3	CONFIG_MODE
4	AUTO_ADDR_AVAIL
5	AUTO_ADDR_ASSI_GN
6	LDS_0
7	CONFIG_OK

Flag 2

Bit Number	Meaning
0	OFFLINE
1	INTERNAL
2	EEPROM_OK
3	AUTO_ADDR_ENABLE
4	PERIPHERY_FAULT
5	Ground short
6	reserved
7	MPO startup

Flags whose values modify the AS-i master mode are shown in gray. The values of the other flags have no significance for the 'store total configuration' command and cannot be modified on the AS-i master with this call..

CONFIG_MODE	The entry '0' means that the DP/AS−i LINK changes to the protected mode after executing the command. The entry '1' means that the configuration mode is retained.
	0: On completion of the job, the AS-i master starts up in the protected mode.
	1: On completion of the job, the AS-i master starts up in the configuration mode..
AUTO_ADDR_ENABLE	'0' means that the automatic address programming is disabled, '1' means that the automatic address programming is enabled.
	0: Automatic address programming disabled.
	1: Address programming enabled

8.3.19   Write_Extended_Parameter_List

Meaning

With this command, the parameters for all slaves are transferred to the AS-i master. The AS-i master transfers **only** the parameters **that have changed; in other words, that differ from the previously set (actual) parameters** to the AS-i slaves.

Structure of the Job Data in the Send Buffer

Byte	Meaning							
	Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
0	Command number: 3C $_H$							
1	00$_H$							
2	irrelevant				Parameters slave 1			
3	Parameters slave 2				Parameters slave 3			
4	Parameters slave 4				Parameters slave 5			
5	Parameters slave 6				Parameters slave 7			
6	Parameters slave 8				Parameters slave 9			
7	Parameters slave 10				Parameters slave 11			
8	Parameters slave 12				Parameters slave 13			
9	Parameters slave 14				Parameters slave 15			
10	Parameters slave 16				Parameters slave 17			
11	Parameters slave 18				Parameters slave 19			
12	Parameters slave 20				Parameters slave 21			
13	Parameters slave 22				Parameters slave 23			
14	Parameters slave 24				Parameters slave 25			
15	Parameters slave 26				Parameters slave 27			
16	Parameters slave 28				Parameters slave 29			
17	Parameters slave 30				Parameters slave 31			
18	irrelevant				Parameters slave 1B			
19	Parameters slave 2B				Parameters slave 3B			
20	Parameters slave 4B				Parameters slave 5B			
21	Parameters slave 6B				Parameters slave 7B			
22	Parameters slave 8B				Parameters slave 9B			
23	Parameters slave 10B				Parameters slave 11B			
24	Parameters slave 12B				Parameters slave 13B			
25	Parameters slave 14B				Parameters slave 15B			
26	Parameters slave 16B				Parameters slave 17B			
27	Parameters slave 18B				Parameters slave 19B			
28	Parameters slave 20B				Parameters slave 21B			
29	Parameters slave 22B				Parameters slave 23B			
30	Parameters slave 24B				Parameters slave 25B			
31	Parameters slave 26B				Parameters slave 27B			
32	Parameters slave 28B				Parameters slave 29B			
33	Parameters slave 30B				Parameters slave 31B			

8.3.20 Read_Extended_Parameter_Echo_List

Meaning

The read parameter echo list call outputs the echo values of all AS-i slaves. The echo values of an AS-i slave originate from the last parameter call sent to this AS-i slave.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 33h
1	00h

Structure of the Response Data in the Receive Buffer

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1	irrelevant				Par echo slave 1			
2	Par echo slave 2				Par echo slave 3			
3	Par echo slave 4				Par echo slave 5			
4	Par echo slave 6				Par echo slave 7			
6	Par echo slave 8				Par echo slave 9			
5	Par echo slave 10				Par echo slave 11			
6	Par echo slave 12				Par echo slave 13			
7	Par echo slave 14				Par echo slave 15			
8	Par echo slave 16				Par echo slave 17			
9	Par echo slave 18				Par echo slave 19			
10	Par echo slave 20				Par echo slave 21			
11	Par echo slave 22				Par echo slave 23			
12	Par echo slave 24				Par echo slave 25			
13	Par echo slave 26				Par echo slave 27			
14	Par echo slave 28				Par echo slave 29			
15	Par echo slave 30				Par echo slave 31			
16	irrelevant				Par echo slave 1B			
17	Par echo slave 2B				Par echo slave 3B			
18	Par echo slave 4B				Par echo slave 5B			
19	Par echo slave 6B				Par echo slave 7B			
20	Par echo slave 8B				Par echo slave 9B			
21	Par echo slave 10B				Par echo slave 11B			
22	Par echo slave 12B				Par echo slave 13B			
23	Par echo slave 14B				Par echo slave 15B			
24	Par echo slave 16B				Par echo slave 17B			
25	Par echo slave 18B				Par echo slave 19B			
26	Par echo slave 20B				Par echo slave 21B			
27	Par echo slave 22B				Par echo slave 23B			
28	Par echo slave 24B				Par echo slave 25B			

29	Par echo slave 26B	Par echo slave 27B
30	Par echo slave 28B	Par echo slave 29B
31	Par echo slave 30B	Par echo slave 31B

8.3.21   Write_CTT2_request

Meaning

Using this call, a CTT2 request according to AS-i slave profile "CombinedTranslationType2" can be sent to the AS-i master as a byte string. This forwards the string bytes to the AS-i slave address specified in the send buffer.

With this call, a send buffer with a maximum of 223 bytes is transferred to the AS-i master. The actual number of string bytes to be sent to the AS-i slave is calculated by the AS-i master from byte 2 of the send buffer (number of string bytes).

The CTT2 request is replied to by the addressed AS-i slave with a CTT2 response. The AS-i master transfers this response as a byte string in the response buffer.

The structure of the CTT2 request or CTT2 response (code, index, ...) always begins with string byte 1. For more detailed information, refer to the relevant AS-i slave description.

As long as strings are being transferred on AS-i, there is no cyclic data transfer with the addresses AS-i slave.
Due to the type of protocol, the transfer of approximately 200 bytes can take up to half a minute.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 44 $_H$
1	Slave address
2	Number of string bytes
3	String byte 1
4	String byte 2
...	...
...	String byte (n−1)
...	(String byte n)

Structure of the Response Data in the Receive Buffer

Byte	Meaning
0	Number of string bytes
1	String byte (1)
2	String byte (2)
...	.....
	String byte (n-1)
...	String byte (n)

8.3.22   Read_Version_ID

Meaning

This call reads out the version ID of the firmware of the DP/AS−i LINK.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 14_H

The response of the DP/AS−i LINK contains the name and the firmware version number in the form shown below:

Structure of the Response Data in the Receive Buffer

Byte	Meaning
0	Device name incl. version
1	
2	
:	
:	
31	

8.3.23   Read_AS-i_Slave_ID

Meaning

With this call, the ID code of an AS-i slave can be read out directly over the AS-i cable. The call is intended for diagnostic purposes and is not required in the normal master mode.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 17$_H$
1	Slave address

Structure of the Response Data in the Receive Buffer

Byte	Meaning			
	Bit 7	**Bit 4**	**Bit 3**	**Bit 0**
0	reserved		ID code	

8.3.24   Read_AS-i_Slave_Extended_ID1

Meaning

With this call, the extended ID1 code of an AS-i slave can be read out directly over the AS-i cable. The call is intended for diagnostic purposes and is not required in the normal master mode.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 37_H
1	Slave address

Structure of the Response Data in the Receive Buffer

Byte	Meaning			
	Bit 7	**Bit 4**	**Bit 3**	**Bit 0**
0	reserved		Extended ID1 code	

8.3.25   Write_AS-i_Slave_Extended_ID1

Meaning

With this call, the extended ID1 code of an AS-i slave with address "0" can be written directly over the AS-i cable.

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

Structure of the Job Data in the Send Buffer

Byte	Meaning	
0	Command number: $3F_H$	
1	irrelevant	Extended ID1 code

8.3.26   Read_AS-i_Slave_Extended_ID2

Meaning

With this call, the extended ID2 code of an AS-i slave can be read out directly over the AS-i cable. The call is intended for diagnostic purposes and is not required in the normal master mode.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 38$_H$
1	Slave address

Structure of the Response Data in the Receive Buffer

Byte	Meaning			
	Bit 7	**Bit 4**	**Bit 3**	**Bit 0**
0	reserved		Extended ID2 code	

8.3.27   Read_AS-i_Slave_I/O

Meaning

With this call, the I/O configuration of an AS-i slave can be read out directly over the AS-i cable. The call is intended for diagnostic purposes and is not required in the normal master mode.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 18
1	Slave address

Structure of the Response Data in the Receive Buffer

Byte	Meaning		
	Bit 7	**Bit 4**	**Bit 3** **Bit 0**
0	reserved		I/O configuration

8.3.28   Get_LPF

Meaning

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

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number 3E $_H$

Structure of the Responses in the Receive Buffer

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Slave 0	Slave 1	Slave 2	Slave 3	Slave 4	Slave 5	Slave 6	Slave 7
1	Slave 8	Slave 9	Slave 10	Slave 11	Slave 12	Slave 13	Slave 14	Slave 15
2	Slave 16	Slave 17	Slave 18	Slave 19	Slave 20	Slave 21	Slave 22	Slave 23
3	Slave 24	Slave 25	Slave 26	Slave 27	Slave 28	Slave 29	Slave 30	Slave 31
4	Slave 0B	Slave 1B	Slave 2B	Slave 3B	Slave 4B	Slave 5B	Slave 6B	Slave 7B
5	Slave 8B	Slave 9B	Slave 10B	Slave 11B	Slave 12B	Slave 13B	Slave 14B	Slave 15B
6	Slave 16B	Slave 17B	Slave 18B	Slave 19B	Slave 20B	Slave 21B	Slave 22B	Slave 23B
7	Slave 2B4	Slave 25B	Slave 26B	Slave 27B	Slave 28B	Slave 29B	Slave 30B	Slave 31B
8	reserved							
...	reserved							
13	reserved							

> For the LPF data, the bit values have the following meaning:
>
> Bit=0: Slave signals no peripheral fault
> Bit=1: Slave signals peripheral fault.

8.3.29   Write_AS-i_Slave_Parameter_String

Meaning

With this call, a parameter string complying with AS-i slave profile 7.4 can be sent to the AS-i master that passes on the string to the AS-i slave address specified in the send buffer.

With this call, a send buffer with a maximum of 223 bytes is transferred to the AS-i master. The actual number of parameter bytes to be sent to the AS-i slave is calculated by the AS-i master from byte 2 of the send buffer (number of parameter bytes).

The remaining information in the string is not evaluated by the AS-i master and is passed on to the AS-i slave transparently. As long as the string transfer is active, there is no user/analog data exchange with the addressed AS-i slave.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number: 40 $_H$
1	Slave address
2	Number of parameter bytes
3	String byte (1)
4	String byte (2)
...	.....
	String byte (n-1)
...	String byte (n)

Maximum value for n=220

8.3.30   Read_AS-i_Slave_Parameter_String

Meaning

With this call, a parameter string complying with AS-i slave profile 7.4 can be read from the AS-i slave with the AS-i slave address specified in the send buffer.

The AS-i master supplies up to 221 bytes of response data. The number of parameter bytes actually sent by the AS-i slave is signaled by the AS-i master in byte 0 of the receive buffer (number of parameter bytes).

If the AS-i slave sends a string longer than 220 bytes, the AS-i master aborts the string transfer and terminates the job with an error. The received data are then not made available to the user program.

As long as the string transfer is active, there is no user/analog data exchange with the addressed AS-i slave.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number 41_H
1	Slave address

Structure of the Response Data in the Receive Buffer

Byte	Meaning
0	Number of parameter bytes
1	String byte (1)
2	String byte (2)
...	.....
	String byte (n-1)
...	String byte (n)

Maximum value for n=220

8.3.31   Read_AS-i_Slave_ID_String

Meaning

With this call, an identification string complying with the AS-i slave profile 7.4 can be read from the AS-i slave with the AS-i slave address specified in the send buffer. The AS-i master supplies up to 221 bytes of response data. The number of ID bytes actually sent by the AS-i slave is signaled by the AS-i master in byte 0 of the receive buffer (number of ID bytes).

If the AS-i slave sends a string longer than 220 bytes, the AS-i master aborts the string transfer and terminates the job with an error. The received data are then not made available to the user program.

As long as the string transfer is active, there is no user/analog data exchange with the addressed AS-i slave.

Note

As an exception, with this call, the bytes contained in the bits "Follows" and "Valid" are also transferred (see AS-i slave profile 7.4).

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number 42$_H$
1	Slave address

Structure of the Response Data in the Receive Buffer

Byte	Meaning
0	Number of ID bytes
1	String byte (1)
2	String byte (2)
...	.....
...	String byte (n-1)
...	String byte (n)

Maximum value for n=220

8.3.32   Read_AS-i_Slave_Diagnostic_String

Meaning

With this call, a diagnostic string complying with AS-i slave profile 7.4 can be read from the AS-i slave with the AS-i slave address specified in the send buffer. The AS-i master supplies up to 221 bytes of response data. The number of diagnostic bytes actually sent by the AS-i slave is signaled by the AS-i master in byte 0 of the receive buffer (number of diagnostic bytes).

If the AS-i slave sends a string longer than 220 bytes, the AS-i master aborts the string transfer and terminates the job with an error. The received data are then not made available to the user program.

As long as the string transfer is active, there is no user/analog data exchange with the addressed AS-i slave.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number 43_H
1	Slave address

Structure of the Response Data in the Receive Buffer

Byte	Meaning
0	Number of diagnostic bytes
1	String byte (1)
2	String byte (2)
...	.....
...	String byte (n-1)
...	String byte (n)

Maximum value for n=220

8.3.33   Read_AS-i_line_error_counter

Meaning

This command reads out AS-i line-specific error counters. Bytes 28−35 signal the AS-i slave on which the error occurred (bit=1: error exists).

Meaning of the counters:

Error	Meaning
AS-i Power Fail	AS-i power supply missing, too low, not stable.
Ground short	Slave was connected over AS-i cable A or B with chassis ground.
Slave failure	The slave was taken out of the list of activated slaves (LAS) (after several consecutive timeouts).
Missing slave frame	Slave response of an existing slave was not received.
Bad slave frame	Slave response of a slave is mutilated or corrupt.
I/O error	Slave signals "Peripheral Fault" in the response to Read_Status.
Protocol error	Error in data transfer according to CTT1−5 (for example, bad or missing toggle bit, ...).
Bad master frame	AS-i master detects an error in its own send frame (by checking the receive line).

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number 4A $_H$

Structure of the Responses in the Receive Buffer

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0							High byte	
1			AS-i Power Fail				Low byte	
2							High byte	
3			Ground short				Low byte	
4							High word / high byte	
5			Summator:				High word / low byte	
6			Slave failure				Low word / high byte	
7							Low word / Low byte	

Byte	Meaning							
8						High word / high byte		
9	Summator: Missing slave frame					High word / low byte		
10						Low word / high byte		
11						Low word / Low byte		
12						High word / high byte		
13	Summator: Bad slave frame					High word / low byte		
14						Low word / high byte		
15						Low word / Low byte		
16						High word / high byte		
17	Summator: Slave I/O error					High word / low byte		
18						Low word / high byte		
19						Low word / Low byte		
20						High word / high byte		
21	Summator: Slave protocol error					High word / low byte		
22						Low word / high byte		
23						Low word / Low byte		
24						High word / high byte		
25	Summator: Bad master frame					High word / low byte		
26						Low word / high byte		
27						Low word / Low byte		
28	Slave 0	Slave 1/1A	Slave 2/2A	Slave 3/3A	Slave 4/4A	Slave 5/5A	Slave 6/6A	Slave 7/7A
29	Slave 8/8A	Slave 9/9A	Slave 10/10A	Slave 11/11A	Slave 12/12A	Slave 13/13A	Slave 14/14A	Slave 15/15A
30	Slave 16/16A	Slave 17/17A	Slave 18/18A	Slave 19/19A	Slave 20/20A	Slave 21/21A	Slave 22/22A	Slave 23/23A
31	Slave 24/24A	Slave 25/25A	Slave 26/26A	Slave 27/27A	Slave 28/28A	Slave 29/29A	Slave 30/30A	Slave 31/31A
32	Slave 0B	Slave 1B	Slave 2B	Slave 3B	Slave 4B	Slave 5B	Slave 6B	Slave 7B
33	Slave 8B	Slave 9B	Slave 10B	Slave 11B	Slave 12B	Slave 13B	Slave 14B	Slave 15B
34	Slave 16B	Slave 17B	Slave 18B	Slave 19B	Slave 20B	Slave 21B	Slave 22B	Slave 23B
35	Slave 24B	Slave 25B	Slave 26B	Slave 27B	Slave 28B	Slave 29B	Slave 30B	Slave 31B

8.3.34   Read_and_delete_AS-i_line_error_counter

Meaning

The command works in the same way as "Read_AS-i_line_error_counter". On completion, the AS-i master also sets all error counters to 0.

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number 4B $_H$

Structure of the Responses in the Receive Buffer

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0							High byte	
1			AS-i Power Fail				Low byte	
2							High byte	
3			Ground short				Low byte	
4						High word / high byte		
5			Summator: Slave failure			High word / low byte		
6						Low word / high byte		
7						Low word / Low byte		
8						High word / high byte		
9			Summator: Missing slave frame			High word / low byte		
10						Low word / high byte		
11						Low word / Low byte		
12						High word / high byte		
13			Summator: Bad slave frame			High word / low byte		
14						Low word / high byte		
15						Low word / Low byte		
16						High word / high byte		
17			Summator: Slave I/O error			High word / low byte		
18						Low word / high byte		
19						Low word / Low byte		

Byte	Meaning							
20						High word / high byte		
21	Summator: Slave protocol error					High word / low byte		
22						Low word / high byte		
23						Low word / Low byte		
24						High word / high byte		
25	Summator: Bad master frame					High word / low byte		
26						Low word / high byte		
27						Low word / Low byte		
28	Slave 0	Slave 1/1A	Slave 2/2A	Slave 3/3A	Slave 4/4A	Slave 5/5A	Slave 6/6A	Slave 7/7A
29	Slave 8/8A	Slave 9/9A	Slave 10/10A	Slave 11/11A	Slave 12/12A	Slave 13/13A	Slave 14/14A	Slave 15/15A
30	Slave 16/16A	Slave 17/17A	Slave 18/18A	Slave 19/19A	Slave 20/20A	Slave 21/21A	Slave 22/22A	Slave 23/23A
31	Slave 24/24A	Slave 25/25A	Slave 26/26A	Slave 27/27A	Slave 28/28A	Slave 29/29A	Slave 30/30A	Slave 31/31A
32	Slave 0B	Slave 1B	Slave 2B	Slave 3B	Slave 4B	Slave 5B	Slave 6B	Slave 7B
33	Slave 8B	Slave 9B	Slave 10B	Slave 11B	Slave 12B	Slave 13B	Slave 14B	Slave 15B
34	Slave 16B	Slave 17B	Slave 18B	Slave 19B	Slave 20B	Slave 21B	Slave 22B	Slave 23B
35	Slave 24B	Slave 25B	Slave 26B	Slave 27B	Slave 28B	Slave 29B	Slave 30B	Slave 31B

8.3.35   Read_AS-i_slave_error_counter

Meaning

This command reads out AS-i slave-specific error counters.

Meaning of the counters:

Error	Meaning
Slave failure	The slave was taken out of the list of activated slaves (LAS) (after several consecutive timeouts).
Missing slave frame	Slave response of an existing slave was not received.
Bad slave frame	Slave response of a slave is mutilated or corrupt.
I/O error	Slave signals "Peripheral Fault" in the response to Read_Status.
Protocol error	Error in data transfer according to CTT1–5 (for example, bad or missing toggle bit, ...).
Bad master frame (optional)	AS-i master detects an error in its own send frame (by checking the receive line).

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number 4C $_H$
1	AS-i slave address

Structure of the Responses in the Receive Buffer

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0				Slave failure			High byte	
1							Low byte	
2				Missing slave frame			High byte	
3							Low byte	
4				Bad slave frame			High byte	
5							Low byte	
6				I/O error			High byte	
7							Low byte	
8				Protocol error			High byte	
9							Low byte	
10				Bad master frame			High byte	
11							Low byte	

8.3.36   Read_and_delete_AS-i_slave_error_counter

Meaning

This command reads out AS-i slave-specific error counters. On completion, the AS-i master also sets all error counters to 0.

Meaning of the counters:

Error	Meaning
Slave failure	The slave was taken out of the list of activated slaves (LAS) (after several consecutive timeouts).
Missing slave frame	Slave response of an existing slave was not received.
Bad slave frame	Slave response of a slave is mutilated or corrupt.
I/O error	Slave signals "Peripheral Fault" in the response to Read_Status.
Protocol error	Error in data transfer according to CTT1−5 (for example, bad or missing toggle bit, ...).
Bad master frame (optional)	AS-i master detects an error in its own send frame (by checking the receive line).

Structure of the Job Data in the Send Buffer

Byte	Meaning
0	Command number 4D $_H$
1	AS-i slave address

Structure of the Responses in the Receive Buffer

Byte	Meaning							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Slave failure						High byte	
1							Low byte	
2	Missing slave frame						High byte	
3							Low byte	
4	Bad slave frame						High byte	
5							Low byte	
6	I/O error						High byte	
7							Low byte	
8	Protocol error						High byte	
9							Low byte	
10	Bad master frame						High byte	
11							Low byte	

9 DP Slave Diagnostics

This chapter...

With DP slave diagnostics, errors on PROFIBUS DP (for example parameter assignment errors) and errors on the AS-Interface are signaled to the DP master.

In protected mode, the DP/AS−i LINK module signals "Diagnostics" whenever the configuration on the AS−Interface is changed. Changes in the configuration might be that voltage on the AS-Interface is too low (AS-i Power Fail) or that configuration errors have been detected (missing, incorrect or existing but unconfigured AS-i slaves).

If the error is eliminated again on the AS-Interface, this is indicated by "leaving diagnostic state" (bit 3 in the station status 1 set to "0").

The exact cause of the problem is entered in the device-related diagnostic information – see Section 9.4.

Diagnostic events are always signaled via the slot number of the digital module assigned to the disrupted AS-i line. Depending on the DP master type, STEP 7 uses:

- For AS-i line 1: slot number 1 or 4
- For AS-i line 2: slot number 2 or 5

The slot number depends on the mode (DP mode: DPV1 / S7−compatible) and the device type of the DP master.

9.1　　Overview

Notice

The DP/AS−i LINK only signals errors on the AS-Interface when the DP/AS−i LINK is operating in the protected mode and when the diagnostic interrupt is enabled in the DP configuration.

Notice

If the DP/AS-i LINK is not supplied by the 24 V supply, and if the AS-i power (on AS-i line 1) falls below 14 V, no DP data traffic is possible due to the missing power supply. This means that no diagnostic message can be created to signal that the AS-i power supply is too low. The DP master recognizes that the DP/AS−i LINK module has failed and indicates this problem to its user program.
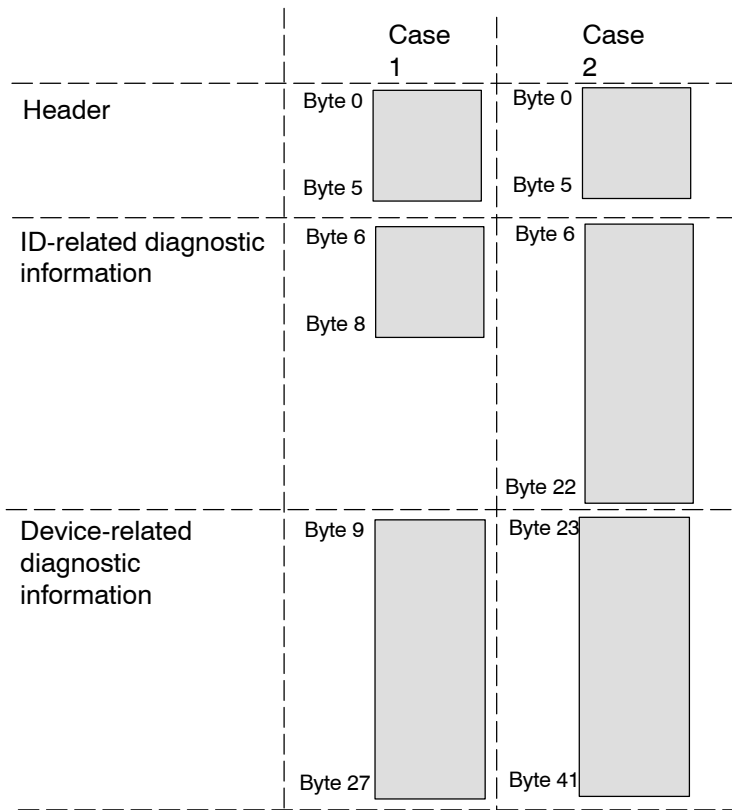

Access Mechanism

Read the manual of your DP master to find out the mechanisms you can use on the DP master to access diagnostic information.

The following sections explain the content of the DP slave diagnostic information.

Structure of the DP Slave Diagnostic Information

DP slave diagnostics with the DP/AS–i LINK depends on the particular situation (case 1 corresponds to diagnostics with the DP/AS-i Link 20E):

	Case 1	Case 2
Header	Byte 0 ... Byte 5	Byte 0 ... Byte 5
ID-related diagnostic information	Byte 6 ... Byte 8	Byte 6 ... Byte 22
Device-related diagnostic information	Byte 9 ... Byte 27	Byte 23 ... Byte 41

Case 1:

Short ID-related diagnostics with 3 bytes is used when only one binary line "ASi-1" is configured.

- For example, the DP/AS-i LINK Advanced was configured with STEP 7 as a single master and without AS-i analog slaves.
- For example, only AS-i line 1 was configured for the DP/AS-i LINK Advanced with GSD file.

9.2   Header Diagnostics

Meaning

The station status provides an overview of the status of a DP slave.

The following applies to the individual error bits in the station status:

- 0: No error
- 1: Error

Station Status 1

Byte	Bit	Value/meaning	Remedy
0	0	1: The DP/AS−i LINK module cannot be addressed by the DP master.	• Is the correct DP address set on the DP/AS−i LINK? • Bus connector connected? • RS-485 repeater set correctly? • External auxiliary voltage on the DP/AS−i LINK module exists?
	1	1: The DP/AS−i LINK is not yet ready for data exchange.	Has the DP/AS−i LINK already started up?
	2	1: Incorrect configuration data from the DP master. Required configuration is not supported by the DP/AS−i LINK module.	Check the configuration
	3	1: Error on the AS-Interface 0: No error was detected on the AS-Interface.	If available, evaluate the device-related diagnostic information (see Section 9.4).
	4	1: Function not supported, e.g. changing the DP address of the DP/AS−i LINK module by the DP master.	Check the configuration.
	5	1: The DP master cannot interpret the response from the DP/AS−i LINK module correctly.	Check the PROFIBUS.
	6	1: The DP/AS−i LINK detects an incorrect parameter assignment frame (e.g. incorrect length, incorrect ID number, incorrect parameters).	Check the configuration.
	7	1: The DP/AS−i LINK module was assigned parameters by a different DP master from the DP master that currently has access to the DP/AS−i LINK.	This bit is always 1 if, for example, you are accessing the DP/AS−i LINK module with a PG or a different DP master. The DP address of the parameter assignment master is in the diagnostic byte "Master PROFIBUS Address".

Station Status 2

Byte	Bit	Value/meaning
1	0	1: The DP/AS−i LINK module must have parameters reassigned by the DP master.
	1	1: A static diagnostic message exists.
	2	1: This bit is always set to '1'.
	3	1: The response monitoring of the DP/AS−i LINK is activated.
	4	1: The DP/AS−i LINK has received the "FREEZE" control command.
	5	1: The DP/AS−i LINK has received the "SYNC" control command.
	6	0: This bit is always set to '0'.
	7	1: The DP/AS−i LINK module is deactivated, in other words, it is not taking part in the current processing.

Station Status 3

Byte	Value	Value/meaning
2	Station status 3 is reserved and is irrelevant for diagnostics on the DP/AS−i LINK module.	
3	xx $_H$	PROFIBUS address of the DP master
		In DP slave diagnostics, byte 3 contains the hexadecimal address of the PROFIBUS master that assigned parameters for the DP/AS−i LINK module.
4	81 $_H$	Vendor ID of the DP/AS−i LINK
5	39 $_H$	In DP slave diagnostics, byte 4 and byte 5 also include the Vendor ID of the DP/AS−i LINK.

9.3   Structure of ID-Related Diagnostics

Byte	Value	Value/meaning
6	43 H	Header and length of the **short** ID-related diagnostic information.
	51 H	Header and length of the **long** ID-related diagnostic information.
7	xxxx xxxx	Each bit addresses a slot (bit 2^0 = slot 1; bit 2^1 = slot 2; ...).
8		0: Slot error-free
		1: Slot has error
9..22		(bytes 9..22 only used with **long** ID-related diagnostics)

9.4   Structure of the Device-Related Diagnostic Information

The device-related diagnostic information consists of a fixed header in bytes 9 to 12 (or 23 to 26) and a variable field with bytes 13 to 27 (or 27 to 41) that signals the errors on the AS-Interface.

The byte addresses **in parentheses** apply to **Case 2** of the long ID−related diagnostics.

Byte	Value	Meaning
9 (23)	13 H	Length of the device-related diagnostics
10 (24)	01 H	ID for diagnostic interrupt
	81 H	ID for status message
11 (25)	xx H	Slot number of the module triggering the interrupt. Errors on an AS-i line are always signaled over the binary module assigned to the corresponding AS-i line.
12 (26)	01 H	Diagnostics entering state
	02 H	Diagnostics exiting state

Bytes 13 to 27 (or 27 to 41) of the device-related diagnostic information contain error bits for errors on the AS-i line. A delta list (bytes 20 to 27 or 34 to 41) contains all the slaves that deviate from the configuration, in other words, missing, incorrect or existing but not configured AS-i slaves .

Byte	Bit	Value/meaning
13 (27)	0	1: Group error bit
	1	1: Internal error (for example EEPROM defective).
	2	1: External error (for example slave failed or APF).
	3	1: At least one slave differs from the expected configuration.
	4	1: Power on the AS-Interface missing (APF) or ground short.
	5 ..7	0

Byte	Value	Meaning
14 (28)	0 .. 3	Module class (C $_H$ = ID for the AS-i master)
	4	1: Channel information exists (bytes 20..27 (34..41) contain the list of missing, incorrect or excess slaves).
	5	0
	6	Diagnostic interrupt from substitute. Group error: At least one AS-i slave is signaling an I/O error. For more detailed information, you can use "Get_LPF" command (see Section 8.3.28).
	7	reserved

Byte	Bit	Value/meaning
15 (29)	0	1: At least one AS-i slave differs from the expected configuration.
	1	0: Normal status 1: Module has detected short to ground on the AS-i cable.
	2	0: Normal status 1: The DP/AS-i LINK is offline.
	3	1: Hardware error (internal watchdog)
	4..7	0

Byte	Bit	Value/meaning
16 (30)	0,1	0
	2	1: EEPROM defective
	4..7	0

Byte	Value	Meaning
17 (31)	60 $_H$	Fixed value
18 (32)	00$_H$	Fixed value
19 (33)	40 $_H$	Fixed value

Byte	Bit *)	Value/meaning *)
20 (34)	0..7	1: Error in AS-i slave 0.. 7
21 (35)	0..7	1: Error on AS-i slave 8..15
22 (36)	0..7	1: error in AS-i slave 16..23
23 (37)	0..7	1: error in AS-i slave 24..31
24 (38)	0..7	1: error in AS-i slave 0B.. 7B
25 (39)	0..7	1: error in AS-i slave 8B..15B
26 (40)	0..7	1: error in AS-i slave 16B..23B
27 (41)	0..7	1: error in AS-i slave 24B..31B

*) Bit 0 belongs to slave 0, bit 1 belongs to slave 1 etc.

Notes on the SIMATIC S7 System

- Bytes 13 to 27 (or 27 to 41) correspond to diagnostic data record 1 of SIMATIC S7.

- The diagnostic interrupt is not supported by some DP masters and is therefore automatically disabled by STEP 7. Instead, a status message is sent as device-related diagnostic information.
  You can recognize whether or not the diagnostic interrupt was disabled by STEP 7 in OB82 in the user program by checking the interrupt triggering module address:

  – OB82_MDL_ADDR = I/O address of an AS-i binary module –> diagnostic interrupt exists.

  – OB82_MDL_ADDR = Diagnostic address of the Link –> diagnostic interrupt does not exist. Instead, a status message is signaled.

- The complete diagnostic frame is obtained in OB82 for example by calling SFC13 "DPNRM_DG".

Based on the slot number (byte 11 or 25), you can recognize which AS-i line triggered diagnostics in the user program. If you configure with STEP 7, the following applies:

- AS-i line 1: diagnostics via slot number 1 or 4

- AS-i line 2: diagnostics vie slot number 2 or 5

For information on the slot number, refer to the introduction "This chapter...".

If you configure the DP/AS–i LINK using the GSD file, you can choose the slot number yourself.

❑

10 Dealing with Problems / Error Displays

This chapter...

This chapter contains information on the special modes of the IE/AS-i LINK and explains how to deal with errors.

10.1 Replacing a Defective AS-i Slave/Automatic Address Programming

Simple Replacement of AS-i Slaves

Using the automatic address programming function, you can replace failed AS-i slaves extremely simply.

Notice

Remember that "automatic address programming" is only possible in the following situations:

– The DP/AS-i LINK is in the protected mode

  and

– Only one AS–i slave has failed.

The sections below explain how to replace failed AS-i slaves using the automatic address programming function.

Detecting a Defective AS-i Slave

If the AUP LED is lit (only in the protected mode) this indicates the following:

* Exactly **one** slave has failed.

* Automatic address programming by the DP/AS–i LINK is possible.

You can identify the failed AS-i slave, for example in the display in "AS-i –> Lifelist".

You can now replace the defective AS-i slave as follows:

Replace the defective AS-i slave with an **identical** AS-i slave with address zero (default address).

The DP/AS-i LINK now programs this slave with the address of the original slave you are replacing.

The "AUP" and "CER" LEDs go off.

10.2   Error Displays/Remedying Errors

The following table lists the possible causes of problems during operation of the DP/AS−i LINK and possible remedies.

You will see the corresponding error messages on the display or via WBM.

Table 10-1

Error	Possible Cause	Remedy
BF LED lit (indicates an error on PROFIBUS)	Connection to the PROFIBUS master interrupted.	Check the attachment of the DP master and DP/AS−i LINK module to PROFIBUS.
	DP master in wrong mode.	Check/correct the mode on the DP master.
	Incorrect parameter assignment/ configuration by the PROFIBUS DP master. The PROFIBUS address configured on the DP master does not match the address of the DP/AS-i LINK .	Check/correct the configuration of the DP master.
APF LED lit	The power requirements of the AS-i slaves are too high or the power supply unit is inadequate for the power requirements. Result: The voltage on the AS-i cable is too low.	Check the power requirements of the AS-i slaves. If necessary, supply the AS-i slaves with an external voltage.
ON LED is not lit	The AS-i power supply unit is not connected or is defective.	Check the connection of the AS-i power supply unit and if necessary replace it.
	Short circuit on the AS-i cable.	Check the AS-i cable and the connected AS-i slaves.
SF lit	The DP/AS-i LINK signals diagnostic information to the DP master. Causes: Parameter assignment/ configuration error on PROFIBUS, configuration error on the AS-Interface (for example slave failed) or AS-i Power Fail.	Check the "CER", "APF" LEDs. Evaluate the bits in the slave diagnostic information to identify the error in greater detail.

Table 10-1   , (continued)

Error	Possible Cause	Remedy
CER LED is permanently lit.	The DP/AS-i LINK is not yet configured.	Configure the DP/AS-i LINK.
	A configured AS-i slave has failed (evaluate the slave display).	Replace the defective AS–i slave or reconfigure the DP/AS-i LINK if the AS–i slave is not required.
	An unconfigured slave was connected to the AS-i cable.	Remove the AS–i slave or reconfigure the DP/AS-i LINK.
	An AS-i slave was connected whose configuration data (I/O configuration, ID code) do not match the values of the configured AS-i slave.	Check whether the wrong slave has been connected. If necessary, reconfigure the DP/AS-i LINK.
	Short circuit on the AS-i cable.	Check the AS-i cable and the connected AS-i slaves.
The CER display flickers, in other words a configured slave is lost sporadically.	Bad contact	Check the electrical connections of the AS-i slaves.
	Interference on the AS-i cable.	Check the correct grounding of the DP/AS-i LINK and check the AS-i cable. Check that the shield of the AS-i power supply unit is connected correctly.
The DP/AS-i LINK does not switch from the configuration mode to the protected mode.	Cyclic data exchange with the DP master is active.	Interrupt the connection to the DP master (by unplugging the bus connector) or switch the DP master to STOP.
	An AS-i slave with address 0 is connected to the AS-i cable. The DP/AS-i LINK cannot switch to the protected mode as long as this slave exists.	Remove the AS-i slave with address 0.
When working with the display or WBM, the DP/AS-i LINK does not change from protected mode to configuration mode.	Cyclic data exchange with the DP master is active.	Interrupt the connection to the DP master (by unplugging the bus connector) or switch the DP master to STOP.

Table 10-1   , (continued)

Error	Possible Cause	Remedy
After failure of an AS-i slave, the "AUP" display remains off.	The DP/AS-i LINK is in configuration mode.	"Automatic Programming" is not possible in the configuration mode. Program the address of the new AS-i slave with the address programmer or using the command interface of the DP/AS–i LINK.
	More than one AS-i slave has failed.	Check the AS-i cable. If "APF" is displayed at the same time, check the power supply on the AS-i cable. If more than one slave is defective, program the address on the replaced slaves using the addressing unit.
	The DP/AS-i LINK has detected unconfigured AS–i slaves.	Remove the unconfigured AS-i slaves from the AS-i cable.
Automatic address programming does not work although the "AUP" LED was previously lit.	The configuration data (I/O configuration, ID code) of the replaced AS-i slave do not match the values of the original slave.	Check whether the correct "replacement slave" was used. Compare the information from the manufacturer about configuration data. If you want to replace the original slave with a different type, assign the address with the addressing unit and reconfigure the DP/AS-i LINK
	The replaced AS-i slave does not have the address "ZERO".	Set the address of the replaced slave with the addressing unit.
	The replaced AS-i slave is not correctly connected or is defective.	Check the connections of the slave and if necessary replace the slave.
The "CER" LED and the LEDs of active AS-i slaves flicker irregularly.	An extender is installed in the AS-Interface with "Line1" and "Line2" and the connections are reversed.	Correct the connections on the extender.

❏

A   AS−Interface Protocol Implementation Conformance Statement (PICS)

PICS for DP/AS−INTERFACE LINK Advanced

Table A-1

Vendor	SIEMENS AG
Product Name	DP/AS-INTERFACE LINK Advanced
Order number	6GK1 415−2BA10 single master
	6GK1 415−2BA20 double master
Firmware version	2
Master Profile	M4
Date	18.04.2006

List of Master Functions Available

This section describes whether and how the functions can be used during operation. Many of the functions are also available over the display or WBM.

Table A-2

No.	Function or Call on the Host Interface (symbolic representation)	M4	Comment / Function implemented by
1	Image, Status = Read_IDI()	X	By access to the I/O data of the DP/AS−INTERFACE LINK Advanced
2	Status = Write_ODI(Image)	X	By access by the DP master to the I/O data of the DP/AS−INTERFACE LINK Advanced
3	Status = Set_Permanent_Parameter(Addr, Param)	X	By the PROFIBUS parameter assignment or by command (see Section 8.3)
4	Param, Status = Get_Permanent_Parameter(Addr)	X	see Section 8.3
5	Status, Param = Write_Parameter(Addr, Param)	X	see Section 8.3
6	Status, Param = Read_Parameter(Addr)	X	see Section 8.3
7	Status = Store_Actual_Parameters()	X	see Section 8.3
8	Status = Set_Permanent_Configuration(Addr, Config)	X	see Section 8.3

Table A-2   , (continued)

No.	Function or Call on the Host Interface (symbolic representation)	M4	Comment / Function implemented by
9	Status, Config = Get_Permanent_Configuration(Addr)	X	see Section 8.3
10	Status = Store_Actual_Configuration()	X	By keyboard and display; also with a command (see Section 8.3)
11	Status, Config = Read_Actual_Configuration(Addr)	X	see Section 8.3
12	Status = Set_LPS(List31)	X	see Section 8.3
13	Status, List31 = Get_LPS()	X	see Section 8.3
14	Status, List31 = Get_LAS()	X	see Section 8.3
15	Status, List32 = Get_LDS()	X	see Section 8.3
16.0	Status = Get_Flags()	X	see Section 8.3
16.1	Status, Flag = Get_Flag_Config_OK()	X	see Section 8.3
16.2	Status, Flag = Get_Flag_LDS.0()	X	see Section 8.3
16.3	Status, Flag = Get_Flag_Auto_Address_Assign()	X	see Section 8.3
16.4	Status, Flag = Get_Flag_Auto_Prog_Available()	X	see Section 8.3
16.5	Status, Flag = Get_Flag_Configuration_Active()	X	see Section 8.3
16.6	Status, Flag = Get_Flag_Normal_Operation_Active()	X	see Section 8.3
16.7	Status, Flag = Get_Flag_APF()	X	see Section 8.3
16.8	Status, Flag = Get_Flag_Offline_Ready()	X	see Section 8.3
16.9	Status, Flag = Get_Flag_Periphery_OK()	X	see Section 8.3
17	Status = Set_Operation_Mode(Mode)	X	By keyboard and display; also with a command (see Section 8.3)
18	Status = Set_Offline_Mode(Mode)	X	see Section 8.3
19	Status = Activate_Data_Exchange(Mode)	–	optional command
20	Status = Change_Slave_Address(Addr1, Addr2)	X	see Section 8.3
21.1	Status = Set_Auto_Address_Enable	X	see Section 8.3
21.2	Status = Get_Auto_Address_Enable	X	see Section 8.3
22.1	Status, Resp = Cmd_Reset_ASI_Slave(Addr, RESET)	–	optional command
22.2	Status, Resp = Cmd_Read_IO_Configuration(Addr, CONF)	X	see Section 8.3

Table A-2   , (continued)

No.	Function or Call on the Host Interface (symbolic representation)	M4	Comment / Function implemented by
22.3	Status, Resp = Cmd_Read_Identification_Code(Addr, IDCOD)	X	see Section 8.3
22.4	Status, Resp = Cmd_Read_Status(Addr, STAT)	X	see Section 8.3
22.5	Status, Resp = Cmd_Read_Reset_Status(Addr, STATRES)	–	optional command
22.6	Status, Resp = Cmd_Read_Ext_ID-Code_1(Addr, IDCOD1)	X	see Section 8.3
22.7	Status, Resp = Cmd_Read_Ext_ID-Code_2(Addr, IDCOD2)	X	see Section 8.3
23	Status, S_List = Get_LPF()	X	see Section 8.3
24	Status = Write_Extended_ID-Code_11(S_Ext_ID-Code_1)	X	see Section 8.3
25	AImage, Status = Read_AIDI()	X	see Section 8.3
26	Status = Write_AODI(AImage)	X	see Section 8.3
27	String, Status = Read_ParamStr(S_Addr)	X	see Section 8.3
28	Status = Write_ParamStr(S_Addr, String)	X	see Section 8.3
29	String, Status = Read_DiagStr(S_Addr)	X	see Section 8.3
30	String, Status = Read_IdentStr(S_Addr)	X	see Section 8.3
Part B	**Supported Slave Profiles**		
1	Support of extended address mode	X	
2	Support of Combined transaction type 1 integrated (S-7.3 only)	X	
3	Full support of Combined transaction type 1 integrated	X	Only profiles 7.3/7.4 are supported.
4	Support of Combined transaction type 2 integrated	X	
5	Support of Combined transaction type 3 integrated	X	
6	Support of Combined transaction type 4 integrated	X	
7	Support of Combined transaction type 5 integrated	X	

Symbols in column 3 (M4)

Symbol	Meaning
X	Function exists
–	Function does not exist

How the AS-i cycle time depends on the number of connected slaves

The AS-i cycle time can be calculated using the following formula:

> If 5 or more AS-i slaves are activated:
>
> t_{cycl} = (1 + number of activated AS-i slaves) x 154 μs
>
> If less than 5 AS-i slaves are activated:
>
> t_{cycl} = (1 + number of activated AS-i slaves) x 654 μs

If two 2 AS-i slaves with extended addressing mode occupy the same address (for example, address 5A and address 5B), this slave pair is calculated as one 1 AS-i slave in the above formula. The reason for this is that slave pairs with the same address are addressed only in every second cycle. The cycle time in the formula above is therefore doubled for such slaves.

❑

B References

/**1**/   AS−Interface. Das Aktuator−Sensor−Interface für die Automation
AS−Interface. The Actuator−Sensor−Interface fo Automation

Werner Kriesel, O.W. Madelung, Carl Hanser Verlag München Wien 1999

/**2**/   AS-Interface Complete Specification

can be ordered from the AS−International Association e.V.
Address:

AS−International Association
Zum Taubengarten 52
D−63571 Gelnhausen
Germany

Tel.: +49 − 6051 − 473212
Fax.: +49 − 6051 − 473282

(The AS-i technology is promoted by the AS-Interface Association e. V.)

Internet address of the AS-International Association e.V.:

http://www.as-interface.net

/**3**/ /**4**/   SIMATIC NET Industrial Communication and Field Devices

Catalog IK PI

The catalog can be ordered from your local SIEMENS branch office or distributor.

/**5**/   SIMATIC NET
Industrial Communications Networks PROFIBUS Networks
Manual
Siemens AG

/**6**/   PROFIBUS standard EN 50170

Order numbers

The order numbers of the SIEMENS documentation listed above can be found in the catalogs "SIMATIC NET Industrial Communication, Catalog IK10" and "SIMATIC Programmable Controllers SIMATIC S7 / M7 / C7 − Components for Integrated Automation, Catalog ST70".

You can order these catalogs and obtain additional information from your local SIEMENS branch or distributor.

C Notes on the CE Mark

Product Name:

DP/AS−INTERFACE LINK Advanced (single master)

Order no.: 6GK1415−2BA10

DP/AS−INTERFACE LINK Advanced (double master)

Order no.: 6GK1415−2BA20

EC Directive EMC 2004/108/EC

The product listed above meets the requirements of the EC directive 2004/108/EC "Electromagnetic Compatibility".

The EC Declaration of Conformity is available for the responsible authorities according to the above−mentioned EC Directive at the following address:

Siemens Aktiengesellschaft
Industry Automation
Industrielle Kommunikation (A&D SC IC)
Postfach 4848
D−90327 Nürnberg, Germany

Area of Application

The product meets the following requirements:

Area of Application	Requirements	
	Emission	Immunity
Industrial operation	EN 61000−6−4 : 2007	EN 61000−6−2 : 2005

If the product is used in a domestic area, it may interfere with other devices.

Installation Instructions

The product meets the requirements providing you adhere to the instructions for installation and operation as described in this documentation:

Notes for the Manufacturers of Machines

The product is not a machine in the sense of the EC Machinery Directive. There is therefore no declaration of conformity for this product relating to the EC Machinery Directive 98/37/EC.

If the product is integrated as part of a machine, it must be included in the declaration of conformity of the manufacturer.

D Glossary

D.1   Terms Relating to AS-Interface

APF

AS−i Power Fail Flag or LED display that indicates that the power supply on the AS−i cable is too low or has failed (for example failure of the AS−i power supply unit).

AS-i (AS-Interface)

Actuator−sensor interface. A network system for the lowest field area of the automation range. It is suitable for networking sensors and actuators with control devices. (previously: SINEC S1)

AS-i A/B slave

AS-i A/B slaves use the extended addressing mode. Pairs of A/B slaves can be assigned to one address on the AS-Interface; by organizing addresses in this way, up to 62 AS-i A/B slaves can be attached to the AS-Interface.

AS-i analog slave

AS-i analog slaves are special AS-i slaves that exchange analog values with the AS−i master.

AS−i master

The AS−i master is used to monitor and control the simplest binary actuators and sensors via AS−i modules or AS−i slaves.
A distinction is made between a standard AS−i master and the extended AS−i master.

AS–i module

For the AS-Interface, a module concept has been defined that allows the block-like linking of AS–i slaves – sensors and actuators – via AS–i modules. The following types of module exist:
The **active** AS–i module with integrated AS–i chip: Using this, up to four conventional sensors and four conventional actuators can be connected.
The **passive** AS–i module: this functions as a distributor and provides a connection for up to four sensors and actuators with an integrated AS–i chip.
In keeping with the concept of the standard AS–i master and the extended AS–i master either AS–i chips with standard functions or with extended functions are used in the AS–i slaves.

AS–i slave

All the nodes that can be addressed by an AS–i master are known as AS–i slaves.
AS–i slaves are distinguished by their design (AS–i modules and sensors or actuators with an integrated AS–i attachment) and their address range (AS-i standard slaves and AS-i A/B slaves with the extended addressing mode).

AS-i standard slave

An AS-i standard slave always occupies one address on the AS-Interface; with this address organization, up to 31 AS-i standard slaves can be attached to the AS-Interface.

Combined Transaction Type (CTT)

Communication protocols on AS–Interface according to the Specification V3.0 for the transfer of larger amounts of data (analog values, strings, etc.).

Extended AS–i master

An extended AS–i master (M4) supports 31 addresses for standard AS–i slaves or AS–i slaves with the extended addressing mode. This increases the number of addressable AS–i slaves to a maximum of 62.
The extended AS–i masters from SIMATIC NET support the integrated transfer of AS–Interface analog slaves operating according to the profile 7.3, 7.4, 7.5.5, 7.A.5, B.A.5, 7.A.A, 7.A.8, 7.A.9 or 6.0 (Combined Transaction Types CTT 1–5 according to AS–i Specification V3.0).

LAS

List of activated slaves.

LDS

List of detected slaves.

LPS

> List of permanent slaves.

Nibble

> A nibble is a unit of information consisting of four bits.

Protected mode

> In protected mode, the DP/AS–i LINK exchanges data only with the configured AS–i slaves. "Configured" means that the slave addresses stored on the DP/AS–i LINK and the configuration data match the values of the existing AS–i slaves.

Standard AS–i master

> Up to 31 standard AS–i slaves or slaves with the extended addressing mode (A slaves only) can be connected to a standard AS–i master.

D.2 Terms Relating to PROFIBUS

Bus parameter

Bus parameters control the way in which data is transmitted on the bus. Each –> station on –> PROFIBUS must use bus parameters that match the bus parameters of the other stations.

CLEAR mode

Mode of the DP master. Inputs are read cyclically, outputs remain set to 0.

CP

Communications processor: Module for communications tasks for installation in computers or programmable logic controllers.

Device database

Device databases (GSD) contain the DP slave descriptions according to EN 50170, Vol 2. The use of GSD files makes it easier to configure the –> DP master and the –> DP slaves.

Distributed peripheral I/Os (DP)

Input and output modules used in a distributed configuration by the CPU (central processing unit of the controller). The programmable logic controller and the distributed I/Os are connected via the –> PROFIBUS bus system. For the programmable logic controllers, there is no difference between these I/Os and local process inputs or process outputs.

DP master

Active node on –> PROFIBUS that exchanges data with the DP slaves of a DP master system when it has the token..

DP master system

A –> DP master and all the –> DP slaves with which this DP master exchanges data.

DP mode

In communication between the DP master and the DP slaves, a distinction is made between the following four modes:
– OFFLINE
– STOP
– CLEAR
– RUN
Each of these modes is characterized by defined actions between the DP master and DP slave.

DP slave

A –> station with slave functions in –> PROFIBUS DP.

Firmware

Firmware; here, the software running on the device.

FREEZE mode

The FREEZE mode is a DP mode in which process data can be acquired from one, or several (group) or from all DP slaves at the same time. The point at which the data is acquired is indicated by the FREEZE command (this is a control frame for synchronization).

Maximum station delay

A –> bus parameter for –> PROFIBUS. The Maximum Station Delay (max. TSDR) specifies the longest time required by one of the –> stations in a –> subnet between receiving the last bit of an unacknowledged –> frame to sending the first bit of the next frame. A sender must wait until the max. TSDR has elapsed after sending an unacknowledged frame before it can send a further frame.

Minimum stationdDelay

A –> bus parameter for –> PROFIBUS. The Minimum Station Delay (min. TSDR) specifies the minimum time that the receiver of a –> frame must wait before sending the confirmation or sending a further frame. The min. TSDR is based on the longest time required by a station in the sub system to receive a confirmation after sending the frame.

MPI

The multipoint interface (MPI) is the PG interface of SIMATIC S7.

PROFIBUS

A field bus complying with EN 50170, Vol. 2. Previously known as SINEC L2.

PROFIBUS address

The PROFIBUS address is a unique identifier of a –> station connected to –> PROFIBUS. The PROFIBUS address is transferred in the –> frame to address a station.

PROFIBUS DP

DP mode complying with EN 50170, Vol 2.

SIMATIC NET

Siemens SIMATIC Network and Communication. Product name for –> networks and network components from Siemens (previously SINEC).

SIMATIC NET PROFIBUS

SIMATIC NET bus system for industrial application based on PROFIBUS. (previously SINEC L2).

SINEC

Previous product name for networks and network components from Siemens. New name: SIMATIC NET.

SYNC mode

The SYNC mode is a DP mode in which one, more than one (group) or all –> DP slaves transfer data to their process outputs at the same time. The time at which the data is transferred is signaled by the SYNC command (a control frame for synchronization).

Target rotation time

A –> bus parameter for –> PROFIBUS. The token gives a –> station on PROFIBUS the right to transmit frames. A station compares the token rotation time it has measured with the target rotation time. The difference between the two times decides whether only high or also low priority frames can be sent.

TIA

Based on the individual customer requirements, Totally Integrated Automation (TIA) allows branch–specific automation solutions to be implemented that greatly increase productivity while ensuring that investment remains secure.

Token bus

Network access technique for bus access rights with more than one active station (used in PROFIBUS). The token is passed on from active station to active station. Between each active station receiving and passing on the token there is one complete token circuit.

UNFREEZE

Job for resetting the −> FREEZE mode.

UNSYNC

Job for resetting the −> SYNC mode.

❑